## 4.5 Maritime Transport Sector Planning Issues

### 4.5.1 Overview

In Cuba, there are 29 ports registered under the Estudio Nacional de Ordenamiento Territorial (ENOT), and 23 are currently in operation. There are 114 port facilities, of which 66 (58%) are operated by the enterprises comprising OSDE GEMAR, while the remaining 48 are operated by enterprises forming other business groups.


Source: JICA Study Team

**Figure 4.5.1 Major ports in Cuba**

23 port facilities are operated by enterprises comprising OSDE Cuban Petroleum Corporation (CUPET) attended by the Ministry of Energy and Mining (MINEM), for handling crude oil and petroleum products and 11 facilities are operated by enterprises attended by the Food Ministry (MINAL) for handling grains. Besides, enterprises attended by some other OACEs are involved in port facility management as shown in Table 4.5.1.

**Table 4.5.1 Cuban Ports by OACEs**

| OACE | Port facilities | Remarks |
|---|---|---|
| MITRANS | 66 | GEMAR |
| MINEM | 23 | CUPET oil terminals |
| MINAL | 11 | Grain berths |
| MINFAR | 8 | Container in Mariel, AUSA. |
| MICONS | 3 | |
| MINAG | 2 | |
| MINDUS | 1 | |
| TOTAL | 114 | |

Source: A hearing survey by the JICA study team

Concerning maintenance and management of port facilities in other ports (other than port Mariel), many port facilities are deteriorated and not usable due to a shortage of funds for renewal, spare parts for maintenance, etc. Besides, some valuable port infrastructures, although located in strategic positions, have been left unused for many years due to their aging and unsafety. Therefore, it should be pointed out that a national port development master plan is needed to inform the priority of port renovation under limited funds.

### 4.5.2 Present conditions of port and facilities

#### (1) Port categories

Ports in Cuba are categorized into three groups: 1st Category Port, 2nd Category Port, and Local Port. Each category is defined and described under the Port Law as follows.

a) 1st Category Port
- Executing international trade and undertaking essential for the national economy
- Contributing industries and undertakes vital for the national economy
- Activities are based on the critical needs of the national economy
- Holding geographical advantages for maritime traffic and evacuation for rough climate conditions

b) 2nd Category Port
- Holding international periodical trade and mainly dedicated to cabotage trade which plays essential roles in the national economy

c) Local Port
- Contributing provincial and municipal activities, such as ship anchorage, loading & unloading, and passenger transportation, including river ports

The 1st Category Ports and 2nd Category Ports are shown in Table 4.5.2, where it is noted that not all of the national ports are managed by enterprises under the MITRANS sector.

**Table 4.5.2 Ports by category**

| Category | Port Name |
|---|---|
| 1st (8 ports) | Habana*, Cienfuegos*, Santiago de Cuba*, Matanzas*, Nuevitas*, Batabanó-Nueva Gerona*, Mariel and Moa |
| 2nd (12 ports) | Carupano*, Vita*, Antilla*, Baracoa*, Boqueron*, Manzanillo*, Guayabal*, Palo Alto*, Casilda*, Santa Lucía, Cardenas* and Casasa* |

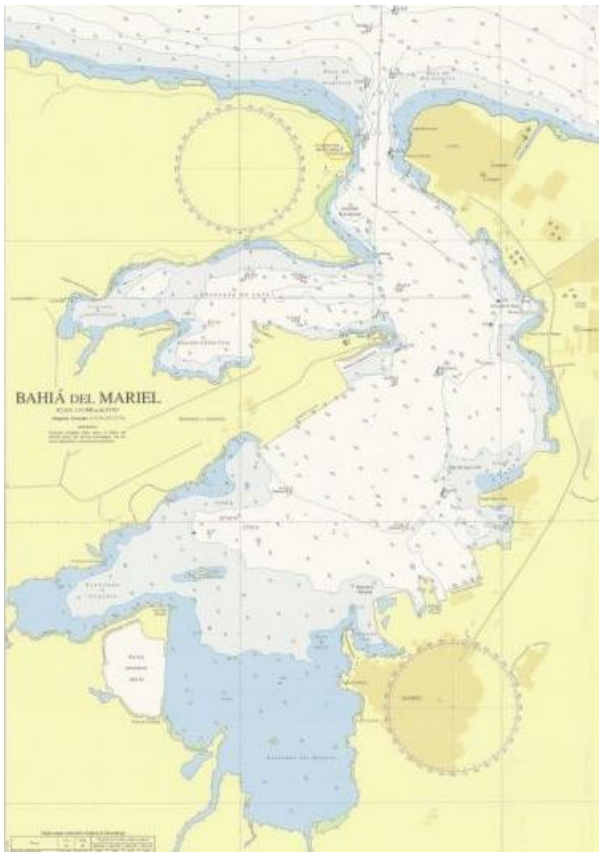
Note: * marked ports are managed by enterprises comprising OSDE GEMAR
Source: GEMAR

#### (2) Mariel

This port has a territorial maritime administration, which has four members for supervising and controlling activities in that port.

Mariel Port Container Terminal, located about 50 km west of Havana, opened in 2014. It is a modern container terminal port functioning as one of Cuba's most important national gateway ports.

PSA Singapore manages the container terminal under a management contract with AUSA. This terminal is a major part of the Mariel Special Development Zone project, and all container ships that were previously calling at Havana Port have been transferred to Mariel Port. Accordingly, the container terminal of Havana Port was closed upon the opening of this Mariel container terminal.




Source: JICA Study Team

**Figure 4.5.2 Mariel port**

The port has a wharf of 702 m in length and accommodates a maximum vessel draft of 11.5 m, which is equipped with 4 QGCs (Quay Gantry Crane). A future development plan includes an expansion of the berth to 2,400 m in length with a basin depth of -17 m. The container yard has an area of 27,000m$^2$ and is equipped with 12 Rubber Tired Gantry cranes (RTG) and 2 Rail Mounted Gantry cranes (RMG).

The port management states that the current terminal capacity is 800,000 TEU/year, while the current throughput is approximately 250,000 TEU/year (at almost 30~35% capacity).


| Name | Facilities | | | | Remarks |
|---|---|---|---|---|---|
| Mariel ContainerTerminal | Quay length | 702 | m | | Container |
| | Max draft | 11.5 | m | | |
| | Shore Crane | 4 x STS (ZPMC) | | | |
| General Cargo Berth | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | General Cargo |
| | No.8 | 180 | 8.80 | 30,000 | |
| | No.9 | 202 | 8.80 | 26,000 | |
| Osvaldo Padrón Pier | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | General Cargo |
| | No. 5 | 100 | 6.70 | 10,000 | |
| | No. 6 | not in use | | | |
| | No. 7 | not in use | | | |
| Rene Arcay Pier | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | Cement |
| | North side | 170 | 7.60 | 35,000 | |
| | South side | 170 | 8.20 | 35,000 | |
| Andres González Lines Berth | Max ship length | 170 | m | | General Cargo |
| | Max ship draft | 7.40 | m | | |
| | Max ship size | 20,000 | tons | | |
| Sugar Terminal | Max ship length | 203 | m | | Bulk raw sugar Not in use |
| | Max ship draft | 9.45 | m | | |
| | Max ship size | 30,000 | tons | | |

Source: hearing by JICA Study Team

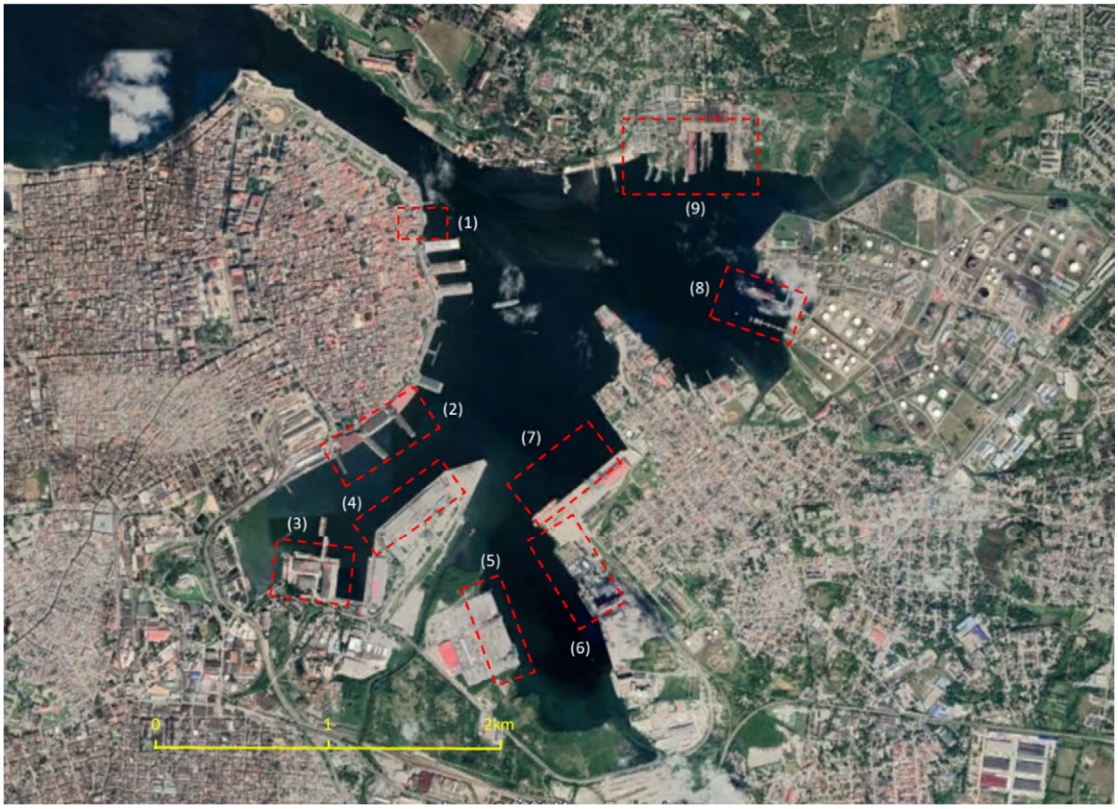
**Figure 4.5.3 Mariel port facilities**

Source: JICA Study Team

**Figure 4.5.4 Mariel port container terminal**

### (3) Havana

Havana Port has been performing as the national gateway port of Cuba for a long time. Havana has attractive historical tourism resources; UNESCO designated its old city and colonial castles, fortresses, and squares in 1982 as World Heritage Sites. The Cuban government plans to develop the city as the country's principal tourism and leisure center, while cargo facilities will be moved from Havana to Mariel. As an initial stage, the container terminal facility was closed upon the opening of the Mariel terminal. Currently, the cruise ship terminal, bulk and breakbulk terminals,, reefer cargo terminal, Ro/Ro berth, and Oil/Liquid terminals are still in operation.



| Name | Facilities | | | | Remarks |
|---|---|---|---|---|---|
| 1. Terminal Sierra Maestra | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | Large cruise ship |
| | Pier 1 North | 275 | 6.9-10.2 | 79,000 | |
| | Pier 1 South | 170 | 8.3 | 25,000 | |
| | Pier 2 | Not in use | | | |
| | Pier 3 | Not in use | | | |
| 2. Aracelio Iglesias and Juan Manuel Diaz Terminals | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | General Cargo Small boats |
| | Pier 1 North | 170 | 7.6-9.2 | 15,000 | |
| | Pier 1 South | 170 | 8.5 | 20,000 | |
| | Wharf No. 2 | 100 | 5.4 | 15,000 | |
| | Wharf No. 3 | 165 | 6.4 | 20,000 | |
| 2. Osvaldo Sanchez Wharf | Zone No. | LOA (m) | Draft (m) | Max Ship Size (tons) | Small boats |
| | Zone 1 | 90 | 2.5 | 8,000 | |
| | Zone 2 | | | | |
| | Zone 3 | 170 | 2.5-3.6 | 8,000 | |
| 3. Havana Fishing Port | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | |
| | 1 | 220 | 8.0 | 15,000 | Sea products Frozen cargo Under Ministerio de la Industria Alimentaria (MINAL) |
| | 1-A | not in use | | | |
| | 2 | 136 | 8.2 | 20,000 | |
| | 3 (TERREF) | 160 | 8.4 | 18,000 | |
| | 3-A (Asticar) | 108 | 6.1 | 15,000 | Shipyard |
| | 4 (Asticar) | 240 | 5.7 | 15,000 | |
| | 5 (Asticar) | 115 | 4.0 | 15,000 | |
| | 6 (Flogolfo) | 50 | 1.7 | 1,000 | Sea products |
| 4. Haiphong Terminal | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | General Cargo |
| | 1 | 160 | 10.0 | 30,000 | |
| | 2 | 160 | 7.0 | 26,000 | |
| | 3 | 160 | 8.4 | 26,000 | |
| | 4 (Ro-Ro) | 211 | 9.4 | 25,000 | |
| | 5 (not in use) | 186 | 8.1 | 15,000 | |
| | 5-A (not in use) | 100 | 6.5 | 10,000 | |
| 5. Havana Container Terminal | Max ship length | 250 m | | | The operation has been terminated. |
| | Max ship draft | 9.9 m | | | |
| | Max ship size | 56,000 tons | | | |
| 6. Jose Antonio Echeverria Wharf | Max ship length | 250 m | | | Bulk cargo |
| | Max ship draft | 9.9 m | | | |
| | Max ship size | 56,000 tons | | | |
| 6. Terminal Porto Dapena | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | General cargo, vehicles, heavy equipment |
| | 16 (Ro-Ro) | 165 | 8.8 | 26,000 | |
| | 17 | 165 | 8.8 | 30,000 | |
| 6. Turcios Lima Wharf | Max ship length | 200 m | | | Bulk cargo |
| | Max ship draft | 9.4 m | | | |
| | Max ship size | 37,000 tons | | | |
| | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | General Cargo |

| Name | Facilities | | | | Remarks |
|---|---|---|---|---|---|
| 7. Andrés González Lines Terminal | 21 | 180 | 10.4 | 50,000 | |
| | 22 | 190 | 10.2 | 50,000 | |
| | 23 | 190 | 10.3 | 50,000 | |
| 8. Ñico Lopez Oil Terminal | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | Oil fuel products Unión Cuba Petroleo (Cupet) |
| | South Pier | 250 | 11.0 | 66,000 | |
| | North Pier | 186 | 10.4 | 46,400 | |
| | No.3 | 95 | 3.7 | | |
| 9. Shipyard berths | | | | | For repairing |

Source: JICA Study Team

**Figure 4.5.5 Havana port facilities**

- Sierra Maestra Terminal (Cruise ship terminal)

  There are 3 piers for receiving cruise ships. The north pier has already been renovated and used as the cruise ship terminal. The middle and south piers are still under renovation. The center pier will include restaurants and shops for tourists, and the south pier will be renovated as a new cruise ship terminal.

**North pier**

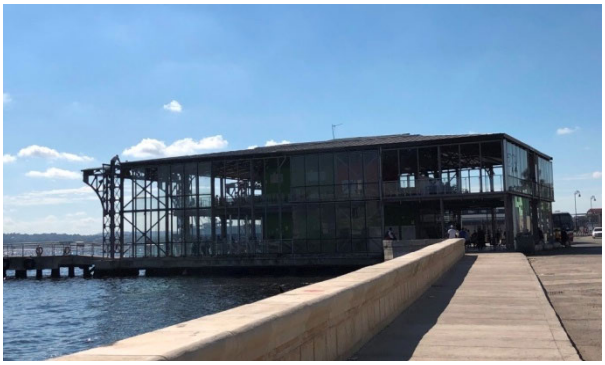
**Center pier (under renovation)**

Source: JICA Study Team

**Figure 4.5.6 Sierra Maestra terminal (Cruise ship terminal)**

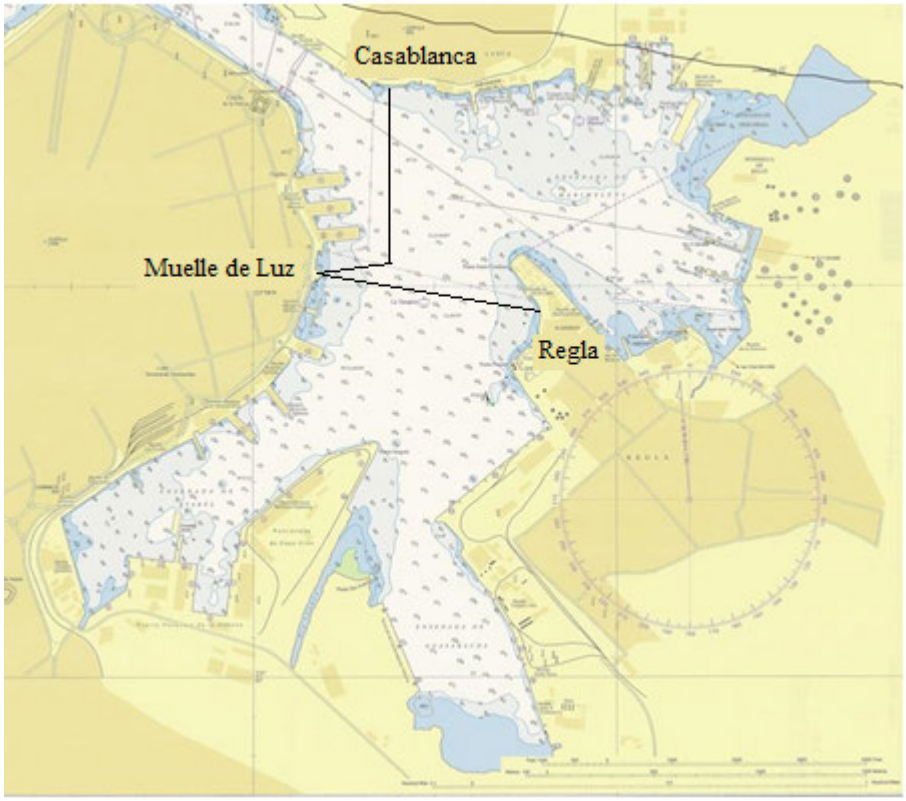
- Passenger Terminals

  There are 3 small piers as passenger terminals in Habana Bay, that are used for passenger services, connecting the 3 following terminals: Regla, Casablanca, and Muelle de Luz. This latter was repaired and renovated, and a terminal building was constructed as well, located on the south of Sierra Maestra Terminal.



**Renovated passenger terminal (Muelle de Luz)**

**Passenger boat**




Source: JICA Study Team

**Figure 4.5.7 Passenger terminals**

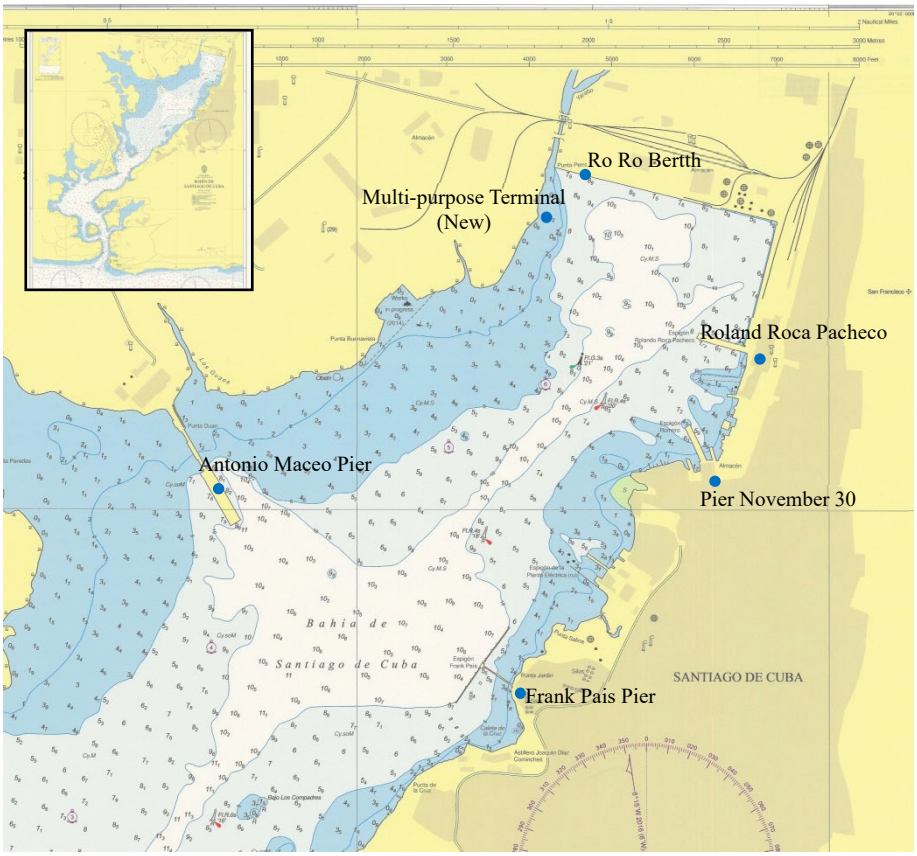
- Haiphong Terminal
  Haiphong Terminal is the main cargo terminal in Havana Bay, with 5 berths (880m in total length). These terminals handle general cargo and bulk (bagged alongside the vessel) cargo. The berths are equipped with 3 quay cranes, but the ships' gear handles most cargo.
- Bulk Terminals (Muelle Turcios Lima and Muelle José A. Echeverria)
  Muelle Turcios Lima and Muelle Jose Echeverria handle bulk cargo (wheat).
- Manuel Porto Dapena Terminal
  Manuael Porto Dapena terminal is used for steel material and Ro-ro operations.

- Andrés González Lines Terminal
  Andrés González Lines Terminal´s berth length is 600 m in total, accommodating about 50,000 DWT ships used for general cargo, metals, and bulk cargo (according to import contracts, it is bagged alongside the vessel).

### (4) Santiago de Cuba

The Santiago de Cuba Port is the main international gateway port in the country's eastern region. The annual cargo volume handled at this port is approximately 1 million tons, including about 50,000 TEUs.

A new multi-purpose terminal has been constructed using China's financial support of 120 million USD and 5 million USD from Cuba. The new terminal has 232 m of berth length with a 10.8 m depth and is equipped with 3 quay cranes. Besides, it has 2 warehouses with a 10,000-ton storage capacity. The terminal (Phase 1) opened in March 2019, followed by Phase 2 development, including the redevelopment of the Ro-Ro berth and terminal to increase port capacity.



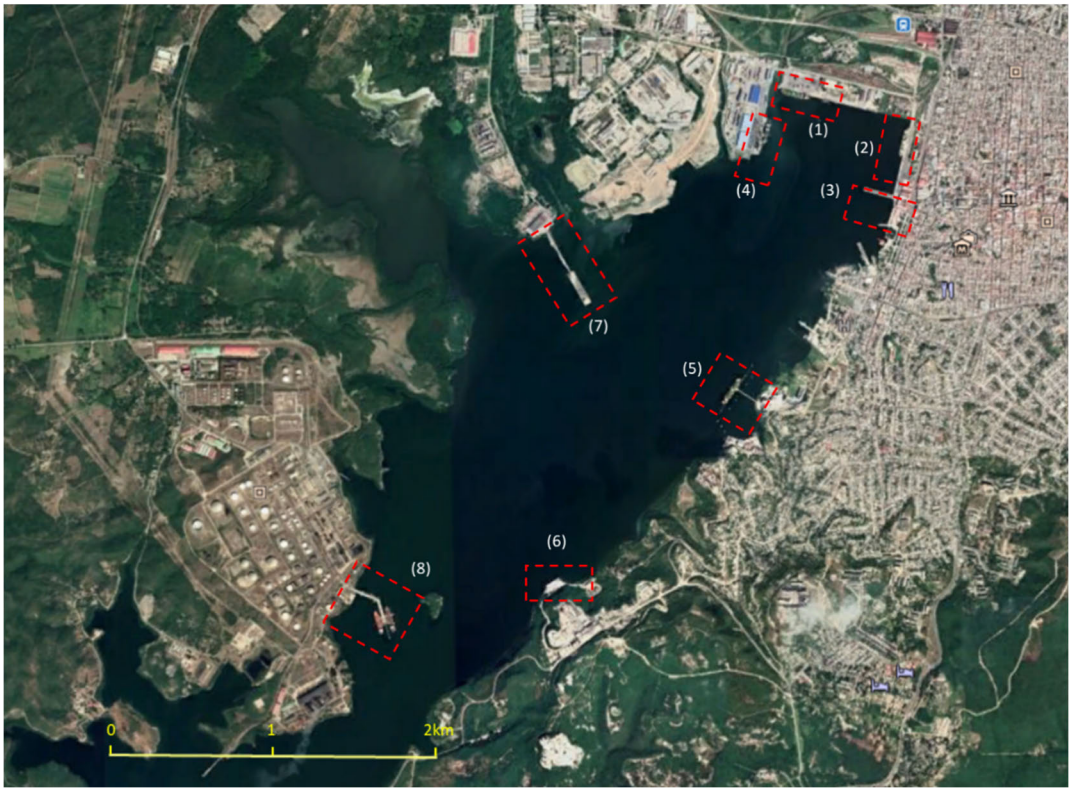

Source: JICA Study Team

**Figure 4.5.8 Santiago de Cuba port**

The mouth of the bay is narrow and shallow. Maintenance dredgings have been carried out in approximately 10-year intervals. The channel of the bay mouth needs to be widened/deepened if desired to accommodate larger vessels.

There is a river mouth between the new multi-purpose berth and the Ro-Ro berth, where continuous maintenance (dredging) will be required to maintain the depth of the berth. Concerning this

sedimentation issue, a river bypass for discharging sediment is designed and constructed in Phase 1. Therefore, it is important to carefully monitor the movement of the basin depth during the operation of the new terminal.

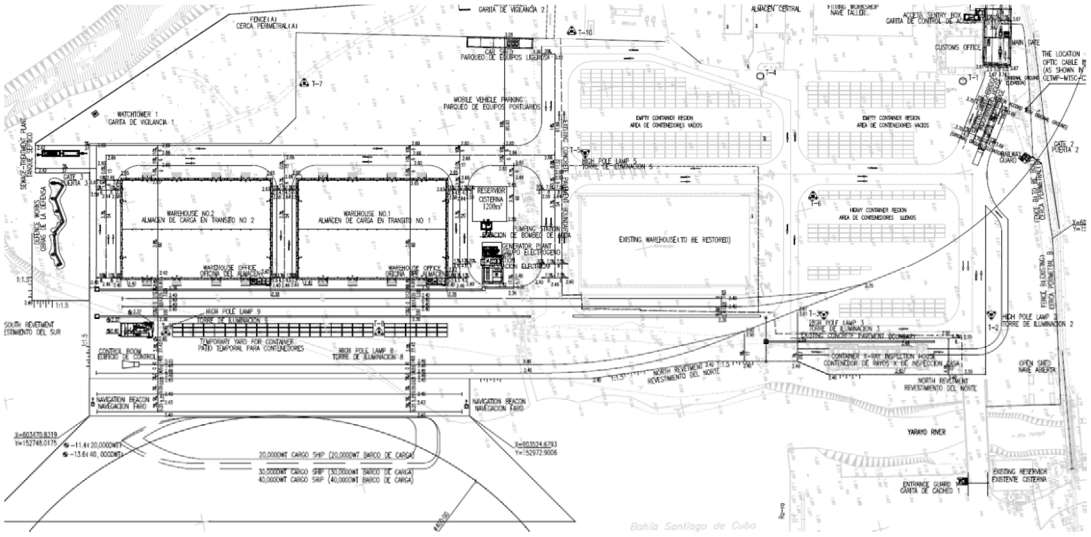



| Name | Facilities | | | | Remarks |
|---|---|---|---|---|---|
| 1. Ro-Ro Berth | Max ship length | 186 m | | | Container |
| | Max ship draft | 8.0 m | | | |
| | Max ship size | 30,000 tons | | | |
| 1. Luis Felipe Mena Gil Wharf (Malecon) | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | General cargo |
| | West Berth | Not in use | | | |
| | East Berth | 135 | 6.4-8.0 | 7,500 | |
| | Terminal 620 | 186 | 6.3-7.9 | 40,000 | |
| 2. Roland Roca Pacheo Pier | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | General Cargo and Bulk Cargo |
| | North | 110 | 6.1 | 6,000 | |
| | South | 200 | 7.0-8.0 | 53,000 | |
| 3. Pier November 30 | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | Cruise ship |
| | 3 | 163 | 8.7-8.9 | 30,000 | |
| | 4 | 163 | 7.8-8.6 | 30,000 | |
| 4. Multi-purpose Terminal | Berth length | 231 m | | | Supported by China Bulk grain products |
| | Ship size | 40,000 tons | | | |
| | Port Crane | 2 x 20T and 1 x 50T | | | |
| 5. Frank Pais Wharf | Max ship length | 186 m | | | Bulk terminal |
| | Max ship draft | 8.0 m | | | |
| | Max ship size | 30,000 tons | | | |

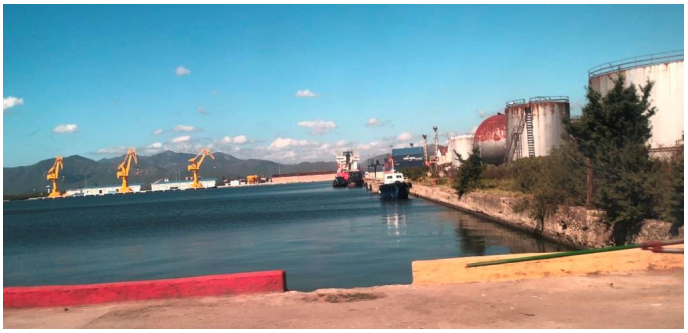
| Name | Facilities | | | | Remarks |
|---|---|---|---|---|---|
| 6. Cement Plant Pier | Max ship length | 186 m | | | Cement terminal |
| | Max ship draft | 8.0 m | | | |
| | Max ship size | 30,000 tons | | | |
| 7. Antonio Maceo Pier | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | Frozen products, Port Crane x 2 |
| | South-East | 170 | 9.21 | 12,000 | |
| | North-East | 170 | 9.57 | 12,000 | |
| 8. Refinery Pier | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | Oil fuel, Petroproducts Under CUPET |
| | South-East | 186 | 10.9 | 52,000 | |
| | North-East | 214 | 11.0 | 52,000 | |

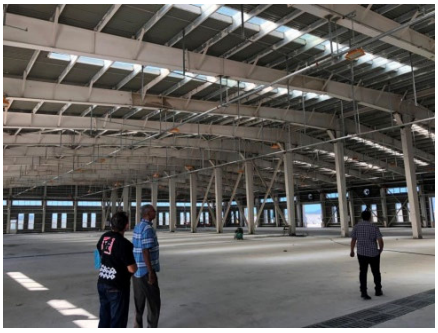
Source: JICA Study Team

**Figure 4.5.9 Santiago de Cuba port facilities**



Source: Santiago de Cuba Port





Source: JICA Study Team

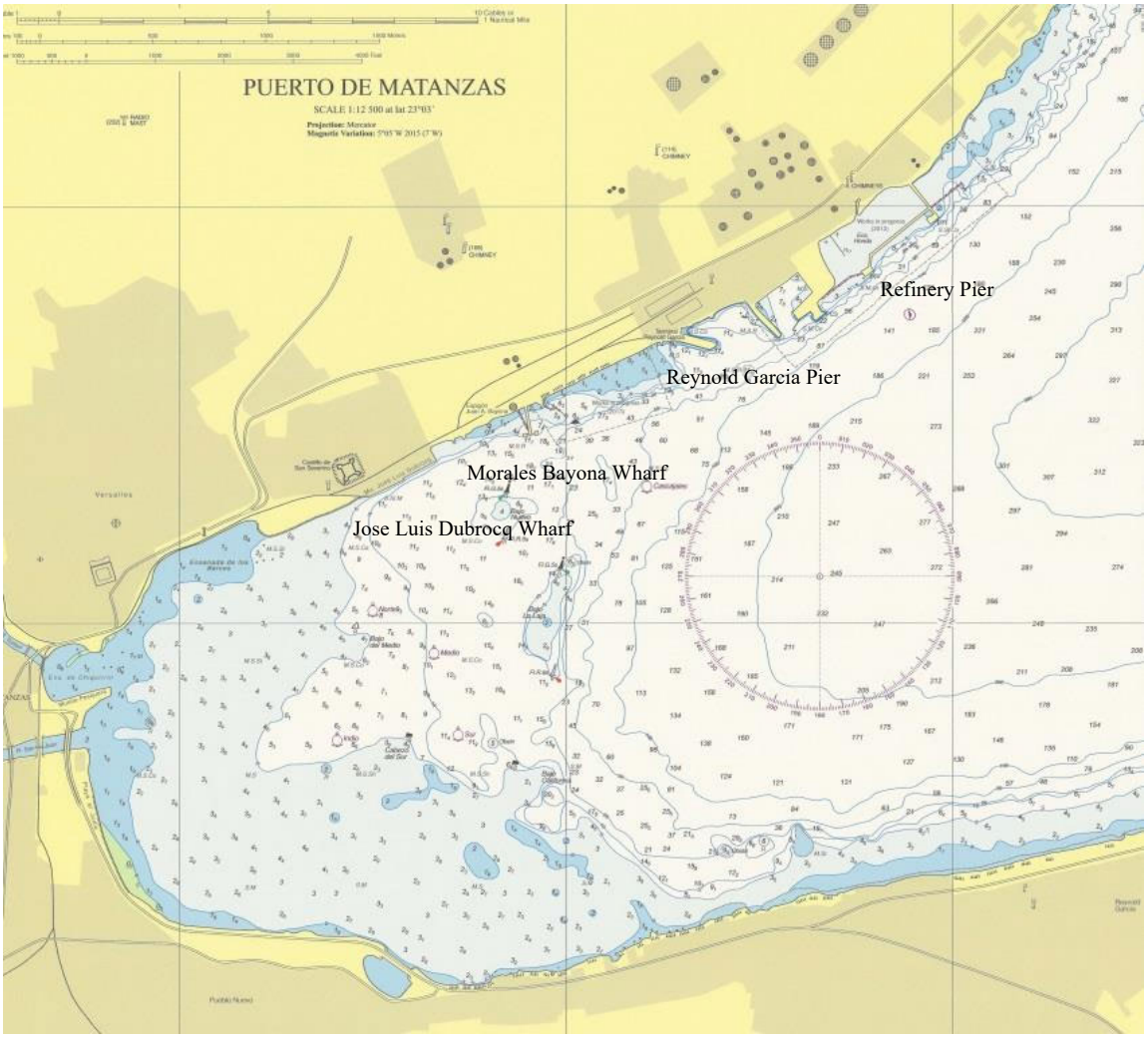
**Figure 4.5.10 New multi-purpose terminal, Santiago de Cuba port**

### (5) Matanzas

Taking advantage of its water depth, the primary function of the Matanzas port is to receive crude oil imported by large tankers. The crude oil receiving terminal is operated by enterprises comprising OSDE Cupet (Unión Cuba-Petróleo) jointly with UFC. UFC is in charge of the transportation to different territories, while retail distribution is carried out by entities in the Cupet - Cimex and Oro Negro fuel stations, owned by enterprises constituting GAE.

Facilities other than oil berths are under the jurisdiction of GEMAR, including bulk fertilizer and bulk sugar quay facilities. Jose Luis Dubrocq wharf is used to import fertilizer and cabotage shipment of sulfur. Reynold Garcia Pier is used for exporting bulk sugar. Morales Bayona Pier and Refinery Pier are managed by enterprises integrating Cupet.

UEB Port of Matanzas also manages the Cardenas port, which is located close to Varadero; however, this is not currently used. Now, UEB Port of Matanzas is working on a redevelopment project of the Cardenas port to receive foodstuff for the hotels in Varadero.



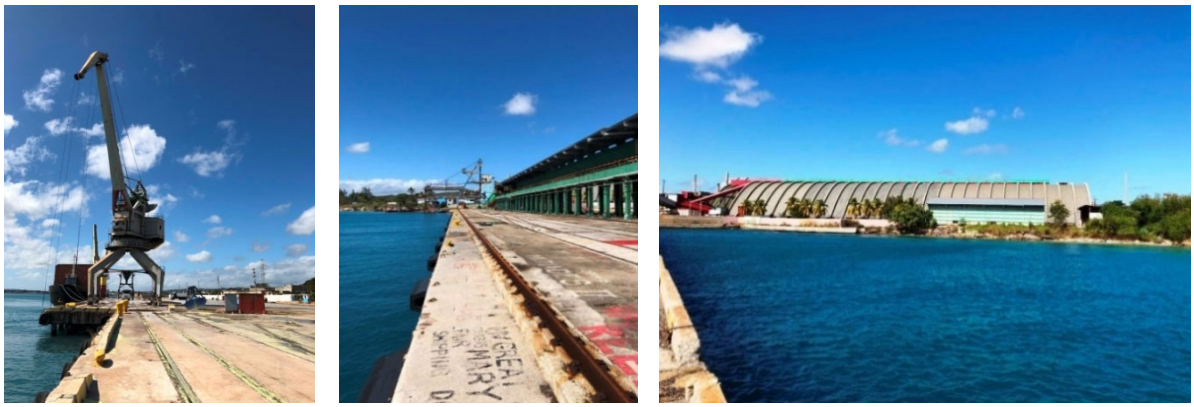

Source: JICA Study Team

**Figure 4.5.11 Matanzas port**


| Name | Facilities | | | | Remarks |
|---|---|---|---|---|---|
| 1. Jose Luis Dubrocq Wharf | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | General Cargo Fertilizer |
| | 1 | 180 | 9.8-10.1 | 25,000 | |
| | 2 | 152 | 9.6 | 25,000 | |
| 2. Morales Bayona Wharf | Max ship length | 220 | m | | Molasses LPG |
| | Max ship draft | 10.6 | m | | |
| | Max ship size | 60,000 | tons | | |
| 3. Reynold Garcia Pier | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | Bulk raw sugar |
| | North | 100 | 8.0 | 1,000 | |
| | South | 212 | 11.7 | 40,000 | |
| 4. Refinery Pier | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | Crude oil CUPET sector |
| | 1 | 295 | 18.2 | 130,000 | |
| | 2 | 241 | 13.8 | 80,000 | |
| | 3 | 207 | 12.9 | 57,000 | |

Source: JICA Study Team

**Figure 4.5.12 Matanzas port facilities**



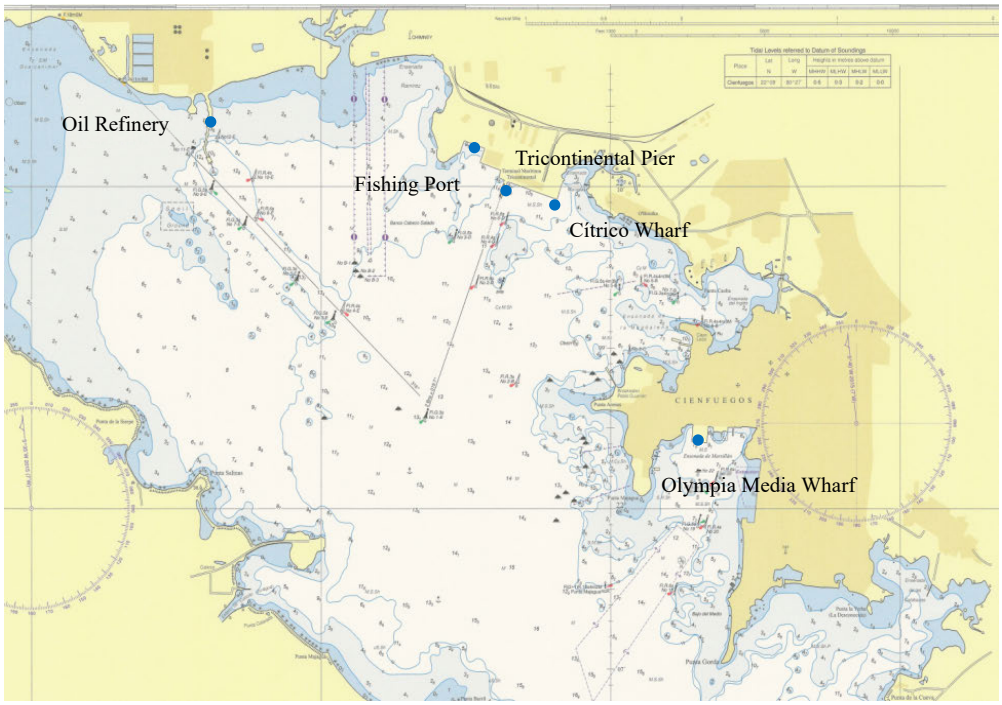
**Jose Luis Dubrocq** **Reynold Garcia** **Warehouse of sugar**

Source: JICA Study Team

**Figure 4.5.13 Matanzas port (wharves and warehouse)**

### (6) Cienfuegos

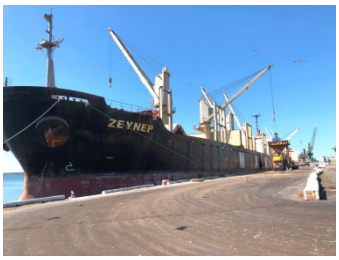
In the Cienfuegos Port, la Empresa de Servicios Portuarios del Centro (comprising OSDE GEMAR) manages the Olympia Medina Wharf, Cítrico Wharf, and Tricontinental Pier. Olympia Medina Wharf is used as a cruise ship terminal. The waterfront near this wharf was redeveloped for tourism, and a modern promenade along a major street is there. Cítricos Wharf is a dedicated general cargo terminal for importing bulk and cabotage shipments. Tricontinental Pier is used primarily for bulk sugar exporting and importing bulk grain.




Source: JICA Study Team

**Figure 4.5.14 Cienfuegos port**

**Olympia Medina wharf**




**Cítrico wharf**

**Tricontinental pier**

Source: JICA Study Team

**Figure 4.5.15 Cienfuegos port (wharf and pier)**

The city of Cienfuegos had been developed as a center of industry with the financial support of the former Soviet Union during the 1960s to 1980s. However, continued development could not be made upon the USSR's collapse. Olympia Medina wharf was built in the 1950s and is deteriorating. Recently, Cimab conducted an investigation and developed a plan to repair and maintain Cítricos Wharf and Tricontinental Pier, built in the 1970s.


| Name | Facilities | | | | Remarks |
|---|---|---|---|---|---|
| | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | |
| 1 Olympia Medina Wharf | 1 | 180 | 6.5-7.1 | 16,000 | General Cargo<br>Cruise ship |
| | 2 | 170 | 5.6—6.6 | 16,000 | |
| | 3 | 170 | 5.2 | 16,000 | |

| Name | Facilities | | | | Remarks |
|---|---|---|---|---|---|
| 2. Citrico Berth | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | General Cargo<br>Bulk Cargo |
| | 3 | 160 | 9.0 | 35,000 | |
| | 4 | 160 | 9.9 | 40,000 | |
| | 5 | 185 | 10.0 | 40,000 | |
| | 6 | 175 | 10.4 | 35,000 | |
| 3. Tricontinental Pier | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | East: Bulk raw sugar<br>West: Grain |
| | East | 227 | 10.5 | 48,000 | |
| | West | 200 | 10.2 | 40,000 | |
| 4. Refinery Pier | Berth No. | LOA (m) | Draft (m) | Max Ship Size (tons) | Crude oil<br>Under CUPET |
| | 1 (East) | 228 | 11.9 | 52,000 | |
| | 2 (West) | 185 | 11.3 | 50,000 | |
| | 3 | 40 | 2.9 | various ships | |

Source: JICA Study Team

**Figure 4.5.16 Cienfuegos port facilities**

### (7) Nuevitas

Nuevitas Port handles the import of fertilizer and bagged food, the export of chrome ore, and the cabotage shipment of cement clinker.


Source: Google Earth (2019 July)

**Figure 4.5.17 Nuevitas port**

Litoral Wharf is very old, having been built in 1924. The wharf was repaired in 2009, and since then, the wharf has been used with a limited working load of 1.5 t/m$^2$. Other wharves were built by an American private sugar company, but after the Cuban revolution, the facilities were managed by Cuba. Deterioration of these wharves is quite severe, with the quay cranes not working.

The port is located in the inner water with one mouse channel. The navigation channel of the bay is shallow and narrow, where pilotage and navigation are difficult.

**Port view**

**Deterioration of a wharf**

**Warehouse**

Source: JICA Study Team

**Figure 4.5.18 Nuevitas port facilities**

The port is located in the eastern boundary of the north keys, so it should be determinant in the supply of goods for the tourist development of the "Jardines del Rey" and "Norte de Camaguey" regions.

### (8) Carupano*

Carpano Port was initially built in 1909, thus having over 100 years of history. In 1978, the Sugar Terminal was built (Berth No. 1), where conventional manual cargo handling was changed to mechanical handling. In 1988, the general cargo terminal was built (Berth No. 3); the advantage of this port is not only its location close to several sugar mills, but it is also linked to the national railway system.


Source: Google Earth (2019 July)

**Figure 4.5.19 Carupano port**

The main operation of Carupano Port is the export of sugar. 100,000 to 300,000 tons of bulk sugar is exported using the Sugar Terminal (Berth No. 1). There are sugar mill facilities near the port; bulk sugar produced in the mills is transported to the port by railway.

The general cargo berth (Berth No.3) is used for import/export and cabotage. Metals and corn are imported. Primary export goods are billets produced in a steel mill located in Las Tunas. Cabotage includes cement inbound shipped from Mariel.

The port is located in lagoon water, where the connecting channel to the outer sea is narrow with a basin depth of 9 m. Navigation for passing this channel requires tugboats and pilot support.

**Berth No. 3**

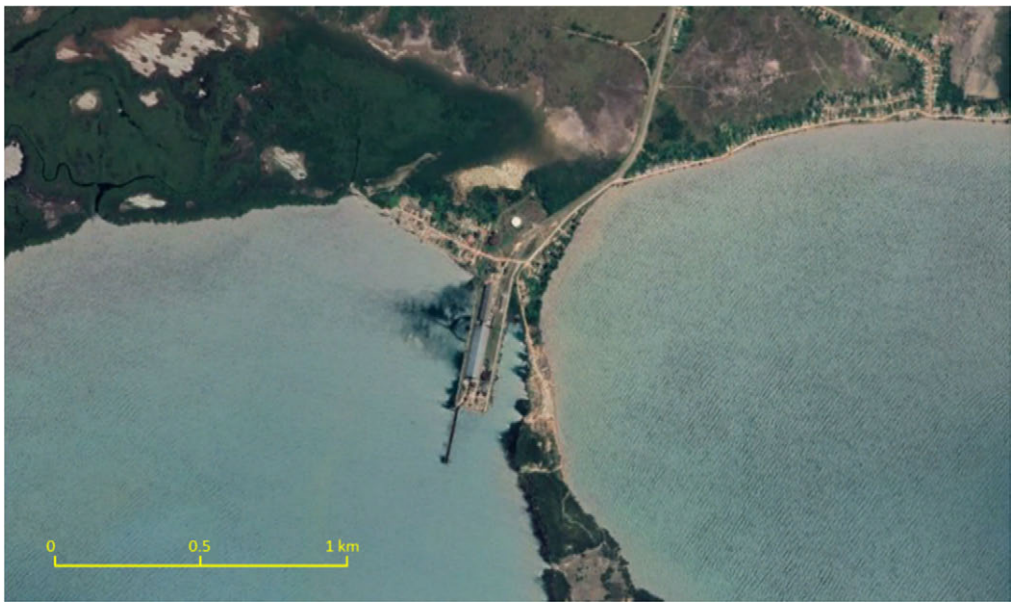
**Berth No. 1**

Source: JICA Study Team

**Figure 4.5.20 Carupano port facilities**

### (9) Guayabal

The primary operations of Guayabal Port are the exports of bulk sugar, rum, syrup, alcohol, and other sugar by-products. Berth and warehouse facilities were built in 1961-1962. Export sugar volume is 200,000 to 400,000 tons/year. Rum and syrup are exported as liquid bulk, mainly for Europe. In addition, there are sugar mill facilities near the port; bulk sugar produced in the mills is transported to the port by railway.




Source: Google Earth (2019 July)

**Figure 4.5.21 Guayabal port**

The east side of the port is sheltered from ocean waves by a slender land strip, while the south/west side is open to the outer sea. The port manager stated that there are some days with no operations due to rough sea conditions. The pier depth is 8.7 m, and an 11 km-long approach channel extends southward. Periodical maintenance dredging of the channel is needed. Port management hopes to expand the pier and deepen the basin and channels to accommodate larger bulk vessels (40,000 DWT).

Source: JICA Study Team

**Figure 4.5.22 Guayabal port facilities**

### 4.5.3 Maritime equipment

Maritime equipment, such as cargo handling equipment, port working ships, and cabotage fleet, plays a significant role in port operations. The continued deterioration of maritime equipment has resulted in the inefficiency of port management. The deterioration has been mainly caused by aging without proper maintenance.

#### (1) Cargo handling equipment

Table 4.5.3 shows the condition of cargo handling equipment in Cuba, reported by GEMAR in 2018. It should be noted that about 40 percent of cargo handling equipment was in bad condition that year.

**Table 4.5.3 Condition of cargo handling equipment**

| EQUIPMENT | TOTAL | CONDITION | | |
|---|---|---|---|---|
| | | Good | Intermediate | Bad |
| FORKLIFT | 165 | 50 | 52 | 63 |
| TRACTORS | 44 | 22 | 7 | 15 |
| CARGADOR FRONTAL | 21 | 7 | 3 | 11 |
| LAND CRANES | 26 | 12 | 3 | 11 |
| TRIMMING DOZER | 14 | 4 | 1 | 9 |
| TRAILERS | 23 | 6 | 10 | 7 |
| GANTRY CRANES | 9 | 0 | 4 | 5 |
| BULLDOZER | 3 | 1 | 0 | 2 |
| **TOTAL** | 305 | 102 | 80 | 123 |

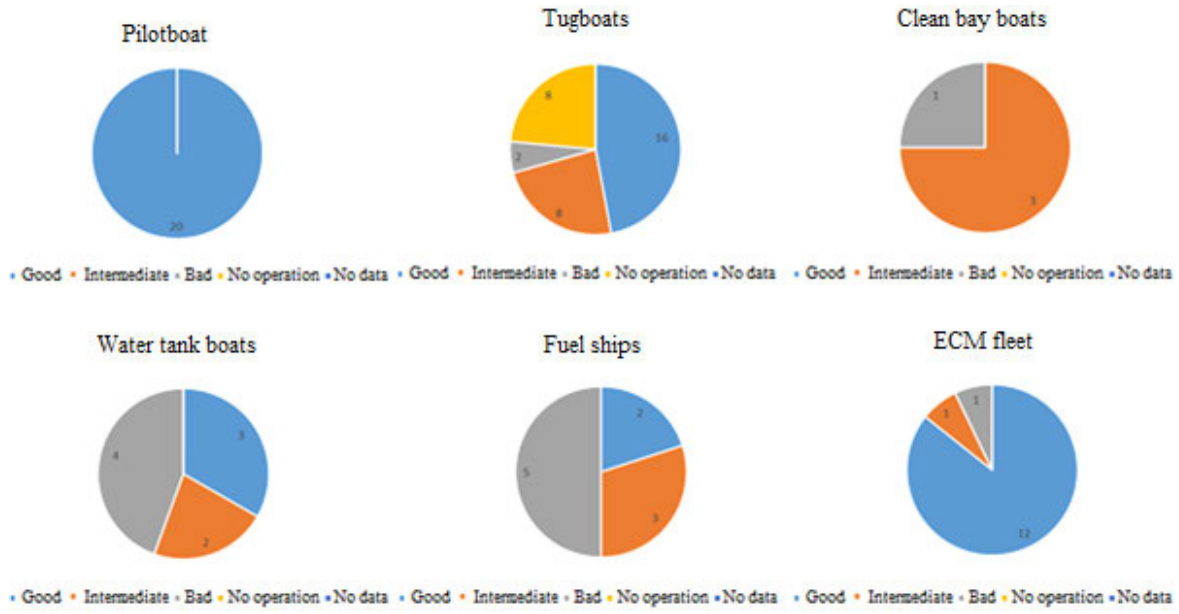
Source: GEMAR

In particular, trimming dozers and bulldozers have severely deteriorated, showing about two-thirds of them in poor condition. Besides, the number of cargo handling equipment is insufficient to conduct efficient port operations. Because of the limited number of equipment, cargo handling takes a longer time. The usable equipment will be deteriorated sooner or later because of aging. This is a critical issue to address in the port/maritime sector.

#### (2) Port working ships

Caribbean Navigation Enterprise, comprising OSDE GEMAR, owns, for auxiliary operations in ports, 34 tugboats; 20 pilot boats; 7 auxiliary ships; 12 ship chandlers; 1 workshop barge; 5 floating cranes; 1 cargo barge PC-400; 4 clean bay boats; and 1 garbage barge.

The port-working ships have been operated for about 23 years on average, and about 21 percent of them were in poor condition or not operational in 2018. On the other hand, tugboats have been used for about 17 years on average. So the deterioration of the tugboats is critical for safe port operation. Besides, half of the fuel ships are in poor condition. But, on the other hand, all pilot boats are in good condition.




Source: GEMAR (2020)

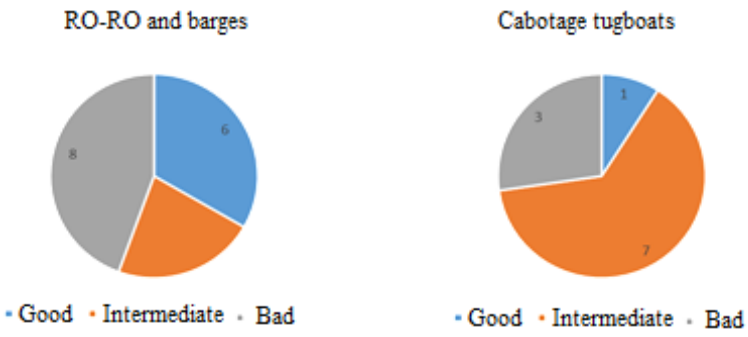
**Figure 4.5.23 Condition of port working ships**

### (3) Cabotage fleet

Caribbean Navigation Company has 6 Ro-Ro ships, 12 cargo barges, 10 fuel barges, and 11 cabotage tugboats for cabotage transportation. Unfortunately, most of them have deteriorated seriously because of their aging of about 35 years on average.

Figure 4.5.24 shows the conditions of cabotage fleets as reported by GEMAR in 2020. About 45 percent of the vessels were in poor condition.

Cabotage tugboats have not so deteriorated; however, they noted that they have already been used for about 40 years in intermediate conditions, which indicates they are likely to fall into poor condition shortly. Besides, it should be noted that the number of cabotage tugboats is not enough to meet their requirement, even though a cabotage tugboat is used in other ports sometimes, which leads to more fuel consumption and delays in port operations. It is said that repair costs for the existing fleet in poor condition are close to or sometimes higher than the cost of a new fleet.




Source: GEMAR (2020)

**Figure 4.5.24 Condition of cabotage fleets**

### 4.5.4 Maintenance of port facilities

Most of the Cuban ports are old and deteriorated and need urgent repairs. For example, many wharves were built over 50 years ago and needed to be rebuilt. Table 4.5.4 summarizes the conditions of the port facilities as of 2019.

**Table 4.5.4 Condition of the port facilities**

| Port | Observation in Field Survey |
|---|---|
| Havana | Sierra Maestra Passenger Terminal piers are under renovation. Pier No. 1 has already completed the renovation and is in use. |
| Matanzas | For the Dubrocq berth, repair has been done based on a deterioration survey. |
| Cienfuegos | The terminal was built in the 1950s. For Olympia Media Terminal, the repair plan is under implementation by Cimab based on a deterioration survey. |
| Guayabal | The terminal was built in 1961-62. Thanks to continuous maintenance, there seem to be almost no problems concerning the terminal berth. |
| Nuevitas | Berths were built from 1910-1930. Severe deterioration was observed in the berths. Litoral Wharf was repaired and in use, but the operation is limited. |
| Carúpano | The sugar handling pier is old but in use. Pier No. 2 is not in use due to severe deterioration. |
| Santiago de Cuba | The old wharf was built in the 1970s. Unfortunately, the middle of the wharf is not in use due to severe deterioration. |

Source: Field survey by the JICA Study Team

### 4.5.5 Cargo handling at major ports (GEMAR)

It should be noted that the information in this section is limited to GEMAR only but does not include the statistics of other OSDEs.

#### (1) Roles of major ports

The major roles of ports in Cuba are: a) importing consumer goods and food in bulk; b) importing various products by container, c) exporting agricultural products such as sugar; d) receiving cruise ships (foreign tourists), and e) cabotage shipping (domestic transport).

The role of the major ports is summarized as follows.

a) Import Bulk Cargo: Mariel, Havana, Matanzas, Cienfuegos, Nuevitas, Carupano, and Santiago de Cuba

b) Import Container Cargo: Mariel, and Santiago de Cuba
c) Export Sugar: Matanzas, Cienfuegos, Carupano, and Guayabal
d) Tourist Receiving Cruise Ship: Havana, Cienfuegos, and Santiago de Cuba
e) Cabotage: Almost all ports

### (2) Cargo Volume of Major Ports

10-year statistics of cargo volume (handled by enterprises under GEMAR sector) are shown in Table 4.5.5 and Figure 4.5.25.

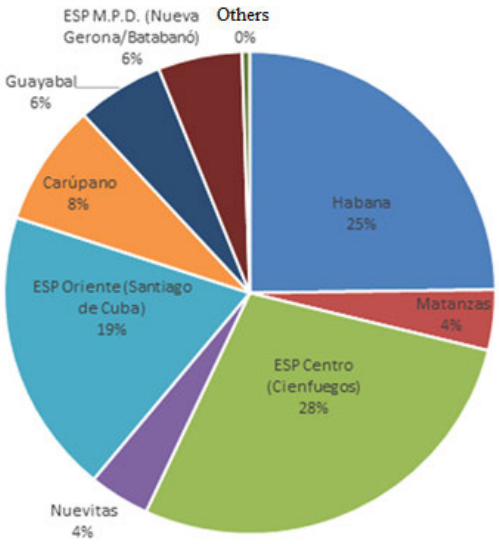
Mariel Port handles approximately 300,000 TEUs of container cargo annually, and its cargo volume is estimated to be between 2,100,000 tons and 2,400,000 tons per year.

**Table 4.5.5 Cargo handling volume of Cuban ports (under GEMAR)**

(Unit: 1,000 ton)

| Port (Port Group) | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Habana | 1,118 | 1,166 | 1,123 | 1,050 | 1,081 | 1,172 | 980 | 927.9 | 729.88 | 684.8 | 1,003.25 |
| Matanzas | 103 | 246 | 236 | 249 | 217 | 192 | 118 | 121.9 | 73.31 | 35.5 | 159.17 |
| ESP Centro (Cienfuegos) | 1,451 | 1,618 | 1,333 | 1,258 | 1,204 | 1,179 | 989 | 1,045 | 803.89 | 513.43 | 1,139.43 |
| Nuevitas | 162 | 163 | 201 | 199 | 171 | 246 | 250 | 187 | 167.31 | 146.18 | 189.24 |
| Carúpano | 310 | 377 | 343 | 543 | 424 | 442 | 363 | 263.4 | 249.11 | 149.23 | 346.37 |
| Guayabal | 295 | 283 | 259 | 360 | 331 | 424 | 207 | 918.5 | 841.65 | 644.4 | 456.35 |
| ESP Oriente (Santiago de Cuba) | 716 | 839 | 912 | 1087 | 1057 | 1014 | 1002 | 227 | 181.2 | 181.2 | 721.64 |
| ESP M.P.D. (Nueva Gerona/Batabanó) | 249 | 252 | 264 | 266 | 256 | 254 | 239 | 286 | 206.58 | 70.5 | 234.3 |
| Others | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.7 |
| **Cuba Total** | **4,431** | **4,944** | **4,671** | **5,012** | **4,741** | **4,923** | **4,148** | **3,976.7** | **3,252.9** | **2,425.2** | **4,252.45** |

Source: Cimab




Source: Cimab

**Figure 4.5.25 Share of cargo volume for each port**

### (3) Import cargo

According to the statistics from GEMAR, primary imported goods are food in bags or bulk, such as corn and soybean, and similarly bagged or bulk fertilizer (noted that the data does not include consumer goods).

**Table 4.5.6 Import Cargo Volume of Cuban Port (GEMAR sector)**

(Unit: 1,000 ton)

| Port (Port Group) | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Habana | 988 | 1,027 | 1,020 | 981 | 1,046 | 1,107 | 942 | 906.3 | 723.5 | 665 | 940.58 |
| Matanzas | 38 | 56 | 63 | 56 | 51 | 48 | 33 | 11.9 | --- | --- | 44.61 |
| ESP Centro (Cienfuegos) | 533 | 590 | 579 | 628 | 645 | 628 | 581 | 595.8 | 449.2 | 345.42 | 557.44 |
| Nuevitas | 127 | 98 | 141 | 131 | 80 | 118 | 124 | 82.1 | 76.23 | 79.52 | 105.68 |
| ESP Oriente (Santiago de Cuba) | 576 | 640 | 707 | 821 | 794 | 771 | 742 | 716.1 | 666.3 | 550.3 | 698.37 |
| Carúpano | 29 | 30 | 18 | 80 | 61 | 64 | 79 | 51.3 | 44.67 | 28.04 | 48.5 |
| **Cuba Total** | 2,291 | 2,442 | 2,528 | 2,697 | 2,677 | 2,736 | 2,499 | 2,363.5 | 1,959.9 | 1,668.3 | 2,395.18 |

Note: Guayabal, Batabanó-Gerona, and others do not handle import cargo.
Source: Cimab

### (4) Export Cargo

Regarding the export cargo from Cuba, volumes of 4 ports are relatively large, namely Cienfuegos, Guayabal, Carúpano, and Matanzas (the data does not include Mariel and Moa).

Raw sugar in bulk is dominant in weight in each port, i.e., 89% in Matanzas, 57% in Cienfuegos, 72% in Carúpano, and 94% in Guayabal.

Other than the major export cargo listed in the GEMAR data, nickel ore is one of the primary export goods of Cuba, which is handled at the Moa Port by a foreign company. Thus the statistics are not recorded under GEMAR.

**Table 4.5.7 Export cargo volume of Cuban port (GEMAR sector)**

(Unit: 1,000 ton)

| Port (Port Group) | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Habana | 81 | 87 | 61 | 36 | 28 | 52 | 37 | 20.7 | 3.09 | --- | 45.08 |
| Matanzas | 54 | 175 | 160 | 186 | 163 | 144 | 76 | 94.7 | 73.31 | 35.5 | 116.15 |
| ESP Centro (Cienfuegos) | 729 | 846 | 631 | 455 | 355 | 359 | 177 | 274.9 | 226.61 | 108.1 | 416.16 |
| Nuevitas | 20 | 23 | 23 | 33 | 30 | 14 | 25 | 43.7 | 38.29 | 10.18 | 49.19 |
| Carúpano | 234 | 263 | 286 | 372 | 272 | 291 | 192 | 145.1 | 152.33 | 109.64 | 231.71 |
| ESP Oriente (Santiago de Cuba) | 56 | 69 | 86 | 100 | 105 | 96 | 96 | 86.3 | 58.08 | 58.3 | 81.07 |
| Otros | 6 | | | | | | | 286 | 206.58 | 70.5 | 142.27 |
| **Cuba Total** | **1,180** | **1,463** | **1,247** | **1,182** | **953** | **956** | **603** | **951.4** | **758.29** | **392.22** | **1,081.63** |

Note: Guayabal and Batabanó-Gerona ports do not handle export cargo.
Source: Cimab

### (5) Cabotage

Regarding cabotage, ESP M.P.D. handles the largest volume for inter-island shipping between the main island and Isla de la Juventud, that is, between Batabano and Nueva Gerona. Major types of cabotage cargo are food and consumer goods in containers and construction materials such as cement, etc. Other than ESP M.P.D., the volumes of cabotage cargo in Cienfuegos and Santiago de Cuba are higher than in other ports. The primary cabotage commodities of these ports are “cement” and “cement clinker”.

**Table 4.5.8 Cabotage cargo volume of Cuban port (GEMAR sector only)**

(Unit: 1,000 ton)

| Port (Port Group) | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Habana | 49 | 52 | 42 | 33 | 7 | 13 | 1 | 1 | 3.29 | 19.8 | 22.1 |
| Matanzas | 11 | 15 | 13 | 8 | 3 | 0 | 9 | 15.3 | --- | --- | 5.9 |
| ESP Centro (Cienfuegos) | 188 | 182 | 123 | 175 | 203 | 192 | 231 | 174.8 | 128.08 | 59.9 | 129.4 |
| Nuevitas | 15 | 42 | 36 | 35 | 61 | 114 | 101 | 61.2 | 54.78 | 56.48 | 40.4 |
| ESP Oriente (Santiago de Cuba) | 84 | 130 | 120 | 167 | 158 | 147 | 165 | 116.1 | 117.28 | 38.8 | 97.1 |
| Carúpano | 47 | 84 | 38 | 91 | 92 | 88 | 93 | 67.1 | 52.11 | 13.55 | 53.3 |
| ESP M.P.D. (Nueva Gerona/Batabanó) | 249 | 252 | 264 | 266 | 256 | 254 | 239 | 227 | 181.2 | 181.2 | 178 |
| Others | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.2 |
| **Cuba Total** | **666** | **756** | **635** | **774** | **780** | **808** | **838** | **662.5** | **536.74** | **369.73** | **528.4** |

Note: Guayabal port does not handle cabotage cargo.
Source: Cimab

### (6) Container cargo handling

Mariel Port handles approximately 300,000 TEUs/year[12]. In comparison, the container handling volume in Santiago de Cuba port during 2016-2018 was 55,000 TEUs/year, including about 20,000 TEUs/year for import and a similar number of TEUs for export (mostly empty containers). Therefore, the cabotage trade of containers is roughly estimated to be 3,000 to 5,000 TEUs/year, for which domestic containers can be exchanged between Mariel and Santiago de Cuba.

The container handling volume is expected to be increased upon opening the new multi-purpose berth in Santiago de Cuba port.

### (7) Sugar Export

“Raw sugar in bulk” is one of Cuba's most important export items. In this regard, it is vital to maintain the facilities for sugar export. Sugar export increased from 2010 until 2017. However, it significantly decreased in 2018. This drop in export was Hurricane Irma, which heavily damaged Cuba in September 2017.

[12] According to an interview with an executive of Mariel Port.

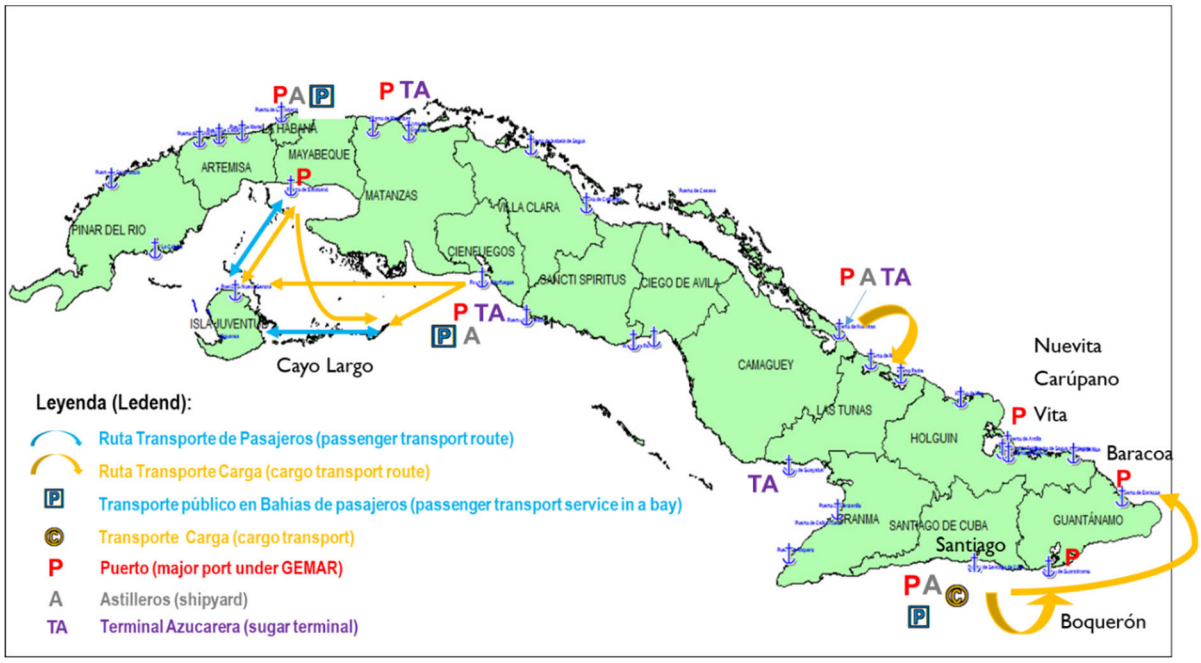
**Table 4.5.9 Sugar export**

(Unit: 1,000 ton)

| Port | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Matanzas | 54 | 173 | 159 | 0 | 163 | 143 | 75 | 95 | 72 | 36 | 97 |
| Cienfuegos | 351 | 381 | 425 | 426 | 336 | 345 | 175 | 230 | 194 | 107 | 297 |
| Carúpano | 138 | 159 | 201 | 320 | 240 | 218 | 122 | 104 | 122 | 93 | 172 |
| Guayabal | 277 | 239 | 221 | 327 | 308 | 407 | 199 | 278 | 199 | 71 | 253 |
| Total | 820 | 952 | 1000 | 1074 | 1047 | 1112 | 570 | 706 | 587 | 306 | 819 |

Source: Cimab

Of these four ports, Matanzas and Carúpano face the northern side of Cuba, while Cienfuegos and Guayabal face the south. These ports should be expanded and strengthened for handling capacity based on the possible increase in production. The sugar industry is engaged in secondary product development from sugarcane and its export, such as rum, alcohol, and syrup, for industrial use. New facilities for this commodity, e.g., storage tanks for liquid cargo and pumping and pipeline systems for loading vessels, will be required. For instance, Guayabal Port has recently invested in liquid cargo facilities to export such a new type of cargo.




Source: GEMAR

**Figure 4.5.26 Maritime transport services by GEMAR**

### 4.5.6 Maritime transport between Batabano and Nueva Gerona

The Youth Island (La Isla de la Juventud) is the largest island in Cuba (3,056 km²), with about 90,000 residents. Its core industries are agriculture and fisheries, but it produces marble and has been exported for construction work on the main island. It is expected to gradually increase the transport of watermelons for their consumption in Havana, while citrus productions currently enhanced are recovered.

### (1) Passenger demand

According to GEMAR, the number of passengers traveling between Youth Island and the main island in 2015 was 258,000, but the actual demand is estimated to be about 380,000 passengers annually.

Besides, the demand for freight transportation during the same period was estimated to be 200,000 tons per year, but the actual result is 130,000 tons per year. According to the future demand forecast by GEMAR, passenger demand in 2016 was estimated to be 430,000 passengers, and in 2021 it would be 590,000 passengers.

Four ferries were used to accommodate this passenger transportation demand, but as of June 2016, all of them were out of order, and a ferry from Mexico (380 passengers) was contracted from June 1, 2016, to the end of August of the same year. Subsequently, the number of vessels used on this route stabilized a situation that continues with fluctuations up to the present.


Source: JICA Study Team

**Figure 4.5.27 La Isla de la Juventud**

### (2) Cargo demand

The actual freight transportation record in 2015 was 130,000 tons, and in the container was 35,000 TEU (one way) (about 40,000 TEU including the container to Cayo Largo), which are mainly used for transportation of basic daily necessities including food, pharmaceuticals, construction materials, fertilizers, feed, and fuel.

Before 2018, six Ro-Ro freighters were in service for freight transport between Youth Island and the main island (three Gerona types and three Pelicano types). The Gerona type has a transportation capacity of 800 tons and can carry 40 pieces in a 20-foot container. The Pelicano type has a loading capacity of 200 tons and can carry up to 11 pieces in a 20-foot container. It takes about 5 to 6 minutes to load and unload one container. The transportation time between the islands is about 8 to 10 hours.

In addition, to the Ro-Ro freighters, there was a large ship that carried construction materials from the main island (via Batabano) to the Youth Island, and on the way back, it carried watermelons, etc., from Youth Island.

### (3) Passenger terminals

The berth length at the passenger terminal at Batabanó is 60-70 m, but the actual usable length is about 40 m.

On the other hand, the berth length of Gerona port is 120 m, the river width is 80 m, the water depth is 5-6 m, and a maximum of 70 m can be turned around, but in reality, a ship with a length of 40-50 m can be used safely. It is said that it can be done.

### (4) Cargo terminals

The river width near the port of Nueva Gerona is 90 m, the water depth is 4-5 m, and dredging is required. The crane is currently out of order. The wharf presently used for freight was once a terminal for passenger ferries. If a relatively large ferry like the one used to be in service, passengers would be boarded and disembarked at this wharf, but ticket sales and check-in will be made at the existing passenger terminal building and a shuttle bus for that purpose.


Source: JICA Study Team

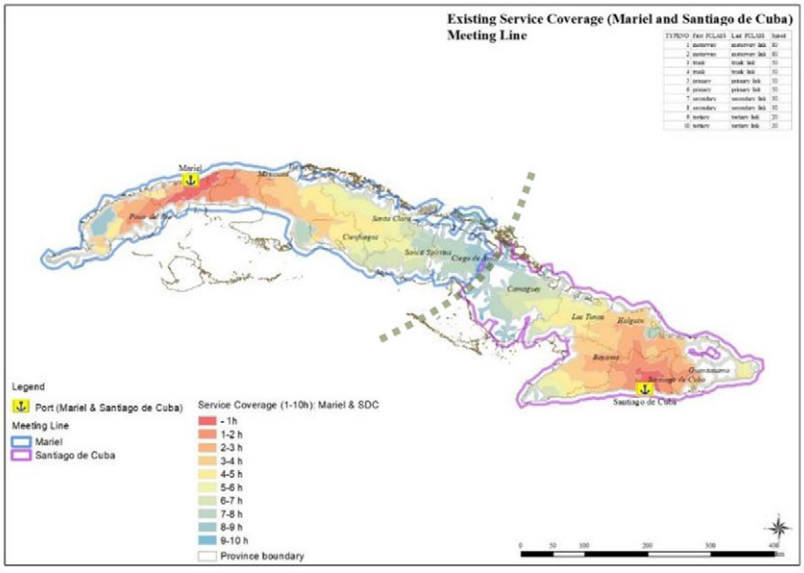
**Figure 4.5.28 Batabano port**


Source: JICA Study Team

**Figure 4.5.29 Nueva Gerona port**

### 4.5.7 Accessibility from the ports

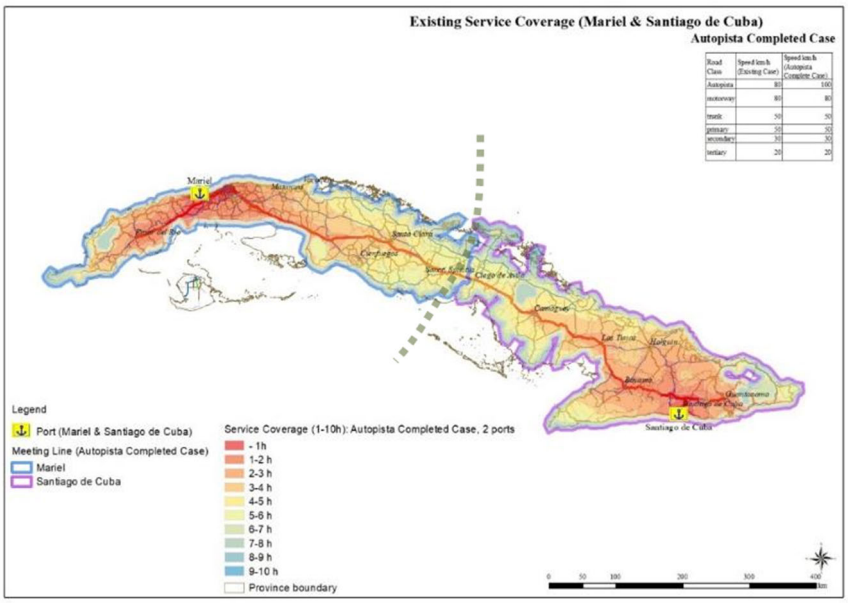
The service coverage of a port can be defined by a reachable range (distance) when using roads. Figure 4.5.30 shows the reachable area from Mariel and Santiago de Cuba ports. The dotted line is the meeting line, the same travel hours from the two ports using the existing roads. The existing meeting line is slightly east of the mid-point of the two ports; that is, the service coverage of the Santiago de Cuba port is slightly smaller due to the poorer condition of the existing roads in the eastern area.




Source: JICA Study Team

**Figure 4.5.30 Service coverage of Mariel and Santiago de Cuba using the existing roads**

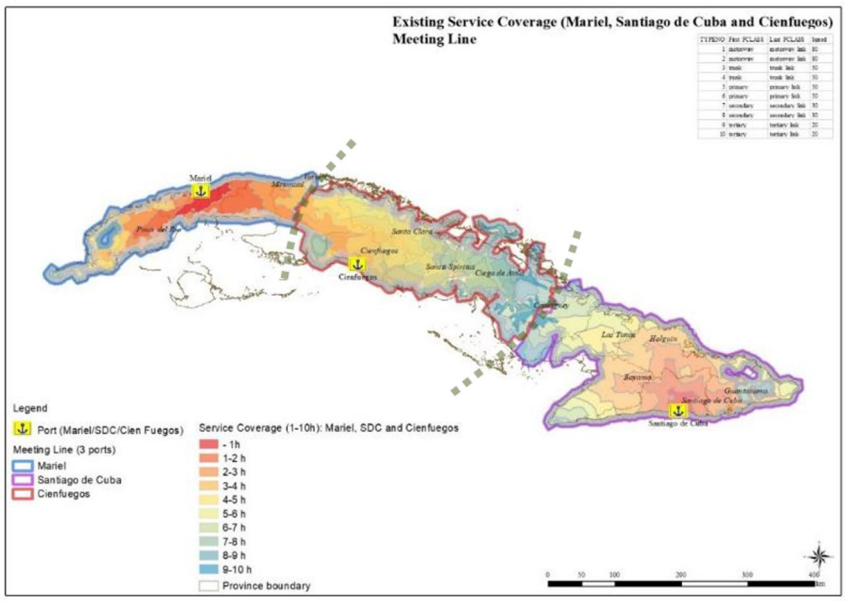
By completing Autopista through Santiago de Cuba, this meeting line will be shifted to the west at about 55 km. In other words, the service coverage of Santiago de Cuba port can be expanded by improving Autopista.




Source: JICA Study Team

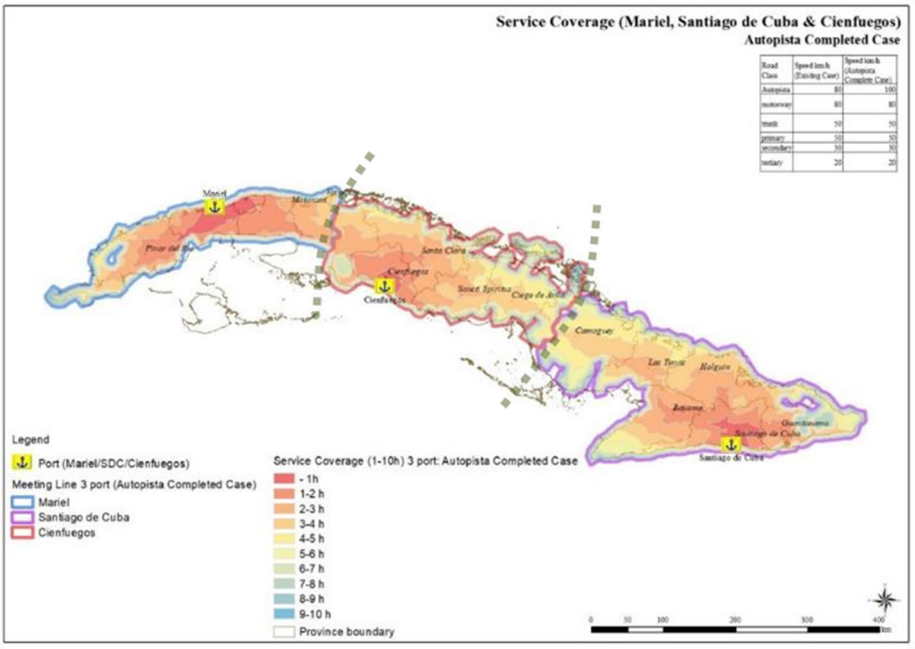
**Figure 4.5.31 Service coverage of Mariel and Santiago de Cuba with completion of Autopista**

A similar analysis can be made in the case of three ports, namely Mariel, Cienfuegos, and Santiago de Cuba. With the completion of Autopista, most of the Cuban area will be reachable from the three ports within 5 hours, as shown in Figure 4.5.33.




Source: JICA Study Team

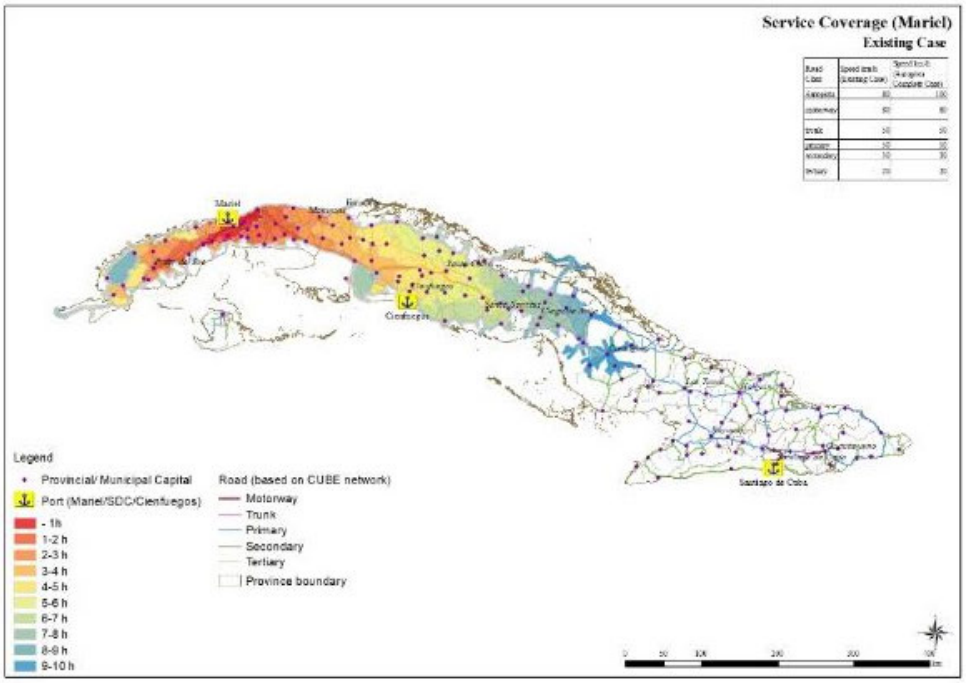
**Figure 4.5.32 Service coverage of Mariel, Cienfuegos, and Santiago de Cuba using the existing roads**




Source: JICA Study Team

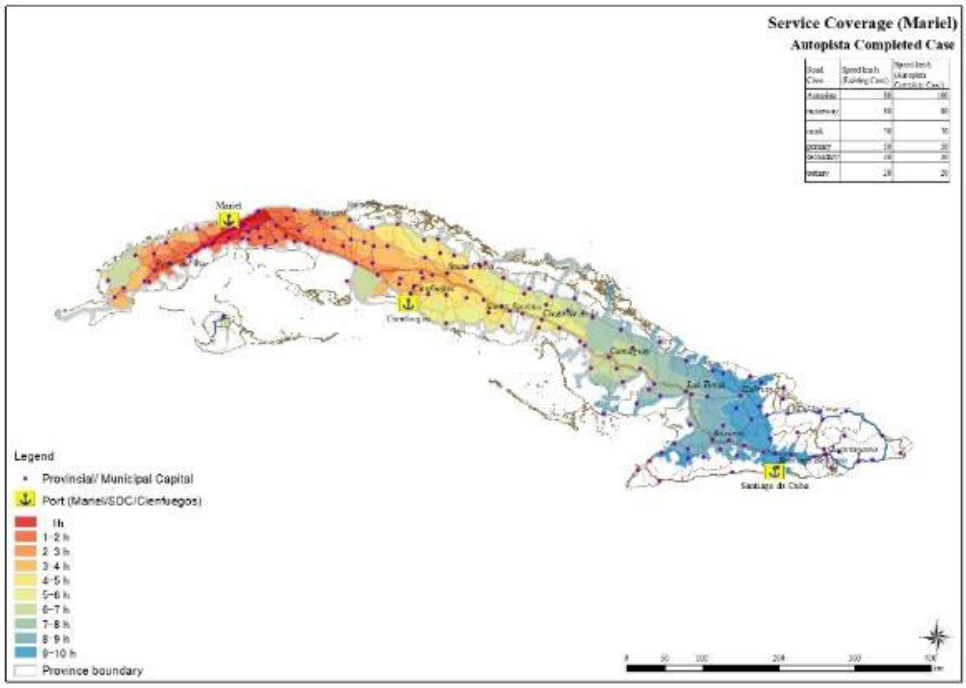
**Figure 4.5.33 Service coverage of Mariel, Cienfuegos, and Santiago de Cuba with completion of Autopista**

Figure 4.5.34 shows the travel distance from the Mariel port using the existing roads. A truck may be able to reach Camaguey. Figure 4.5.35 shows the same in case Autopista is completed through Santiago de Cuba. With the completed Autopista, a truck may get to Santiago de Cuba in 10 hours (excluding rest time).




Source: JICA Study Team

**Figure 4.5.34 Service coverage of Mariel using the existing roads**




Source: JICA Study Team

**Figure 4.5.35 Service coverage of Mariel with completion of Autopista**

Table 4.5.10 shows the number of reachable cities from Mariel by travel time. Regarding reachable cities, the existing service coverage of Mariel port is 59%, which will increase to 84% by the completion of Autopista.

**Table 4.5.10 Reachable cities from Mariel port**

| | Existing Case | | | Autopista Completed Case | | |
|---|---|---|---|---|---|---|
| | No. of Cities | Accumulation | Cover rate | No. of Cities | Accumulation | Cover rate |
| Up to 1h | 8 | 8 | 5% | 11 | 11 | 7% |
| 1-2 h | 16 | 24 | 15% | 18 | 29 | 19% |
| 2-3 h | 7 | 31 | 20% | 10 | 39 | 25% |
| 3-4 h | 10 | 41 | 26% | 15 | 54 | 35% |
| 4-5 h | 13 | 54 | 35% | 16 | 70 | 45% |
| 5-6 h | 14 | 68 | 44% | 13 | 83 | 54% |
| 6-7 h | 6 | 74 | 48% | 10 | 93 | 60% |
| 7-8 h | 6 | 80 | 52% | 9 | 102 | 66% |
| 8-9 h | 5 | 85 | 55% | 13 | 115 | 74% |
| 9-10 h | 6 | 91 | 59% | 15 | 130 | 84% |

Source: JICA Study Team

### 4.5.8 Maritime Administration of Cuba.

The Maritime Administration of Cuba (AMC) is an entity that is part of the public administration bodies attached to MITRANS. The general structure of AMC is composed of one (1) Directorate, one (1) General Director, one (1) Deputy Director, one (1) Secretary, four (4) Directorates, and four (4)

Territorial Administrations. The following organizational units of AMC are in charge of fulfilling the mission and functions.

- Directorate of Maritime, River and Lake Transport,
- Directorate of Maritime Safety,
- Economic and Financial Directorate,
- Port Administration Directorate,
- Port Maritime Operations Department,
- Technical and Infrastructure Department,
- Emergency Oil Spill Response Department,
- Human Resources Department,
- Assurance Department, and
- Legal Group.

AMC also has four (4) Territorial Administrations and a Working Group, which are:

- Western Territory Maritime Administration,
- Mariel Territory Maritime Administration,
- Central Territory Maritime Administration,
- Central-East Territory Maritime Administration Working Group, and
- Eastern Territory Maritime Administration.

AMC is the authority that represents the Cuban state in the maritime transport sector and supervises and controls the port naval activities. It is a budgeted unit attached to MITRANS and is responsible for working out regulations of port and maritime standards. The following four related legislations have been enacted:

- Ports Law (Decreto-Ley No. 230 de Puertos),
- Detailed Regulations for Enforcement of the Port Law (Reglamento del Decreto-Ley de Puertos),
- Marine Transportation Act (Ley No. 115 de la Navegación Marítima, Fluvial y Lacustre), and
- Detailed Regulations for Enforcement of the Marine Transportation Act (Reglamento de Ley de la Navegación Marítima, Fluvial y Lacustre).

Ports Law constitutes the basis of the Cuban port system. It establishes the basic principles related to port classification, national port authority, management of the port area, and the order maintenance of all ports, including environmental conservation (August 28, 2002).

Based on the Port and Harbor Act provisions, the Detailed Regulations for Enforcement of the Port and Harbor Act, more detailed provisions on port operations and development were enacted, port organization functions, ship entry, departure rules, etc. (December 24, 2002).

The Marine Transportation Act (enacted on July 3, 2013) is a fundamental law concerning marine transportation. It describes the roles of national organizations such as MITRANS, the responsibilities of carriers, captains, and crew, marine transportation contracts, safe navigation rules, etc.

The Marine Transportation Act Enforcement Regulations (in force on October 2, 2013) stipulate more detailed provisions for each legislation in response to the requirements of the Marine Transportation Act.

Directorate of Maritime, River and Lake Transport (Direccion de Transporte Maritimo, Fluvial y Lacustre) is the responsible directorate (at the level of AMC/MITRANS) of navigation in Cuba, as well as the operation, control, and development of the state system of maritime, river and lake transport, which covers maritime and river transport means, related services of the maritime transport, chartering of vessels and the naval industry, as well as the approval of operation licenses for this kind of transport.

In addition, the Maritime Safety Directorate/AMC conciliates and proposes the national interests before the International Maritime Organization and controls the fulfillment of the international maritime conventions of which Cuba is a signatory, as well as promotes and attends to the signature of intergovernmental conventions and treaties on maritime transport and port development.

The Directorate of Maritime, River, and Lake Transport has two groups:

- Operation and Fleet, and
- Naval engineering.

With the structural reform of MITRANS that began in 2015, all of the operational directorates (ports, shipping, and peripheral operators) initially under the jurisdiction of MITRANS were separated from OACE. Instead, they were placed in the corresponding OSDEs, new government managing bodies created for those functions.

In the case of port maritime activities, enterprise functions were placed in the different enterprises that comprise OSDE GEMAR, Grupo Empresarial de Transporte Marítimo Portuario. The transition to a new organization was centered on the Grupo Empresarial de la Industria Portuaria (ASPORT), a previous conglomerate specializing in ports. As a result, the activity was integrated and expanded. All the operating enterprises related to ports and maritime transport that were individually connected to different directorates of MITRANS were integrated under the new organization GEMAR, which has as the objective of directing only some issues of state interest of the enterprises comprising it. In contrast, all the enterprise matters are managed by each enterprise, which has a given level of autonomy, mainly for developing their operations.

To coordinate all port maritime entities, following the legislation in force, port administrations are created in ports classified as first category and port administration committees for second category ports.

Furthermore, regarding the port management organization, the Empresas de Servicios Portuarios (ESPs) was established by dividing the whole country into five regions and bundling the port management enterprises of each port in each region. That is, there are five ESPs, which are: ESP de Occidente (eastern), ESP del Centro (central), ESP del Centro Este (east central), ESP del Oriente (eastern), and ESP Manuel P. Dapena (Youth Island and surroundings). These port activities are attended in MITRANS by the Directorate of Port Administration of AMC.

Currently, the following 20 operating organizations exist under the GEMAR sector. Cimab, the counterpart of this survey, is an enterprise integrated under OSDE GEMAR.

**Table 4.5.11 Ports owned by enterprises integrated under GEMAR**

| Name of the enterprise | Name of the port |
|---|---|
| E.S.P Occidente | La Habana<br>Matanzas |
| E.S.P Manuel Porto Dapena | Nueva Gerona (Isla de la Juventud)<br>Batabanó (Prov. Mayabeque)<br>Cayo Largo del Sur |
| E.S.P Centro | Cienfuegos<br>Isabela (Prov. Villa Clara)<br>Casilda (Prov. S. Spíritus)<br>Palo Alto (Prov. Ciego de Ávila) |
| E.S.P Centro Este | Casasa (Prov. Camagüey)<br>Nuevitas (Prov. Camagüey)<br>Carúpano (Prov. Las Tunas)<br>Guayabal (Prov. Las Tunas)<br>Vita (Prov. Holguín)<br>Antilla (Prov. Holguín) |
| E.S.P Oriente | Niquero (Prov. Granma)<br>Manzanillo (Prov. Granma)<br>Santiago de Cuba<br>Boquerón (Prov. Guantánamo)<br>Baracoa (Prov. Guantánamo) |

Source: CIMAB

### 4.5.9 Capacity development

Many central government staff, local port managers, and engineers are highly motivated. However, the following issues can be pointed out through the discussion with the TWG members and field observation.

- Since many of the existing port infrastructure, facilities, and equipment are seriously deteriorating, it is urgently necessary to judge whether it can be repaired/renovated or replaced with a new one. In this regard, it is required to have the capacity to carry out a series of diagnoses of the existing infrastructure, facilities, and equipment.
- In parallel, it will be necessary to increase capacity for periodic surveys/investigations of the port infrastructure, facilities, and equipment.
- For new capital investment and large-scale renovation, it is necessary to have a comprehensive port sector improvement plan. In this regard, capacity development of the planning for the port infrastructure and maritime transportation is needed.

### 4.5.10 Review of the ongoing plans

#### (1) Port development policy

Based on the Guidelines of the Economic and Social Policy of the Party and the Revolution for the period 2016-2021, Guidelines 221 and 222 inform:

- To develop the national merchant fleet and shipyards as a way to increase the foreign currency earnings and savings, and

- To increase the efficiency of port and maritime operations based on the organized systems that provide a higher level of service in handling goods and accommodate a more significant number of cruise ships through modernization and timely maintenance of the port infrastructure, equipment, and maritime security system as well as dredging of the main ports.

The Cuban Maritime Administration has elaborated the "Policy Proposal for the Development of Maritime, River and Lake Transport and its auxiliary and related services". This document had not yet been approved at the moment of developing this report. However, it is updated and outlines the policies for developing the port-maritime activity, considering the involvement of other OACEs.

Based on this policy statement, GEMAR has developed the “Comprehensive Development Plan of the Maritime Port Transportation, 2018-2030”, in which existing state-owned facilities and equipment were surveyed and the requirement established for short/long-term investment plan.

The policy statement also points out the importance of tourism development to raise the national economy. Tourism development is also closely related to the port development for Cuba. The redevelopment of Havana Port, the Old Habana cityscape, and improvement projects of cruise ship terminals, such as the Sierra Maestra Passenger Terminal in Havana and the terminal plan in Cienfuegos, are the expected outputs of this policy.

This repair and modernization of the Havana Cruise Terminal is one of two projects planned by other organizations outside the ports that are subordinated to enterprises comprising OSDE GEMAR. The other one is the repair and modernization of the Matanzas Supertanker Terminal under the MINEM sector.

### (2) Development Plan of GEMAR

Cimab worked for GEMAR to establish a short/long-term development plan for GEMAR sector ports in 2018. As a result, the “Comprehensive Development Plan of the Maritime Port Transportation 2018-2030” proposes the following aspects of the ports and facilities development plan.

Objectives:

- To establish the strategic development plan of ports, auxiliary fleet, shipyards, cabotage fleet, and maritime passenger transport in enterprises integrating GEMAR
- To define the short-, mid-, and long-term investment plan; and
- To make a comprehensive development program for maritime transport to enhance port activities.

With the above objectives, the following target development scope was set out.

1) Development of GEMAR ports 2018-2030
2) Development of the cabotage and workboats of GEMAR 2018-2030
3) Development and maintenance program for maritime passenger transport 2018-2030
4) Development of GEMAR shipyards 2018-2030
5) Development of the Computer Science and Communication Technologies (CSCT) in GEMAR 2018-2030

6) Development of services and other investments in the port sector 2018-2030
7) Dredging of GEMAR ports

The budget was estimated in the Comprehensive Development Plan as follows.

**Table 4.5.12 Budget for comprehensive development plan**

(Unit: Million USD)

| No. | Item | Short Term 2018-2022 | Long Term 2027-2030 | Total |
|---|---|---|---|---|
| 1) | Development of GEMAR Ports 2018-2030 | 10.4 | 7.7 | 18.1 |
| 2) | Development of the Cabotage and WorkBoat fleet of GEMAR 2018-2030 | 17.9 | 13.8 | 31.7 |
| 3) | Development and Maintenance Program for the Maritime Passenger Transportation 2018-2030 | 1.0 | 1.1 | 2.2 |
| 4) | Development of GEMAR shipyards 2018-2030 | 4.2 | 6.5 | 10.7 |
| 5) | Development of the Computer Science and Communication Technologies (CSCT) in GEMAR 2018-2030 | 3.3 | 2.1 | 5.5 |
| 6) | Development of Services and Other Investments in the Port sector 2018-2030 | 1.7 | 2.4 | 4.1 |
| 7) | Dredging of GEMAR Ports | 4.8 | 6.2 | 10.9 |
| Total | | 43.3 | 39.9 | 83.2 |

Source: Comprehensive Development Plan of the Maritime Port Transport 2018-2030, GEMAR

### (3) Havana Port Development Plan

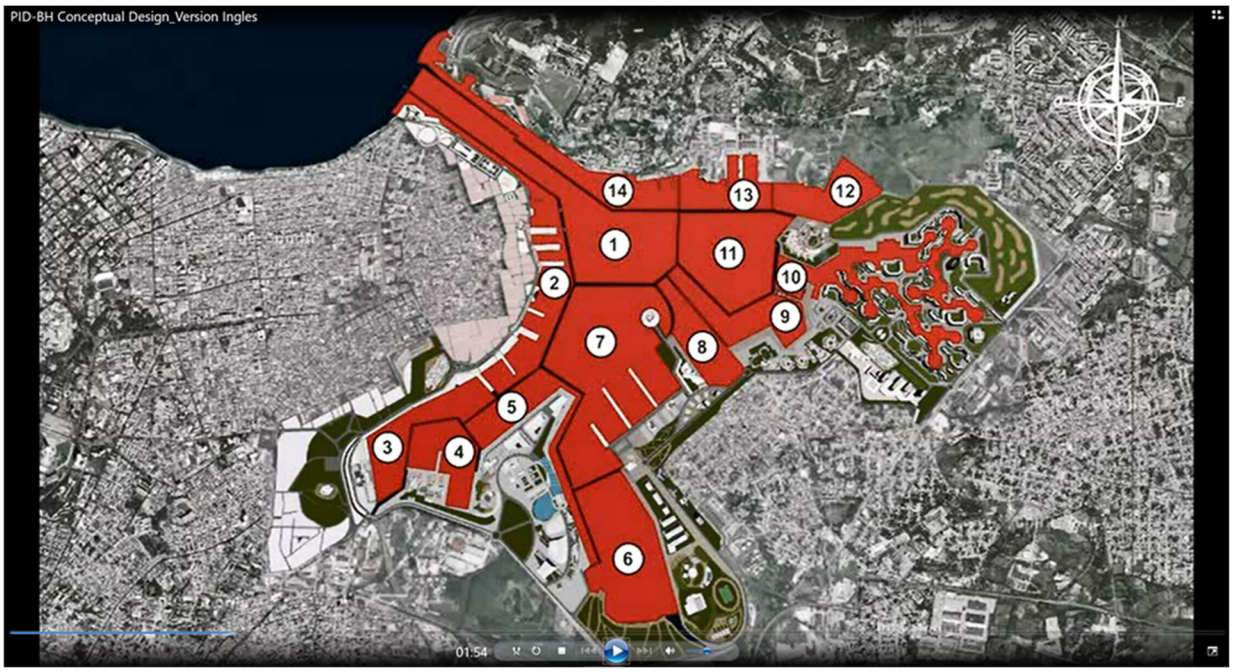
Table 4.5.13 and Figure 4.5.36 show the updated redevelopment plan of Havana port as a tourism and leisure center.

**Table 4.5.13 Havana port redevelopment plan**

| Area | Name | Existing Condition | Development Concept |
|---|---|---|---|
| Area 1 | Havana Bay Access Channel | ✓ Entrance channel (L 1,800 m, W 270 m, D 11.43 m<br>✓ Bay tunnel (immersed tunnel) across the mouth of the bay | Port Access Area |
| Area 2 | Old Havana littoral | ✓ There are 9 docks of different dimensions<br>✓ Port-related facilities (most of them not in use) | Historical Center Area |
| Area 3 | “Ensenada de Atares” West Shore | ✓ Docks which depth of 6 ~ 9 m<br>✓ Finishing industrial use | Nautical Area |
| Area 4 | “Ensenada de Atares” East Shore | ✓ Docks which depth of 6 ~ 9 m<br>✓ Industrial use (shipyards) | Sports Marina Area |
| Area 5 | “Cayo Cruz” Peninsula | ✓ Docks with depth of 8 ~ 12 m<br>✓ Luyano river mouth in the west shore of the “Ensenada de Guasabacoa (Guasabacoa Little Bay).”<br>✓ Commercial port (Haiphong Terminal in use) | Yacht Harbour Area |
| Area 6 | “Guasabacoa” Little Bay | ✓ Natural shore 800 m wide, “Martin Perez” river mouth<br>✓ 100 m length docks with depth 7 ~ 12 m<br>✓ Industrial and commercial use<br>✓ Zone without maritime traffic interference | Nautical Sports Area |

| Area | Name | Existing Condition | Development Concept |
|---|---|---|---|
| Area 7 | West "Regla" littoral | ✓ Docks with depth of 10 ~ 12 m<br>✓ Commercial port in use<br>✓ Boats key for passengers | Cruise Line Area |
| Area 8 | St Catalina Point | ✓ GEOCUBA sea studies | St Catalina Point Area (Natural Park) |
| Area 9 | East "Regla" Littoral | ✓ Irregular fractioned shore, with docks which depth of 3 ~10 m<br>✓ "Tadeo" river's mouth (River Channel)<br>✓ Industrial use | Natural Park Area |
| Area 10 | "Nico-Lopez" Refinery Area | ✓ Oil Refinery<br>✓ Big docks with considerable depth<br>✓ Industrial use - main contamination source of Habana bay | Residential Marina Area (Tourism Development) |
| Area 11 | Water body | ✓ Average depth 9 m | Water body |
| Area 12 | Nature Protected Area | ✓ Thermo-electric plant "Frank Pais" (not in use)<br>✓ SAMARP Dock<br>✓ Insalubrious Zone "La Julia"<br>✓ Declared natural area (swamp) | Ecological Park |
| Area 13 | Shipyard Area | ✓ Empresa Nacional de Astilleros (ENA) Shipyards National Enterprise<br>✓ EMI (Empresa Militar Industrial) Granma<br>✓ Caribbean Dry-dock Company INC (CDC) | Shipyard Area |
| Area 14 | Casa Blanca South Littoral | ✓ "Casa Blanca" shore<br>✓ La Cabana Fortress<br>✓ French Quay<br>✓ El Morro Castle | Casa Blanca Area (tourism) |

Source: PID-BH de la zona marítima portuaria (movie)




Source: PID-BH de la zona marítima portuaria (movie)

**Figure 4.5.36 Havana port redevelopment plan**

### 4.5.11 Planning issues in the maritime transport sector

Based on understanding the existing condition, though the information is limited to GEMAR data and the discussion with TWG members, a series of planning issues in the maritime transport sector were identified. These are summarized in Table 4.5.14.

**Table 4.5.14 Port maritime transport sector issues to be addressed**

| Key areas | Issues to be addressed |
|---|---|
| 1. Planning and coordination | • Update the inventory database (computerized system) of port infrastructure, equipment, spare parts, and navigation channel. |
| | • Continued implementation of the GEMAR 2018-2030 plan in a coordinated manner with other industrial sectors. |
| | • Implementation of Havana Port redevelopment in a coordinated manner (with La Habana). |
| | • Establishment of a regular planning coordination mechanism among MEP, MINTUR, MITRANS, and other ministries about port/maritime transport-related issues. |
| | • Development of port infrastructure maintenance plan/programs (prioritization). |
| | • Development of human resource database of GEMAR and ESP staff. |
| | • Preparation of human resource development plan/training programs (advanced training program, strengthening of Cimab). |
| | • Development of a database for cargo handling and passenger transport records (statistics). |
| | • Plan and design of Port EDI for major ports. |
| | • More effective use of Santiago de Cuba for export and import by container for the national interest. |
| | • Well-coordinated intermodal transport (port-1st warehouse-truck/rail-2nd warehouse/final destination). |
| | • Commercial use of the port area (joint development with the non-state sector). |
| | • Involvement of non-state sector, including FDI in the service provision (cargo and passengers). |
| 2. Transport infrastructure development | • Acceleration of ongoing port infrastructure. |
| | • Phased and continued improvement of the major ports and equipment. |
| | • Phased and continued improvement of the vessels. |
| | • Continued improvement of the navigation system and safety device installation. |
| | • Improvement/renewal of dockyards. |
| | • Procurement of spare parts, materials, machines, and equipment for maintenance work. |
| 3. Environment, safety, and security | • Installation of an advanced communication system and safety device. |
| | • Security enhancement. |
| | • Public (passengers) enlightenment about safety and security. |
| | • Prevention measures against COVID-19. |
| | • Public enlightenment about COVID-19. |
| 4. Transport service and industry development | • Improved passenger boat services in Havana, Santiago de Cuba, and other bays. |
| | • Introduction of online ticketing service. |
| | • Introduction of a smart card system. |
| | • Attract tourists (foreigners) by improving cruise ship-related services. |
| | • Attract more cargo consigners by improving handling efficiency. |
| | • Advancement of monthly/weekly “balance de cargas” system to increase cargo transport efficiency (cabotage transport for both ways). |

| Key areas | Issues to be addressed |
|---|---|
| | • Havana port business development plan - effective use of the Havana port area. |
| | • Promote the national port/vessel-related industry. |
| | • Coordinating with an investment portfolio. |
| | • Introduction of Third Party Logistics (3PL) service with the non-state sector can be considered. |
| 5. Transport pricing and resource allocation | • Provision of an appropriate and stable state budget allocation for regular inspection and maintenance work. |
| | • Increase staff salary to attract quality human resources to the port/maritime sector. |
| | • FDI can be considered in the port infrastructure development and service provision. |
| | • Increase revenue from the port area real estate business. |
| 6. Institutional and regulatory development | • Legislative and regulatory frameworks for maritime transport service provision and operation (service production) and maintenance need to be reviewed and upgraded– the introduction of FDI, etc. - enhanced opportunities for private sector involvement in the provision of maritime transport infrastructure and services. |
| | • Foreseen shortage (aging) of human resources needs to be considered - institute long-term training programs in the maritime transport sector planning, management, and operations to improve human resource capabilities. |

Source: TWG and JICA Study Team

## 4.6 Aviation Sector Planning Issues

### 4.6.1 Overview of the Air Transport Sector

Cuba's airport and air transport sector is the responsibility of the Institute of Civil Aeronautics of Cuba (IACC), subordinate unit to the Ministry of Transport (MITRANS). Under Law 1218 on transport, Decree-Law 255 governs civil aviation, and a further decree elaborates the provisions in more detail.

IACC is the agency in charge of directing, executing, and controlling the state's policy on air transportation, air navigation, and its auxiliary and related services. In addition, IACC sets associated regulations and manuals that meet the International Civil Aviation Organization (ICAO) standards. IACC regulations are set out in the Cuban Aeronautical Regulations and Cuban Aeronautical Manuals.

While IACC oversees aeronautical administration, in general, aeronautics and airports are controlled and directed by the Cuban Aviation Corporation (CACSA), as the relevant OSDE. With the 2015 reorganization of MITRANS, all departments and directorates with business functions under IACC were placed under the essential coordination of CACSA.

As a result, CACSA controls and directs the enterprises comprising it, in total 11 and 3 international economic associations, and is attended by the Minister of Transport (Resolution 240/2017). Among those enterprises, they include Cuban Enterprise of Airports and Aeronautical Services (ECASA), Cubana de Aviación (national airline), Aerovaradero (air cargo operator), and three joint ventures with foreign capital.

CACSA is responsible for meeting the demand for passenger and cargo transportation by air, having a sustainable airport and aeronautical infrastructure that guarantees the surveillance and sovereignty of Cuba's airspace, as well as ensuring the demand for agricultural activity, which contributes to the country's food program.

The enterprises and international economic associations comprising CACSA are the following:

- Empresa Cubana de Aeropuertos y Servicios Aeronáuticos (ECASA S.A.), in charge of providing ground assistance services to aircraft and passengers for Cuba's 10 international airports (it does not provide air traffic control services),
- Empresa de Navegacion Aerea (ECNA S.A.), in charge of providing air traffic, meteorological, telecommunications, communications, and aeronautical information services,
- Cubana de Aviación S.A., founded in 1929, provides regular and non-scheduled passenger, cargo and mail transportation services. It has the most varied possibilities for domestic, international, and interline connections. Another airline Aerogaviota, which operates with military affiliation, provides limited service on five domestic and five international routes.
- Aerovaradero S.A., in charge of the development of domestic and international air cargo activity,
- Cubacatering S.A., in charge of providing air catering and gastronomic services in all airport facilities in the country,
- ESPAC S.A., in charge of safety and security in airport facilities,
- Commercial Takeoff S.A., in charge of representing airlines and foreign commercial companies,

- Aviaimport S.A. provides services of contracting, import, and commercialization of the necessary stuffs for the aviation system,
- CCOA S.A. provides consulting services, technical advice in the preparation and execution of investments in the Civil Aviation system,
- ENSA S.A. provides services for the dispersion of chemical and biological products, patrolling and extinguishing of forest fires,
- SERVAC S.A. provides services to enterprises in the aviation sector.

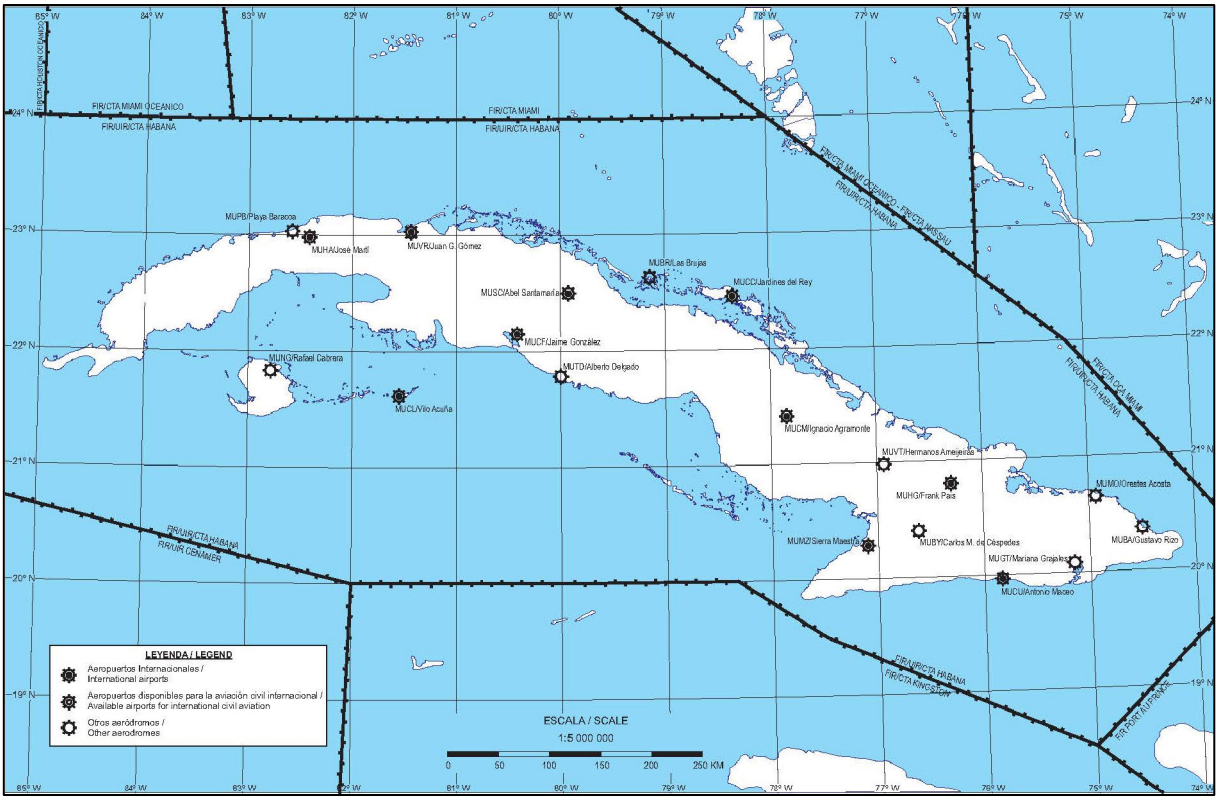
The three joint ventures are;

- Empresa Hispano Cubana de Mantenimiento de Aeronaves (Cuban Spanish Enterprise for Aircraft Maintenance) (IBECA), which is in charge of in line maintenance of aircraft,
- ELCA Empresa Logística de Carga Aérea (Air Cargo Logistics Enterprise), which is a cargo enterprise dedicated to the development of Havana as a transit point for goods;
- GAM Technic, Aeronautical Maintenance Group (Grupo Aeronáutico de Mantenimiento) provides primary technical maintenance services to aircraft.

### 4.6.2 Airports

Cuba has 10 international airports – José Martí/Havana, Varadero, Santa Clara, Cienfuegos, Cayo Coco, Camagüey, Holguín, Manzanillo, Santiago de Cuba, and Cayo Largo – and 12 domestic airports: Baracoa, Bayamo, Ciego de Ávila, Guantanamo, Havana-Baracoa Beach, Las Tunas, Moa, Nueva Gerona, Santa María Key, Pinar del Río, Sancti Spíritus, and Trinidad. All are managed by enterprises comprising CACSA.

Locations of airports managed by ECASA are shown in Figure 4.6.1.




Source: Aeronautical Information Publication in the Republic of Cuba (AIP)

**Figure 4.6.1 Airport locations in Cuba**

Cuba's airports are summarized in Table 4.6.1, including runway length, code designators, etc.

**Table 4.6.1 Airports in Cuba**

| No. | | Airport name | City | Runway length × width (meters) | | IATA Code | ICAO Code |
|---|---|---|---|---|---|---|---|
| **International** | | | | | | | |
| 1 | 1 | Ignacio Agramonte | Camagüey | 3,000 | 45 | CMW | MUCM |
| 2 | 2 | Jardines del Rey | Cayo Coco | 3,000 | 45 | CCC | MUCC |
| 3 | 3 | Vilo Acuña | Cayo Largo del Sur | 3,000 | 45 | CYO | MUCL |
| 4 | 4 | Jaime González | Cienfuegos | 2,400 | 45 | CFG | MUCF |
| 5 | 5 | José Martí International | Havana | 4,000 | 45 | HAV | MUHA |
| 6 | 6 | Frank País | Holguín | 3,238 | 45 | HOG | MUHG |
| 7 | 7 | Sierra Maestra | Manzanillo | 3,000 | 45 | MZO | MUMZ |
| 8 | 8 | Abel Santamaría | Santa Clara | 3,017 | 45 | SNU | MUSC |
| 9 | 9 | Antonio Maceo | Santiago de Cuba | 4,002/ 1,400 | 45/ 45 | SCU | MUCU |
| 10 | 10 | Juan Gualberto Gómez | Varadero-Matanzas | 3,502 | 45 | VRA | MUVR |
| **Domestic** | | | | | | | |
| 11 | 1 | Gustavo Rizo | Baracoa | 1,850 | 30 | BCA | MUBA |
| 12 | 2 | Carlos Manuel de Céspedes | Bayamo | 2,099 | 30 | BYM | MUBY |
| 13 | 3 | Máximo Gómez | Ciego de Ávila | 3,532 | 45 | AVI | MUCA |
| 14 | 4 | Mariana Grajales | Guantánamo | 2,446 | 45 | GAO | MUGT |
| 15 | 5 | Playa Baracoa | Havana - Playa Baracoa | 2,305 | 45 | UPB | MUPB |

| No. | | Airport name | City | Runway length × width (meters) | | IATA Code | ICAO Code |
|---|---|---|---|---|---|---|---|
| 16 | 6 | Hermanos Ameijeiras | Las Tunas | 1,820 | 45 | VTU | MUVT |
| 17 | 7 | Orestes Acosta | Moa | 1,860 | 30 | MOA | MUMO |
| 18 | 8 | Rafael Cabrera Mustelier | Nueva Gerona (Isla de la Juventud) | 2,500/1,623 | 45/ 30 | GER | MUNG |
| 19 | 9 | Las Brujas | Cayo Santa María | 1,800 | 45 | BWW | MUBR |
| 20 | 10 | La Coloma | Pinar del Río | 2,000 | 45 | LCL | MULM |
| 21 | 11 | Sancti Spíritus | Sancti Spíritus | 1,801 | 45 | USS | MUSS |
| 22 | 12 | Alberto Delgado | Trinidad | 1,801 | 30 | TND | MUTD |

Source: IACC

### 4.6.3 Airport facilities

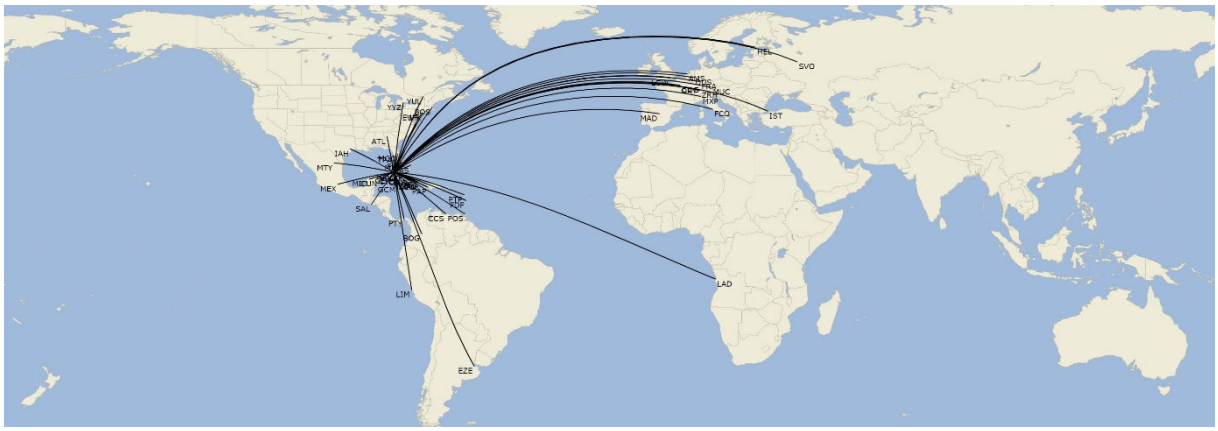
Current problems for Cuban airports include the general deterioration of airport facilities, particularly ground support equipment (GSE), a challenge that needs to be resolved urgently.

Although the problem is still limited, deteriorated GSE seriously affects flight operations and delays some flights. However, defects in other equipment have not yet caused flight delays. Accordingly, adequate passenger service is being provided at Havana's José Martí Airport, the gateway to Cuba, and Varadero Airport, which receives the second largest number of foreign tourists.

Conditions at Cuba's six main international airports: 1) Jose Marti/Havana; 2) Juan G. Gomez/Varadero; 3) Abel Santamaria/Santa Clara; 4) Jardines de Rey/Cayo Coco; 5) Frank Pais/Holguin and; 6) Antonio Maceo/Santiago de Cuba are summarized below.

#### (1) Jose Marti/ Havana International Airport (IATA: HAV)

Jose Marti Airport is Cuba's largest international airport, with a 4,000 x 45-meter runway. In 2018, the airport handled 6.2m passengers, of which 5.9m were international and 0.3m were domestic passengers. Scheduled international flights are offered to North America, the Caribbean, Latin/South America, Europe, and Africa, as shown below in Figure 4.6.2.




Source: JICA Study Team (Innovata Airline Schedule Data via Diio Mi)

**Figure 4.6.2 International air routes from/to Havana**

There are three international terminals: Terminal 3 serves most major foreign airlines; Terminal 2 serves U.S. and charter flights; Terminal 5 serves Cubana de Aviación's global operations.

Terminal 3 is the only "modern" terminal, but it only has eight jet-boarding bridges. The other single-story terminals are generally old-fashioned and deteriorated, using mobile stairs for aircraft boarding.

In addition, there is a separate domestic terminal (Terminal 1), which is inconveniently located for transfers from the other terminals. It was observed that many GSE (ground support equipment) vehicles were out of order in 2019.

In 2017, the Jose Marti air cargo terminal was improved with the installation of large-size X-ray equipment acquired via Chinese aid. In addition, Russian-made equipment is used for air traffic control in air navigation facilities, and Russian support is expected to continue.

**Table 4.6.2 CACSA additional information on Jose Marti**

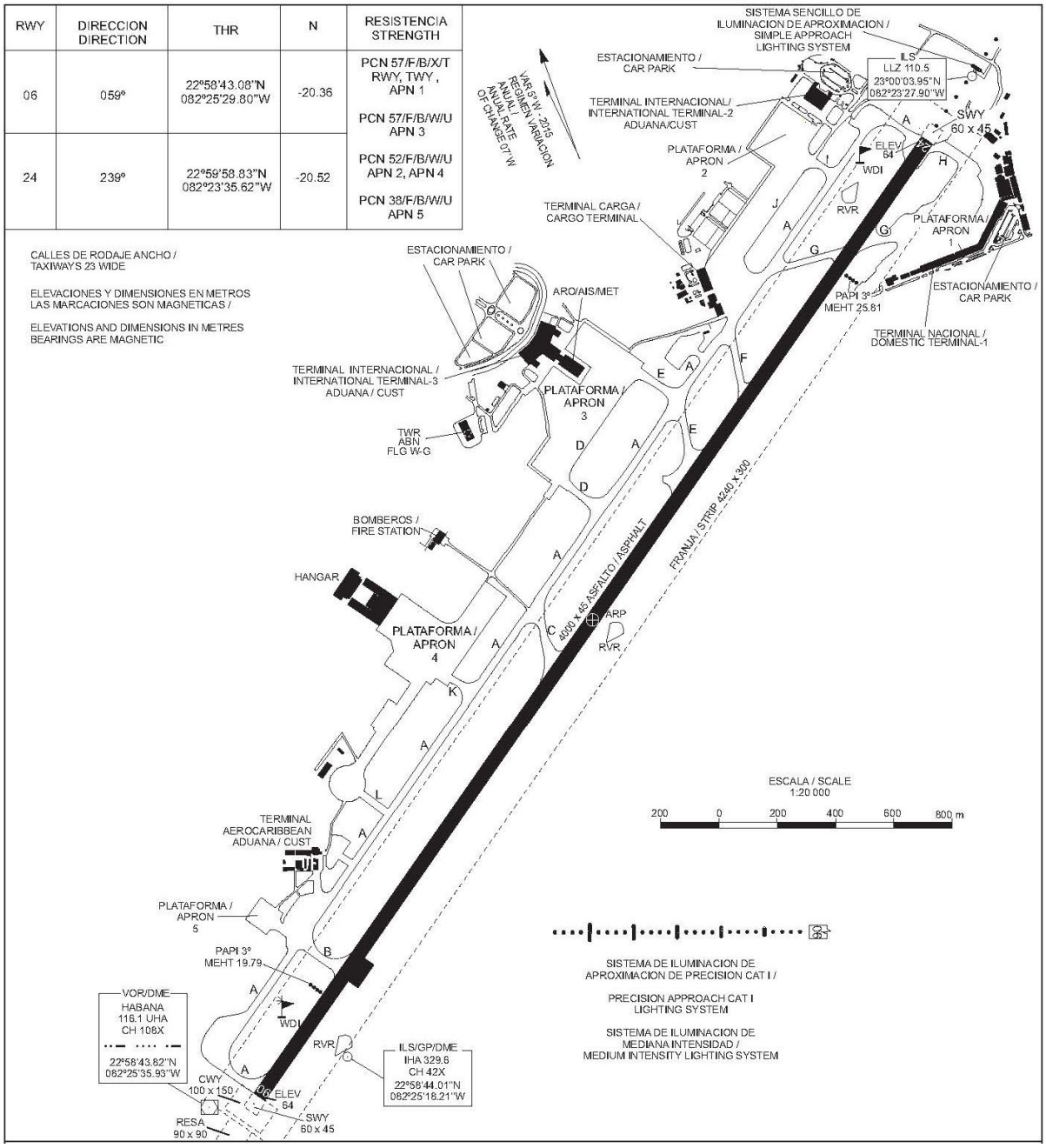
| Item | | Description | | | | |
|---|---|---|---|---|---|---|
| Principal features | Name | La Havana Jose Marti International Airport | | | | |
| | Operation | International and domestic | | | | |
| | Code | ICAO: MUHA IATA: HAV | | | | |
| | Location | Latitude: 22º59'21"N | | | | |
| | | Longitude: 082º24'33"W | | | | |
| | Access to airport | 12 km from Havana City center, approx. 30 min. by road | | | | |
| | Reference ground elevation | 64 m +MSL | | | | |
| | Temperature | Average 32.3 ºC | | | | |
| | Firefighting | CAT 9 | | | | |
| | Operation | 24 hours | | | | |
| | Operator | Airport facility: ECASA, Navigation system: ECASA | | | | |
| Runway | | No. | Dimensions | PCN | Slope | Strip Dimension |
| | | 06/24 | 4,000 m × 45 m | 57/F/B/X/T | 0% | 4,240 m × 300 m |
| Taxiway | | Width | | PCN | surface | |
| | | 23 m | | 57/F/B/X/T | Asphalt | |
| Aircraft parking apron | | PCN | | | | |
| | | APN1: 57/F/B/X/T | | APN3: 57/F/B/W/U | APN2,4: 52/F/B/W/U | |
| Radio NAV & landing aids | | GP, VOR/DME | | | | |
| Approach and runway lighting | | RWY06: Precision Approach CAT-I SALS 900M | | | | |
| | | RWY24: SALS 420M | | | | |

Source: AIP

AIP-CUBA AD 2 MUHA 2-1-1-1
12 OCT 17

PLANO DE AERODROMO - OACI / AERODROME CHART - ICAO | 22°59'21"N 082°24'33"W | ELEV 64 | TWR 118.1 ATIS 132.5 GND 121.9 | LA HABANA / José Martí Intl

| RWY | DIRECCION DIRECTION | THR | N | RESISTENCIA STRENGTH |
|---|---|---|---|---|
| 06 | 059° | 22°58'43.08"N 082°25'29.80"W | -20.36 | PCN 57/F/B/X/T RWY, TWY, APN 1<br>PCN 57/F/B/W/U APN 3 |
| 24 | 239° | 22°59'58.83"N 082°23'35.62"W | -20.52 | PCN 52/F/B/W/U APN 2, APN 4<br>PCN 38/F/B/W/U APN 5 |




Source: AIP

**Figure 4.6.3 Map of Jose Marti Airport**

| | |
|---|---|
|  |  |
| **Congestion at T-3 check-in area** | **T-2 Boarding Southwest Airlines** |
|  |  |
| **Boarding car** | **Refueling vehicle** |
|  |  |
| **Container dolly** | **Dolly (bulk cart)** |

Source: JICA Study Team, 2019

**Figure 4.6.4 Photos of Jose Marti Airport**

### (2) Varadero Juan Gualberto Gomez International Airport (IATA: VRA)

Varadero, 150 km east of Havana, is one of Cuba's most important tourist destinations, noted for its sandy beaches. Located near Havana and Matanzas, it is easy to reach by land, air, or sea.

In 2018, Varadero served 1.5m passengers, Cuba's second-largest airport by passenger volume. It is primarily served by international flights from several airports across Canada, Mexico, the Caribbean, Europe, Russia, and Miami (U.S.).


Source: JICA Study Team (Innovata Airline Schedule Data via Diio Mi)

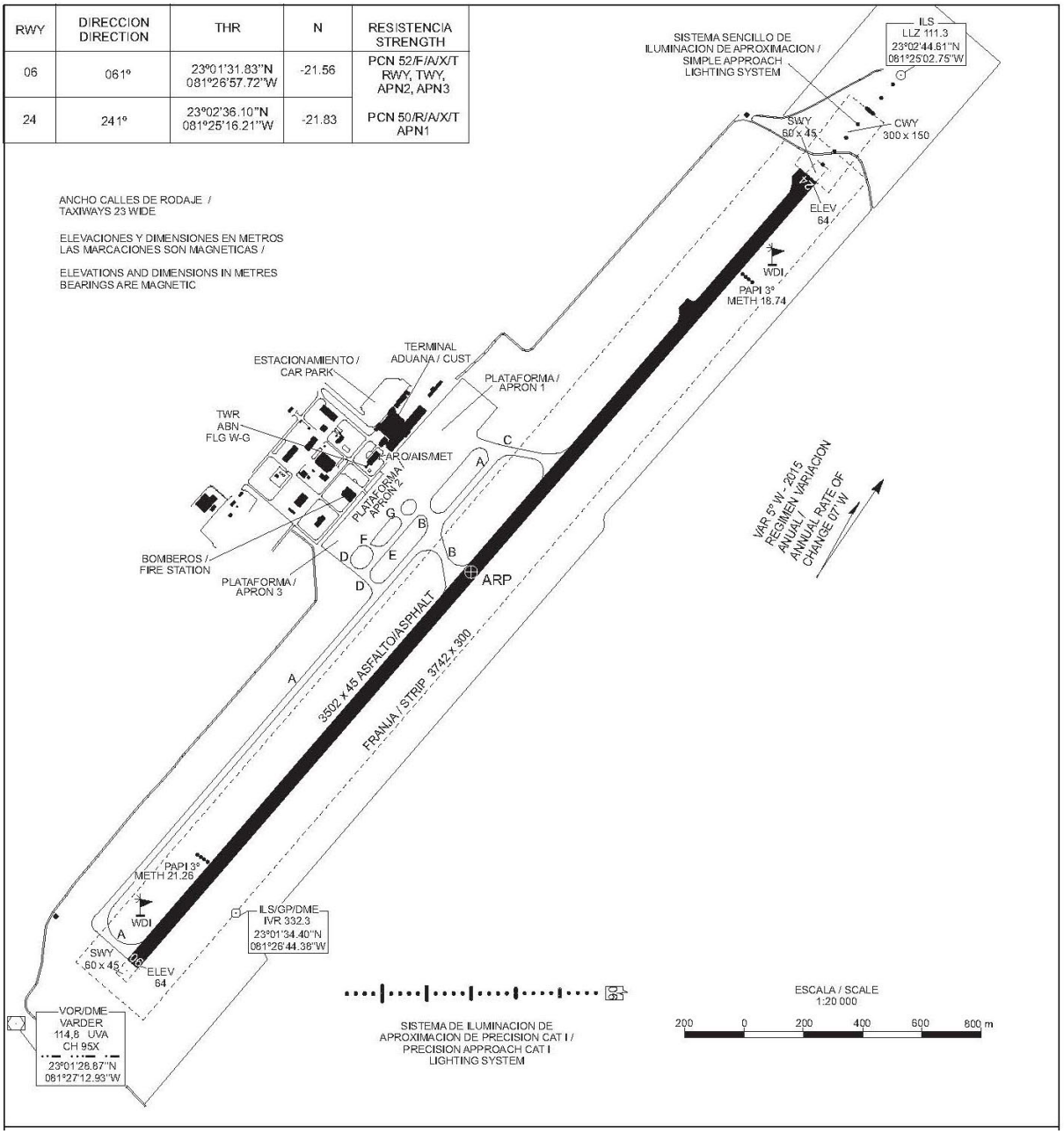
**Figure 4.6.5 International air routes from/ to Varadero**

The airport has a single runway (3,502 × 45m). In 2010, a new passenger waiting hall (approx. 2,000 $m^2$) was built with Venezuelan funds. However, it was observed that both departing and arriving passengers faced bottlenecks on the stairs. GSE facilities need renewal, as essential equipment, like the push-back tractor, was out of order. CACSA plans to improve cargo facilities located far from the aircraft parking area. But it is necessary to formulate a comprehensive airport master plan, including a new cargo terminal with expanded aircraft parking aprons.

AIP-CUBA AD 2 MUVR 2-1-1-1
12 OCT 17

PLANO DE AERODROMO - OACI / AERODROME CHART - ICAO | 23°02'04"N 081°26'07"W | ELEV 64 | TWR 118.4 | VARADERO / Juan Gualberto Gómez Intl

| RWY | DIRECCION DIRECTION | THR | N | RESISTENCIA STRENGTH |
|---|---|---|---|---|
| 06 | 061° | 23°01'31.83"N 081°26'57.72"W | -21.56 | PCN 52/F/A/X/T RWY, TWY, APN2, APN3 |
| 24 | 241° | 23°02'36.10"N 081°25'16.21"W | -21.83 | PCN 50/R/A/X/T APN1 |



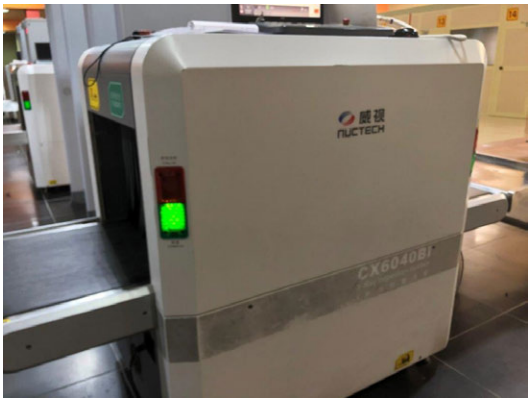

Source: AIP

**Figure 4.6.6 Map of Juan G. Gomez Varadero Airport**

**Table 4.6.3 Information on Juan G. Gomez Varadero Airport**

| Item | | Description | | | | |
|---|---|---|---|---|---|---|
| Principal features | Name | Varadero/Juan Gualberto Gimez International Airport | | | | |
| | Operations | International and domestic | | | | |
| | Code | ICAO: MUVR IATA: VRA | | | | |
| | Location | Latitude: 23º02'04"N | | | | |
| | | Longitude: 081º26'07"W | | | | |
| | Access to airport | 22 km from Varadero City center, approx. 30 min. by road | | | | |
| | Reference ground elevation | 64 m +MSL | | | | |
| | Temperature | Average 32.0 ºC | | | | |
| | Firefighting | CAT 9 | | | | |
| | Operation | 24 hours | | | | |
| | Operator | Airport facility: ECASA, Navigation system: ECASA | | | | |
| Runway | | No. | Dimensions | PCN | Slope | Strip dimensions |
| | | 06/24 | 3,502 m × 45 m | 52/F/A/X/T | 0% | 3,742 m × 300 m |
| Taxiway | | width | | PCN | surface | |
| | | 23 m | | 52/F/A/X/T | Asphalt | |
| Aircraft parking apron | | PCN | | | | |
| | | APN1: 50/R/A/X/T | | APN2,3: 52/F/A/W/U | | |
| Radio NAV & landing aids | | GP, VOR/DME | | | | |
| Approach and runway lighting | | RWY06: ALS CAT-I 900M LIH | | | | |
| | | RWY24: SALS 420M LIM | | | | |

Source: AIP

| | |
|---|---|
|  |  |
| **GSE Yard (dolly)** | **GSE Yard (boarding car)** |
|   |   |
| **X-ray (donated by China)** | **X-ray (donated by China)** |
|  |  |
| **Fuel farm** | **Refueling truck** |

Source: JICA Study Team, 2019

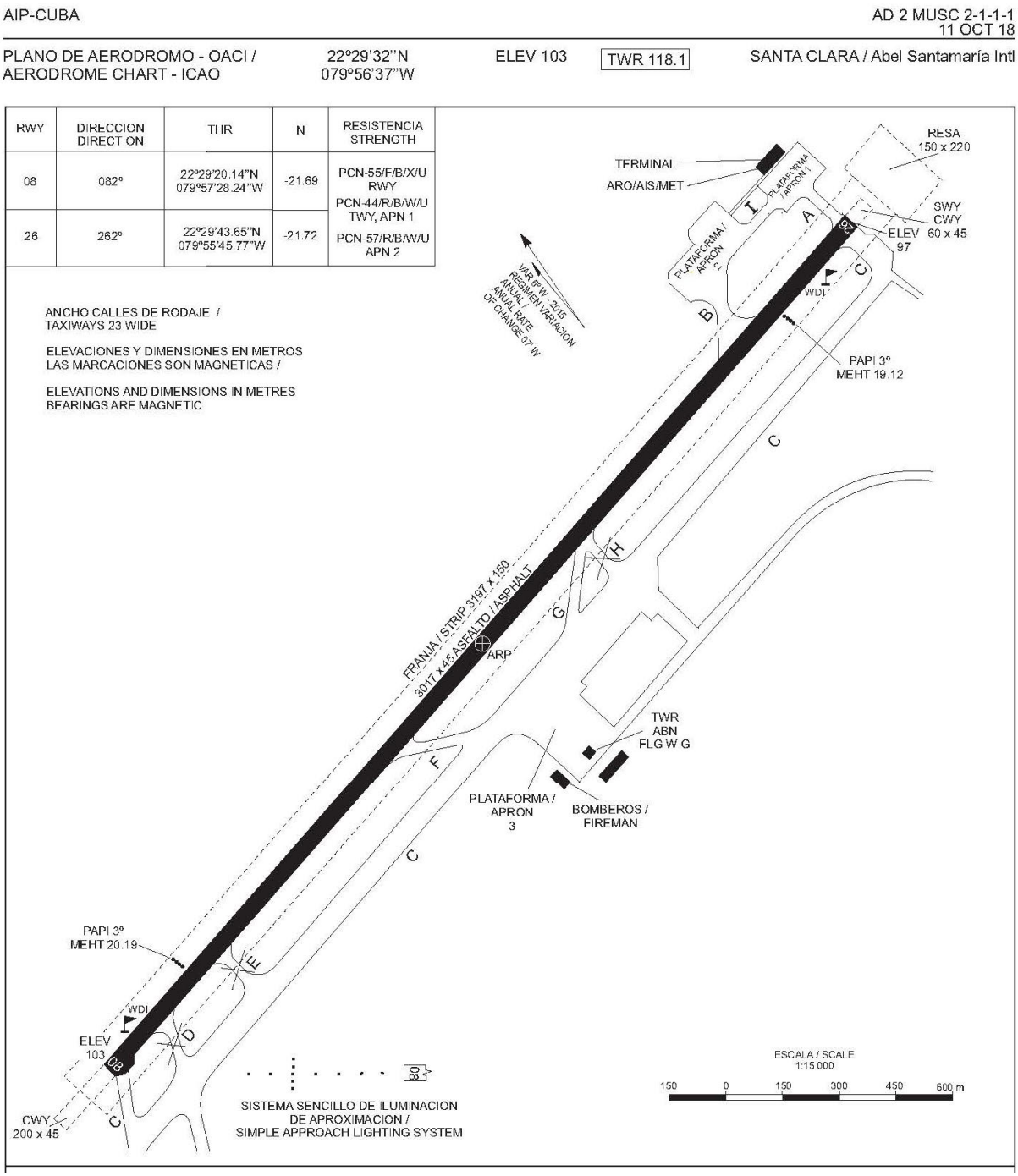
**Figure 4.6.7 Photos of Juan G. Gomez Varadero Airport**

### (3) Santa Clara/Abel Santamaria International Airport (IATA: SNU)

Santa Clara Airport is located in central Cuba, 335 km southwest of Havana. It serves the city of Santa Clara and nearby beaches to the north. Situated 90 minutes by road from the seaside town of Cienfuegos, the airport also serves many foreign travelers bound for popular Cienfuegos and Trinidad. In 2018, it was Cuba's 3rd-largest airport by passenger volume serving 834,000 passengers, mainly by international flights arriving from airports across Canada, plus Italy, Poland, Russia, Mexico, and Panama, as well as Miami and Fort Lauderdale in the U.S. The airport has a single runway (3,017 x 45m).


Source: JICA Study Team (Innovata Airline Schedule Data via Diio Mi)

**Figure 4.6.8 International air routes from/ to Santa Clara**




Source: AIP

**Figure 4.6.9 Map of Santa Clara Airport**

The existing SNU terminal building, especially its check-in hall, is narrow and does not have sufficient capacity to serve passengers during the peak season. It was also observed that there is no room to extend the terminal. The airport has added several check-in counters in the departure concourse during the peak season. The location of the existing passenger terminal, adjacent to Runway 26, is not ideal. Besides, the control tower and the parallel taxiway are on the opposite side under military control. Therefore, a high priority is to formulate a comprehensive airport master plan.

**Table 4.6.4 Information on Abel Santamaria/Santa Clara Airport**

| Item | | Description | | | | |
|---|---|---|---|---|---|---|
| Principal features | Name | Santa Clara/Abel Santamaria International Airport | | | | |
| | Operation | International and domestic | | | | |
| | Code | ICAO: MUSC IATA: SNU | | | | |
| | Location | Latitude: 22º29'32"N | | | | |
| | | Longitude: 079º56'37"W | | | | |
| | Access to airport | 9 km from Santa Clara City center, approx. 15 min. by road | | | | |
| | Reference ground elevation | 103 m +MSL | | | | |
| | Temperature | Average 33.2 ºC | | | | |
| | Firefighting | CAT 8 | | | | |
| | Operation | 1300-0700 | | | | |
| | Operator | Airport facility: ECASA, Navigation system: ECASA | | | | |
| Runway | | No. | Dimensions | PCN | Slope | Strip dimensions |
| | | 08/26 | 3,017 m × 45 m | 55/F/B/X/T | 0.2 % | 3,197 m × 150 m |
| Taxiway | | Width | | PCN | Surface | |
| | | 23 m | | 44/R/B/W/U | Asphalt | |
| Aircraft parking apron | | PCN | | | | |
| | | APN1: 44/R/B/W/U | | APN2: 57/R/B/W/U | | |
| Radio NAV & landing aids | | VOR/DME | | | | |
| Approach and runway lighting | | RWY08: SALS 420M LIM | | | | |
| | | RWY26: | | | | |

Source: AIP

**Terminal building from the air side**

**New cargo warehouse (under construction, 2019)**

**GSE yard**

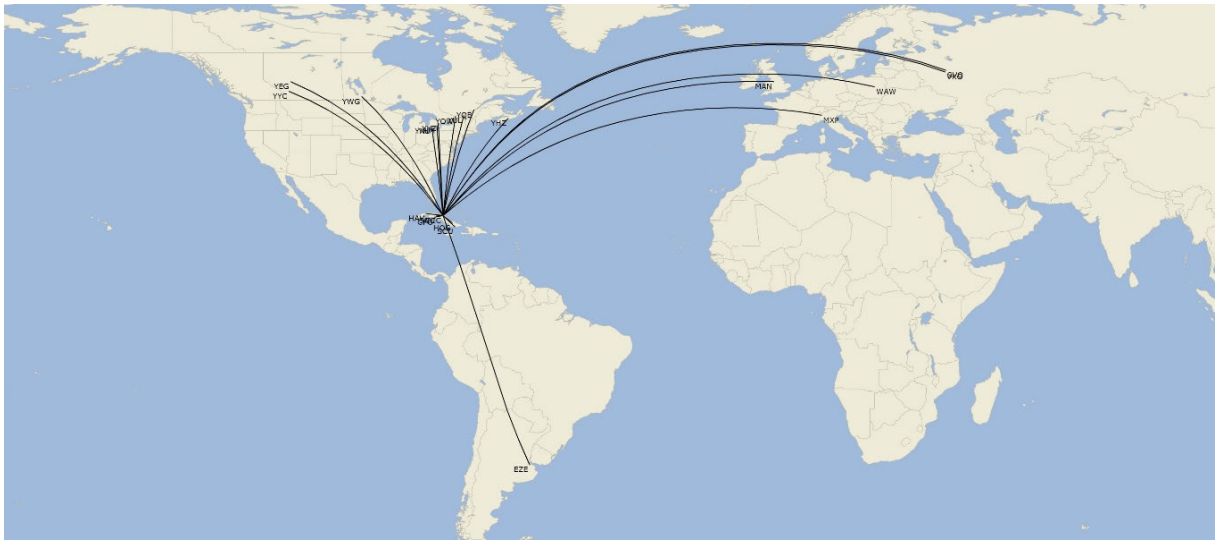
**Workshop**

Source: JICA Study Team

**Figure 4.6.10 Photos of Santa Clara Airport**

### (4) Cayo Coco/Jardines del Rey International Airport (IATA: CCC)

Jardines del Rey airport is located at Cayo Coco key on the north coast in the Ciego de Ávila Province of central Cuba. It was inaugurated on December 26, 2002, replacing the old domestic Cayo Coco Airport 10 km to the west. With 572,000 passengers in 2018, the airport serves the popular island resort destination with flights from various Canadian airports, including Buenos Aires, Europe, and Russia. Its runway is 3,000 × 45 m.



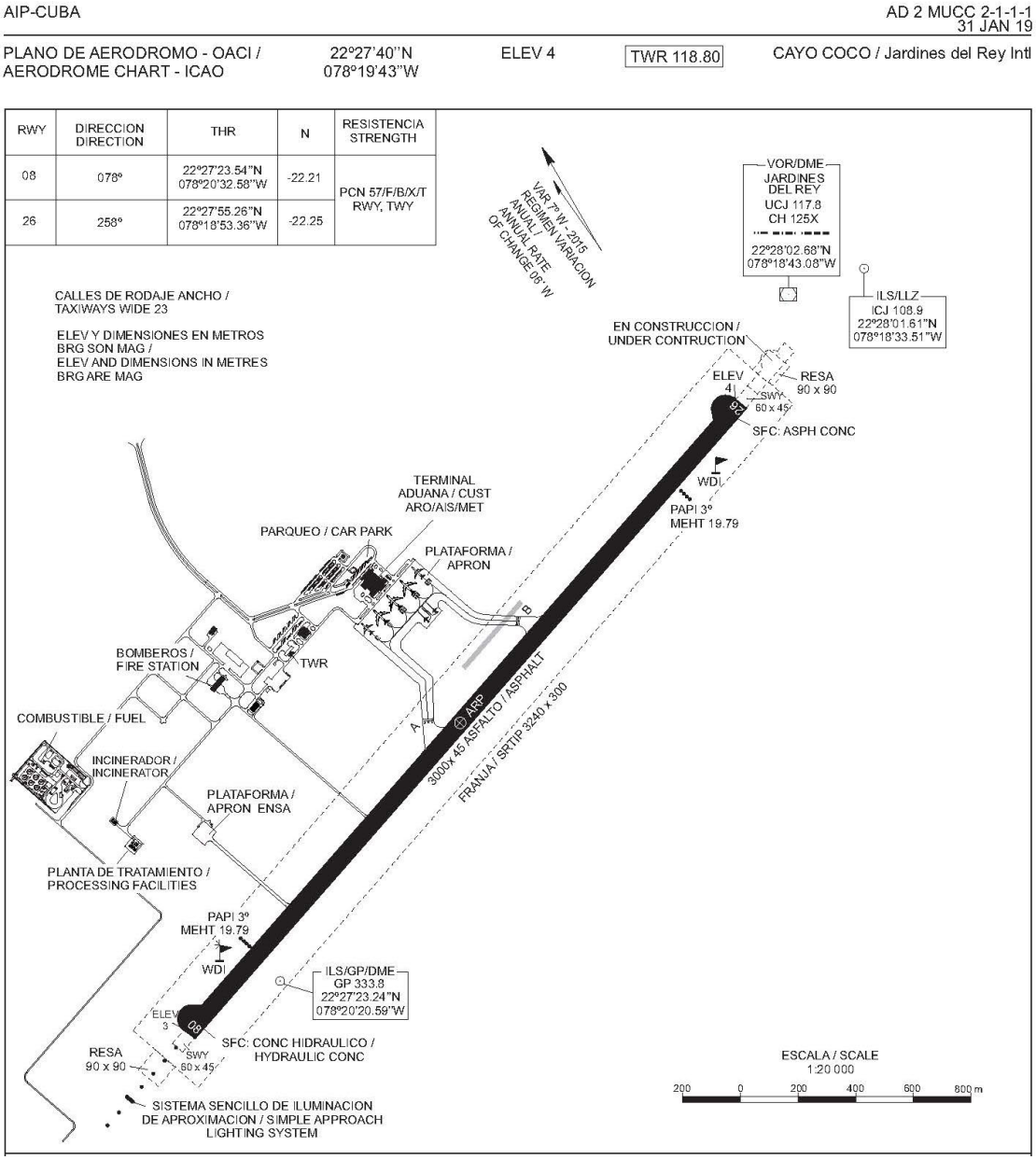

Source: JICA Study Team (Innovata Airline Schedule Data via Diio Mi)

**Figure 4.6.11 International air routes from/to Cayo Coco**

**Table 4.6.5 Information on Cayo Coco/Jardines del Rey Airport**

| Item | | Description | | | | |
|---|---|---|---|---|---|---|
| Principal features | Name | Cayo Coco/ Jardines del Rey International Airport | | | | |
| | Operation | International and domestic | | | | |
| | Code | ICAO: MUCC IATA: CCC | | | | |
| | Location | Latitude: 22º16'27.84"N | | | | |
| | | Longitude: 078º11'47.94"W | | | | |
| | Access to airport | 65 km from Moron City center, approx. 60 min. by road | | | | |
| | Reference ground elevation | 4 m +MSL | | | | |
| | Temperature | Average 32.4 ºC | | | | |
| | Firefighting | CAT 9 | | | | |
| | Operation | 1200-2359 | | | | |
| | Operator | Airport facility: ECASA, Navigation system: ECASA | | | | |
| Runway | | No. | Dimensions | PCN | Slope | Strip dimensions |
| | | 08/26 | 3,000 m × 45 m | 55/F/B/X/T | 0.08 to0.48 % | 3,240 m × 300 m |
| Taxiway A, B | | Width | | PCN | surface | |
| | | 23 m | | 57/F/B/X/T | Asphalt | |
| Aircraft parking apron | | PCN | | | | |
| | | APN1: 57/R/B/W/U | | | | |
| Radio NAV & Landing AIDS | | GP, CAT-1, VOR/DME | | | | |

Source: AIP




Source: AIP

**Figure 4.6.12 Map of Cayo Coco Airport**

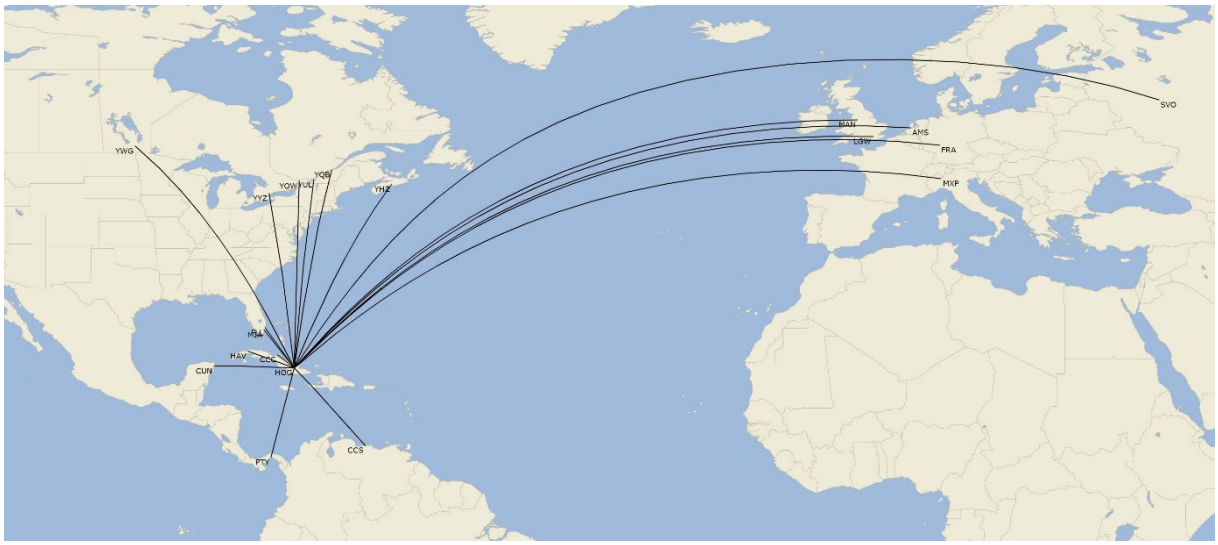
| | |
|---|---|
|  |  |
| **Passenger terminal airside** | **Check-in hall** |
|  |  |
| **Waiting lounge** | **Security checkpoint for arriving passengers** |
|  |  |
| **Passenger terminal view from the control tower** | **GSE workshop view from the control tower** |

Source: JICA Study Team

**Figure 4.6.13 Photos of Cayo Coco/Jardines del Rey Airport**

### (5) Frank Pais/Holguin International Airport (IATA: HOG)

Frank Pais International Airport is located 13 km southwest of Holguin, the capital city of Holguin Province in southeastern Cuba. Holguin is one of the wealthiest parts of Cuba in its natural surroundings and has gradually become a key tourist destination. High sierras, fertile valleys, and sandy beaches are among its attractions.




Source: JICA Study Team (Innovata Airline Schedule Data via Diio Mi)

**Figure 4.6.14 International air routes from/to Holguin**

The airport handles international flights from numerous Canadian, European, and Russian cities, including Cancun, Mexico; Panama City; Caracas, Venezuela; Miami and Fort Lauderdale (U.S.); and domestic flights. The airport handled about 800,000 passengers in 2018. The runway is 3,288 × 45 m. A new control tower opened in 2020.

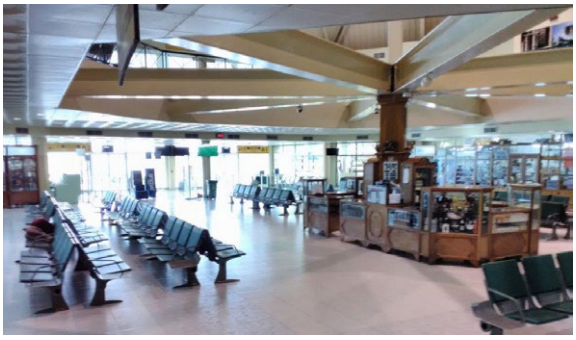
**Table 4.6.6 Information on Frank Pais/Holguin Airport**

| Item | | Description | | | | |
|---|---|---|---|---|---|---|
| Principal features | Name | Frank Pais/Holguin International Airport | | | | |
| | Operation | International and domestic | | | | |
| | Code | ICAO: MUHG IATA: HOG | | | | |
| | Location | Latitude: 20º2814.888"N | | | | |
| | | Longitude: 076º11'07.44"W | | | | |
| | Access to airport | 13 km from Holguin City center, approx. 30 min. by road | | | | |
| | Reference ground elevation | 110 m +MSL | | | | |
| | Temperature | Average 33.8 ºC | | | | |
| | Firefighting | CAT 8 | | | | |
| | Operation | 24 hours | | | | |
| | Operator | Airport facility: ECASA, Navigation system: ECASA | | | | |
| Runway | | No. | Dimensions | PCN | Slope | Strip dimensions |
| | | 08/26 | 3,238m × 45m | 57/F/B/X/U | 0.8 % | 3,508m × 300m |
| Taxiways A, B, C, D, E | | Width | | PCN | Surface | |
| | | 23m | | 57/F/B/X/U | Asphalt | |
| Aircraft Parking Apron | | PCN | | | | |
| | | APN1: 57/F/B/X/U | | | | |
| Radio NAV & Landing AIDS | | GP, VOR/DME | | | | |

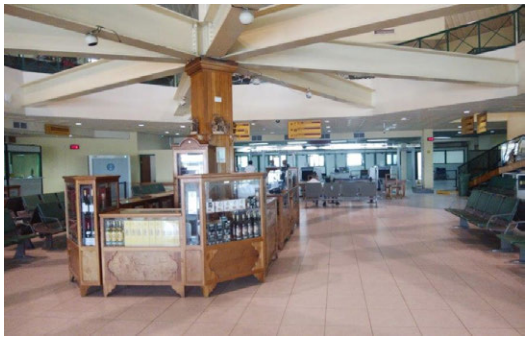
Source: AIP

**International passenger terminal land-side**

**International passenger terminal airside**



**International passenger terminal waiting lounge**



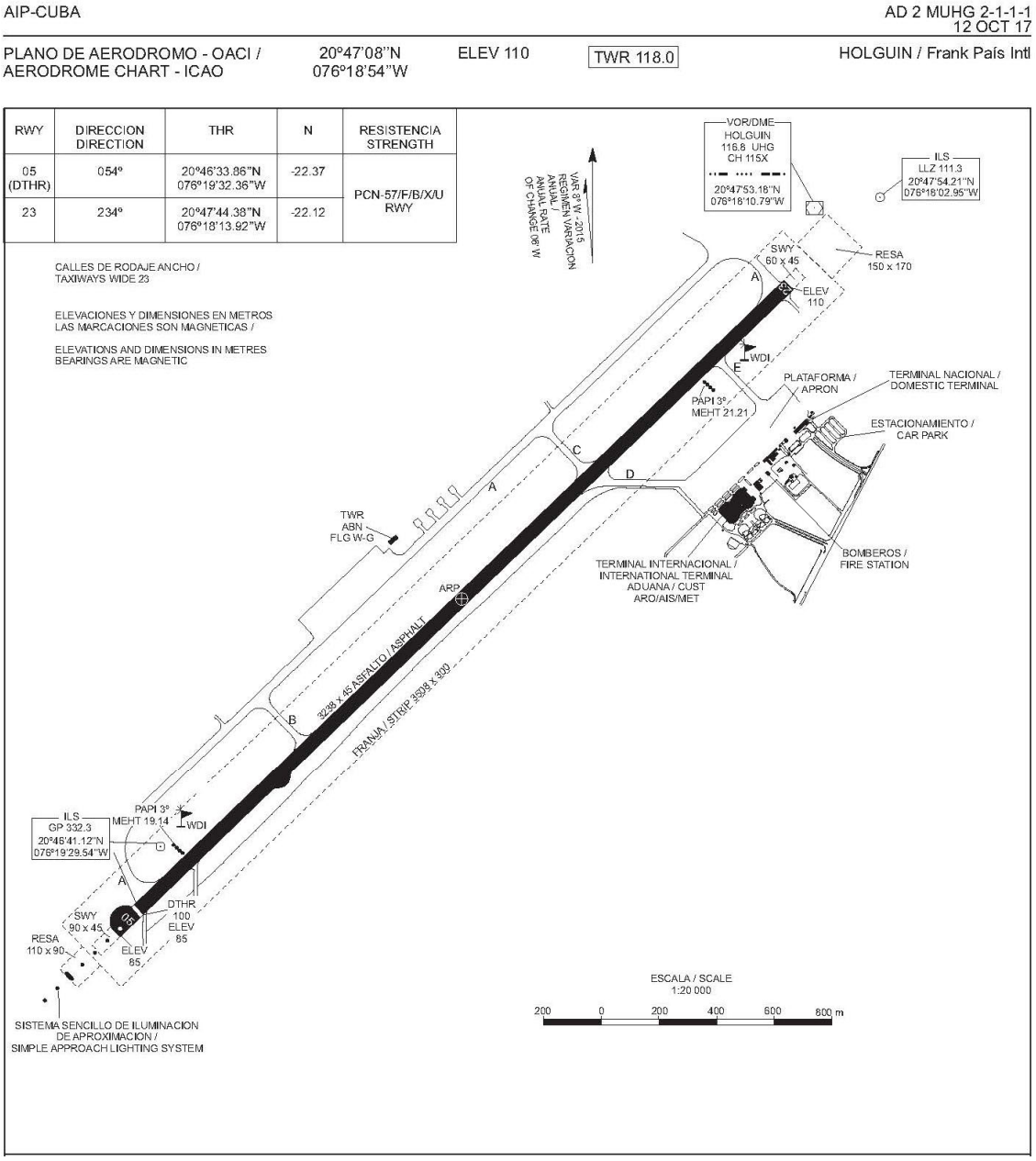
**International passenger terminal waiting lounge**

**Control tower under construction (2019)**

**Passenger area view from the control tower**

Source: JICA Study Team

**Figure 4.6.15 Photos of Holguin Airport**

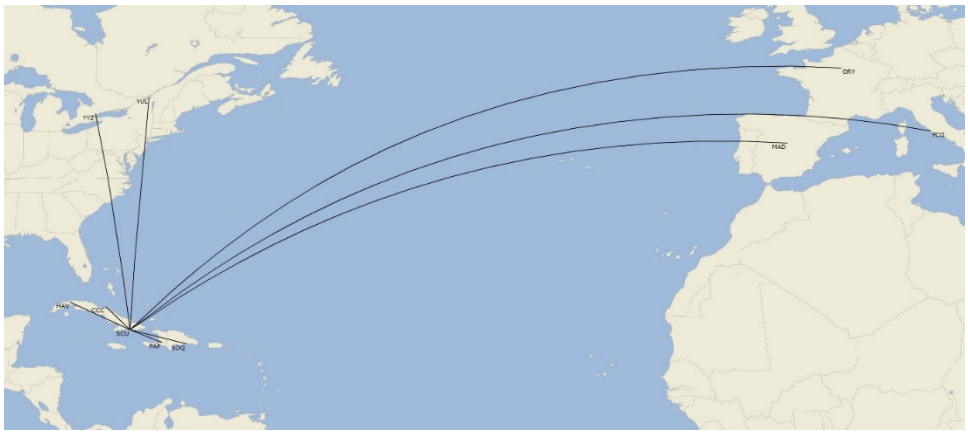



Source: AIP

**Figure 4.6.16 Map of Holguin Airport**

### (6) Santiago de Cuba/Antonio Maceo International Airport (IATA: SCU)

Antonio Maceo Airport is located 7 km southeast of Santiago de Cuba, Cuba's second-largest city and capital of Santiago de Cuba Province. Santiago, considered the birthplace of Cuban music, boasts lively hospitality and is widely popular with foreigners and Cubans.



Source: JICA Study Team (Innovata Airline Schedule Data via Diio Mi)

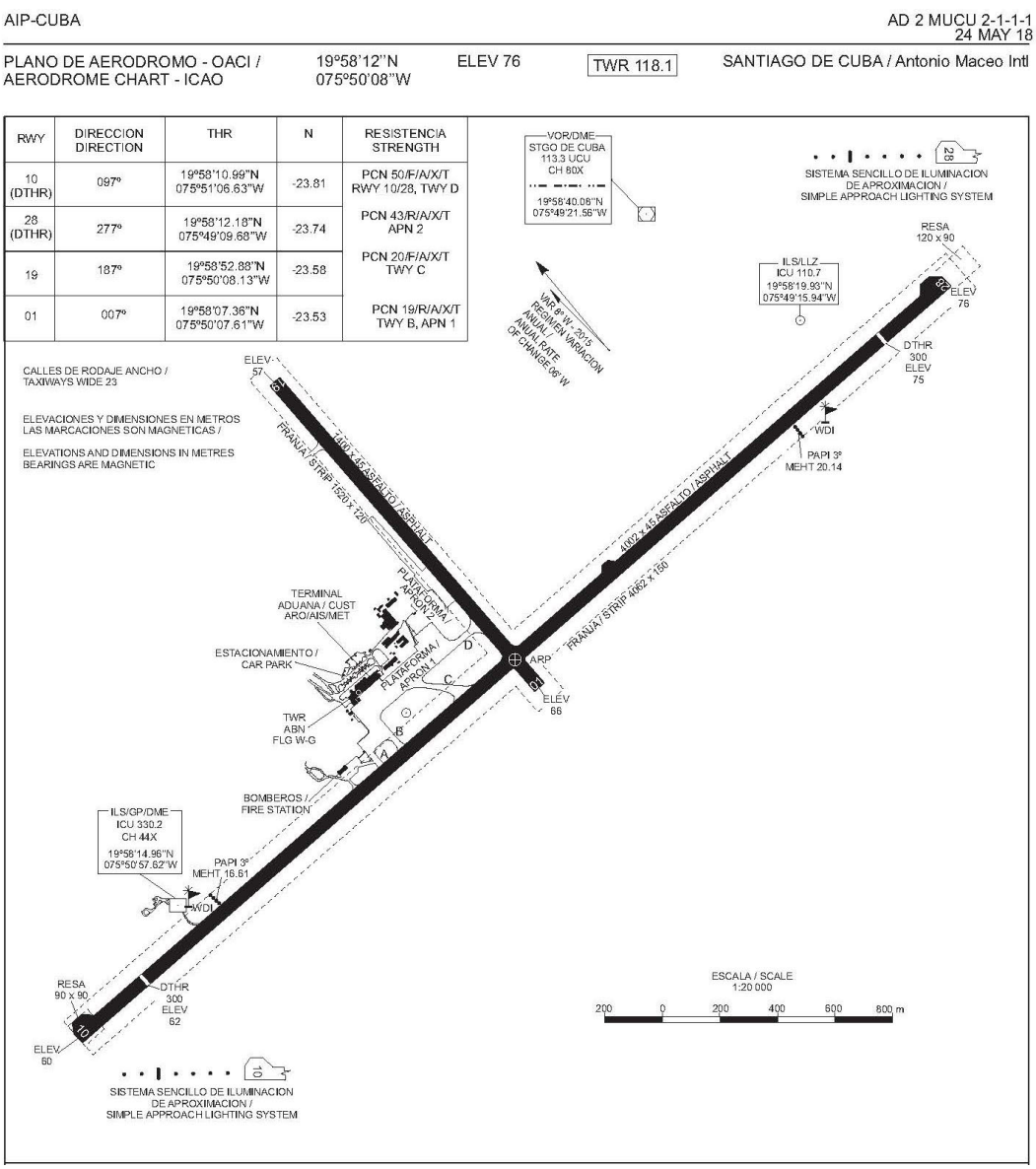
**Figure 4.6.17 International air routes from/to Santiago de Cuba**

Santiago is the most connected domestic airport apart from Havana, with flights to all major Cuban cities. International services include flights from Toronto, Montreal, Madrid, Paris, and Rome. The 4,002m × 45m runway has 12 aircraft parking stands and handles about 300,000 annual passengers. International standards severely constrain it with a small/outdated passenger terminal that handles domestic (approx. 60%) and international (40%) passenger volumes. There are no jet bridges, and the terminal is particularly ill-suited to handle large wide-body aircraft due to its size. Mobile staircases are used for embarking/disembarking directly onto the tarmac. There is just one shuttle bus for airside passenger transfers. The cargo warehouse is also outdated and too small for efficient cargo handling.

**Table 4.6.7 Information on Santiago de Cuba/Antonio Maceo Airport**

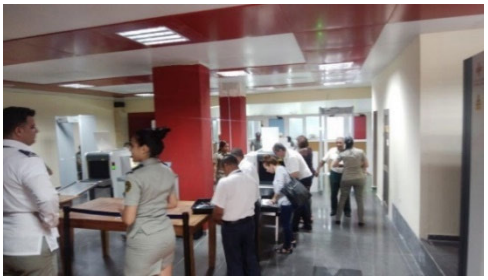
| Item | | Description | | | | |
|---|---|---|---|---|---|---|
| Principal features | Name | Santiago de Cuba/Antonio Maceo International Airport | | | | |
| | Operation | International and domestic | | | | |
| | Code | ICAO: MUCU IATA: SCU | | | | |
| | Location | Latitude: 19º34'52.32"N | | | | |
| | | Longitude: 075º30'02.88"W | | | | |
| | Access to airport | 7 km from Santiago de Cuba City center, approx. 15 min. by road | | | | |
| | Reference ground elevation | 76 m +MSL | | | | |
| | Temperature | Average 31.7 ºC | | | | |
| | Firefighting | CAT 8 | | | | |
| | Operations | 12:00-05:00 (local time/08:00 to 01:00) | | | | |
| | Operator | Airport facility: ECASA, Navigation system: ECASA | | | | |
| Runway | | No. | Dimensions | PCN | Slope | Strip dimension |
| | | 01/19 | 1400 × 45 m | 20F/A/X/T | -0.4, +1 % | 1520 x 120 |
| | | 08/26 | 4002 × 45 m | 50/FAB/X/T | +0.5,-0.4,+0.5 % | 4062 × 150 m |
| Taxiways B, C, D | | Width | | PCN | surface | |
| | | A, B, C, D | | A, B, C, D | A, B, C, D | |
| | | 23 m | | N/A, 19,20,50 | R, R, F, F | |
| Aircraft parking apron | | PCN | | | | |
| | | APN1: 19/R/A/X/T | | APN2: 43/R/A/X/T | | |
| Radio NAV/ landing aids | | GP, LLZ, VOR/DME | | | | |

Source: AIP




Source: AIP

**Figure 4.6.18 Map of Santiago de Cuba/Antonio Maceo Airport**

| | |
|---|---|
|  |  |
| **Passenger terminal, land-side** | **Passenger terminal, airside** |
|  |  |
| **Check-in hall** | **Waiting lounge** |
|  |  |
| **Security checkpoint of the departure area** | **The suspended domestic passenger terminal** |

Source: JICA Study Team

**Figure 4.6.19 Photos of Santiago de Cuba Airport**

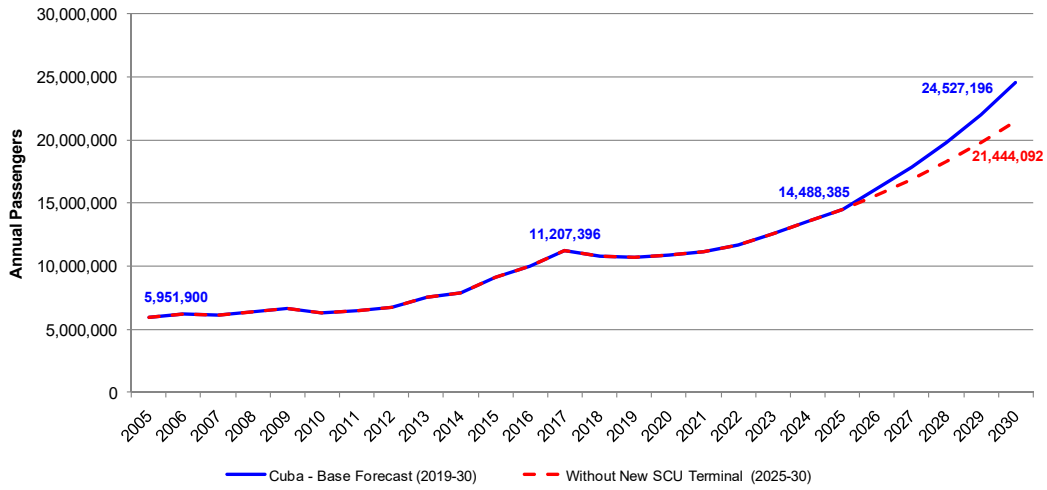
### 4.6.4 Commercial air transport sector

Commercial air transport in Cuba is provided by two air carriers: Cubana de Aviación and Aerogaviota, which operates a limited number of flights under the management of the Armed Forces. Cubana, with a domestic market share of about 90%, served around 1.2m passengers in 2015. Cubana (IATA: CU) currently operates flights to 11 domestic destinations and international services. Aerogaviota, the only carrier at four airports – Ciego de Ávila, Trinidad, Cayo Santa María, and Santa Clara – also operates five international routes to the Dominican Republic.

However, both airlines have limited operations due to a lack of aircraft and spare parts. To cover deficiencies, Cubana has made lease contracts with foreign airlines.

### 4.6.5 Demand forecast

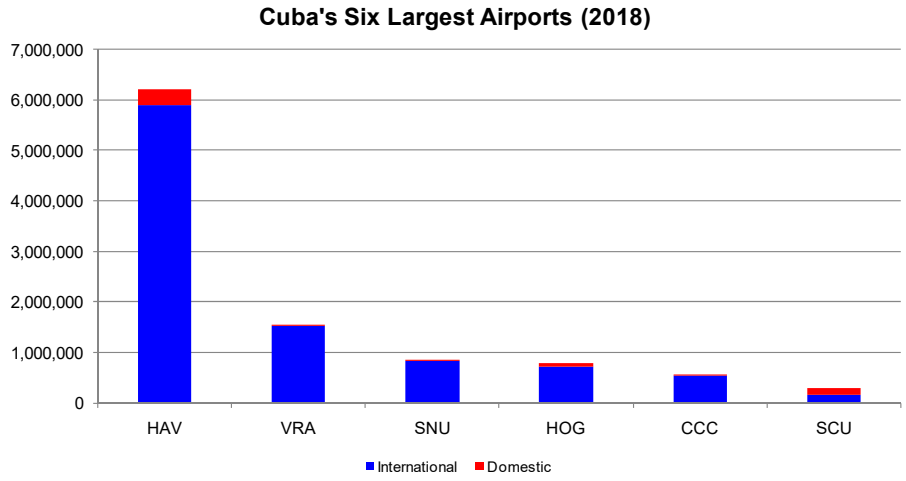
Before the COVID-19 pandemic, the JICA Study Team forecasted that Cuba's air traffic demand would double by 2030. Figure 4.6.20 shows the base passenger forecast with a new Santiago de Cuba international terminal operating by 2025, plus a forecast without the proposed new terminal. The base forecast projects that Cuba traffic will approximately double, reaching nearly 25 million passengers by 2030. Without the new Santiago de Cuba international terminal, total Cuban traffic is expected to reach 21.4 million by 2030.




Source: JICA Study Team

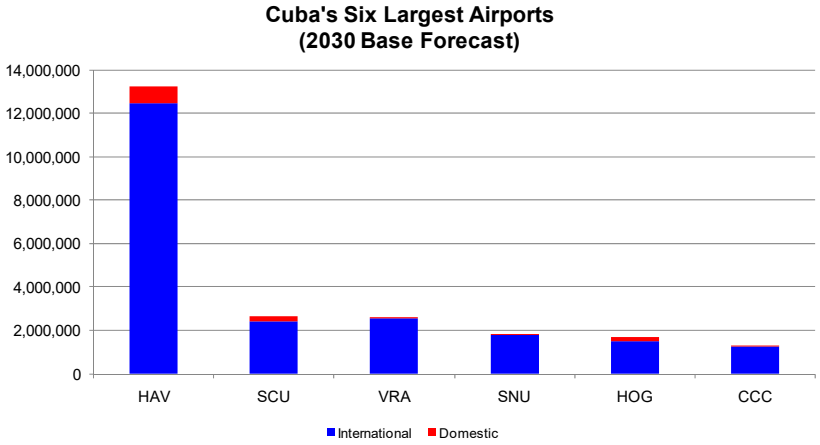
**Figure 4.6.20 Passenger demand forecasts to 2030**

Figure 4.6.21 shows 2018 international/domestic traffic at Cuba's six largest airports. Figure 4.6.22 shows the 2030 forecast traffic for the same airports. Assuming the new Santiago de Cuba international terminal opens by 2025, it would grow to become Cuba's second busiest airport by 2030 since SCU also has a significant domestic traffic base.




Source: JICA Study Team

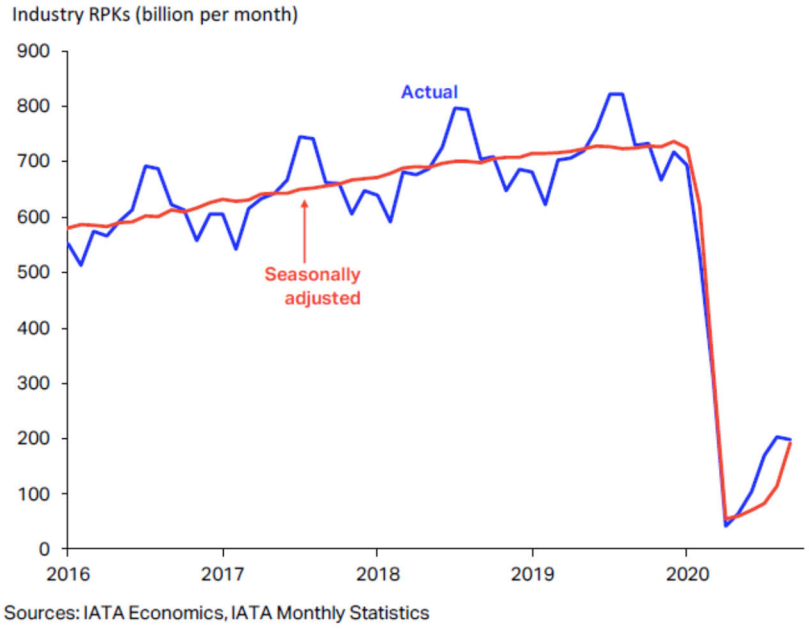
**Figure 4.6.21 Passenger traffic at Cuba's six top airports in 2018**




Source: JICA Study Team

**Figure 4.6.22 Passenger traffic forecast at Cuba's six top airports in 2030**

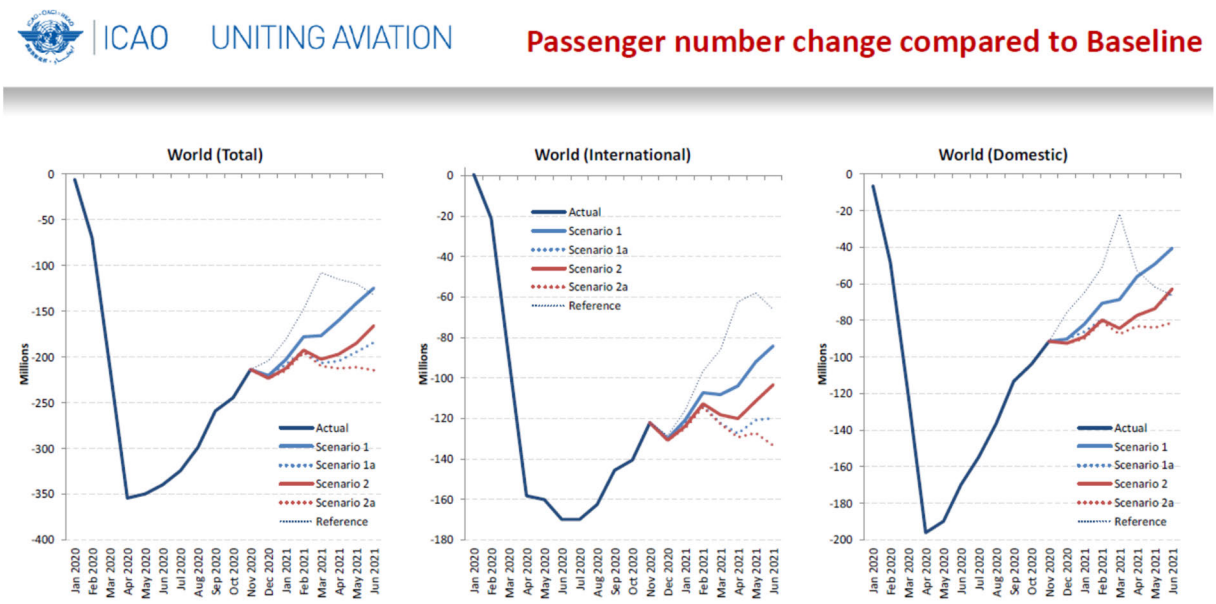
Since the onset of COVID-19, however, IATA's air passenger market analysis (released September 2020) shows that passenger volumes fell drastically in 2020. As a result, industry-wide revenue passenger kilometers (RPKs) were 72.8% below September 2019.




Source: IATA

**Figure 4.6.23 IATA Air Passenger Volume (RPKs)**

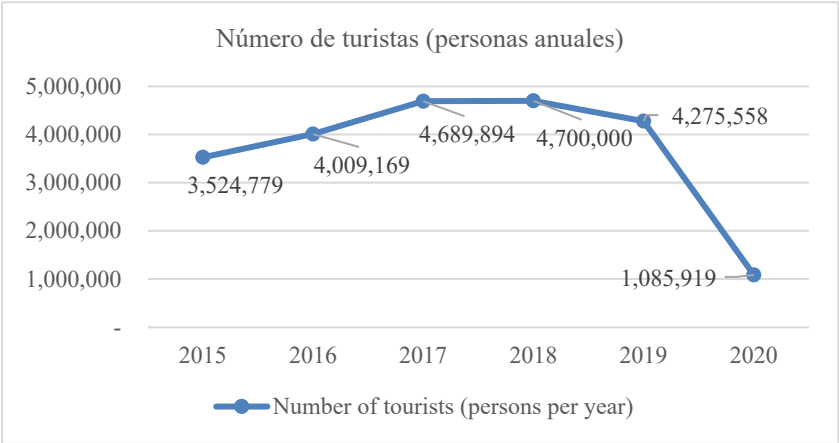
December 2020 forecasts from ICAO, shown below, show a similar trend.




Source: ICAO

**Figure 4.6.24 ICAO estimates of air passenger seat capacity change**

In Cuba, international tourist arrivals averaged about 4.7 million per year in 2017 and 2018. But with COVID-19, traffic decreased sharply to nearly 1 million visitors in 2020.



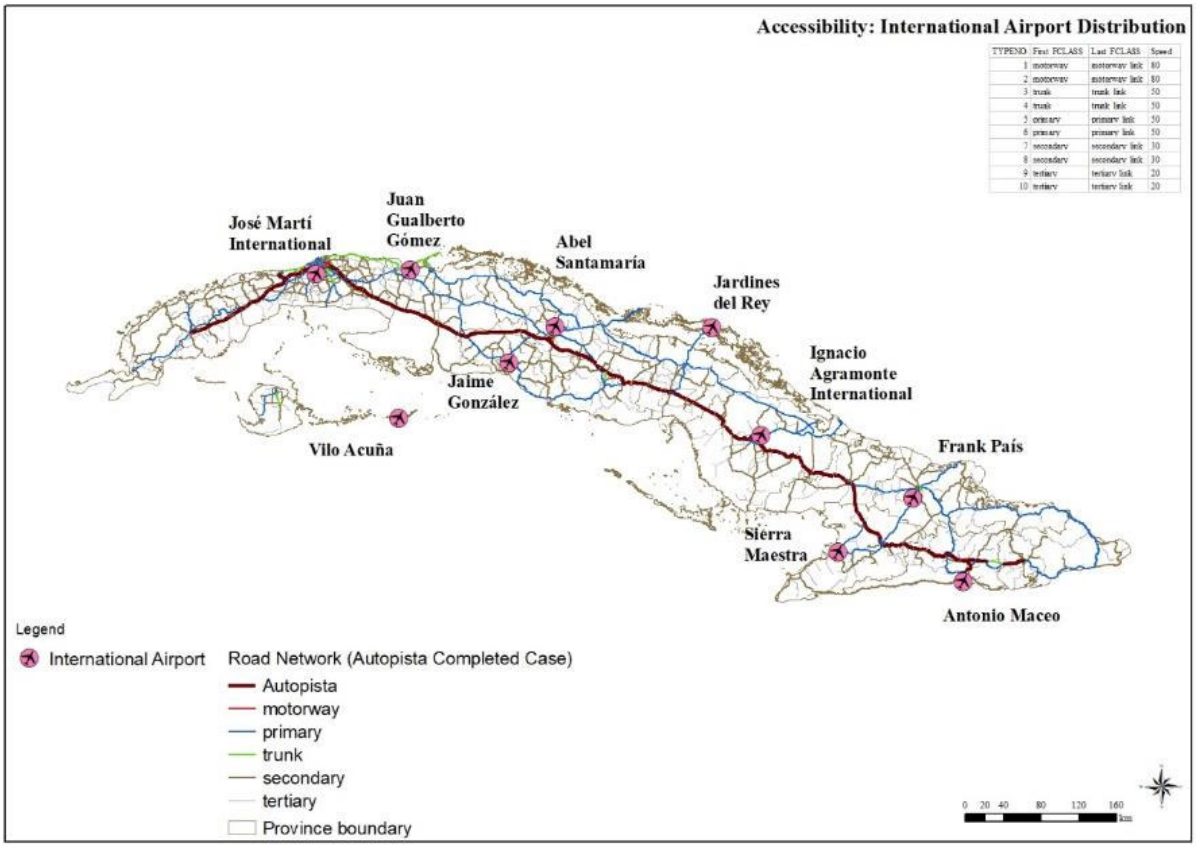

Source: JICA Study Team

**Figure 4.6.25 International tourist arrivals in Cuba**

Under these circumstances, demand forecasts must be revisited considering various impacts, including COVID-19 and U.S. policies toward Cuba.

### 4.6.6 Accessibility from the international airports

Figure 4.6.26 shows Cuba's international airports' locations and major road network. Using GIS, areas reachable from each airport within three hours were identified.



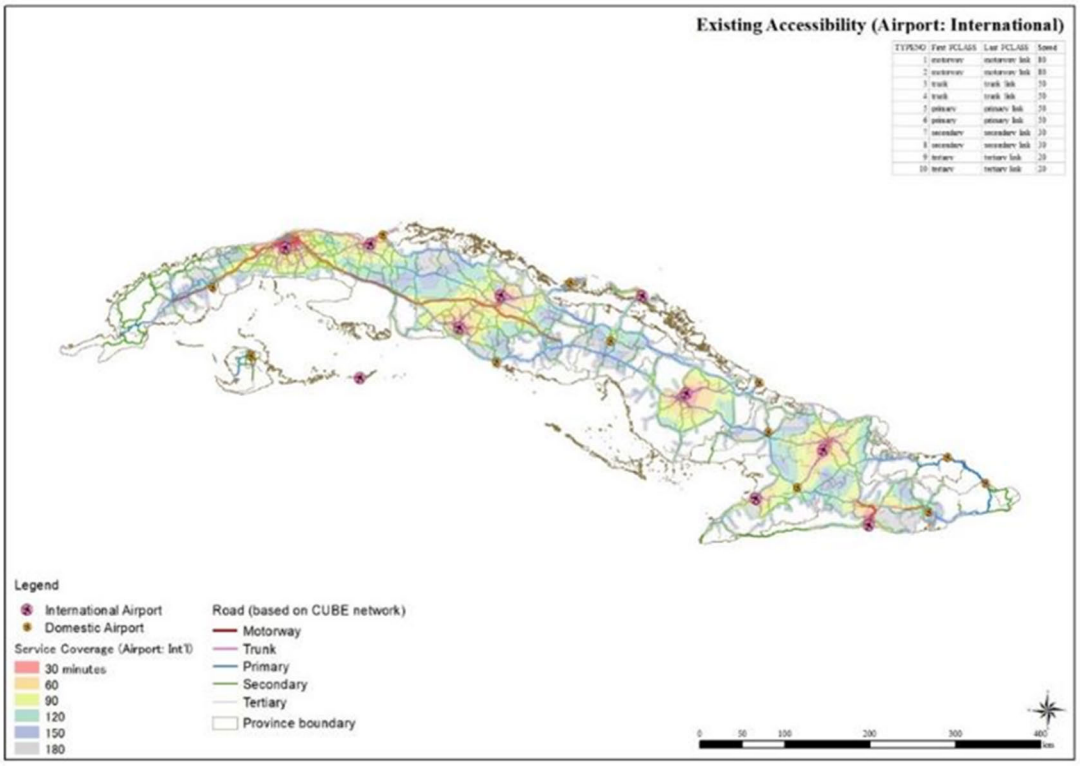

Source: JICA Study Team

**Figure 4.6.26 Cuba's international airports and road network**

Figure 4.6.27 shows the time required to reach the nearest international airport from all parts of Cuba. Western Cuba is well served with four airports and a relatively well-developed road network thanks to Autopista. But airport access in eastern Cuba is poor, mainly due to substandard roads.

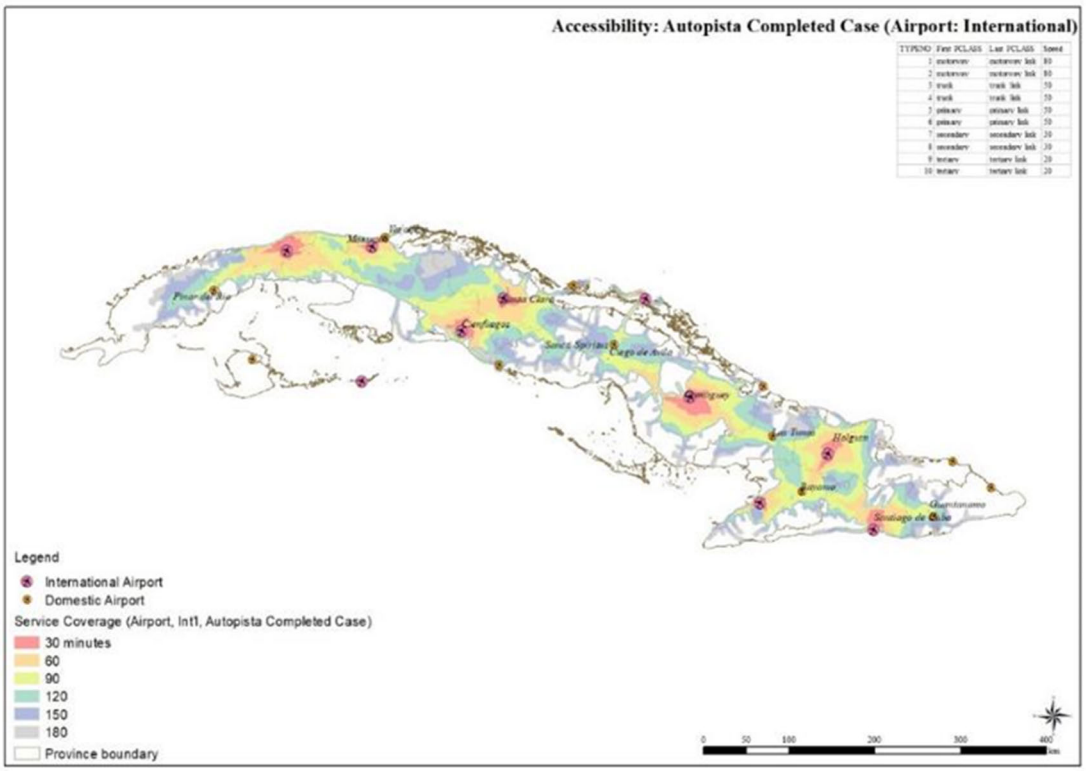
Figure 4.6.28 shows service coverage (road travel time) from the international airports if the Autopista is completed to Santiago de Cuba. Service coverage of airports in eastern Cuba would improve dramatically, as shown in Figure 4.6.28.

While international airports are critical for tourism, access to them is also vital for Cubans, especially in case of natural disasters when emergency supplies and medicines are needed. Figure 4.6.29 shows the numbers of residents within the effective service range of the international airports. Completing the Autopista will significantly improve airport access, especially in eastern Cuba.



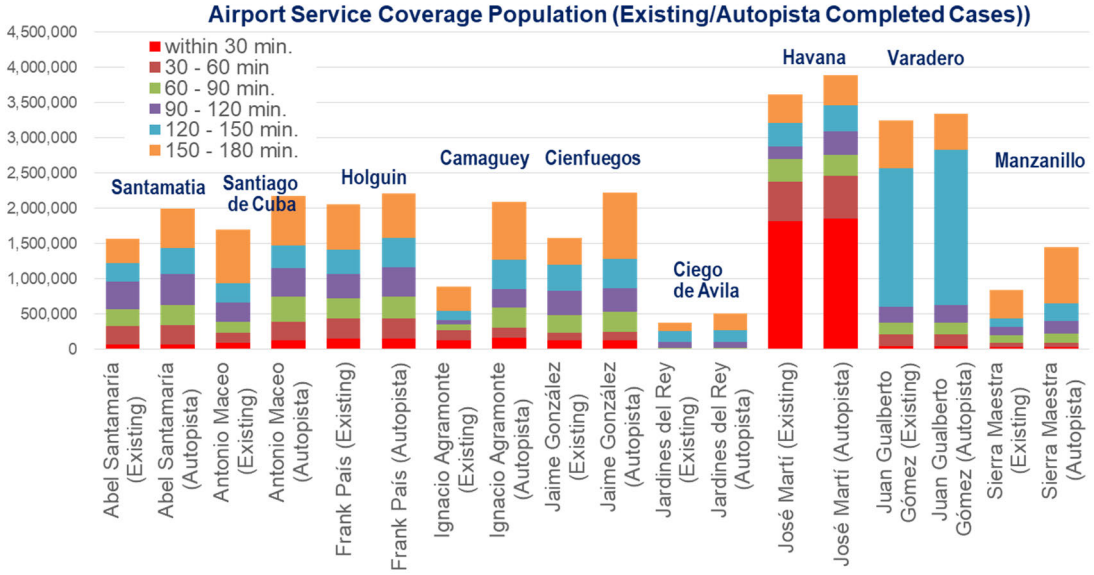

Source: JICA Study Team

**Figure 4.6.27 International airport service coverage, 3-hour travel time**




Source: JICA Study Team

**Figure 4.6.28 International airport service coverage with completion of Autopista**




| Airport | Travel time distance and covered population (1,000) | | | | | | | Increase (persons) | Increase (times) | Impact of Aoutopista |
|---|---|---|---|---|---|---|---|---|---|---|
| | within 30 min. | 30 - 60 min | 60 - 90 min. | 90 - 120 min. | 120 - 150 min. | 150 - 180 min. | Total | | | |
| Abel Santamaría (Existing) | 66 | 261 | 239 | 395 | 268 | 339 | 1,566 | 431 | 1.28 | Medium |
| Abel Santamaría (Autopista) | 66 | 281 | 279 | 445 | 366 | 560 | 1,997 | | | |
| Antonio Maceo (Existing) | 98 | 136 | 158 | 270 | 270 | 772 | 1,705 | 470 | 1.28 | Medium |
| Antonio Maceo (Autopista) | 127 | 265 | 351 | 409 | 327 | 696 | 2,175 | | | |
| Frank País (Existing) | 158 | 282 | 282 | 351 | 343 | 636 | 2,052 | 160 | 1.08 | Small |
| Frank País (Autopista) | 158 | 283 | 307 | 412 | 426 | 627 | 2,212 | | | |
| Ignacio Agramonte (Existing) | 128 | 147 | 81 | 56 | 133 | 351 | 896 | 1,193 | 2.33 | Small |
| Ignacio Agramonte (Autopista) | 163 | 149 | 278 | 268 | 410 | 821 | 2,089 | | | |
| Jaime González (Existing) | 133 | 108 | 249 | 343 | 366 | 380 | 1,580 | 644 | 1.41 | Medium |
| Jaime González (Autopista) | 133 | 110 | 295 | 334 | 410 | 943 | 2,224 | | | |
| Jardines del Rey (Existing) | 2 | 2 | 24 | 76 | 150 | 129 | 384 | 123 | 1.32 | Small |
| Jardines del Rey (Autopista) | 2 | 2 | 24 | 82 | 160 | 237 | 507 | | | |
| José Martí (Existing) | 1,816 | 560 | 328 | 179 | 326 | 412 | 3,620 | 270 | 1.07 | Small |
| José Martí (Autopista) | 1,858 | 601 | 303 | 325 | 374 | 429 | 3,890 | | | |
| Juan Gualberto Gómez (Existing) | 48 | 168 | 165 | 229 | 1,958 | 684 | 3,252 | 93 | 1.03 | Small |
| Juan Gualberto Gómez (Autopista) | 48 | 168 | 165 | 245 | 2,200 | 518 | 3,345 | | | |
| Sierra Maestra (Existing) | 36 | 56 | 109 | 116 | 128 | 396 | 840 | 610 | 1.73 | Large |
| Sierra Maestra (Autopista) | 36 | 56 | 136 | 170 | 256 | 797 | 1,450 | | | |

Note: Covered populations by multiple airports are double counted.

Source: JICA Study Team

**Figure 4.6.29 Improvement in airport service coverage with completion of Autopista**

Increasing international tourism is one of Cuba's key economic development objectives. As a strategy to achieve this objective, improving airport facilities and access from the airports to tourist destinations is a challenge for the airport sector. While existing airports badly need improvements, there is no need for new ones – just better roads for existing ones.

Once Santiago de Cuba's airport is upgraded, and the Autopista is completed, the movement pattern of international tourists may change as Santiago de Cuba becomes a more convenient gateway. In addition, completion of the Autopista will also expand service coverage of airports in Camaguey, Cienfuegos, and Manzanillo, as shown in Figure 4.6.29.

### 4.6.7 CACSA Group's human resource situation

CACSA's total headcount in December 2018 was 15,103, including staff at 11 group companies. In addition, there were 805 directors, 4,823 technicians, 231 administrative staff, 3,446 operators, 4,465 services section staff, and 1,333 permanent contract and high-season personnel.

**Table 4.6.8 CACSA employees' status**

| Occupational category | Approved | Permanent | Seasonal contract | Total | % |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (2) + (3) = (4) | (2) / (1) |
| Operator | 3,969 | 3,446 | 226 | 3,672 | 86.8% |
| Services | 5,551 | 4,465 | 758 | 5,223 | 80.4% |
| Administrative | 254 | 231 | 6 | 237 | 90.9% |
| Technical | 5,653 | 4,823 | 343 | 5,166 | 85.3% |
| Manager level | 849 | 757 | 0 | 757 | 89.2% |
| Director level | 52 | 47 | 0 | 47 | 90.4% |
| Executive level | 1 | 1 | 0 | 1 | 100.0% |
| Total | 16,329 | 13,770 | 1,333 | 15,103 | 84.3% |

Source: CACSA

Educational levels attained by these personnel are shown in Table 4.6.9 below.

**Table 4.6.9 CACSA employees education levels**

| Educational level | Permanent | Seasonal | Total | % |
|---|---|---|---|---|
| University level | 3,571 | 273 | 3,844 | 25.5% |
| College level | 3,573 | 403 | 3,976 | 26.3% |
| Technical college | 4,536 | 381 | 4,917 | 32.6% |
| High school level | 1,982 | 274 | 2,256 | 14.9% |
| 6th grade | 108 | 2 | 110 | 0.7% |
| Total | 13,770 | 1,333 | 15,103 | 100.0% |

Source: CACSA

Workforce details of CACSA group companies are shown below in Table 4.6.10.

**Table 4.6.10 CACSA group enterprises employee composition**

| Occupational category | Approved (1) | Permanent (2) | Seasonal contract | Total | % (2)/(1) |
|---|---|---|---|---|---|
| CACSA | 188 | 177 | 1 | 178 | 94 |
| SERVAC | 411 | 363 | 30 | 393 | 88 |
| ECA | 1,685 | 1,458 | 40 | 1,498 | 87 |
| ECASA | 6,095 | 5,345 | 332 | 5677 | 88 |
| ENSA | 705 | 607 | 52 | 659 | 86 |
| CUBACATERING | 1,976 | 1,777 | 76 | 1,853 | 90 |
| AVIAIMPORT | 156 | 119 | 5 | 124 | 76 |
| AEROVARADERO | 498 | 445 | 28 | 473 | 89 |
| CCOA | 80 | 73 | 6 | 79 | 91 |
| ESPAC | 3,349 | 2,379 | 658 | 3,037 | 71 |
| TAKE OFF | 270 | 255 | 6 | 261 | 94 |
| MIXED | 118 | 103 | 4 | 107 | 87 |
| ECNA | 798 | 669 | 95 | 764 | 84 |
| TOTAL | 16,329 | 13,770 | 1,333 | 15,103 | 84 |

Source: CACSA

The number of existing staff is slightly smaller than the planned levels. It is not clear whether this is due to a shortage of staff. At time of writing, the needs for training pilots, GSE operators and mechanics were not clear. Further study of human resource needs will be needed.

### 4.6.8 Airport/Aviation sector planning issues

Issues identified through TWG activities

Table 4.6.11 summarizes issues identified in the TWG based on the understanding of the existing conditions.

**Table 4.6.11 Airport/Aviation sector issues to be addressed**

| Key areas | Issues to be addressed |
|---|---|
| 1. Planning and coordination | • National airline (Air Cubana) business development plan |
| | • Strategic plan to attract new carriers from Asia/Middle East and LCCs |
| | • Improve domestic air service (coordinated w/ tourism sector, consider competition w/ bus & rail) |
| | • Business development plans for air sector Empresas |
| | • Study on emergency air transport services (international and domestic) |
| | • Coordinated development (effective land use) of areas surrounding airports |
| | • Improve ground transport services for air passengers |
| | • Master plans to improve each international & domestic airport (infrastructure, buildings, facilities, and equipment) |
| | • Computerized human resources database in the air sector |
| | • Human resource development plan/training programs in the air sector |
| | • Study scope to involve the non-state sector in airport management, including FDI (concession); (State: ATC; non-state: runway, apron, terminals, etc.). Review the suspended concession agreement. |
| | • Establish regular coordination among MEP, MITRANS, CACSA, ECASA, etc. |
| 2. Transport infrastructure development | • Urgent rehabilitation of deteriorated runways, aprons, airport buildings, GSE, etc. |
| | • Develop an advanced inventory database of airport infrastructure, equipment, and spare parts (as a basis for improvement plans and procurement programs) |
| | • Renew/increase aircraft fleet |
| | • The early improvement of priority airports (terminal capacity and quality improvement) |
| | • Barrier-free design (terminal buildings) |
| | • Roads (ground transport) accessibility improvements |
| 3. Environment, safety & security | • Advanced air traffic control |
| | • Advanced/automated CIQ (Custom, Immigration, Quarantine) system |
| | • Environmental monitoring of areas surrounding airports |
| | • Prevention/protection measures against natural disasters |
| | • Prevention measures against COVID-19 |
| | • Public enlightenment about COVID-19 |
| 4. Transport service & industry development | • Enhance domestic air services (frequency) |
| | • Enhance international air services (broader market) |
| | • Attract new carriers (from Asia, the Middle East, etc.) |
| | • Enhance air-related business (non-state enterprises, concession, airport hotels, etc.) |
| | • Improve/enhance in-flight services |

| Key areas | Issues to be addressed |
|---|---|
| 5. Transport pricing & resource allocation | • Secure appropriate annual state budget for infrastructure maintenance |
| | • Self-sustainability of national air carrier |
| | • Revise pricing (passenger facility charge, security surcharge, baggage handling surcharge, landing fee, etc.) |
| | • Provide attractive salaries to recruit quality human resources to the aviation sector |
| | • FDI for infrastructure development and service provision |
| | • Increase revenue from air-related business opportunities |
| 6. Institutional & regulatory development | • Enhance scope for the non-state sector in providing air transport infrastructure/services – revise legislative/regulatory frameworks for air transport service provision and operation and maintenance, e.g., FDI, etc. |
| | • Counter the coming shortage of human resources (due to aging) with long-term training programs in the aviation sector (management, ATC, pilots, GSE staff, CIQ staff, etc.) |

Source: TWG and JICA Study Team

### (1) Urgent challenges

The deterioration of airport facilities is a challenge that needs to be resolved urgently, particularly ground support equipment (GSE) and passenger-airport equipment. Deteriorated GSE seriously affects flight operations, and although the problem is still limited, it already delays some flights. Passenger-airport equipment has not yet caused flight delays due to defects, but as adequate passenger service is not provided, urgent measures are required, particularly at Havana and Varadero.

### (2) Airport concession

The government plans to expand and upgrade Havana's airport via a concession agreement with a foreign investor to develop further and modernize Cuba's airports. In 2016, the French Groupe ADP with Bouygues Batiment International (France) and TAV Airports (Turkey) confirmed "exclusive talks" with Cuba's government for the development concession at Jose Marti International Airport. Groupe ADP has a 38% stake in TAV Airports and a 49% stake in TAV Construction. Groupe ADP operates all three Parisian international airports (Charles de Gaulle, Orly, and Le Bourget), handling more than 100m passengers in 2018.

Reportedly, infrastructure developments proposed under the concession involved increasing Jose Marti's capacity to 10 million passengers per year. CACSA also stated that the contract under negotiation with the ADP consortium included the development of civilian operations at San Antonio De Los Banos Airport, 20 km south of Jose Marti, currently an active military airbase. Built in 1947, San Antonio de Los Banos has three concrete runways: a primary runway 05/23 that is 3,596 x 56m; a cross-runway 12/30 that is 2,482 x 46m; and runway 01/19 that is 2,400 x 46m and suitable for smaller aircraft. In addition, plans reportedly called for it to be Havana's second international airport, primarily used for international business aviation/air taxi flights and as an alternative to Jose Marti.

On behalf of IACC, CACSA was given the authority to negotiate an agreement with Groupe ADP for final approval by the Council of Ministers (as of 2019). Discussions have been ongoing for the past three years. However, once the absolute concession terms are agreed upon and approved, finalizing financing for the deal would likely take 6-9 more months. So, the start of any development program under a concession agreement is still far off.

At this juncture, it can be suggested that it might be prudent for the government to consider replacing the “exclusive talks agreement” with Groupe ADP and issue a second tender invitation to other select and qualified investors. Several other qualified airport investor groups exist in Spain, Italy, the UK, and Canada. For example, Ontario Teachers, one of Canada's largest pension funds, has significant airport investments.

Consideration should also be given to expanding the airport tender to include Santiago de Cuba’s airport, where new passenger and cargo terminals are urgently needed. This could be either bundled in addition to/or as a substitute for San Antonio de Los Banos Airport.

As Cuba’s second-largest city, close to attractive tourist destinations, Santiago de Cuba has ample potential to generate sizable air traffic, both international and domestic. But its current airport can only handle limited international flights due to the inadequate size of its existing and vastly outdated passenger terminal. With a new passenger terminal, it is estimated that Antonio Maceo International Airport would see a significant increase in international passenger traffic and eventually exceed the traffic volume of Varadero by 2030.

**(3) Long-term challenges**

A political hindrance to realizing Cuba’s full air traffic growth potential is the on/off state of relations with the United States.

During the first four months of 2019, over 140,000 U.S. visitors arrived in Cuba by cruise ship, a threefold increase from 2017. However, in June 2019, U.S. President Trump imposed a ban on all cruise ships sailing to Cuba from U.S. ports of call, effectively banning U.S. cruise traffic that had resumed in May 2016 during President Obama’s opening of relations with Cuba.

The reinstated ban on U.S. tourism to Cuba by U.S. President Trump in 2019 led several U.S. carriers to pull out of Cuba, including Alaska Airlines, Silver Airways, Spirit Airlines, and Frontier Airlines. In addition, low-cost carrier Sun Country Airlines relinquished its U.S. Dept. of Transportation-granted Cuba rights before even starting service. In addition, COVID-19 has been negatively affecting Cuban tourism since March 2020.

In the long run and under a new U.S. administration in the future, it is expected that Cuba-US relations will again improve and that the U.S. will eventually reemerge as Cuba’s largest air travel market, along with continuing growth from the large, established Canadian market. Serving as Cuba’s main air carrier gateway, Havana’s international airport traffic growth will continue along with development at the other main international airports: Varadero, Santa Clara, Cayo Coco, Holguin, and Santiago de Cuba.

## 4.7 Cargo Transportation Issues

### 4.7.1 Planning and regulatory bodies

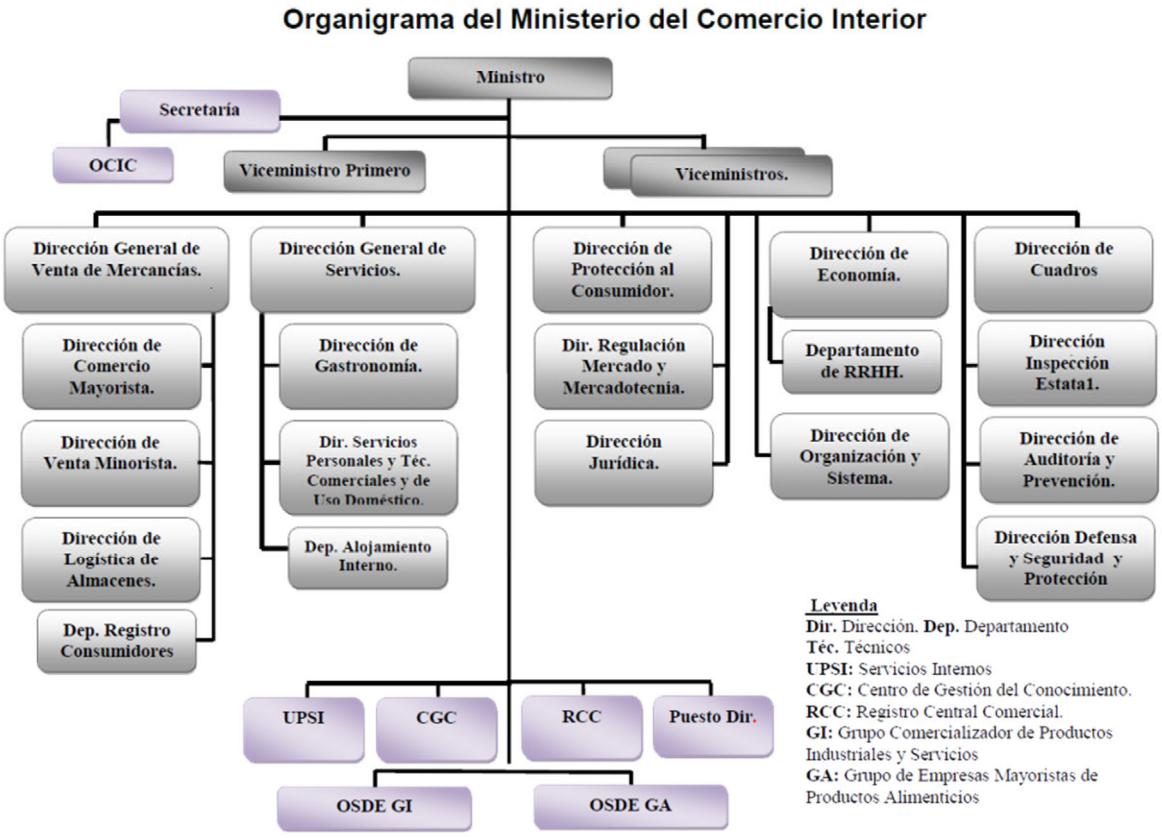
The regulation on cargo transport (movement) is under MITRANS, while the regulation on storage facilities is under MINCIN. Although transport movement and storage are inherently integrated, these two are separately managed in Cuba.

#### (1) Cargo Transport

MITRANS provides licenses to entities that provide cargo transport services. The cargo transport directorate, DTC/MITRANS, is responsible for planning cargo transport in the state. Besides, MITRANS has directorates and attached units (IACC, AMC, UET and ATF) that regulate and control each transport mode.

#### (2) Storage Facilities

MINCIN regulates storage facilities in the state and provides licenses to facility owners. Under the control of MINCIN, various enterprises and other entities own the warehouses.




Source: MINCIN

**Figure 4.7.1 Organizational Structure of MINCIN**

### 4.7.2 Balance de Cargas

Cuba has a unique demand and supply matching system, namely “Balance de Cargas”.

In other countries using a so-called market mechanism, demand (cargo owners) and supply (transportation service providers) meet in the market, and the supply and demand are balanced by using prices as a signal. On the other hand, in Cuba, demand (scale of production or material needs) is already planned, that is, production volumes and corresponding transportation needs are known in advance. In this regard, the issue is how to realize transportation (supply) while minimizing fuel consumption and other associated costs.

This way of thinking is similar to how a transportation enterprise allocates resources (vehicles, drivers, fuels, etc.) efficiently (minimizes costs) to provide transportation services while maximizing profit. In many transport companies in other countries, a computerized resource allocation method is used to maximize profit.

As mentioned before, in Cuba, to minimize this cost, an annual “cargo transport demand and supply matching process” is held (“Balance de Cargas”, and fuel allocation is determined based on the submitted application forms (BC forms). Also, the realization of transportation is monitored by MITRANS regularly.

UEBs and enterprises are requested to submit their cargo transport plan through OSDE, using the unified forms (BC forms detailed below) The BC-4 forms are submitted to the Cargo Transportation Direction of MITRANS (DTC/MITRANS). The BC forms consist of the following seven forms:

| | |
|---|---|
| BC Form 1 (BC-1): | Inventory of transport vehicles; |
| BC Form 1-A (BC-1A): | Capacity of cargo transport means |
| BC Form 2 (BC-2): | Demand for cargo transport (Cargo to be transported by transport service providers, mainly by OSDEs transport entities in the MITRANS sector);. |
| BC Form 3 (BC-3): | Operations plan by owned vehicles (vehicles owned by cargo owners); |
| BC Form 4 (BC-4): | Cargo transport plan (Origin and Destination Information, including BC-2 and BC-3 data); |
| BC Form 5 (BC-5): | Summary of cargo transported by clients (cargo owners); |
| BC From 6 (BC-6): | Summary of the group of entities involved in the cargo balance activities; and |
| BC R: | Summary report of cargo transport (realized transport activities) |

## Form BC-1: Inventory of Transport Means in Automotive Transport (sample)

Modelo BC-1. "Inventario de Medios del Transporte Automotor"

Empresa/Unidad **BASE TRANSPORTE** Provincia **LAS TUNAS** Año **2017**

**EMPRESA: CONSTRUCCIÓN y MONTAJE**

Organismo MICONS

Lugar de basificación **CARRETERA CENTRAL KM 690 LAS TUNAS**

| | Número de Chapa | Tipo de Vehículo | Capacidad | Marca | Año | Tipo de Combustible | Norma de Consumo (Km /L ) | Días Disponibles |
|---|---|---|---|---|---|---|---|---|
| 1 | B065536 | Cuña SemiRem. Volteo | 25.5 | ROMAN | 1988 | Diesel | 2.00 | 184 |
| 2 | TSL 142 | Cuña SemiRem. Volteo | 25.5 | FIAT | 1978 | Diesel | 2.00 | 0 |
| 3 | B065619 | Cuña SemiRem. Volteo | 25.5 | DAC 19280 | 1988 | Diesel | 2.00 | 235 |
| 4 | B066503 | Cuña SemiRem. Volteo | 25.5 | FIAT 619 | 1977 | Diesel | 2.38 | 204 |
| 5 | B056197 | Camión Volteo | 18.0 | FIAT 300PC | 1984 | Diesel | 2.27 | 150 |
| 6 | B066864 | Camión Volteo | 10.0 | MAZ 5551 | 1989 | Diesel | 2.38 | 144 |
| 7 | TSG063 | Camión Volteo | 10.0 | MAZ 5551 | 1989 | Diesel | 2.38 | P. BAJA |
| 8 | TSG932 | Camión Volteo | 18.0 | PEGASO 2331 | 1985 | Diesel | 2.00 | P. BAJA |
| 9 | B055809 | Camión Volteo | 10.0 | MAZ 5551 | 1989 | Diesel | 2.38 | 126 |
| 10 | B000389 | Camión Volteo | 18.0 | ROMAN | 1989 | Diesel | 2.00 | 150 |

## Form BC-1A: Capacity of the cargo transportation means (sample)

**Modelo BC-1 A Capacidad de los Medios del Transporte Automotor - Plan 2018**

**ACINOX COMERCIAL**

| **OACE / OSDE / CAP: GESIME** | | | | **Empresa: ACINOX COMERCIAL** | | | | **Fecha: 9/5/2017** | |
|---|---|---|---|---|---|---|---|---|---|
| **Tipo de Vehículo** | **Cantidad de Vehículos** | | | **Capacidad** | **Índice** | **Distancia** | | **Transportación (En Mt)** | |
| | **Inventario** | **Disponibles** | **% CDT** | **Promedio** | **Aprov. Cap.** | **Media (km)** | | **Capacidad** | **Demanda** |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| ***Existentes*** | | | | | | | | | |
| **Cuñas Tractoras** | 19 | 15 | 79% | 25.0 | 0.81 | 99 | | 375.0 | |
| **Camiones Plataforma** | | | | | | | | | |
| **Camiones Volteo** | | | | | | | | | |
| **Camiones Furgón** | 1 | 1 | | 4.0 | 0.70 | 50 | | 4.0 | |
| **Camiones Cisterna** | | | | | | | | | |
| **Camionetas** | 1 | 1 | | | | | | | |
| **Paneles** | 1 | 0 | | | | | | | |
| **Semirremolques** | 18 | 14 | 78% | | | | | | |
| **Remolques** | 0 | 0 | 0 | | | | | | |
| ***Subtotal Tractivos*** | 22 | 17 | 77% | | | | | 379.0 | 0.0 |
| ***Nuevas Incorporaciones*** | | | | | | | | | |
| **Cuñas Tractoras** | 0 | 0 | 0% | | | | | | |
| **Camiones Volteo** | | | | | | | | | |
| **Semirremolques** | 0 | 0 | 0% | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| ***Subtotal Tractivos*** | 0 | 0 | 0% | | | | | 0.0 | 0.0 |
| | | | | | | | | | |
| ***Total General*** | 22 | 17 | 77% | | | | | 379.0 | 0.0 |

_____ _____

**Nombre y Apellidos, Firma y Cuño** **Cargo que ocupa**

## Form BC-2: Demand for Cargo Transportation (Cargo to be transported by transport service providers)

PLAN DE TRANSPORTACIÓN POR (ORIGEN Y DESTINO) DE LAS CARGAS 2018

EMCARGA

| Modelo BC-2 | | | Modelo BC-2 | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Empresa** | **Producto** | **Embalaje** | **Municipio** | | **Distancia** | **Carga a transportar (Ton)** | | | | | | | | | | | | | | | | |
| | | | **Origen** | **Destino** | **KM** | **Presentado** | **Aprobado** | **ENE** | **FEB** | **MAR** | **ABR** | **MAY** | **JUN** | **JUL** | **AGO** | **SEP** | **OCT** | **NOV** | **DIC** |
| ACINOX COMERCIAL | BARRAS | ATADOS | COTORRO | ISLA DE LA JUVENTUD | 50 | 770 | | | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| ACINOX COMERCIAL | BARRAS | ATADOS | COTORRO | ARTEMISA | 80 | 6160 | | | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 |
| ACINOX COMERCIAL | BARRAS | ATADOS | COTORRO | MAYABEQUE | 50 | 2910 | | | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| ACINOX COMERCIAL | BARRAS | ATADOS | LAS TUNAS | GRANMA | 70 | 4858 | | | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 |
| ACINOX COMERCIAL | PUNTILLAS | CAJAS | COTORRO | PINAR DEL RIO | 190 | 193 | | | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| ACINOX COMERCIAL | PUNTILLAS | CAJAS | COTORRO | ARTEMISA | 80 | 183 | | | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| ACINOX COMERCIAL | PUNTILLAS | CAJAS | COTORRO | MAYABEQUE | 50 | 183 | | | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| ACINOX COMERCIAL | PUNTILLAS | CAJAS | COTORRO | CARDENAS | 150 | 201 | | | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| ACINOX COMERCIAL | PUNTILLAS | CAJAS | COTORRO | CIENFUEGOS | 225 | 183 | | | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| ACINOX COMERCIAL | PUNTILLAS | CAJAS | COTORRO | VILLA CLARA | 300 | 186 | | | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |

## Form BC-3: Transport plan by owned vehicles (vehicles owned by cargo owners)

| Vehículos | | | Norma | Viajes | Carga | Carga | Aprov. | Kilómetros | | Aprov. | Tráfico | Dist. | Consumo | Indice |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chapas | Tipo de Vehículo | Capacidad | consumo | Real. | Transp. | Posible | Capac. | Carga | Total | Rec. | (Tkms) | media 1ton. | Comb. | L/Tkm |
| B032030 | Fulgon | 6 | 3.60 | 170 | 900 | 1020 | 88 | 9860 | 19227 | 51 | 8874.0 | 9.9 | 5340.8 | 0.602 |
| B070007 | Fulgon | 6 | 3.60 | 169 | 900 | 1014 | 89 | 9802 | 19113.9 | 51 | 8821.8 | 9.8 | 5309.4 | 0.602 |
| B151295 | Plataforma | 6 | 3.00 | 170 | 1000 | 1020 | 98 | 9860 | 19227 | 51 | 9860.0 | 9.9 | 6409.0 | 0.650 |
| B070781 | Cisterna | 6 | 3.90 | 210 | 1164 | 1260 | 92 | 12180 | 23751 | 51 | 14177.5 | 12.2 | 6090.0 | 0.430 |
| B151262 | Cisterna | 6 | 3.00 | 201 | 1164 | 1206 | 97 | 11658 | 22733.1 | 51 | 13569.9 | 11.7 | 7577.7 | 0.558 |
| B078656 | Plataforma | 9 | 2.10 | 129 | 1000 | 1161 | 86 | 7482 | 14589.9 | 51 | 7482.0 | 7.5 | 6947.6 | 0.929 |
| B017488 | Cuña | 12 | 2.00 | 155 | 1700 | 1860 | 91 | 8990 | 17530.5 | 51 | 15283.0 | 9.0 | 8765.3 | 0.574 |

## Form BC-4: Cargo Transportation plan by origin/destination (BC2 + BC3)

PLAN DE TRANSPORTACIÓN POR (ORIGEN Y DESTINO) DE LAS CARGAS
Modelo BC-4
BD-4

| No | Organismo | Grupo | Empresa | Productos | Embalaje | Munuicipio | | Distancia | Carga (Ton) | Tráfico En |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Origen | Destino | | | |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Regla | Cotorro | 25 | 1.469 | 36.729 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Mariel | Cotorro | 62 | 0.240 | 14.880 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Cotorro | 5 | 0.727 | 3.633 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Cotorro | 2 | 5.118 | 10.235 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Guanabacoa | 20 | 0.180 | 3.600 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Boyeros | 25 | 0.216 | 5.400 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Alquizar | 90 | 0.240 | 21.600 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Artemisa | 119 | 0.241 | 28.703 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Güines | 58 | 0.216 | 12.528 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Guanajay | 95 | 0.240 | 22.800 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Pinar del Rio | 174 | 0.240 | 31.823 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Cárdenas | 157 | 0.227 | 25.638 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Santa Clara | 136 | 0.175 | 23.795 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Camagüey | 509 | 0.277 | 91.095 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Nuevitas | 561 | 0.175 | 98.287 |
| | MINDUS | GESIME | ACINOX Comercial | Hierro y acero (laminados, barras, alambrón, cabillas) | Atados, rollos y bobinas | Cotorro | Bayamo | 716 | 0.252 | 110.776 |

## Form BC-5: Summary of transported by clients (cargo owners)

MODELO BC-5: Plan de Transportación de Cargas por Clientes y Productos (En Mt.)
TRANSCONTENEDORES ENOC 5 de diciembre año 2019

| OSDE/Empresas | Plan 2018 | Estimado 2018 | Demandado | Aceptado | Diferencia |
|---|---|---|---|---|---|
| **AZCUBA** | **184.9** | **88.5** | **163.9** | **163.9** | **0.0** |
| AZUMAT | 166.0 | 43.8 | **142.2** | **142.2** | **0.0** |
| TECNOAZUCAR | 18.9 | 44.7 | **21.7** | **21.7** | **0.0** |
| **GEICON INDUSTRIAL DE LA CONSTRUCCION** | **18.8** | **27.2** | **28.2** | **28.2** | **0.0** |
| GEPALSI | 0.0 | 1.0 | 2.5 | 2.5 | **0.0** |
| PERDURIT | 4.8 | 4.5 | 5.2 | 5.2 | **0.0** |
| EMPRESA CARPINTERIA DE MADERA | 1.0 | 1.5 | 3.5 | 3.5 | **0.0** |
| DURALMET | 0.1 | 0.1 | 0.1 | 0.1 | **0.0** |
| ERMM Andrez Gonzales Lines | 4.0 | 3.0 | **4.3** | **4.3** | **0.0** |
| Emp. Impermeabilizantes IMPERASFALT | 8.9 | 5.9 | **12.0** | **12.0** | **0.0** |
| **CEMENTOS CIENFUEGOS S.A** | 0.0 | **11.2** | **0.6** | **0.6** | **0.0** |
| **GECONS, CONSTRUCCION Y MONTAJE** | **29.0** | **53.6** | **37.2** | **37.2** | **0.0** |
| ESCAMBRAY | 20.0 | **37.6** | **30.2** | **30.2** | **0.0** |
| EPROMAP | 9.0 | **11.0** | **2.0** | **2.0** | **0.0** |
| SOMEC | 0.0 | **5.0** | **5.0** | **5.0** | **0.0** |
| **GRUPO Diseño e Ing. Construcción** | **11.5** | **4.6** | **4.0** | **4.0** | **0.0** |
| CONSTRUIMPORT | 6.5 | 2.3 | **2.0** | **2.0** | **0.0** |
| IMECO | 5.0 | 2.3 | **2.0** | **2.0** | **0.0** |

## Form BC-6: Summary of the group of entities involved in the cargo balance activities

**Grupo Empresarial:GEA**
**Organísmo: MITRANS**

| Entidad | Código REEUP | Unidades | | Vehículos Prom. Trabajando (Uno) | Capacidad Prom. Trabajando (t) | Carga Prom. Un Vehículo (t) | Dist. (Media km) | Combustible (En litros) |
|---|---|---|---|---|---|---|---|---|
| | | Nombre | Munic/Prov. | | | | | |
| Empresa de Transporte (ETAG) | 151.0.13248 | UEB No. 2 Occidente | Gbcoa/Habana | 33 | 825.00 | 25.00 | 83.4 | 1361.86 |
| | 151.0.13248 | UEB No. 3 Centro | Cfgos/Cfgos | 21 | 525.00 | 25.00 | 83.1 | 992.34 |
| | 151.0.13249 | UEB No. 4 Oriente | Stgo de Cuba/Stgo de Cuba | 20 | 500.00 | 25.00 | 94.0 | 874.62 |
| **TOTAL** | | | | **74** | **1850.00** | **25.00** | **86.1** | **3228.82** |

Form BC R: Summary report of cargo transport (realized transport activities)

| RESUMEN DEL BALANCE DE CARGAS | | | Diesel | Año: | 2018 |
|---|---|---|---|---|---|
| Empresa | EMPRESA PROVINCIAL DE TRANSPORTE | Código REEUP : | | 310.1.04886 | |
| Organismo | OLPP | Real | Plan | Estimado | Plan |
| Provincia | CIEGO DE ÁVILA | 2016 | 2017 | 2017 | 2018 |
| Conceptos | | Actividad : | TRANSPORTACIÓN DE CARGA AUTOMOTOR | | |
| | | | | | |
| INDICADORES DIRECTIVOS | | | | | |
| Carga a Transportar | Mt | 262.5 | 219.0 | 234.2 | 273.8 |
| De ello: En Contenedores | Mt | | | | |
| Cantidad Contenedores Llenos | U | | | | |
| Tráfico | MMtkm | 9.87 | 8.83 | 9.35 | 11.57 |
| Distancia Media de una Tonelada | km | 37.6 | 40.3 | 39.9 | 42.2 |
| Consumo Combustible | t | 572.78 | 516.08 | 546.23 | 674.79 |
| Intensidad Energética | t/MMtkm | 58.05 | 58.43 | 58.43 | 58.33 |
| INDICADORES COMPLEMENTARIOS | | | | | |
| Vehículos Promedio Existentes | U | 141 | 141 | 144 | 144 |
| Vehículos Promedio Trabajando | U | 64 | 94 | 94 | 100 |
| Capacidad Promedio Trabajando | t | 278.0 | 413.6 | 432.8 | 458.1 |
| Capacidad de Transportación | Mt | 286.8 | 260.0 | 277.7 | 316.5 |
| Cantidad de Viajes | U | 65331 | 59088 | 60368 | 69108 |
| Carga Posible | Mt | 312.9 | 268.6 | 286.8 | 335.7 |
| Kilómetros Total | Mkm | 3338.0 | 3092.6 | 3128.8 | 3699.1 |
| Kilómetros con Carga | Mkm | 2705.6 | 2452.4 | 2474.2 | 2935.2 |
| Distancia Promedio de un Viaje | km | 41.4 | 40.2 | 41.0 | 40.1 |
| Capacidad Promedio de un Vehículo | t | 4.3 | 4.4 | 4.6 | 4.6 |
| Coeficiente Aprovechamiento del Parque | % | 45.4 | 66.7 | 65.3 | 69.4 |
| Índice Aprovechamiento del Recorrido | U | 0.81 | 0.79 | 0.79 | 0.79 |
| Índice Aprovechamiento Capacidad de Peso | U | 0.84 | 0.82 | 0.82 | 0.82 |
| Norma de Consumo | km/ℓ | 4.90 | 5.04 | 4.82 | 4.61 |
| COMPROBACIONES | | | | | |
| Cantidad de Viajes | U | 72024 | 61050 | 62287 | 73270 |
| Rotación | U | 3.4 | 2.1 | 2.1 | 2.4 |
| Índice de Consumo | km/ℓ | 4.90 | 5.04 | 4.82 | 4.61 |
| Intensidad Energética | t/MMtkm | 58.11 | 58.67 | 58.68 | 61.53 |
| Variación Intensidad Energética | t/MMtkm | 0.07 | 0.24 | 0.25 | 3.20 |
| Diferencia de Combustible | t | 0.69 | 2.10 | 2.33 | 36.98 |
| Sub Director de Cargas<br>Cargo que ocupa | | Lic. Camilo Valentín Zayas<br>Nombre y Apellidos, Firma y Cuño | | | |

Under the supervision of MITRANS, enterprises demanding cargo transportation and transport service providers start compiling the "Balance of Cargo" from March/April of the previous year and complete the process in November. In this process, entities producing/owning cargo for transportation submit their demand, and transport entities (service providers) offer their capacity. The demand and the supply are matched so that the resources are utilized at full capacity. "Balance of Cargo" is implemented after approval by MEP (Ministerio de Economia y Planificación).

The basic scheme of the cargo transport plan defined in "Methodological Indications to Determine the Cargo Balance" is shown in Table 4.7.1. Any modification to any of these schemes requires authorization from DTC/MITRANS.

**Table 4.7.1 General Scheme of Cargo Transportation Plan**

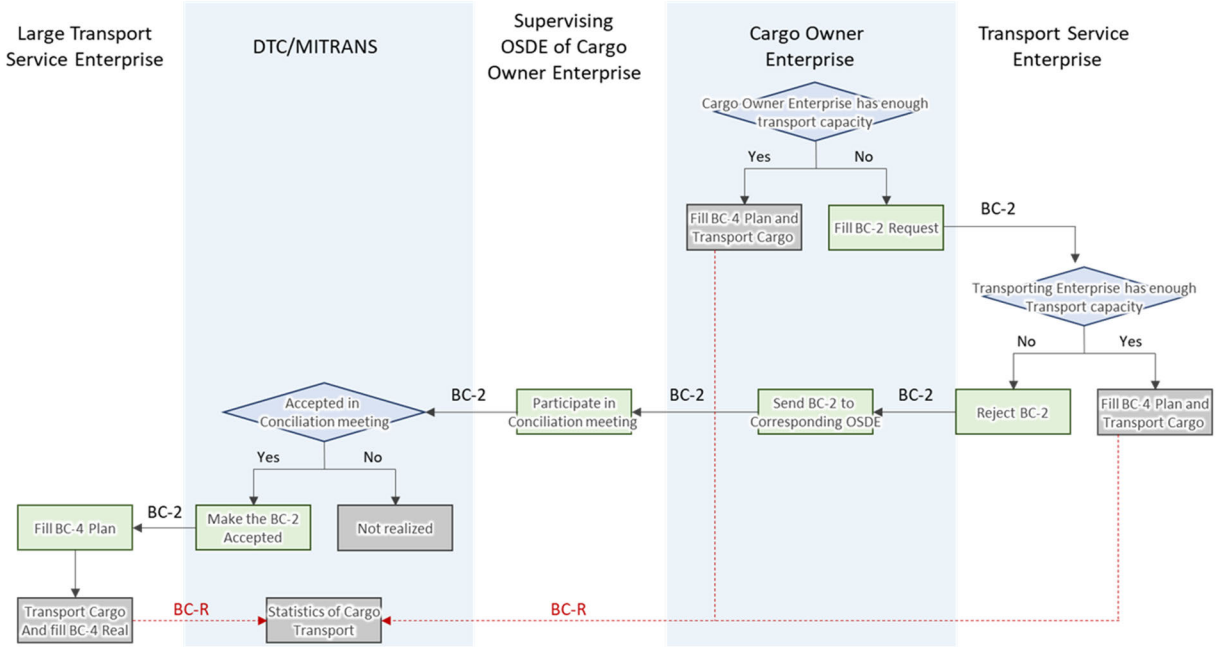
| Category | Means |
|---|---|
| Large lots or long distances | Railway and maritime |
| Containers over a distance of 250 km | Railway, except for transportation from Mariel and La Habana to Cienfuegos and Trinidad and vice versa, as well as refrigerated containers to and from anywhere in the state |
| Port and Railway Loading and Unloading Centers | Means of OSDEs of MITRANS; and road for MINAG, AZCUBA, AUSA, and Provincial governments |
| Small lots | Road means for OSDEs of MITRANS, OACE, and Provincial governments |
| Fragile, perishable, or requiring special care cargo | Road means for OSDE-OACE and Provincial governments |
| Agricultural cargos | Vehicles of OSDEs of MINAG, AZCUBA, and Provincial governments and vehicles of OSDEs of MITRANS in case of cargos of state interest |
| Construction loads | Road vehicles OSDE MICONS, Provincial governments and vehicles of OSDE MITRANS in case of cargos of state interest |
| Retail, collection and distribution, and specialized cargo | Road vehicles of OSDE-OACE, AUSA, and Provincial governments |
| Transports within their respective provinces | Vehicles of Provincial governments |

Note: CAPs no longer exist since January 2021. Law 138, 2020, Official Gazette No. 14, Ordinary, February 5th, 2021. Now, there are Provincial Governments in the 15 provinces. CAMs in the municipalities now perform the CAP's activities at local levels.

Source: Methodological indications to determine the Cargo Balance

Figure 4.7.2 shows a general decision-making flow of a series of cargo transportation plans.

First, the cargo owners check if they have enough means and capacity to transport their cargo (products) by themselves (under their management). Suppose a cargo owner (Empresa) can find enough transport means within the same group (OSDE); in that case, hiring cargo transport services from third parties is unnecessary, so it prepares BC-3 (specifically for its control) and BC-4. On the other hand, suppose it cannot find enough transport means. In that case, it is necessary to hire cargo transport services from transport enterprises under OSDE GEA or other transport services providers such as GELMA (MINAG), TRANZMEC (AZCUBA), and AUSA. BC-2 forms are prepared and submitted to its corresponding OSDE to integrate the transport services. Those OSDEs needing transport service enterprises are invited to join an annual BC meeting for negotiation (conciliation) with DTC/MITRANS. Finally, BC-4 forms are prepared by transport service providers. A necessary amount of fuel and other resources are reported to MEP based on the BC-4 forms once approved by DTC/MITRANS.




Source: JICA Study Team

**Figure 4.7.2 Basic flow of Balance de Cargas System**

Entities need to obtain permission from MITRANS when they intend to change the mode of transportation designated in the "Balance of Cargo." Even in emergencies such as bad weather or malfunctions, cargo should be transported by the designated mode of transport; accordingly, transport delays may happen.

MITRANS compiles the plan, and also monitors the achievement status of the plan, and reviews the situation each year. The number of staff in DTC/MITRANS is sixteen (16), with only two in charge of the cargo transportation plan.

### 4.7.3 Entities (service providers) involved in the cargo transport

Following the instruction of "Balance de Cargas," entities producing goods or having transport means are requested to submit the information on transport supply (the number and specification of owned vehicles) and transport demand (type, amount, and OD of goods) to DTC/MITRANS regularly. Table 4.7.2 shows the names of OACEs and OSDEs involved in the goods transport. The number of entities, including Empresas, is over 300 in total.

**Table 4.7.2 List of OACEs and OSDEs on Balance de Cargas**

| No. | OACEs | OSDEs | | Empresa |
|---|---|---|---|---|
| 1 | MITRANS | GEA | Grupo Empresarial de Servicios Automotor | ETAG |
| 2 | | | | ENOC |
| 3 | | | | EMCARGA |
| 4 | | GEMAR | Grupo Empresarial del Transporte Marítimo Portuario | |
| 5 | | UFC | Unión de Ferrocarriles de Cuba | |
| 6 | MICONS | GECONS | Grupo Empresarial de Construcción y Montaje | |
| 7 | | GEICON | Grupo Empresarial Industrial de la Construcción | |
| 8 | MINAG | GAF | Grupo Empresarial Agro-Forestal | |
| 9 | | GAG | Grupo Empresarial Agrícola | |
| 10 | | GEAF Artemisa | Grupo Empresarial Agropecuario y Forestal Artemisa | |
| 11 | | GEAF Mayabeque | Grupo Empresarial Agropecuario y Forestal Mayabeque | |
| 12 | | GEFF | Grupo Empresarial de Flora y Fauna | |
| 13 | | GEGAN | Grupo Empresarial Ganadero | |
| 14 | | GELMA | Grupo Empresarial de Logística del MINAG | |
| 15 | | LABIOFAM | Grupo Empresarial LABIOFAM | |
| 16 | | TABACUBA | Grupo Empresarial de Tabaco de Cuba | |
| 17 | MINAL | GEIA | Grupo Empresarial Industria Alimentaria | |
| 18 | Council of Ministers | AZCUBA* | Grupo Empresarial | TRANZMEC |
| 19 | MINCIN | GCPIS | Grupo Comercializador de Productos Industriales y Servicios | |
| 20 | | GEMPA | Grupo de Empresas Mayoristas de Productos Alimenticios y Otros Bienes de Consumo | |
| 21 | MINDUS | GEIQ | Grupo Empresarial de la Industria Química | |
| 22 | | GEMPIL | Grupo Empresarial de la Industria Ligera | |
| 23 | | GESIME | Grupo Empresarial de la Industria Sidero Mecánica | |
| 24 | MINED | GEOMINED | Grupo Empresarial MINED | |
| 25 | MINEM | CUPET | Unión Cuba Petróleo | |
| 26 | | GEOMINSAL | Grupo Empresarial Geominsal | |
| 27 | | CUBANiquel | Grupo Empresarial Cubaníquel | |
| 28 | MINFAR | GAE | Grupo de Administración Empresarial | TRD-CARIBE |
| 29 | | | | CIMEX |
| 30 | | | | AUSA |
| 31 | MININT | | | PROVARI |
| 32 | MINSAP | GEASAP | Grupo Empresarial de Aseguramiento a la Salud Publica | |
| 33 | MINTUR | SERVITUR | Grupo Empresarial Servitur SA. | |
| 34 | Council of Ministers | BIOCUBAFARMA* | Grupo Empresarial de las Industrias Biotecnológica y Farmacéutica | |
| 35 | | PALCO* | Grupo Empresarial PALCO | |
| 36 | INRH | GEAS | Grupo Empresarial de Aguas y Saneamiento | |
| 37 | | GEAT | Grupo Empresarial de Gestión de las Aguas Terrestres | |
| 38 | Provincial governments** | Artemisa | EPT (Artemisa) | |
| 39 | | Camagüey | EPT (Camagüey) | |
| 40 | | Ciego de Ávila | EPT (Ciego de Ávila) | |
| 41 | | Cienfuegos | EPT (Cienfuegos) | |

| No. | OACEs | OSDEs | | Empresa |
|---|---|---|---|---|
| 42 | | Granma | EPT (Granma) | |
| 43 | | Guantánamo | EPT (Guantánamo) | |
| 44 | | Holguín | EPT (Holguín) | |
| 45 | | Isla de la Juventud | EPT (Isla de la Juventud) | |
| 46 | | La Habana | EPT (La Habana) | |
| 47 | | Las Tunas | EPT (Las Tunas) | |
| 48 | | Matanzas | EPT (Matanzas) | |
| 49 | | Mayabeque | EPT (Mayabeque) | |
| 50 | | Pinar del Río | EPT (Pinar del Río) | |
| 51 | | Sancti Spíritus | EPT (Sancti Spíritus) | |
| 52 | | Santiago de Cuba | EPT (Santiago de Cuba) | |
| 53 | | Villa Clara | EPT (Villa Clara) | |

Note: AZCUBA*, BIOCUBAFARMA*, and PALCO* are neither OSDEs nor OACES but Grupos Empresariales (Business Group).
**Provincial governments have substituted former CAPs since January 2021, in relation to transportations in the provinces.
Source: Hearing by JICA Study Team

### (1) MITRANS

Several Empresas are integrating OSDEs attended by MITRANS that provide cargo transportation services per requests through Balance de Cargas.

For road transport, EMCARGA is for general cargo, ETAG for bulk cargo, and ENOC (Empresa Nacional Operadora de Contenedores) for containers, which forms OSDE GEA (Grupo Empresarial de Servicios de Transporte Automotor). For rail transport, 6 enterprises integrating OSDE UFC are the service providers (in 2021, 2 new transport enterprises were created: FERROAZUCAR in operations related to the sugar mills and FERROMAR S.A, a mercantile society for the transportation of Mariel Special Development Zone). Empresas, forming OSDE GEMAR (Grupo Empresarial de Transporte Maritimo Portuario / Shipping Corporation), are the service providers for maritime transport.

Regarding the road transport service providers, namely, EMCARGA, ETAG, and ENOC, a brief description of each is given below.

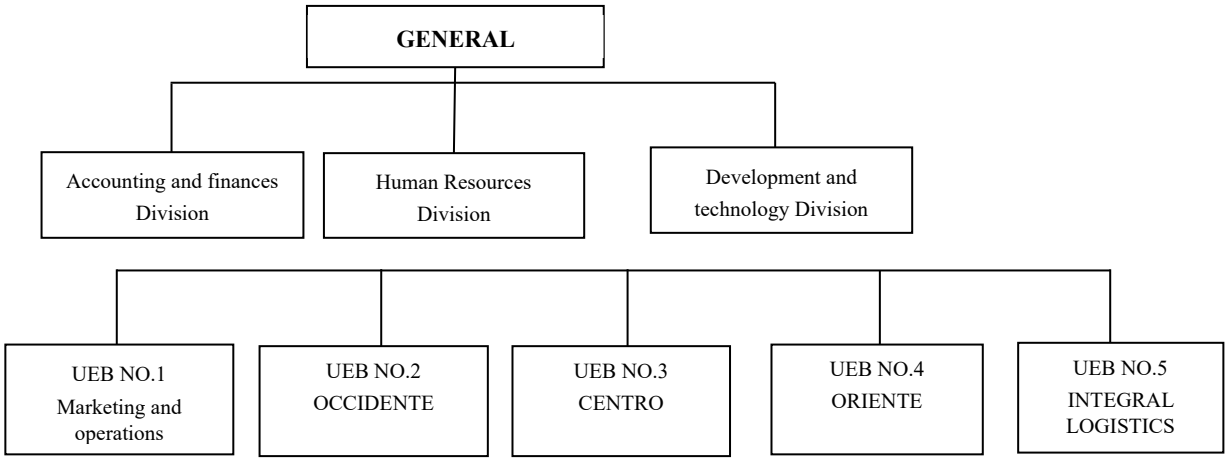
#### 1) EMCARGA

EMCARGA is responsible for general cargo transportation. It has branches in each province of the state.

#### 2) ETAG

ETAG is responsible for bulk food transportation by transport means between ports, factories, mills, silos, and warehouses. The main transport items are raw materials such as soy, wheat, and other cereals. In this regard, ETAG's services are mainly provided for entities under MINAG and MINAL.

ETAG has 3 UEBs, namely UEB No. 2 (Occidente, La Habana), UEB No. 3 (Centro, Cienfuegos), and UEB No. 4 (Oriente, Santiago de Cuba), to provide the road transport services covering the entire state. The organizational structure of ETAG is shown in Figure 4.7.3.




Source: ETAG

**Figure 4.7.3 Organizational Structure of ETAG**

### 3) ENOC

ENOC is an enterprise of forming OSDE GEA as well, specializing in container transport by tractor units and container semi-trailers. It provides services nationwide, although it does not have provincial branches. It has subordinated 10 UEBs, in Havana, Mayabeque, Ciego de Ávila, Camagüey, Villa Clara, Holguín, Granma, and Santiago de Cuba provinces. This entity also provides coordination of multi-modal transport among entities under MITRANS based on the demand of cargo owners.

## (2) AUSA (Almacenes Universales S.A)

AUSA provides not only cargo transport by automotive means but also various services listed in

Table 4.7.3. The customers of AUSA benefit from the integrated services.

Major customers of AUSA are Empresas forming OSDE GAE (Grupo de Administracion Empresarial), in MINFAR (Ministerio de las Fuerzas Armadas Revolucionarias) sector, such as Gaviota (tourism), Tiendas Panamericanas, TRD-Caribe, CIMEX (retailers in CUP and MLC market ), and ZEDM. Aside from the entities under GAE, AUSA transports cargo for the entities under other OACEs.

**Table 4.7.3 AUSA's Functions**

| Category | Main Activities |
|---|---|
| Logistics | - Storage of goods<br>- Lease of premises and spaces<br>- Supply of labor force<br>- Customs and freight services<br>- Insurance management of freight and stored goods<br>- Multi-modal freight transport operator |
| Maintenance of Equipment | - Rental, maintenance and repair services for merchandise handling and lifting equipment<br>- Maintenance of port equipment and automotive transport |
| Special Development Zones | - Operation of Special Development Zones<br>- Logistics services in the Special Development Zones |
| Port operation | - Provide operation services for port terminals, containers, and cargo terminals, as well as docking services for vessels and cleaning, maintenance, repair, and remodeling of containers. |
| Consignee agent | - Management of berthing permits for the vessel and pilot services<br>- Preparation of documents for port authorities and customs offices |

Source: JICA Study Team based on the information from AUSA website

In La Habana, AUSA has established three branches for transportation: road transport, refrigerated products distribution, and other cargo. There is also a branch that is responsible for the warehouse leases: Metropolitan Lease Branch. The leasing spaces are provided to entities under GAE, MINFAR, and third parties.

Additionally, AUSA has facilities in Pinar del Rio, Matanzas (Varadero), Cienfuegos, Villa Clara, Ciego de Avila, Camaguey, Holguin, Las Tunas, and Santiago de Cuba.

**Entrance to Cargo Facility**

**Fuel Station next to the entrance**

Source: JICA Study Team

**Figure 4.7.4 AUSA Facility in Havana**

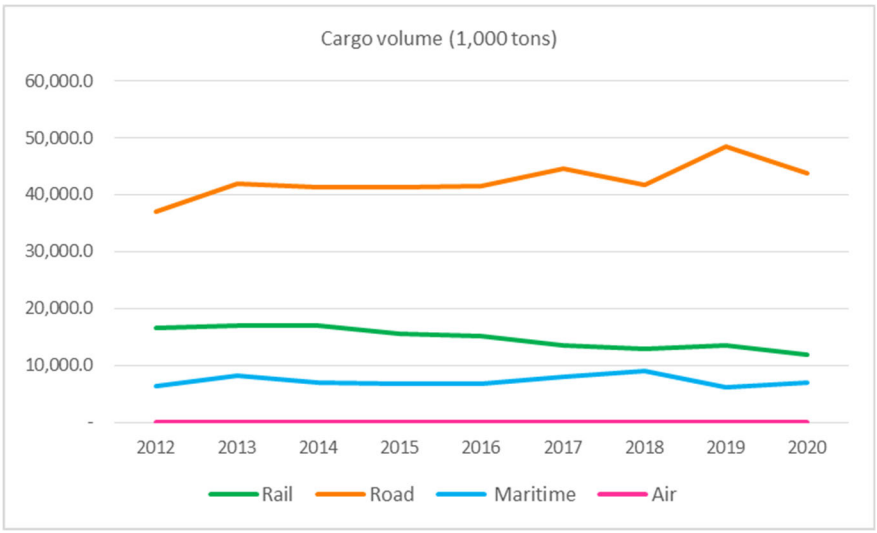
### (3) Other Entities

Aside from the entities under MITRANS and AUSA, there are other logistics service providers. For instance, Zelcom, attached to CIMEX, has large-scale facilities in Berroa, La Habana. Besides, newly established logistics providers exist in Mariel. Although the cargo handling volume handled by them is not significant, their practices with modern facilities and equipment might help develop or renovate facilities in other areas of the state

## 4.7.4 Cargo Transport by Mode

The total annual cargo transport volume was stable (not fluctuating so much, being around 64~65 million tons per year) from 2013 until 2017, according to the statistics of ONEI (Oficina Nacional de Estadistia e Informacion). During the same period, the volume of cargo transported by rail decreased from 16.6 million tons in 2013 to 13.4 million tons in 2017. On the other hand, road transport has increased from 40.0 million to 44.5 million tons per year during the same period.

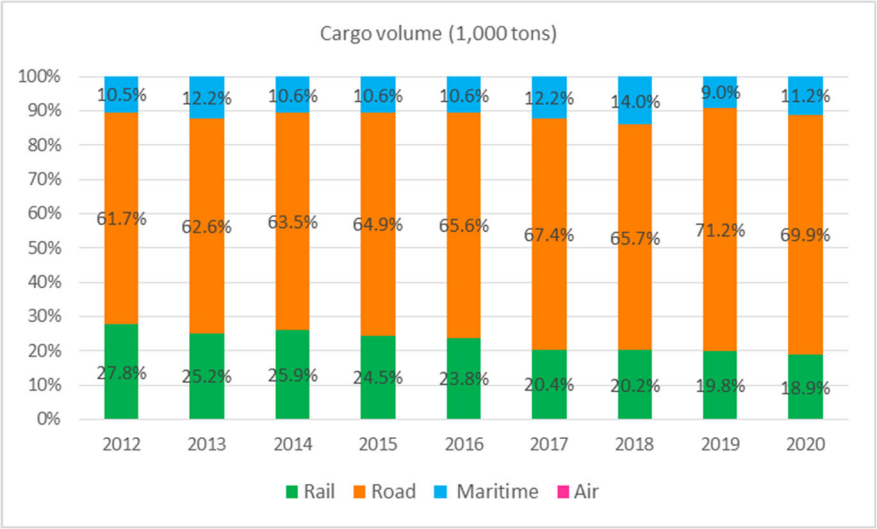
It must be pointed out that cargo transport volume increased in 2019 but considerably decreased in 2020 due to COVID-19, reaching 62.7 million tons. In 2020, it further reduced to 43.7 million tons (estimate).




Source: ONEI Annual Statistics of Cuba 2020

**Figure 4.7.5 Cargo Volume (thousand tons per year)**

Figure 4.7.6 shows the share of each mode in the total transport volume. The share of rail transport has continuously decreased from 27.8% (2012) to 18.9% (2020). On the other hand, the share of road transport has increased from 61.7% (2012) to 69.9% (2020). Besides, it should be noted that the road transport sector has been contributing to the non-public use sector. The maritime cabotage is important to transport liquid materials, of which share was 10.1% in 2020. There has been no significant air cargo transport record in the past.




Source: ONEI Annual Statistics of Cuba 2020

**Figure 4.7.6 Modal Share of Cargo Transport Volume (%)**

**Table 4.7.4 Cargo Transport Volume**

Unit: Thousand tons

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|
| Total | 59,869.2 | 67,053.7 | 65,159.6 | 63,587.2 | 63,453.2 | 65,972.2 | 63,616.4 | 68,244.6 | 62,661.1 |
| Rail | 16,617.2 | 16,879.4 | 16,892.8 | 15,566.2 | 15,119.0 | 13,449.3 | 12,856.2 | 13,525.6 | 11,840.0 |
| Public use | 16,020.5 | 16,356.3 | 16,341.3 | 14,961.6 | 14,693.6 | 12,985.0 | 12,447.2 | 13,278.1 | 11,701.9 |
| Non-public use (b) | 596.7 | 523.1 | 551.5 | 604.6 | 425.4 | 464.3 | 409.0 | 247.5 | 138.1 |
| Road | 36,956.3 | 41,963.9 | 41,383.0 | 41,286.4 | 41,603.7 | 44,494.2 | 41,825.1 | 48,578.6 | 43,816.9 |
| Public use | 9,587.3 | 9,825.5 | 9,014.4 | 9,460.2 | 9,407.3 | 10,045.9 | 9,217.0 | 8,297.4 | 6,674.7 |
| Non-public use (b) | 27,369.0 | 32,138.4 | 32,368.6 | 31,826.2 | 32,196.4 | 34,448.3 | 32,608.1 | 40,281.2 | 37,142.2 |
| Maritime international (c) | 385.7 | 377.6 | 432.6 | 509.5 | 582.4 | 581.4 | 566.4 | 392.2 | 438.7 |
| Import | 212.7 | 232.5 | 307.2 | 412.7 | 470.3 | 469.5 | 458.6 | 317.5 | 353.1 |
| Export | 59.0 | 55.4 | 60.1 | 47.1 | 32.6 | 32.5 | 32.0 | 22.1 | 22.7 |
| Among foreign ports | 114.0 | 89.7 | 65.3 | 49.7 | 79.5 | 79.4 | 75.8 | 52.5 | 62.9 |
| Maritime cabotage (d) | 5,900.4 | 7,825.3 | 6,442.3 | 6,216.3 | 6,139.2 | 7,438.7 | 8,359.8 | 5,741.2 | 6,558.7 |
| Dry | 491.2 | 254.3 | 228.9 | 510.5 | 490.0 | 486.0 | 370.8 | 206.2 | 250.3 |
| Liquid | 5,409.2 | 7,571.0 | 6,213.4 | 5,705.8 | 5,649.2 | 6,952.7 | 7,989.0 | 5,535.0 | 6,308.4 |
| Air | 9.6 | 7.5 | 8.9 | 8.8 | 8.9 | 8.6 | 8.9 | 7.0 | 6.8 |
| National | 1.1 | 0.8 | 0.7 | 0.8 | 0.9 | 0.5 | 0.4 | 0.4 | 0.2 |
| International | 8.5 | 6.7 | 8.2 | 8.0 | 8.0 | 8.1 | 8.5 | 6.6 | 6.6 |

(a) By enterprises specializing in cargo transportation
(b) It includes the equipment that used to belong to the extinguished sugar cane factories
(c) It includes the mix of enterprises
(d) From the year 2012, the fuel moved by cabotage is included in the category of liquid cargo
Source: ONEI Annual Statistics of Cuba 2020

Table 4.7.5 shows cargo traffic volume by each transportation mode measured by ton-kilometers (the total cargo traffic measured by volume multiplied by distance). Similar to the total cargo volume, the cargo traffic volume was relatively stable at around 8.5 billion ton-kilometers until 2017 but decreased to 7.1 billion in 2020.

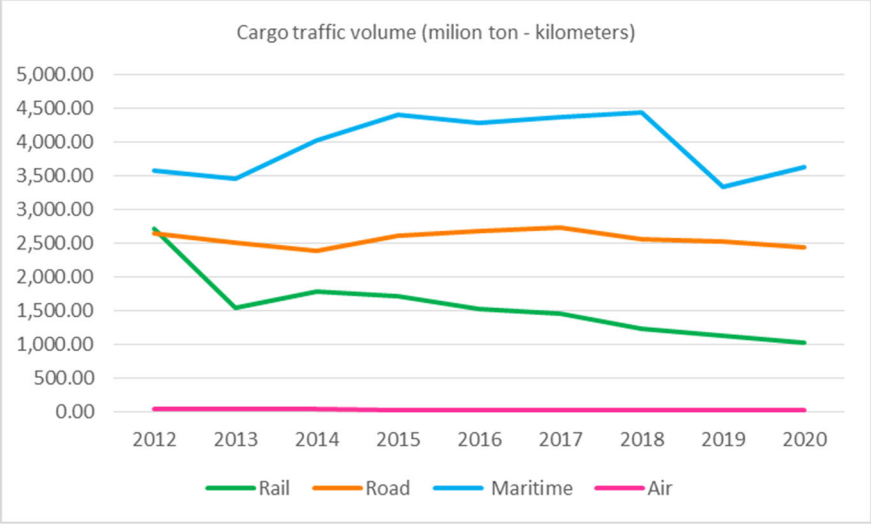
The rail cargo traffic volume has decreased from 2.71 billion ton-kilometers (2012) to 1.02 billion ton-kilometers (2020). On the other hand, the road-based cargo traffic volume has slightly increased from 2.65 billion ton-kilometers (2012) to 2.73 billion ton-kilometers (2017) but again decreased to 2.44 billion ton-kilometers in 2020.

**Table 4.7.5 Cargo Traffic Volume**

Unit: million ton-kilometers

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|
| Total | 8,972.4 | 7,533.5 | 8,235.5 | 8,754.3 | 8,522.7 | 8,587.2 | 8,244.2 | 7,003.1 | 7,115.3 |
| Rail | 2,714.4 | 1,533.7 | 1,786.6 | 1,704.0 | 1,522.3 | 1,455.5 | 1,221.5 | 1,131.9 | 1,019.9 |
| Public use | 1,619.1 | 1,301.6 | 1,513.0 | 1,451.1 | 1,310.4 | 1,232.5 | 1,109.7 | 1,060.1 | 999.7 |
| Non-public use [(b)] | 1,095.3 | 232.1 | 273.6 | 252.9 | 211.9 | 223.0 | 111.8 | 71.8 | 20.2 |
| Road | 2,647.2 | 2,505.3 | 2,393.4 | 2,613.4 | 2,680.0 | 2,727.6 | 2,554.0 | 2,524.1 | 2,443.7 |
| Public use | 834.3 | 801.7 | 831.8 | 860.5 | 864.1 | 875.9 | 800.2 | 790.8 | 583.2 |
| Non-public use (b) | 1,812.9 | 1,703.6 | 1,561.6 | 1,752.9 | 1,815.9 | 1,851.7 | 1,753.8 | 1,733.3 | 1,860.5 |
| Maritime international [(c)] | 1,881.3 | 1,984.7 | 2,487.6 | 2,902.0 | 2,806.8 | 2,802.0 | 2,722.2 | 2,151.0 | 2,271.6 |
| Import | 944.1 | 1,188.7 | 1,570.0 | 2,205.4 | 2,203.8 | 2,200.0 | 2,132.3 | 1,672.1 | 1,823.7 |
| Export | 426.6 | 381.0 | 461.3 | 340.7 | 215.5 | 215.1 | 210.1 | 156.9 | 162.6 |
| Among foreign ports | 510.6 | 415.0 | 456.3 | 355.9 | 387.5 | 386.8 | 379.8 | 322.0 | 285.3 |
| Maritime cabotage [(d)] | 1,697.0 | 1,475.9 | 1,535.2 | 1,508.4 | 1,486.1 | 1,574.8 | 1,727.6 | 1,181.9 | 1,363.9 |
| Dry | 196.8 | 254.3 | 228.9 | 241.9 | 232.2 | 236.8 | 190.2 | 110.8 | 131.3 |
| Liquid | 1,500.2 | 1,221.6 | 1,306.3 | 1,266.5 | 1,253.9 | 1,338.0 | 1,537.4 | 1,071.1 | 1,232.6 |
| Air | 32.5 | 33.9 | 32.7 | 26.6 | 27.5 | 27.3 | 18.9 | 14.2 | 16.2 |
| National | 5.6 | 10.9 | 5.7 | 4.8 | 5.0 | 5.0 | 2.4 | 1.9 | 0.1 |
| International | 26.9 | 23.0 | 27.0 | 21.8 | 22.5 | 22.3 | 16.5 | 12.3 | 16.1 |

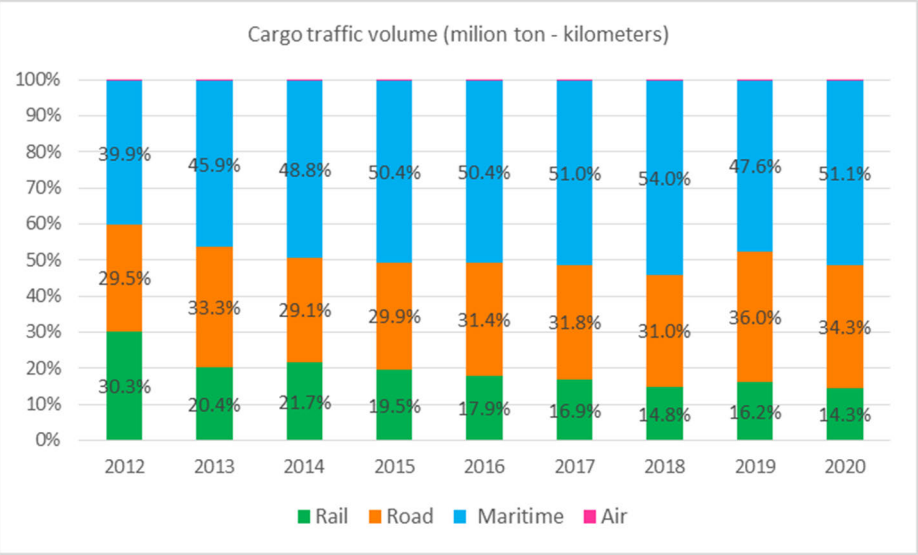
(a) By enterprises specialized in the transportation of cargo
(b) It includes the equipment that used to belong to the extinguished sugar cane factories
(c) It includes the mix of enterprises
Source: ONEI Annual Statistics of Cuba 2020




Source: ONEI Annual Statistics of Cuba 2020

**Figure 4.7.7 Cargo Traffic Volume (million ton-kilometers)**

Figure 4.7.8 shows the share of each mode in the total cargo traffic in ton-kilometers. In 2012, the cargo traffic share by rail was 30.3%, which decreased to 14.3 % in 2020. On the other hand, the road share has been increasing, reaching 34.3% of the total in 2020.




Source: ONEI Annual Statistics of Cuba 2020

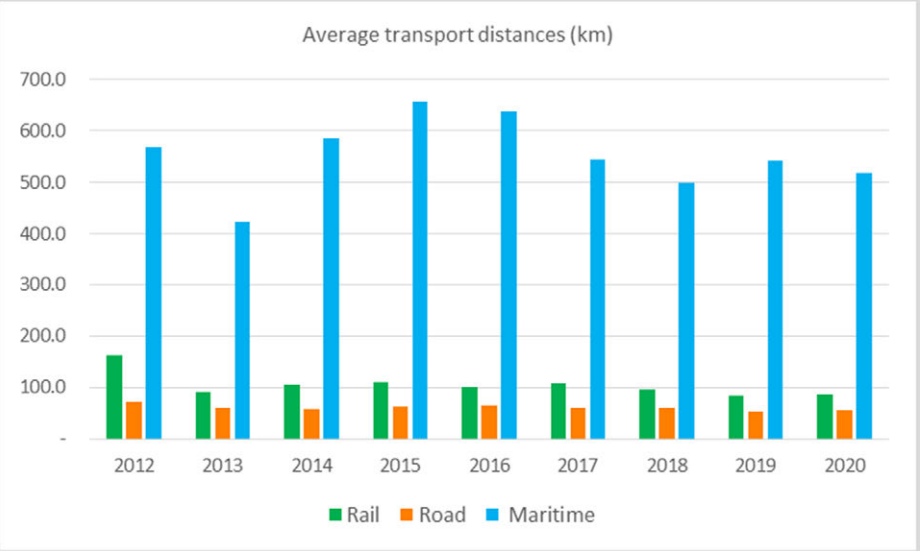
**Figure 4.7.8 Cargo Traffic Volume Share**

Figure 4.7.9 shows the average distances of cargo transport by dividing ton-kilometers in Table 4.7.5 by tons in Table 4.7.4.

The average rail cargo transport distance in 2012 was 163.3 km, suddenly decreasing to around 90.1 km in 2013 and increasing slightly from 2014 but decreasing again to 86.1 km in 2020. The road transport distances also suddenly reduced from 71.6 km in 2012 to 59.7 km in 2013, increasing slightly to around 64 km in 2015 and 2016 but again decreasing to 55.8 km in 2020.

The average maritime cargo transport distance in 2012 was 287.6km, which suddenly decreased to 188.6 km in 2013. It increased to around 240 km in 2014~2016 but again reduced to 208.0 km in 2020.

In general, maritime cabotage transport is used for more extended transportation (mainly for liquid materials), followed by rail and road. However, no significant market segmentation (distinction) is found between the rail and road transport sectors. Further detailed analysis by type of commodity is available based on the BC-2 and BC-4 data to understand the characteristics of cargo transportation.




Unit: km

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|
| Rail | 163.3 | 90.9 | 105.8 | 109.5 | 100.7 | 108.2 | 95.0 | 83.7 | 86.1 |
| Road | 71.6 | 59.7 | 57.8 | 63.3 | 64.4 | 61.3 | 61.1 | 52.0 | 55.8 |
| Maritime international | 4,877.6 | 5,256.1 | 5,750.3 | 5,695.8 | 4,819.4 | 4,819.4 | 4,806.1 | 5,484.4 | 5,178.0 |
| Maritime cabotage | 287.6 | 188.6 | 238.3 | 242.7 | 242.1 | 211.7 | 206.7 | 205.9 | 208.0 |

Source: ONEI Annual Statistics of Cuba 2020

**Figure 4.7.9 Average transport distance (km)**

### 4.7.5 Cargo transport by the entity

In Cuba, most economic activities are made through state enterprises (Empresas). For instance, agricultural activities are made by enterprises under MINAG (Ministerio de la Agricultura); production of daily food products is made by enterprises under MINAL (Ministerio de la Industria Alimenticia), and production of sugar and its by-products for the domestic trade and exports are done by enterprises integrating AZCUBA (Grupo Azucarero).

Concerning the cargo transport activities, about half of the cargo (in terms of tons) is transported by cargo owners (producers), namely state enterprises under various ministries (refer to Table 4.7.6), while OSDEs under MITRANS are responsible for the remaining 40% of the total cargo transport needs, which are transported by Empresas (state corporations) under MITRANS and MINFAR.

**Table 4.7.6 Cargo transportation volume by implementing entities (2020)**

| Entities | Cargo transport volume (Thousand tons) | % |
|---|---|---|
| 1) OACE - own means | 24,224.40 | 40.7% |
| 2) Regional Government (GC) Provincial governments | 3,900.20 | 6.6% |
| 3) AUSA | 1,513.40 | 2.5% |
| 4) Gathering and Distribution | 4943.2 | 8.3% |
| 5) Public enterprises specialized in cargo transportation in the MITRANS sector. | 24,935.3 | 41.9% |
| Total | 59,516.4 | 100.0% |

Source: Balance de Cargas (2020), MITRANS

The breakdown of the cargo volume transported by entities under MITRANS' OSDEs is shown in Table 4.7.7. The volume of rail transport is the largest among the modes, which is made by enterprises integrating OSDE UFC (Union de Ferrocarriles de Cuba ), the solo rail transport operator in the state.

**Table 4.7.7 Cargo Transport Volume by Entities under MITRANS (2020)**

| Modes | Cargo Transport Volume (Thousand Tons) | % | |
|---|---|---|---|
| **(1) Railway** | 11,701.90 | 46.9% | |
| Sugar Related Items | 3,759.8 | | 15.1% |
| Others | 7,942.1 | | 31.8% |
| **(2) Automotive** | 6,674.7 | 26.8% | |
| General cargo | 4,031.8 | | 16.2% |
| Container cargo | 1,718.4 | | 7% |
| Bulk cargo | 924.5 | | 3.7% |
| **(3) Maritime** | 6,558.7 | 26.3% | |
| E.N. Caribe | 120.9 | | 0.5% |
| Fuel | 6,305.1 | | 25.3% |
| Cement | 132.7 | | 0.5% |
| Total Sum | 24,935.30 | 100.0% | 100.0% |

Source: MITRANS Balance de Cargas

Although the total volume in Table 4.7.7 slightly differs from the ONEI statistics shown in Table 4.7.4, the following is observed from the comparison of the two sets of data.

The volume of road cargo transport by MITRANS is 24,935.3 thousand tons, approximately 42% of the total (59,516.4 thousand tons) in 2020. This means that most road transport is conducted by entities other than MITRANS.

### 4.7.6 Distribution of Basic Goods

Basic goods distributed to citizens include 1) Canasta Basica (regulated products of Canasta Basica), 2) Canasta Libre, and 3) CUC (which does not exist since January 2021, the currency is unified to CUP.) market items.

Canasta Basica is necessities (basic items) such as foodstuff, school items, and medicines. Items of Canasta Basica are distributed to Bodegas in each community, and citizens can purchase them at low

(reasonable) prices in CUP. Canasta Libre items are similar to Canasta Basica, which can be purchased in CUP at Bodegas. Commercialized in CUP in Bodegas and specialized markets, other basic products can also be purchased with ceiling prices.

Before January 2021, CUC markets were operated by entities under MINFAR, such as TRD (Cadena de Tiendas Caribe) and CIMEX (Grupo Empresarial CIMEX), and now they are partly traded in CUP and MLC.

The distribution of Canasta Basica is mainly under the responsibility of MINCIN, while other related ministries exist, such as MES (Ministerio de Educacion Superior), for school items. The state-wide transportation of the school items is made by transport entities of the MITRANS sector's OSDEs, and that at retail levels is made by local transport means of MINCIN and Transport Provincial Enterprises.

Examples of stores at the community level are shown in Figure 4.7.10.

**Bodega in Havana**

**Canasta Basica (upper) and Canasta Libre (lower)**

**CUC Store**

Source: JICA Study Team

**Figure 4.7.10 Canasta Basica stores in the community**

The accumulation of large retail facilities is observed at the center of a community. For example, at the center of Habana del Este, CUC stores (until December 2020), CUP stores, and non-state sector stores were found (Figure 4.7.11). Groceries and clothing can be purchased at CUP stores, while home appliances were sold at CUC stores (until December 2020). The distribution of goods to these stores is conducted similarly to what is described above.

As seen in the photo (Figure 4.7.11), store storage space is generally limited, and goods are often stored in the selling space. Therefore, it can be said that goods inventory management needs to be improved to achieve efficient distribution and storage of goods.

**Building**

**CUC Store (until December 2020)**

**CUP Store**

Source: JICA Study Team

**Figure 4.7.11 Stores at the Center of Community**

MINCIN sector enterprises are responsible for the distribution of Canasta Basica. The existing distribution system is hierarchal. First, goods are distributed from factories, ports, etc., to the wholesale facilities of UEBs subordinated to EMPA (Empresa Mayorista de Productos Alimenticios) under MINCIN. Then the goods are transported from the EMPA facilities to Bodegas (Figure 4.7.24). .

The cargo transport of basic goods by truck is conducted not only by MINCIN sector enterprises, but also by other entities, including Empresas under MITRANS such as EMCARGA and EPT (Empresa Provincial de Transporte). Different transport modes are also used; for example, in rural areas such as Baracoa in eastern Cuba, the distribution of Canasta Basica is conducted by barges due to the poor road conditions.


**EMPA in La Habana**


**MINCIN Truck**

Source: JICA Study Team

**Figure 4.7.12 MINCIN Facility and Equipment**

### 4.7.7 Cargo Transport of Manufacturers and Importers

Entities of producers, manufacturers, and importers have their means of transport, especially trucks and storage facilities. Consequently, these entities establish their supply chains. Some parts of their cargo transport are completed within their internal network, and others are conducted by procuring transport service providers.

Figure 4.7.13 shows a factory and a truck of Complejo Lacteo de la Habana, Empresa, that produces dairy products under MINAL. The factory exists on the outskirts of La Habana, and distribution is conducted by small trucks.

**Factory of Dairy Products**


**Truck owned by Complejo Lacteo**

Source: JICA Study Team

**Figure 4.7.13 Factory and Truck of Dairy Product**

Another food producer, CORACAN S.A., a joint venture with Nestle under MINAL, has an organized hierarchal logistics chain: factories, large-scale distribution bases (West, Central, and East), and small-scale distribution bases.

A medicine enterprise named EMCOMED (Empresa de Medicamentos), forming BIOCUBAFARMA Business Group, is specialized in the transportation of medical products. The distribution of medical products needs to be implemented very carefully. In this regard, EMCOMED owns refrigerated trucks.

Figure 4.7.14 shows the storage facility of EMCOMED in La Habana, along with their trucks. The EMCOMED established a network of storage and distribution facilities around the state. EMCOMED also uses cargo transport services provided by MITRANS sector enterprises to overcome the shortage of transport means.

**Storage Facility**


**A truck owned by EMCOMED**

Source: JICA Study Team

**Figure 4.7.14 Storage Facility and Truck of Medical Manufacturer**

Foreign trade is under the responsibility of MINCEX (Ministerio del Comercio Exterior y la Inversión Extranjera). Various entities make the distribution of imported goods in the state. For instance, wheat is transported by ETAG from a port to a wheat mill, where packaging is conducted. Afterward, packaged flour is transported by EMCARGA from a mill to a bread factory. Finally, manufactured bread is transported from the factory to retail stores by EPT at the municipality level.

An example of the transport of imported goods, potatoes that are transported by automotive means of TRANSAGRO at the entrance of La Habana port, is shown in Figure 4.7.15.

**Entrance of Havana Port**

**Empty Truck**

Source: JICA Study Team

**Figure 4.7.15 Distribution of Imported Agricultural Products**

Goods for the CUC market (CUP and MLC have been used since January 2021) and tourism industries are transported through specified supply chains. The distribution in the ex-CUC market is mainly conducted by enterprises forming GAE (Grupo de Administracion Empresarial), MINFAR, such as Almacenes Universales SA (AUSA), and CIMEX. As shown in Figure 4.7.16, TRANSCIMEX transports containers by their automotive means and owns refrigerated trucks for distribution.

**Container Transportation**

**Refrigerated Truck**

Source: JICA Study Team

**Figure 4.7.16 Distribution of Imported Goods**

### 4.7.8 Existing facilities and equipment for automotive transportation

#### (1) Automotive means

An inventory data of trucks (automotive vehicles) is available at UET (Unidad Estatal de Trafico), an entity attached to MITRANS. According to the data, 26% of (automotive vehicles) are less than 15 years old, 37% are 16 to 30 years old, and the remaining 37% are over 30 years old.

In Cuba, remolques (chassis) can be produced by enterprises integrating OSDE GESIME (Grupo Empresarial de la Industria Sideromecánica), being attended by MINDUS. Other parts for maintaining vehicles (spare parts) need to be imported. Therefore, the replacement schedule of spare parts should be planned carefully in advance. However, the shortage of spare tires was pointed out as a critical issue.

EMCARGA transports general cargo. It is observed that the specification of their vehicles is basic, as shown in Figure 4.7.17.

Source: www.periodicovictoria.cu (left), JICA Study Team (right)

**Figure 4.7.17 Transport means of EMCARGA**

ETAG transports bulk cargo, having approximately 140 vehicles with an average capacity of 25 tons. A typical tractor unit and semi-trailer (wagon type) owned by ETAG with an open roof are shown in Figure 4.7.18.


Source: JICA Study Team

**Figure 4.7.18 Transport means of ETAG**

ENOC owns tractor units and chassis to carry containers, and their fleet is used to transport various containers, as shown in Figure 4.7.19.



Source: JICA Study Team

**Figure 4.7.19 Transport means of ENOC**

AUSA owns various vehicles, including tractor units and container chassis (semi-trailers), small refrigerated trucks, etc., as shown in Figure 4.7.20.


Source: JICA Study Team

**Figure 4.7.20 Transport means of AUSA**

### 4.7.9 Transportation Bases

For the entities under MITRANS, EMCARGA has depots in all provinces. An example of the truck base for EMCARGA in La Habana is shown in Figure 4.7.21 (left).

ETAG (Empresa de Transporte de Alimentos a Granel) has three (3) transport bases in the state; namely, in La Habana (right photo), Cienfuegos, and Santiago de Cuba, where large-scale ports that handle bulk cargo are located.

**EMCARGA**

**ETAG**

Source: JICA Study Team

**Figure 4.7.21 Truck Bases of EMCARGA and ETAG in La Habana**

### 4.7.10 Storage Facilities

Although MINCIN (Ministerio del Comercio Interior) controls storage facilities, other OACEs and OSDEs attend enterprises which own their facilities. The storage facilities in Cuba are outlined in Table 4.7.8. The number of storage facilities in Cuba totals 13,469, and their characteristics are as follows:

Entities under MINDUS (Ministerio de Industrias) have the most storage facilities, with 1,832 or 13% of the total, followed by MINAL, MINFAR, MINAG, and MINTUR (Ministerio de Turismo). Of the total storage facilities, 7,827 (57%) are for wholesalers, and 5,819 (43%) are for retailers.

12,892 (94%) of the storage facilities have roofs, while 757 (6%) do not have roofs. The storage facilities without roofs are owned mainly by entities in MINAG, MINEM (Ministerio de Energía y Minas) sectors, and enterprises integrating AZCUBA.

Although the number of retail facilities of MINCIN is shown as 0 in the table, MINCIN entities do have retail facilities.

**Table 4.7.8 Outline of Storage Facilities in Cuba**

| No. | Organization/ Entities | Total Number | Category | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Wholesaler | Retailer | Roofed | Non-roofed | Food | Non-food | Both |
| TOTAL | | 13,649 | 7,827 | 5,819 | 12,892 | 757 | 4,506 | 6,865 | 2,278 |
| 1 | MINDUS | 1,812 | 1233 | 579 | 1,738 | 74 | 395 | 1,188 | 229 |
| 2 | MINAL | 1,669 | 579 | 1,090 | 1,660 | 9 | 1,057 | 308 | 304 |
| 3 | MINFAR | 1,434 | 975 | 459 | 1,425 | 9 | 184 | 703 | 547 |
| 4 | MINAG | 1,360 | 525 | 835 | 1,130 | 230 | 465 | 775 | 120 |
| 5 | MINTUR | 1,244 | 204 | 1,040 | 1,241 | 3 | 357 | 502 | 385 |
| 6 | PROVINCIAL GOVERNMENTS | 1,090 | 668 | 422 | 1,079 | 11 | 474 | 524 | 92 |
| 7 | MITRANS | 698 | 386 | 312 | 644 | 54 | 199 | 346 | 153 |
| 8 | AZCUBA | 685 | 578 | 107 | 578 | 107 | 315 | 325 | 45 |
| 9 | MINCIN | 667 | 667 | - | 667 | - | 457 | 206 | 4 |
| 10 | MINEM | 598 | 497 | 101 | 430 | 168 | 141 | 415 | 42 |
| 11 | MICONS | 522 | 384 | 138 | 475 | 47 | 191 | 324 | 7 |
| 12 | MINCOM | 305 | 167 | 138 | 278 | 27 | 10 | 206 | 89 |
| 13 | INRH | 220 | 158 | 62 | 210 | 10 | 54 | 105 | 61 |
| 14 | MINCULT | 190 | 134 | 56 | 190 | 0 | 6 | 177 | 7 |
| 15 | HISTORIADOR | 176 | 64 | 112 | 174 | 2 | 36 | 47 | 93 |
| 16 | MES | 152 | 0 | 152 | 150 | 2 | 33 | 105 | 14 |
| 17 | MINSAP | 151 | 150 | 1 | 151 | 0 | 0 | 149 | 2 |
| 18 | MININT | 150 | 145 | 5 | 150 | 0 | 20 | 129 | 1 |
| 19 | BIOCUBAFARMA | 148 | 60 | 88 | 148 | 0 | 4 | 137 | 7 |
| 20 | INDER | 109 | 32 | 77 | 109 | 0 | 29 | 49 | 31 |
| 21 | CITMA | 80 | 73 | 7 | 80 | 0 | 24 | 30 | 26 |
| 22 | MINED | 55 | 28 | 25 | 53 | 2 | 13 | 38 | 4 |
| 23 | C.ESTADO | 50 | 50 | 0 | 50 | 0 | 18 | 30 | 2 |
| 24 | MINCEX | 39 | 32 | 7 | 39 | 0 | 10 | 29 | 0 |
| 25 | ICRT | 35 | 32 | 2 | 35 | 0 | 12 | 12 | 11 |
| 26 | INRE | 10 | 6 | 4 | 8 | 2 | 2 | 6 | 2 |

Source: Data from CIMAB

The condition of the storage facilities is shown in Table 4.7.9 below.

69% of the total storage facilities are in good condition, 26% are intermediate and 5% are in poor condition. The share of "good" is lower than 60% for MITRANS, INRH, MES, and INDER.

**Table 4.7.9 Condition of Storage Facilities in Cuba**

| No. | Organization/ Entities | Total Number | Construction Status | | | Percentage | | |
|---|---|---|---|---|---|---|---|---|
| | | | Good | Regular | Bad | Good | Regular | Bad |
| TOTAL | | 13,649 | 9,368 | 3,604 | 677 | 69% | 26% | 5% |
| 1 | MINDUS | 1,812 | 1,202 | 552 | 58 | 66% | 30% | 3% |
| 2 | MINAL | 1,669 | 1,086 | 472 | 111 | 65% | 28% | 7% |
| 3 | MINFAR | 1,434 | 1,173 | 244 | 17 | 82% | 17% | 1% |
| 4 | MINAG | 1,360 | 953 | 352 | 55 | 70% | 26% | 4% |
| 5 | MINTUR | 1,244 | 922 | 235 | 87 | 74% | 19% | 7% |
| 6 | PROVINCIAL GOVERNMENTS | 1,090 | 663 | 370 | 57 | 61% | 34% | 5% |
| 7 | MITRANS | 698 | 275 | 395 | 28 | 39% | 57% | 4% |
| 8 | AZCUBA | 685 | 449 | 153 | 83 | 66% | 22% | 12% |
| 9 | MINCIN | 667 | 395 | 202 | 70 | 59% | 30% | 10% |
| 10 | MINEM | 598 | 475 | 108 | 15 | 79% | 18% | 3% |
| 11 | MICONS | 522 | 474 | 41 | 7 | 91% | 8% | 1% |
| 12 | MINCOM | 305 | 196 | 86 | 23 | 64% | 28% | 8% |
| 13 | INRH | 220 | 120 | 87 | 13 | 55% | 40% | 6% |
| 14 | MINCULT | 190 | 183 | 4 | 3 | 96% | 2% | 2% |
| 15 | HISTORIADOR | 176 | 108 | 51 | 17 | 61% | 29% | 10% |
| 16 | MES | 152 | 78 | 64 | 10 | 51% | 42% | 7% |
| 17 | MINSAP | 151 | 110 | 40 | 1 | 73% | 26% | 1% |
| 18 | MININT | 150 | 147 | 3 | 0 | 98% | 2% | 0% |
| 19 | BIOCUBAFARMA | 148 | 90 | 56 | 2 | 61% | 38% | 1% |
| 20 | INDER | 109 | 61 | 38 | 10 | 56% | 35% | 9% |
| 21 | CITMA | 80 | 63 | 15 | 2 | 79% | 19% | 3% |
| 22 | MINED | 55 | 33 | 15 | 7 | 60% | 27% | 13% |
| 23 | C.ESTADO | 50 | 44 | 6 | 0 | 88% | 12% | 0% |
| 24 | MINCEX | 39 | 30 | 9 | 0 | 77% | 23% | 0% |
| 25 | ICRT | 35 | 28 | 6 | 1 | 80% | 17% | 3% |
| 26 | INRE | 10 | 10 | 0 | 0 | 100% | 0% | 0% |

Source: Data from CIMAB

### 4.7.11 Logistics Complex

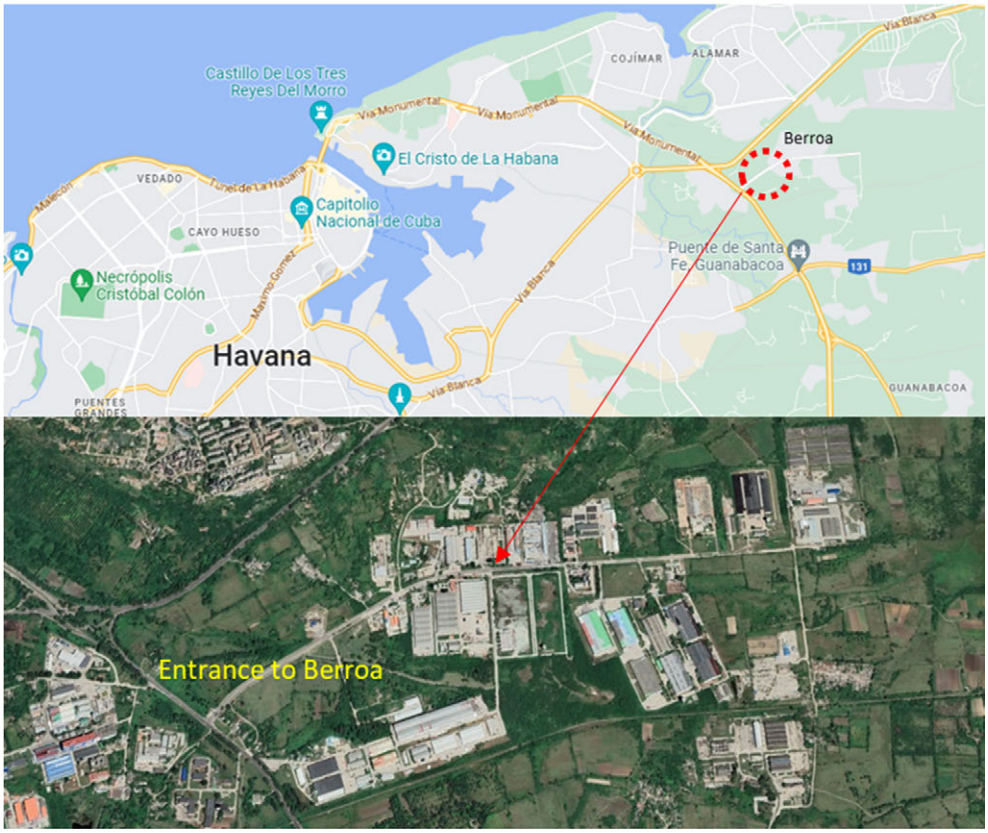
Integration of transport facilities and services in one place, including truck terminals, warehouses, and storage facilities, is essential to achieve effective and efficient logistics for cargo owners. From this perspective, three good practices are found around La Habana: Berroa in eastern Habana, Mariel, and Guanabacoa.

### (1) Berroa

Berroa is located in the eastern part of La Habana, where the circular road connects Autopista to the east part of the state and other roads. The road extends to the western part of the state, offering easy access to the Mariel industrial area, where international container handling functions have been shifted from La Habana Port. The entrance to Berroa is off the ring road (see Figure 4.7.22).

Originally, Berroa is where CIMEX (Corporation in MINFAR sector) established logistics facilities, while other agents, such as ITH (Comercializadora ITH S.A.) enterprise of the MINTUR sector, also built storage and other logistics facilities. Zelcom is a facility under CIMEX.

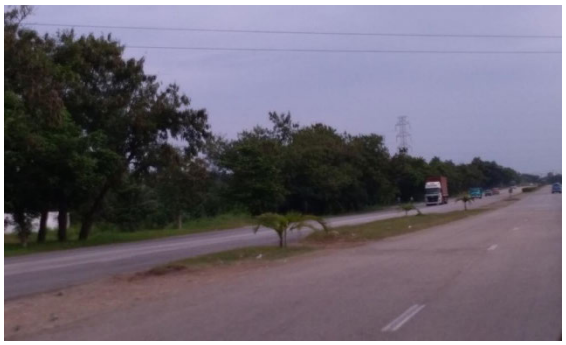
ENOC transports imported containers from Mariel Port. Besides, the transport of containers is also done by AUSA (Almacenes Universales S.A.). In addition, MINCIN sector trucks were also observed in the area.




Source: JICA Study Team using Google Map

**Figure 4.7.22 Location of Berroa**

In Berroa, large facilities such as warehouses, storage facilities, and truck bases were observed facing the road and some factories, as shown in Figure 4.7.23.



**Ring Road Connected to Berroa Area**

**Entrance to Berroa Area**

**Truck Base**

**Logistics Facilities of Zelcom**

**Maintenance Facilities of Automotive**

**Detergent Factory**

*) Zelcom S.A. :Zona Especializada de Logistica y Comercio
Source: JICA Study Team

**Figure 4.7.23 Facilities in Berroa Area**

### (2) Mariel

The Mariel Special Development Zone (ZED Mariel) offers special incentives to promote investment in production and logistics.

Investors in the ZED Mariel are offered incentives, including tax exemptions and reductions. The incentives are summarized in Table 4.7.10, showing special treatment on tax on sales and services, corporate tax, tax on the use of labor force contribution, local development, and customs duties.

**Table 4.7.10 Incentives for Investments in ZED Mariel**

| | Tax on Sales and Services | Corporate Tax | Tax on the use of labor force contribution to local development | Custom Duties |
|---|---|---|---|---|
| Incentive | 0%<br>During the first year of operation | 0%<br>During the first 10 years of operation | 0% | 0% |
| Remarks | 1% thereafter | 12% thereafter | Exempted | On imports of means and equipment for the investment process |

Source: JICA Study Team based on the information on www.zedmariel.com/en

Mariel has newly built a terminal to handle the containers that have shifted from Havana Port. The container terminal is operated by PSA (Singapur company) by a management contract signed with AUSA. Next to the container terminal, there is a logistics zone where several logistics facilities have been established with foreign investment.

Cargo transport between La Habana and Mariel is mainly conducted by road. The transportation time from Berroa to Mariel Port via Autopista is approximately 70 minutes under no traffic congestion. The distance is about 70 km, as shown in Figure 4.7.24.


Source: JICA Study Team using Google Map

**Figure 4.7.24 Main Route of Road Transportation between Mariel and Berroa**

Although the Mariel area is connected to the railway, cargo to/from La Habana is usually transported by road transport means, not by rail, since the distance between Mariel and La Habana is not so long and the amount of cargo is too small for rail transportation.

In the ZED Mariel, logistics-related companies have been established, and existing facilities are listed in Table 4.7.11. Foreign investment is significant among these companies and facilities, not only through joint ventures with Cuban companies but also including cases of 100% foreign capital.

**Table 4.7.11 Logistics-Related Companies in Mariel (In operation)**

| Company | Business | Approval Date | Modality of Investment | Country |
|---|---|---|---|---|
| RICHMEAT de Cuba | Production of meat | February 16th, 2015 | 100% Foreign Capital Company | Mexico |
| PROFOOD SERVICE S.A. | Production of juices and beverages | March 16th, 2015 | 100% Foreign Capital Company | Spain |
| BDC LOG S.A. | Logistics and transport services | April 27th, 2015 | 100% Foreign Capital Company | Belgium |
| BDC TEC S.A. | Electronics | May 2nd, 2015 | 100% Foreign Capital Company | Belgium |
| DEVOX CARIBE S.A. | Production of paints | June 6th, 2015 | 100% Foreign Capital Company | Mexico |
| Servicios logísticos Mariel S.A. | Logistics and transport services | June 23rd, 2015 | 100% Cuban Capital Company | Cuba |
| Logística Hotelera del Caribe S.A. | Logistics in hotels and related services | December 15th, 2016 | Joint Venture | Cuba – Spain |
| WOMY EQUIPMENT RENTAL b.v. | Renting, maintenance, and repair of heavy equipment | March 1st, 2016 | 100% Foreign Capital Company | Nederlands |
| THAI BINH GLOBAL INVESTMENT CORPORATION | Production of disposable diapers and sanitary pads | March 1st, 2016 | 100% Foreign Capital Company | Vietnam |
| CARILOG | Logistics services | April 8th, 2016 | International Economic Association | Cuba – France |
| BOUYGUES Construcción Cuba S.A. | Engineering and construction | April 19th, 2016 | 100% Foreign Capital Company | France |
| Tecnologías Constructivas S.A. | Construction (metallic structures) | July 1st, 2016 | Joint Venture | Cuba -Spain |
| ENGIMOV CARIBE S.A. | Engineering, construction, and production of construction materials. | January 16th, 2017 | 100% Foreign Capital Company | Portugal |
| AUTOCENTRO ZED S.A. | Center of technical services in the representation of the KAMAZ trucks plant | January 28th, 2017 | 100% Foreign Capital Company | Russian Federation |
| NESCOR S.A. | Food production | October 25th, 2017 | Joint Venture | Cuba -Switzerland |
| RIMCO Caribe LLC | Trading, renting, maintenance, and repairing services to Caterpillar equipment, AGCO agricultural equipment, and other brands. | November 1st, 2017 | 100% Foreign Capital Company | Puerto Rico |
| RESA CARIBE S.A. | Scaffolding equipment and electric platform, industrial and constructive maintenance services. | December 26th, 2017 | 100% Foreign Capital Company | Spain |
| China Communications Construction Company Ltd | Engineering and construction services | September 13th, 2018 | 100% Foreign Capital Company | China |
| CTB Service S.A. | Warehouse logistics, maintenance, repair of construction, lifting, handling, and cargo transport equipment, services of regeneration of batteries. | October 29th, 2018 | 100% Foreign Capital Company | Spain |

Source: JICA Study Team from the information on www.zedmariel.com/en

Additionally, a few companies are in different moments of the investment process as of 2019, all of which are 100% foreign capital, as shown in Table 4.7.12.

**Table 4.7.12 Logistics Related Companies in Mariel (In Investment Process)**

| Company | Business | Approval Date | Modality of Investment | Country |
|---|---|---|---|---|
| Vidrios Mariel S.A. | Production of glass containers | September 13th, 2016 | 100% Foreign Capital Company | Italy |
| ARCO 33 S.A. | Production of disposable syringes | October 23rd, 2016 | 100% Foreign Capital Company | Korea |
| FIDAS DO BRASIL S.A. | Logistics. | November 30th, 2016 | 100% Foreign Capital Company | Brazil |
| Grupo TOT Color S.A. | Production of metallic paintings | Enero 16th, 2017 | 100% Foreign Capital Company | Spain |
| Mariel Solar Energy CGY S.A. | Photovoltaic solar energy | August 5th, 2017 | 100% Foreign Capital Company | United Kingdom |
| TGT CARIBE S.A. | Production of cheese | November 23th, 2017 | 100% Foreign Capital Company | Spain |
| Lentes del Caribe S.A. | Ophthalmology products | February 15th, 2018 | 100% Foreign Capital Company | El Salvador |
| VI MARIEL | Infrastructure development | March 29th, 2018 | 100% Foreign Capital Company | Vietnam |
| AGUNSA Mariel S.A. | Logistics Operator | April 2nd, 2018 | 100% Foreign Capital Company | Chile |
| CTB Service S.A. | Technical engineering and warehousing logistics | October 29th, 2018 | 100% Foreign Capital Company | Spain |
| Newrest Catering Mariel S.A. | Elaboration of food, drinks, laundry, and cleaning services | December 18th, 2018 | 100% Foreign Capital Company | Spain |

Source: JICA Study Team from the information on www.zedmariel.com/en

According to the information from ZED Mariel, 46,784 m² of roofed warehouses, 30,000 m² of open warehouses, and 8,500 m³ of refrigerated warehouses have already been built in the special development zone.

**Logistics Zone (Zona de Logistica)** **Container Depots**

Source: JICA Study Team

**Figure 4.7.25 Current Situation of Logistics Zone in Mariel**

As shown in Figure 4.7.26, facilities in Mariel are advanced; for instance, the platform makes cargo handling activities efficient, and ample space and pavement provide flexibility for truck maneuvering and container storage. Many advanced functions are found in these facilities, which are exemplary for other facilities in the rest of the state.


Source: JICA Study Team using a photo from www.zedmariel.com/en

**Figure 4.7.26 Current Situation of Logistics Zone in Mariel**

### (3) Guanabacoa, La Habana

Many warehouses have been observed in Guanabacoa, La Habana, since the Autopista to Santiago de Cuba started in this area; the accumulation of warehouses tends to be observed at transport hubs. While the storage facilities in this area cover a large area, the facilities are antiquated and lack modern equipment.


Source: JICA Study Team using Google Map

**Figure 4.7.27 Facilities in Guanabacoa**


**Autopista**


**Refrigerated Facility**


**Warehouse**

Source: JICA Study Team

**Figure 4.7.28 Autopista and Facilities around Guanabacoa, Havana**

### (4) Provincial Level

Each province has its entities for cargo transport, such as EPT. For example, the JICA Study Team visited San Jose de las Lajas in Mayabeque Province. The truck base is not paved, nor do the facilities have roofs.



Source: JICA Study Team using Google Map

**Figure 4.7.29 Truck Base in San Jose de las Lajas, Mayabeque Province**

## 4.7.12 Operation and Maintenance

### (1) Automotive transport

The operation and maintenance of trucks (automotive vehicles) is conducted by each operator (Empresa), owning trucks. In addition, maintenance services are also contracted to third parties. There are service providers, such as Mercedes Benz, for post-sale services.

The "Annual Statistics of Cuba 2020" (ONEI) includes some indicators of road freight transport, as shown in Table 4.7.13. From these statistics, the coefficient of vehicle use increased from 2012 to 2018 but decreased in 2019 and 2020 due to COVID-19. Furthermore, looking at other indicators, the "total traveled distance" and "distance traveled by a vehicle" also increased up to 2019 but decreased in 2020.

**Table 4.7.13 Selected Indicators of Automotive Freight Transport**

| CONCEPT | Unit | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| Coefficient of use of the fleet | % | 70.1 | 70.9 | 72.1 | 66.3 | 63.8 |
| Public use | | 63.8 | 60 | 62.1 | 53.7 | 59.3 |
| Non-public use | | 71.2 | 72.1 | 73.3 | 69.1 | 66.8 |
| Total travelled distance | Million km | 306.2 | 313.2 | 317.5 | 337.4 | 321.7 |
| State Use | | 106.5 | 109.5 | 111.2 | 117.4 | 120.0 |
| Non-state use | | 199.7 | 203.7 | 206.3 | 220 | 201.7 |
| Distance travelled by a vehicle | km | 129.7 | 132.1 | 132.9 | 133.9 | 119.0 |
| State Use | | 74.1 | 75.6 | 80.0 | 81.0 | 88.9 |
| Non-state use | | 139.2 | 140.7 | 141.2 | 143.0 | 131.3 |

(*) It refers only to the vehicles that are operated by specialized enterprises belonging to the state-run transport sector.
Source: ONEI Annual Statistics of Cuba 2020

### (2) Storage Facilities

The operation and maintenance of the storage facilities and equipment are also implemented by each operator that owns the facilities. Nonetheless, MINCIN, the regulator and the responsible government entity for the storage facilities, categorizes storage facilities into four types as shown in Table 4.7.14 along with "Resolution 59/04 MINCIN Logistics Regulation of Warehouses" and "Resolution 153/07 MINCIN EXPELOG and Categorization."

**Table 4.7.14 Categorization of Storage Facilities in Cuba**

| Category | Condition |
|---|---|
| First level | Products are stored under conditions that guarantee the essential requirements for adequate control and precise conservation. |
| Second level | Storage is made with an appropriate correspondence between the products and the technology, and work begins on the approach toward the client. |
| Third level | Considers the storage of the products with a focus on the client and adapts its rigor and operation to the needs, which include agility, efficiency, schedule, etc. |
| Without Categorization | There is an invalidating requirement for categorizing the first level in the evaluation process. |

Source: Resolution by MINCIN

## 4.7.13 Human Resource Capacity

### (1) Balance of Cargo

Balancing the supply-demand of freight transportation through the Balance de Calga is complex and requires a great deal of effort and time to develop an annual transportation plan. In addition, MITRANS must monitor and oversee the implementation of the cargo transportation plan and analyze the results. Despite the enormous amount of work involved, DTC/MITRANS has 16 professional staff members, only two of whom are experts in freight transportation planning.

The current balance de cargas system needs to be modernized and labor-saving as soon as possible through ICT. In the future, we would like to upgrade the system to a level where domestic logistics can be monitored and supervised in real-time from a control center located within MITRANS.

If an action to establish a new ICT-based freight transportation supply-demand coordination system is approved, the first thing that needs to be done is to provide training to ensure that the information planned by the provinces, companies, and UEBs is recorded in a uniform format. Therefore, the first thing that needs to be done is training to ensure that the information on the cargo transport plan prepared by the prefecture, companies, and UEB is recorded in a consistent format. A technically effective way to tackle this challenge would be using a cloud system.

Suppose cloud systems can be used to update information and analyze transportation problems using this information. In that case, transportation planning updates and decision-making are expected to become faster and more accurate. Currently, real-time data is difficult to obtain (exchanged by telephone), and one issue that needs to be addressed is to improve the speed of freight transportation information.

**(2) Transport service providers**

TRAMOS, a road and driving education company under the umbrella of OSDE GEA, has a curriculum of studies in road safety, regulations, and driving techniques, and has UEBs (schools) in all provinces. TRAMOS is also a member of the National Traffic Safety Committee.

The main tasks of TRAMOS are

- Re-qualification courses for current drivers every two years
- Conducts preparatory courses for those seeking a driver's license
- Offer training courses for self-employed and private sector drivers

The above three issues will be addressed in a one-month learning program.

To achieve better results in the future as an educational institution, it is recognized that the current training program needs to be improved. One of the effective ways to do this is to train participants in the training program using ICT, such as a driving simulation program. To implement such ICT-based learning programs, it is also necessary to introduce computers and other equipment and materials.

Training in operating techniques for cargo handling machinery (e.g., forklifts) is the responsibility of each company in the MINCIN sector. With the introduction of new machinery, in addition to new operating techniques, training is also required for new maintenance tasks. In particular, the introduction of new machines and vehicles requires the improvement of technical skills in the maintenance and management of electrical and communication systems.

Cimab, as a GEMAR-affiliated company (empresa), could contribute to human resource development not only by conducting research on training programs, but also by conducting surveys for the introduction of new equipment and monitoring its use before and after the start of operation.

### 4.7.14 Ongoing Actions / Projects

**(1) Policy directions**

As for the upper level policies on freight transportation as indicated in the "Guidelines for the Economic and Social Policies of the Party and the Revolution (2021-2026)," two upper level policies must be kept in mind.

First, "X. Transportation Policy Guidelines" aims to realize intermodal transportation in the domestic freight transportation system by utilizing the comparative advantages of each transportation mode in terms of transportation efficiency, and also considering the introduction of more efficient transportation means.

The next section, "XII. Transportation Policy Guidelines for Trade Policy," indicates that a national logistics plan will be developed to ensure integrated management of the domestic supply chain.

**Table 4.7.15 Listed Contents Related to Logistics**

| Category | Condition |
|---|---|
| X. POLICY FOR TRANSPORT GUIDELINES | 163. Improve the cargo balance, achieve an adequate operation of the Port-Transport-Internal Economy chain, taking advantage of the comparative advantages in terms of efficiency of rail and cabotage, specialized companies and the use of containers, to achieve multi-modal integration, with a transformation in the participation structure, based on the use of more efficient means. |
| XII. TRADE POLICY GUIDELINES | 189. Develop a national logistics plan to ensure the integrated management of the country's supply chains |

Source: Guidelines of the Economic and Social Policy of the party and the revolution for the Period 2021-2026

Current MITRANS concerns include Increased fuel consumption due to the growing use of automobiles for cargo transport. Depending on the nature, weight, volume, and distance of the cargo, there is a growing interest in more aggressive use of rail and sea transport.

The first problem with more active use of marine transportation is the shortage of vessels. Another problem is the partial shallowness of the waterways (shipping channels) in the bay at major ports such as Havana, Mariel, and Santiago de Cuba. In addition, we recognize that cargo transport, especially to the Island of Youth and Baracoa, is an important issue.

In terms of road transport, the aging of the automobile fleet is a major issue, in that only about 70% of the vehicle fleet is in operation. In addition, there is a problem, particularly with regard to the delivery of basic goods within the prefecture, of the wasteful use of large trucks to transport small lots of goods, i.e., not fully utilizing the loading capacity of the vehicles and increasing fuel consumption. This is due to the shortage of small trucks, and it is desirable to have a standard automobile fleet arrangement that is adapted to the actual transportation conditions in each prefecture. It should also be noted that the shortage of spare tire supply is also a serious problem.

As for bulk cargo storage facilities, there is an urgent need to improve warehouses and silos, and MITRANS, MINAL, and MINAG, the ministries concerned, are in the process of discussing ways to restore their functions.

In terms of transportation of basic commodities (canasta bascia), there are problems related to refrigerated and frozen transportation. For the storage and transportation of poultry and other commodities, there is a very high demand for refrigerated warehouses and refrigerated vehicles.

### (2) Projects by PROCUBA

PROCUBA (Promoción del Comercio Exterior y la Inversión Extranjera de Cuba) is an entity attached to MINCEX that provides specialized services to exporters and importers in Cuba; producers of goods and services; and potential foreign partners for the development, promotion, and marketing of their

goods and services, as well as for the identification of opportunities for business with foreign investors.

According to PROCUBA, wholesale trade, namely, the sales activities of nationally produced or imported goods to manufacturers, traders, and large customers, is an issue in Cuba. PROCUBA intends to upgrade this area by using 3PL party logistics operators who can efficiently provide solutions to achieve stable and timely transport services. In this regard, three (3) projects are listed in the investment portfolio on PROCUBA, all of which are an investment in existing refrigerated logistics facilities in La Habana as shown in Table 4.7.16.

The issue with the logistics of the refrigerated food supply is addressed from conservation, storage, transport, and inventory management from the aspect of achieving efficiency and optimization. It seems reasonable to enhance the efficiency of existing facilities by referring to advanced management systems of foreign practices in value-added logistics, such as refrigerated supply chains. According to the current policy, it will be possible to invite foreign partners to achieve a higher level of the supply chain of refrigerated food.

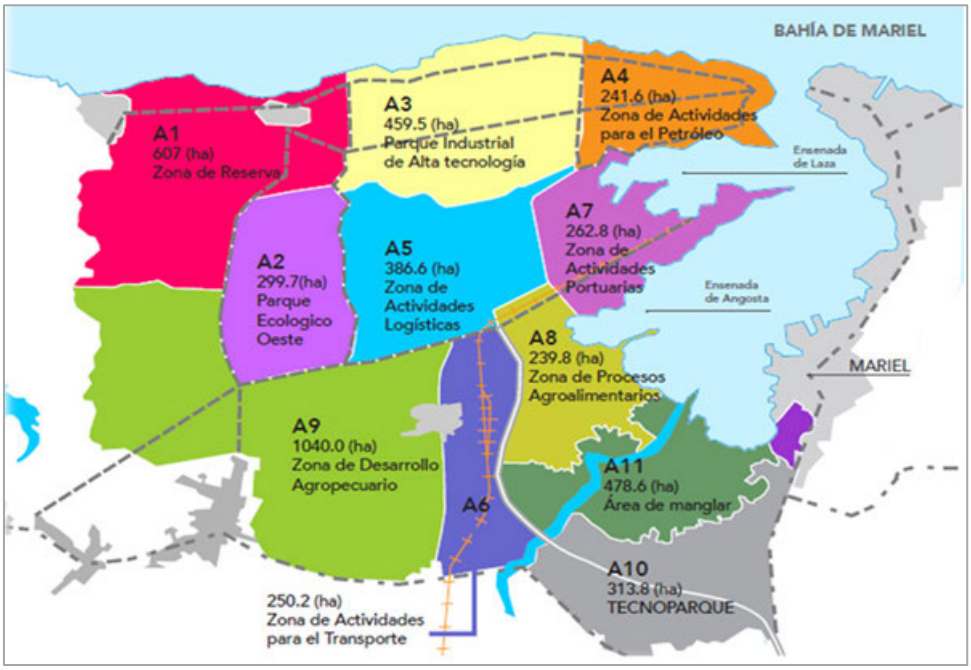
**Table 4.7.16 Investment Opportunity listed in PROCUBA (Logistics)**

| | |
|---|---|
| **Project Name** | 3PL LOGISTICS OPERATOR FOR THE MANAGEMENT OF SUPPLY CHAINS FOR REFRIGERATED FOODS (3 PROJECTS). |
| **Description** | Creating a category 3PL logistical operator for wholesale sales of frozen foods, permitting us to meet the demand of national and foreign markets on the basis of recovery and expansion of warehousing capacities and refrigerated distribution. This operator's logistical activities shall provide mixing, warehousing, transportation, and sales activities in accordance with each product's characteristics within the supply chain, from national producers and/or foreign suppliers right up to the final destination as determined by the customers. |
| **Investment Modernity** | Joint Venture |
| **Cuban Part** | Sociedad Mercantil ALBUS S.A |
| **Estimated Investment Amount** | 26.6 million USD |
| **Locations** | Refrigerated facilities, Berroa, Havana<br>Refrigerated facilities, Habana del Este. Havana<br>Refrigerated facilities, de Playa, Havana |
| **Potential Market** | The sale of refrigerated foods involves a growing demand for efficient conservation and distribution of fresh and frozen foods in the national market and for exports faced with reduced competition in logistical service suppliers in Cuba. The consolidation of in and out-of-hotel tourism and the sustained development of ZED Mariel, of the productive sectors and non-State management forms and other sectors of interest on the basis of the positioning of the foreign partner in the international market, constitute a selling point for setting up this business. |
| **Anticipated Results** | With the application of this project, it is expected:<br>- We hope to be able to position a trusted logistical operator in national territory to ensure excellent service to national and foreign users, where the maximum use of installed capacities is made; investment recovery is foreseen in the 5th year of operations. |

Source: PROCUBA website

### (3) Projects in Mariel

As shown in Figure 4.7.30, ZED Mariel has a 386.6-hectares Logistics Activities Zone with ample capacity for treating, handling, and storing dry and refrigerated cargo. In addition, several companies already provide a range of logistics services, including transportation, rental, repair, and equipment maintenance. Only 85,284 $m^2$ of warehouses have been built, and further development is expected.




Source: http://www.juventudrebelde.cu

**Figure 4.7.30 Zoning of Mariel Area**

Foreign investment is being promoted in a variety of business areas in the logistics field, including storage, transportation, distribution, labeling, packaging, and palletizing. Investment using 100% foreign capital is allowed in Mariel.

**Table 4.7.17 Listed Investment Opportunity at Mariel (Logistics)**

| | |
|---|---|
| **Project Name** | BUILDING AND OPERATING COMPREHENSIVE LOGISTICAL FACILITIES AND SERVICES |
| **About the Project** | Setting up logistical enterprises that provide comprehensive merchandise storage, transportation, and distribution services, port-to-port, and the processing of merchandise: labeling, bottling, packing, palletizing, etc. |
| **Sector:** | Logistics |
| **Modality of Investment:** | 100% Foreign Capital Company |
| **Investment Amount:** | 10 - 20 million USD |
| **Location:** | Sector A |

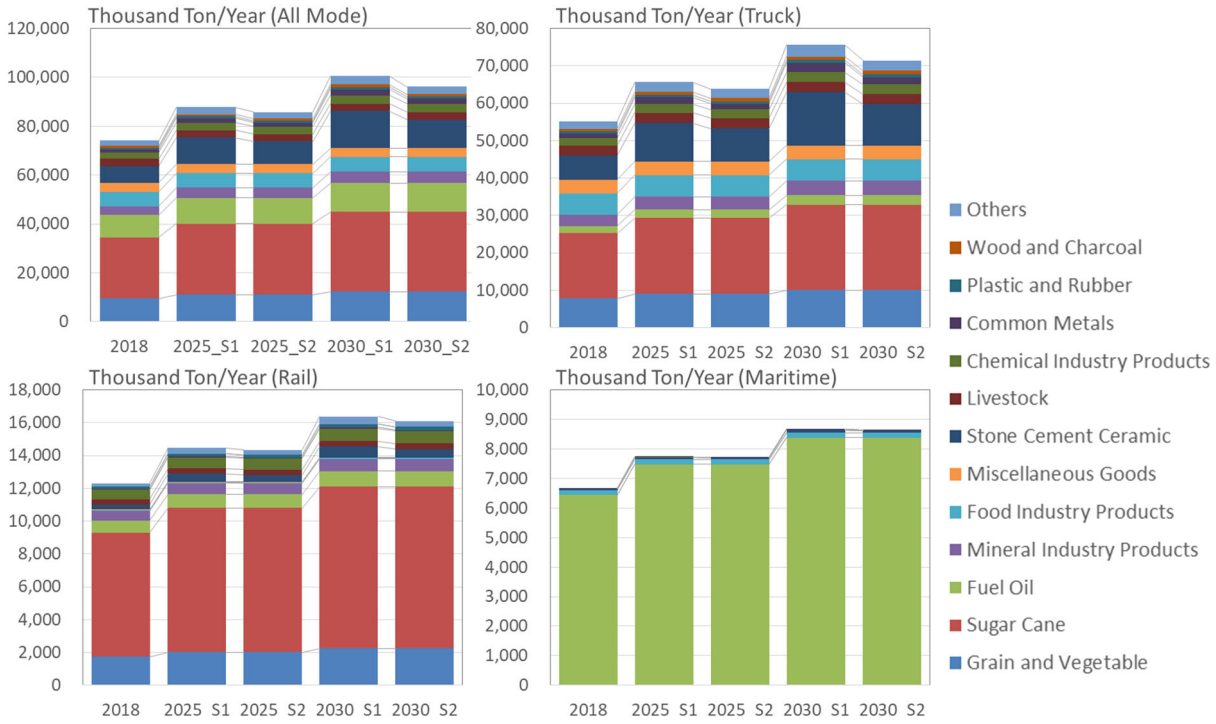
Source: ZED Mariel

ZED Mariel is already a key logistics complex where international logistics functions exist. When manufacturing grows in the future, the importance of Mariel as a logistics hub will further increase. The injection of foreign investment and expertise would expedite the process.

### 4.7.15 Cargo Demand Forecast up to 2030

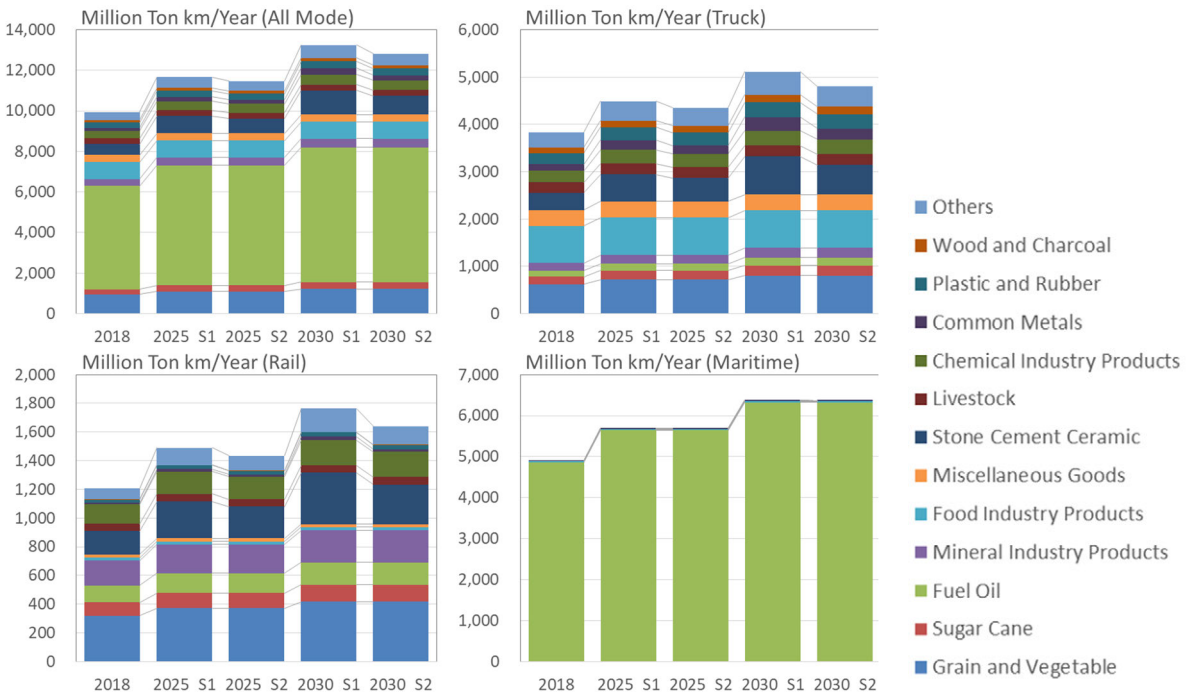
For the cargo demand forecast (it is necessary to update the socio-economic framework by reflecting the impacts caused by COVID-19 and the recovery afterward), three different growth rates were applied based on the projections of population growth, general GDP growth, and GDP growth in tourism which were estimated in this project.

Figure 4.7.31 and Figure 4.7.32 show the future cargo volume and volume distance for scenarios 1 and 2 by mode and by commodity type. As an initial demand forecast, it is assumed that the future modal share of cargo transport is the same as the current situation for all commodities.



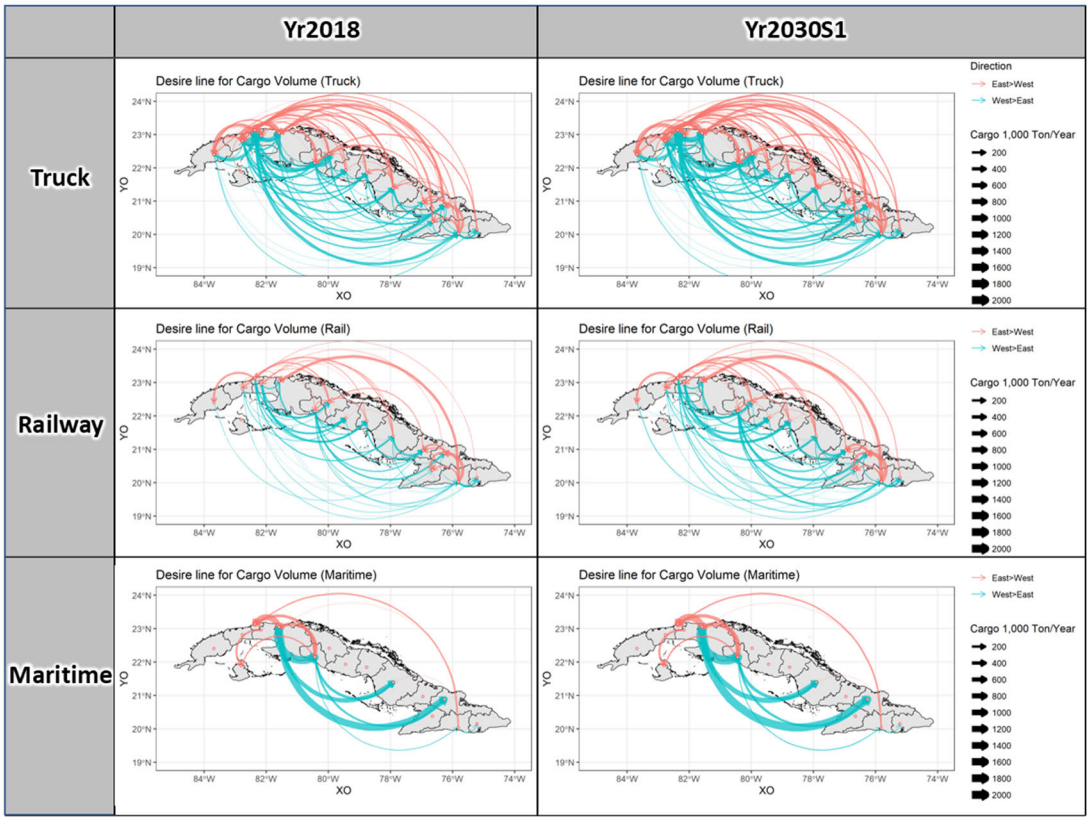

Source: JICA Study Team

**Figure 4.7.31 Future Cargo Volume (1,000 tons/year)**




Source: JICA Study Team

**Figure 4.7.32 Future Cargo Volume Distance by Mode (million ton-km/year)**




Source: JICA Study Team

**Figure 4.7.33 Future Cargo Volume OD (scenario 1) by mode of transport (1,000 tons/year)**

### 4.7.16 Planning issues

#### (1) Upstream policy

"Cuba y su desafío económico y social (Cuba and its Economic and Social Challenges)" was issued in September 2020, which will guide the downstream policy instruments in the cargo transport sector. The cargo transport-related components are shown below.

**Table 4.7.18 Relevant statement in "Cuba y su desafío económico y social"**

| **Logistics-related sections in "Cuba y su desafío económico y social" in September 2020** | |
|---|---|
| Key Strategies | • Maintain a central planning system.<br>• Promote domestic production, and reduce dependence on imports.<br>• Market regulation by indirect method.<br>• Subsidiarity among various economic actors (ex. FDI, a state-owned enterprise, etc.).<br>• Role of domestic demand with dynamics.<br>• Further independent management of state-owned enterprises.<br>• Readjustment of the relationship between owner and management, appropriate relation with non-state-owned sector and state-owned enterprise sector.<br>• Enhance competitiveness, use materials, resources, budget, etc. effectively, improve work efficiency and motivation.<br>• Environmental policy is harmonized with social order. |
| Efficient and comprehensive logistics with transport, warehouse, trade. (for whole) | • Continuously enhance the efficiency of transport and port operations to prevent excessive staying times at each connecting point.<br>• Expand/enhance the usage of the "long-distance operation and administration system" to all transport-related state-owned enterprises. Enhance the level of analysis and supervising and find/correct inefficient transport situations by improving "web mobile". Study introducing fuel sensor. |
| Efficient and comprehensive logistics with transport, warehouse, trade. (Reordering of cargo transportation) | • Apply mathematical models in coordination with universities to optimize the use and capacity of shipping, rail, and road routes, as well as the use of fuel<br>• Ensure that vessels/vehicles deployed on routes are operating at no less than 75% capacity by combining cargo from clients with common origins and destinations. |
| Cabotage Transportation | • Increase cabotage freight transport by 10%, about what is planned in 2020.<br>• To do this, use chartered vessels for the transportation of cement, in the transportation of food in the returns, and thus avoid movement in ballast.<br>• Reorganize the transportation of cargo by cabotage with the means available. Evaluate the acquisition of at least two small boats to work in the traffic of both coasts. |
| Foreign trade | • Provide export and import services to non-state forms of management through foreign trade companies, with payments backed in foreign currency.<br>• Increase efficiency in the field of economic, commercial, and financial relations in commercial policy and establish concrete and realistic lines of work to expand and diversify them.<br>• Raise the domain of the potential of each market to increase exports, attract foreign investment, and access credit.<br>• Stimulate exports by implementing the Measures for the Improvement of the Socialist State Enterprise, which contribute to the creation of economic resources and the flexibility of the mechanisms to stimulate exports, including business with foreign capital.<br>• Promote the export of services, medical equipment, pharmaceuticals, and other high value-added products, without neglecting traditional exports and other areas under development, from local initiatives and consolidating work with the territories for the development of exportable funds. |

| Logistics-related sections in "Cuba y su desafío económico y social" in September 2020 | |
|---|---|
| | • Encourage the creation and consolidation of export hubs in territories closer to ports and airports.<br>• Promote the export of information technology and programming services, telemedicine and second opinion consultations, health tourism, sports, cultural, and other professional services, including through videoconferences as a new modality.<br>• Design and implement the springs that stimulate the producers of raw materials to link themselves as suppliers of the national industry to obtain export goods with greater added value and avoid imports of products that could be obtained in the state.<br>• Form an import strategy that corresponds to the real economic conditions, which realistically considers the highest priorities, type and sources of financing, import substitution capacities based on the possibilities of the national industry, diversification of markets and suppliers, defining those products of widespread use that due to their transversality, it is essential to guarantee in a concentrated way to manage them effectively.<br>• Diversify and increase the services provided by companies that carry out foreign trade: commission contracts for goods on consignment, wholesale marketing of national industry productions and non-state forms of management, and the performance of leasing contracts for certain equipment or machinery that provides vitality to priority spheres. |

Source: Cuba y su desafío económico y social (summarized by JICA Study Team)

### (2) Indicators for implementing efficient cargo transport

The efficiency of cargo transport is often measured by "energy intensity (Intensidad Energética)," namely, the consumption of fuels (tons) divided by cargo traffic (ton-kilometers) in Cuba. As shown in Table 4.7.19 and Table 4.7.20, "energy intensity" is calculated and compared among entities. Minimization of the use of fuels is the target in implementing efficient cargo transport since entities need to transport cargo as much as possible with a limited amount of fuel.

**Table 4.7.19 Energy Intensity of Cargo Transport by Implementing Entities (2020)**

| Entities | Cargo transport volume (Thousand of tons) | Cargo traffic (Millions of Ton-kilometers) | Total consumption (Tons) | Energy intensity (Tons per millions of Ton- kilometer) |
|---|---|---|---|---|
| 1) OACE - Own means | 24,224.4 | 1,479.70 | 59,424.5 | 40.16 |
| 2) Regional Government | 3,900.2 | 146.72 | 9,097.1 | 62.00 |
| 3) AUSA | 1,513.4 | 365.90 | 9,438.7 | 25.80 |
| 4) Gathering and distribution | 4,943.2 | 403.25 | 24,384.1 | 60.47 |
| 5) Public enterprises specialized in cargo transportation in the MITRANS sector (Except cement and fuel transported by maritime) | 24,935.3 | 1,603.84 | 27,563.5 | 17.19 |

Source: MITRANS Balance de Cargas

**Table 4.7.20 Energy Intensity of Cargo Transport by Entities under MITRANS (2020)**

| Entities | Cargo transport volume (thousand tons) | Cargo traffic (Millions of Ton-kilometers) | Total consumption (Tons) | Energy intensity (Tons per millions of Ton-kilometers) |
|---|---|---|---|---|
| Railway | | | | |
| Sugar Related Items | 7,942.1 | 148,5 | 3,206.1 | 21,59 |
| Others | 3,759.8 | 851.20 | 8,812.4 | 10.35 |
| Automotive | | | | |
| General cargo | 4,031.8 | 333.26 | 8,069.33 | 24.21 |
| Container cargo | 1,718.4 | 172.37 | 4,525.38 | 26.25 |
| Bulk cargo | 924.5 | 77.53 | 2,189.54 | 28.24 |
| Maritime | | | | |
| E.N. Caribe | 120.9 | 20.98 | 760.79 | 36.26 |
| Total Sum | 18,497.5 | 1,603.84 | 27,563.54 | 17.19 |

Source: MITRANS Balance de Cargas

The existing measurement indicator of transport efficiency is only energy intensity. Under this measurement system, each entity focuses on the optimization of its activities (minimization of fuel consumption), however, only with this measure, total optimization would not be achieved.

Efficiency should be addressed from the aspect of total logistics activities, but not only from the fuel consumption. In this regard, other parts of cargo movement such as storage facility management should be considered.

In general, logistics costs include;

- Fuel cost;
- Cost of moto-resources (tyres, batteries, spare parts, etc.)
- Labor cost;
- Investment cost of facilities and equipment;
- Operation and maintenance cost; and
- Cost to provide value-added services (such as express service, refrigerated services, etc.).

The higher efficiency of logistics activities is achieved by minimizing the sum of all logistics cost items, which would be achieved by transport service provides (3PL party logistics service providers) by responding to the competitive market (demand from cargo owners). In this regard, a comprehensive set of indicators needs to be considered for measuring the efficiency of cargo transport as part of the Balance de Cargas system.

### (3) Efficient Use of Existing Facilities and Equipment

It is understood that approximately 30% of transport vehicles are not in good condition, mainly due to the shortage of spare parts. Besides, the insufficient supply of tires is also an issue hindering road transport in Cuba. Cargo handling equipment at the ports, railway stations, warehouses, airports, etc., is also not in good condition overall.

Effective use of existing facilities and equipment is the priority. In the case of transport vehicles, prior planning of efficient utilization of transport vehicles, in terms of the number to be deployed and transport routes, is necessary.

Effective planning of maintenance and replacement of facilities and equipment is also important. Moreover, the degree of deterioration of facilities and maintenance greatly depends on how daily operation is implemented; the burden of maintenance could be reduced if operation methods were improved. Necessary actions, including training and education of workers, should also be implemented by each entity and by responsible government entities from a comprehensive perspective.

Also, seasonal fluctuations in demand, particularly regarding agricultural products, affect efficiency in the logistics sector. Congestion tends to occur during the harvest season, while facilities are not fully utilized in other seasons. More efficient use of existing assets needs to be realized through cooperation among concerned entities under different OSDEs.

### (4) Mechanization

To achieve efficient cargo handling at loading/unloading to/from transport means and storage facilities, mechanization should be further promoted. For example, equipment such as forklifts, unified pallets, and vertical racks in storage facilities should be introduced.

At newly developed storage facilities in ZED Mariel, modern equipment has been installed, and operation is being conducted efficiently, as shown in Figure 4.7.34, while the efficiency of cargo handling of Canasta Basica needs to be improved.

Source: http://www.zedmariel.com/en (left) and JICA Study Team (right)

**Figure 4.7.34 Examples of Advanced Equipment and Manual Operation**

By introducing forklifts and pallets for cargo handling of bagged cargos in storage facilities, the efficiency of cargo handling and storage can be enhanced (see Figure 4.7.35).

Source: JICA website

**Figure 4.7.35 Example of Introduction of Forklifts and Pallets**

### (5) Total Optimization of Logistics Activities

Shippers' (producers') logistics activities tend to be partially optimal (self-serving). For example, in Cuba, logistics activities are often inefficient (e.g., trucks are empty on the return trip) because producers transporting large volumes of cargo use their own vehicles. Efforts are being made to improve such inefficiencies through coordination in the balance de cargs. In addition to this, further government-led efforts are desired, such as coordination among shippers and other stakeholders, research on optimal solutions, and development of 3Pl providers.

### (6) Fostering Total Logistics Providers

Logistics activities from cargo origin to destination consist of elements such as packaging, freight forwarding, and storage. As mentioned above, major shippers in Cuba own their own means of transportation and also have transportation service providers (Empresas) within the same group. On the other hand, there are a limited number of transportation entities that provide integrated logistics services from origin to final destination.

Empresas under the MITRANS umbrella such as EMCARGA, ETAG, and ENOC provide freight forwarding services, but these empresas specialize in trucking freight from one point to another and do not provide other logistics services such as storage, inventory management, and refrigerated transport. They do not offer other logistics services such as storage, inventory management, or refrigerated transport. On the other hand, AUSA and foreign-owned companies newly located in ZED Mariel offer integrated freight forwarding services from origin to final destination. Following this type of integrated transportation service mechanism, state-owned and non-state-owned intermodal service providers should be fostered.

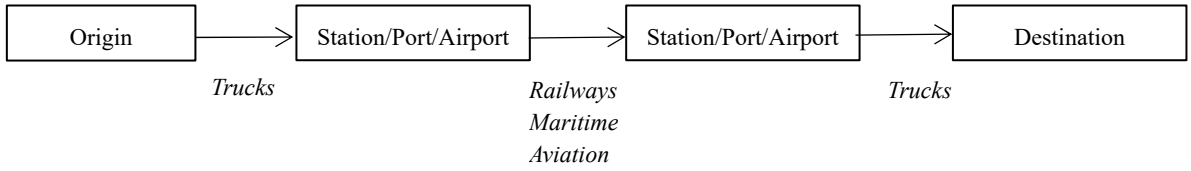
**Table 4.7.21 Entities and Providing Services**

| | Cargo Transport | | Storage |
|---|---|---|---|
| | Transport vehicles | Maritime, Railway, Aviation | |
| Cargo Owners | ○ | × | ○ |
| MITRANS | ○ | ○ | △ |
| AUSA | ○ | ○ | ○ |

Source: JICA Study Team

### (7) Efficient Implementation of Multimodal Transportation

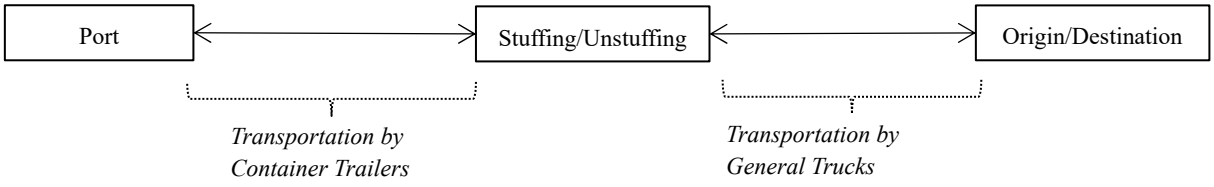
Cargo transport services using the railway, road, maritime, and aviation sectors are offered by different Empresas forming OSDEs attended by MITRANS. It is important to note that cargo transport by railway, ship or plane always requires transport by automotive transport to/from stations, seaports, or airports. Accordingly, the coordination of intermodal cargo transport is an important issue. Although ENOC, an entity under MITRANS, is implementing such coordination, a system that contributes to further enhancement of multi-modal transport is desirable. As a result, the convenience of cargo owners will increase, and cargo transportation will become more efficient.




Source: JICA Study Team

**Figure 4.7.36 Typical Multi-modal Cargo Transport**

Moreover, export/import containers need to be loaded/unloaded at an inland location; therefore, the cargo is needed to be transported between the place of loading/ unloading and the origin/destination of the cargos. Accordingly, international container cargos also require multi-modal transport, and thus effective coordination is also necessary.




Source: JICA website

**Figure 4.7.37 Typical Land Transportation of International Container Cargo**

Transshipment of cargo from one mode to another mode at connecting points is an issue in implementing efficient multi-modal cargo transport, particularly in domestic cargo transport, in which inefficiency in transshipment greatly affects the overall transport efficiency from the origin to the final destination.

A Center for Loading and Unloading (Centro de Carga y Discarga), a facility where cargoes are transshipped between railways and automotive transport, is shown on the left side of Figure 4.7.38. Such facilities are generally located at large stations such as La Habana.

The photo on the right of Figure 4.7.38 shows the railway developed behind the container terminal in Mariel Port, contributing to efficient logistics. However, many facilities at other locations need to be improved from the perspective of transshipment between transport modes in multi-modal transport.

**Cargo Terminal at Havana Station**

**Mariel**

Source: JICA Study Team

**Figure 4.7.38 Examples of Facilities for Multi-modal Transport**

Improvement of the efficiency of multi-modal transport is necessary to enhance the utilization of railways and vessels for domestic cargo transportation, an essential policy of MITRANS. In addition to establishing the necessary facilities and introducing the required equipment, the sharing of cargo information through ICT (Information and Communications Technology) should be promoted. Besides, the unification of transport standards, such as using the same-size pallet, is desirable.

The establishment of measures through cooperation among stakeholders is essential. As a first step, discussions on how to tackle existing issues should be held among stakeholders.

### (8) Promotion of Utilization of ICT

The logistics sector in Cuba could be greatly improved through the introduction and use of ICT. ICT could be used in various aspects of logistics activities, including intermodal transportation, inventory management, and efficient use of existing facilities and equipment.

Some concrete, immediate examples of improvements that can be made using ICT are described below.

- Although railroad trains and transport vehicles are equipped with GPS, they are currently used only to monitor their location and are not used to supervise vehicle operations in real time. On the other hand, some vehicles of companies under other ministries are also equipped with GPS to record the route and time of travel. By making more effective use of these already installed systems and analyzing the data obtained, efficient management and operation can be achieved, and the data can be used for investment planning for the future.
- Freight transport across provincial borders requires drivers to check and sign documents at checkpoints along the way. Digitization of this process could contribute to more efficient cargo transport (e.g., shortening the time required for procedures).
- Currently, ICT is not effectively used in the compilation and analysis of balance de cargas. The fundamental cause is that the format and names of input information are not standardized, and the collected information is not in a state where it can be immediately analyzed (i.e., it is not a database). First, codes and definitions for data entry should be clarified, and application forms can be entered remotely through the internet, thereby saving time and effort in the entry, tabulation, and analysis of balance de cargas.

While there are many ideas for the use of ICT as described above, a more detailed study on ICT implementation strategies and an ICT implementation plan based on this study should be developed as a common issue in the logistics sector.

**(9) Improvement of Refrigerated Logistics and Introduction of Value-added Services**

Cuba needs to modernize its low-temperature storage & distribution system (cold chain). Currently, there is a lack of refrigerated vehicles and refrigerated storage facilities to meet the transportation and storage demands of products such as imported poultry. First, a detailed study of existing cold storage facilities (including a demand survey) should be conducted, and a renovation/renewal plan should be developed for the efficient use and maintenance of existing facilities and equipment. In accordance with the demand for cold storage, construction of new cold storage facilities will also be considered. As part of the effective use of existing facilities, different refrigeration facilities of different ODSE groups could be jointly used, but this would require close coordination and would be difficult to achieve without the help of ICT.

No refrigerated transport services are provided in the rail sector. In addition, as an operator under MITRANS, EMCARGA does not own any refrigerated vehicles. Currently, it can be said that MITRANS is not involved in the refrigerated/frozen transportation business; MINCIN and AUSA-affiliated carriers provide refrigerated transportation services, but the number of refrigerated vehicles is limited. Medium- to long-term studies are needed regarding the establishment of an integrated transport of refrigerated and frozen cargo, i.e., a cold chain (low-temperature storage & distribution system), and a cold chain establishment plan should be developed for all relevant OSDEs.

In the long term, the introduction of value-added logistics services should also be considered. In addition to refrigerated logistics services, other services include storage facility rental, equipment rental for freight forwarding, consolidation of small-lot cargo, and inventory management. It appears that newly established logistics companies in AUSA and Mariel already provide some of these services, but more service providers are expected to be invited.

**(10) Logistics Complexes at Proper Locations**

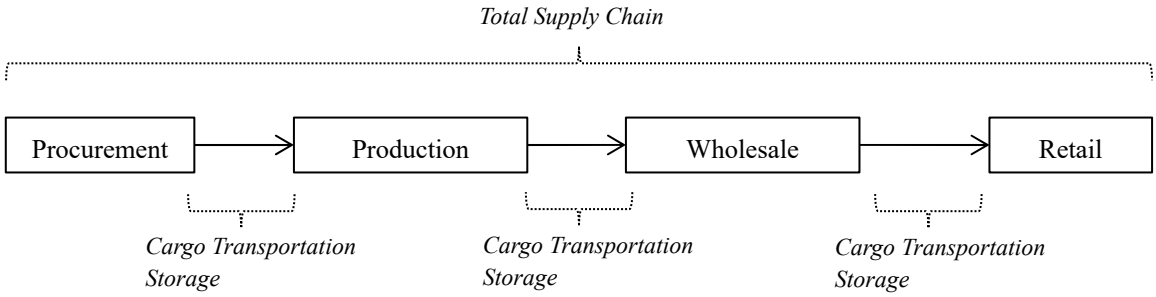
Regional logistics efficiency can be improved by locating logistics complexes along the expressway (Autopista) and national trunk roads, and along major roads connecting cities and ports. In the western region of Cuba, logistics facilities are located in the ZED Mariel and Havana areas, and a relatively efficient logistics system is considered to have been established. On the other hand, in the central and eastern regions of the country, there are no large-scale logistics bases because of the small scale of industrial concentration. In the future, when developing resorts in the northern islands and industrial parks near urban centers such as Santiago de Cuba, Holguín, and Cienfuegos, logistics bases should be constructed in conjunction with these developments.

**(11) Introduction of supply chain management**

Figure 4.7.39 illustrates the supply chain concept. It is an integrated management of logistics between several different companies, from raw material procurement to production, wholesale, and retail, in order to deliver goods to customers at minimum cost (and maximize profit). Although the objectives are

different, in balance de cargas it can be thought of as coordinating the demand for freight transportation between two neighboring parties in this figure.

In Cuba, it may be possible to introduce a modern supply chain for certain relatively large industries, e.g., the manufacture and sale of pharmaceuticals, to improve profit margins.




Source: JICA Study Team

**Figure 4.7.39 Typical Flow of Total Supply Chain**

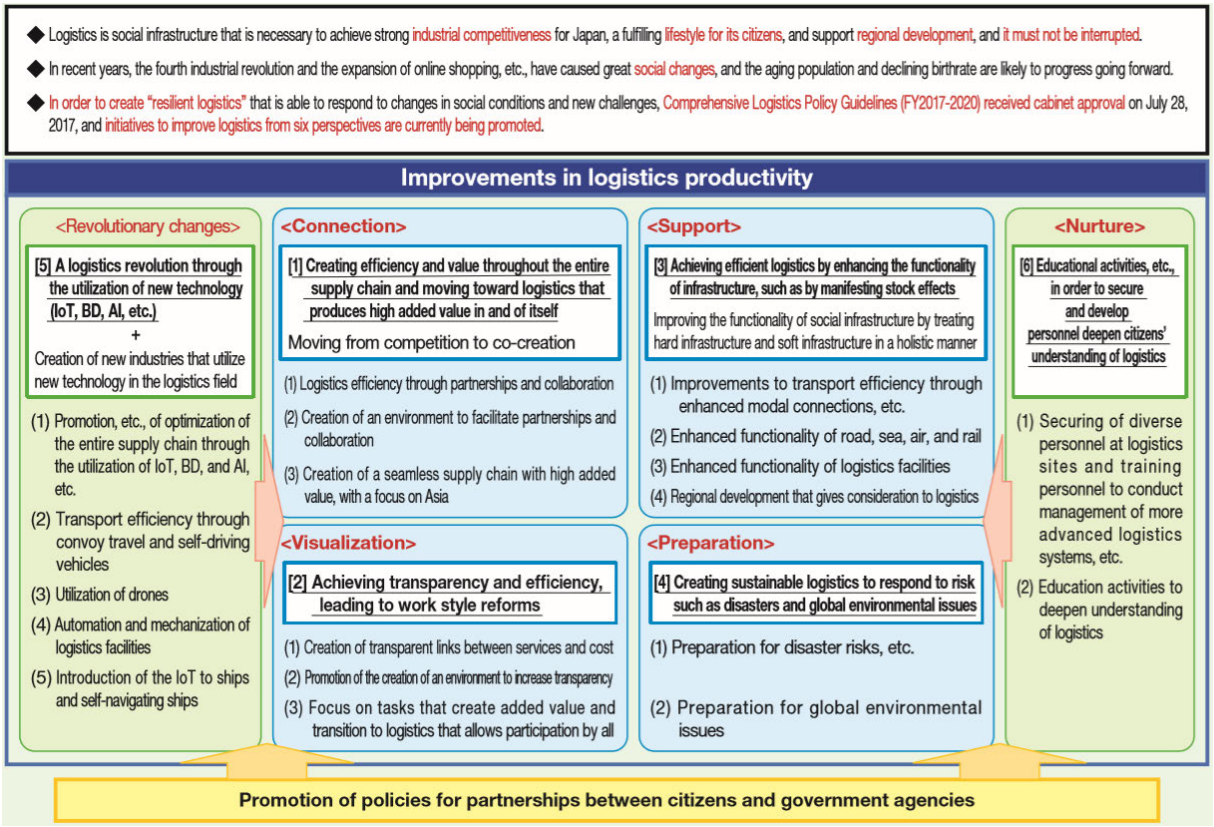
### (12) Formulation of National Logistics Plan

The "Guiding Principles for the Economic and Social Policies of the Party and the Revolution (2021-2026)" informs the need to develop a national logistics plan.

This master plan study has extensively researched and compiled recommendations on passenger movement and logistics, based primarily on information from the MITRANS sector.

In order to develop a master plan focusing on the logistics sector in the future, it will be necessary to conduct the study and compile a plan within the OACE cross-sectoral framework, not only within MITRANS.

For instance, in the case of Japan, there is a framework of cooperation among related ministries in formulating a logistics master plan, summarized in Figure 4.7.40, and the “Comprehensive Logistics Policy Guidelines” are compiled every five years to facilitate efficient and optimized logistics activities.




Source: Ministry of Land, Infrastructure, Transport, and Tourism, Japan

**Figure 4.7.40 Summary of Comprehensive Logistics Policy Guidelines in Japan**

### (13) Issues identified through TWG activities

Table 4.7.22 summarizes the issues identified in the TWG based on the understanding of the existing conditions with some additional ideas of the JICA study team at the time of writing this report.

**Table 4.7.22 Transport sector issues to be addressed**

| Key areas | Issues to be addressed |
|---|---|
| 1. Planning and coordination | • Development of an advanced inventory database (computerized system) of cargo transport means and storage facilities-digital transformation |
| | • Improvement (modernization) of the "Balance de Cargas" system using ICT |
| | • More effective use of the "Balance de Cargas" system to optimize the use of cargo transport means and storage facilities |
| | • Modal shift from automotive transportation to rail/maritime transport (saving of fuel consumption) |
| | • Study on the involvement of the non-state sector, including FDI to enhance cargo transport and storage services. |
| | • Study on transport services for specific products (refrigerated goods, medical products, etc.) |
| | • Study on the storage facilities and terminals (distribution centers) |
| | • Capacity analysis and enhancement of human resources in the cargo transport sector |
| | • Enhanced coordination between MITRANS and MINCIN |
| | • Establishment of regular plan coordination/monitoring mechanism among MEP, MITRANS, MINCIN, etc. (special committee) |
| | • Formation of national logistics master plan |

| Key areas | Issues to be addressed |
|---|---|
| 2. Transport infrastructure development | • Renewal/increase of new trucks (large, medium, and small trucks) for EPT |
| | • Renewal/increase of new container trailers for ENOC. |
| | • Enhancement (modernization, refrigerated facilities) of storage facilities under MINCIN |
| | • Procurement of trucks for refrigerated goods |
| | • Logistics centers/truck terminals in the central and eastern regions |
| | • GPS based tracking system for cargo (truck) movement |
| 3. Environment, safety, and security | • Regular inspection of transport vehicles (emission gases, etc.) |
| | • Natural gas vehicles (small trucks) for EPT |
| | • Rest areas/facilities for truck drivers |
| | • Environmental monitoring of the vehicle depot and logistics centers (waste water, etc.) |
| | • Prevention measures against COVID-19 |
| | • Public enlightenment about COVID-19 |
| 4. Transport service and industry development | • Enhancement of Empresas (transport service providers) under MITRANS as 3PL providers. |
| | • Strategic plan formulation for attracting non-state 3PL (domestic and foreign companies) providers. |
| 5. Transport pricing and resource allocation | • The appropriate annual state budget for the renewal and the maintenance of transport means and storage facilities. |
| | • Increase revenue from cargo transport services and self-sustainability of Empresas under GEA. |
| | • Revision of pricing for services by Empresas under GEA |
| | • Attractive salary to attract quality human resources to the cargo transport sector |
| | • FDI for infrastructure development and cargo transport service provision |
| 6. Institutional and regulatory development | • Enhanced opportunities for non-state sector involvement in the provision of cargo transport infrastructure and services – revision of legislative and regulatory frameworks for cargo transport service provision and operation (service production) and maintenance such as the introduction of FDI, etc. |
| | • Foreseen shortage (aging) of human resources needs to be considered - institute long-term training programs in the cargo transport sector (planning, management, drivers, technicians, etc.) |

Source: TWG and JICA Study Team

# Chapter 5 National Transport Development: Visions, Objectives, Strategies & Goals

## 5.1 Direction

The strategic directions in formulating the master plan are summarized as follows:

- Develop transport infrastructure to support the economic sector that contributes to the acquisition of the foreign currency, focusing on tourism and other strategic sectors.
- Develop a transportation system that supports the export industries, focusing on the Special Development Zone(s).
- Develop efficient and safe transport systems and services for passenger travel and goods distribution throughout the country with reasonable transport costs.

Under a likely economic growth scenario, 2022-2026 is anticipated to be a "Preparatory Period" followed by the "Acceleration Period" for the expected economic growth afterward. Most of the capital investment will be made during the acceleration period. However, projects profiled in the Master Plan during the preparation period can still be implemented with appropriate funding allocation.

The following principles are employed in finding component projects in the master plan.

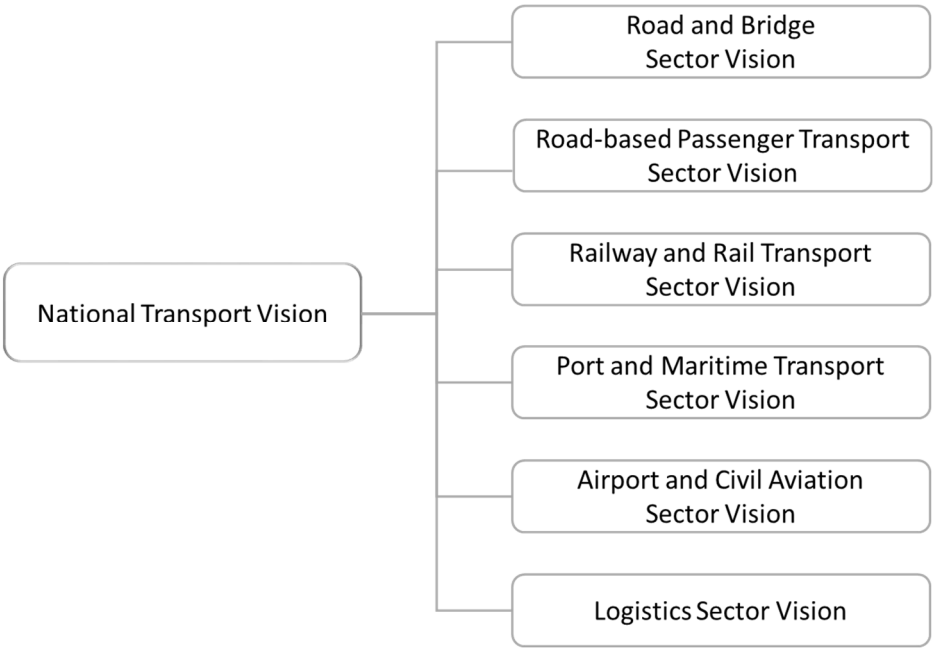
- Selection and Concentration: Intensive investment in transport infrastructure, facilities, and equipment that leads to foreign currency acquisition.
- Digital Transformation: Increase efficiency of transport infrastructure, facilities, equipment, and resource utilization using information and communication technology (ICT).
- Renewal of seriously deteriorated transport infrastructure/facilities/equipment instead of repairing them to reduce the operation and maintenance costs and to decrease environmental impacts.
- Abandon unused/less-used transport infrastructure/facilities/equipment.
- Clean Transportation that enhances the attractiveness of tourist destinations and contributes to the mitigation of climate change.
- Advanced Technologies to prepare for the population aging and shortage of human resources in the future.
- Support State enterprises and Non-state SMEs in the transport sector.

## 5.2 Vision statements

Vision statements have been guided by upstream policies relevant to the transport sector, specifically "Conceptualization of the Economic & Social Model," "National Economic & Social Development Plan 2030," "Indications from the President, June 2019," "Cuba & its Economic & Social Challenges,

September 2020," plus understanding of the planning issues discussed in Chapter 4.

The vision statements have been drafted according to the structure shown in Figure 5.2.1. First is the overall vision statement that covers all transport sub-sectors. Second, under the overall vision statement, are vision statements for each of the following sub-sectors: 1) Road & bridge sector; 2) Road-based passenger transport sector; 3) Railway & rail transport sector; 4) Port & maritime transport sector; 5) Airport & civil aviation sector; & 6) Logistics sector.




Source: JICA Study Team

**Figure 5.2.1 Vision statement structure**

## I. National transport development vision

The overall transport sector vision statement was drafted in accord with the principles that guide downstream objectives, along with strategies devised in a series of discussions & efforts by the Technical Working Group (TWG-1). The basic directions agreed upon by members of TWG-1 comprise:

- Maintain centralized planning
- Promote domestic products & services & reduce imports where possible
- Manage the transport market indirectly
- Maintain the transport sector's complementary role as an economic agent
- Stimulate the domestic market
- Give autonomy to management to achieve financial independence
- Review roles & relationships of state & non-state-owned entities
- Safeguard the environment & well-being of society

Guided by these directions, the vision statement is as follows:

**Transport sector vision statement**

> *To develop an efficient, modern, safe & environmentally friendly transportation system in a coordinated & sustainable manner that embraces all transport modes for the benefit of Cuba & its people.*

## II. Road & bridge sector vision

This sector has numerous issues that need to be addressed urgently, notably the rehabilitation of road & bridge infrastructure, renewal of aged vehicles & procurement of construction machinery. On the other hand, this sector can also contribute to the recovery of economic growth by improving road transport efficiency. Mindful of these factors, the following aspects were addressed in formulating the sector's vision statement.

- To contribute to an increase in the efficient & effective functioning of the gateway ports,
- To contribute to industrial & tourism growth & enhance investment potential,
- To contribute to an increase in agricultural productivity,
- To provide a safe, resilient road & bridge infrastructure,
- To promote & enhance public transport & logistics services, and
- To improve the quality of life for citizens.

Guided by the above, TWG-3 drafted the following vision statement for the road & bridge sector.

**Road & bridge sector vision statement**

> *To develop safe & resilient infrastructure for a multimodal, efficient & environmentally friendly automotive transport system to meet Cuba's socio-economic needs.*

## III. Road-based passenger transport (bus) sector vision

For Cubans, bus services are the vital transport mode for daily socio-economic activities: commuting to work/school, hospital, shopping & visiting friends. As such, there is an urgent need to improve service by ending the shortage of buses by procuring new vehicles & renewing existing ones. In addition, service can also be improved by providing amenities such as bus location information & e-ticketing systems.

As road-based transport services are also vital for tourists, strategic collaboration with MINTUR & MINFAR is necessary to provide attractive bus services to visitors & thereby acquire foreign currency in the transport sector. Furthermore, to further develop the bus industry, it is also necessary to strengthen maintenance systems & increase domestic manufacturing (e.g., Diana buses). Plus, it is important to clarify further the division of roles between official bus service providers & private operators (truck buses) & to boost cooperation between them. Accordingly, the vision for road-based transport is as follows:

**Road-based passenger transport vision statement**

> *To provide safe, efficient, sustainable, and environmentally friendly bus transportation services that guarantee inclusive mobility, improving the population's quality of life, and high-quality transport services to support the tourism industry.*

## IV. Railway & rail transport sector vision

Rail transport plays a vital role in the long-distance movement of passengers & cargo. Plus, rural communities rely on industrial rail lines (sugarcane lines). In urban transport, rail currently plays a limited role but may be more critical in the long term. Plus, there is future potential to serve international visitors with comfortable, high-speed, long-distance train services & thereby contribute to tourism growth in Cuba. For cargo, especially heavy/bulky commodities such as cement, sugarcane & fuel, rail transport play a significant role that can be further enhanced, which is desirable from an environmental perspective. TWG-4 was mindful of these factors in drafting this vision statement:

**Railway & rail transport sector vision statement**

> *To develop a safe, efficient, sustainable & environmentally friendly railway system along the main economic corridors in coordination with other modes of transport in order to achieve greater intermodality through the provision of high-quality services.*

## V. Maritime transport sector development vision

Cuba's two major gateway ports, Mariel & Santiago de Cuba, handle almost all international container cargo, each serving one end of the 1,200 km-long main island. Other specialized ports handle imports of fuel & exports of sugar & mineral products. The deterioration of vessels & port facilities is a critical issue that guided discussions in TWG-6 and led to the following vision statement.

**Maritime transport sector development vision statement**

> *To develop maritime port activity and provide competitive maritime transport services, having world-class national and international ports equipped with modern and environmentally friendly technologies and systems that guarantee the quality and efficiency of intermodal operations.*

## VI. Aviation sector development vision

There are 10 international gateway airports in the country. Among these, Jose Marti International (Havana), Antonio Maceo (Santiago de Cuba), and Juan Guaberto Gomez (Varadero) are the most important. Currently, most international tourists come through Havana and travel around mainly in the western and central regions.

In the planning horizon of this master plan, there are 3 airports, namely Jose Marti International (Havana), Juan Gualberto Gomez (Varadero), and Abel Santamaria (Santa Clara), identified as prioritized airports to be improved. In addition, the role of Antonio Maceo could be further upgraded to welcome international tourists through the eastern gateway of the state; however, work is not planned until improvements are completed at the three prioritized airports.

Plus, it could be necessary to have a strategic consideration concerning the development of the northern coast keys; in a similar way to Juan Gualberto Gómez international airport, an airport can be designated to support the development of those key areas.

TWG-5 members have drafted the airport/civil aviation vision statement as follows.

**Airport and Civil Aviation Sector Vision Statement**

> *To turn Cuba into one of the main hubs of the Caribbean, with an efficient, safe, and secured aeronautical and airport infrastructure, with high standards of quality, capacity, sustainability, and environmental friendliness, to satisfy the social and economic transportation needs of the nation, in coordination with other modes of transportation.*

**VII. Logistics sector development vision**

Trucks are typically owned by state commodity/material producers or cargo owners. Each enterprise, integrating different family business groups (OSDEs), uses its trucks or storage facilities in established logistics chains (supplier-factory-distributor-retailer-consumer). It should be noted that Cuba has very few non-state cargo transport service providers at present.

Empresas under GEA, such as ETAG, ENOC, and EMCARGA, also provide cargo services with various Empresas under other OSDEs, arranged via "Balance de Cargas" for cargo transport needs that cannot be met by producers themselves. Truck transport services by EPTs are important for delivering basic goods to communities in each province.

Rail transport plays a vital role in the long-distance transport of heavy/bulky commodities such as sugarcane, cement & fuels. Similarly, ships transport fuel & other cargo from the main island to other islands, such as Isla de la Juventud. Commodity storage facilities are under MINCIN, including those it does not own, which indicates the necessity of close cooperation between MINCIN & MITRANS. PROCUBA also has interests in the cargo sector and expected investment in 3PL. One widespread & critical issue is the urgent need to replace obsolete trucks, vessels & aircraft to increase safety & fuel efficiency.

Based on conditions in the logistics sector & ongoing projects, TWG-2 drafted this vision statement.

**Logistics sector vision statement**

> *Create a Caribbean logistics platform focused on meeting customer needs with services that ensure cargoes reach customers just in time at minimal monetary & environmental costs.*

## 5.3 Transport development objectives

### 5.3.1 Cross-sectoral objectives

Cross-sectoral objectives (overall policies) were drafted by TWG-1, guided by cross-sectoral transport planning issues & upstream policies. Table 5.3.1 summarizes proposed objectives that are common across the transport sector. Objectives inform specific purposes or directions for each sub-sector's six key areas of consideration. As multiple strategies can be identified under one objective, goals & projects are guided by the strategy for each transport sub-sector.

**Table 5.3.1 Overall cross-sectoral objectives**

| Key area | Objectives | Description of objectives |
|---|---|---|
| 1. Planning & coordination | 1.1 Establish data collection & provision system & integrated database covering all transport modes. | Data system to be supported by advanced ICT as part of Cuba's digital transformation. Data collection is to be made regularly/systematically. In addition, some data is to be collected in real-time. This aims to facilitate better transport planning. |
| | 1.2 Improve coordination/integration/ collaboration mechanisms between all transport-related actors. | Strengthen strategic planning capacity for all transport modes simultaneously to increase coordination between all agencies/actors & boost capital investment efficiency. |
| | 1.3 Develop national transport infra-structure & system development plan aligned with national spatial development & investment plans. | Create a national transport development plan coherent with the national spatial development plan by INOTU (Instituto Nacional de Ordenamiento Territorial y Urbanismo) & investment portfolio prepared by MINCEX and MINCIN. |
| | 1.4 Increase human resources for better planning & management. | Increase human resources (well-trained staff & professionals) in transport planning & management to boost transport planning & investment efficiency. |
| | 1.5 Establish a standard transport sector investment evaluation system. | Establish evaluation mechanisms/methods to guarantee the effectiveness of investment processes in the transport sector, including transport development plans, infrastructure, technological & special equipment. |
| | 1.6 Promote the use of ICT | Introduce advanced ICT to manage cargo/passenger demand & supply. |
| | 1.7 Strengthen legal, regulatory & normative framework to ensure modern, safe, environmentally friendly transport services. | Review/update existing frameworks to reach the international standard of efficiency & sustainability. |
| | 1.8 Draft capital investment financial plan for operation/maintenance and infrastructure management. | By developing a consolidated financial plan, ensure implementation of planned transport investments. |
| 2. Transport infrastructure development | 2.1 Maintain existing transport infrastructure & facilities in good condition. | Ensure safe/good condition of transport infrastructure, facilities & equipment in line with Cuba's social & economic development plans. |
| | 2.2 Effectively use of existing transport infrastructure for passengers/cargo. | Before making new investments, utilize existing infrastructure, facilities & equipment as much as possible. |
| | 2.3 Maintain existing transport infrastructure/services in good order, ready for growing demand. | Maintain existing good condition/operation of transport infrastructure to support Cuba's growing economic activity & meet the public needs. |
| | 2.4 Upgrade existing infrastructure/ services to international standards & enable multimodal transport. | Upgrade existing infrastructure/services physically and technically, with increased level of services (LOS) & institutional/regulatory systems to meet global standards. |
| | 2.5 Provide safe, efficient inter-provincial transport to contribute to balanced national development. | To contribute to balanced development, a key State objective, the transport sector must provide safe, resilient, robust inter-provincial transport infrastructure/services. |

| Key area | Objectives | Description of objectives |
|---|---|---|
| | 2.6 Strengthen links between urban economic activity centers & surrounding areas. | To achieve integrated socio-economic development & growth of urban activity centers & surrounding areas, transport connectivity needs to be strengthened. |
| | 2.7 Connect growing economic activity centers & key transport nodes by high-speed and high-capacity transportation. | Higher-capacity/speed links between major transport centers & growth centers, enabled by solid transport infrastructure & reliable/cost-effective services, can accelerate the economic development of the centers. |
| | 2.8 Create integrated national/inter-national transport networks to facilitate multimodal services. | Develop an integrated/comprehensive national transportation system by adopting ICT & other technologies along with existing infrastructure. |
| | 2.9 Promote human resource development in ICT & technology R&D. | Develop human resources to utilize ICT & other technologies as a basis for advanced transport planning & infrastructure development. |
| 3. Environment safety & security | 3.1 Promote awareness of the need for safer, more enviro-friendly transport. | Raise awareness of the use of safer, more enviro-friendly transport technologies, behavior & public safety. |
| | 3.2 Raise popular awareness of the climate-change challenge. | Along with increasing awareness of climate-change issues, measures/actions should be reflected in regional & industrial development plans, transport planning & infrastructure development. |
| | 3.3 Prepare more social/enviro-friendly options/alternatives in formulating transport plans, | Several options/alternatives should be prepared to promote enviro-friendly transport behavior & infrastructure development. |
| | 3.4 Develop a legal framework that supports environmental responsibilities & obligations. | Prepare legal/regulatory framework to guide planning & design work to meet international environmental standards. |
| | 3.5 Build a safe transport system to international standards. | Build a safe transportation system that complies with national & international requirements. |
| | 3.6 Enlighten road users, including drivers and pedestrians, to reduce traffic accidents by obeying laws. | Reduce accidents by educating people on the causes of traffic accidents. |
| | 3.7 Promote the use of environmentally friendly technologies. | To reduce carbon dioxide, advanced technologies such as EVs should be considered. |
| | 3.8 Secure all-weather & disaster-resistant land transportation means. | Ensure resiliency in the transport sector to protect human life. |
| | 3.9 Build a system to monitor, manage & control transport safety/security. | Develop a monitoring system for transport safety/security. Plus, upgrade ambulance services. |
| 4. Transport service & industry development | 4.1 Integrate transport entities/services to enable multimodal transport. | Create efficient intermodal transport service by enhancing coordination systems between transport providers. |
| | 4.2 Strengthen planning & managing of Balance de Cargas. | Upgrade the existing Balance de Cargas system. |
| | 4.3 Introduce the principle of competition in the transport market to foster new services & related industries. | Introducing competition in the transport market is expected to improve service efficiency & quality. Plus, new service providers will enter the market. |

| Key area | Objectives | Description of objectives |
|---|---|---|
| | 4.4 Promote FDI, joint ventures, etc., in investment, operation/maintenance of transport infrastructure. | FDI will be welcomed by the state to enhance capacity & transport quality. A new legal/institutional framework must be prepared. |
| | 4.5 Improve the existing system for managing/inspecting the transport of passengers & freight. | Strengthen existing control/inspection system to comply with regulations established for cargo & passenger transport services. |
| | 4.6 Develop an integrated cargo handling, storage, stockpiling & transportation plan. | Ensure proper planning of cargo transport, including handling, storage, a deposit of goods & activities of freight forwarders & other complementary services. |
| | 4.7 Produce or import transport means following international standards. | Promote management, production & import of transport equipment to meet freight/passenger transport demand. |
| 5. Transport pricing & resource allocation | 5.1 Reduce transport infrastructure development burden on the national treasury. | FDI will be welcomed to build transport infrastructure to minimize new investment in an early stage of economic recovery through 2030. |
| | 5.2 Introduce the “beneficiary pays principle” in pricing transport services. | This pricing approach is based on the idea that a supply-demand balance can be achieved through pricing. |
| | 5.3 Demonstrate the benefit of investment in the transport sector to investors. | Attract overseas investors to the transport sector by properly evaluating & disclosing data on investment effects. |
| | 5.4 Secure financial resources needed for transport infrastructure development. | Ensure adequate annual budget for fixed capital formation in the transport sector to achieve targeted economic growth considering incremental capital-output ratio. |
| | 5.5 Prepare precise demand forecasts to demonstrate investment efficiency. | Use ICT & other advanced technologies & methodologies to create accurate demand forecasts. |
| | 5.6 Maintain the principle of "Affordable Pricing" for Cubans to maintain a reasonable level of daily life. | That transport services should be provided at reasonable & affordable prices is one of the state’s most important principles. |
| | 5.7 Introduce a wider tolling system to collect tolls from those who can afford to pay. | By introducing a pricing system per level of service, reasonable transport fees can be collected from users. |
| 6. Institutional & regulatory development | 6.1 Clarify the roles & responsibilities of parties involved in the transport sector. | Roles & responsibilities to be clearly defined: ownership, planning, construction, operation/maintenance & management of infrastructure, facilities & services. |
| | 6.2 Establish a coordination body aimed at promoting cooperation between state & non-state actors in the transport sector | A coordination body should be established to invite & properly position non-state enterprises in the existing business environment. |
| | 6.3 Review & improve existing legal/ regulatory framework related to the use of transport infrastructure & provision of transport services. | Existing legal/regulatory framework to be reviewed & amended to invite FDIs & various forms of non-state enterprise. |

Source: TWG & JICA Study Team

### 5.3.2 Road & bridge sector

Road & bridge sector objectives were drafted by TWG-3 guided by planning issues in the sector & upstream policies. As summarized in Table 5.3.2, a set of strategies & goals was proposed to realize the objectives.

**Table 5.3.2 Objectives, strategies & goals for road & bridge sector**

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| 1. Planning & coordination | 1.1 Regular updating of road transport statistics & inventory data | Need a mechanism to regularly update data such as road inventory & traffic volume to use as basic data for maintenance. Also need to utilize ICT for the collection, analysis & use of data. | 1.1.1: Develop GIS database for road & bridge inventory. | Vital to regularly update road & bridge inventory using GIS. Data should drive integrated systems to support planning, development, operation & maintenance, etc. | 1.1.1.1: All inventory is to be updated annually. |
| | 1.2 Establish effective coordination mechanism among transport stakeholders in road & bridge infrastructure planning to achieve greater investment efficiency. | When implementing new construction & maintenance of roads & bridges, establish a mechanism that supports cooperation with activities of other transport sub-sectors. | 1.2.1: Establish a working group for the coordination of policies & plans at CNV. | Vital to hold monthly coordination meetings among MITRANS, MICONS, CNV, CPV, etc., to synchronize policies & plans. | 1.2.1.1: Hold monthly coordination meetings among MITRANS, MICONS, CNV, CPV & all related organizations. |
| | | | 1.2.2: Seek & link all road activity in Cuba to various TA & ODA plans offered by international cooperation agencies. | Seek further assistance & business opportunities in the road & bridge sector from international aid agencies. | 1.2.2.1: Receive continuous technical support from international aid agencies until 2030. |
| | | | 1.2.3: Establish an entity (infrastructure directorate under provincial transportation directorate now being created) in each province to oversee project planning, execution & implementation of roads of provincial/municipal interest. | Vital to develop provincial infrastructure directorates to manage project planning, execution & implementation of roads of provincial/municipal interest. (e.g., DPTGH in Havana & DPT in Ciego de Ávila) | 1.2.3.1: Design entity (infrastructure under provincial transport directorate now being created) in each province in charge of project planning, execution/implementation of roads of provincial/municipal interest. |
| | 1.3 Focus new investment on supporting Cuba's growing industries, such as international tourism & SDZs. | New investments in the road & bridge sector should focus on supporting Cuba's growing industries, such as international tourism & SDZs. | 1.3.1 Encourage international investors to invest & maintain road & bridge infrastructure & services with a simplified procedure for entering the Cuban market. | Encourage non-state enterprises to enter road & bridge infrastructure sectors by simplifying procedures. | 1.3.1.1: Establish non-state enterprises with international investors to build profitable road infrastructures, such as new toll roads and bridges. |
| | | | 1.3.2: Attract investors by informing international societies of future road development plans. | Set up an information dissemination system (e.g., an annual event) to inform international societies of Cuba's road development plans. | 1.3.2.1: Annually inform international societies of road development plans by responsible organizations, such as CNV. |
| | 1.4 Strengthen/increase human resources in road & bridge planning & management to implement integrated transport policies to meet changing national/international transport needs. | Need to increase human resources in road & bridge planning/management to monitor, review & update integrated transport policies, strategies & related projects & actions to meet changing national & international transport needs. | 1.4.1: Prepare human resources training plan for organizations related to road & bridge planning & management. | Human resources in road & bridge planning & management are needed to monitor, review & update integrated transport policies, strategies & related projects & actions to meet changing national & international transport needs. | 1.4.1.1: Annual overseas training for a minimum of 10 personnel in planning & management positions. |
| | 1.5 Upgrade existing data collection system, database & analytical tools to the international standard for efficient operation, monitoring & planning. | Need to introduce computers & software for efficient data collection, monitoring & analysis of transport operations. | 1.5.1 Promote the use of ITS. | It is necessary to establish a specialized unit for ITS in CNV to formulate an ITS development plan in the road & bridge sector. | 1.5.1.1: Establish an ITS unit and formulate an annual ITS development plan in the road & bridge sector. |
| 2. Transport infrastructure development | 2.1 Prioritize most deteriorated roads & bridges & improve the network to international standard. | For safety especially, need to identify roads & bridges requiring urgent repair. These should be repaired or renewed. | 2.1.1: Improve road & bridge network to international level, prioritizing most deteriorated sections. | Need to implement an immediate action plan for critical road & bridge sections. | 2.1.1.1: To reach international levels in 30% of Cuba's road network, priorities are: Autopista, Carretera Central, access roads to tourist poles, Circuito Norte & Circuito Sur. |
| | | | 2.1.2: Repair/replacement of seriously damaged bridges on heavy vehicle routes & access roads to tourist poles & tourism developments. | Priority should be the repair of seriously damaged bridges on heavy vehicle routes & access roads to tourist poles & tourism developments. | 2.1.2.1: Annually rehabilitate 20% of bridges on heavy vehicle routes & access roads to tourist poles & tourism developments. |
| | 2.2 Utilize existing roads & bridges to reduce capital investment costs. | Need to prioritize the repair of existing roads & bridges before considering new investments. | 2.2.1: Improvement of maintenance capacity & efficiency. | Vital to have efficient equipment for the maintenance of infrastructure & facilities. | 2.2.1.1: Acquire efficient equipment for maintenance of infrastructure & facilities. |

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | 2.3 Expand road networks to support growth industries & meet changing public/social transport needs. | Make necessary road investments (e.g., extensions/widening) to support national priority investments. | 2.3.1 Support container transport by truck to/from Mariel & Santiago de Cuba. | Consider transport needs for container traffic by truck to/from Mariel & Santiago de Cuba. | 2.3.1.1: Conduct annual market & demand analysis study for container transport for further road infrastructure/network development. |
| | 2.4 Strengthen connectivity between growth centers (e.g., provincial capitals & major tourist destinations) & international gateway ports. | Strengthen existing hub & spoke road network plus form network that enhances links with key transport nodes (e.g., ports, airports, SDZs). | 2.4.1: Complete Autopista & main highways as the country's backbone. | Complete national roads & Autopista. | 2.4.1.1: Develop 30% of national roads by 2026 & complete Autopista by 2030. |
| | 2.5 Develop hierarchical road networks to facilitate stable multimodal transport services. | Improve road network to enable hierarchical multimodal transport services, allocating appropriate trucks for various purposes. | 2.5.1: Develop road network step-by-step to meet expected cargo & passenger demand. | Consider cargo & passenger demand in developing roads. | 2.5.1.1: Identify priority freight/passenger corridors in developing roads while considering other modes (e.g., rail/ship). |
| | | | 2.5.2: Increase road business opportunities. | Study how to improve existing service areas & road information, plus the viability of tolls. | 2.5.2.1: Study on tolls & rest areas (*Michi no Eki*) on main roads. |
| | 2.6 Develop alternate routes in case of natural disasters. | Develop bypass routes to prepare for natural disasters, focusing on areas likely to be affected by disasters. | 2.6.1: Prioritize continuous improvement & reinforcement of Autopista, Carretera Central, Circuito Norte & Circuito Sur. | Adopt modern/advanced technologies for improvement & reinforcement in the road & bridge sector. | 2.6.1.1: Apply modern/advanced technology to increase the level of safety & protection of roads. |
| 3. Environment, safety & security | 3.1 Improve traffic safety & reduce road accidents. | Need to reduce pedestrian/vehicle accidents, especially when crossing high-standard roads. Plus, need to introduce facilities/equipment to improve safety, e.g., lighting/guardrails. | 3.1.1: Update/apply safety standards. | To have updated safety & security norms. | 3.1.1.1: Reduce the number of traffic accidents each year. |
| | | | 3.1.2: Use modern/advanced technologies to improve traffic safety. | Install basic safety devices & gradually improve safety with advanced technologies. | 3.1.2.1: Apply modern/advanced technologies to improve safety. |
| | 3.2 Improve safety/security in the transport of fuel & other dangerous goods. | Improve quality/safety of hazardous goods transport via regulation & proper management. | 3.2.1: Update current safety/protection standards and install state-of-the-art technologies to transport hazardous goods. | Raise safe/protection standards to increase the quality of transporting hazardous goods and procure new high-standard tank lorries following the updated standards. | 3.2.1.1: Achieve zero accidents related to the transport of fuel & other dangerous goods. |
| | 3.3 Promote the use of environmentally friendly transport technologies. | Highly fuel-efficient (low-carbon) technologies, e.g., hybrid, EV & hydrogen vehicles, can be introduced in phases. | 3.3.1.:Progressive installation of modern fuel-efficient (low-carbon) technologies such as electric or hybrid vehicles. | Study/adopt modern low-carbon technologies in the road sector. | 3.3.1.1: Reduce $CO_2$ emissions each year (targets for 2026 & 2030). Introduce 2% of hybrid or electric vehicles annually. |
| | 3.4 Raise awareness of safe, environmentally friendly behavior. | To boost road-user safety & environmental standards, need to continue raising popular awareness via public relations & in schools. | 3.4.1: Promote environmental information campaigns in the road & bridge sector. | Use media to raise popular awareness of the importance of environmental protection. | 3.4.1.1: Use TV & radio ads to raise popular environmental protection awareness. |
| 4. Transport service & industry development | 4.1 Enhance road-related business opportunities. | Create business opportunities along major roads & collaborate with economic activities in each province, such as planning, designing & maintaining service areas. | 4.1.1: Collaborate with local economic activities in planning, designing, and constructing service areas along Autopista & roads of national interest. | May need to study local economic activities, plus survey the needs of Cuban & foreign road users. | 4.1.1.1: Establish synergies with local authorities in developing economic activities along Autopista & roads of national interest. |
| | | | 4.1.2: Create new road-related businesses by taking advantage of passing road traffic. | Gradually expand road-related businesses. | 4.1.2.1: Expand road-related business by 20% annually in certain areas. |
| | 4.2 Develop non-road businesses such as shops, restaurants, hotels & regional development/cooperation facilities. | Need to support creating business opportunities along roads & support activities of business entities, including non-state enterprises. | 4.2.1: Increase multi-purpose use of existing service areas. | Make the best full use of existing service areas nationwide. | 4.2.1.1: Use/expand existing service areas nationwide. |
| | | | 4.2.2 Provide real-time automated information in service areas: traffic accidents, weather, tourist attractions, hotel reservations, etc. | Provide useful information in service areas as a key feature of road transport. | 4.2.2.1: Provide comprehensive/useful information in service areas as a key feature of road transport. |
| | | | 4.2.3: Establish rest stops (*Michi no Eki*) on major highways, including existing ones. | Need to survey needs/opinions of Cuban & foreign road users. | 4.2.3.1: Establish non-state enterprises. |

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| 5. Transport pricing & resource allocation | 5.1 Introduce the "beneficial payment principle" in the road transport market & industry. | Beneficial payment is a kind of direct tax. Usage fees are set/collected according to the service used (e.g., distance traveled on Autopista), with funds applied to road operation & maintenance costs, etc. Higher tariffs for foreign users may be considered. | 5.1.1: Set reasonable rates on new tolls for international visitors | Need to review existing toll bridges to set reasonable rates, including new toll roads to increase revenue from the road & bridge sector. | 5.1.1.1: Increase revenue from tolls paid by international visitors. |
| | | | 5.1.2: Set reasonable toll rates for international container cargo transport services. | Need to review existing toll bridges & set reasonable toll rates, including new toll roads, to increase revenue from tolls paid by international cargo transport services. | 5.1.2.1: Increase revenue from tolls paid by international container cargo transport services. |
| | | | 5.1.3: Establish tolling in touristic places (e.g., access to the tunnel and historical centers). | Establish tolling in touristic places to increase toll revenues. | 5.1.3.1: Increase revenue from tolls in touristic places. |
| | | | 5.1.4: Set charges for exceptional-load permits. | Strategy to be implemented in concert with monitoring/control of overloaded trucks. | 5.1.4.1: Design new management forms to charge for exceptional-load permits. |
| | 5.2 Apply "Affordable Pricing" to maintain transport accessibility. | As Cubans should be able to use roads & related facilities equally, need to consider the income levels of Cuban people in setting tolls. | 5.2.1: Establish affordable rates on new tolls for national visitors. | Need to set affordable rates considering transport accessibility & mobility of national visitors. | 5.2.1.1: Increase revenue from tolls paid by national visitors. |
| | 5.3 Ensure adequate funding in the annual budget for urgent projects. | A pressing need to secure a state budget for roads & bridges requiring urgent repair/renewal. Need to estimate the required budget accurately. | 5.3.1: Earmarked tax (special purpose tax) for rehabilitation of roads & bridges | Earmarked tax (special purpose tax) is expected to become a new, stable source of funds for road & bridge maintenance. | 5.3.1.1: Establish new, stable funding sources for maintenance & rehabilitation of roads & bridges. |
| | 5.4 Provide business opportunities for road infrastructure development, operation & maintenance. | Allow non-state entities (incl. foreign firms) to enter the road infrastructure business (development & inspection/maintenance/management work). | 5.4.1: Introduce non-state investors & toll road operators. | Vital to study the feasibility of non-state enterprises investing in toll road development. | 5.4.1.1: Investment in toll road improvement & development by non-state enterprises. |
| 6. Institutional & regulatory development | 6.1 Clearly define the responsibility of each entity related to the road & bridge sector (MITRANS, CNV, CPV, EPT, MICONS, ECOING, etc.). | Clarify the role of central government (planning, budget allocation, project progress monitoring, administrative guidance, technical guidance). Plus, decentralization is to be promoted for road infrastructure development, maintenance & management. | 6.1.1: MITRANS via CNV must act as the only body with the power to dictate road policies & enforce them on all road administrators. | An international benchmark study on road sector management may be needed. | 6.1.1.1: Establish single body to dictate road policies & ensure compliance: CNV. |
| | | | 6.1.2: In each province, establish an infrastructure directorate (reporting to CNV) in charge of planning, projects, and implementing roads of provincial interest. | Need to establish infrastructure directorates at the provincial level (reporting to CNV) in charge of provincial & municipal road management, planning, projects, etc. | 6.1.2.1: In each province, establish an infrastructure directorate in charge of roads of provincial/municipal interest. |
| | 6.2 Offer foreign investors reasonable/ fair investment opportunities for road & bridge infrastructure development. | To encourage foreign companies to enter Cuba's road & bridge sector, need to develop an appropriate legal framework. | 6.2.1: Prepare regulations & guidelines to attract FDI in road & bridge sector. | Road & bridge-related laws, regulations, & standards attractive to FDI are needed to manage foreign investment in the road sector. | 6.2.1.1: Update road & bridge-related laws, regulations & standards. |
| | 6.3 Provide road-related business opportunities to non-state companies, including foreign investors. | Need to implement various measures to attract foreign companies actively. | 6.3.1: Prepare business guidelines to attract the non-state sector to road-related business. | To facilitate FDI, need to prepare business guidelines for non-state enterprises. | 6.3.1.1: Establish business synergy with non-state enterprises and prepare road & bridge sector business portfolio to facilitate FDI. |

Source: TWG & JICA Study Team

### 5.3.3 Road-based passenger transport (bus) sector

Objectives for the road-based passenger sector were drafted based on identified planning issues & upstream policies. A set of strategies & goals, summarized in Table 5.3.3, was then proposed to realize the objectives.

**Table 5.3.3 Objectives, strategies & goals for the road-based passenger transport sector**

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| 1. Planning & coordination | 1.1 Contribute to the development of the tourism sector by coordinating all tourism-related entities. | Various entities under MITRANS, MINTUR & MINFAR provide tourist bus services (intercity, airport, etc.). Need to clarify the division of roles among these actors & coordinate efforts to improve services. | 1.1.1: Clarify the roles of MITRANS, MINTUR & MINFAR in tourist bus services, and form a comprehensive plan. | Clarify roles of tourist bus providers under MITRANS, MINTUR & MINFAR, plus make a comprehensive tourism transport plan including operation consignment system (sharing vehicles & staff) via regular coordination meetings. | 1.1.1.1: Hold regular coordination meetings for tourist bus service providers under MITRANS, MINTUR & MINFAR.<br>1.1.1.2: Establish operation consignment system (sharing vehicles & staff) in tourism services. |
| | | | 1.1.2: Planning bus operation/allocation with MINTUR, MINFAR's hotel/tourism business & bus business. | Draft operation plans with MITRANS creating a mechanism to integrate/monitor information on bus operations of MINTUR & MINFAR's hotel/tourism businesses. | 1.1.2.1: Analyze current status of hotel & tourism businesses, bus operations, arrangements by MINTUR & MINFAR. |
| | 1.2 Improve sustainability & capacity of intercity & interprovincial bus services to support Cubans' socio-economic activities. | Socio-economic activities, industrial revitalization & stable growth all require high-quality intercity & interprovincial bus services with greater transport capacity. | 1.2.1: Establish intercity & interprovincial traffic demand/ supply monitoring system & sustainable business plan. | Establish a flexible operation plan & fare system that responds to fluctuations in demand via a system to monitor demand, operation status & operation costs. Plus, study cooperation with truck-bus/taxi operators for intercity transport. | 1.2.1.1: Visualization/monitoring of intercity & interprovincial bus demand, operation status & operating costs.<br>1.2.1.2: Establish flexible intercity & interprovincial bus operation plans & fare systems responsive to demand.<br>1.2.1.3: Cooperate w/ truck-bus & taxi operators. |
| | 1.3 Ensure access to social services with sustainable bus services that meet citizens' basic needs. | Need to provide urban bus services to meet citizens' basic needs. | 1.3.1: Plan urban bus service operations by establishing a monitoring system for traffic demand & supply. | Promote visualization of urban buses' demand, operation status & operating costs via a monitoring system to enable formulation/update of bus operation plans. | 1.3.1.1: Visualization & monitoring of city bus demand, operation status & operating costs |
| | | | 1.3.2: Make sustainable/effective city bus service operation plans. | Along with studies to plan efficient urban transport system featuring a hierarchical network of trunk & feeder lines, make plans to improve convenience, e.g., introducing pattern schedules, transfer fare system & cooperation with individual operators. | 1.3.2.1: Create an efficient urban transport system featuring a network of trunk & feeder lines.<br>1.3.2.2: Improve public transport convenience by introducing a "clock-face schedule" & transfer fare discount system.<br>1.3.2.3: Expand public transport service area by eliminating non-serviced areas.<br>1.3.2.4: Establish a sustainable operation plan collaborating with truck-bus & taxi operators. |
| | 1.4 Given limited resources (vehicles/fuel), establish an efficient hierarchical bus network in cooperation with other transport modes. | An efficient bus network can be created by coordinating interprovincial buses (EON), city & urban buses (EPTs), truck buses & taxi operators. In addition, multimodal intercity transport services can be provided in collaboration with air & rail services. | 1.4.1: Formulate a comprehensive passenger transport plan coordinated with airlines & railways. | An integrated passenger transport network plan for multimodal intercity services will be formulated to provide integrated services between interprovincial (EON) & intracity and urban (EPTs) buses plus air & rail services. | 1.4.1.1: Establish a comprehensive passenger transport network plan. |
| | | | 1.4.2: Strengthen connectivity between intercity & intracity buses, making transfers seamless. | Coordination meetings between EON & EPTs are to be held regularly to review intercity & intracity bus operation plans, & achieve seamless connectivity. | 1.4.2.1: Hold coordination meetings between EON & EPTs to review operation plans for intercity & city buses.<br>1.4.2.2: Refine route plans to achieve seamless access to intercity transport. |
| 2. Transport infrastructure development | 2.1 Renew interprovincial & local buses & increase transport capacity. | By renewing remarkably deteriorated interprovincial & local bus vehicles, future transport capacity can be assured. | 2.1.1: Establish a standardized bus management system in EON & EPTs. | Facilitate inter-organizational collaboration in maintenance & management with a standardized bus fleet management system in EON & EPTs to improve bus fleet availability. | 2.1.1.1: Improve availability of buses (operable number/total number of vehicles: Target 70% versus 61% for all EON buses in 2019. |

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | | | 2.1.2: Procure buses for interprovincial & intercity & urban services, especially for rural areas. | Improve bus service (currently lacking) in intercity & rural areas with a systematic bus procurement plan for intercity & rural services areas. Plus, a vehicle leasing system for individual operators. | 2.1.2.1: Increase the number of interprovincial bus vehicles nationwide to 1,000 (vs. 846 for EON in 2019).<br>2.1.2.2: Establish a vehicle leasing system for individual business owners.<br>2.1.2.3: Stable production of Diana buses. |
| | 2.2 Improve public transport convenience by improving bus terminals & major bus stops & providing more information to users. | Improve amenities of bus terminals & major bus stops with benches & roofs, plus provide information such as real-time bus routes, service updates & maps. | 2.2.1: Improve service level & comfort of bus terminals in major cities. | Renovate major interprovincial & intercity bus terminals to improve amenities, including real-time operation information. | 2.2.1.1: Rebuild/renovate major bus terminals.<br>2.2.1.2: Provide real-time bus operation info at major terminals. |
| | | | 2.2.2: Improve the waiting environment at major bus stops. | Create comfortable waiting environments with smart bus shelters at major urban bus stops & boost convenience with real-time information & links to last-mile transport. | 2.2.2.1: Introduce smart bus shelters.<br>2.2.2.2: Prepare easy-to-understand route maps.<br>2.2.2.3: Improve last-mile transport by installing cycle-share & bicycle parking areas. |
| | | | 2.2.3: Provide real-time operation information by introducing a bus location system (mainly in major cities). | Improve convenience/visibility of urban public transport by providing real-time bus service information via ICT. | 2.2.3.1: Digitize all bus operation data to provide online operation info (GTFS, General Transit Feed Specification).<br>2.2.3.2: Introduce dynamic bus operation info system (GTFS real-time) via GPS on buses.<br>2.2.3.3: Provide real-time route/operation information using mobile applications. |
| | 2.3 Strengthen bus maintenance & management system. | Review inventory data (e.g., buses, spare parts, inspection records) to create a bus maintenance & renewal plan. | 2.3.1: Promote digital transformation to improve bus fleet management | Digitize the information on the existing buses and spare parts as a database. The database is updated periodically. | 2.3.1.1: Digitize inventory data on buses & spare parts & formulate renewal plan. |
| 3. Environment safety & security | 3.1 Provide safe/secure bus transport services to users. | To improve safety & service reliability, improve the skills of drivers & mechanics. Also, improve safety at bus terminals & bus stops. | 3.1.1: Thorough safety education for bus drivers & mechanics. | Improve the safety/reliability of bus services by systematically implementing safety training for drivers & mechanics. | 3.1.1.1: Reduce the number of traffic accidents per 1 million-km bus service (1.76 for EON in 2018). |
| | | | 3.1.2: Ensure safety/security on buses. | Improve passenger safety & security by installing monitored onboard cameras in buses. | 3.1.2.1: Install monitored cameras on buses. |
| | | | 3.1.3: Install CCTV at bus terminals in cooperation with the police. | Improve safety & security via the installation of monitored CCTV at bus terminals. | 3.1.3.1: Install CCTV at main bus terminals & establish monitoring system. |
| | 3.2 Provide bus services resilient against natural disasters & infectious diseases, e.g., COVID-19. | COVID-19 countermeasures are the near-term priority. In addition, Business Continuity Plans (BCP) for infectious diseases & natural disasters should also be formulated. | 3.2.1: COVID-19 infection control measures for bus passengers. | Promote a safe/secure passenger environment by installing COVID-19 countermeasures & providing information on bus congestion. | 3.2.1.1: Introduce COVID-19 countermeasures (partitions, thermometers, disinfectant, etc.).<br>3.2.1.2: Provide information on bus congestion. |
| | | | 3.2.2: Build a bus system with long-term resistance to infectious diseases & disasters. | Boost resilience of bus services with the phased introduction of contactless payment systems & other infection control measures; formulate BCPs for bus operators to prepare for major disasters. | 3.2.2.1: Phased launch of contactless payments.<br>3.2.2.2: Infection control manuals for bus operators.<br>3.2.2.3: Establish BCPs for bus business. |
| 4. Transport service & industry development | 4.1 Spur passenger demand for interprovincial buses with a user-friendly booking system. | To boost intercity bus convenience, review reservation/ticket sales system & introduce online/mobile systems. | 4.1.1: Establish online interprovincial bus reservation & ticket sales system. | Review the current interprovincial bus reservation system & create a reservation/ticketing system via online/mobile applications. | 4.1.1.1: Improve the interprovincial bus reservation system.<br>4.1.1.2: Establish online & mobile reservation/ ticketing systems. |
| | 4.2 Improve amenities of interprovincial travel by improving service areas. | To improve the amenity of interprovincial travel, improve highway service areas, working with road administrators. | 4.2.1: Improve interprovincial service area in collaboration with road administrators. | Improve user comfort in interprovincial travel by enhancing highway service areas, etc., working with road managers. | 4.2.1.1: Improve service areas & facilities. |
| | 4.3 Promote import substitution of bus vehicles & spare parts. | Promote the domestic bus manufacturing industry to import substitution of vehicles & parts further. Also, promote the technological development of EV buses. | 4.3.1: Foster/strengthen the domestic bus manufacturing industry. | Promote import substitution in vehicles & parts by fostering human resources & promoting capital investment in domestic bus manufacturing, & promoting technological development of intercity buses & EV buses. | 4.3.1.1: Expand Diana Bus production & human resource development.<br>4.3.1.2: Develop intercity bus manufacturing.<br>4.3.1.3: EV bus manufacturing feasibility study |

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| 5. Transport pricing & resource allocation | 5.1 Expand revenue in the bus-related service business. | To boost profitability, develop shops & restaurants at bus terminals. Also, diversify with bus-related services such as mixed cargo/passenger transport. | 5.1.1: Develop shops & restaurants at bus terminals. | Improve user comfort & secure new revenue sources to support the provision of interprovincial bus services by promoting the development of restaurants & shops at bus terminals. | 5.1.1.1: Work with other state- & non-state Empresa to develop restaurants & shops at bus terminals. |
| | | | 5.1.2: Explore mixed cargo/passenger services to provinces. | Study new revenue sources such as bus parcel service to provinces. | 5.1.1.2: Offer logistics services to local cities in collaboration with other public corporations. |
| | 5.2 Increase revenue from foreign tourists by providing luxury bus services | Profitability can be improved by establishing a flexible fare system based on the level of service to tourists while providing tourists with better service. | 5.2.1: Provide various services & fare systems for foreign passengers. | Promote tourism industry development with new services for foreign tourists, e.g., setting fares according to the level of service) to fund the expansion of the interprovincial network. | 5.2.1.1: Offer profitable airport transfers.<br>5.2.1.2: Create a flexible bus fare system for foreign passengers.<br>5.2.1.3: Introduce various service levels, including luxury buses.<br>5.2.1.4: Develop luxury bus lounges at major bus terminals. |
| 6. Institutional & regulatory development | 6.1 Promote cooperation with individual operators to boost bus service levels. | Improve public transport service level by coordinating with individual truck-bus & taxi operators while ensuring safety via MITRANS supervision. | 6.1.1: Clarify the position of private bus operators in the road-based passenger transport network, safety assurance & operation planning & management. | Improve the public transport network & improve the level of service by clarifying the position of private truck-bus & taxi operators & initiating collaboration with public operators while ensuring safety under appropriate operation planning & management from MITRANS. | 6.1.1.1: Clarify division of roles between state-owned enterprises & private truck-bus/taxi operators.<br>6.1.1.2: Establish vehicle standards & license system to ensure safety.<br>6.1.1.3: Establish operation planning/monitoring system. |

Source: TWG & JICA Study Team

### 5.3.4 Railway & rail transport sector

TWG-4 drafted objectives for the railway & rail transport sector guided by sectoral planning issues and upstream policies. A set of strategies and goals, summarized in Table 5.3.4, were then proposed to realize the objectives.

**Table 5.3.4 Objectives, strategies & goals for railway & rail transport sector**

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| 1. Planning & coordination | 1.1 Use statistics as a key tool for railway planning, operation control & management. | Regularly update inventory data of track, rail facilities, telecommunications facilities, vehicles, garages, repair shops, etc. ICT systems will be developed to gather/analyze this data to support planning & other decision-making. | 1.1.1: Establish a single data platform for information/data collection, provision & management using ICT (including GIS) | Unify data management systems for different fields & entities, such as maintenance & operation. | 1.1.1.1: Develop prototype database system by 2026. |
| | 1.2 Strengthen railway management planning & administration | Need to enable an analysis of financial/accounting & service/operation data in a unified manner (covering all entities under UFC). Also need to build integrated planning & management system to enhance UFC management capabilities. | 1.2.1: Harmonize entities' financial management systems with systems for services to generate unified accounting records. | Implement a new accounting system specific to railway services to improve the efficiency & sophistication of operations. | 1.2.1.1: Build inventory (asset) data recording system by 2024<br>1.2.1.2: Establish an accounting system of services' incomes & expenditures by 2026<br>1.2.1.3: Build a set of performance indicators for rail transport services by 2026 using a new accounting system.<br>1.2.1.4: Unify accounting systems by 2030. |
| | | | 1.2.2: Expand the use of ICT in railway planning | Introduce ICT into railway operation management, etc. | 1.2.2.1: Computerize all planning by 2026<br>1.2.2.2: Achieve 100% connectivity coverage of facilities by 2030. |
| | | | 1.2.3: Use foreign experience in areas of planning & control in railway management, adapting it to Cuban conditions. | Improve railway business by utilizing overseas knowledge in railway operations & maintenance management. | 1.2.3.1: Create a railway technological observatory (unit of senior railway specialists) by 2024. |
| | 1.3 Develop railway plans that contribute to priority economic sectors | Need to create channels to link with institutions, business entities & investment portfolios beyond the transport sector. Contribution to the tourism sector is highly desired, along with providing basic services to Cubans. | 1.3.1: Systematically integrate spatial development initiatives (ENOT, ZED Mariel, N. Coast/Cayos, etc.) & economic entities into railway development plans. | Formulate railway infrastructure & service development plan informed by development plans of other ministries. | 1.3.1.1: Review/update the railway development program every 5 years, considering the development of other industrial sectors. |
| 2. Transport infrastructure development | 2.1 Provide robust track infrastructure resistant to natural disasters to increase the level of safety & services, taking into account growing economic activity & public transport demands. | Aim to build high-speed, high-capacity rail transport services connecting major cities & economic activity centers – robust, disaster-resistant & highly reliable at reasonable transport costs. | 2.1.1: Increase mechanization to achieve higher productivity & quality in maintenance & repair work | Promote mechanization of maintenance to increase efficiency & sophistication | 2.1.1.1: Mechanize 100% of maintenance on Central & Cienfuegos lines by 2030. |
| | | | 2.1.2: Execute repair program for main lines & other structures | Rehabilitation focused on Central Line & other main lines.<br>Urgent repair of significantly deteriorated facilities to ensure the safety | 2.1.2.1: Comply with annual repair plans<br>2.1.2.2: Start rehabilitation of Central Line and Cienfuegos line before 2026 |
| | | | 2.1.3: Execute a new railway construction program to meet new transport demand. | Promote rail infrastructure development for key routes/corridors, missing rail links & cargo transport bases. | 2.1.3.1: Build no less than 70 km of new lines before 2030. |
| | | | 2.1.4 Execute rehabilitation & maintenance program on existing rail lines. | Improve maintenance capacity for existing railway infrastructure & rehabilitate, especially in major corridors. | 2.1.4.1: Establish track & bridge maintenance cycle on Central Line by 2026.<br>2.1.4.2: Rehabilitate Central, South, Cienfuegos & Cárdenas lines by 2030. |
| | 2.2 Improve efficiency/protection in loading/unloading center operations. | Need to improve/expand & modernize handling facilities & equipment of CCD & cargo collection/distribution services (trucks). | 2.2.1: Implement intrusion protection, fencing & lighting system improvements. | Improve the safety & cargo handling capacity of CCDs by upgrading cargo handling facilities (CCD) & improving the efficiency of cargo operations. | 2.2.1.1: 100% implementation in CCDs by 2030 |
| | | | 2.2.2: Upgrade cargo handling areas, access lines, and weighing systems. | | 2.2.2.1: Reduce wagon dwell time in CCDs. |
| | | | 2.2.3: Replenish/modernize CCD loading & unloading equipment | | 2.2.3.1: Fulfill annual CCD investment plan. |
| | | | 2.2.4: Expand ICT in the CCD work process | | 2.2.4.1: Computerize cargo train operation planning |

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | 2.3 Improve passenger service at stations | Need to increase the level of services (LOS) at railway stations to attract more Cuban passengers & international visitors. | 2.3.1: Improve state of passenger stations & customer services. | Improve passenger service at stations by upgrading Havana Central & other stations & enhancing transport node functions.<br>Offer safe/comfortable services, mindful of vulnerable groups. | 2.3.1.1: Repair 5 stations each year starting in 2023. |
| | | | 2.3.2: Improve intermodal services. | Improve access to/from rail stations with convenient feeder services (taxi & bus). | 2.3.2.1: All passenger train stations are to have intermodal service for access by 2030. |
| | 2.4 Expand FERRONET computer systems | The current FERRONET network needs to be improved with advanced technologies. | 2.4.1: Increase capacity, speed, coverage & services of FERRONET. | Improve transmission speed & capacity needed to digitize business operations. | 2.4.1.1: 100% coverage of railway entities by 2030 |
| 3. Environment, safety & security: | 3.1 Improve safety to international standards & reduce railway accidents. | Strong need to significantly reduce railway accidents by improving rail systems, including infrastructure, communication & operation systems, rolling stock & staff capability with ICT. | 3.1.1: Remedy causes affecting the safety of train operations, with collaboration with citizens and local bodies, focusing on local factors. | Collaborate with citizens, local government bodies, educational institutes, & schools to increase awareness of safety. | 3.1.1.1: Make an official arrangement with local bodies of people's power regarding safety improvement. |
| | | | 3.1.2: Increase level-crossing safety. | Reduce accidents at level crossings by installing an automatic crossing gate (barrier). | 3.1.2.1: Reduce level-crossing accidents from the 2020 level. |
| | | | 3.1.3: Increase staff's train operation capability. | Increase training for personnel involved in train operations to improve safety further. | 3.1.3.1: 100% of staff involved in train movement are to have updated railway safety certificates by 2026. |
| | | | 3.1.4: Increase the use of ICT in accident control systems. | Promote the use of ICT, including databases related to safety measures. | 3.1.4.1: Implement computer system/database for the Central line operation by 2026, focusing on accidents and incidents. |
| | | | 3.1.5: Work on causes/conditions affecting traffic safety. | Investigate causes and conditions of rail accidents and research measures for reducing accidents by considering local conditions.<br>Based on research, carry out a series of projects to prevent accidents. | 3.1.5.1: Carry out a series of studies on safety improvement, focusing on local factors urgently (~2026).<br>3.1.5.2: Reduce accident (no. of incidents per 100,000 train-km) to 3.0 in 2026 and 2.5 in 2030<br>3.1.5.3: Continuous advertising campaign on railway safety.<br>3.1.5.4 Continuous upgrading of the rail safety based on the research.<br>3.1.5.5: Deploy enough station operators & dispatchers, so all major lines are covered. |
| | 3.2 Introduce environmental-friendly technology & increase the environmental awareness of railway staff | Contribute to climate change challenge by adopting environmental-friendly technologies such as EV & hydrogen power sources.<br>Incorporate strategic environmental assessments (SEA) into the planning process.<br>Increase environmental awareness of railway staff. | 3.2.1: Evaluate electric traction, hybrids, and other alternatives for suburban services. | Promote the use of alternative technologies to reduce emissions | 3.2.1.1: Rehabilitate Hershey Line as suburban commuter line & tourist attraction by 2028.<br>3.2.1.2: Continuous study on alternate (clean) energy. |
| | | | 3.2.2: SEAs required in all railway development projects. | Incorporate SEAs in all railway planning and development processes to achieve sustainability. | 3.2.2.1: Suggestions from SEAs are taken into consideration in all new/repair projects. |
| | | | 3.2.3: Mitigate railway environmental impact. | Establish environmental protection strategy, including air pollution & waste treatment, in all rail institutions. | 3.2.3.1: Prepare environmental protection strategies & corresponding measures for all railway-related entities by 2026<br>3.2.3.2: Build treatment facilities for polluting waste in workshops & scrubbing areas as soon as possible.<br>3.2.3.3: Equip all new passenger cars with waste bilge system |
| | | | 3.2.4: Adopt measures to save electricity. | Reduce energy consumption with energy-saving equipment, e.g., LEDs and solar power. | 3.2.4.1: Study on energy-saving & clean energy production technologies, e.g., photovoltaic systems<br>3.2.4.2: Install LED lighting to reduce electricity consumption.<br>3.2.4.3 Install photovoltaic systems at stations & other facilities. |

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | | | 3.2.5: Adopt measures to save water. | Study water recycling. | 3.2.5.1: Establish water recycling by rehabilitating scrubbing systems in workshops. |
| | | | 3.2.6: Adopt fuel-saving measures. | Conserve fuel by upgrading locomotives & conduct studies on alternative fuels, computerization, technologies, etc., to increase energy efficiency. | 3.2.6.1: Prepare a plan to install fuel sensors on locomotives.<br>3.2.6.2: Complete installation of GPS on existing locomotives.<br>3.2.6.3: Comply with fuel consumption regulations according to services. |
| | 3.3 Increase security & safety in railway infrastructure & facilities. | Need to increase security by installing facilities such as fencing & CCTV cameras. | 3.3.1: Add intruder protection systems, fencing & better lighting in facilities. | Adopt measures to enhance the security of railway facilities, including fences and lighting. | 3.3.1.1: Add security features (fencing, lighting) in all CCDs/main stations by 2030. |
| | | | 3.3.2: Improve cargo security & protection. | Improve cargo tracking system using advanced technologies, including GPS. | 3.3.2.1: Install GPS on locomotives by 2026.<br>3.3.2.2: Install diligence systems using CCTV at major CCDs by 2030.<br>3.3.2.3: Complete the railway scale weighing system |
| 4. Transport service & industry development | 4.1 Increase long-distance rail passenger traffic & attract tourists. | Improving the railway level of service (LOS) is expected to spur a significant increase in passenger traffic & provide an attractive experience for international visitors. | 4.1.1: Improve railway level of service. | Upgrade railcars & facilities (operation & communication) to improve:<br>• travel time<br>• punctuality<br>• frequency<br>• carrying capacity<br>• security<br>• intermodality<br>• comfort | 4.1.1.1: Aim to transport 15.8 million passengers (UFC rail customers) in 2030 (2.7 million long-distance passengers, 5.2 million passengers from the Provincial Directorates of Transport) |
| | | | 4.1.2: Make trains more attractive than buses in terms of service, comfort & fares. | Study scope to compete with bus/air by offering attractive services & fares to boost passenger traffic and make rail sustainable. | 4.1.2.1: Set fares competitive with the bus. |
| | | | 4.1.3: Provide safe, accessible, comfortable services for all passengers. | Meet the needs of vulnerable people (blind, elderly, mobility challenged, etc.) by adopting a “universal design.” | 4.1.3.1: All trains/stations must cater to the needs of vulnerable people. |
| | | | 4.1.4: Add tourist trains and other services to deliver added value. | Introduce sightseeing trains, etc., to generate increased revenue. | 4.1.4.1: Increase in tourist trains compared to 2020<br>4.1.4.2: Create MIPYMEs in tourist trains by 2026. |
| | | | 4.1.5 Use railway lines in Havana and neighboring provinces for urban railway services | Using the existing rail lines in Havana and neighboring provinces, develop rail networks and services to support the daily activities of citizens in Havana and neighboring provinces. | 4.1.5.1: Carry out feasibility study (technical and economic) on Havana Metro Network development by 2026 |
| | | | 4.1.6 Extend rail passenger transport services to important areas/destinations considering social and economic activities | Extend rail transport services to support various activities, including commuting to special economic zones, tourist destinations, leisure places, etc. | 4.1.6.1: Carry out a series of feasibility studies on proposed projects through the planning horizon (~2030) |
| | | | 4.1.7 Enhance rail services in rural areas using sugarcane rail lines. | Improve accessibility to sugarcane rail lines in rural areas and enhance passenger transport services using sugarcane rail lines (managed by provincial transportation directorates) | 4.1.7.1: Continuous increase in passenger volume compared to those achieved in 2020<br>4.1.7.2: Build 10 railbuses per year. |
| | 4.2 Increase rail’s modal share of cargo transport & meet growing rail transport demand. | Rail cargo volume & modal share should be increased to reduce heavy dependence on trucks, especially for long-distance transport. | 4.2.1: Improve freight railcars & yards management by specifying who is directly responsible for their management. | Conduct studies on improving the efficiency of freight transport, including freight train operation, plus yard/warehouse management. | 4.2.1.1: Establish a new organization for rail cargo transport by 2026<br>4.2.1.2: Increase in medium-distance cargo volume compared to 2020. |

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | | | 4.2.2: Increase utilization rate of available locomotives. | Utilization rate should be improved by enhancing the operation of trains with better management of locomotives: use of the locomotive in successive services to avoid its immobility, increasing tractive capacity, daily productivity, hours of work, and daily km traveled. | 4.2.2.1: Increase locomotive productivity index vs. 2020.<br>4.2.2.2. Raise the average gross weight per train to 1,100 tons. |
| | | | 4.2.3: Procure new rolling stock & other equipment. | Based on the analysis of the efficient use of available rolling stock & equipment, prepare a procurement plan for new rolling stock & other equipment to meet future demand. | 4.2.3.1 Procure 837 freight cars & 7 medium-power locomotives by 2030 based on the procurement plan |
| | | | 4.2.4 Study on improving parcel transport services. | Based on a study, improving parcel service (express) as a state-sector rail business | 4.2.4.1: Carry out a study on parcel service (2023/2024)<br>4.2.4.2: Increase parcel volumes compared to 2020. |
| | | | 4.2.5 Improve the technical availability of the existing fleet of wagons and locomotives (TAC) | By repairing and improving existing equipment, achieve an increase in technical availability of equipment to reduce investments for purchasing new equipment. | 4.2.5.1: Achieve a TAC of 80% by 2026<br>4.2.5.2: Achieve a TAC of locomotives of 70% in 2030<br>4.2.5.3: Annually carry out more than 445 overhauls of freight cars.<br>4.2.5.4: Annually carry out more than 25 overhauls of locomotives. |
| | | | 4.2.6 Increase advanced transportation services for containers, fuel, cement, aggregates, bulk sugar, and food. | Focusing on containers, fuel, cement, aggregates, bulk sugar, and food transport, transport services should be increased. | 4.2.6.1 Continuous increase in modal share of railway transport of the focused commodities compared to 2020. |
| | | | 4.2.7 Increase efficiency in sugar cane transportation | The existing sugarcane transport efficiency can be improved. In this regard, an urgent study is required. | 4.2.7.1: Carry out studies on measures that can be applied to improve the transport efficiency of sugarcane |
| | | | 4.2.8: Increase the use of rail in the main freight transport in the country and reduce the disorganized/ad hoc use of motor transport (trucks) | Considering the economics of transportation, priority is given to increasing the volume of rail transport of the primary goods that travel long distances. | 4.2.8.1: Continuous increase of the rail sector in modal share of freight transportation. |
| | 4.3 Introduce advanced technology & management systems to improve railway business performance. | Need to introduce advanced technologies & management systems to modernize the railway sector. | 4.3.1: Promote advanced technologies for high-quality transportation services of containers, fuels, cement, aggregates, bulk sugar, and food | Study and introduce advanced transport technologies to transport specific types of cargo. | 4.3.1.1: Study on advanced cargo transport means and technologies in 2026.<br>4.3.1.2: Creation of a railway technology observatory (department for control of data) by 2024 |
| | | | 4.3.2: Introduce non-state sector/FDI investment/operation of freight services, aiming to contribute to financing of sustainable railway services revenue from non-rail business. | Study scope for non-railway business & overseas investment to boost UFC profitability. | 4.3.2.1: Prepare guidelines for the non-state sector to enter rail/non-rail business by 2026.<br>4.3.2.2: Increase revenue from non-rail business vs. 2020.<br>4.3.2.3: Invite the non-state sector, including FDI (foreign direct investment), to investment opportunities of rail transport services by 2030 |
| | | | 4.3.3: Increase market research capacity to study customer needs and growth trends. | UFC's rail service needs to be improved based on customer needs.<br>Carry out survey and analysis of passenger and cargo transport demand, which provides a basis for designing optimal and efficient rail services | 4.3.3.1: Create a market research unit by 2024.<br>4.3.3.2: Conduct market/demand analysis studies and opinion surveys of passenger & cargo rail users. |

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | | | 4.3.4: Increase convenience (user-friendliness) of rail travel & rail cargo transportation using ICT | Expand the use of ICTs, e.g., Wi-Fi in stations/trains, train operation information, e-ticketing, online cargo shipping order, cargo tracking, etc. | 4.3.4.1: Provide Wi-Fi access at major rail stations by 2026.<br>4.3.4.2: Provision of train operation information and e-ticketing by 2024.<br>4.3.4.3: Online cargo transport ordering system by 2026. |
| | | | 4.3.5: Introduce advanced technologies for train operation planning, management, and control. | Conduct a study on new and advanced technologies and introduce appropriate technologies to improve train operation planning, monitoring, and controlling trains. | 4.3.5.1: Conduct a study on advanced technologies for train operation plan, monitoring, and control in 2023~2025.<br>4.3.5.2: Installation of advanced technologies in 2026~2030. |
| | 4.4 Develop the national railway industry | Need to support existing rail-related industries, including those under UFC and other ministries (e.g., sleeper production), to increase capacity, quality & efficiency, and promote import substitution. | 4.4.1: Modernize railway workshops/ equipment with new technologies. | Replace obsolete and inefficient equipment & introduce new technologies to boost the efficiency/ productivity of workshops & other rail-related factories. | 4.4.1.1: Rehabilitate no less than 3 railway workshops annually.<br>4.4.1.2: Complete the investment program at Ciénaga Workshop by 2023.<br>4.4.1.3: Conduct investment at Sagua Workshop for repair/construction of freight wagons by 2030.<br>4.4.1.4: Conduct a rehabilitation program for railway workshops in Luyano & San Luis with AFD (French aid agency).<br>4.4.1.5: Conduct investment program at GESIME workshops in Valdes Reyes, Santa Clara & Jovellanos. |
| | | | 4.4.2: Promote domestic production of aggregates & spare parts. | Increase production of aggregates & spare parts in UFC/3rd-party facilities creating production chains & using innovative tech. | 4.4.2.1: Achieve minimum annual increase in production of aggregates & spare parts of 2%. |
| | | | 4.4.3: Implement an ICT-based quality management system. | Use quality management systems to improve technological discipline & service quality. | 4.4.3.1: Quality systems implemented in 50% of workshops |
| | | | 4.4.4: Prioritize the repair work of existing locomotives, coaches, and wagons | Give priority to the production and supply of repairing parts for vehicles and facilities used on priority routes | 4.4.4.1: Priority supply of spare parts and repair work for the equipment used in the high-priority rail lines |
| 5. Transport pricing & resource allocation | 5.1 Achieve financially sustainable operation & maintenance of rail transport infrastructure & systems | Need to generate profit from rail & non-rail business for sustainable development of rail infrastructure & services. Also aim to reduce the burden on the state treasury for railway infrastructure building, maintenance, operation, maintenance & management. | 5.1.1: Increase revenue (MLC) from international visitors | By attracting more international visitors to rail services, the rail sector can contribute to acquiring foreign currency.<br>Higher tariffs for non-Cuban users can be considered. | 5.1.1.1: Achieve continuous increase in income (MLC) from international passengers |
| | | | 5.1.2: Increase revenue (MLC) from international container and cargo transportation. | By attracting more international container shippers to use rail services, the rail sector can contribute to acquiring foreign currency. | 5.1.1.2: Achieve continuous increases in income (MLC) from container cargo transport services |
| | | | 5.1.3: Increase revenue from non-railway services/business. | Study non-railway businesses that can generate increased sales for UFC. | 5.1.3.1: Generate income by leasing assets such as space in railway stations.<br>5.1.3.2: Increase participation of state & non-state entities in non-rail businesses such as catering services, kiosks, souvenir shops, coffee shops, restaurants, etc. |
| | | | 5.1.4: Introduce the “beneficial payment principle” in the rail transport market & industry. | Set passenger/cargo tariffs according to the level of services used (e.g., the higher tariff for faster service) to offset rail-sector operation & maintenance costs. | 5.1.4.1: Set new tariff structure based on the level of services.<br>5.1.4.2: Achieve continuous increase in income (Peso) from national passengers. |

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | | | 5.1.5: Subsidize unprofitable passenger services in rural areas | To provide rail services to all Cubans at "affordable prices," subsidies can be provided to maintain unprofitable lines in rural areas. Furthermore, "cross-subsidy" from profitable to unprofitable lines can be considered to secure financing. | 5.1.5.1: Obtain government approval for stable subsidies. |
| | | | 5.1.6: Enhance UFC's accounting capacity/capability | By introducing a modern accounting system (as used in other countries), the performance of UFC can be accurately analyzed, which should lead to enhanced financial performance & reduction of state burden. | 5.1.6.1: Review/upgrade the existing accounting system by 2026 (ongoing).<br>5.1.6.2: Increase human resources in the accounting unit. |
| | 5.2 Increase investment efficiency in rail infrastructure development & equipment procurement | To avoid inefficient investment, need to establish appropriate evaluation processes & procedures in making investment decisions. | 5.2.1: Establish appropriate evaluation methodology corresponding to the nature of investment in the rail sector. | Study financial/economic costs of labor, construction materials, imported materials, etc. Properly estimate passenger/cargo demand using transport model and estimate financial revenue & economic benefit. | 5.2.1.1: Conduct a feasibility study of all proposed investments in an annual plan.<br>5.2.1.2: Conduct post-investment studies to check the efficiency of investment. |
| 6. Institutional & regulatory development | 6.1 Clarify roles/responsibilities of ATF & UFC | Clarify roles/responsibilities of ATF & UFC in ownership, planning, development, operation & maintenance & management of railway facilities.<br>Clarify the role of UFC as a national railway business entity. | 6.1.1: Establish a simple and efficient structure for the national railway development and service provision | Clearly define the roles and responsibilities of each entity related to the railway sector: MITRANS (OACE): ATF, UFC (OSDE), other railway operators) regarding ownership of assets, planning, development, operation, and maintenance. | 6.1.1.1: Conduct a study on the demarcation of responsibility/ownership of the railway between ATF & UFC.<br>6.1.1.2: Creation of National Railway Regulatory Authority based on ATF |
| | 6.2 Incremental improvement based on the current organizational structure for further business development | Further organizational/structural improvement in delivering rail transport services should be built based on the current UFC. | 6.2.1: Use UFC's current structure as a basis for further organizational improvement | New business entities (state and non-state business entities) in the rail sector are expected to follow the UFC's guidelines. | 6.2.1.1: Create new companies following the study and guidelines by UFC |
| | 6.3 Improve working conditions to attract quality human resources to the rail sector. | Improve working conditions, including salaries, to attract quality staff to the rail sector. Plus, need to retain existing skilled staff by offering good employment conditions. | 6.3.1: Raise salary to attract qualified staff and pay special attention to young staff | Consider various new salary structures to attract quality human resources (e.g., pay higher than other transport sectors or performance-based salary). | 6.3.1.1: Apply a flexible salary system, incl. bonuses, for staff with good performance.<br>6.3.1.2 Achieve high retention among youth. |
| | 6.4 Provide continuous railway staff training | Given the aging workforce, need to be continuous training for existing & new rail sector staff. | 6.4.1: Provide training programs targeting younger workers. | Intensive to join training program can be considered such as the provision of professional certificate and increase in salary | 6.4.1.1: Increase the number of staff with post-secondary education and professional certification. |
| | | | 6.4.2: Boost human resources development by having staff participate in educational programs at domestic universities. | Design/consolidate short-cycle modality for preparation of high-school students as rail technicians in conjunction with universities, based on the experience of ISPJAE. | 6.4.2.1: Comply with the annual plan of training actions. |
| | | | 6.4.3: Strengthen FERPRO as a training center for railway specialties. | Improve the ability of instructors at the UFC training center. | 6.4.3.1: Raise academic & teaching level of lecturers/improve study materials.<br>6.4.3.2: Improve student facilities & accommodations.<br>6.4.3.3: Install simulators in the education system |
| | | | 6.4.4: Increase overseas training opportunities and training in Cuba by inviting international experts | Increase overseas & domestic training by foreign instructors. | 6.4.4.1: Conduct at least one overseas training each year. |
| | 6.5 Adopt international treaties, laws, regulations & standards | By adopting international best practices, Cuban railway infrastructure & services can be significantly improved. | 6.5.1: Activate operation of Railways Technical Standards Committee | Revitalize the operation of the Railway Technical Standards Committee | 6.5.1.1: Prepare annual plan to implement Cuban standards & railway branches for ATF Board of Director's approval. |
| | | | 6.5.2: Increase participation in international railway entities. | Consider joining an international railway organization. | 6.5.2.1: Incorporate ATF and UFC into international rail organizations. |

Source: TWG & JICA Study Team

### 5.3.5 Port & maritime transport sector

TWG-6 drafted objectives for the port & maritime transport sector based on identified planning issues & upstream policies. A set of strategies & goals, summarized in Table 5.3.5, was then proposed to realize the objectives.

**Table 5.3.5 Objectives, strategies & goals for port & maritime transport sector**

| Key area | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| 1. Planning & coordination | 1.1 Support the tourism sector via well-coordinated planning. | Aim to support the tourism sector by drawing up strategic port & maritime development plans well-coordinated with international tourism development plans/projects & demand forecasts. | 1.1.1: Make Havana to Mariel cargo transport function relocation plan to support the Havana Bay redevelopment plan. | Need a detailed plan & program to relocate Havana port functions to Mariel & accelerate the new development plan for Havana Bay. | 1.1.1.1: Relocation work starts in 2024.<br>1.1.1.2: Relocation will be completed by 2030. |
| | | | 1.1.2: Make port development plans for cargo transport to tourist resort areas (Casassa, Antilla, etc.). | As foreign currency acquisition from tourism is a key priority, better maritime transport is needed for resort construction & supply of operating resorts. | 1.1.2.1: Complete Casassa port development by 2025 for operation in 2026.<br>1.1.2.2: Antilla port is to be redeveloped in three phases & completed by 2030. |
| | | | 1.1.3: Make a cruise passenger facility development plan (Havana, Cienfuegos, Santiago de Cuba, etc.) | For the same reason as above, better cruise passenger facilities are needed to serve growing cruise traffic with more attractive facilities. | 1.1.3.1: Make a development plan (incl. a master plan, feasibility study, basic/detailed designs, and costing) for the Havana passenger terminal by 2025.<br>1.1.3.2: Make a new Cienfuegos cruise passenger terminal development plan by 2025.<br>1.1.3.3: Make a new Santiago de Cuba cruise passenger terminal development plan by 2030. |
| | 1.2 Support growth industries by enhancing port & maritime transport infrastructure/services. | Need to renew/construct export storage facilities for agricultural products, processed marine products & pharmaceuticals as exports are expected to increase. Also need to develop ports & international cargo transport means in conjunction with industrial sector plans. | 1.2.1: Need more/better maritime transport services for companies in Mariel SDZ. | Better transport services are needed to attract foreign investors to Mariel SDZ. | 1.2.1.1: Conduct a comprehensive customer needs survey in 2022-2023 to understand the transport needs of companies in Mariel SDZ. |
| | | | 1.2.2: Better intermodal links between ship & rail needed at Mariel. | Seamless transport links between ship & rail/road transport are essential to attract foreign investors to Mariel SDZ. | 1.2.2.1: Conduct a study on inter-modality improvement at Mariel in 2023. |
| | 1.3 Boost capacity & efficiency of maritime transport by increasing containerization. | To meet the growing demand for containerized cargo transport, need to develop a plan for the containerization of strategic products. | 1.3.1: Prepare plans to create a container freight station (CFS) at the port of Santiago de Cuba. | Development of CFS is key to the fast vanning/ devanning of container cargo, which facilitates smooth transfer between international & domestic transport services. Also, providing LCL (less-than-container-load) service to multiple shippers will contribute to more efficient use of container transport. | 1.3.1.1: Make a plan for Santiago de Cuba CFS in 2023-2024.<br>1.3.1.2: Following-stage activities (FS, DD & tender) for Santiago de Cuba CFS development in 2025. |
| | | | 1.3.2: Reduce empty container cargo transport in the return trips by efficiently using containers (particularly cement & sugar products, imported consumer goods, etc.). | About 90% of containers exported from Mariel are empty, which increases round-trip. shipping cost for imports. Need to find export cargoes in cooperation with Mariel SDZ firms. | 1.3.2.1: Conduct containerized cargo study in 2023/2024 based on Balance de Cargas data.<br>1.3.2.2: Make container cargo plan in 2024-2025, before 2025-2026 feasibility study. |
| | 1.4 Create a coordinated planning mechanism between maritime transport & other transport sectors. | , Urgently need a dialogue mechanism to coordinate maritime transport and other transport services to achieve efficient intermodal transport using ships. | 1.4.1: Coordinate the transportation inter-ministry plan of MITRANS, inviting the main transport demanders such as MINAL, MINEM, etc. | Each OSDE now holds its port cargo handling plans & operational data. Making a viable public port investment plan requires coordination among entities. | 1.4.1.1: Create a plan coordination committee chaired by Deputy Minister, MITRANS<br>1.4.1.2: Hold quarterly high-level meetings.<br>1.4.1.3: Hold monthly OSDE-level meetings. |
| | 1.5 Establish useful/reliable statistics & databases in the port & maritime transport sector. | Need to create a database of port facility & shipping information, which must be updated/published regularly. And need to promote the digitization of information. | 1.5.1: Develop domestic maritime transport/traffic statistics & database systems that port users can share. | Port/maritime planning requires the collaboration of all OSDEs port-related statistics in a digital database open to relevant parties. This data is also vital for maintenance planning/budgeting. | 1.5.1.1: Develop a statistics-sharing portal in 2023/2024.<br>1.5.1.2: Plan/design real-time domestic cargo movement monitoring system in 2023-2024. |
| | | | 1.5.2: Create international marine traffic statistics & database open to port users. | For the same reason as above, for international maritime transport/traffic transport systems. | 1.5.2.1: Plan/design real-time international cargo movement monitoring system in 2023-2024. |

| Key area | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | 1.6 Increase human resources needed for planning & coordination. | Skills (knowledge, training, experience) needed for planning & coordination with multiple agencies. Need to train existing staff & hire skilled persons. | 1.6.1: Upgrade port & maritime transport planning courses in institutes/colleges. | Focusing on human resources considering restaffing needs is anticipated in 10~20 years. In this context, academic experts should educate the young generation of specialists. | 1.6.1.1: Upgrade port & maritime transport planning college courses by 2023-2024. |
| | | | 1.6.2: Increase Cuban trainers for port & maritime transport planning | To achieve the above, lecturers/trainers should be increased. | 1.6.2.1: Double number of Cuban trainers for port & maritime transport planning by 2025.<br>1.6.2.2: Conduct overseas training regularly. |
| 2. Transport infrastructure development | 2.1 Develop port facilities to achieve higher transport quality, efficiency & competitiveness. | Focusing on key ports, need to meet rising demands for modernized logistics & improve port functions. Need upgraded port facilities, special equipment for specific products (e.g., sugar, fuel, ore, etc.) & ICT systems. | 2.1.1: These port facilities to be upgraded & modernized:<br>1) Extension of Casassa Port<br>2) Santiago de Cuba Port container terminal (new development)<br>3) Upgrade of Cienfuegos Port<br>4) Upgrade of Nuevitas Port | Port facilities in the four ports (Casassa, Santiago de Cuba container terminal, Cienfuegos & Nuevitas) are prioritized for upgrading by 2030. | 2.1.1.1: Operational efficiency: from 5.4 m. tons (2022) to 6.13 m. tons (2030)<br>Roofed storage capacity in main ports: from 122,000 tons (2022) to 163,000 tons (2030)<br>Technical availability coefficient (TAC) in port equipment: from 75% (2023) to 85% (2030). |
| | 2.2 Repair deteriorated port facilities to initial operating conditions. | Focusing on key ports, need to rehabilitate significantly deteriorated port facilities urgently. | 2.2.1: Repair/modernize priority ports. | Highly deteriorated ports (Baracoa, Havana, Cienfuegos, Santiago de Cuba, Batabanó, Nueva Gerona, Cayo Lago del Sur, Nuevitas & Antilla) are prioritized for rehabilitation and upgrading by 2030. | 2.2.1.1: Repair/modernization of the following ports to be completed by 2030: Baracoa, Havana, Cienfuegos, Santiago de Cuba, Batabanó, Nueva Gerona, Cayo Largo del Sur, Baracoa, Nuevitas, Antilla. |
| | 2.3 Repair/modernize sugar export port facilities. | Need to rehabilitate aging/inoperable facilities in ports exporting sugar. | 2.3.1: Repair/modernize sugar ports in relation to the recovery levels to be reached by the sugar industry:<br>1) Repair/upgrade old warehouses<br>2) Build honey/alcohol tanks for exports<br>3) Repair/upgrade Guayabal port<br>4) Repair/upgrade Carupano port<br>5) Procure new sugar-handling equipment | Sugar ports need to be repaired/modernized, considering the possible business opportunities in the international market. | 2.3.1.1: Operational efficiency: from 5.4 m. tons (2022) to 6.13 m. tons (2030)<br>Roofed storage capacity in main ports: from 122,000 tons (2022) to 163,000 tons (2030)<br>Technical availability coefficient (TAC) in port equipment: from 75% (2023) to 85% (2030). |
| | 2.4 Rehabilitate/replace auxiliary & transport fleet with new vessels. | Need to support goods transport to Isla de Juventud, tourism development in northern islands, & other domestic coastal shipping by rehabilitating/renewing aged vessels. | 2.4.1: Ensure the repair of vessels, prioritizing 32 auxiliary & cargo vessels, plus 354 additional vessels as necessary. | Although obsolete vessels should be replaced, some still usable vessels must be repaired & replaced gradually, considering the possibilities of the country. | 2.4.1.1 & 2.4.2.1:<br>TAC auxiliary fleet:<br>• 52-70% (2023)<br>• 85% (2030)<br>TAC cabotage fleet:<br>• 50-70% (2023)<br>• 85% (2030)<br>TAC passenger fleet:<br>• 75% (2023)<br>• 85% (2030) |
| | | | 2.4.2: As resources permit, gradually refit 14 vessels in mid-term, plus 24 new builds for the following uses:<br>1) Multipurpose freighters for the north coast<br>2) Support vessels for north coast tourism<br>3) Freighters for routes between Isla de Juventud, Batabanó, Cienfuegos, and Cayo Largo del Sur.<br>4) Auxiliary fleet to ensure port services.<br>5) Passenger vessels for Isla de Juventud. | | |
| | 2.5 Modernize shipyards to meet increasing ship repair requirements. | Existing shipyards must be upgraded to meet repair requirements, which must be done following international standards. | 2.5.1: Procure new floating docks, dry docks, cranes & forklifts for major shipyards. | To achieve national vessel repair targets, major shipyards must be upgraded. In addition, work from foreign customers will also be met, which can contribute to foreign currency acquisition. | 2.5.1.1: Repair capacity<br>• 50-40% (2022)<br>• 50-55% (2023)<br>• 100% (2030)<br>Provide repair capacity to meet the demand of ship owners (including foreign companies). |

| Key area | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| 3. Environment, safety & security | 3.1 Conduct proper social/ environmental assessments at the planning stage. | Following CITMA policy, need to conduct an environmental impact assessment (EIA) & consider likely social/environmental impacts at the planning stage. | 3.1.1: In planning construction & operational phases of proposed projects, EIAs should be conducted. MITRANS must coordinate with CITMA. | EIAs should be mandatory & conducted at the appropriate phase of projects.<br>Social impacts should be carefully examined, particularly for large-scale developments. | 3.1.1.1: Review/amend all proposed infrastructure projects per EIA findings.<br>3.1.1.2: Create MITRANS EIA unit.<br>3.1.1.3 Train staff for SEAs & EIAs. |
| | 3.2 Introduce advanced/enviro-friendly technologies, equipment & facilities. | Need to contribute to the climate-change challenge by introducing eco-friendly/zero-carbon technologies. | 3.2.1: Introduce low-emission technology as ships & cargo equipment are renovated or procured. Introduce solar/wind power as port facilities are renovated. These measures are expected to reduce operating costs as well. | To meet the climate-change challenge, many green technologies are now available. As Cuba must play its part in cutting emissions, such technologies should be considered when replacing existing facilities & equipment. | 3.2.1.1: As ships & equipment are renovated or procured, consider using green technologies. |
| | | | 3.2.2: Adopt measures to save electricity. | Reduce energy consumption with energy-saving equipment, e.g., LEDs and solar power. | 3.2.2.1: Study on energy-saving & clean energy production technologies, e.g., photovoltaic systems<br>3.2.2.2: Install LED lighting to reduce electricity consumption.<br>3.2.2.3 Install photovoltaic systems at workshops & other facilities. |
| | | | 3.2.3: Adopt measures to save water. | Study water recycling. | 3.2.3.1: Establish water recycling by rehabilitating scrubbing systems in workshops. |
| | 3.3 Increase transport efficiency by reducing fuel consumption, which will contribute to mitigating climate change. | Better cargo handling management and new fuel-saving technologies must improve transport efficiency (transport volume per unit fuel consumption). | 3.3.1: Fuel consumption per unit cargo volume should be reduced by increasing the occupancy of cargo ship holds. Plus, procure fuel-saving ships/equipment. | Boosting the efficiency of shipping will contribute both to environmental conservation & fuel savings. | 3.3.1.1: Cut cargo unit fuel consumption.<br>• 2025 - 0.018 liters/ton-NM*<br>• 2030 - 0.016 liters/ton-NM<br>* ton-NM: cargo volume x nautical mile |
| | 3.4 Promote a modal shift from truck to coastal shipping to help reduce greenhouse gas emissions. | Domestic shipping should be favored for long-distance bulk cargo & fuel transport. Division of roles with railway must be considered. | 3.4.1: Identify large-volume/long-distance cargo movements currently transported by trucks that can be shifted to coastal shipping. | The modal shift can effectively cut both emissions & transport costs. Need to identify/select commodities, considering viable routes & required transit times. | 3.4.1.1: Conduct study on road-to-ship modal shift by 2025. Implement pilot project by 2030. |
| | 3.5 Install specialized equipment & ICT to counter spread of COVID-19. | Need to install anti-COVID-19 measures to maintain normal port operations. Proven measures must be effectively used. | 3.5.1: Equip all international ports with PCR test kits, remote thermometers, etc.<br>Test all cruise passengers & ship's crew by internationally established health test methods. | Effective control of COVID-19 is essential. | 3.5.1.1: Procure equipment for all international gateway ports by 2022.<br>3.5.1.2: Launch mobile phone-based tracking of cruise passengers/foreign crew by the end of 2022. |
| | 3.6 Strengthen capability to prevent the import of illegal drugs & weapons. | As protecting Cuba from an invasion of illegal drugs & weapons is vital, the introduction of relevant specialists, facilities & equipment is urgently needed. | 3.6.1: Deploy drug and weapon detector dogs at international gateway ports. | In addition to X-rays & other mechanical equipment, drug and weapon detector dogs are needed at international gateway ports. Plus, need to reinforce human resources in this field. | 3.6.1.1: Deploy drug detector dogs in Havana, Mariel, Cienfuegos, and Santiago de Cuba by 2025. |
| | | | 3.6.2: Strengthen capacity for crackdown implementation. | | 3.6.2.1: Create special unit for drug & weapon crackdown by 2023/2024. |
| | 3.7 Improve navigational safety. | As many Cuban ports are located on inland bays, highly skilled pilots are essential in some ports for the arrival and departure of vessels. In addition, navigational safety facilities & equipment in many ports are aging & may impair safety. | 3.7.1: Upgrade navigation aids. | Urgently need to upgrade existing navigation aids to maintain safety. Plus, need to renew old facilities/equipment & increase the cadre of professional pilots. | 3.7.1.1: Upgrade navigation aids at Mariel & Havana by 2022/2023; Cienfuegos by 2025/2026. |
| | | | 3.7.2: Port pilots to be trained & increased. | | 3.7.2.1: Continuous training of port pilots. |
| 4. Transport service & industry development | 4.1 Upgrade existing port services to increase the scale of business. | As container handling volumes at Mariel (322,000 TEU in 2019) are under half the annual capacity of 800,000 TEU, need to increase volume by improving the level of service. One key remedy is providing seamless links between exporters/importers & shipping lines. | 4.1.1: Containerization should be introduced for major export commodities. | Promote containerization via cooperation with exporters/importers (OSDEs under other ministries). This can also reduce the export of empty containers, adding to import costs. | 4.1.1.1: Promote industrial development to increase the value of commodities suitable for container transport, i.e., raw material exports can be gradually shifted to value-added exports. |
| | | | 4.1.2: Seamless intermodal services between ship & land transport (rail & truck) should be provided. | By developing CFS (e.g., by a terminal operator) in or near major ports, seamless intermodal services between ship & land transport services should be provided. | 4.1.2.1: Following the pattern used by existing CFS (CARILOG, Cuba & France), CFS for other ports can be developed with FDI based on forecast demand. |

| Key area | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | 4.2 Enhance maritime transport industries at two international ports, Mariel & Santiago de Cuba. | Eastern Cuba can be served by Santiago de Cuba port. By enhancing its container cargo handling capacity, the role of the Santiago de Cuba port can be further enhanced. | 4.2.1: To increase the operational capacity of Santiago de Cuba port to assimilate larger container ships "feeder-max" size. | Eastern Cuba area can be served by Santiago de Cuba port with additional container cargo handling capacity, achieving a balanced national distribution of import commodities among this port and Mariel. | 4.2.1.1: Balanced container handling by 2030.<br>4.2.1.2: Assuming SDZ in Santiago de Cuba is developed, adjacent port & transport systems are to be further upgraded after 2030. |
| | 4.3 Install Port EDI systems (electronic data interchange) to streamline import/export procedures. | Need to increase cargo handling efficiency & reduce associated costs by introducing EDI at major import/export ports. | 4.3.1: Deploy Port EDI systems at Mariel, Santiago de Cuba & Cienfuegos ports. | EDI is an advanced tool to speed-up port-related procedures, e.g., customs, government documents, security, immigration, etc. | 4.3.1.1: Study EDI for Mariel, Santiago de Cuba & Cienfuegos in 2024/2025.<br>4.3.1.2: Install EDI at Mariel (2024/25), Santiago de Cuba (2026/27), Cienfuegos (2027/28). |
| 5. Transport pricing & resource allocation | 5.1 Introduce the "beneficial payment principle" in the port & maritime transport market & industry. | Set port & shipping tariffs (passenger/cargo) according to the level of service. Higher tariffs for non-Cuban users can be considered. | 5.1.1: Evaluate/set reasonable cargo handling fee structure for international shippers & consignees. | Cargo handling fees should be attractive to foreign shippers but sufficient to fund the maintenance and repair of port facilities. Therefore, appropriate fee levels should be carefully studied & set. | 5.1.1.1: Study suitable port & domestic transport fee structure in 2023/2024, including how a port income can cover maintenance costs.<br>5.1.1.2: Apply new port fee structure in 2025. |
| | 5.2 "Affordable pricing" to maintain transport accessibility for Cubans. | As Cubans should be able to use ferries & related facilities equally, need to consider affordability when setting ferry fares. | 5.2.1: Provide ferry services for Cuban people at reasonable yet affordable fares; state subsidy can be reviewed. | Review/update existing ferry fares based on affordability. Consider different fare structures for non-Cuban passengers. | 5.2.1.1: Conduct affordability study 2023/2024; based on the study, set new ferry tariff in 2024.<br>5.2.1.1: Cooperating with MINTUR/MEP, set a new ferry fare structure for non-Cubans in 2024. |
| | 5.3 Secure adequate funds in the annual state budget for urgent rehabilitation of existing port facilities. | Special budgetary treatment is needed to rehabilitate seriously deteriorated existing port facilities. (other than Mariel port). | 5.3.1: To revise the current tax system. | It can be considered a special purpose tax to fund upgrading deteriorated port facilities. In addition, tax can be levied on port user tariffs. | 5.3.1.1: Apply new port service fee structure, incl. port facility rehabilitation charge, in 2025. |
| | 5.4 Invite international port operators to invest in a way that reduces the state's financial burden in developing port facilities. | Following the national FDI policy, it is necessary to introduce foreign capital in the port sector, e.g., a concession agreement with the port operator to develop a new Santiago de Cuba container port. | 5.4.1: Encourage the use of Santiago de Cuba Port by inviting international shippers & port operator(s). | Ideally, regular container ship service to/from Mariel will be extended to Santiago de Cuba port. In addition, to study the possibility of inviting an international port operator to run Santiago de Cuba port. | 5.4.1.1: Study on shipping lines to serve Mariel & Santiago de Cuba ports in 2023/2024.<br>5.4.1.2: Conduct a study on outsourcing of Santiago de Cuba port operation in 2025/2026. |
| | | | 5.4.2: Invite international port operators/ developers to new cruise ship berths. | To accommodate increasing cruise ship traffic, a new cruise ship berth can be developed by foreign investors. | 5.4.2.1: Study on future cruise traffic, 2023/24. |
| 6. Institutional & regulatory development | 6.1 AMC continues to act as the sole planning/regulatory body in port & maritime transport. | AMC should act as the sole planning & regulatory body in the port & maritime transport sector under the planning coordination of the Transport Planning Department. | 6.1.1: Establish the division of roles/responsibilities among AMC, GEMAR, and other agencies. | Clearly define the roles/responsibilities of agencies in the port & maritime transport sector: asset ownership (land/infrastructure), planning, infrastructure development, operation & maintenance. Strengthen AMC's capacity in port planning & GEMAR's as coordinator capacity via functional improvement of structure & training of staff. | 6.1.1.1: Conduct a study on structural improvement in the port & maritime transport sector in 2022/2023, followed by organizational improvements in 2024/2025.<br>6.1.1.2: 1 Progressively achieve higher efficiency & effectiveness in port & maritime transport sector. |
| | 6.2 Establish rules & guidelines to promote FDI in the port & maritime transport sector. | Need to update the existing legal framework to introduce foreign capital in the port sector. Specifically, consider how to attract foreign investors to container terminal construction & operation in Santiago de Cuba. | 6.2.1: Revise the existing legal framework for foreign investors (port operators) ' participation in Cuba's port & maritime transport sector by referring to international best practices. | Need to study the business strategies of international port operators, specifically decision-making factors in evaluating new port operation opportunities.<br>Based on the study, an attractive business plan for the Santiago de Cuba terminal can be developed. | 6.2.1.1: Conduct study on port terminal operation & associated business performance in 2025/2026.<br>6.2.1.2: Based on the study, design an attractive concession agreement in 2026/2027. |
| | 6.3 Establish regulations/guidelines to increase business opportunities for non-state companies in the port & maritime transport sector. | Need to consider terms & conditions to encourage non-state Empresas (Cuban-owned) & non-state companies (including FDI) to seek opportunities in the port-related sector. | 6.3.1: Establish necessary legal standards & guidelines to encourage the participation of non-state enterprises in the port & maritime transport sector. | Starting with small/medium-scale business opportunities, state & non-state Cuban Empresa are to be invited to the port & maritime transport sector. | 6.3.1.1: Conduct a study on possible areas for outsourcing (services) to state & non-state enterprises in 2023/2024.<br>6.3.1.2: Based on the study, issue phased invitations to state & non-state enterprises. |

Source: TWG & JICA Study Team

### 5.3.6 Airport & civil aviation sector

Based on the airport & civil aviation sector planning issues and the upstream policies, Objectives were drafted by TWG-5. Consequently, a set of strategies and goals has been proposed to materialize the set of Objectives, summarized in Table 5.3.6, according to the identified planning issues from the six planning fields.

**Table 5.3.6 Objectives, strategies, and goals for the airport and civil aviation sector**

| Key area | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| 1. Planning & coordination | 1.1 To achieve effective monitoring and planning of operations | To upgrade existing information gathering and sharing methods, database systems, and analytical tools using advanced ICTs to achieve greater efficiency in the monitoring and planning of services and operations | 1.1.1: Establish a flight operation result information management system | Establish an information management system of operation results by collecting the air traffic statistics (passenger and freight) of major airports using ICT and updating the air traffic database at IACC periodically for more efficient operation planning | 1.1.1.1: To have an advanced data collection system in line with global standards for better airport management and air traffic control services by 2023.<br>1.1.1.2: To set a flight planning for each season using slot coordination software in 2023.<br>1.1.1.3: To develop modules for ICT-supported statistical analysis of air cargo for better planning in 2023 |
| | | | 1.1.2: Establish an asset data and management system | Upgrade the asset data and information management system using ICT by conducting a comprehensive inventory survey of the existing infrastructure, facilities, and equipment (including GSE). | 1.1.2.1: To have an upgraded asset (inventory) database of infrastructure, facilities, and equipment in the main airports by 2023.<br>1.1.2.2: To complete an inventory survey of all airports by 2025.<br>1.1.2.3: To expand the inventory database system for all airports by 2030. |
| | | | 1.1.3: Establish a customer (passengers, airlines and service providers) need information collection system. | Establish a customer needs information collection system using ICT.<br>By conducting a “customer survey (international and domestic air passengers, airlines and service providers)” to understand customer needs and improve the quality and level of services | 1.1.3.1: To provide captive portals (web pages) at international airports with advertising of all services, passenger information, operations, and image of Cuba, among others, in 2023.<br>1.1.3.2: To implement a customer survey through the captive portals, which is expected to improve immediate customer service by 2023.<br>1.1.3.3: To improve services (passenger procedure) and facilities (check-in counter, bag drop, stores, etc.) of the three main airports (HAV, VRA, SNU) by 2025 based on feedback from customers.<br>1.1.3.4: To have a baggage tracking system in place upon arrival and departure by 2023.<br>1.1.3.5: To upgrade and update services and facilities at all airports to international standards by 2030 based on customer surveys and according to passenger demand. |
| | | | 1.1.4: Establish an airline’s needs information collection system | Establish an airline needs information collection system.<br>By conducting an “airlines’ needs survey” and regular communications with airlines to understand their needs and improve the quality and level of services. | 1.1.4.1: To reinstate the application structure for periodic communication with airlines in 2022.<br>1.1.4.2: To improve services (passenger procedure) and facilities (check-in counter, bag drop, stores, etc.) of the four main airports (HAV, VRA, SNU, and SCU) by 2026, taking into account passenger demand and feedback from airlines.<br>1.1.4.3: To upgrade services and facilities at all airports to an international level by 2030, taking into account passenger demand and feedback from airlines |

| Key area | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | | | 1.1.5: Introduction of advanced asset management tools | Introduction of advanced asset management tools such as BIM (Building Information Modeling) for airport facility management and maintenance | 1.1.5.1: To complete a feasibility study of advanced planning methods for facilities management at three major airports (HAV, VRA, SNU) in 2023<br>1.1.5.2: To introduce BIM for the three major airports (HAV, VRA, SNU) in 2030. |
| | 1.2 To ensure qualified human resources | To ensure qualified human resources and personnel training with updated training programs to meet the growing needs of civil aviation | 1.2.1: Establish training programs of international standards for human resources. | Establish comprehensive training programs of high qualification to international standards, reviewing the current programs and comparing them with the advanced training provided by international institutions aimed at aviation activities in Cuba and abroad. | 1.2.1.1: To conclude in the year 2022 with the study program for the Diploma Course in the air transportation sector for the integral preparation of workers and managers.<br>1.2.1.2: To develop a program aimed at airport and air navigation specialties in 2022 for the comprehensive training of workers and managers.<br>1.2.1.3: In the year 2023, materialize the training of the first group of graduates in the above programs.<br>1.2.1.4: To have fully trained airports and air navigation specialists by 2025.<br>1.2.1.5: To continually improve the levels of competence of aeronautical personnel following the Cuban Aeronautical Regulations and international standards by 2025.<br>1.2.1.6 To make interchanges and collaboration conventions with international institutions for training and knowledge upgrading in the different specialties in the aviation system. |
| | 1.3 To increase investment efficiency through effective coordination | To establish an effective coordination mechanism in the planning process of air transport infrastructure and services among stakeholders to achieve greater investment efficiency | 1.3.1:Increase coordination among the different state institutions involved in the air sector and with the investors, including FDI. | Smooth coordinations for planning and permissions between the different entities involved, as same as with investors. | 1.3.1.1: A planning coordination mechanism among the different entities will be established in 2023-2024.<br>1.3.1.2 To search business opportunities with international cooperation agencies and foreign investors.<br>1.3.1.3 To introduce modern/advanced technologies for enhancing the efficiency level of investments. |
| | | | 1.3.2: Development of a domestic air sector master plan | Prepare a Master Plan for the development of the air sector business (domestic market) with a regulation available for state and non-state entities | 1.3.2.1: A master plan for developing the air sector business will be prepared by 2024.<br>1.3.2.2: A guideline will be prepared by 2024 to encourage the domestic air sector business for non-state entities |
| | | | 1.3.3: Development of an international civil aviation market master plan | Prepare a Master Plan for the development of the airline business (international market) with regulations available for international airlines | 1.3.3.1: A master plan for inviting international airlines is prepared by 2023<br>1.3.3.2: A guideline will be prepared by 2024 to invite international airlines |
| 2. Transport infrastructure development | 2.1 To establish an efficient parts/material supply system for airport operation and maintenance | For safe, smooth, and reliable airport operation, it is necessary to provide necessary parts and materials timely and efficiently. In this regard, the establishment of advanced material and O&M service supply system is needed by integrating the existing services and systems | 2.1.1: Modernization of the airport operation and maintenance service delivery system | By upgrading the existing parts/material delivery system, more efficient O&M services shall be developed. In this regard, ICT will be effectively introduced to advance the current system | 2.1.1.1: A consolidated coding system of parts and materials is established by 2023<br>2.1.1.2: A coordination system between different O&M services providers for the airport operation and maintenance is established by 2023<br>2.1.1.3: Information on parts/materials of all warehouses is shared by O&M service providers via a cloud database. |

| Key area | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | 2.2 To modernize airport infrastructure, facilities, and equipment | To upgrade and modernize existing airport infrastructure, facilities, and equipment following international guidelines for more efficient airport operations | 2.2.1: Updating demand forecast by paying attention to negative impacts caused by COVID-19 | Updating demand forecast periodically (passenger and cargo), taking into account COVID-19 and the world economic situation | 2.2.1.1: Updating the air passenger and cargo demand forecast (2022-2030) of the existing airlines by taking account of the impacts caused by COVID-19 in 2022<br>2.2.1.2: Periodically update the demand forecast with close cooperation with MINTUR about the number of international visitors<br>2.2.1.3: Carry out a study on possible new commodities/products that can be transported (export & import) by air |
| | | | 2.2.2: Rehabilitation and upgrading of the infrastructure of the main airports | To be prepared for increasing international visitors and air cargo, it is necessary to rehabilitate and upgrade the existing airport buildings and infrastructure of the main airports | 2.2.2.1: Immediate improvement of VRA. SNU and Cayo las Brujas International Airports in 2023-2024<br>2.2.2.2: Immediate improvement of Cayo Largo (repair of the aprons, runways, and taxiways) in 2022-2023<br>2.2.2.3: Capacity improvement (check-in counters, waiting space, immigration gates, etc.) for passengers of Havana International Airport by 2025.<br>2.2.2.4: Capacity expansion of the existing air catering facilities in Havana and a new catering facility construction in Havana in 2025<br>2.2.2.5: Capacity improvement (check-in counters, waiting space, immigration gates, etc.) for passengers at VRA and SNU by 2026<br>2.2.2.6: Capacity improvements of other international airports based on the expected passenger demand by 2030<br>2.2.2.7: Gradual/continuous improvement of aprons, runways, and taxiways in the main airports through 2030 |
| | | | 2.2.3: Development of fuel bases | For a stable supply of jet fuels, it is necessary to improve and upgrade the existing fuel bases as soon as possible | 2.2.3.1: Immediate improvement (construction) of fuel facilities for HAV and VRA airports in 2023<br>2.2.3.2: Procurement of special fuel supply equipment for HAV and VRA airports in 2023<br>2.2.3.3: Progressive improvement (construction) of fuel facilities for other major airports through 2028<br>2.2.3.4: Progressive procurement of special fuel supply equipment for other major airports through 2028 |
| | | | 2.2.4: Infrastructure development and procurement of equipment for handling the increasing air cargo | To increase air cargo handling efficiency and to be prepared for the expected increase in air cargo, the existing cargo handling systems need to be upgraded and enhanced | 2.2.4.1: Certified personnel are in place for cargo handling and treatment in 2022-2023<br>2.2.4.2: The process of checking, storage, distribution, and dispatch of incoming cargo is improved by using bar codes by 2023.<br>2.2.4.3: To install an automated palletizing and cargo weighing system in the export warehouse by 2023.<br>2.2.4.4: State-of-the-art technological equipment and system for air cargo handling are installed by 2030 |

| Key area | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | 2.3 To renew aircraft for domestic and international tourism | To recover and/or renew the aircraft fleet to meet the growing needs for air transportation of passengers and cargo, taking into account the growth of tourism and domestic demand. | 2.3.1: Aircraft recovery and renovation in line with demand | To recover the own aircraft and to rent or acquire the necessary number of aircraft following the demand forecast, especially focusing on international visitors (tourists) and associated domestic travel needs | 2.3.1.1: Recovery and/or procurement of aircraft for Air Cubana according to the planned program until 2024.<br>2.3.1.2: Aircraft leases to meet the domestic and international demand through commercial agreements in various modalities (code-sharing, interline passenger and cargo agreement, fare proration agreement, protection agreement, including the session of the right of routes) through 2030.<br>2.3.1.3: Establishment of strategic alliances with national and international organizations to strengthen and develop services |
| | 2.4 Urgent rehabilitation and renewal of deteriorated equipment | To rehabilitate severely damaged/aged equipment and acquire new equipment urgently to maintain the level of safety and services. | 2.4.1: Renewal and modernization of airport equipment | Focusing on critical equipment to maintain the safety level, urgent procurement of new equipment shall be made | 2.4.1.1: Renewal of damaged/aged equipment for the main international airports by 2023<br>2.4.1.2: Introduction of electrified equipment to contribute to a reduction of greenhouse gases by 2023-2030.<br>2.4.1.3: Necessary equipment (renewal of damaged/aged equipment) is installed at all airports by 2030 |
| | | | 2.4.2:Development of ICT infrastructure and automation of service processes | ICT infrastructure should be further strengthened as a basis for companies to provide various services efficiently | 2.4.2.1: Automating the main processes to which the service is subject by 2023.<br>2.4.2.2: The automation of all processes is gradually introduced based on their efficiency in 2025 |
| 3. Environment, safety & security | 3.1 To incorporate social and environmental considerations and contribute to SDGs | To establish social and environmental consideration processes in the planning, designing, construction, and operation of air transport infrastructure in line with the State Plan for coping with the climate change | 3.1.1: Development of social and environmental evaluation criteria | Development of social and environmental evaluation criteria for the installation of new facilities and equipment based on the international best practices | 3.1.1.1: Complete social and environmental evaluation criteria for installing new facilities and equipment in 2023. |
| | | | 3.1.2: Update of social and environmental standards | Update and/or development of social and environmental standards for airport facilities and equipment based on the international best practices | 3.1.2.1: Complete a survey in 2022 on cases of social and environmental actions to be taken for other facilities and equipment.<br>3.1.2.2: Update national social and environmental standards for airport facilities and equipment in 2023. |
| | | | 3.1.3: Study mitigation measures and adaptation | By referring to the international best practices, study advanced measures to mitigate adverse impacts caused by airport-related development and apply such measures in developing airport infrastructure | 3.1.3.1: Complete the development of national mitigation measures in the aviation sector in 2023.<br>3.1.3.2: Carry out a series of surveys about the necessity of adaptation of such measures from 2024 for all airports |
| | 3.2 Modernization of air navigation system | It is necessary to modernize the air navigation system to increase Cuba's air navigation safety level in line with an international technology roadmap as part of the global air navigation plan. | 3.2.1: Update of CNS/ATM system | To update the Communications, Navigation, Surveillance, and Air Traffic Management (CNS/ATM) system to follow an international technology roadmap as a part of the global air navigation system | 3.2.1.1: Complete the survey on global air navigation systems in line with an international technology roadmap in 2023.<br>3.2.1.2: Complete the development of the national air navigation system roadmap for the aviation sector in 2023.<br>3.2.1.3: Complete the development of an air navigation system rehabilitation plan for the major airports (José Martí International (HAV), Juan Gualberto Gómez (VRA), and Abel Santamaría (SNU)) in 2025.<br>3.2.1.4: Complete the development of an air navigation system rehabilitation plan for all airports by 2028. |

| Key area | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | | | 3.2.2: Development of national air navigation service standards for service providers | Referring to the international best practices, update and develop national safety standards for air navigation service providers | 3.2.2.1: Study on cases of other countries and airports for organization structure of air navigation services in 2023.<br>3.2.2.2: Establishment of an organization structure for proper air navigation service in 2023. |
| | | | 3.2.3: Adopt measures to save electricity. | Reduce energy consumption with energy-saving equipment, e.g., LEDs and solar power. | 3.2.3.1: Study on energy-saving & clean energy production technologies, e.g., photovoltaic systems<br>3.2.3.2: Install LED lighting to reduce electricity consumption.<br>3.2.3.3 Install photovoltaic systems at workshops & other facilities. |
| | | | 3.2.4: Adopt measures to save water. | Study water recycling. | 3.2.4.1: Establish water recycling by rehabilitating scrubbing systems in workshops. |
| | 3.3 To improve the safety and security system | To strengthen the facilities' security and physical protection systems, with greater effectiveness in preventing and confronting possible acts of unlawful interference, following the standards and methods recommended in ICAO Annex 17 and national regulations. | 3.3.1: Update of Aviation Security (AVSEC) standards | To update the AVSEC standards following International Civil Aviation Organization (ICAO) Annex 17 | 3.3.1.1: Complete the case studies of other countries and airports in 2023.<br>3.3.1.2: Update and development of national AVSEC standards in 2023<br>3.3.2.1: Complete the case study of other countries and airports in 2022.<br>3.3.2.4: Actualizar y desarrollo de normas nacionales AVSEC en 2023. |
| | | | 3.3.2:Development of security equipment rehabilitation plan | To develop a security equipment rehabilitation plan based on the standard. | 3.3.2.1: Complete the case study of other countries and airports in 2022.<br>3.3.2.2 To carry out a control and diagnosis of all safety and security systems of facilities and key objectives in 2023.<br>3.3.2.3 Improvement and update of safety and security systems in the facilities based on the key objectives and the control carried out in 2025.<br>3.3.2.4: Update and development of national AVSEC standards by 2023. |
| | 3.4 Update the comprehensive airport emergency plan | To update the emergency plan and ensure equipment at airports (ambulances, rescue services, fire systems) follows ICAO standards and national regulations. | 3.4.1: Review and conciliation of the aviation safety plan. | To update Safety Management System (SMS) following ICAO standards and national safety and security standards | 3.4.1.1: Update and development of the safety plan for airport security. |
| | | | 3.4.2: Develop of safety equipment rehabilitation plan | To develop a safety equipment rehabilitation plan based on the SMS | 3.4.2.1: Carry out the survey on the equipment's current condition in 2023.<br>3.4.2.2: Gradual substitution and upgrade of the equipment (fire extinguisher equipment, ambulances, among others) guarantee safety and security during emergencies. |
| | 3.5 To increase qualified human resources | To ensure personnel, safety, and aviation training programs following the requirements of the Aeronautical Authority, ICAO standards, and national regulations. | 3.5.1: Establish highly qualified training programs | Establish a highly qualified training program to achieve the international standard by reviewing the current programs based on the experiences of international institutions for safety and security in the aviation sector. | 3.5.1.1: Survey about the current and advanced programs provided by international institutions in 2023.<br>3.5.1.2 Develop highly qualified training programs for the staff in all the airports by 2024. |
| 4. Transport service & industry development | 4.1 To boost the Aviation Sector with Foreign Investment | To promote foreign investment in the civil aviation sector aligned with the growth of the tourism sector | 4.1.1: Development of a business environment for international investors | To create a preferable business environment in legal and financial for international investors | 4.1.1.1: Carry out a study case in other countries and APP scheme in the airport´s air sector in 2022-2023<br>4.1.1.2: Development of draft regulations for APP in 2023-2024 |

| Key area | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | | | 4.1.2: Acquisition of airport management knowledge | To acquire some knowledge for airport management, including enhancement of non-aeronautical business and airline marketing for future execution by Cuban enterprise | 4.1.2.1: Study on international practices about airport management, including non-aeronautical business and airlines marketing in 2022-2023<br>4.1.2.2: Establishment of a special unit to deal with international investors for APP airport management in 2023-2024 |
| | 4.2 To develop airport transfer services | To provide fast, comfortable, and reasonable airport transfer services (airport shuttle service, etc.) between an airport and passengers' travel origins/destinations | 4.2.1: Development of airport transfer infrastructure and services with close cooperation with other transport service providers | Based on the demand forecast, provide enough space to accommodate airport transfer service vehicles such as parking spaces and waiting rooms and develop airport transport services with support from related sectors | 4.2.1.1: Carry out a feasibility study on intermodal facilities of the airports (Internacional José Martí (HAV), Juan Gualberto Gómez (VRA), Abel Santamaría (SNU) and Antonio Maceo (SCU)) in 2023<br>4.2.1.2: Prepare an intermodal facilities improvement plan for each of the four major airports by 2024.<br>4.2.1.3: Construction of the intermodal facilities of the four major airports in 2027-2028 |
| | 4.3 To develop air cargo transportation services | To leverage the capabilities of passenger and cargo aircraft to grow air freight and offer higher quality and more efficient services. | 4.3.1: Provide attractive air cargo transport services by providing quality handling services | Following the international standards used by well-qualified cargo transport service providers, high-quality air cargo handling services are provided to support international airlines, including Air Cubana | 4.3.1.1: Study on air cargo handling facilities, equipment, and services in other major international airports in other countries in 2022-2023.<br>4.3.1.2: A well-qualified training program for air cargo handling managers and staff is developed for the major airports (José Martí International (HAV), Juan Gualberto Gómez (VRA), Abel Santamaría (SNU), Jardines del Rey (CCC) and Frank País (HOG)), 2022-2023), which will be followed by other airports in 2025-2026.<br>4.3.1.3 Carry out studies on possible exporters for establishing contracts in relation to air cargo transportation. |
| | | | 4.3.2: Increase customer satisfaction (air cargo transport service users) | To offer competitive and attractive services to increase customer satisfaction by introducing modern facilities, equipment, and services | 4.3.2.1: Study on customers' needs concerning air cargo transport services focusing on three major airports (HAV, VRA, and SNU) in 2022-2023<br>4.3.2.2: Prepare air cargo handling facilities and equipment improvement plan for three major airports in 2023-2024<br>4.3.2.3: Installation of the recommended facilities and equipment in the three major airports in 2025-2026 |
| 5. Transport pricing & resource allocation | 5.1 To increase revenue from the airport operation | By setting reasonable prices for the use of the airport in Cuba, the revenue from the airport service provision needs to be increased. | 5.1.1: Revision of the airport taxes and other service fees | To establish reasonable airport taxes for international passengers and airlines, including cargo transport services | 5.1.1.1: Study on airport tax structure in other countries in 2022-2023<br>5.1.1.2: Prepare a Cuba national airport tax pricing plan in 2023-2024<br>5.1.1.3: Implementation of the new airport tax pricing method for three major airports (José Martí International (HAV), Juan Gualberto Gómez (VRA), and Abel Santamaría (SNU)) in 2025<br>5.1.1.4: Continuous introduction of the new airport tax pricing method for all other airports after 2026 |

| Key area | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | 5.2 To secure a budget for safe operation | To secure funding to maintain air transportation infrastructure for safe operation. | 5.2.1: Secure of safety operational budget from the increased revenue | Newly established airport taxes (passenger service charge, parking fee, other taxes) should include (cover) the budget necessary for maintaining the safety of the airport operation. Based on the passenger and cargo flight demand forecast and associated revenue, estimate the available budget for airport operation and secure the funding for maintaining the level of safety. | 5.2.1.1: Study on the revenue from the updated airport tax scheme in 2023-2024 |
| | 5.3 To introduce a strategic airfare pricing system | To make national airlines (Air Cubana, Aerogaviota) competitive in pricing in the international air transport market with incentives for customers. | 5.3.1: Establishment of competitive yet reasonable airfare referring to the international air market | To establish an attractive airfare for international passengers and air cargo forwarders, at the same time, such a pricing system should contribute to the profit generation of the national airlines | 5.3.1.1: Study on airfare setting and associated services in other countries (airlines) in 2023-2024<br>5.3.1.2: Prepare an airfare setting strategy and plan in 2023-2024<br>5.3.1.3: Introduction of the new airfare from 2024, which will be reviewed and updated annually. |
| 6. Institutional & regulatory development | 6.1 To invite state and non-state companies to the airport infrastructure development, operation and maintenance, and other business opportunities at airports | To encourage Cuban (state and non-state) companies to join airport-related business opportunities by improving the existing regulatory framework. | 6.1.1: Revision of the airport-related business regulation | By reviewing and updating the existing regulatory framework concerning airport-related business, try to invite and encourage more state and non-state Cuban companies to join the airport-related business opportunities. | 6.1.1.1: Study on airport terminal operation companies (such as NIAA and TIAT, Japan) in other countries in 2022-2023<br>6.1.1.2: Prepare an airport business operation plan to include state and non-state companies in 2024~2026 for four major airports.<br>6.1.1.3: Introduction of non-state companies in airport business opportunities at four major (International José Martí (HAV), Juan Gualberto Gómez (VRA) Santiago de Cuba (SCU) and Abel Santamaría (SNU)) from 2027 |
| | 6.2 To provide an opportunity for foreign investors in developing airport infrastructure | By setting attractive business opportunities for international investors/airport operators, the major airports in Cuba can be further developed as an international hub for airlines | 6.2.1: To be prepared for business negotiations with investors | By studying ongoing practices about international airport operation using FDI, IACC must be prepared for discussions with potential investors to develop the air sector in Cuba | 6.2.1.1: Carry out a study on airport concession agreements in 2022~2024.<br>6.2.1.2: Prepare a balanced concession agreement plan for discussion with potential investors in 2025-2026. |
| | 6.3 To update the legal framework to meet the global standards | To update the existing legal framework in the air transport sector by regional harmonization following the policy by ICAO. | 6.3.1: Update the legal framework | To update the existing legal framework to monitor/audit service providers of air navigation, airport, and aircraft following the international requirement updated by ICAO | 6.3.1.1: Complete the survey on updated ICAO requirements in 2022.<br>6.3.1.2: Complete the development of the legal framework plan in 2023-2024.<br>6.3.1.3: Introduction of updated framework plan in 2025-2026. |

Source: TWG & JICA Study Team

### 5.3.7 Logistics sector

TWG-2 drafted objectives for the logistics sector based on identified planning issues & upstream policies. A set of strategies & goals, summarized in Table 5.3.7, was then proposed to realize the objectives.

**Table 5.3.7 Objectives, strategies & goals for the logistics sector**

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| 1. Planning & coordination | 1.1 Develop a system to collect, update & share cargo transport data. | Cargo transport data (transport means, demand, etc.) is the basis for better planning. Therefore, information should be regularly collected, analyzed & shared with relevant parties, including non-state entities.<br>Need to use the BC database for better logistics planning to optimize the use of equipment & storage facilities over the mid- to long-term. | 1.1.1: Urgent improvement & digitization of BC system. | Improve existing paper-based BC system using ICT (Dynamic BC system). | 1.1.1.1: Initial upgrade of BC system: standard cargo coding system, data-entry error-checking function in 2022-2024.<br>1.1.1.2: Online BC meeting for annual freight transport planning from 2023.<br>1.1.1.3: Monthly cargo transport plan based on updated BC data (available trucks owned by enterprises, etc.) from 2024. |
| | | | 1.1.2: Enhance the BC system by consolidating information on transport means, equipment & storage facilities. | To develop an efficient freight transport system, the central planning agency will use BC data for medium/long-term planning. By integrating information on transport means & storage facilities, optimally balance transport services & demand. | 1.1.2.1: Develop cloud-based BC system, 2024-26.<br>1.1.2.2: Weekly/daily cargo transport matching service with real-time BC data from 2027. |
| | 1.2 Develop a coordination system to integrate/consolidate logistics services provided by different entities. | In addition to Empresa under GEA, GEMAR, UFC & CACSA, various entities now provide domestic freight services. However, given limited resources (vehicles, fuel & human resources), need to boost transport capacity by integrating transport services provided by different entities. | 1.2.1: Establish logistics business communication system | Build a system for smooth communication between many parties in the logistics sector. | 1.2.1.1: Create a logistics planning coordination committee headed by MITRANS in 2023/2024. |
| | | | 1.2.2: Supervised by MITRANS, 4 OSDEs (GEA, GEMAR, UFC, CACSA) to provide intermodal transport services jointly as 3PL service providers. | By integrating services provided by different OSDEs under MITRANS, user-friendly intermodal freight transport services can be provided. | 1.2.2.1: 3PL transport services by 4 OSDEs (GEA, GEMAR, UFC & CACSA) from 2024.<br>1.2.2.2: Cargo demand information sharing among all transport enterprises, including non-state & international service providers, from 2026. |
| | | | 1.2.3: Integrate transport services (including frozen/refrigerated cargo & medical supplies) between different OSDEs to provide integrated intermodal services. | Inviting transport enterprises under other OSDEs (other than GEA, GEMAR, UFC, and CACSA) provides better integrated intermodal services. | 1.2.3.1: Survey of transport service information (including refrigerated & medical goods, etc.) of all OSDEs/operators in 2023/2024.<br>1.2.3.2: Cargo demand-supply matching by 2026.<br>1.2.3.3: Make a national logistics master plan with the horizon year 2040 (in 2026~2028). |
| | | | 1.2.4: Using non-state transport enterprises, improve provincial transport services for basic daily necessities. | Invite non-state transport enterprises to provincial transport services to improve freight transport services for basic living goods. | 1.2.4.1: Improve provincial freight transport service (EPT) by renewing aging vehicles in 2022-2026.<br>1.2.4.2: Improve provincial freight transport service by inviting non-state providers from 2024.<br>1.2.4.3: Create a demand-supply matching system for transport providers (including non-state) by 2026. |
| | 1.3 Increase human resources for efficient coordination of freight transport services. | Need to increase human resources to coordinate among a wide range of stakeholders. | 1.3.1: Human resources development related to BC system & ICT. | Train/increase ICT engineers, who are vital to improving logistics efficiency. | 1.3.1.1: Logistics ICT training course (2022-30).<br>1.3.1.2: Provide regular training on logistics analysis, planning & technologies. |
| | | | 1.3.2: Provide training to increase coordinators & logistics planners. | Train specialists involved in coordination/planning. | 1.3.2.1: Training courses on logistics business & planning (2022-2030). |
| 2. Transport infrastructure development | 2.1 Boost freight transport capacity & efficiency/quality to meet increasing demand. | Need to prepare for freight volume growth in the future by developing infrastructure to improve capacity, efficiency & quality. | 2.1.1: Renewal of aged vehicles owned by enterprises under MITRANS. | As many trucks are now very old, they should be replaced with new fuel-efficient vehicles. | 2.1.1.1: Renew all trucks over 25 years old (as of 2021) by 2026. |
| | | | 2.1.2: Improve the truck maintenance system, including a stable supply of parts. | Build a system to maintain logistics vehicles, including stable spare parts supply efficiently. | 2.1.2.1: Continuous truck inspection/maintenance by skilled technicians/specialists (2022-2030). |

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | | | 2.1.3: Develop a system for efficient communication between logistics service providers & customers. | Create a communication system to enable smooth business transactions between customers & transport enterprises. | 2.1.3.1: Launch real-time cargo tracking system in 2026/2027.<br>2.1.3.2: Develop application software to connect logistics service providers & customers in 2022-26. |
| | 2.2 Increase cargo storage capacity, efficiency & quality to meet increasing demand. | In parallel with logistics infrastructure, need to develop quality storage facilities focusing on strategic products & basic commodities. | 2.2.1: Improve/expand existing warehouses. | Improve/renew existing warehouses (many old/deteriorated), adding functionality to improve the quality of storage services. | 2.2.1.1: Make a renewal plan for basic materials warehouses in 2023/2024.<br>2.2.1.2: Make renewal plan for warehouses under MINCIN in 2023/2024. |
| | | | 2.2.2: Build new warehouses with cutting-edge technology in strategically selected locations. | Select locations for new warehouses to enhance logistics efficiency. Prioritize storage for reefer cargo & special-handling goods, e.g., pharma. | 2.2.2.1: Build new warehouses for reefer cargo at major ports and airports & in each province with advanced cargo-handling technology (2022-2030). |
| | | | 2.2.3: Improve packaging technology & services. | Improve packaging technology/services to boost the quality of cargo transport services. | 2.2.3.1: Enhance the packaging industry (2022-2030). |
| 3. Environment, safety & security | 3.1 Establish safe/reliable logistics services resilient against infectious diseases. | Especially in pandemics, need to ensure transport network/services for medical supplies & food delivery.<br>Need to make freight transport services resilient against hurricanes, etc. Alternative cargo transport routes & means must be prepared in a natural disaster. | 3.1.1: Create a national business continuity plan (BCP) in the logistics sector. | Make national BCP to ensure safe/sustainable logistics in emergencies such as pandemics. | 3.1.1.1: Make national logistics BCP in 2023/2024 based on current transport means & resources. |
| | 3.2 Create robust cargo transport Network & services which are resilient against natural disasters & infectious diseases. | Need to make freight transport services resilient against hurricanes, etc. In addition, alternative goods transport alternative routes and means must be prepared in case of disasters. | 3.2.1: Provide weather & accident information. | Enhance information distribution system to optimize role in natural disasters. | 3.2.1.1: Install weather & accident information sharing system for logistics providers, 2022-2026. |
| | | | 3.2.2: Make alternative transport plans. | Make alternative transport plans in advance so goods can be delivered even during a disaster. | 3.2.2.1: Update national logistics BCP) to prepare for natural disasters in 2024/2025. |
| | | | 3.2.3: Increase the capacity of storage facilities for food and other goods. | To prepare for emergencies, secure storage capacity for food & other essential goods. | 3.2.3.1: Based on national logistics BCP, develop nationwide food storage bases in 2027-2030. |
| | 3.3 Increase safety in transporting hazardous goods such as fuel & chemical products. | Need to increase the safety of hazardous goods transport by using safer transport means & designating safe routes/times for movement | 3.3.1: Designate safe routes for specific hazardous goods. | Specify safe routes & times for the transport of hazardous goods. | 3.3.1.1: Make hazardous goods transport control & management plan in 2024/2025. |
| | | | 3.3.2: Real-time status monitoring of hazardous goods transport & storage. | Introduce real-time monitoring (using ICT) of hazardous goods transport & storage status. | 3.3.2.1: Install monitoring system for hazardous goods vehicles & storage facilities in 2027-2030. |
| | 3.4 Create a nationwide emergency medical care transport system. | As decent medical services should be available to all Cubans wherever they live, need to establish a nationwide ambulance system. | 3.4.1: Establish a national emergency response system. | Create a national emergency response system to provide high-quality emergency medical services. | 3.4.1.1: Make a national emergency transport plan in 2024/2025.<br>3.4.1.2: Launch nationwide transport system for emergency supplies (pharma products, etc.) & medical services in 2026. |
| | 3.5 Contribute to mitigation of climate change issues | The logistics sector must reduce greenhouse gas emissions by improving transport efficiency, introducing advanced technologies, etc. | 3.5.1: Introduce new zero/low-emission or renewable fuel vehicles to reduce environmental impact. | Study/procure eco-friendly vehicles (including the use of renewable energy) that can contribute to reducing $CO_2$. | 3.5.1.1: Continuous R&D activities on environmentally friendly technologies (Cimab) |
| 4. Transport service & industry development | 4.1 Modernize the freight transportation industry. | By introducing the 3PL concept, the service levels of domestic freight transportation are increased.<br>New entities are integrated, including the state-owned companies that make up GEA, GEMAR, UFC and CACSA, which may be 3PL service providers. | 4.1.1: Establish the full service provider using all modes of transportation. | A new organization can be established that includes providers from companies that integrate GEA, GEMAR, UFC and CACSA to provide 3PL services integrated with the new CB database. | 4.1.1.1: Study the creation of 3PL service providers by integrating them with the services provided by the companies that make up GEA, GEMAR, UFC, and CACSA.<br>4.1.1.2: Establish 3PL service companies based on the study.<br>4.1.1.3: To increase the 3PL companies by including cargo transportation services from other companies (members of other OSDEs). |

| Key areas | Objectives | Description of objectives | Strategies | Description of strategies | Goals |
|---|---|---|---|---|---|
| | 4.2 Encourage non-state Cuban enterprises to play a vital role in provincial transport services. | Non-state Cuban enterprises are encouraged to provide cargo transport services, focusing on the distribution of basic commodities & collection of small parcels in provinces. | 4.2.1: Prepare rules/regulations & special incentives to encourage non-state enterprises to enter the provincial cargo transport market. | Starting from small-scale cargo transport services, non-state enterprises (MIPYMES) are encouraged to develop businesses in the cargo transport sector. Based on the study, financial support can be considered. | 4.2.1.1: Study on (MIPYMES) in the cargo transport sector in 2023/2024.<br>4.2.1.2: Create incentives to encourage (MIPYMES) in the cargo transport market. |
| | 4.3 Encourage international transport service providers in the logistics sector. | Non-Cuban companies can be invited to enter the logistics service sector in Cuba. | 4.3.1: Review the legal framework & invite more international cargo service providers (not only in Mariel SDZ). | As Mariel already functions as a transportation base in Cuba, more measures can be implemented to revitalize the cargo transport market. | 4.3.1.1: Review the legal framework to invite more international cargo transport service providers in Cuba in 2023/2024. |
| 5. Transport pricing & resource allocation | 5.1 Secure funding for logistics infrastructure development. | Need to secure annual budget to build, operate & maintain logistics-related infrastructure & facilities. | 5.1.1: Introduce special purpose tax for renewal of logistics-related facilities. | By securing funds from tax revenues, implement financial support measures to renew aging vehicles, cargo handling equipment & warehouses. | 5.1.1.1: Study on funding needs for renewal of logistics infrastructure (e.g., rolling stock & cargo handling equipment) in 2023/2024.<br>5.1.1.2: Study on special purpose tax to improve logistics-related facilities in 2023/2024. |
| | 5.2 Introduce the market mechanism concept in setting cargo tariffs. | Based on global practices in setting cargo tariffs, devise a new system to invite international logistics service providers into the Cuban market. | 5.2.1: Prepare guidelines for tariff setting via collaboration among MEP, MINCEX, MINCIN & OSDEs. | Concerned ministries & OSDEs collaborate to set guidelines to clarify the pricing structure for logistics. | 5.2.1.1: Establish a new pricing system for logistics services plus guidelines for cargo owners & logistics enterprises in 2024/2025. |
| | 5.3 Introduce new financing methods for procuring freight transport vehicles & equipment. | As transport enterprises must aim to be self-sustaining, capital financing for vehicles, equipment & storage facilities, etc., is a critical issue. Need to study domestic & international financing systems & methods, such as leasing. | 5.3.1: Seek overseas financing support for vehicles & equipment. | Study financing methods with loans from overseas so vehicles & equipment can be procured quickly. | 5.3.1.1: Seek funding from overseas financing agencies for vehicles & infrastructure, 2022-2030. |
| | | | 5.3.2: Leases for vehicles & equipment. | Study/implement procurement methods by leasing vehicles & other equipment from overseas. | 5.3.2.1: Effective use of leasing arrangements for new vehicles, vessels & aircraft (2022-2030). |
| | | | 5.3.3: Financing by Cuban banks | Direct financing from domestic banks so transport equipment can be procured as scheduled. | 5.3.3.1: Continuous financing support by domestic financing agencies (2022-2030). |
| 6. Institutional & regulatory development | 6.1 Integrated governance system for logistics activities. | Cuba's cargo transport system will be gradually upgraded by introducing new ideas such as 3PL. However, to oversee his reform process, a new specialized organization is needed to monitor & supervise transport enterprises. | 6.1.1: Form high-level consensus on national logistics strategies by creating a logistics master plan. | Make a logistics master plan & commit to a high-level strategy for domestic logistics activities. | 6.1.1.1 (1.2.3.3): Make a national logistics master plan with the 2040 horizon year in 2026~2028. |
| | | | 6.1.2: Establish a new organization to control all logistics activities in Cuba. | Existing logistics jurisdictions must be consolidated to create a new body supervising all logistics activities. | 6.1.2.1: Create a National Logistics Authority in charge of planning, regulation, monitoring & controlling major cargo movement by all transport modes in 2027-2030. Refer to Strategy 4.1.1 |

Source: TWG & JICA Study Team

## 5.4 Policy-level SEA

During preparing the objectives mentioned above, the following 12 SEA policies described in Chapter 2 were used to guide the finalization of transport objectives, strategy, and goals. As shown in Figure 5.4.2, these SEA policies were integrated into each sector's objectives by environmental and social experts from CIMAB who were included in the TWGs. This policy-level intervention from SEA ensures that the objectives of NTMP are in line with the SEA policy.

| | |
|---|---|
| Economics | a. To invest in **cost-effective and efficient** transport infrastructure and services to promote **strategic industrial sectors** including agriculture, tourism, and SEZ.<br>b. To develop transport infrastructure and services that encourage the production of **higher value-added** products including logistics and storage system |
| Environmental | c. To continue to protect and preserve existing natural resources<br>d. To apply effective tourism resource conservation measures<br>e. To promote suitable energy sources for transport operation such as the use of EV and renewable energy or clean engine and new refinery facility<br>f. To reduce health risk by **minimizing pollution** from transport sector (air, water and wastes)<br>g. To develop and maintain transport infrastructure that is **resilient to climate change,** especially in flood risk areas from sea level rise |
| Social | h. To increase **the safety** of transport users and operators by improving safety standards and the use of technology (COVID-19)<br>i. To **ensure the equal access** to job and social services for all social groups including vulnerable groups<br>j. To improve coverage of **emergency transport service,** especially to tertiary hospitals (COVID-19)<br>k. To **raise awareness** on environment and safety through education and training (COVID-19)<br>l. To **strengthen capacity** on sustainable transport planning and operation |

Source: JICA Study Team

**Figure 5.4.1 SEA policy for policy-level SEA**


Source: JICA Study Team

**Figure 5.4.2 Policy-level SEA in the NTMP**

After the final objectives in each sector were developed, they were assessed by SEA policies. Table 5.4.1 shows the assessment result. The a, b, c, etc. in the table correspond with the SEA policies shown in Figure 5.4.1. The result informs that each sector's objectives cover most SEA policies across all planning areas. This means that the economic, environmental, and social aspects of SEA policies are well incorporated into the transportation objectives and will be reflected in the strategy, goals, and projects developed from these objectives.

**Table 5.4.1 Confirmation of SEA policy in objectives of each sector**

| Sector objectives \ Planning area | | Planning & coordination | Transport infrastructure development | Environment safety & security | Transport service & industry development | Transport pricing & resource allocation | Institutional & regulatory development |
|---|---|---|---|---|---|---|---|
| **1. Planning & coordination** | Economic | a, | a, b, | - | a, b, | b | - |
| | Environmental | c, f, | - | c, d, e, f, g, | - | - | - |
| | Social | h, l | h, i, j, l | h, k | h | - | l |
| **2. Passenger transport** | Economic | a, | - | - | - | a, | - |
| | Environmental | - | - | g, | e, f, | - | - |
| | Social | i, j | i, l | h, k, l | h, i, l | i | h, l |
| **3. Road & bridge** | Economic | a, | a, b, | - | - | - | - |
| | Environmental | - | g, | e, f, | - | - | - |
| | Social | l | h, i, j | h, k | i | i | l |
| **4. Railway** | Economic | a | a, b, | - | a, b | a, | - |
| | Environmental | - | f, g, | e, f, g, | f, | f, | - |
| | Social | l | h, i | h, l | i, j | h, i | l |
| **5. Aviation** | Economic | a, | a, b, | - | a, b, | a, | - |
| | Environmental | - | - | c, d, e, f, g | - | - | - |
| | Social | l | h, i | h, i, j, k, l | h, i | h, i | l |
| **6. Maritime** | Economic | a, b, | a, | - | a, b | - | a, |
| | Environmental | - | f, | c, d, e, f, g | - | f, | - |
| | Social | l | i | h, l | - | i | l |

Note: refer to Figure 5.4.1
Source: JICA Study Team

# Chapter 6 Project Implementation

## 6.1 Overall implementation schedule

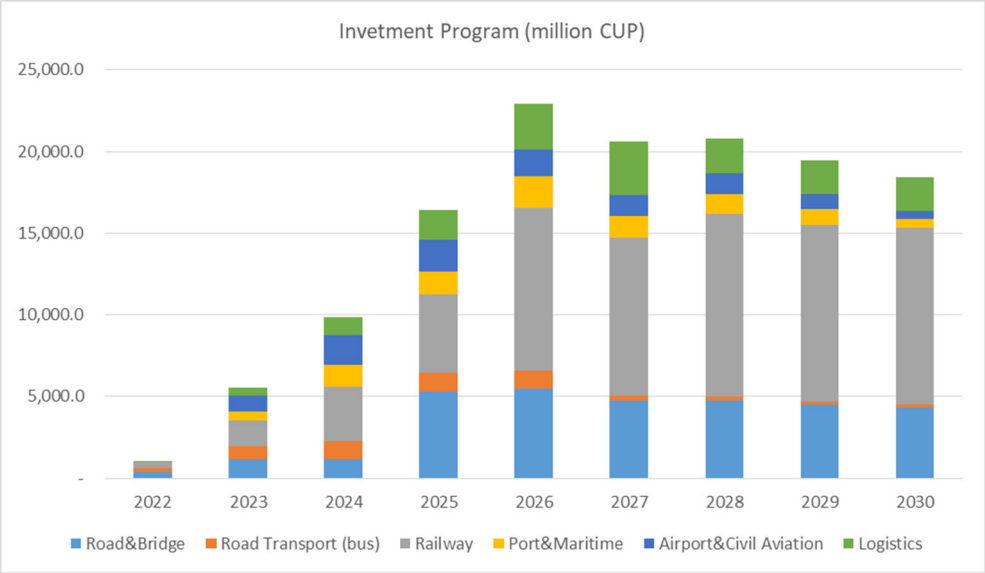
The first five years (2022-2026) are positioned as the preparation period, while accelerated growth is expected in the following years (2027-2030) based on stable investment in the transport sector.

The total investment amount by 2030 is 135 billion CUP, of which 41% (55.8 billion CUP) is planned to be invested in the first five years and the remaining 59% (79.2 billion CUP) in the last four years.

In every transport subsector, the first five years will focus on collecting and analyzing the inventory data, various surveys, feasibility studies, and education & training. At the same time, it is necessary to invest in infrastructure that requires urgent repairs and upgrades.

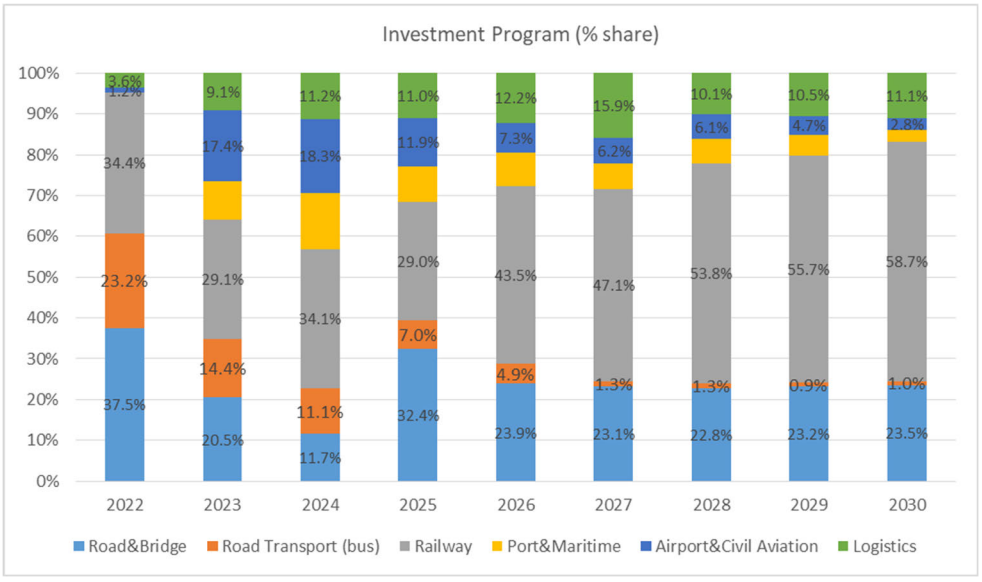
The latter four years will be a period of continuous investment following the plans prepared in the first five years.

As shown in Figure 6.1.1, investment in the railway sector accounts for approximately 46% of the total, followed by investment in the road and bridge sector (approximately 24%). Overall, the investment plan focuses on land transportation.




Unit: million CUP

| Year | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Road&Bridge | 386.5 | 1,136.4 | 1,150.7 | 5,319.9 | 5,472.1 | 4,763.6 | 4,738.6 | 4,518.6 | 4,331.1 | 31,817.6 |
| Road Transport (bus) | 239.1 | 800.0 | 1,094.4 | 1,145.1 | 1,115.9 | 263.3 | 263.3 | 184.6 | 184.6 | 5,290.3 |
| Railway | 354.5 | 1,611.6 | 3,365.1 | 4,767.9 | 9,972.1 | 9,708.6 | 11,189.8 | 10,838.0 | 10,808.0 | 62,615.8 |
| Port&Maritime | - | 528.3 | 1,348.3 | 1,425.4 | 1,908.3 | 1,306.3 | 1,222.9 | 972.9 | 525.0 | 9,237.5 |
| Airport&Civil Aviation | 12.5 | 966.1 | 1,807.1 | 1,948.2 | 1,664.3 | 1,267.9 | 1,267.9 | 910.7 | 517.9 | 10,362.5 |
| Logistics | 37.3 | 502.4 | 1,106.1 | 1,809.4 | 2,798.1 | 3,283.1 | 2,097.3 | 2,040.7 | 2,040.7 | 15,715.0 |
| Total | 1,029.9 | 5,544.7 | 9,871.8 | 16,416.0 | 22,930.9 | 20,592.6 | 20,779.8 | 19,465.6 | 18,407.3 | 135,038.6 |
| | | | | | 55,793.4 | | | | 79,245.3 | |




| Year | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Road&Bridge | 37.5% | 20.5% | 11.7% | 32.4% | 23.9% | 23.1% | 22.8% | 23.2% | 23.5% | 23.6% |
| Road Transport (bus) | 23.2% | 14.4% | 11.1% | 7.0% | 4.9% | 1.3% | 1.3% | 0.9% | 1.0% | 3.9% |
| Railway | 34.4% | 29.1% | 34.1% | 29.0% | 43.5% | 47.1% | 53.8% | 55.7% | 58.7% | 46.4% |
| Port&Maritime | 0.0% | 9.5% | 13.7% | 8.7% | 8.3% | 6.3% | 5.9% | 5.0% | 2.9% | 6.8% |
| Airport&Civil Aviation | 1.2% | 17.4% | 18.3% | 11.9% | 7.3% | 6.2% | 6.1% | 4.7% | 2.8% | 7.7% |
| Logistics | 3.6% | 9.1% | 11.2% | 11.0% | 12.2% | 15.9% | 10.1% | 10.5% | 11.1% | 11.6% |
| Total | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| | | | 41.3% | | | | 58.7% | | | |

Source: TWG and JICA Study Team

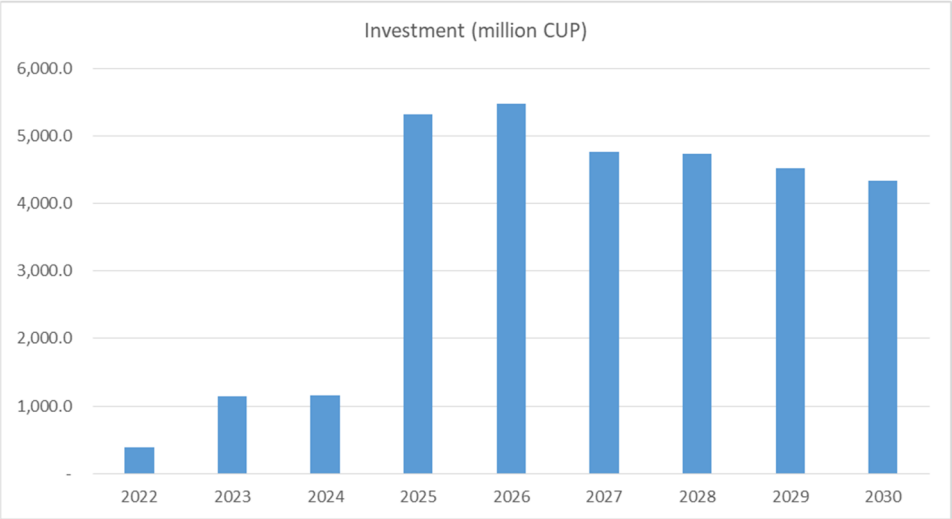
**Figure 6.1.1 Expected funding for the transport sector**

## 6.2 Road & Bridge sector

### 6.2.1 Expected funding for the Road & Bridge sector

The total budget for the road & bridge sector is 31,817.5 million CUP. The first five years (2022-2026) require 13,466 million CUP, accounting for 42.3% of the total budget, while the budget for the remaining four years (2027-2030) is 18,351.9 million CUP (57.7%).

In the first five years, efforts will be made to develop human resources in the road and bridge sector (RB013), rehabilitate damaged/deteriorated infrastructure, upgrade data inventory systems, and create new business opportunities such as "Michi-no-Eki[1]."




| Year | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Investment (million CUP) | 386.5 | 1,136.4 | 1,150.7 | 5,319.9 | 5,472.1 | 4,763.6 | 4,738.6 | 4,518.6 | 4,331.1 |

Source: TWG and JICA Study Team

**Figure 6.2.1 Expected funding for the Road & Bridge sector**

### 6.2.2 Implementation schedule

Table 6.2.1 shows the implementation schedule of the road & bridge sector component projects. Following this implementation schedule, the organization designated as the executing agency needs to formulate a detailed implementation plan for each project.

It should be noted that the cost for RB003 requires further detailed study based on RB001.

[1] Japan's roadside stations – Japan's roadside stations – "Michi-no-Eki" is government-designated rest stops offering various services, including shops selling local products, restaurants, bathroom & shower, spring hot, information for tourists, traffic information, etc. This system was launched in the mid-1990s, and as of February 2022, there are 1,194 roadside stations fairly evenly distributed throughout Japan.
https://www.mlit.go.jp/road/road_e/index_e.html

**Table 6.2.1 Implementation schedule for the Road and Bridge sector**

| Project Code | Name | Preparation period | | | | | Acceleration period | | | | million CUP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | |
| RB001 | Study and modernization of means for updating the inventory of roads and bridges with Cimab support, succeeding the Project "Andariego Vial" (Completion date 2021) | | | | | | | | | | 75.0 |
| RB002 | Integral Development of Roads of National Interest 2020 – 2030 | | | | | | | | | | 25,920.0 |
| RB003 | Immediate Action Plan for Critical Road and Bridge Sections | | | | | | | | | | 2,559.0 |
| RB004 | Procurement of Road Maintenance Machines and Equipment | | | | | | | | | | 377.2 |
| RB005 | Plan of the Road Network for Heavy Vehicles | | | | | | | | | | 50.0 |
| RB006 | Cuba ITS Development Plan | | | | | | | | | | 75.0 |
| RB007 | Pedestrian Facility Development for Better Environment | | | | | | | | | | 125.0 |
| RB008 | Construction of stop & rest road stations (MICHI NO EKI) along main roads | | | | | | | | | | 1,250.0 |
| RB009 | Neo-mobility Project | | | | | | | | | | 435.0 |
| RB010 | Study on toll roads, pricing for international cargo transport (containers), and affordable prices for Cubans in new tolls | | | | | | | | | | 37.5 |
| RB011 | Tourism Promotion Project Utilizing Grant Aid with Business and Operating Rights in Cuba | | | | | | | | | | 750.0 |
| RB012 | Establishment of Transport Planning Centre of Excellence | | | | | | | | | | 75.0 |
| RB013 | Technical Training Program on Road and Bridge Sector in Japan | | | | | | | | | | 44.4 |
| RB014 | Capacity Development for Road Maintenance by Technical Cooperation Project | | | | | | | | | | 44.4 |
| Total (million CUP) | | 386.5 | 1,136.4 | 1,150.7 | 5,319.9 | 5,472.1 | 4,763.6 | 4,738.6 | 4,518.6 | 4,331.1 | 31,817.6 |
| | | | | | 13,465.6 | 42.3% | | | 18,351.9 | 57.7% | |

Source: TWG and JICA Study Team

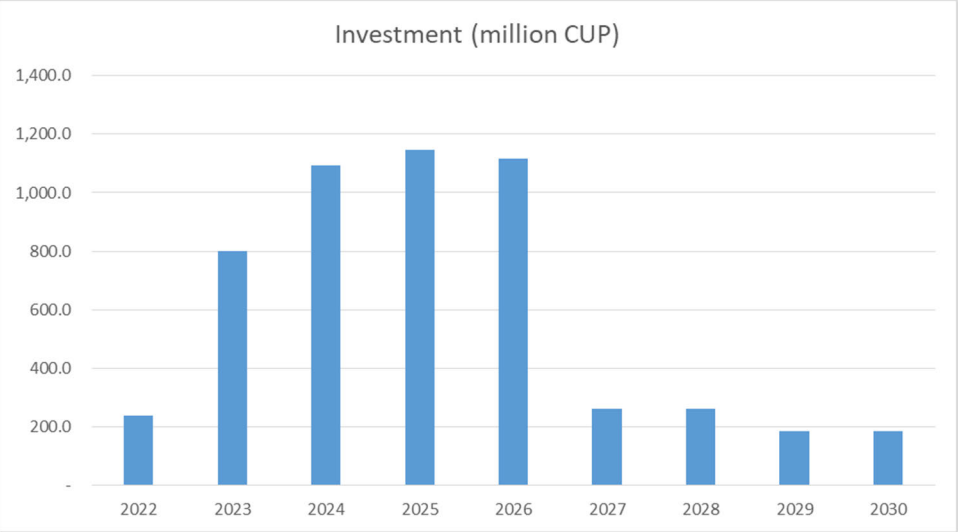
## 6.3 Road-based Passenger Transport (bus) sector

### 6.3.1 Expected funding for the Road-based Passenger Transport (bus) sector

The bus sector's project implementation focuses on the first five years. The total implementation budget is 5,290.3 million CUP. Of that, the first five years (2022-2026) budget is 4,394.5 million CUP, accounting for 83.1% of the total budget. The budget for the remaining four years (2027-2030) is 895.8 million CUP (16.9%).

It can be estimated that the average expenditure in the first five years is 878.9 million CUP/year, and the average spending in the second half is 224 million CUP/year.

For the first five years, concerned agencies will promote the effective utilization (shared use) of buses owned by multiple institutions to improve the level of intercity bus service. In addition, to increase the amount of foreign currency earnings, new bus coaches will be procured to accommodate the growing number of foreign visitors. Furthermore, in the latter half of the master plan period, it is assumed that each province's intercity bus terminal building will be renovated or rebuilt. By renovating the bus terminal, it is expected to improve the travel comfort for passengers and, at the same time, create new business opportunities (sales of local products, etc.).




| Year | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Investment (million CUP) | 239.1 | 800.0 | 1,094.4 | 1,145.1 | 1,115.9 | 263.3 | 263.3 | 184.6 | 184.6 |

Source: TWG and JICA Study Team

**Figure 6.3.1 Expected funding for the Road-based Passenger Transport sector**

### 6.3.2 Implementation schedule

Table 6.3.1 is an implementation schedule of the component projects of the bus sector. Following this implementation schedule, the organization designated as the executing agency needs to formulate a detailed implementation plan for each project.

**Table 6.3.1 Implementation schedule for the Road-based Passenger Transport sector**

| Project Code | Project Name | | | Preparation period 2022 | 2023 | 2024 | 2025 | 2026 | Acceleration period 2027 | 2028 | 2029 | 2030 | million CUP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RT001 | Tourist bus service plan & operation coordination | a) | Coordination committee of tourist bus service providers under the MITRANS, MINTUR and MINFAR | | | | | | | | | | 1.25 |
| | | b) | Bus operation/vehicle arrangement plan for international tourists | | | | | | | | | | 1.25 |
| | | c) | Establishment of operation consignment system (sharing vehicles and human resources) for tourist services | | | | | | | | | | 2.50 |
| RT002 | Intercity bus service plan & operation coordination at the central level | a) | Coordination meetings between EON and EPT- reviewing the operation plan of intercity bus and city bus | | | | | | | | | | 1.25 |
| | | b) | Clarification of the division of roles between state-owned enterprises (EON, EPT, etc.) and individual business owners (truck bus / taxi operators) | | | | | | | | | | 1.25 |
| | | c) | Establishment of operation consignment system (sharing vehicles and human resources) for services | | | | | | | | | | 3.75 |
| | | d) | Establishment of vehicle lease system in collaboration with individual business owners. | | | | | | | | | | 1.25 |
| RT003 | Comprehensive bus network development plan | a) | Comprehensive bus passenger transport network plan (main island) | | | | | | | | | | 7.50 |
| | | b) | Sustainable operation plan for intercity bus passenger transport with support from truck bus and taxi operators (individual business owners) | | | | | | | | | | 1.25 |
| | | c) | Sustainable operation plan for urban bus transport with support from truck bus and taxi operators (individual business owners) | | | | | | | | | | 1.25 |
| | | d) | Provision of highly profitable service plan such as airport services | | | | | | | | | | 1.25 |
| RT004 | Revision of bus fare system | a) | Flexible operation and fare systems for intercity buses to respond seasonal peak/off-peak demand | | | | | | | | | | 1.25 |
| | | b) | Flexible fare for luxury bus services for foreign passengers | | | | | | | | | | 1.25 |
| | | c) | Flexible fare to respond different LOS (for Cubans) | | | | | | | | | | 1.25 |
| RT005 | Information for bus passengers | a) | Preparation of easy-to-understand route maps and bus maps | | | | | | | | | | 1.25 |
| | | b) | Improvement of convenience of public transportation network by introduction of clock-face schedule and transfer fare discount system. | | | | | | | | | | 1.25 |
| RT006 | Advanced bus operation and management system development | a) | Online operation information by digitizing all bus operation information. (GTFS, General Transit Feed Specification) | | | | | | | | | | 7.50 |
| | | b) | Real-time route / operation information using mobile applications | | | | | | | | | | 2.50 |
| | | c) | Introduction of dynamic bus operation information system (GTFS real time) by installing GPS devices on bus vehicles | | | | | | | | | | 12.50 |
| | | d) | Establishment of operation planning / monitoring system for operation management | | | | | | | | | | 7.50 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RT007 | Digital transformation for the management of bus fleets and spare parts | a) | Digitization of inventory information of bus vehicles/spare parts and establishment of renewal plan | | | | | | | | | 5.00 |
| | | b) | Establishment of a database system to share the information on vehicle/spare parts and engineers of each UEB | | | | | | | | | 5.00 |
| RT008 | Urgent bus fleet rehabilitation and procurement | a) | Improvement of availability of bus vehicles (operable number/total number of vehicles: Target 70%) (It was 61% for all EON buses in 2019) | | | | | | | | | 100.00 |
| | | b) | Increase the number of bus vehicles for intercity services nationwide to 1,000. (It was 846 units in total for EON in 2019) | | | | | | | | | 1,125.00 |
| | | c) | Procurement of vehicles and spare parts based on the bus vehicle/spare parts renewal plan | | | | | | | | | 225.00 |
| RT009 | Renovation of intercity bus terminals (part of Michi no Eki project) | a) | Rebuilding and renovation of major inter-city bus terminals | | | | | | | | | 1,200.00 |
| | | b) | Provision of real time information (bus operation, traffic accident, weather condition, etc.) | | | | | | | | | - |
| | | c) | Creation of business opportunities: cooperation with state and non-state business bodies | | | | | | | | | 1.25 |
| RT010 | Advanced covered bus stops (smart bus shelters) development | a) | Advanced covered bus stops (bus shelters) development along the urban bus routes | | | | | | | | | 425.00 |
| | | b) | Provision of real time information (bus location and arrival information, daily news, government notification, etc.) | | | | | | | | | - |
| RT011 | Safety improvement projects | a) | Establishment of vehicle standards and license system from the viewpoint of safety management | | | | | | | | | 1.25 |
| | | b) | Installation of in-vehicle cameras on bus vehicles and monitoring | | | | | | | | | 12.50 |
| | | c) | Install CCTV at the bus terminals and bus stops, then establish a monitoring system | | | | | | | | | 4.80 |
| RT012 | Resiliency improvement | a) | Formulation of infection control manuals for bus operators | | | | | | | | | 1.25 |
| | | b) | Introduction of COVID-19 countermeasure equipment (installation of partitions, thermometer, disinfectant, etc.) | | | | | | | | | 4.25 |
| | | c) | Introduction of contactless payment system | | | | | | | | | 50.00 |
| | | d) | Establishment of BCP (Business Continuity Plan) in preparation for infectious diseases | | | | | | | | | 1.25 |
| RT013 | Ticketing system improvement | a) | Improvement of intercity bus reservation system (review of Ultima Hora system or introduction of electronic notification) | | | | | | | | | 6.25 |
| | | b) | Establishment of online reservation / ticketing system and reservation / ticketing system using mobile application | | | | | | | | | 6.25 |
| RT014 | Sustainable bus fleet production | a) | Expansion of Diana Bus production | | | | | | | | | 2,000.00 |
| | | b) | Study on Bus vehicles manufacturing (including EV buses) | | | | | | | | | 56.25 |
| | | | Total (million CUP) | 239.1 | 800.0 | 1,094.4 | 1,145.1 | 1,115.9 | 263.3 | 263.3 | 184.6 | 184.6 | 5,290.30 |
| | | | | | | | 4,394.6 | 83.1% | | | 895.7 | 16.9% | |

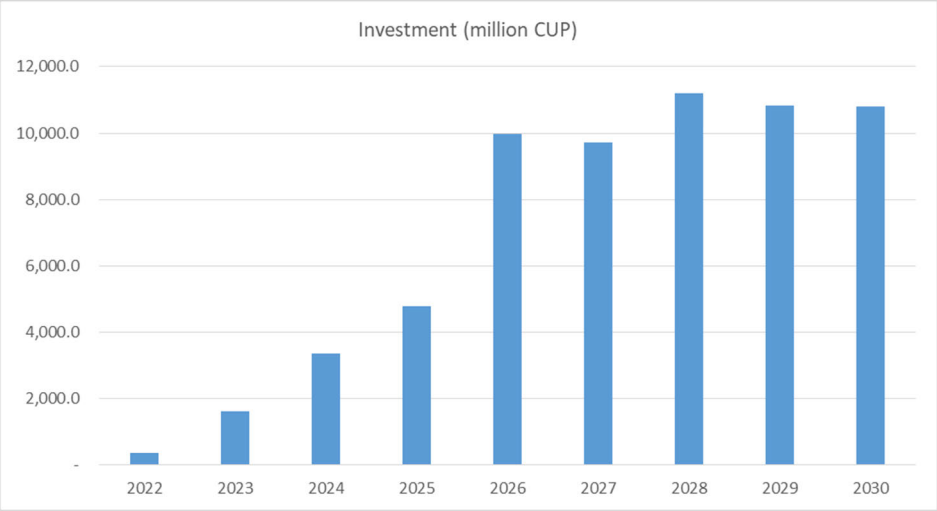
Source: TWG and JICA Study Team

## 6.4 Rail Transport sector

### 6.4.1 Expected funding for the Rail Transport sector

The total investment in the rail transport sector for 2022-2030 is estimated at 62,615.6 million CUP. Of that, the first five years (2022-2026) budget is 20,071.2 million CUP, accounting for 32,05% of the total funding. The budget for the remaining four years (2027-2030) is 42,544.4 million CUP (67.9% of the total). The average expenditure in the first five years is 4,014.2 million CUP/year, and the average spending in the second half is 10,636,1 million CUP/year.

For the first five years, the investment focuses on UFC's management efficiency improvement, including digital transformation, effective use of the current rail asset, safety, and security improvement, staff training and education, and feasibility studies. Following the preparatory work in the first five years, the investment in the remaining years focuses on capital investment, including large-scale renovation of the current rail lines and new line construction. It should be noted that the Biran Project will be carried out through the master plan period (2022-2030).




| Year | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Investment (million CUP) | 354.5 | 1,611.6 | 3,365.1 | 4,767.9 | 9,972.1 | 9,708.6 | 11,189.8 | 10,838.0 | 10,808.0 |

Source: TWG and JICA Study Team

**Figure 6.4.1 Expected funding for the Rail Transport sector**

### 6.4.2 Implementation schedule

Table 6.4.1 is an implementation schedule of the component projects in rail transport. Following this implementation schedule, the organization designated as the executing agency needs to formulate a detailed implementation plan for each project.

**Table 6.4.1 Implementation schedule for the Rail Transport sector**

| Project Code | Name | Preparation period | | | | | Acceleration period | | | | million CUP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | |
| RW001 | Development of railway operation & management performance indicators and a monitoring system | | | | | | | | | | 30.0 |
| RW002 | Establishment of a new accounting system using ICT | | | | | | | | | | 30.0 |
| RW003 | Development of a database of railcars and other equipment using ICT | | | | | | | | | | 30.0 |
| RW004 | Computerization of railway operation planning, control, and monitoring | | | | | | | | | | 250.0 |
| RW005 | Updating the Railway Sector's 5-Year Development Plan | | | | | | | | | | 75.0 |
| RW006 | Feasibility Study on the Airport Line (José Martí airport and Havana) | | | | | | | | | | 75.0 |
| RW007 | Feasibility Study on the Airport Line extension from Havana to Varadero | | | | | | | | | | 75.0 |
| RW008 | Feasibility Study on the rehabilitation and extension of the railways to the northern key development areas including Villa Clara, Ciego de Avila, Camaguey and Holguin | | | | | | | | | | 125.0 |
| RW009 | Feasibility Study on Commuter Rail Services Development in Havana | | | | | | | | | | 75.0 |
| RW010 | Modernization of Track Inspection and Maintenance Planning System | | | | | | | | | | 37.5 |
| RW011 | Modernization of Bridge Inspection and Maintenance Planning System | | | | | | | | | | 37.5 |
| RW012 | Procurment of trackwork machines and equipment | | | | | | | | | | 500.0 |
| RW013 | Workshop for track machine & equipment maintenance | | | | | | | | | | 250.0 |
| RW014 | Feasibility Study and Detailed Design of the Central Line Rehabilitation and Improvement | | | | | | | | | | 250.0 |
| RW015 | Rehabilitation of the Central Line including the Havana junction | | | | | | | | | | 26,093.8 |
| RW016 | Feasibility Study and Detailed Design of the Southern Line, Cienfuegos Line, and Cárdenas Branch Line | | | | | | | | | | 296.3 |
| RW017 | Rehabilitation of the South Line, Cienfuegos Line, and Cárdenas Branch | | | | | | | | | | 4,443.8 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RW018 | Study on CCD (Centro de Carga y Descarga) rehabilitation | | | | | | | | | | 50.0 |
| RW019 | Construction of CCD Habana 222 | | | | | | | | | | 125.0 |
| RW020 | Study and design for station rehabilitation | | | | | | | | | | 50.0 |
| RW021 | The Second Stage of the Central Station of Havana Restoration and Reha | | | | | | | | | | 250.0 |
| RW022 | Research & Development of the modern railway technologies and management | | | | | | | | | | 125.0 |
| RW023 | Study on Battery-Electric Locomotive and DEMU (Deisel Electric Multiple Unit) | | | | | | | | | | 50.0 |
| RW024 | Installation of photovoltaic systems at stations, level crossings and other railway facilities | | | | | | | | | | 250.0 |
| RW025 | Safety improvement of level crossings | | | | | | | | | | 42.0 |
| RW026 | Security improvement of cargo storage, handling, and transportation | | | | | | | | | | 75.0 |
| RW027 | Feasibility Study on the Improvement of passenger train service between Habana and Mariel SDZ | | | | | | | | | | 37.5 |
| RW028 | Birán project - update of railbus service in rural areas | | | | | | | | | | 250.0 |
| RW029 | Rehabilitation of the Hershey electrified line | | | | | | | | | | 17,250.0 |
| RW030 | Rolling stock procurement program | | | | | | | | | | 8,250.0 |
| RW031 | Installation of GPS for effieint train monitoring and operation | | | | | | | | | | 125.0 |
| RW032 | Study on the cargo transport efficiency improvement | | | | | | | | | | 25.0 |
| RW033 | Study on the parcel transport service improvement | | | | | | | | | | 25.0 |
| RW034 | Improve the cargo train operation diagram and operation | | | | | | | | | | 25.0 |
| RW035 | Digital transformation of cargo handing and transportation data collection and analysis system using Harmonized Commodity Description and Coding System (HS Code) | | | | | | | | | | 50.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| RW036 | Repair program of railcars | | | | | | | | | 1,500.0 |
| RW037 | Modernization of the workshops | | | | | | | | | 1,125.0 |
| RW038 | Modernization of the vaporization system of the fuel tanks of the Sagua workshop | | | | | | | | | 12.5 |
| RW039 | Marketing of rail cargo and passenger | | | | | | | | | 25.0 |
| RW040 | Study on the railway transport tariff structure | | | | | | | | | 12.5 |
| RW041 | Increase the capacity of UFC as an integrated logistics operator | | | | | | | | | 75.0 |
| RW042 | Organizational restructuring of UFC and related entities | | | | | | | | | 25.0 |
| RW043 | Study on the reorganization of the national railway planning, administration, and management systems | | | | | | | | | 37.5 |
| RW044 | Upgrade training/educational system in the rail transport sector | | | | | | | | | 50.0 |
| RW045 | Diigital transformation of cargo handing and transportation data collection and analysis system using Harmonized Commodity Description and Coding System (HS Code) | | | | | | | | | 25.0 |
| Total (million CUP) | | 354.5 | 1,611.6 | 3,365.1 | 4,767.9 | 9,972.1 | 9,708.6 | 11,189.8 | 10,838.0 | 10,808.0 | 62,615.8 |
| | | | | | 20,071.3 | 32.1% | | | 42,544.4 | 67.9% | |

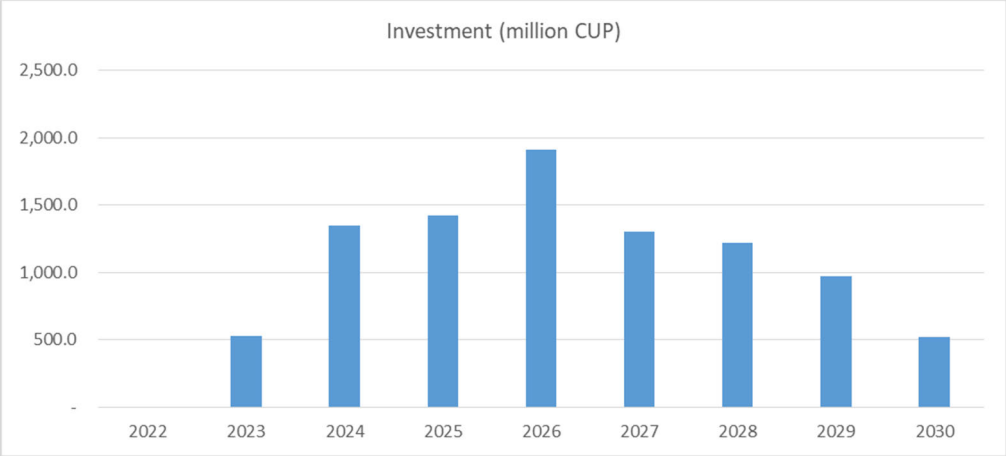
Source: TWG and JICA Study Team

## 6.5 Port & Maritime Transport sector

### 6.5.1 Expected funding for the Port & Maritime Transport sector

The total implementation budget is 9,237.4 million CUP. Of that, the first five years (2022-2026) require 5,210.3 million CUP, accounting for 56.4% of the total budget. The budget for the remaining four years (2027-2030) will be 4,027.1 million CUP (43.6%). The average expenditure in the first five years is 1,042.1 million CUP/year, and the average spending in the second half is 1,006.8 million CUP/year.

For the first five years, the investment focuses on feasibility studies on projects to improve the port operation efficiency, new cruise ship terminal, urgent rehabilitation of the deteriorated ports, and staff training and education. Following the preparatory work (feasibility studies) in the first five years, the investment in the remaining years focuses on capital investment, including large-scale renovation of the port facilities, procurement of new vessels, and construction of the shipyard.




| Year | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Investment (million CUP) | - | 528.3 | 1,348.3 | 1,425.4 | 1,908.3 | 1,306.3 | 1,222.9 | 972.9 | 525.0 |

Source: TWG and JICA Study Team

**Figure 6.5.1 Expected funding for the Port & Maritime Transport sector**

### 6.5.2 Implementation schedule

Table 6.5.1 is an implementation schedule of the component projects in the bus sector. Following this implementation schedule, the organization designated as the executing agency needs to formulate a detailed implementation plan for each project.

**Table 6.5.1 Implementation schedule for the Port & Maritime Transport sector**

| Project Code | Name | Preparation period | | | | | Acceleration period | | | | million CUP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | |
| M001 | Development of Passenger Cruise Terminal in Cienfuegos Port (Feasibility Study) | | | | | | | | | | 37.5 |
| M002 | Containerization of International/Domestic Cargo Transport (Plan and Feasibility Study) | | | | | | | | | | 25.0 |
| M003 | Port Statistics and Database System Development Project | | | | | | | | | | 75.0 |
| M004 | Preparatory Study to Introduce Maritime Transport Planning Courses to Academic Institutes/Colleges in Cuba | | | | | | | | | | 12.5 |
| M005 | Expansion and modernization of Casasa Port | | | | | | | | | | 500.0 |
| M006 | Santiago de Cuba Port Container Terminal | | | | | | | | | | 625.0 |
| M007 | Cienfuegos Port Expansion and modernization | | | | | | | | | | 500.0 |
| M008 | Cruise Passenger Terminal in Santiago de Cuba Port (Feasibility Study) | | | | | | | | | | 37.5 |
| M009 | Repair and modernization of the port of Nuevitas | | | | | | | | | | 250.0 |
| M010 | Repair of hydro-technical issues of the facilities of Gerona, Cayo Largo del Sur, and Batabanó ports. | | | | | | | | | | 300.0 |
| M011 | Baracoa port repair and modernization | | | | | | | | | | 250.0 |
| M012 | General repair of Havana Port | | | | | | | | | | 250.0 |
| M013 | Matanzas Port Repair and Modernization | | | | | | | | | | 500.0 |
| M014 | Repair and modernization project of the port of Antilla | | | | | | | | | | 500.0 |
| M015 | Repair and modernization of Sugar Ports (Cienfuegos, Carupano, Guayabal) | | | | | | | | | | 750.0 |
| M016 | Rehabilitation and modernization of GEMAR vessels | | | | | | | | | | 2,000.0 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M017 | Procurement of Two 2,500DWT multipurpose vessels for coastal shipping in the north coast | | | | | | | | | | 750.0 |
| M018 | Procurement of cargo vessels for tourism development in the north coast (port of Casasa) | | | | | | | | | | 1,000.0 |
| M019 | Development of GEMAR Shipyards | | | | | | | | | | 625.0 |
| M020 | Strategic Environmental Assessment (SEA) for Port and Maritime Projects (study) | | | | | | | | | | 25.0 |
| M021 | Reduction of Fuel Consumption for Port and Maritime Sector (study) | | | | | | | | | | 25.0 |
| M022 | Modal Shift from Road Transport to Maritime Transport (study) | | | | | | | | | | 50.0 |
| M023 | Upgrading Plan for Ship Navigation System in Cuban Ports (study) | | | | | | | | | | 37.5 |
| M024 | Study on Appropriate Price of Port Service and Domestic Transportation (incl. Passengers) | | | | | | | | | | 12.5 |
| M025 | Strategic Plan for Foreign Direct Investment of Port and Maritime Sector (Use of Concession Agreement) | | | | | | | | | | 25.0 |
| M026 | Strategic Plan for Development of Non-state Enterprises of Port and Maritime Sector | | | | | | | | | | 25.0 |
| M027 | Study on EDI and Installation of System in Cuban Ports | | | | | | | | | | 50.0 |
| Total (million CUP) | | - | 528.3 | 1,348.3 | 1,425.4 | 1,908.3 | 1,306.3 | 1,222.9 | 972.9 | 525.0 | 9,237.5 |
| | | | | | 5,210.4 | 56.4% | | | 4,027.1 | 43.6% | |

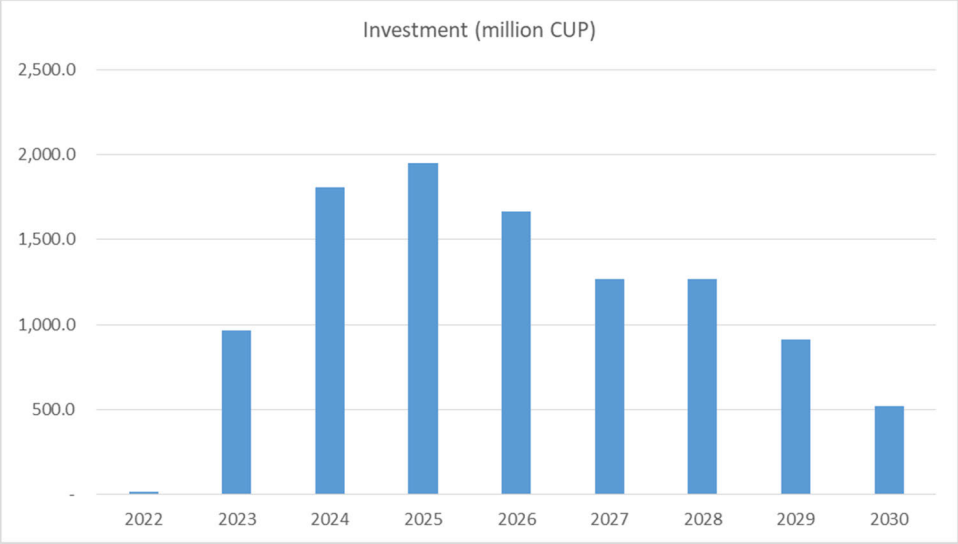
Source: TWG and JICA Study Team

## 6.6 Airport & Civil Aviation Sector

### 6.6.1 Expected funding for the Airport & Civil Aviation sector

The total implementation budget is 10,362.6 million CUP. The first five years (2022-2026) require 6,398.2 million CUP, accounting for 61.7% of the total budget. The budget for the remaining four years (2027-2030) is 3,964.4 million CUP (38.3%). The average expenditure in the first five years is 1,279.6 million CUP/year, and the average spending in the second half is 991.1 million CUP/year.

For the first five years, the investment focuses on the renewal of aged ground service equipment (GSE), upgrading the air traffic control & management system, airport rehabilitation master plans, and staff training & education. Following the preparatory work (feasibility studies) in the first five years, the investment in the remaining years focuses on capital investment, including large-scale renovation of the airport facilities, installation of the safety management system & security equipment.




| Year | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Investment (million CUP) | 12.5 | 966.1 | 1,807.1 | 1,948.2 | 1,664.3 | 1,267.9 | 1,267.9 | 910.7 | 517.9 |

Source: TWG and JICA Study Team

**Figure 6.6.1 Expected funding for Airport & Civil Aviation sector**

### 6.6.2 Implementation schedule

Table 6.6.1 is an implementation schedule for the Airport & Civil Aviation sector's component projects. Following this implementation schedule, the organization designated as the executing agency needs to formulate a detailed implementation plan for each project.

**Table 6.6.1 Implementation schedule for Airport & Civil Aviation sector**

| | | Preparation period | | | | | Acceleration period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Code | Name | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | million CUP |
| A001 | Airport Facility and Equipment Master Plan Project (three major airports) | | | | | | | | | | 37.5 |
| A002 | Airport System Digitization Project (major three airports) | | | | | | | | | | 250.0 |
| A003 | GSE (Ground Support Equipment) Procurement Project (major three airports) | | | | | | | | | | 750.0 |
| A004 | Technical Assistance for GSE (Ground Support Equipment) maintenance (three major airports) | | | | | | | | | | 50.0 |
| A005 | Jose Marti International Airport Passenger Terminal Expansion Project | | | | | | | | | | 2,500.0 |
| A006 | Air Freight Logistics Process Digitization Project | | | | | | | | | | 250.0 |
| A007 | Major airports technical assistance for ground handling (passenger/ramp handling) | | | | | | | | | | 75.0 |
| A008 | Aviation sector sustainability master plan development project | | | | | | | | | | 50.0 |
| A009 | Development of innovative logistics warehouse (Havana) | | | | | | | | | | 1,250.0 |
| A010 | Aircraft Renewal/Procurement/Lease Plan | | | | | | | | | | 25.0 |
| A011 | Upgrading air traffic control system & operation project (HAV, VRA, SCU, SNU) | | | | | | | | | | 250.0 |
| A012 | Upgrading safety management system (SMS) & safety security equipment | | | | | | | | | | 500.0 |
| A013 | Human resources capacity building plan project | | | | | | | | | | 50.0 |
| A014 | Study on state & non-state investment in aviation sector | | | | | | | | | | 50.0 |
| A015 | Sustainable Airport Services Improvement Plan | | | | | | | | | | 50.0 |
| A016 | Strategic Pricing System Introduction Plan Project | | | | | | | | | | 25.0 |
| A017 | Upgrading of aviation sector regulatory framework | | | | | | | | | | 25.0 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A018 | Santa Clara International Airport facility expansion project | | | | | | | | | | 2,500.0 |
| A019 | Introduction of facilities and equipment adjusted to universal design. | | | | | | | | | | 500.0 |
| A020 | Modernization of facilities and fuel equipment / truck project (major three airports) | | | | | | | | | | 375.0 |
| A021 | Project for the procurement of technological equipment (three major airports) | | | | | | | | | | 750.0 |
| A022 | Technical assistance for the development of a plan to increase non-aeronautical revenues | | | | | | | | | | 50.0 |
| | Total (million CUP) | 12.5 | 966.1 | 1,807.1 | 1,948.2 | 1,664.3 | 1,267.9 | 1,267.9 | 910.7 | 517.9 | 10,362.5 |
| | | | | | 6,398.2 | 61.7% | | | 3,964.3 | 38.3% | |

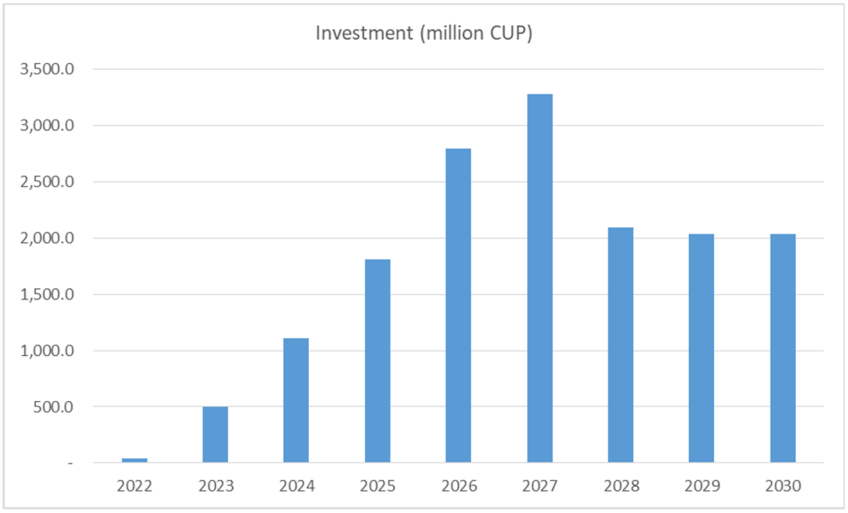
Source: TWG and JICA Study Team

## 6.7 Logistics Sector

### 6.7.1 Expected funding for the Logistics sector

The total implementation budget is 15,715.0 million CUP. The first five years (2022-2026) require 6,253.2 million CUP, accounting for 39.8% of the total budget. The budget for the remaining four years (2027-2030) is 9,461.8 million CUP (60.2%). The average expenditure in the first five years is 1,250.7 million CUP/year, and the average spending in the second half is 2,365.5 million CUP/year.

For the first five years, the investment focuses on the renewal of aged vehicles, digital transformation, upgrading the Balance de Cargas system, corresponding institutional & organizational changes, preparing a Business Continuity Plan (BCP), and staff training & education. Following the preparatory work (plan and feasibility studies) in the first five years, the investment in the remaining years focuses on capital investment, including installation of the computerized systems, new warehouses, safety management system & security equipment.




| Year | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Investment (million CUP) | 37.3 | 502.4 | 1,106.1 | 1,809.4 | 2,798.1 | 3,283.1 | 2,097.3 | 2,040.7 | 2,040.7 |

Source: TWG and JICA Study Team

**Figure 6.7.1 Expected funding for the Logistics sector**

### 6.7.2 Implementation schedule

Table 6.7.1 is an implementation schedule of the Logistics sector component projects. Following this implementation schedule, the organization designated as the executing agency needs to formulate a detailed implementation plan for each project.

**Table 6.7.1 Implementation schedule for the Logistics sector**

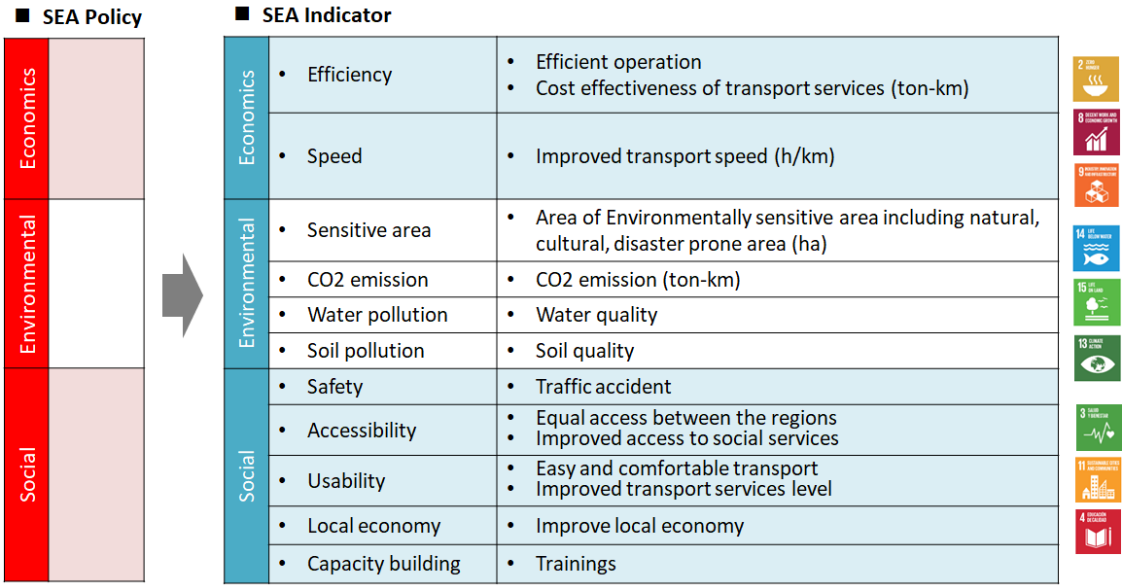
| Project Code | Name | Preparation period | | | | | Acceleration period | | | | million CUP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | |
| LG001 | Digital Transformation (DX) of the BC system Phase 1 | | | | | | | | | | 50.0 |
| LG002 | Digital Transformation (DX) of the BC system Phase 2 | | | | | | | | | | 100.0 |
| LG003 | Cargo Transport Service Integration | | | | | | | | | | 60.0 |
| LG004 | Human Resources (HR) Development in the logistics sector | | | | | | | | | | 60.0 |
| LG005 | Formulation of the National Logistic Master Plan 2040 | | | | | | | | | | 75.0 |
| LG006 | Renewal of aged vehicles (trucks) | | | | | | | | | | 1,000.0 |
| LG007 | DPT( Direction Provincial de Transporte) enhancement plan | | | | | | | | | | 240.0 |
| LG008 | Establishment of standard inspection procedure and a procurement plan of inspection equipment | | | | | | | | | | 25.0 |
| LG009 | Establishment of vehicle inspection companies based on the vehicle inspection plan (LG008) | | | | | | | | | | 150.0 |
| LG010 | General warehouse rehabilitation/renewal plan | | | | | | | | | | 100.0 |
| LG011 | Rehabilitation/renewal of general warehouse of each province | | | | | | | | | | 4,000.0 |
| LG012 | Study on needs for storage of specific important goods in Mariel, Matanzas, Cienfuegos and Santiago de Cuba | | | | | | | | | | 100.0 |
| LG013 | Construction of priority new warehouses | | | | | | | | | | 4,000.0 |
| LG014 | Study on packaging technology and industry development | | | | | | | | | | 25.0 |
| LG015 | Business Continuity Plan (BCP) in the logistics sector | | | | | | | | | | 37.5 |
| LG016 | Disaster/accident information sharing system development | | | | | | | | | | 37.5 |
| LG017 | Installation of Disaster/Road Accident information sharing system at Michi-no-Eki | | | | | | | | | | 120.0 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LG018 | Study on the hazardous goods transport needs and designation of hazardous goods transportation | | | | | | | | | | 37.5 |
| LG019 | Installation of hazardous good vehicle monitoring system | | | | | | | | | | 50.0 |
| LG020 | Study on the state-wide emergency medical transport needs | | | | | | | | | | 37.5 |
| LG021 | Upgraded emergency medical transport service unit (company) | | | | | | | | | | 5,000.0 |
| LG022 | R&D on zero-carbon technologies in the logistics sector (CIMAB) | | | | | | | | | | 60.0 |
| LG023 | 3PL logistics service provider development plan | | | | | | | | | | 25.0 |
| LG024 | Establishment of a 3PL service provider by integrating transport services of empressas under GEA, GEMAR, UFC, and CACSA | | | | | | | | | | 250.0 |
| LG025 | Study on Non-state Micro, Small and Medium sized enterprises (MIPYMES) | | | | | | | | | | 25.0 |
| LG026 | Study on the provision of business opportunities to international companies | | | | | | | | | | 25.0 |
| LG027 | Study on National Logistics Authority | | | | | | | | | | 25.0 |
| | Total (million CUP) | 37.3 | 502.4 | 1,106.1 | 1,809.4 | 2,798.1 | 3,283.1 | 2,097.3 | 2,040.7 | 2,040.7 | 15,715.0 |
| | | | | | 6,253.2 | 39.8% | | | 9,461.8 | 60.2% | |

Source: TWG and JICA Study Team

## 6.8 Plan-level SEA

At the plan level, the potential impacts of proposed projects were assessed by the 11 SEA indicators, as shown in Figure 6.8.1, representing the principal ideas of SEA policies.

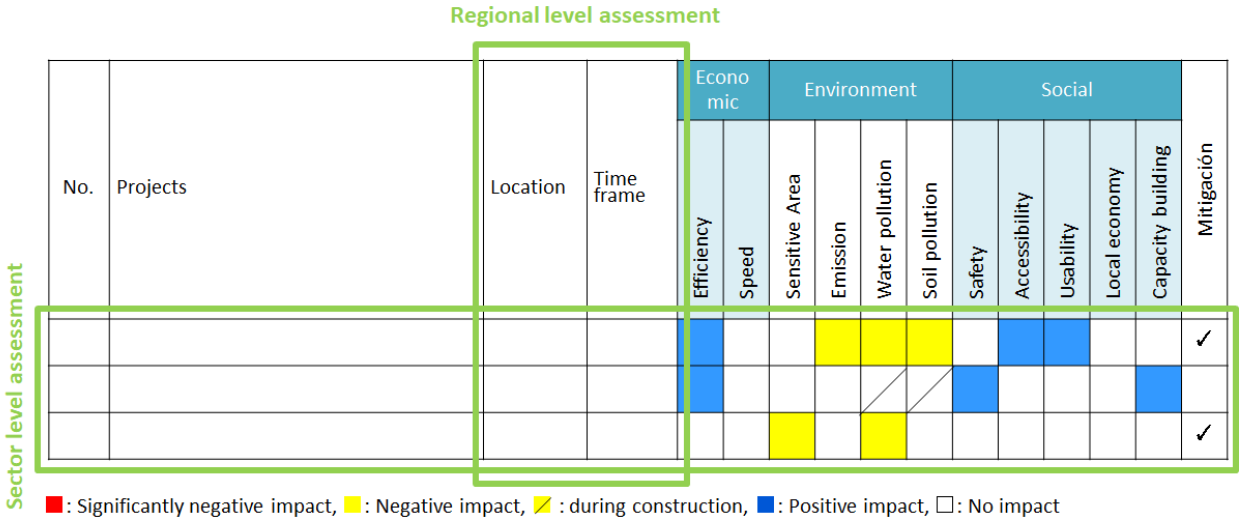



| | | |
|---|---|---|
| Economics | • Efficiency | • Efficient operation<br>• Cost effectiveness of transport services (ton-km) |
| | • Speed | • Improved transport speed (h/km) |
| Environmental | • Sensitive area | • Area of Environmentally sensitive area including natural, cultural, disaster prone area (ha) |
| | • CO2 emission | • CO2 emission (ton-km) |
| | • Water pollution | • Water quality |
| | • Soil pollution | • Soil quality |
| Social | • Safety | • Traffic accident |
| | • Accessibility | • Equal access between the regions<br>• Improved access to social services |
| | • Usability | • Easy and comfortable transport<br>• Improved transport services level |
| | • Local economy | • Improve local economy |
| | • Capacity building | • Trainings |

Source: JICA Study Team

**Figure 6.8.1 SEA indicators for plan-level SEA**

Rapid assessments were carried out for priority projects proposed by each TWG. One of the purposes of this assessment is to understand the anticipated impacts of the NTMP and provide early warning of negative impacts and the necessity to consider mitigation measures during the implementation of the projects. SEA indicators are used for rating impacts as significantly negative, negative, only during construction, positive, and no impact. As shown in the table below, sector- and regional-level assessments were made for each project.



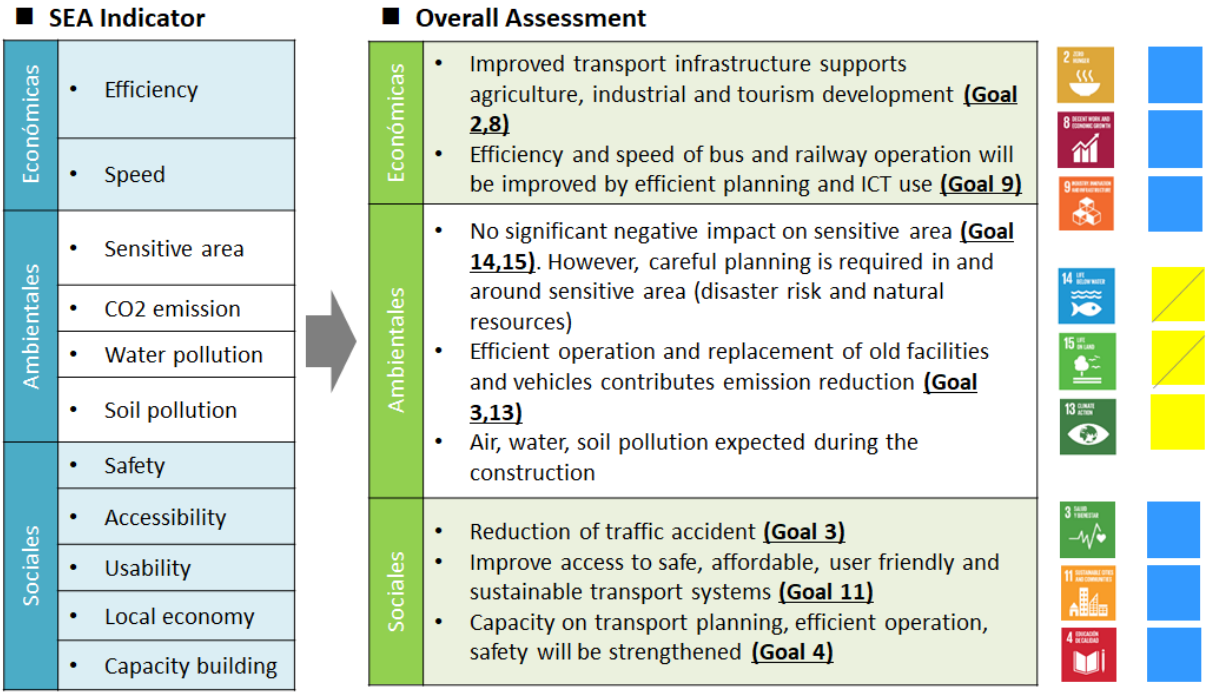

Source: JICA Study Team

**Figure 6.8.2 Plan-level SEA rapid assessment method**

### 6.8.1 Overall assessment

The overall assessment was made to understand the total impact of the master plan component projects and their contribution to the SDGs. From the economic perspective, improved operation and speed contribute to the efficiency of commodity transport and fuel consumption, which benefits are in line with SDGs 2, 8 & 9. In contrast, no significant environmental impacts are expected, even though some impacts are anticipated from construction work to rehabilitate existing infrastructure around sensitive areas, including air, water, and soil pollution. These negatively affect SDGs 14 & 15.

While emission reductions can be expected from replacing old vehicles and facilities, GHG emissions may rise with increased movement and continued use of low-quality fuel, affecting SDGs 3 & 13. In social aspects, possible reduction of traffic accidents, improved access to transport services & social facilities, and capacity building through various proposed training schemes contribute to SDGs 3, 4 & 11.




Source: JICA Study Team

**Figure 6.8.3 Overall Assessment**

### 6.8.2 Project-level assessments by the transport subsector

Regarding the proposed component projects, a rapid assessment was carried out for each transport subsector: Road & Bridge, Bus, Railway, Maritime, and Aviation.

Following are rapid assessment results for each sector.

#### (1) Road & bridge sector

Rehabilitation of critical roads and bridges is identified as an immediate priority. Improved efficiency, speed, accessibility, and safety are expected from upgrading existing infrastructure. Further positive impacts in terms of usability are anticipated via new mobility projects in Havana and the developing

pedestrian facilities in major cities. In addition, the "Michi-no-Eki" concept can promote local products and accordingly contribute to local economies. Anticipated negative impacts during construction include air, noise & soil pollution and accident risk.

**Table 6.8.1 Rapid assessment of the Road & Bridge sector**

| No | Name | Econo-mic | | Environment | | | | Social | | | | | Mitigation required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Efficiency | Speed | Sensitive areas | Emissions | Water pollution | Soil pollution | Safety | Accessibility | Usability | Local economy | Capacity building | |
| RB001 | Study and modernization of means for updating the inventory of roads and bridges with CIMAB support, succeeding the Project "Andariego Vial" (Completion date 2021) | ■ | | | | | | ■ | | | | | |
| RB002 | Integral Development of Roads of National Interest 2020 – 2030 | ■ | ■ | | ⁄ | | ⁄ | ⁄ | ■ | | ■ | | ✓ |
| RB003 | Immediate Action Plan for Critical Road and Bridge Sections | ■ | ■ | | ⁄ | ⁄ | ⁄ | ■ | | ■ | ■ | | ✓ |
| RB004 | Procurement of Road Maintenance Machines and Equipment | | | | | | | ■ | | ■ | | | |
| RB005 | Plan of the Road Network for Heavy Vehicles | ■ | ■ | | | | ⁄ | ■ | | | | | ✓ |
| RB006 | Cuba ITS Development Plan | ■ | ■ | | ■ | | | ■ | | ■ | | | |
| RB007 | Pedestrian Facility Development for Better Environment | | | | | | | ■ | | ■ | | | |
| RB008 | Construction of stop & rest road stations (MICHI NO EKI) along main roads | | | | | | ⁄ | | | ■ | ■ | | ✓ |
| RB009 | Neo-mobility Project | | | | ■ | | | | ■ | ■ | ■ | | |
| RB010 | Study on toll roads, pricing for international cargo transport (containers), and affordable prices for Cubans in new tolls | | | | | | | | | ■ | | | |
| RB011 | Tourism promotion project utilizing grant aid with business & operating rights | | | ⁄ | ⁄ | ⁄ | ⁄ | ■ | | | ■ | | ✓ |
| RB012 | Develop a transport planning center of excellence | ■ | ■ | | ■ | | | ■ | | ■ | | ■ | |
| RB013 | Technical Training Program on Road and Bridge Sector in Japan | ■ | | | | | | ■ | | | | ■ | |
| RB014 | Capacity development for road maintenance via technical cooperation project | | ■ | | | | | ■ | | | | ■ | |

Legend:
Significantly negative impact; Negative impact; Negative impact during construction; Positive impact; No impact

Source: JICA Study Team

### (2) Bus sector

Most of the proposed projects aim to increase the number of bus services and service levels, directly contributing to improved accessibility and usability. In addition, customer-targeted bus services can increase profitability and improve bus service and customer satisfaction. However, more bus operation also increases air pollution and $CO_2$ emissions if the aged vehicles are continuously used with low-quality fuels.

**Table 6.8.2 Rapid assessment of the Bus sector**

| No | Name | Econo-mic | | Environment | | | | Social | | | | | Mitigation required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Efficiency | Speed | Sensitive areas | Emissions | Water pollution | Soil pollution | Safety | Accessibility | Usability | Local economy | Capacity building | |
| RT001 | Tourist bus service plan & operation coordination | ■ | | | | | | | | ■ | | | |
| RT002 | Intercity bus service plan & operation coordination at the central level | ■ | | | | | | | ■ | | | | |
| RT003 | Comprehensive bus network development plan | ■ | | | | | | | ■ | ■ | | | |
| RT004 | Revision of the bus fare system | | | | | | | | ■ | ■ | | | |
| RT005 | Information for bus passengers | | | | | | | | | ■ | | | |
| RT006 | Advanced bus operation and management system development | ■ | | | | | | | | ■ | | | |
| RT007 | Digital transformation for the management of bus fleets and spare parts | ■ | | | | | | | | | | ■ | |
| RT008 | Urgent bus fleet rehabilitation and procurement | | | | | | | ■ | ■ | ■ | | | |
| RT009 | Renovation of intercity bus terminals (part of the Michi no Eki project) | | | | ⁄ | ⁄ | ⁄ | | | ■ | ■ | | ✓ |
| RT010 | Advanced covered bus stops (smart bus shelters) development | | | | | | | | | ■ | | | |
| RT011 | Safety improvement projects | | | | | | | ■ | | | | | |
| RT012 | Resiliency improvement | | | | | | | ■ | | | | | |
| RT013 | Ticketing system improvement | | | | | | | | | ■ | | | |
| RT014 | Sustainable bus fleet production | | | | | | | | ■ | ■ | | | |

Legend:
■ Significantly negative impact ■ Negative impact ⁄ Negative impact during construction ■ Positive impact □ No impact

Source: JICA Study Team

### (3) Railways

Proposed projects include rehabilitation of existing lines, study on new connections, creation of integrated operation centers, study on alternative fuel use, and use of ICT (signaling, GPS, etc.). Positive impacts are expected from increased operational efficiency, accessibility, and usability via digitization, rehabilitation, and extension of railway lines. Emission reductions can be expected from the modal shift of cargo transport from road-based transport and the possible use of alternative energy sources. On the other hand, negative impacts are expected during construction, including air, water, and soil pollution, waste generation, and accident risks. The potential need for land acquisition and possible impacts on sensitive coastal areas must also be considered.

**Table 6.8.3 Rapid assessment of the Railway sector**

| No | Name | Econo-mic | | Environment | | | | Social | | | | | Mitigation required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Efficiency | Speed | Sensitive areas | Emissions | Water pollution | Soil pollution | Safety | Accessibility | Usability | Local economy | Capacity building | |
| RW001 | Development of railway operation & management performance indicators and a monitoring system | ■ | | | | | | | | | | | |
| RW002 | Establishment of a new accounting system using ICT | | | | | | | | | | | ■ | |
| RW003 | Development of a database of railcars and other equipment using ICT | | | | | | | | | | | ■ | |
| RW004 | Computerization of railway operation planning, control, and monitoring | ■ | | | | | | ■ | | ■ | | | |
| RW005 | Updating the Railway Sector's 5-Year Development Plan | ■ | | | ■ | | | | | | ■ | | |
| RW006 | Feasibility Study on the Airport Line (José Martí airport and Havana) | | ■ | | ▨ | ▨ | ▨ | ■ | | | ▨ | | ✓ |
| RW007 | Feasibility Study on the Airport Line extension from Havana to Varadero | | ■ | ▨ | ▨ | ▨ | ▨ | | ■ | | ▨ | | ✓ |
| RW008 | Feasibility Study on the rehabilitation and extension of the railways to the northern key development areas, including Villa Clara, Ciego de Avila, Camaguey, and Holguin | | ■ | ▨ | ▨ | ▨ | ▨ | | ■ | | ▨ | | ✓ |
| RW009 | Feasibility Study on Commuter Rail Services Development in Havana | | ■ | | ▨ | ▨ | ▨ | | ■ | | ▨ | | ✓ |
| RW010 | Modernization of Track Inspection and Maintenance Planning System | | | | | | | ■ | | | | ■ | |
| RW011 | Modernization of Bridge Inspection and Maintenance Planning System | | | | | | | ■ | | | | ■ | |
| RW012 | Procurement of trackwork machines and equipment | | | | | | | ■ | | ■ | | | |
| RW013 | Workshop for track machine & equipment maintenance | | | | | | ▨ | | | ■ | | ■ | ✓ |
| RW014 | Feasibility Study and Detailed Design of the Central Line Rehabilitation and Improvement | | ■ | | ▨ | ▨ | ▨ | ■ | ■ | | ▨ | | ✓ |
| RW015 | Rehabilitation of the Central Line, including the Havana junction | | ■ | | ▨ | ▨ | ▨ | ■ | ■ | | ▨ | | ✓ |
| RW016 | Feasibility Study and Detailed Design of the Southern Line, Cienfuegos Line, and Cárdenas Branch Line | | ■ | | ▨ | ▨ | ▨ | ■ | ■ | | ▨ | | ✓ |
| RW017 | Rehabilitation of the South Line, Cienfuegos Line, and Cárdenas Branch | | ■ | | ▨ | ▨ | ▨ | ■ | ■ | | ▨ | | ✓ |
| RW018 | Study on CCD (Centro de Carga y Descarga) rehabilitation | ■ | | | ■ | ▨ | ▨ | | | | | | ✓ |
| RW019 | Construction of CCD Habana 222 | ■ | | | ■ | | ▨ | | | | | | ✓ |
| RW020 | Study and design for station rehabilitation | | | | ▨ | ▨ | ▨ | | | ■ | | | ✓ |
| RW021 | The Second Stage of the Central Station of Havana Restoration and Rehabilitation | | | | ▨ | ▨ | ▨ | | | ■ | | | ✓ |
| RW022 | Research & Development of modern railway technologies and management | | | | | | | | | | | ■ | |
| RW023 | Study on Battery-Electric Locomotive and DEMU (Deisel Electric Multiple Unit) | | | | ■ | | ▨ | | | | | | ✓ |
| RW024 | Installation of photovoltaic systems at stations, level crossings, and other railway facilities | | | | ■ | | | ■ | | | | | |
| RW025 | Safety improvement of level crossings | | | | | | | ■ | | | | | |
| RW026 | Security improvement of cargo storage, handling, and transportation | | | | | | | ■ | | | | | |

| No | Name | Econo-mic | | Environment | | | | Social | | | | | Mitigation required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Efficiency | Speed | Sensitive areas | Emissions | Water pollution | Soil pollution | Safety | Accessibility | Usability | Local economy | Capacity building | |
| RW027 | Feasibility Study on the Improvement of passenger train service between Habana and Mariel SDZ | ■ | | | ⁄ | ⁄ | ⁄ | | ■ | ■ | □ | | ✓ |
| RW028 | Birán project - update of railbus service in rural areas | | ■ | | | | | | ■ | | ■ | | |
| RW029 | Rehabilitation of the Hershey electrified line | | | | ■ | | ⁄ | ■ | ■ | ■ | | | ✓ |
| RW030 | Rolling stock procurement program | | | | ■ | | | | | ■ | | | |
| RW031 | Installation of GPS for efficient train monitoring and operation | ■ | | | | | | | | | | | |
| RW032 | Study on the cargo transport efficiency improvement | ■ | | | | | | | | | | | |
| RW033 | Study on the parcel transport service improvement | | | | ■ | | | | | | | | |
| RW034 | Improve the cargo train operation diagram and operation | ■ | | | | | | | | | | | |
| RW035 | Digital transformation of cargo handling and transportation data collection and analysis system using Harmonized Commodity Description and Coding System (HS Code) | ■ | | | | | | | | | | | |
| RW036 | Repair program of railcars | ■ | | | | | | ■ | | ■ | | | |
| RW037 | Modernization of the workshops | ■ | | | | | ■ | ■ | | | | | ✓ |
| RW038 | Modernization of the vaporization system of the fuel tanks of the Sagua workshop | ■ | | | | | | | | | | | |
| RW039 | Marketing of rail cargo and passenger | ■ | | | | | | | | | ■ | | |
| RW040 | Study on the railway transport tariff structure | ■ | | | | | | | | | | | |
| RW041 | Increase the capacity of UFC as an integrated logistics operator | ■ | | | | | | | | | | ■ | |
| RW042 | Organizational restructuring of UFC and related entities | | | | | | | | | | | ■ | |
| RW043 | Study on the reorganization of the national railway planning, administration, and management systems | ■ | | | | | | | | | | ■ | |
| RW044 | Upgrade training/educational system in the rail transport sector | | | | | | | | | | | ■ | |
| RW045 | Study on Return on Asset (ROA) | ■ | | | | | | | | | | | |

Legend:
■ Significantly negative impact
□ Negative impact
⁄ Negative impact during construction
■ Positive impact
□ No impact

Source: JICA Study Team

### (4) Maritime

The maritime sector's efficiency and usability will be improved by repairing and modernizing the existing ports. Proposed projects will also improve navigation safety in ports having difficult approaches. Although modal shifts may reduce emissions, there is currently no way to measure emissions from the maritime sector. During the expansion and repair of ports, anticipated negative impacts include air, marine, and soil pollution, plus waste generation.

## Table 6.8.4 Rapid assessment of the Maritime sector

| No | Name | Econo-mic | | Environment | | | | Social | | | | | Mitigation required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Efficiency | Speed | Sensitive areas | Emissions | Water pollution | Soil pollution | Safety | Accessibility | Usability | Local economy | Capacity building | |
| M001 | Development of Passenger Cruise Terminal in Cienfuegos Port (Feasibility Study) | | | | | | | | | | | | ✓ |
| M002 | Containerization of International/Domestic Cargo Transport (Plan and Feasibility Study) | | | | | | | | | | | | ✓ |
| M003 | Port Statistics and Database System Development Project | | | | | | | | | | | | |
| M004 | Preparatory Study to Introduce Maritime Transport Planning Courses to Academic Institutes/Colleges in Cuba | | | | | | | | | | | | |
| M005 | Expansion and modernization of Casasa Port | | | | | | | | | | | | ✓ |
| M006 | Santiago de Cuba Port Container Terminal | | | | | | | | | | | | ✓ |
| M007 | Cienfuegos Port Expansion and modernization | | | | | | | | | | | | ✓ |
| M008 | Cruise Passenger Terminal in Santiago de Cuba Port (Feasibility Study) | | | | | | | | | | | | ✓ |
| M009 | Repair and modernization of the port of Nuevitas | | | | | | | | | | | | ✓ |
| M010 | Repair of hydro-technical issues of the facilities of Gerona, Cayo Largo del Sur, and Batabanó ports. | | | | | | | | | | | | ✓ |
| M011 | Baracoa port repair and modernization | | | | | | | | | | | | ✓ |
| M012 | General repair of Havana Port | | | | | | | | | | | | ✓ |
| M013 | Matanzas Port Repair and Modernization | | | | | | | | | | | | ✓ |
| M014 | Repair and modernization project of the port of Antilla | | | | | | | | | | | | ✓ |
| M015 | Repair and modernization of Sugar Ports (Matanzas, Cienfuegos, Carupano, Guayabal) | | | | | | | | | | | | ✓ |
| M016 | Rehabilitation and modernization of GEMAR vessels | | | | | | | | | | | | |
| M017 | Procurement of Two 2,500DWT multipurpose vessels for coastal shipping in the north coast | | | | | | | | | | | | |
| M018 | Procurement of cargo vessels for tourism development in the north coast (port of Casasa) | | | | | | | | | | | | |
| M019 | Development of GEMAR Shipyards | | | | | | | | | | | | ✓ |
| M020 | Strategic Environmental Assessment (SEA) for Port and Maritime Projects (study) | | | | | | | | | | | | |
| M021 | Reduction of Fuel Consumption for Port and Maritime Sector (study) | | | | | | | | | | | | |
| M022 | Modal Shift from Road Transport to Maritime Transport (study) | | | | | | | | | | | | |
| M023 | Upgrading Plan for Ship Navigation System in Cuban Ports (study) | | | | | | | | | | | | |
| M024 | Study on Appropriate Price of Port Service and Domestic Transportation (incl. Passengers) | | | | | | | | | | | | |
| M025 | Strategic Plan for Foreign Direct Investment of Port and Maritime Sector (Use of Concession Agreement) | | | | | | | | | | | | |
| M026 | Strategic Plan for Development of Non-state Enterprises of the Port and Maritime Sector | | | | | | | | | | | | |
| M027 | Study on EDI and Installation of System in Cuban Ports | | | | | | | | | | | | |

Legend:

Significantly negative impact | Negative impact | Negative impact during construction | Positive impact | No impact

Source: JICA Study Team

### (5) Civil Aviation

Operational efficiency, safety, and usability will be improved by installing modern equipment and technical assistance. In addition, capacity building for airline marketing will enhance the profitability of airport operations and the airlines.

Air, water, and soil pollution and waste generation during airport terminal expansion are anticipated. Also, emissions from incinerators at airports need monitoring. Some airports are at risk of climate change: Cayo Largo, Cayo Coco, Baracoa for sea-level rise, and Santiago de Cuba for hurricanes.

**Table 6.8.5 Rapid assessment of the aviation sector**

| No | Name | Econo-mic | | Environment | | | | Social | | | | | Mitigation required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Efficiency | Speed | Sensitive areas | Emissions | Water pollution | Soil pollution | Safety | Accessibility | Usability | Local economy | Capacity building | |
| A001 | Airport Facility and Equipment Master Plan Project (three major airports) | ■ | | | | | | | | ■ | | | |
| A002 | Airport System Digitization Project (major three airports) | ■ | | | | | | | | ■ | | | |
| A003 | GSE (Ground Support Equipment) Procurement Project (major three airports) | ■ | | | ■ | | | | | ■ | | | |
| A004 | Technical Assistance for GSE (Ground Support Equipment) maintenance (three major airports) | ■ | | | | | | | | ■ | | ■ | |
| A005 | Jose Marti International Airport Passenger Terminal Expansion Project | ■ | | | ⁄ | | ⁄ | | | ■ | ⁄ | | ✓ |
| A006 | Air Freight Logistics Process Digitization Project | | ■ | | ■ | | | | | ■ | | | |
| A007 | Major airports technical assistance for ground handling (passenger/ramp handling) | | | | | | | | | ■ | | ■ | |
| A008 | Aviation sector sustainability master plan development project | ■ | | | ■ | | | ■ | | | | | |
| A009 | Development of innovative logistics warehouse (Havana) | ■ | ■ | | ⁄ | | ⁄ | | | | | | ✓ |
| A010 | Aircraft Renewal/Procurement/Lease Plan | ■ | | | ■ | | | | | ■ | | | |
| A011 | Upgrading air traffic control system & operation project (HAV, VRA, SCU, SNU) | | | | ■ | | | ■ | | | | | |
| A012 | Upgrading safety management system (SMS) & safety security equipment | | | | | | | ■ | | | | | |
| A013 | Human resources capacity building plan project | | | | | | | | | | | ■ | |
| A014 | Study on state & non-state investment in the aviation sector | ■ | | | | | | | | | | | |
| A015 | Sustainable Airport Services Improvement Plan | ■ | | | ■ | | | | | | | | |
| A016 | Strategic Pricing System Introduction Plan Project | | | | | | | | ■ | ■ | | | |
| A017 | Upgrading of aviation sector regulatory framework | | | | | | | ■ | | | | | |
| A018 | Santa Clara International Airport facility expansion project | ■ | | | ⁄ | | ⁄ | | | ■ | ■ | | ✓ |
| A019 | Introduction of facilities and equipment adjusted to universal design. | | | | | | | | | ■ | | | |
| A020 | Modernization of facilities and fuel equipment/truck project (major three airports) | ■ | | | | | | | | | | ■ | |
| A021 | Project for the procurement of technological equipment (three major airports) | | | | | | | | | ■ | | | |
| A022 | Technical assistance for the development of a plan to increase non-aeronautical revenues | ■ | | | | | | | | | | ■ | |

Legend:
Significantly negative impact; Negative impact; Negative impact during construction; Positive impact; No impact

Source: JICA Study Team

### (6) Logistics

Proposed projects include introducing an efficient logistic planning system and establishing third-party logistics (3PL) service providers that aim to improve efficiency, reduce emissions and contribute to capacity building of the logistics sector.

Disaster response and emergency medical transport are also addressed, contributing to people's life-saving. While rehabilitation and improvement of warehouse and storage will increase logistics efficiency, negative impacts such as air, water, soil pollution, and waste generation are expected during construction.

**Table 6.8.6 Rapid assessment of the logistics sector**

| No | Name | Econo-mic | | Environment | | | | Social | | | | | Mitigation required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Efficiency | Speed | Sensitive areas | Emissions | Water pollution | Soil pollution | Safety | Accessibility | Usability | Local economy | Capacity building | |
| LG001 | Digital Transformation (DX) of the BC system Phase 1 | ■ | | | | | | | | | | ■ | |
| LG002 | Digital Transformation (DX) of the BC system Phase 2 | ■ | | | | | | | | | | ■ | |
| LG003 | Cargo Transport Service Integration | ■ | | | | | | | | | | | |
| LG004 | Human Resources (HR) Development in the logistics sector | | | | | | | | | | | ■ | |
| LG005 | Formulation of the National Logistic Master Plan 2040 | ■ | | | | | | | | | ■ | | |
| LG006 | Renewal of aged vehicles (trucks) | | | | ■ | | | | | | | | |
| LG007 | DPT( Direction Provincial de Transporte) enhancement plan | ■ | | | | | | | ■ | | | | |
| LG008 | Establishment of standard inspection procedure and a procurement plan for inspection equipment | | | | ■ | | | ■ | | | | ■ | |
| LG009 | Establishment of vehicle inspection companies based on the vehicle inspection plan (LG008) | | | | ■ | | | ■ | | | | ■ | |
| LG010 | General warehouse rehabilitation/renewal plan | ■ | | | ▨ | ▨ | ▨ | | | | | | |
| LG011 | Rehabilitation/renewal of general warehouse of each province | ■ | | | ▨ | ▨ | ▨ | | | | | | |
| LG012 | Study on needs for storage of specific important goods in Mariel, Matanzas, Cienfuegos, and Santiago de Cuba | ■ | | | ▨ | ▨ | ▨ | | | | | | |
| LG013 | Construction of priority new warehouses | ■ | | | ▨ | ▨ | ▨ | | | | | | |
| LG014 | Study on packaging technology and industry development | ■ | | | | | | | | | | ■ | |
| LG015 | Business Continuity Plan (BCP) in the logistics sector | ■ | | | | | | ■ | | | | | |
| LG016 | Disaster/accident information sharing system development | | | | | | | ■ | | | | | |
| LG017 | Installation of Disaster/Road Accident information sharing system at Michi-no-Eki | | | | | | | ■ | | | | | |
| LG018 | Study on the hazardous goods transport needs and designation of hazardous goods transportation | | | | | | | ■ | | | | | |
| LG019 | Installation of a hazardous goods vehicle monitoring system | | | | | | | ■ | | | | | |
| LG020 | Study on the state-wide emergency medical transport needs | | | | | | | ■ | ■ | | | | |
| LG021 | Upgraded emergency medical transport service unit (company) | | | | | | | ■ | ■ | | | ■ | |
| LG022 | R&D on zero-carbon technologies in the logistics sector (CIMAB) | | | | ■ | | | | | | | ■ | |
| LG023 | 3PL logistics service provider development plan | ■ | | | | | | | | | | | |
| LG024 | Establishment of a 3PL service provider by integrating transport services of empressas under GEA, GEMAR, UFC, and CACSA | ■ | | | | | | | | | | | |

| No | Name | Econo-mic | | Environment | | | | Social | | | | | Mitigation required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Efficiency | Speed | Sensitive areas | Emissions | Water pollution | Soil pollution | Safety | Accessibility | Usability | Local economy | Capacity building | |
| LG025 | Study on Non-state Micro, Small and Medium-sized enterprises (MIPYMES) | | | | | | | | | | | | |
| LG026 | Study on the provision of business opportunities to international companies | | | | | | | | | | | | |
| LG027 | Study on National Logistics Authority | | | | | | | | | | | | |

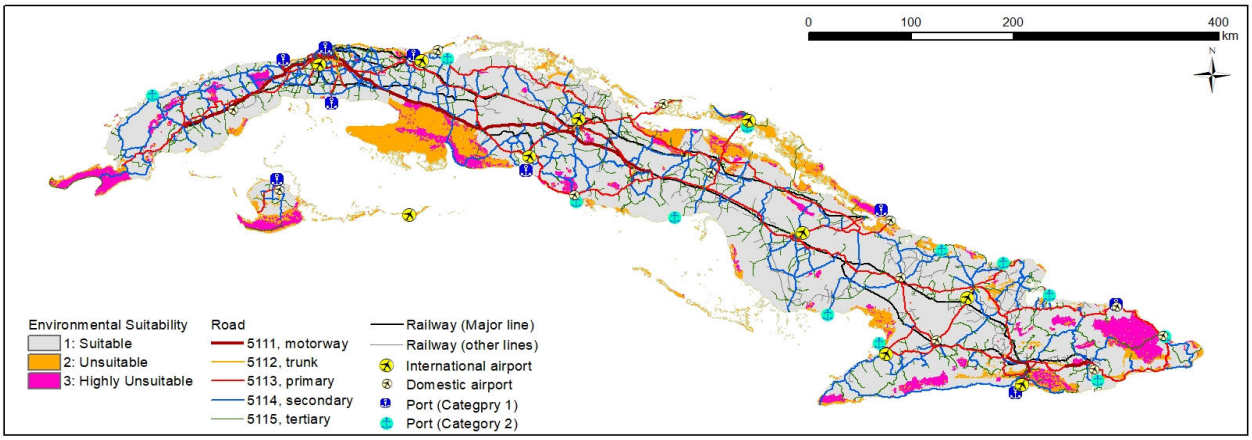
Legend:
Significantly negative impact | Negative impact | Negative impact during construction | Positive impact | No impact

Source: JICA Study Team

### 6.8.3 Regional level assessment

A regional-level assessment of proposed projects was also made. Transportation developments, especially in Havana, Santiago de Cuba, and other provincial capital cities, need careful consideration to ensure the protection of historical/cultural heritage assets.

Besides, tourism and infrastructure developments in Northern Cay areas need careful consideration to preserve coastal and marine ecosystems. Baracoa and Santiago de Cuba are categorized as highly unsuitable areas in the Environmental Suitability due to their geographical characteristics and high natural disaster risks. Therefore, development in those areas must incorporate mitigation measures, especially for port and airport projects.




Source: JICA Study Team

**Figure 6.8.4 Existing transport network & environmental suitability map**

Relatively large-scale projects in each transport subsector are focused on considering mitigation measures. From the regional aspects, projects in Havana, Northern Cays, and Santiago de Cuba are highlighted.

### 6.8.4 Sector-level mitigation

#### (1) Bus sector

To mitigate growing emissions from an increasing volume of public transport operations, there is a need for new buses with lower emissions and higher fuel economy along with higher-quality fuel and renewable energy sources. In addition, improved public transport services should be balanced among regions and not only focused on the tourism sector.

#### (2) Roads & bridges

Large-scale projects include the eastward extension of Autopista. During construction, dust impact should be minimized during high winds in the dry season, and soil pollution and waste management should be controlled. In addition, safety measures must be included along the route, especially where rural roads merge with Autopista. Although plans to designate routes for heavy vehicles and dangerous goods will improve safety, care must be taken to avoid sensitive and residential areas. For hazardous goods transport, accident response plans should also be in place.

#### (3) Railways

Rehabilitation of existing railway lines and new links between central Havana and the airport and Havana to the Northern Cays are significant projects with potential adverse impacts. Therefore, during construction, soil pollution and hazardous wastes must be minimized; and safety measures should be in place. Furthermore, since existing roads are narrow, sufficient space for construction vehicles should be ensured to reduce water pollution, soil erosion, and traffic congestion risks for the proposed new link to the Northern Cays.

#### (4) Aviation

Mitigation measures for air and soil pollution should be ensured during the construction of proposed terminal expansions at Jose Marti and Santa Clara airports. Varadero airport can be considered a good case for waste management, especially proper separation/storage of hazardous wastes. In addition, air quality from incinerators at the airports should be monitored as the volume of waste will increase as airport size and traffic grow.

#### (5) Maritime

Water and soil pollution should be mitigated and monitored during the construction and operation of the proposed container terminal in Santiago de Cuba. Especially with oil spills, risk management plans are essential, along with measures to control hazardous wastes. Climate adaptation measures are also critical as Santiago de Cuba is identified as an area of high hurricane risk.

### 6.8.5 Regional level mitigation

#### (1) Havana

The concentration of developments in Havana contributes to the increasing pressure of urbanization on the capital. As a growth center, the accumulation of environmental and social impacts should be controlled concerning industrialization, urbanization, and infrastructure development. Particularly in Havana Bay and Mariel port, special attention is required for increasing domestic and industrial wastewater and solid & hazardous waste disposal. Continued monitoring of the existing wastewater treatment facility in Havana SDZ is needed. For environmental monitoring of the bay, coordination with the current State Task Force (GTE) can be helpful. As Havana is an important historical heritage site, projects must closely adhere to the laws and regulations for the historic area.

#### (2) Northern Cays

As Cuba's major tourism destination, development pressure in the Northern Cays is unavoidable. It is necessary to link the mainland and the northern islands by developing new transport infrastructure and services. In this regard, EIA is needed to study and assess the possible impacts on the ecosystem and biodiversity to minimize the environmental impacts and maintain marine resources. Although major issues are not yet identified, wastewater discharge from nearby cities and tourism facilities should be closely monitored to ensure necessary mitigation measures are provided early.

#### (3) Santiago de Cuba

Santiago de Cuba can be a key international gateway and the logistics distribution center for eastern Cuba. Due to its mountainous nature, special attention is needed in developing road networks in the area. As a high disaster-risk area, airports, ports, and storage facilities along the coast should incorporate disaster-adaptation measures. Dredged sand disposal sites for Santiago de Cuba are designated by CITMA inland and offshore. As the amounts for disposal will increase, offshore disposal sites will need further study and revision.

### 6.8.6 Recommendations

As the scale of transport infrastructure development in Cuba is currently limited, no significant environmental or social impacts exist. In addition, since the proposed physical projects focus mainly on rehabilitation and improvement of the existing infrastructure, few new developments are likely to cause significant adverse impacts. However, pollution control and climate-change adaptation should be focal points in the transport sector. In this regard, recommendations for MITRANS and CITMA are summarized below.

### 6.8.7 MITRANS

#### (1) Planning

As the planning stage is the best place to identify and prevent foreseeable environmental and social impacts, SEA should be an essential function of the master plan preparation process. In this regard, a vital feature of SEA in this master plan exercise is the involvement of Cimab and TWGs for each transport subsector, which helps ensure that environmental and social aspects are considered alongside technical aspects.

Another key feature is the use of GIS for spatial risk assessment. For example, Cimab summarized the effects of climate change on transport infrastructure in 2021 using Tarea Vida's “Life Task” and transport infrastructure data. Together with climate-change data, other spatial data on environmentally sensitive areas were included in the risk assessment prepared in this master plan. SEA meeting participants considered this exercise helpful in identifying sensitive areas and minimizing potential negative impacts in future developments.

#### (2) Implementation/monitoring

For every implementation agency of the proposed projects, avoiding negative impacts during construction and operation is a crucial consideration. To this end, project-based EIAs should be conducted along with mitigation measures and monitoring activities to ensure adherence to national or international standards where no Cuban standards apply.

Monitoring is a critical element of SEA practice. Therefore, monitoring items should be identified, and corresponding monitoring mechanisms should be implemented. To monitor the impacts and achievement of the objectives of this master plan, proposed monitoring items are presented in Table 6.8.7.

#### (3) Administrative guidance

One crucial environmental concern in the transport sector is emissions from aged vehicles. As MITRANS is the regulatory body for subordinate transport agencies, administrative guidance should be provided to control emission levels, for instance, during inspections of light and heavy vehicles.

**Table 6.8.7 Proposed monitoring items**

| | Items | Indicators | SDGs | National targets | Responsible institutions |
|---|---|---|---|---|---|
| Economic | Efficiency | • Cost-effectiveness of transport services | Goal 8<br>Goal 9 | | MITRANS |
| | Speed | • Improved transport speed (h/km) | Goal 9 | | MITRANS |
| Environmental | Sensitive areas | • Loss of environmentally sensitive areas, including natural and cultural sites (ha)<br>• Mitigation measures for projects in disaster-prone areas | Goal 14<br>Goal 15 | | CITMA |
| | $CO_2$ emissions | • Air quality of project areas<br>• Number of EVs<br>• $CO_2$ emissions | Goal 3<br>Goal 13 | 45% of vehicles using RES by 2030*1 | CITMA, MITRANS |
| | Water pollution | • Water quality of project areas | Goal 14 | | CITMA, Cimab |
| | Soil pollution | • Soil quality of project areas | Goal 15 | | CITMA |
| Social | Safety | • Traffic accidents | Goal 3 | Reduce accidents by 1.5%/year*2 | MITRANS, MININT |
| | Accessibility | • Number of buses<br>• No. of transport users in each province | Goal 11 | | MITRANS |
| | Usability | • Improved transport services level | Goal 11 | | MITRANS |
| | Local economy | • Employment generation<br>• Improve local economy | Goal 8 | | MITRANS (Provincial) |
| | Capacity building | • Number of people trained | Goal 4 | | MITRANS |

*1 MITRANS Program, “Tarea Vida (Life Task)” for 2021-2030 / *2 National Strategic Road Safety Plan 2018-2030
Source: JICA Study Team

### 6.8.8 CITMA

#### (1) Policy interventions

CITMA is responsible for coordinating each ministry to achieve Tarea Vida's “Life Task.” Guidance on climate change adaptation measures for infrastructure development in the transport sector is needed. Technical evaluation for renewable energy use is also required to evaluate the total $CO_2$ emissions from energy production to energy use by transport sectors.

Plus, since air pollution and GHG emissions stem not only from aged vehicles but also from the quality of fuels, the improvement of oil refinery technologies and facilities should be recommended as a long-term policy for the energy sector.

#### (2) Standards/regulations

As the overall regulator of SEAs, it is recommended that CITMA develop standard SEA procedures and accumulate case studies and best practices to build capacity and mainstream SEAs in the planning process. It is also essential to strengthen project-level EIA, especially ecosystem and biodiversity surveys in and around environmentally sensitive areas. In addition, the project formulation and assessment stages should include climate change and disaster risk reduction, response, and adaptation.

### (3) Monitoring

Cuba's current project monitoring system is based on environmental licenses granted by CITMA, with third parties contracted to conduct monitoring during project construction and operation. However, there is no particular system for monitoring master plan impacts. As mentioned above, MITRANS should be responsible for monitoring the master plan with support from CITMA.

## 6.8.9 International conventions

One topic brought up in the SEA meeting was the issue of compliance with international conventions in the transport sector.

Cuba is preparing to comply with MARPOL Annex VI[2], which addresses air pollution from ships. It sets limits on NOx emissions and requires fuel with lower sulfur content. In the aviation sector, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSICA)[3] set a goal to achieve carbon-neutral growth from 2020. Since Cuba falls under the category of Least Developed Countries and Small Island Developing Countries, it is not mandated to join CORSICA. However, all ICAO member states with airline operators conducting international flights must monitor, report and verify $CO_2$ emissions from these flights each year from 2019. All airplane operators with $CO_2$ emissions less than or equal to 10,000 tons are exempted from CORSICA reporting requirements.

To comply with international conventions, capacity building and adequate equipment are needed to monitor emissions from all transport sectors. Cuba's emission standards (set in 2001) are now being reviewed and updated. However, there are no emission standards, measurement methods, or equipment for heavy vehicles, railways, ships, or aircraft. To remedy this, setting of emission standards, monitoring methodology, and procurement of appropriate measuring equipment for the overall transport sector (including road, maritime, and aviation) are proposed in the master plan, including the following:

- Update vehicle emission standards and set a heavy vehicle emission standard.
- Set emission standards and measurement methods for railways, ships, and aircraft.
- Procure emission measuring equipment, train personnel for vehicle inspection and monitoring.

Proposed monitoring items and responsible bodies listed in Table 6.8.7 were discussed and confirmed in the SEA meeting. During the meeting, it was mentioned that a specific entity should be assigned to conduct monitoring. Although MITRANS will be the responsible body, it was proposed that technical officers of TWG members of each sector can do the gathering of monitoring data. An annual meeting between MITRANS and CITMA is also recommended to coordinate the implementation of the master plan.

[2] MARPOL Annex VI came into force on 19 May 2005 introduces requirements to regulate the air pollution being emitted by ships. The emission includes Ozone-Depleting Substances (ODS), Nitrogen Oxides (NOx), Sulfur Oxides (SOx), Volatile Organic Compounds (VOCs) , and shipboard incineration. It also establishes requirements for reception facilities for wastes from exhaust gas cleaning systems, incinerators, fuel oil quality, off-shore platforms, and drilling rigs.

[3] CORSICA is a carbon offset/scheme to lower $CO_2$ emissions for international flights, to curb aviation impact on climate change. Aircraft operators must purchase carbon credits from the carbon market starting in 2021, the scheme is voluntary until 2027.

## 6.9 Financial Considerations

### 6.9.1 Gross Fixed Capital Formation (GFCF)

From 1 January 2021, the Cuban government implemented the monetary unification to abolish the Cuban convertible peso and the 1 CUP/USD rate and established a single exchange rate of 24 CUP/USD for selling USD and 25 CUP/USD for purchasing USD in all economic transactions. Due to the above transformation, the national accounts in terms of current prices in 2021, shown in the Statistical Yearbook of Cuba, ONEI, became completely different from the previous years.

In 2021, the Gross Fixed Capital Formation (GFCF), a component of the expenditure on GDP to measure the value of acquisitions of new or existing fixed assets, recorded 58.9 billion CUP, which increased from 10.5 billion CUP in 2020 at current prices. The composition in 2021 was "construction" (59%), "machinery and equipment" (28%), "others" (10%), and "capitalizable repairs" (3%). By type of business activity, "Business services, real estate, and rental activities" form 35.2% of the total investment output, followed by "Manufacturing industries" (14.4%) and "Transportation, storage and communication" (13.1%) (Table 6.9.1).

**Table 6.9.1 Investments by type of economic activity (2021)**

| | 2021 (mil CUP) | Share of 2021 (%) |
|---|---|---|
| Total | 58,965.0 | 100.0% |
| Agriculture, livestock, forestry. | 1,691.4 | 2.9% |
| Fishing | 345.9 | 0.6% |
| Mining and quarrying | 5,808.0 | 9.8% |
| Sugar industry | 232.8 | 0.4% |
| Manufacturing industries | 8,480.6 | 14.4% |
| Electricity, gas, and water supply | 4,252.9 | 7.2% |
| Construction | 984.0 | 1.7% |
| Trade, repair of personal effects | 1,454.9 | 2.5% |
| Hotels and restaurants | 1,427.6 | 2.4% |
| Transportation, storage, and communications | 7,741.9 | 13.1% |
| Financial intermediation | 97.4 | 0.2% |
| Business services, real estate, and rental activities | 20,735.1 | 35.2% |
| Public administration, defense, social security | 2,275.9 | 3.9% |
| Science and technological innovation | 400.5 | 0.7% |
| Education | 678.4 | 1.2% |
| Public health and social assistance | 1,013.5 | 1.7% |
| Culture and sport | 727.9 | 1.2% |
| Community, social and personal services | 616.2 | 1.0% |

Source: Statistical Yearbook of Cuba, ONEI

### 6.9.2 Expected GFCF in the Transport Sector

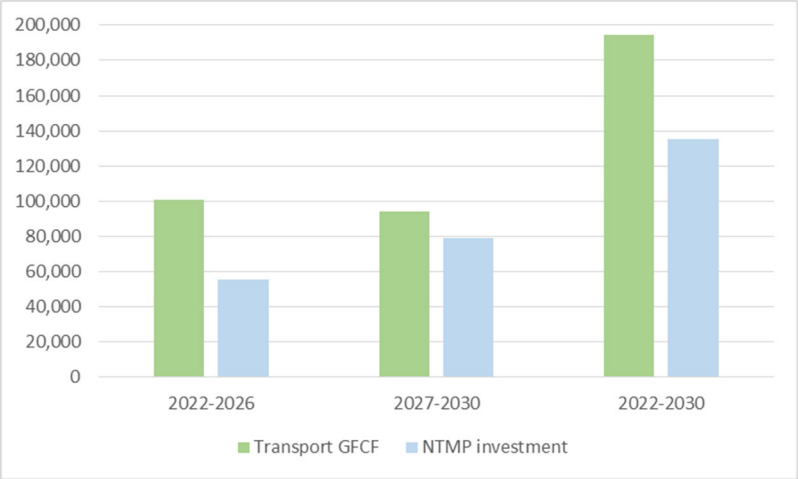
The expected GFCF in the transport sector was estimated by applying the Incremental Capital-Output Ratio (ICOR) approach. ICOR is a measurement to assess investment inefficiency, calculated with the ratio of gross capital formation to GDP divided by the economic growth rate.

A smaller ICOR indicates that a GDP growth rate is higher than an increase in investment; the investment and production efficiency are high. On the other hand, a larger ICOR means that the investment efficiency is low.

Due to the difficulties in estimating Cuba's ICOR based on the available statistics, Cuba's target ICOR is set at 4.0 ~ 5.0 in this study, referring to Central America and Asian countries experience in the last decades. Another critical assumption in estimating GFCF is a GDP annual growth rate (nominal). This is assumed to be 3.5% through the planning horizon, the same as Cuba's average growth rate between 2017 and 2019 (before the COVID-19 pandemic).

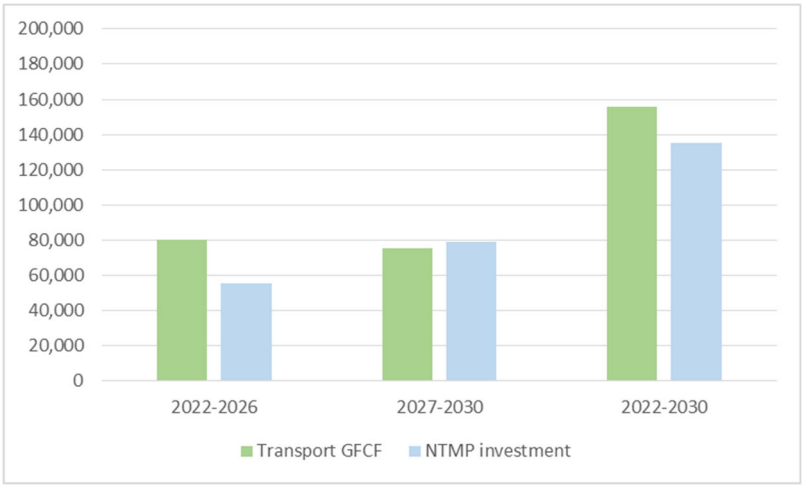
Based on the above assumptions, an indicative GFCF in the transport sector (13.1% of the total GFCF) between 2022 and 2030 is calculated as 194.7 billion CUP at ICOR of 5.0 and 155.7 billion CUP at ICOR of 4.0.

The total investment cost to implement the National Transport Master Plan 2030 (NTMP 2030) is estimated at 135.9 billion CUP, which is 69% of the total GFCF at ICOR 5.0% and 87% at ICOR 4.0%.




Source: TWG & JICA Study Team

**Figure 6.9.1 Indicative transport sector GFCF and NTMP investment (ICOR=5%)**




Source: TWG & JICA Study Team

**Figure 6.9.2 Indicative transport sector GFCF and NTMP investment (ICOR=4%)**

The scale of investment recommended in NTMP 2030 is within the indicative GFCR in the transport sector for 2022~2030, suggesting the proposed investment scale is reasonable in this regard. However, at the same time, this analysis suggests an earlier investment might be helpful to pursue the target economic growth even though the proposed investment strategy focuses on the planning horizon's second half (2027-2030).

**Table 6.9.2 Indicative transport sector GFCF and NTMP 2030 investment**

| | ICOR=5% | | ICOR=4% | |
|---|---|---|---|---|
| | **2022-2026** | **2027-2030** | **2022-2026** | **2027-2030** |
| Transport GFCF (million CUP) | 100,680 | 93,988 | 80,544 | 75,190 |
| | 194,668 | | 155,734 | |
| NTMP 2030 investment (million CUP) | 55,793 | 79,245 | 55,793 | 79,245 |
| | 135,939 | | 135,939 | |

Source: TWG & JICA Study Team

## Table 6.9.3 Indicative GFCF (ICOR=5%) in the transport sector and NTMP investment

Unit: million CUP (current)

| | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| GDP (current) | 818,971 | 847,635 | 877,302 | 908,008 | 939,788 | 972,681 | 1,006,724 | 1,041,960 | 1,078,428 | |
| △GDP | 27,695 | 28,664 | 29,667 | 30,706 | 31,780 | 32,893 | 34,044 | 35,235 | 36,469 | |
| GDP growth rate (current) | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% | |
| Total GFCF (investment) (% against total GDP) | 143,320 | 148,336 | 153,528 | 158,901 | 164,463 | 170,219 | 176,177 | 182,343 | 188,725 | |
| | 17.5% | 17.5% | 17.5% | 17.5% | 17.5% | 17.5% | 17.5% | 17.5% | 17.5% | |
| ICOR | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| A: Transport GFCF (% against total GFCF) | 18,775 | 19,432 | 20,112 | 20,816 | 21,545 | 22,299 | 23,079 | 23,887 | 24,723 | 194,668 |
| | 13.1% | 13.1% | 13.1% | 13.1% | 13.1% | 13.1% | 13.1% | 13.1% | 13.1% | |
| | 100,679.8 | | | | | 93,987.8 | | | | |
| B: NTMP investment | 1,030 | 5,545 | 9,872 | 16,416 | 22,931 | 20,593 | 20,780 | 19,466 | 18,407 | 135,039 |
| | 55,793.4 | | | | | 79,245.3 | | | | |
| A-B | 17,745 | 13,887 | 10,240 | 4,400 | -1,386 | 1,706 | 2,299 | 4,421 | 6,316 | 59,629 |
| | 44,886.4 | | | | | 14,742.5 | | | | |

Source: JICA Study Team

## Table 6.9.4 Indicative GFCF (ICOR=4%) in the transport sector and NTMP investment

Unit: million CUP (current)

| | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| GDP (current) | 818,971 | 847,635 | 877,302 | 908,008 | 939,788 | 972,681 | 1,006,724 | 1,041,960 | 1,078,428 | |
| △GDP | 27,695 | 28,664 | 29,667 | 30,706 | 31,780 | 32,893 | 34,044 | 35,235 | 36,469 | |
| GDP growth rate (current) | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% | |
| Total GFCF (investment) (% against total GDP) | 114,656 | 118,669 | 122,822 | 127,121 | 131,570 | 136,175 | 140,941 | 145,874 | 150,980 | |
| | 14.0% | 14.0% | 14.0% | 14.0% | 14.0% | 14.0% | 14.0% | 14.0% | 14.0% | |
| ICOR | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| A: Transport GFCF (% against total GFCF) | 15,020 | 15,546 | 16,090 | 16,653 | 17,236 | 17,839 | 18,463 | 19,110 | 19,778 | 155,734 |
| | 13.1% | 13.1% | 13.1% | 13.1% | 13.1% | 13.1% | 13.1% | 13.1% | 13.1% | |
| | 80,543.8 | | | | | 75,190.2 | | | | |
| B: NTMP investment | 1,030 | 5,545 | 9,872 | 16,416 | 22,931 | 20,593 | 20,780 | 19,466 | 18,407 | 135,039 |
| | 55,793.4 | | | | | 79,245.3 | | | | |
| A-B | 13,990 | 10,001 | 6,218 | 237 | -5,695 | -2,754 | -2,316 | -356 | 1,371 | 20,695 |
| | 24,750.5 | | | | | -4,055.1 | | | | |

Source: JICA Study Team

## 6.10 Implementation scheme of the National Transport Master Plan

The National Plan for Social Economic Development (PNDES-2030), approved by the National Assembly of People's Power, governs Cuba's social-economic development planning until 2030

The PNDES 2030 and the Transport Master Plan have been prepared simultaneously. The Transport Master Plan constitutes the fundamental basis on which the part corresponding to the transport and logistics sector in the PNDES-2030 has been elaborated. In addition to being the basis for the PNDES 2030 (as far as transport and logistics development is concerned), the Transport Master Plan complements and expands on it.

MITRANS is the rector agency for this Master Plan. The Planning Directorate of MITRANS will oversee the implementation of the Plan and report periodically on progress to the MITRANS Minister or Vice-Minister in charge of the Plan.

The PNDES 2030 is implemented through Macro programs, Programs, and Projects. Aspects related to transportation and logistics are addressed in the "Infrastructure" Macro program, led by an Inter-Institutional Council chaired by the Deputy Prime Minister and Minister of Economy.

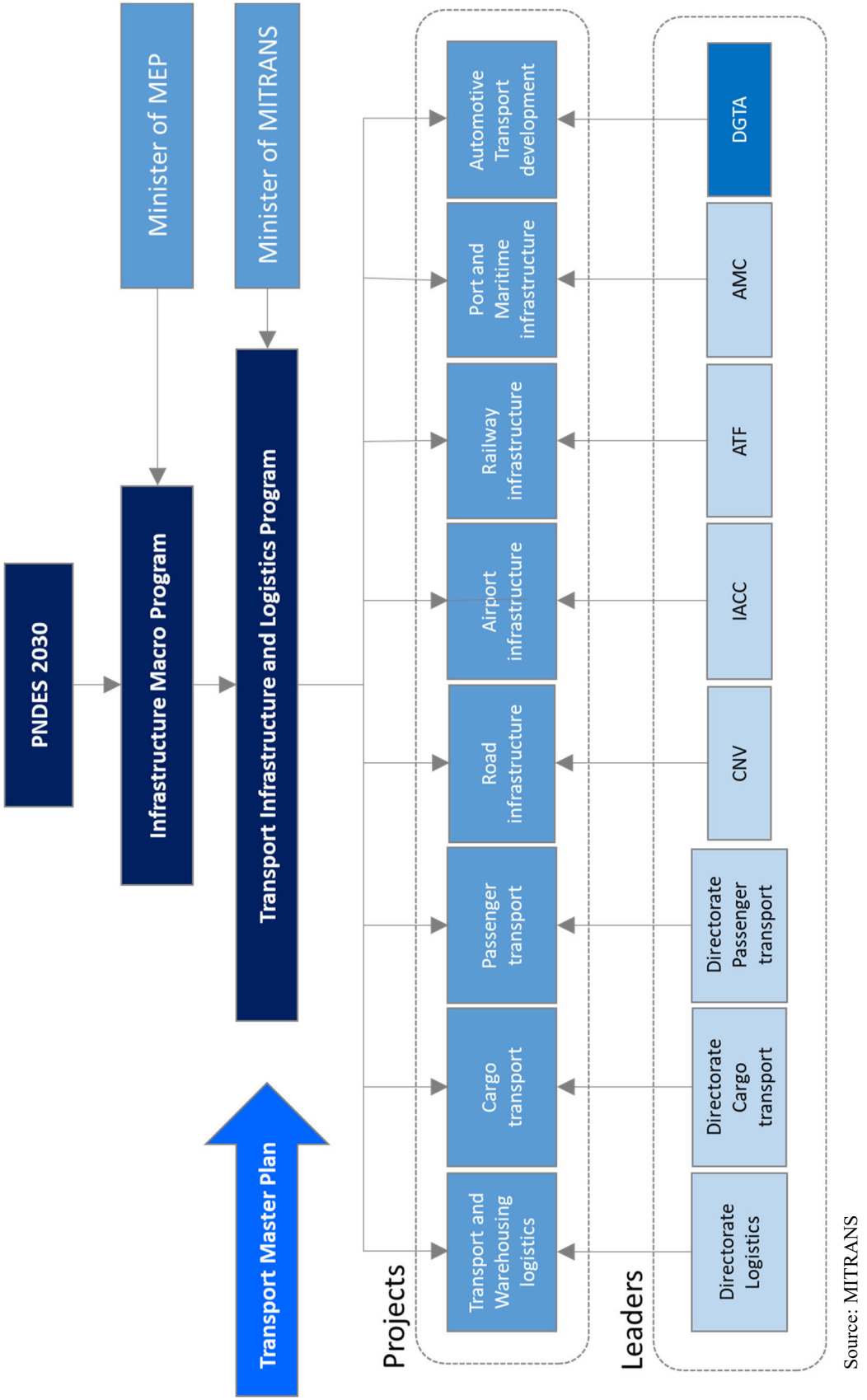
The Infrastructure Macro program includes the "Transport and Logistics Infrastructure Program," headed by the Minister of Transport. The Transport and Logistics Infrastructure Program is the fundamental tool through which the essential elements of the Transport Master Plan are implemented.

The "Transport and Logistics Infrastructure Program" is made up of eight large projects that govern the development of the transport and logistics sector in all its modalities. These large projects are the following:

| Project Name | Leader |
|---|---|
| 1. Integrated Transport and Warehousing Logistics | MITRANS Logistics Director |
| 2. Reordering and Improvements in Cargo Transportation | Director of the Analysis and Development of Cargo Traffic Directorate of MITRANS |
| 3. Reordering and Improvements of Passenger Transportation | Director of the Analysis and Development of Passenger Traffic Directorate of MITRANS |
| 4. Road Infrastructure | Director of CNV |
| 5. Airport Infrastructure | President of IACC |
| 6. Railway Infrastructure | Director of ATF |
| 7. Port Maritime Infrastructure | Director of AMC |
| 8. Automotive Development | Director of DGTA |

The content of each of the Projects of the Transport and Logistics Infrastructure Program, as well as the evaluation of the progress of their execution, are analyzed by the Interinstitutional Council of the Infrastructure Macro program and approved by the Executive Committee of the Council of Ministers of the Republic of Cuba.

The heads of the projects listed in the table above respond to the Minister of Transport for their progress, including achieving the objectives and implementing the strategies, policies, and projects included in the Transport Master Plan.




Source: MITRANS

**Figure 6.10.1 Simplified scheme for the implementation of the National Transport Master Plan**