

**The Republic of Cuba
Ministry of Transport**

**Project for Formulation of
National Transport Master Plan
in the Republic of Cuba**

**Final Report
(Summary)**

March 2023

Japan International Cooperation Agency (JICA)

Oriental Consultants Global Co., Ltd.

Nippon Koei Co., Ltd.

ALMEC Corporation

International Development Center of Japan Inc.

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JR
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USD	1.00 = JPY	130.121
CUC	1.00 = JPY	130.121
CUP	1.00 = JPY	5.20484

(February 2023)

Gulf of Mexico

Straits of Florida

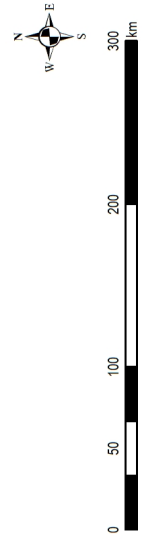
North Atlantic Ocean

Caribbean Sea



- Legend**
- Road Network
 - motorway
 - trunk
 - primary
 - secondary
 - Railway
 - Existing Railway
 - Port
 - Port (Category 1)
 - Port (Category 2)
 - Port (Local)
 - Airport
 - Internacional
 - Nacional
 - Provincial Capital

Study Area



Project for Formulation of National Transport Master Plan in the Republic of Cuba

Final Report Summary

Table of Contents

Study Area

Table of Contents

List of Figures and Tables

List of Abbreviations

	page
Chapter 1 Introduction	
1.1 Structure of the Master Plan	1
1.2 Key areas of consideration	2
Chapter 2 Planning Issues	
2.1 Cross-sector Transport Planning Issues.....	6
2.1.1 Selective and focused investments	6
2.1.2 Robust and efficient transport network	8
2.1.3 Regional development approach	11
2.1.4 Transport for international tourists and tourism sector employees.....	15
2.1.5 Cargo Transport.....	18
2.1.6 Health and medical services	19
2.1.7 Strategic Projects.....	19
2.1.8 Cross-sector Planning Issues	20
2.2 Transport Planning Issues by Transport Subsector.....	22
Chapter 3 National Transport Development: Visions, Objectives, Strategies & Goals	
3.1 Direction.....	29
3.2 Vision statements.....	29
3.3 Transport development objectives.....	33
3.3.1 Cross-sectoral objectives	33
3.3.2 Road & bridge sector.....	37
3.3.3 Road-based passenger transport (bus) sector	40
3.3.4 Railway & rail transport sector.....	43
3.3.5 Port & maritime transport sector	49
3.3.6 Airport & civil aviation sector.....	53
3.3.7 Logistics sector.....	60

Chapter 4 Project Implementation

4.1	Overall implementation schedule	63
4.2	Road & Bridge sector	65
4.2.1	Expected funding for the Road & Bridge sector	65
4.2.2	Implementation schedule.....	65
4.3	Road-based Passenger Transport (bus) sector	67
4.3.1	Expected funding for the Road-based Passenger Transport (bus) sector	67
4.3.2	Implementation schedule.....	67
4.4	Rail Transport sector	70
4.4.1	Expected funding for the Rail Transport sector.....	70
4.4.2	Implementation schedule.....	70
4.5	Port & Maritime Transport sector.....	74
4.5.1	Expected funding for the Port & Maritime Transport sector.....	74
4.5.2	Implementation schedule.....	74
4.6	Airport & Civil Aviation Sector	77
4.6.1	Expected funding for the Airport & Civil Aviation sector.....	77
4.6.2	Implementation schedule.....	77
4.7	Logistics Sector	80
4.7.1	Expected funding for the Logistics sector	80
4.7.2	Implementation schedule.....	80
4.8	Implementation scheme of the National Transport Master Plan	83

List of Figures

	page
Figure 1.1.1 Structure of the Master Plan.....	2
Figure 1.2.1 General Institutional Structure (a division of roles).....	3
Figure 1.2.2 Key Areas of Consideration	5
Figure 2.1.1 Population Size by Service Center in 2017.....	8
Figure 2.1.2 Classified Network (existing)	9
Figure 2.1.3 Travel Time from Major Service Centers under Existing Network Conditions.....	10
Figure 2.1.4 Travel Time from Major Service Centers with Completion of the Autopista	10
Figure 2.1.5 Conceptual Network Structure.....	11
Figure 2.1.6 Characteristics by Region	11
Figure 2.1.7 Transport Network for Potential Areas in Western Region.....	12
Figure 2.1.8 Transport Network for Potential Areas in Central Region	13
Figure 2.1.9 Proposed Network and Potential Areas in Central Eastern Region	14
Figure 2.1.10 Transport Network for Potential Areas in the Eastern Region	15
Figure 2.1.11 Travel Time from Major Airports to Tourism Sites.....	16
Figure 2.1.12 Tourism Development in Havana, Varadero, Northern Cayeria, and Antilla	17
Figure 2.1.13 Production Volumes of Major Agri-industries and Minerals by Municipality.....	18
Figure 2.1.14 Major Logistics Gateways in Cuba.....	19
Figure 2.1.15 Investment Portfolio 2018 and Transport Infrastructure in Cuba	20
Figure 3.2.1 Vision statement structure.....	30
Figure 4.1.1 Expected funding for the transport sector	64
Figure 4.2.1 Expected funding for the Road & Bridge sector	65
Figure 4.3.1 Expected funding for the Road-based Passenger Transport sector	67
Figure 4.4.1 Expected funding for the Rail Transport sector	70
Figure 4.5.1 Expected funding for the Port & Maritime Transport sector	74
Figure 4.6.1 Expected funding for Airport & Civil Aviation sector	77
Figure 4.7.1 Expected funding for the Logistics sector.....	80
Figure 4.8.1 Simplified scheme for the implementation of the National Transport Master Plan.....	84

List of Tables

	page
Table 2.1.1 Classified Network	9
Table 2.1.2 Tourism Development Areas, Planned Hotel Rooms, and Estimated Hotel Workers	16
Table 2.1.3 Cross-sector Transport Planning Issues	20
Table 2.2.1 Planning Issues in the Road and Bridge Sector	22
Table 2.2.2 Planning Issues in the Road-based passenger transport sector	23
Table 2.2.3 Planning Issues in the Rail sector	23
Table 2.2.4 Planning Issues in the Port & Maritime Transport sector	25
Table 2.2.5 Planning Issues in the Airport & Civil Aviation sector	26
Table 2.2.6 Planning Issues in the Logistics sector	27
Table 3.3.1 Overall cross-sectoral objectives	34
Table 3.3.2 Objectives, strategies & goals for road & bridge sector	37
Table 3.3.3 Objectives, strategies & goals for the road-based passenger transport sector	40
Table 3.3.4 Objectives, strategies & goals for railway & rail transport sector	43
Table 3.3.5 Objectives, strategies & goals for port & maritime transport sector	49
Table 3.3.6 Objectives, strategies, and goals for the airport and civil aviation sector	53
Table 3.3.7 Objectives, strategies & goals for the logistics sector	60
Table 4.2.1 Implementation schedule for the Road and Bridge sector	66
Table 4.3.1 Implementation schedule for the Road-based Passenger Transport sector	68
Table 4.4.1 Implementation schedule for the Rail Transport sector	71
Table 4.5.1 Implementation schedule for the Port & Maritime Transport sector	75
Table 4.6.1 Implementation schedule for Airport & Civil Aviation sector	78
Table 4.7.1 Implementation schedule for the Logistics sector	81

List of Abbreviations

Abbreviation		Full Name	
English	Spanish	English	Spanish
AFD	AFD	French Development Agency	Agencia Francesa de Desarrollo
ATF	ATF	Railway Transport Administration	Administración del Transporte Ferroviario
ATC	CAT	Advanced Traffic Control	Control de Tráfico Avanzado
ATS	DAT	Automatic Train Stop	Detención Automática de Tren
AUSA	AUSA	Almacenes Universales SA	Almacenes Universales S.A.
AZCUBA	AZCUBA	Sugar Group	Grupo Azucarero
BCC	BCC	Central Bank of Cuba	Banco Central de Cuba
BOT	COT	Build-Operate-Transfer	Construcción-Operación-Transferencia
CABEI	BCIE	Central American Bank for Economic Integration	Banco Centroamericano de Integración Económica
C/P	C/P	Counterparts	Contrapartes
CACSA	CACSA	Cuban Aviation Corporation Enterprise	Corporación de la Aviación Cubana S.A.
CAF	CAF	Development Bank of Latin America	Banco de Desarrollo de América Latina
CAP	CAP	Council of Provincial Administration	Consejo de Administración Provincial
CCD	CCD	Center of Loading and Unloading	Centro de Carga y Descarga
CCRC	CCRC	Chamber of Commerce of the Republic of Cuba	Cámara de Comercio de la República de Cuba
Cimab	Cimab	Center for Environmental Research and Management of Transport	Centro de Investigación y Manejo Ambiental del Transporte
CITMA	CITMA	Ministry of Science, Technology and Environment	Ministerio de Ciencia, Tecnología y Medio Ambiente
CNoA	CNoA	Non-Agricultural Cooperative	Cooperativa No agropecuaria
CNAP	CNAP	National Center for Protected Areas	Centro Nacional de Áreas Protegidas
CNV	CNV	National Roads Center	Centro Nacional de Vialidad
COF	COF	Railway Operation Center	Centro de Operaciones Ferroviarias
COMECON	CAME	Council for Mutual Economic Assistance	Consejo de Ayuda Mutua Económica
CPV	CPV	Provincial Road Center	Centro Provincial de Vialidad
CSCT	TIC	Computer Science and Communication Technologies	Tecnologías de la Información y las Comunicaciones
CUC	CUC	Cuban Convertible Peso	Peso Cubano Convertible
CUP	CUP	Cuban Peso	Peso Cubano
Cupet	Cupet	Cuba Petrol Union	Unión Cuba Petróleo
CWR	RSC	Continuous Welded Rail	Riel Soldado Continuo
DAC	CAD	Development Assistance Committee	Comité de Ayuda al Desarrollo
DC	CD	Direct Current	Corriente directa
DEL	LDE	Diesel Electric Locomotive	Locomotora Diésel-Eléctrica
DF/R	BI/F	Draft Final Report	Borrador de Informe Final
DGTH	DGTH	General Directorate of Transport of Havana	Dirección General de Transporte de La Habana

Abbreviation		Full Name	
English	Spanish	English	Spanish
DHL	LDH	Diesel Hydraulic Locomotive	Locomotora Diésel Hidráulica
DRIMS	SMIRD	Dynamic Response Intelligent Monitoring System	Sistema de Monitoreo Inteligente de Respuesta Dinámica
DWT	TPM	Deadweight tonnage	Tonelaje de peso muerto
ECASA	ECASA	Cuban Enterprise of Airports and Aeronautical Services S.A.	Empresa Cubana de Aeropuertos y Servicios Aeroportuarios S.A.
ECOING	ECOING	Engineering Works Construction Enterprise	Empresa Constructora de Obras de Ingeniería
ECVF	ECVF	Construction Enterprise of Rail tracks	Empresa Constructora de Vías Férreas
EDI	IED	Electronic Data Interchange	Intercambio Electrónico de Datos
EEA	EAE	Estrategic Environment Assessment	Evaluación Ambiental Estratégica
EFC	EFC	Central Railway Enterprise	Empresa Ferrocarriles Centro
EFCE	EFCE	Central East Railway Enterprise	Empresa Ferrocarriles Centro Este
EFO	EFO	East Railway Enterprise	Empresa Ferrocarriles Oriente
EFOC	EFOC	West Railway Enterprise	Empresa Ferrocarriles Occidente
EIA	EIA	Environment Impact Assessment	Evaluación de Impacto Ambiental
EIIF	EIIF	Industrial Enterprise of Fixed Installations	Empresa Industrial de Instalaciones Fijas
EMCARGA	EMCARGA	General Freight Transport Enterprise	Empresa de Carga por Camiones
EMCOMED	EMCOMED	Medicine Commercializing Enterprise	Empresa Comercializadora de Medicamentos
EMPA	EMPA	Food Product Wholesale Enterprise	Empresa Mayorista de Productos Alimentarios
ENOC	ENOC	National Container Operator Enterprise	Empresa Nacional Operadora de Contenedores
ENOT	ENOT	National Scheme of Territorial Planning	Esquema Nacional de Ordenamiento Territorial
EON	EON	National Bus Enterprise	Empresa de Ómnibus Nacionales
EPS	ESP	Port Services Enterprise	Empresa de Servicios Portuarios
EPT	EPT	Provincial Transport Enterprise	Empresa Provincial de Transporte
ETAG	ETAG	Bulk Cargo Transport Enterprise	Empresa de Transporte de Alimentos a Granel
ETE	ETE	School Transport Enterprise	Empresa de Transporte Escolar
ETT	ETT	Transport Enterprise for Workers	Empresa de Transporte para Trabajadores
EU	UE	European Union	Unión Europea
EV	VE	Electric Vehicle	Vehículo eléctrico
F/R	I/F	Final Report	Informe Final
FDI	IED	Foreign Direct Investment	Inversión extranjera directa
GAE	GAE	Group of Enterprise Management	Grupo de Administración Empresarial
GDP	PIB	Gross Domestic Product	Producto Interno Bruto
GEA	GEA	Business Group of Automotive Transport Services	Grupo Empresarial de Servicios de Transporte Automotor
GEMAR	GEMAR	Business Group of Port Maritime Transport	Grupo Empresarial de Transporte Marítimo Portuario
GESIME	GESIME	Business Group of the Siderurgical Industry	Grupo Empresarial de la Industria Sideromecánica

Abbreviation		Full Name	
English	Spanish	English	Spanish
GIS	SIG	Geographic Information System	Sistema de Información Geográfica
GPS	GPS	Global Positioning System	Sistema de Posicionamiento Global
GSE	EAT	Ground Support Equipment	Equipo de apoyo terrestre
GSM-R	GSM-R	Global System for Mobile Communications–Railway	Sistema Global para las Comunicaciones Móviles–Ferroviario
H.E.	S.E.	His Excellency	Su Excelencia
HDM-4	HDM-4	Highway Development and Management Model 4	Modelo de Desarrollo y Gestión de Carreteras 4
IC/R	II	Inception Report	Informe Inicial
ICD	DCI	Inland Container Depot	Depósito de contenedores en el interior
IMF	FMI	International Monetary Fund	Fondo Monetario Internacional
INOTU	INOTU	National Institute of Spatial Ordering and Town Planning	Instituto Nacional de Ordenamiento Territorial y Urbanismo
IPF	IPF	Institute of Physical Planning	Instituto de Planificación Física
IRI	IRI	International Roughness Index	Índice de Rugosidad Internacional
IT/R	I/P	Interim Report	Informe Parcial
JCC	CCC	Joint Coordination Committee	Comité de Coordinación Conjunta
JPY	JPY	Japanese Yen	Yen japonés
JST	EEJ	JICA Study Team	Equipo de Estudio de JICA
JV	EM	Joint Venture	Empresa Mixta
LCC	TBC	Low Cost Carrier	Transportista de bajo costo
LOS	NDS	Level of Service	Nivel de Servicio
LWR	RSL	Long Welded Rail	Riel Soldado Largo
M/M	A/R	Minutes of Meeting	Actas de Reunión
M/P	P/M	Master Plan	Plan Maestro
MED	MED	Ministry of Education	Ministerio de Educación
MEP	MEP	Ministry of Economy and Planning	Ministerio de Economía y Planificación
MES	MES	Ministry of Higher Education	Ministerio de Educación Superior
MICONS	MICONS	Ministry of Construction	Ministerio de la Construcción
MINAG	MINAG	Ministry of Agriculture	Ministerio de la Agricultura
MINAL	MINAL	Ministry of Food Industry	Ministerio de la Industria Alimentaria
MINCEX	MINCEX	Ministry of Foreign Trade and Foreign Investment	Ministerio del Comercio Exterior y la Inversión Extranjera
MINCIN	MINCIN	Ministry of Domestic Trade	Ministerio del Comercio Interior
MINDUS	MINDUS	Ministry of Industries	Ministerio de Industrias
MINEM	MINEM	Ministry of Energy and Mines	Ministerio de Energía y Minas
MINFAR	MINFAR	Ministry of Revolutionary Armed Forces	Ministerio de las Fuerzas Armadas Revolucionarias
MINTUR	MINTUR	Ministry of Tourism	Ministerio del Turismo
MITRANS	MITRANS	Ministry of Transport	Ministerio del Transporte
MLIT	MLIT	Ministry of Land, Infrastructure,	Ministerio de Tierra, Infraestructura, Transporte

Abbreviation		Full Name	
English	Spanish	English	Spanish
		Transport and Tourism, Japan	y Turismo, Japón,
MOFA	MOFA	Ministry of Foreign Affairs, Japan	Ministerio de Asuntos Exteriores, Japón
MTSS	MTSS	Ministry of Labor and Social Security	Ministerio del Trabajo y Seguridad Social
NC	NC	Cuban Standard	Norma Cubana
NEXCO	NEXCO	Nippon Expressway Company Limited	Compañía Limitada de Expresos de Japón
NEXI	NEXI	Nippon Export and Investment Insurance	Seguros de Exportación e Inversión de Japón
NIEI	INIE	National Institute of Economic Investigations	Instituto Nacional de Investigaciones Económicas
NRMT	NRMT	Ministry of Transport Branch Standard	Norma Ramal del Ministerio del Transporte
NSS	SNE	Non-State Sector	Sector No Estatal
OAD	AOD	Official Agency for development	Asistencia Oficial para el Desarrollo
O&M	O&M	Operation and Maintenance	Operación y Mantenimiento
OACE	OACE	Agency of the Central State Administration	Órgano de la Administración Central del Estado
OD	OD	Origin-Destination	Origen-Destino
ODA	AOD	Official Development Aid	Ayuda Oficial para el Desarrollo
OJT	FEE	On-the-Job-Training	Formación en el empleo
ONEI	ONEI	National Office of Statistics and Information	Oficina Nacional de Estadística e Información
OSDE	OSDE	Higher Organization of Business Management	Organización Superior de Dirección Empresarial
PBB	PEP	Passenger Boarding Bridge	Puente de embarque de pasajeros
PC	HP	Prestressed Concrete	Hormigón Pretensado
PC	PC	Personal Computer	Computadora Personal
PCU	UCP	Passenger Car Unit	Unidad de Autos de Pasajeros
PDA	APD	Personal Data Assistant	Asistente Personal de Datos
PFI	IFP	Private Finance Initiative	Iniciativa de financiación privada
PPP	APP	Public Private Partnership	Asociación Pública Privada
PROCUBA	PROCUBA	Promotion of Foreign Trade and Foreign Investment in Cuba	Promoción del Comercio Exterior y la Inversión Extranjera de Cuba
QGC	QGC	Quay Gantry Crane	Grúa pórtico de muelle
R/D	R/D	Record of Discussion	Registro de Discusión
RES	FRE	Renewable Energy Sources	Fuentes renovables de energía
RTG	RTG	Rubber Tired Gantry Crane	Grúa pórtico sobre neumáticos
SAB	BSA	Semi-Automatic Block	Bloqueo Semiautomático
SCB	SCB	Signals, Centralization and Blocking	Señales, centralización y bloqueo
SDC	COSUDE	Swiss Development Cooperation Agency	Agencia Suiza para el Desarrollo y la Cooperación
SDGs	ODSs	Sustainable Development Goals	Objetivos de Desarrollo Sostenible
SEA	EAE	Strategic Environmental Assessment	Evaluación Ambiental Estratégica

Abbreviation		Full Name	
English	Spanish	English	Spanish
SEN	SEN	National Electric System	Sistema Electroenergético Nacional
SEZ	ZED	Special Economic Zone	Zona Especial de Desarrollo
SNAP	SNAP	National System of Protected Areas	Sistema Nacional de Áreas Protegidas
SNCF	SNCF	French National Railway Company (Societe National des Chemins de Fer)	Sociedad Nacional de Ferrocarriles Franceses
SNS	SRS	Social Networking Service	Servicio de redes sociales
SOLCAR	SOLCAR	Commander “Tony Santiago” Rail tracks Construction Enterprise	Empresa Constructora de Vías Férreas Comandante “Tony Santiago”
SSHWS	SSHWS	Saffir-Simpson Hurricane Wind Scale	Escala de huracanes Saffir-Simpson
TAZs	ZATs	Traffic Analysis Zones	Zonas de Análisis de Tráfico
TIS	STI	Transport Intelligent System	Sistema de Transporte Inteligente
TBD	PD	To Be Decided	Por determinar
toe	tcc	Ton of Oil (Conventional Fuel) Equivalent	Tonelada de Combustible Convencional
ToR	TR	Terms of Reference	Términos de Referencia
TWG	GTT	Technical Working Group	Grupo Técnico de Trabajo
UEB	UEB	Grassroots Business Unit	Unidad Empresarial de Base
UET	UET	State Unit of Traffic	Unidad Estatal de Tráfico
UFC	UFC	Cuban Railway Union	Unión de Ferrocarriles de Cuba
UN	ONU	United Nations	Naciones Unidas
UNDP	PNUD	United Nations Development Programme	Programa de las Naciones Unidas para el Desarrollo
UNE	UNE	National Electric Union	Unión Nacional Eléctrica
UNS	SNU	United Nations System	Sistema de las Naciones Unidas
US	EEUU	United States	Estados Unidos
USD	USD	US Dollars	Dólares estadounidenses
VHF	VHF	Very High Frequency	Frecuencia Muy Alta
WG	GT	Working Group	Grupo de Trabajo
WTTC	WTTC	World Travel & Tourism Council	Consejo Mundial de Viajes y Turismo

Chapter 1 Introduction

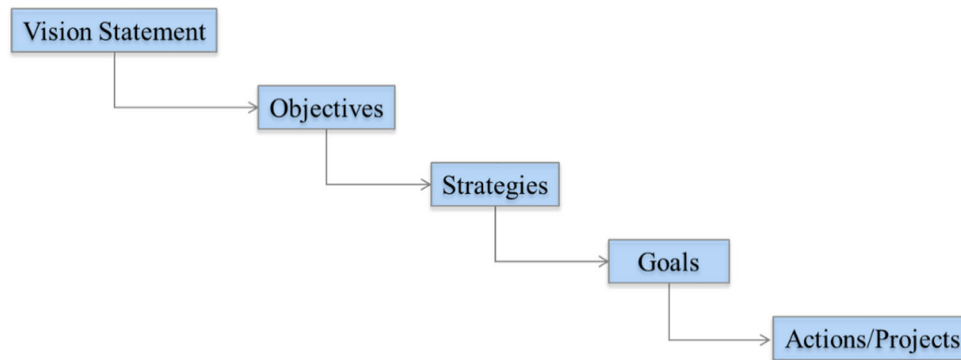
1.1 Structure of the Master Plan

The formulation of this master plan has been guided by observation of Cuba's existing conditions, as well as upstream policies relevant to the transport sector in the "Conceptualization of the Economic & Social Model," the "National Economic & Social Development Plan 2030," "Indications from the President, June 2019," and "Cuba and its Economic & Social Challenges, September 2020." Therefore, this master plan for Cuba's national transport sector can be read as a grand strategy to realize state policy and objectives.

This master plan is based on the hierarchical structure shown in Figure 1.1.1. Recognizing the current situation and principles stated in the upstream policies, the vision statements inform the desired future in 2030, the plan's target year, deemed achievable during the planning horizon.

To realize the vision, specific objectives need to be specified by considering six key areas of planning, as described below. Then, following the identified objectives, multiple and implementable strategies are prepared to realize the objectives, and corresponding numerical goals are set as milestones (to be expressed numerically as much as possible) to be achieved in implementing those strategies. Consequently, specific tactics, that is, actions/projects, to achieve the goals, are identified by a series of numeric analyses such as demand forecasts.

From this process, a clear picture emerges of the inputs required (funding for project implementation, in other words, future fixed capital formation) to execute the strategies and achieve the goals. However, given potential future budget constraints, it may be necessary to revise targets and investment amounts downward. But by reiterating this process, feasible final goals can be set, corresponding actions/projects can be finalized, and mechanisms for execution (budget and organization) can be identified.



- Vision:** Desired future for the transport sector consistent with state development policy and principles.
- Objectives:** Aims to achieve or directions to follow in the transport sector in six key planning areas.
- Strategies:** Strategizing is a process to rationalize coherence between objectives and corresponding goals and actions/projects and to ensure that strategies are practical and implementable within the plan's 2030-time horizon.
- Goals:** Quantifiable values, informing targets to be achieved within the plan's time horizon. For example, "output and outcome indicators" such as the population to be served by a new transport intervention. Goals can be revised in response to changes in external factors such as economic growth scenarios.
- Projects:** Projects can be understood as "the use of resources" in line with the strategies and goals. In this regard, costs (investment amount: expected fixed capital formation plus the cost of project implementation) must be roughly estimated.

Source: JICA Study Team

Figure 1.1.1 Structure of the Master Plan

1.2 Key areas of consideration

In this transport master planning process, six planning criteria will be addressed:

1. Planning and coordination

Under each OACE, a new organization named OSDE (GEA, GEMAR, CACSA, UFC) was established to manage and supervise Empresa under its umbrella. Therefore, OSDE can be seen as an organization equivalent to a coordinator in delivering transport services in each mode.

The Ministry of Transport includes various directorates/departments in charge of roads, railroads, ports/shipping, airports/civil aviation, accounting, general affairs, etc. OSDEs attended by MITRANS (GEA, GEMAR, CACSA, UFC) approve the transport development plans of enterprises integrated under them and monitors their implementation status. At present, as each OSDE's plans are formulated separately, there is evident scope to improve coordination in planning between different modes of transport.

Vertical coordination (like a command/report system) must be well designed from the Ministry to the Empresa levels. At the same time, a horizontal coordination mechanism at the same organizational level is required. Besides, coordination needs to be made with organizations under different ministries. For that purpose, clarifying the roles and responsibilities in a vertical and horizontal relationship is necessary. From this point of view, it is essential to define the planning issues that can be addressed within the 2030 planning horizon.



Source: JICA Study Team

Figure 1.2.1 General Institutional Structure (a division of roles)

2. Infrastructure development (fixed capital formation)

A series of projects (repair, rehabilitation, renewal, new development, etc.) are prepared in line with the strategy and goals. The individual projects that make up the strategy need to have specific targets. Also, it is necessary to propose projects that can be implemented within the planning period, considering budget and time constraints. The progress of each project also needs to be monitored using output indicators.

3. Environment, Safety, and Security

The transport sector must give due consideration to environment-related policies following the SDGs. The transport sector is one of the major sources of carbon dioxide emissions. Accordingly, efforts are needed to minimize or reduce carbon dioxide emissions in the course of expected economic growth in the future. From this point of view, a series of objectives, strategies, goals, and projects must be prepared.

Safety should always be a priority, but measures can be implemented progressively as budget constraints allow. Restoration of infrastructure and facilities that natural disasters have severely damaged should be prioritized from the safety viewpoint.

Also, as COVID-19 or similar diseases must be anticipated in the future, public health measures should be thoroughly considered and developed in the transportation sector.

Regarding the security of passenger and cargo transportation, measures against terrorism should be considered, and sufficient measures should be taken. In particular, it is vital to demonstrate an adequate security system inside and outside the country to promote tourism.

4. Transport service and industry development

Freight transport needs of Empresa under various OSDEs are usually met by the producer or another Empresa under the same OSDE in charge of transportation. However, transport capacity

is often insufficient, so transport is entrusted to other transport organizations under MITRANS. This matching of transportation demand and supply is achieved through a coordination function called Balance de Cargas. It is an issue in the near future to strengthen this coordination function and realize more efficient transportation based on the existing coordination system. Conversely, expanding transport service capacity by introducing 3PL services by non-state-owned enterprises should also be considered.

MITRANS and local transportation bureaus (ETP) play a vital role in domestic passenger transportation (intercity and urban transportation). MITRANS' nationwide capability needs to be further strengthened in the provision of inter-city public transport. For urban public transport, on the other hand, capacity building (bus procurement, staff training, route planning, monitoring, etc.) may be better handled in each province according to local conditions.

MINFAR plays a major role in bus transport for international tourists. Opening this role to the non-state sector in the future may be controversial. However, it may be worth considering from the perspective of promoting private/foreign capital introduction.

Although this National Transport Master Plan cannot discuss the urban transport needs of each province in detail, it may be possible to consider the private capital into the urban transport sector through some form of deregulation.

5. Transport pricing and resource allocation

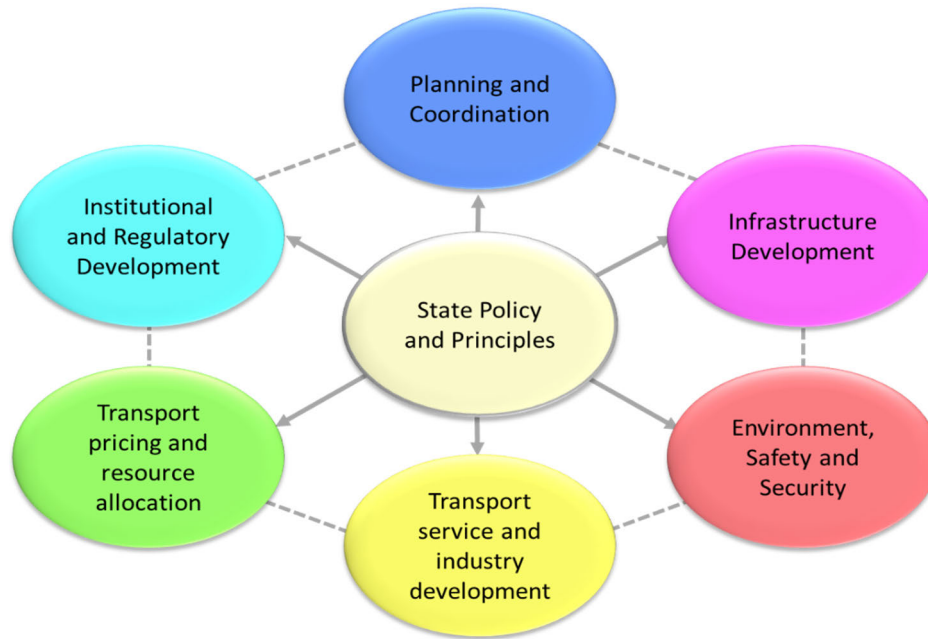
It is still uncertain how currency unification will affect transport pricing and financing. However, the pricing system for services provided by the transportation service organization (Empresa) integrated under OSDEs, attended by MITRANS, may be reviewed from the viewpoint that each transportation service organization (Empresa) eventually becomes financially independent/sustainable.

To recover invested capital, charges should be considered for infrastructure such as roads, bridges, airports (runway, terminal buildings, GSE, etc.), railway and rail coaches, etc. For example, some road sections have already been tolled in the road sector. Therefore, further research on pricing the use of transport infrastructure should be conducted.

Regarding financing for infrastructure development, concession methods, joint ventures with foreign investors, institutional funding organizations (sovereign wealth fund, pension fund, etc.), and utilization of ODA may be considered.

6. Institutional and regulatory development

To carry out strategies based on criteria 1 to 5 above, developing the legal frameworks, organizational capabilities, and human resources is vital to ensure effective implementation. To achieve this, careful consideration is needed to identify an overall strategy for MITRANS and other transport-related organizations.



Source: JICA Study Team

Figure 1.2.2 Key Areas of Consideration

Chapter 2 Planning Issues

2.1 Cross-sector Transport Planning Issues

2.1.1 Selective and focused investments

Cuba's transport challenges and socioeconomic/infrastructural conditions foreseen up to 2030 can be summarized as follows:

- If no substantial capital investments are made, much of the nation's transport infrastructure and facilities will continue to deteriorate, becoming more expensive and technically challenging to repair. The level of safety and services in the transport sector will be accordingly diminished.
- Tourism, Cuba's key source of foreign currency, may be hindered by a continuing pandemic.
- Ongoing economic sanctions may pose severe barriers to mobilizing funds for developing transport and other industrial sectors.
- Due to a lack of foreign exchange reserves, Cuba may face electric power and fuel shortages.
- As Cuban society ages, a shortage of highly skilled staff in the transport sector is anticipated.
- Cubans' purchasing power may not significantly improve by 2030.

Understanding these potential constraints and under the policy framework of adhering to socialist principles while selectively adopting some features of a market-driven economy, it is necessary to consider what can be achieved via a National Transport Master Plan with 2030 as its planning horizon.

In principle, the period through 2030 is defined as a preparatory period for future growth. As such, several common strategic directions can be considered:

- i. Intensive and selective investment in infrastructure/equipment renewal that stimulates foreign currency acquisition and reduces maintenance costs for aged/deteriorated infrastructure, facilities, and equipment.
- ii. Securing critical transport infrastructure to meet Cubans' basic human needs.
- iii. Abandonment of obsolete transport infrastructure (where appropriate).
- iv. Increasing the efficiency of existing infrastructure/equipment via information and communication technology (ICT) as a part of the state's digital transformation effort.
- v. Clean transportation to protect/enhance tourism resources and reduce Cuba's carbon footprint.

In this context, several transport planning directions stand out:

- Establishing a transportation network that contributes to acquiring foreign currency, such as high-standard roads to tourist destinations.
- Transportation systems and services that support export industries, such as high-value agricultural and medical products.
- A system able to efficiently and affordably transport goods (domestic and imported) to any point in the country.

Major tourist destinations include Havana, Varadero, Pinar del Rio, Santiago de Cuba, beach resorts in the northeast, and cities with World Heritage sites such as Sancti Spiritus. Therefore, it is vital to connect airports, hotels, and tourist destinations with a well-designed transportation network that meets international standards to support and promote tourism-centered development.

The trip origin & destination (OD) patterns of international tourists (obtained from the 2019 field survey) show that the tourists concentrate in Havana and Pinar del Rio provinces in the west and Sancti Spiritus province in the east. But few tourists visit centers in the east, such as Santiago de Cuba, because domestic travel is inconvenient: the Autopista ends at Sancti Spiritus, and flights between Havana and Santiago de Cuba are infrequent.

Considering such factors, strategic investments that can boost tourism may include:

- Completion/improvement of the Autopista (with lighting, better pavement, rest areas, etc.)
- Repair/improvement of causeways to the northeastern beach/island resorts
- Hershey electric railway track improvement and rolling-stock renewal
- Making railways tourist-friendly, e.g., with a more accessible ticket reservation system, in-car catering, etc.)
- Improving major railway stations, e.g., mixed-use station buildings with kiosks, etc.)
- Revitalizing tramways in Havana and Santiago de Cuba as tourist attractions
- International airport improvements (capacity increase, related business development, etc.)
- Renewal of aircraft, especially for Havana and Santiago de Cuba
- Renewal of vessels (purchase, lease, or build) for coastal shipping and ferries to Isla de la Juventud
- Tourism-focused redevelopment of Havana port, including cruise ship terminal
- More and better sightseeing buses and taxis

Strategic transport investments with the potential to support Cuba's export industries include enhancing the transportation links to the Mariel Special Development Zone, between agricultural/fishery production sites (tobacco, sugarcane, mango, lobster, etc.) and processing plants or to end users (e.g., fresh seafood to tourist hotels). To this end, strategic investments candidate may include:

- Construction of a bulk terminal a Mariel Port
- Building storage facilities for export-bound agriculture/fishery products near sea or airports
- Enhancing cargo transport by rail

For efficient distribution of imported goods throughout the country:

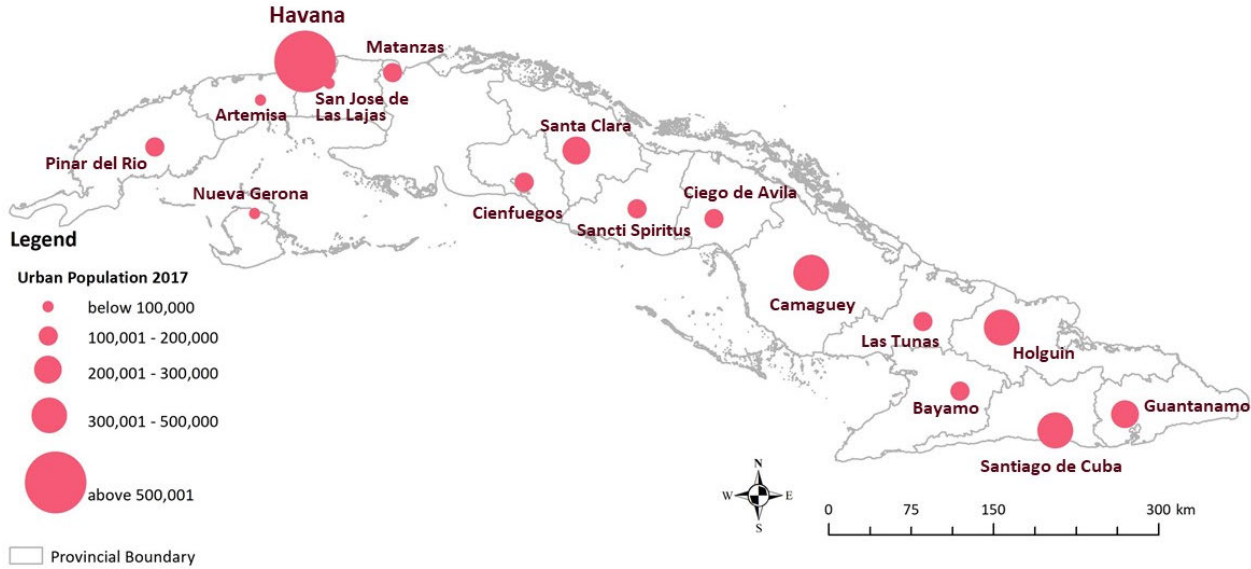
- Highway/rail networks to/from the ports of Mariel in the west and Santiago de Cuba are vital
- Modernization and enhancement of cargo collection, storage, and delivery centers in each province, including frozen food (meat, fish, etc.) and grain storage facilities
- Modernization of oil import terminals and increased coastal product tanker capacity

2.1.2 Robust and efficient transport network

(1) Capital City and Provincial Centers

The populations of the capital city and provincial centers¹ are shown in Figure 2.1.1. With over 2 million people, Havana province is the largest city in Cuba. Santiago de Cuba, Camaguey, and Holguin are the following largest centers.

Based on population and available facilities, the centers can be classified into four levels, from primary to quaternary centers. Havana, the primary center, has the capital function and various services. As secondary centers, three cities can be identified: Santa Clara, Camaguey, and Santiago de Cuba, which have relatively large populations and a variety of service functions. ENOT states these three cities are also termed “main cities.” Other cities are classified as tertiary centers except for Nueva Gerona, deemed a quaternary center due to its location.



Source: JICA Study Team, based on the data from “Population in 2017” by ONEI

Figure 2.1.1 Population Size by Service Center in 2017

(2) Hierarchical Network

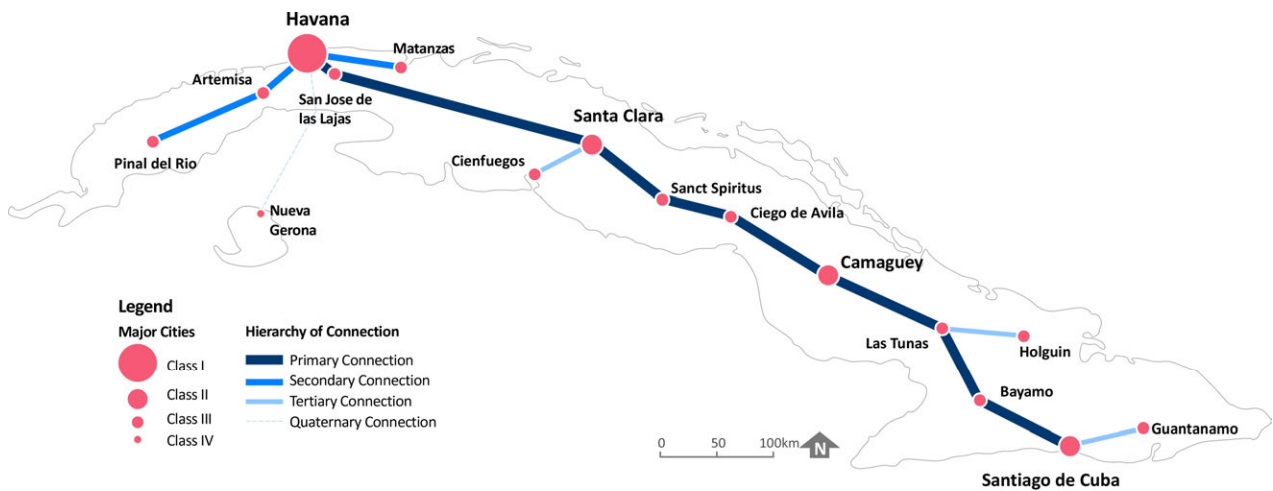
The hierarchy of centers suggests the need to form a hierarchical network. Based on the center hierarchy, the existing national network is also classified into four levels, as shown in Table 2.1.1 and Figure 2.1.2. The network between Havana and Santiago de Cuba is the essential link connecting service centers.

¹ Source: 2017 population data by ONEI

Table 2.1.1 Classified Network

Network	Connected Service Center	Route
Primary Connection	Class I and Class II	<ul style="list-style-type: none"> • Havana – Santa Clara – Camagüey – Santiago de Cuba
Secondary Connection	Class I and Class III	<ul style="list-style-type: none"> • Havana – Artemisa – Pinar del Rio • Havana - Matanzas
Tertiary Connection	Class II and Class III	<ul style="list-style-type: none"> • Santa Clara – Cienfuegos • Las Tunas - Holguin • Santiago de Cuba - Guantanamo
Quaternary Connection	Class I and Class IV	<ul style="list-style-type: none"> • Havana – Nueva Gerona (via Batabane Port)

Source: JICA Study Team



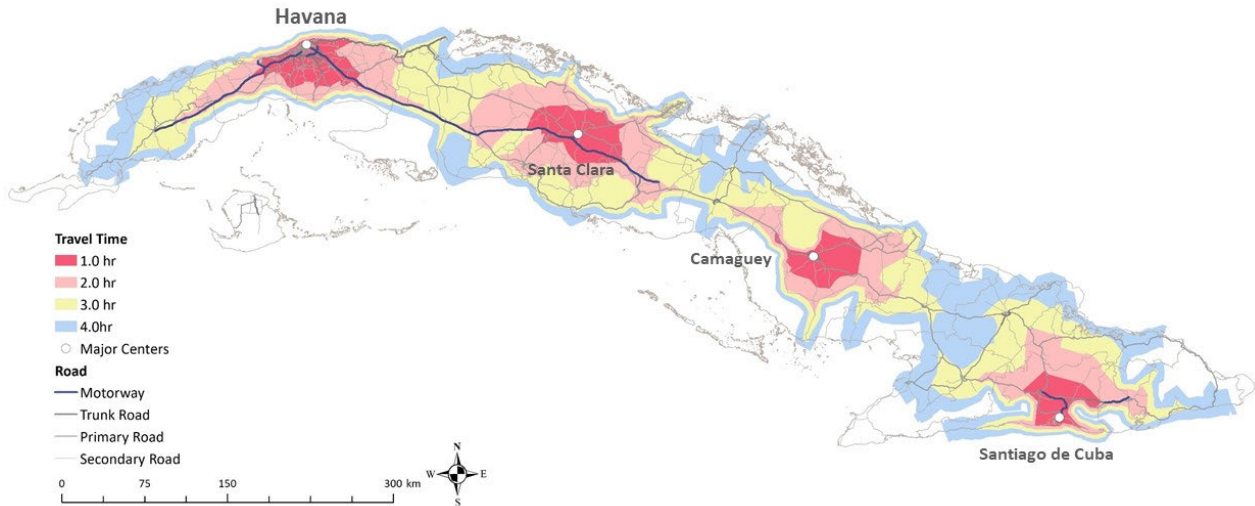
Source: JICA Study Team

Figure 2.1.2 Classified Network (existing)

The service coverage (areas) by roads from the primary and secondary centers are shown in Figure 2.1.3, which is calculated based on travel time using the current road network². In the figure, blue- and white-colored areas show poor accessibility to these centers. For instance, it takes about four hours to reach the secondary centers by car in the areas between Camagüey and Santiago de Cuba.

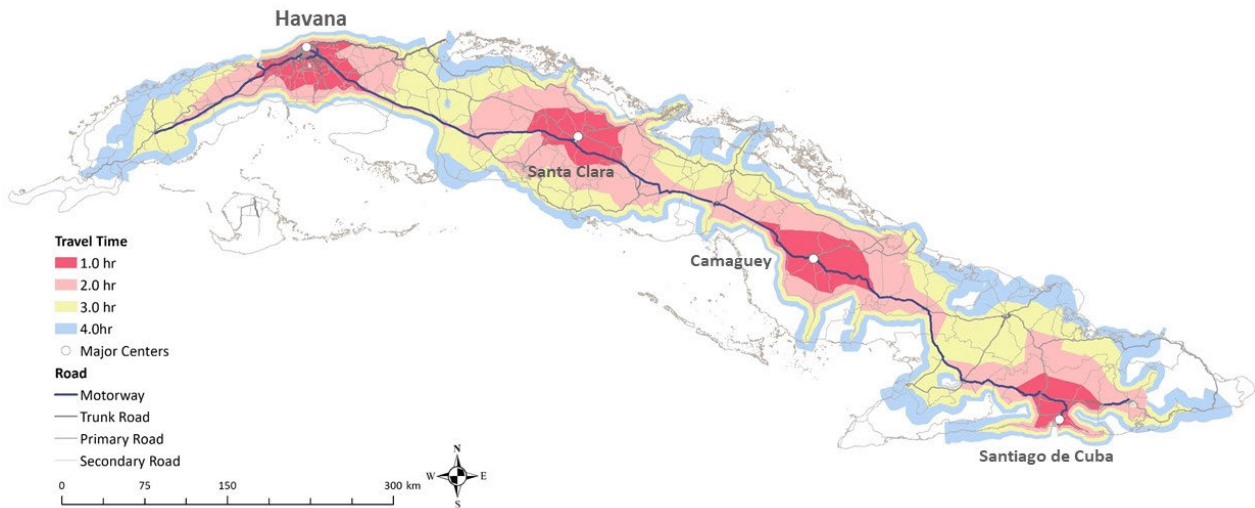
Completing the Autopista would improve accessibility in the eastern area, as shown in Figure 2.1.4. The transport network between Havana and Santiago de Cuba is classified as a primary connection and the most important network for supporting people’s life in Cuba. In this regard, completing Autopista is seen as one of the most strategically important projects.

² Since figures are based on road networks, Isla de la Juventud is excluded from the calculation.



Source: JICA Study Team

Figure 2.1.3 Travel Time from Major Service Centers under Existing Network Conditions



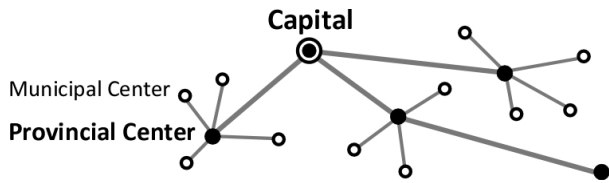
Source: JICA Study Team

Figure 2.1.4 Travel Time from Major Service Centers with Completion of the Autopista

(3) Strategic Network Structure

Cuba's current transport network is a spoke-and-hub structure, with state and provincial capitals as hubs connected by spoke roads to municipal centers. Plus, the spatial distribution of major tourist destinations, potential industrial areas, and major international gateways should be considered important nodes on the network that appropriate modes of transport should strategically connect.

Existing Spoke-hub system



Source: JICA Study Team

Existing system plus strategic network

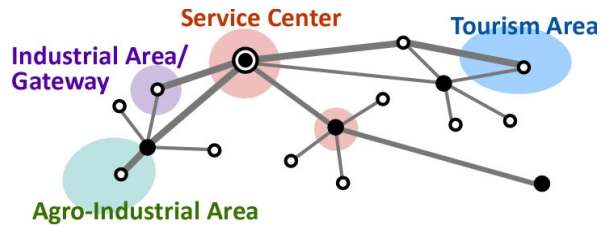


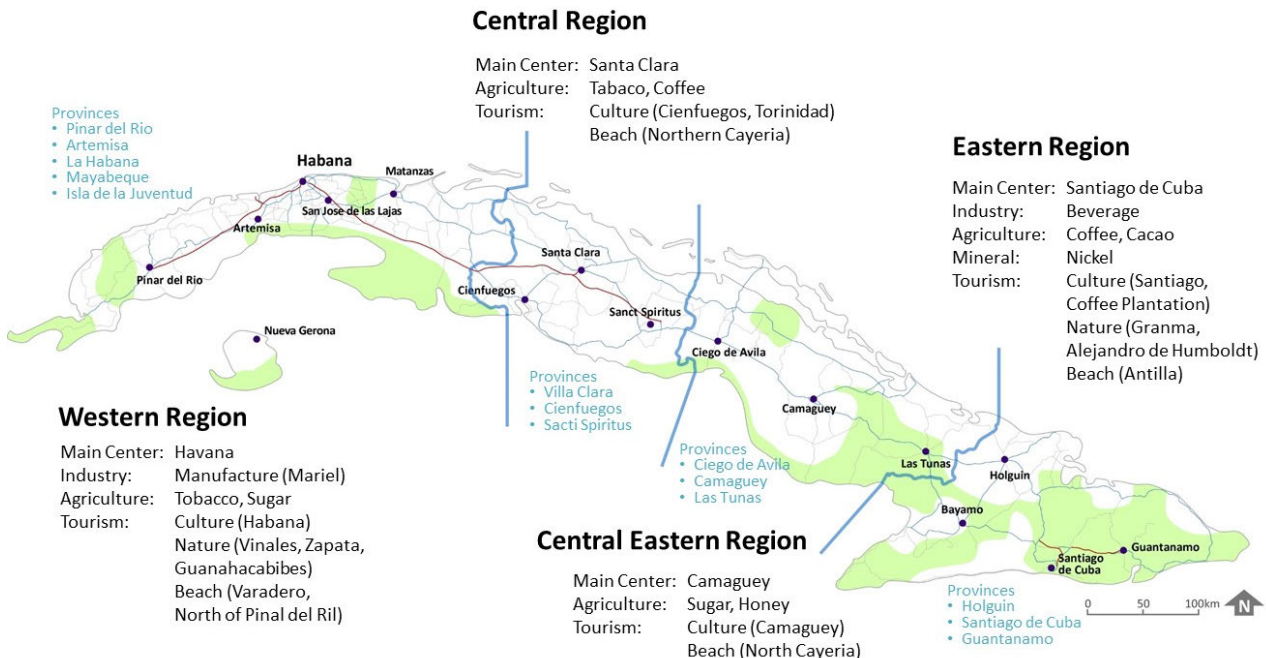
Figure 2.1.5 Conceptual Network Structure

2.1.3 Regional development approach

Cuba's current spatial planning system follows an administrative hierarchy, with ENOT as a national plan and EPOT as a series of provincial plans. But in between ENOT and EPOT, no consolidated planning system covers multiple provinces.

Since international tourists, agricultural and mineral products various general commodities all move across provincial boundaries, it is worthwhile to consider a transport network development plan from an integrated regional development point of view.

Considering the spatial distribution of centers and gateways, Cuba can be divided into four regions: Western, Central, Central-Eastern, and Eastern Regions, each containing three to five provinces. Each region has a primary or secondary center and a major gateway, such as an airport and/or seaport. The significant characteristics of the regions are outlined in Figure 2.1.6.



Source: JICA Study Team

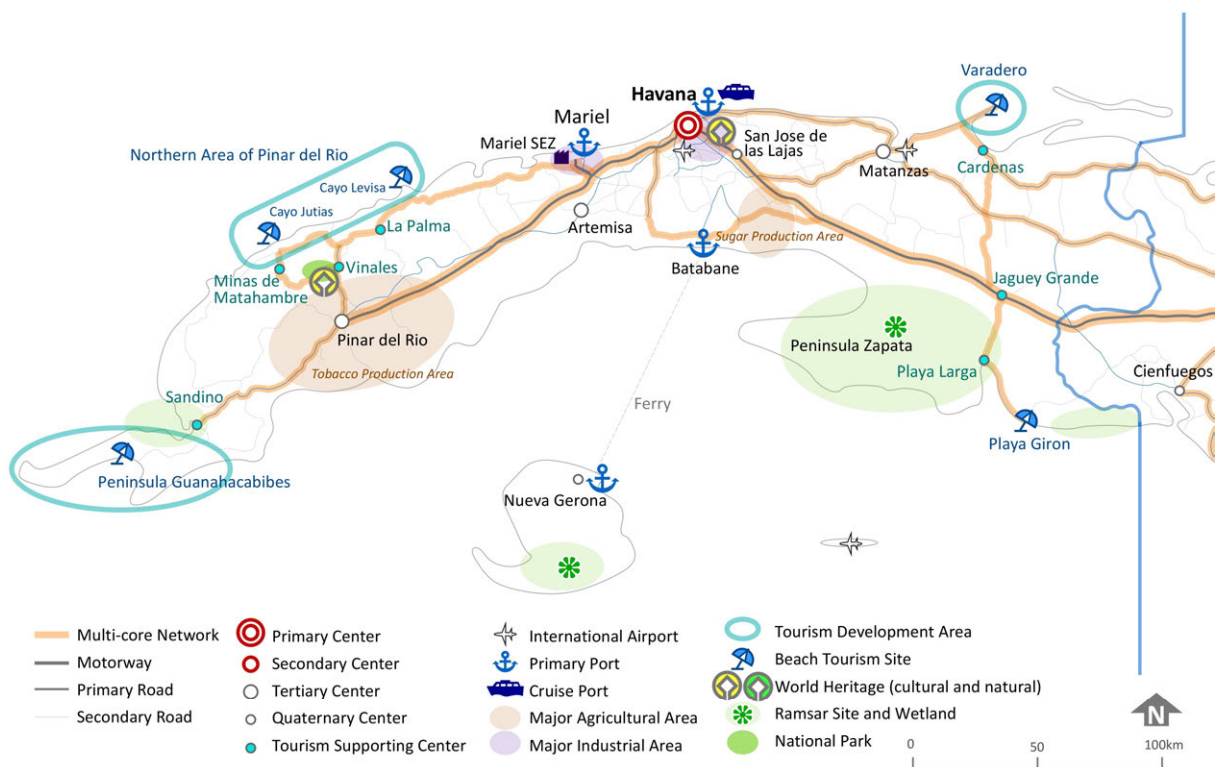
Figure 2.1.6 Characteristics by Region

(1) Western Region

The Western Region comprises five provinces: Havana, Artemisa, Matanzas, Pinar del Rio, and Isla de la Juventud. Havana is the primary regional center, as well as the international gateway for both passengers and cargo. In addition, another three seaports are located in this region: Mariel, Batabano, and Nueva Gerona. In particular, Mariel is recognized as an industrial gateway port.

Major economic activities in this region include manufacturing, tourism, and agriculture. Havana has a variety of industries: manufacturing, tourism, and agri-industries such as rum and cigars. The Mariel SDZ has developed as Cuba's most significant industrial area and is expected to attract foreign investment. Tourism, especially beach resorts, is also expected to grow in this region following the successful development of Varadero. The northern area of Pinar del Rio province and Guanahacabibes Peninsula will be developed in the near future. To support these tourism developments, neighboring towns should house tourism business employees, such as Cardenas, La Palma, Minas de Matahambre, and Sandino. As cultural tourism sites, Havana and Viñales also continue to attract international tourists. In southern Matanzas province, smaller tourist destinations such as Playa Giron draw tourists from Varadero on day trips. In agriculture, tobacco production in Pinar del Rio is dominant in this region.

A focused transport network plan is shown in Figure 2.1.7 based on potential development areas.



Source: JICA Study Team

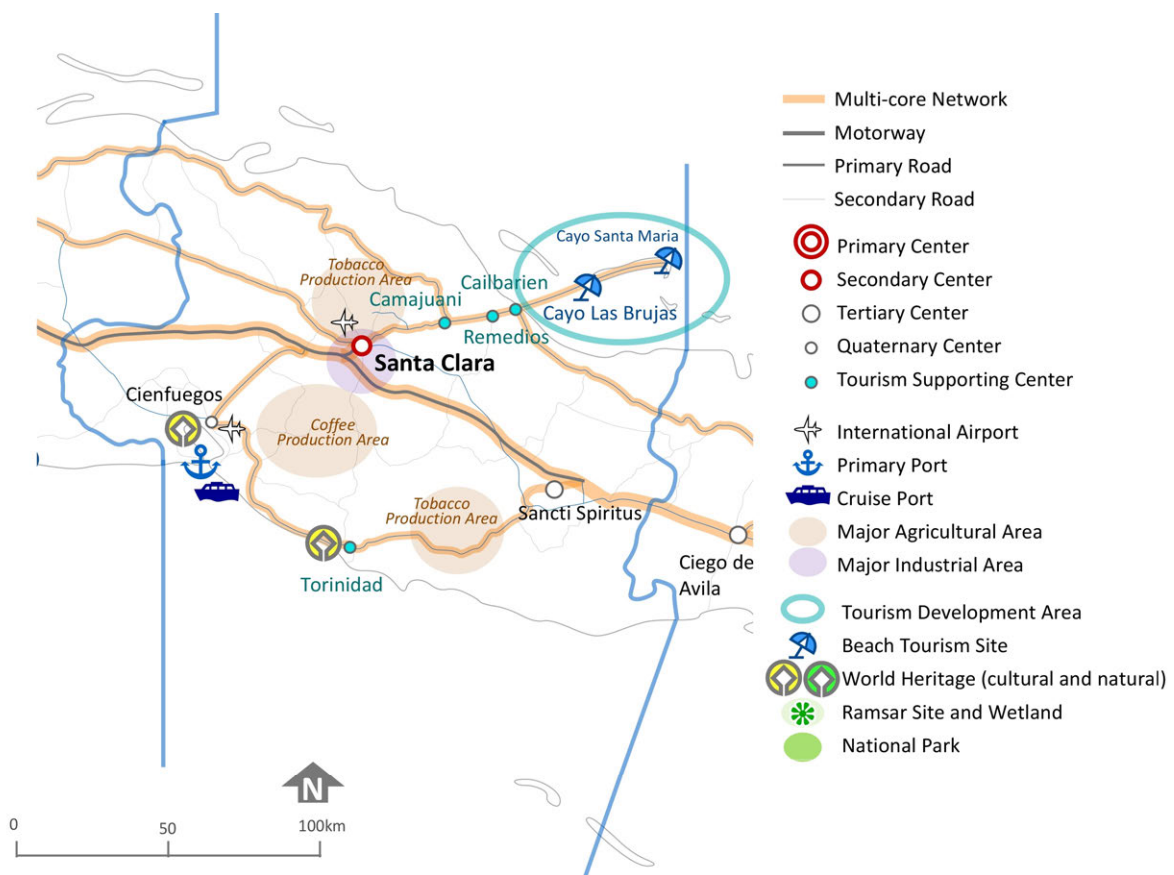
Figure 2.1.7 Transport Network for Potential Areas in Western Region

(2) Central Region

The Central Region consists of three provinces: Villa Clara, Cienfuegos, and Sancti Spiritus. Santa Clara, the provincial center of Villa Clara, is a secondary and regional service center. Santa Clara and Cienfuegos are regional gateways. The port of Cienfuegos welcomes cruise ship tourists.

Major economic activities in this region are agriculture, agri-industry, and tourism. International tourists visit UNESCO world heritage sites at Cienfuegos and Trinidad in the southern part of the region. Cayo Las Brujas and Cayo Santa Maria are planned for beach tourism. Supporting towns that could house tourism workers include Caibarién, Remedios, and Camajuani. In agriculture, tobacco and coffee are produced here, but in relatively low volumes. Meanwhile, the tobacco industry is active in Santa Clara.

A focused transport network plan is shown in Figure 2.1.8 based on potential development areas.



Source: JICA Study Team

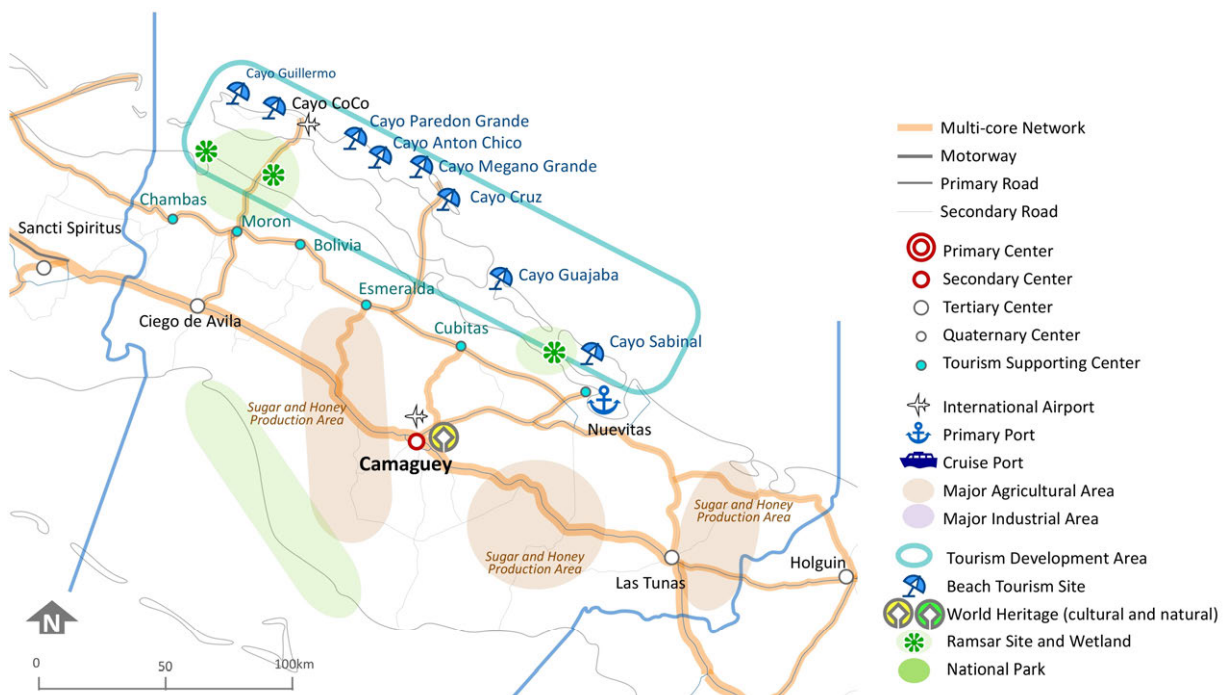
Figure 2.1.8 Transport Network for Potential Areas in Central Region

(3) Central Eastern Region

The Central Eastern Region spans three provinces: Ciego de Avila, Camaguey, and Las Tunas. Camaguey is a secondary service center and regional center. As regional gateways, Camaguey and Cayo Coco have international airports, while Nuevitas has a primary seaport. Visitors to beach resorts in Cayo Coco tend to fly directly to this island from outside Cuba.

Major economic activities in this region are tourism and agriculture. Large-scale tourism developments in the northern islands are expected to significantly stimulate the economy of this region and all of Cuba. In total, 33,400 hotel rooms are planned in the area. Towns in the northern area that will need to house an increasing population of workers include Chambas, Moron, Bolivia, Esmeralda, Cubitas, and Nuevitas. From an environmental perspective, since wetlands, including Ramsar-protected sites, cover the northern coasts, infrastructure development must protect these areas. Plus, Camaguey has a cultural world heritage site. In agriculture, high-volume sugar and honey production dominate in this region.

A focused transport network plan is shown in Figure 2.1.9 based on potential development areas.



Source: JICA Study Team

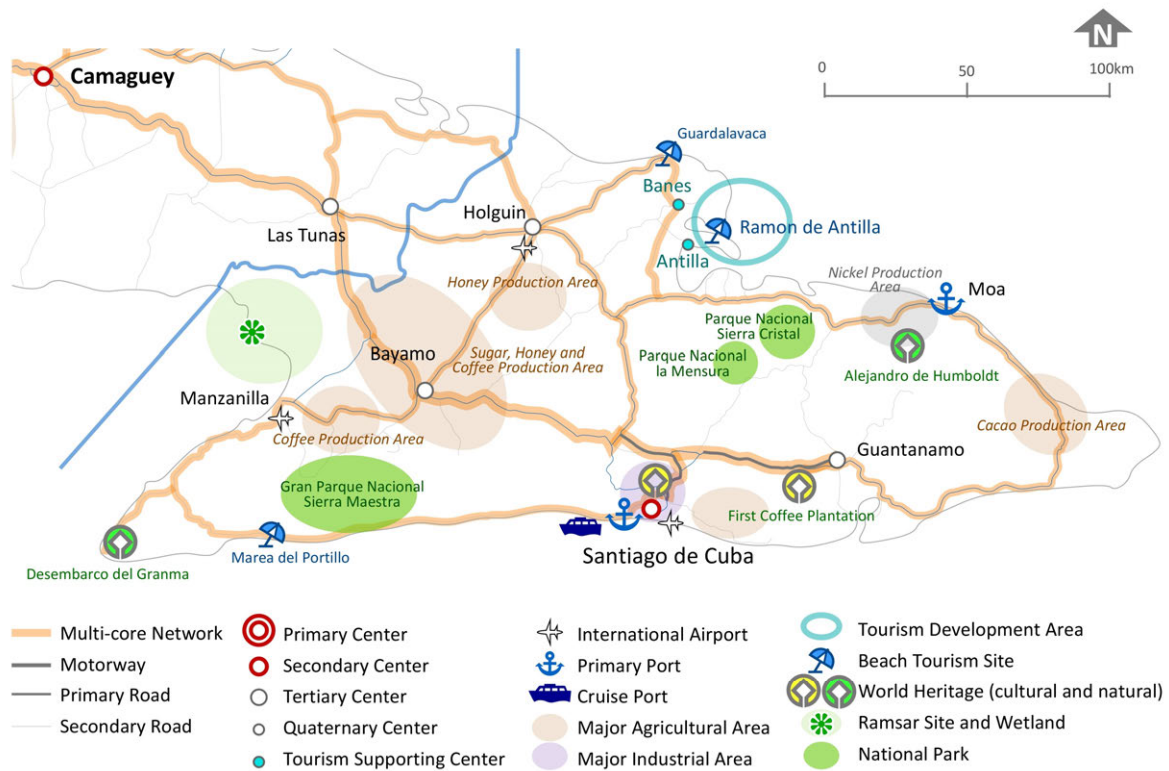
Figure 2.1.9 Proposed Network and Potential Areas in Central Eastern Region

(4) Eastern Region

The Eastern Region includes four provinces: Holguin, Granma, Santiago de Cuba, and Guantanamo. Santiago de Cuba is a secondary service and regional center and Cuba's second-largest gateway, with an international airport and seaport. Two other international airports are in Holguin and Bayamo, and another primary seaport is in Moa.

Major economic activities in the region are industry, mining, tourism, and agriculture. In manufacturing, large beverage factories are located in Holguin, while agri-industries in Santiago de Cuba include rum and cigars. Nickel mines are situated near Moa. In tourism, the region has various resources, such as beach attractions and natural world heritage sites, and national parks, such as Alejandro de Humboldt and Desembarco del Granma. Cultural world heritage sites have also been registered in Santiago de Cuba. Beach tourism development is planned around Antilla. In agriculture, sugar, honey, coffee, and cacao are produced in this region.

A focused transport network plan is shown in Figure 2.1.10 based on potential development areas.



Source: JICA Study Team

Figure 2.1.10 Transport Network for Potential Areas in the Eastern Region

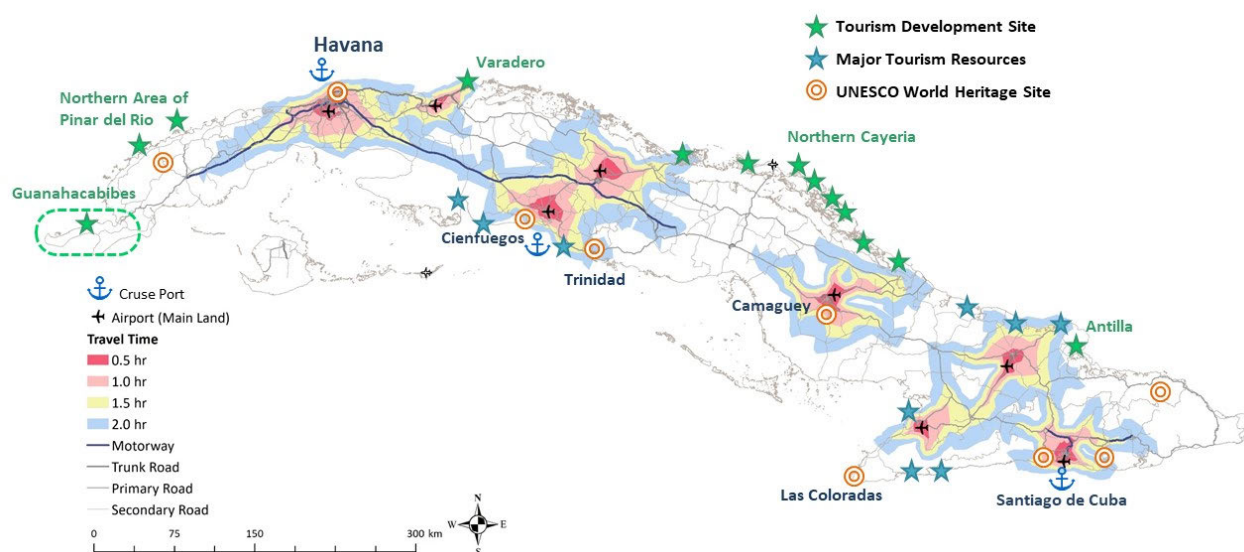
2.1.4 Transport for international tourists and tourism sector employees

(1) Transport for Tourists

Beach resorts and nature/culture world heritage³ sites are the major destinations for tourists. There are two main types of gateways for tourists: international airports and cruise-ship ports. Cuba has 10 international airports, eight on the mainland and two on other islands. Havana, Cienfuegos, and Santiago de Cuba are cruise-ship gateways.

Figure 2.1.11 shows simulated travel times from major international gateways via the mainland road network. This indicates that most tourism destinations, including future development sites, cannot be reached from a significant gateway by car within two hours. In particular, this shows that tourism development sites in Pinar del Rio and Camaguey provinces need better access from the major gateways.

³ Registrado por UNESCO como Sitio de Patrimonio Mundial



Source: JICA Study Team

Figure 2.1.11 Travel Time from Major Airports to Tourism Sites

(2) Transport for tourism sector employees

Table 2.1.2 shows tourism development areas and the number of hotel rooms planned by 2030. Havana, Varadero, and Northern Cayeria will have the lion's share of 55,300 additional planned rooms. The number of hotel industry employees required by 2030 (excluding construction workers) can be estimated at 69,300 by multiplying the number of planned rooms (55,300) by the average number of employees per hotel room (1.25⁴). If all these staffs bring their family members along (the average Cuban household size is 3.1 persons⁵), 214,800 additional persons would need to be settled in surrounding areas.

Table 2.1.2 Tourism Development Areas, Planned Hotel Rooms, and Estimated Hotel Workers

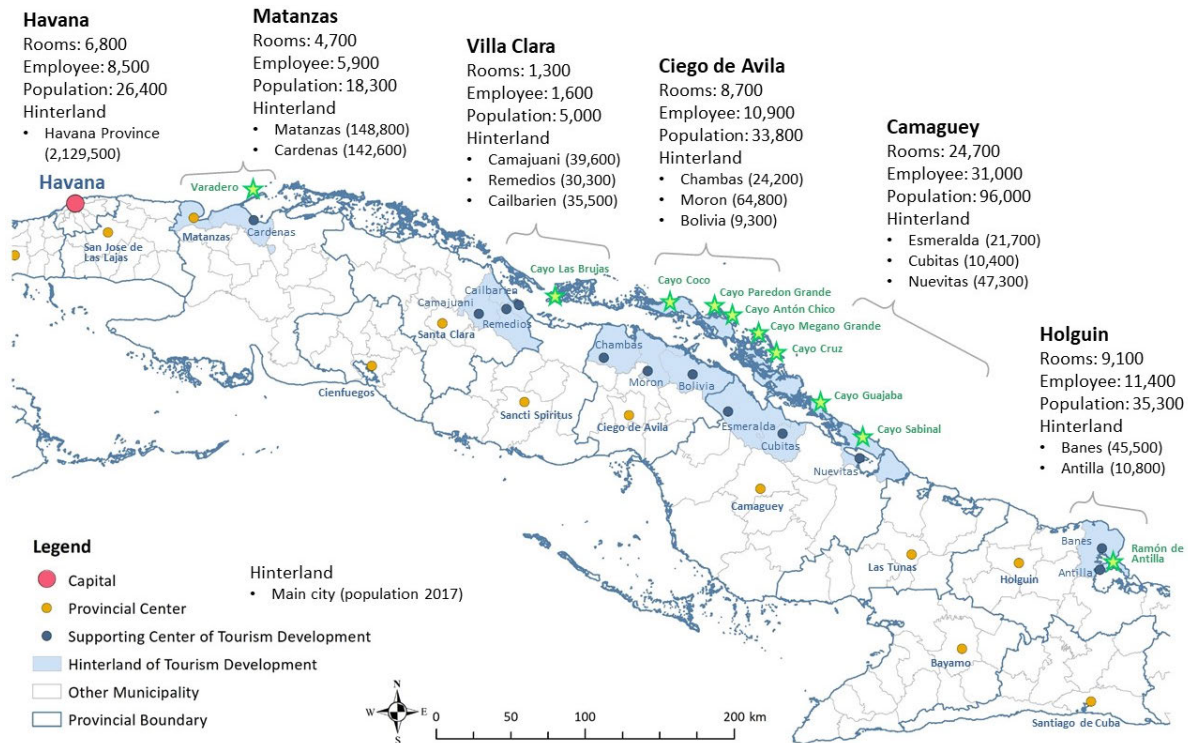
Province	Area of Development	Planned Hotel Rooms 2019-2030	Estimated Required Hotel Workers	Estimated Increased Population	Total Increased Population by Province
Havana	Havana	6,800	8,500	26,400	26,400
Matanzas	Varadero	4,700	5,900	18,300	18,300
Villa Clara	Cayo Las Brujas	1,300	1,600	5,000	5,000
Ciego de Avila	Cayo Coco	5,300	6,600	20,500	33,800
	Cayo Paredon Grande	2,600	3,300	10,200	
	Cayo Antón Chico	800	1,000	3,100	
Camaguey	Cayo Cruz	10,600	13,300	41,200	96,000
	Cayo Sabinal	12,800	16,000	49,600	
	Cayo Mégano Grande	300	400	1,200	
	Cayo Guajaba	1,000	1,300	4,000	
Holguin	Ramón de Antilla	9,100	11,400	35,300	35,300
Total		55,300	69,300	214,800	214,800

Source: JICA Study Team based on planned hotel room data from Cimab

⁴ Source: Japan Ryokan and Hotel Association

⁵ Source: 2018 United Nations data

In the above plan, target sites excluding Havana are located on islands slated for beach development where employees are not allowed to live. So, they and their families need to be settled in the hinterland. Near Varadero, Matanzas, and Cardenas are comparatively large towns that could accommodate the new settlers. But as towns in the hinterland of Northern Cayeria are relatively small, extensive housing and infrastructure development will be necessary to accommodate new hotel workers and their families. In particular, hotel developments in Camaguey and Holguin provinces could bring significant demographic changes, with an estimated 1.5 to 2.2 times the current population near the sites. Moreover, these hinterland towns will need links to major service centers for access to public services.



Source: JICA Study Team based on the data of planned hotel rooms by Cimab and population data by ONEI

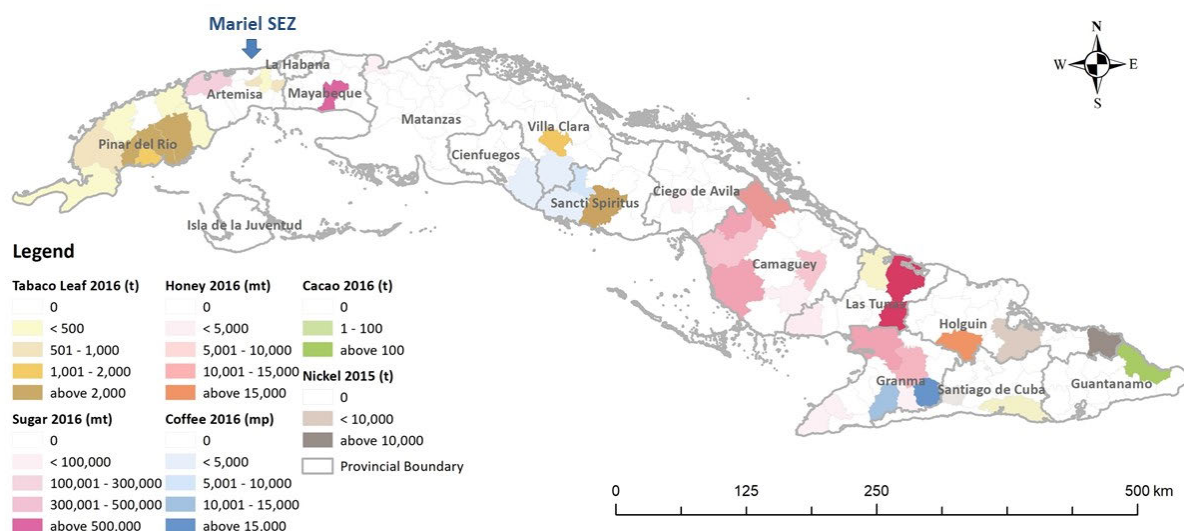
Figure 2.1.12 Tourism Development in Havana, Varadero, Northern Cayeria, and Antilla

According to population projections by ONEI, Cuba's total population will decrease after 2025, and the elderly cohort will increase rapidly. In 2030, the working-age population will be below 55% of the total, while people over 60 will make up 30%. Under these circumstances, securing an adequate labor force in rural towns may be a steep challenge, given the trend of urbanization in Cuba. But, according to discussions with the Ministry of Labor & Social Security, the required labor force can be recruited from neighboring provinces. This implies that the workforce transport network should be planned not only within each province but also to serve inter-provincial commuting to large-scale tourism development areas.

2.1.5 Cargo Transport

(1) Spatial distribution of Major Agricultural and Mineral Production Area

Certain agricultural products and minerals are considered strategic industries for further development in Cuba. Agricultural products for domestic consumption are widely cultivated, while export products are focused in designated areas. For example, tobacco is produced mainly in the western region; sugarcane and honey are concentrated in the central region; coffee, cacao, and nickel are produced in the eastern region. Figure 2.1.13 is a consolidated map of potential areas for agriculture and minerals. These industrial clusters indicate important economic areas that require efficient transport networks and services. The Mariel SDZ and port should also be a priority for enhanced transport networks and services.

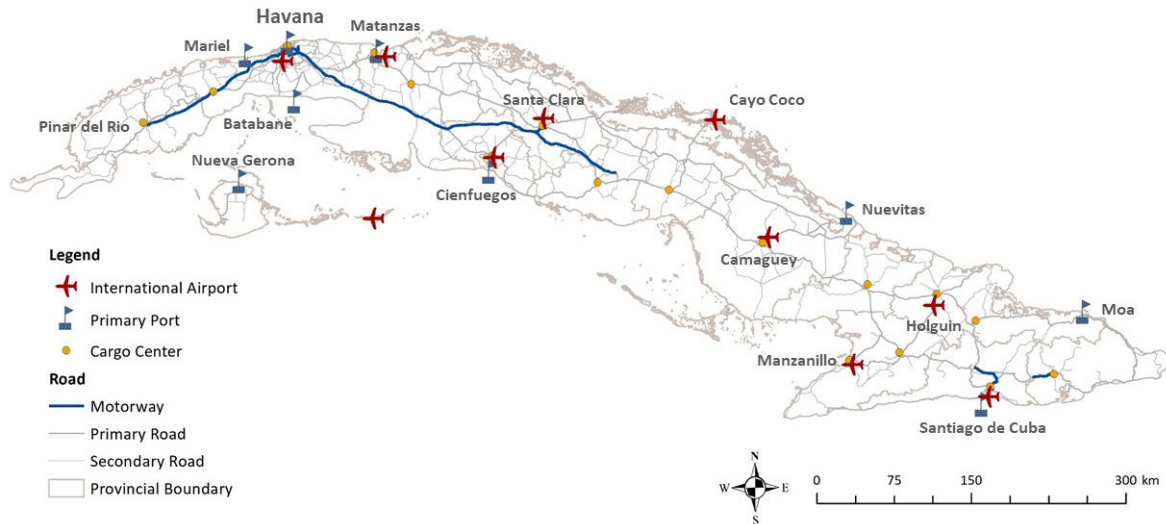


Source: JICA Study Team based on data from “Municipal Anuario Estadístico de la Oficina Municipal de la ONEI 2016.”

Figure 2.1.13 Production Volumes of Major Agri-industries and Minerals by Municipality

(2) Logistics Gateways

Major logistics gateways facilitating Cuba’s international trade include 10 international airports and nine primary seaports. Cargo centers have also been developed in every province for delivering and collecting commodities. These logistics points need to be connected efficiently. Figure 2.1.14 shows the locations of these logistics points.



Source: JICA Study Team based on the data by CIMAB

Figure 2.1.14 Major Logistics Gateways in Cuba

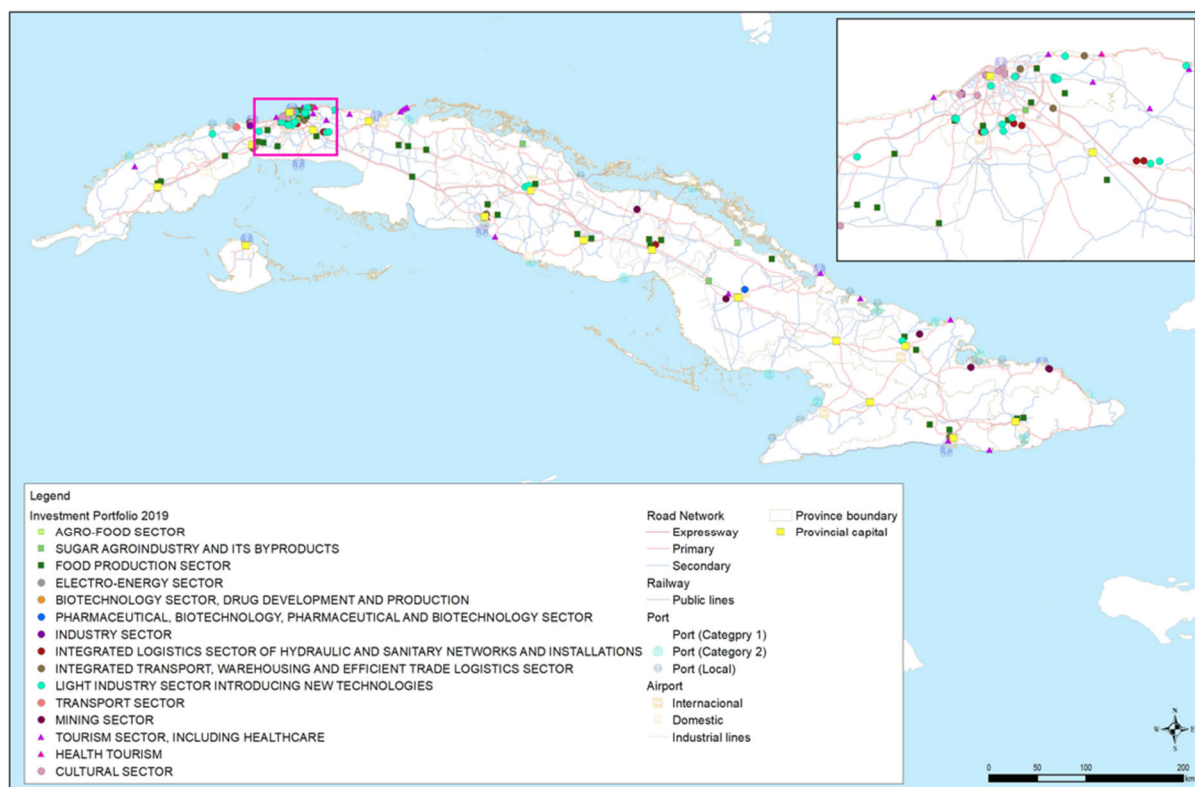
2.1.6 Health and medical services

Cuba has achieved a social system in which everyone has access to free education and healthcare, many healthcare sector workers per capita, and a well-developed regional primary care healthcare system. The medical sector is also recognized as highly competitive in the biotechnology and pharmaceutical industries. However, the deterioration of the public transportation system in recent years is believed to have led to a decline in the level of medical services provided, and improvements are needed.

2.1.7 Strategic Projects

Analysis of the connections between investment-concentrated areas and major transport infrastructure will be one of the factors to prioritize in planning transport infrastructure.

The following figures show the location of the proposed investment listed in the 2018 ProCuba portfolio. The transport network and services are expected to support these planned investments.



Source: JICA Study Team

Figure 2.1.15 Investment Portfolio 2018 and Transport Infrastructure in Cuba

2.1.8 Cross-sector Planning Issues

Transport planning issues were addressed from the perspective of six key areas: 1) Planning and coordination (planning administration); 2) Transport infrastructure development; 3) Environment, safety, & security; 4) Transport service and industry development; 5) Transport pricing and resource allocation, and 6) Institutional and regulatory development.

Cross-sector issues were identified, as summarized in Table 2.1.3, which were identified through discussions in the TWG. These issues need to be addressed, and corresponding objectives should be identified within the planning horizon of 2030.

Table 2.1.3 Cross-sector Transport Planning Issues

Key areas	Planning issues to be addressed
1. Planning and coordination	• Establishment of well-organized traffic and transport statistics, data collection systems, and databases. Digital transformation needs to be accelerated in this regard.
	• Integration and coordination of strategic transport plans and spatial development initiatives (ENOT, EMOT, Mariel SDZ, Northern coastal area/islands, etc.).
	• Integration of strategic transport plans and business investment opportunities (investment portfolio).
	• Coordination of planning activities among transport infrastructure plans (GEMAR 2030 Plan, UFC 2028 Plan, CACSA 2030 Plan) to achieve better synergistic effects and outcomes.
	• Prioritization of transport investment based on quantitative analysis (demand forecast, cost-benefit analysis, etc.).

Key areas	Planning issues to be addressed
2. Transport infrastructure development	<ul style="list-style-type: none"> • Urgent improvement/replacement of seriously damaged/deteriorated transport infrastructure to maintain safe transport and support the daily life of Cubans. • Establishing a transportation (service) network that contributes to the acquisition of the foreign currency, e.g., high-standard roads to tourist destinations. • Transport infrastructure to support export industries such as medical products and high-value agricultural products. • Increase (recover) transport and storage capacity and improve the efficiency of all transport subsectors that are caused by the deterioration of existing infrastructure and aged facilities and equipment. • Effective and efficient use of existing transport assets is needed – “maximum utilization of the existing assets” using ICT and other advanced technologies.
3. Environment, safety, and security	<ul style="list-style-type: none"> • Social & environmental considerations in the planning and design process of transport infrastructure need to be strengthened by introducing SEA and SDGs. • Safety standards and enforcement mechanisms, especially highway safety standards, need to be enhanced. • The use of inefficient/obsolete transport technologies (aged vehicles, etc.) in the transport sector exacerbates energy consumption. • The use of renewable energy needs to be encouraged. • Emergency (ambulance) transport services need to cover the whole country.
4. Transport service and industry development	<ul style="list-style-type: none"> • Enhancement of coordination (intermodality) and smooth transfer between different transport modes and services to increase efficient travel and modal transfer. • By adapting the existing “<i>balance de cargas</i>” system to a modern system, cargo transport services can be improved. One possible solution is to enhance cargo transport capacity under OSDEs attended by MITRANS. Another solution is to introduce Third-Party Logistics (3PL) with a non-state sector. • Consider the introduction of the “competition principle” between transport service providers. • Consider foreign direct investment (FDI) or Joint Venture (JV) in the logistics sector.
5. Transport pricing and resource allocation	<ul style="list-style-type: none"> • Ensure efficient use, upgrading, and maintenance of existing transport assets before major new investments are committed. • Investment returns/cost recovery in the transport sector can be hindered by low ridership/cargo volume, especially in rural areas – the “balance between investment efficiency and equity” needs to be carefully considered. • Introduction of a pricing system based on the quality of services (level of service: LOS and needs (demand) can be considered. • The impacts of transport investments on spatial development (increase in land value) are not well understood, including the use of transport infrastructure to increase attractiveness to investors.
6. Institutional and regulatory development	<ul style="list-style-type: none"> • Roles of the State in supply, management, and maintenance of transport infrastructure and services need clarifying – a clear “regulator” role • Roles of OSDEs in supply, management, and maintenance of transport infrastructure and services need clarifying – a clear “manager” role • The roles of <i>Empresa</i> in the supply, management, and maintenance of transport infrastructure and services need clarifying – the “service provider” role • Legislative and regulatory frameworks for transport infrastructure provision and operation (service production) need updating – introduction of PPP, etc. - enhanced scope for private-sector involvement in providing transport infrastructure and services. • Foreseeable shortage of human resources (aging) must be considered - institute long-term training programs in transport sector planning, management, and operations to improve human resource capabilities.

Source: TWG and JICA Study Team

2.2 Transport Planning Issues by Transport Subsector

The transport sub-sectors planning issues are summarized from the viewpoint of six key areas: 1) Planning & coordination; 2) Transport infrastructure development; 3) Environment, safety, and security; 4) Transport service and industry development; 5) Transport pricing and resource allocation; 6) Institutional & regulatory development.

Table 2.2.1 Planning Issues in the Road and Bridge Sector

Key areas	Planning issues to be addressed
1. Planning and coordination	• Lack of well-organized traffic and transport statistics and data.
	• Need quantitative survey of road/bridge conditions for maintenance & management
	• Need for coordinated planning among institutions related to transport infrastructure at the national level.
	• Integration of the strategic transport plan (this master plan) and spatial development initiatives (ENOT, Mariel SEZ, Northern coastal area/islands, etc.) needs strengthening.
	• Integration of the strategic transport plan (this master plan) and business investment opportunities (investment portfolio) requires strengthening.
	• Need for a resilient road and bridge network to natural disasters.
	• Prioritization of transport investment based on quantitative analysis (cost-benefit analysis, etc.)
2. Transport infrastructure development	• Many roads and bridges were built based on old specifications without complying with road width and cross-sectional composition requirements.
	• Urgent repair of seriously damaged/deteriorated transport infrastructure is needed.
	• Shortage of construction equipment and inadequate facilities lacking capacity and efficiency.
	• Effective and efficient use of the existing transport assets is needed – “maximum utilization of existing assets.”
	• Shortage of night driving safety facilities.
	• At-grade intersections on the Autopista
	• Enhancement of connectivity between centers of activity/growth/tourism and international gateways.
• Utilization of ICT.	
3. Environment, safety and security	• Safety standards and enforcement mechanisms, especially highway safety standards, need overhauling.
	• The use of inefficient transport technologies (aged vehicles, etc.) in the transport sector exacerbates energy consumption.
	• Emergency (ambulance) transport services to cover the whole state are needed.
	• By introducing the idea of SEA and SDGs, social and environmental considerations in the planning process and design of transport infrastructure need to be strengthened.
	• Enlightenment of the people on countermeasures against the COVID-19 pandemic.
4. Transport service and industry development	• Improvement of road-related business opportunities and establishment of stop and rest stations (michi-no-eki)
	• Capacity building of CNV and Empresa Constructora de Obras de Ingeniería (ECOING) through technical training programs in the road and bridge sector.
5. Transport pricing and resource allocation	• Introduction of the “Beneficiaries’ Payment Principle” in using roads and bridges and application of “Affordable Pricing” to maintain the accessibility of transportation.
	• Ensuring the necessary funding in the annual budget for urgent projects.

Key areas	Planning issues to be addressed
6. Institutional and regulatory development	<ul style="list-style-type: none"> Roles of the State, provinces, and Empresa in supply, management, and maintenance of road/bridge infrastructure and services need clarifying for further capacity building.
	<ul style="list-style-type: none"> Foreseen shortage (aging) of human resources needs to be considered - institute long-term training programs in transport sector planning, management, and operations to improve human resource capabilities.
	<ul style="list-style-type: none"> Legislative and regulatory frameworks for transport infrastructure provision and operation (service production) need updating; introduction of PPP, etc. - enhanced scope for private-sector involvement in providing transport infrastructure and services.

Source: JST

Table 2.2.2 Planning Issues in the Road-based passenger transport sector

Key areas	Issues to be addressed
1. Planning and coordination	<ul style="list-style-type: none"> Improve the capacity of bus services that contribute to the mobility of foreign tourists. Role/function sharing of bus services under MITRANS, MINTUR, and MINFAR sectors.
	<ul style="list-style-type: none"> Strengthen sustainability and capacity of intercity bus services that contribute to solidarity between cities
	<ul style="list-style-type: none"> Strengthen the sustainability and transportation capacity of bus service, especially for citizens in local cities
	<ul style="list-style-type: none"> Realize multimodal intercity/urban transportation networks
2. Transport infrastructure development	<ul style="list-style-type: none"> Replace/procure buses for intercity services and local cities
	<ul style="list-style-type: none"> Improve bus terminal facility/bus waiting environment and optimize information provision
	<ul style="list-style-type: none"> Strengthen maintenance and management systems for buses (including spare parts procurement)
3. Environment, safety, and security	<ul style="list-style-type: none"> Improve the safety and security of city buses and intercity bus services
	<ul style="list-style-type: none"> Strengthen countermeasures against infectious diseases
4. Transport service and industry development	<ul style="list-style-type: none"> Improve intercity bus reservation/ticketing system
	<ul style="list-style-type: none"> Improve travel comfort by improving intercity service areas
	<ul style="list-style-type: none"> Strengthen the domestic bus manufacturing industry (Diana Bus)
5. Transport pricing and resource allocation	<ul style="list-style-type: none"> Diversification of profits by diversification of bus-related services
	<ul style="list-style-type: none"> Provide advanced services for foreign tourists and consider a flexible fare system
6. Institutional and regulatory development	<ul style="list-style-type: none"> Effective utilization and appropriate public management of private transport service providers (truck bus/taxi businesses)

Source: TWG and JICA Study Team

Table 2.2.3 Planning Issues in the Rail sector

Key areas	Issues to be addressed
1. Planning & coordination	<ul style="list-style-type: none"> Develop inventory database of rail infrastructure, equipment, spare parts
	<ul style="list-style-type: none"> Develop rail infrastructure maintenance plan/programs
	<ul style="list-style-type: none"> Develop human resource database of UFC staff
	<ul style="list-style-type: none"> Develop human resource development plan/training programs
	<ul style="list-style-type: none"> Develop database for cargo handling and passenger transport records

Key areas	Issues to be addressed
	<ul style="list-style-type: none"> • Continue implementing UFC 2028 plan in coordinated manner with other sectors • Develop coordination system among MEP, MITRANS, ATF, UFC. • Develop coordination system among railway-related Empresas • Develop coordination system between workshops • Rail sector master plan integrated with other economic sectors (investment portfolio, the northern coastal area/islands, etc.) – as part of the project supported by Russia • Develop industrial line improvement/rehabilitation plan (prioritization) for sugar-related industries and local communities • Develop intermodal passenger transport service plan, coordinated with bus services • Develop intermodal cargo service development plan, coordinated with truck services • Develop rail business development plan coordinated with cargo owners • Development of non-rail business development plan (kiosk, etc.) • Study involving non-state sector/FDI in service provision (cargo and passengers)
2. Transport infrastructure development	<ul style="list-style-type: none"> • Accelerate ongoing rail infrastructure improvement with support from Russia. • Study improvement for missing line (Fomento to Meyer) • Study rehabilitating Hershey Line as a tourism attraction and commuter rail system • Study development of new lines to serve the northern keys area • Phased and continued improvement of the industrial lines • Continuous PC sleeper production • Continued improvement of communication system and safety device installation • Improvement/renewal of workshops • Procurement of spare parts, materials, machines, and equipment for maintenance work • Study on urban transit systems in Havana and Santiago de Cuba
3. Environment, safety, and security	<ul style="list-style-type: none"> • Installation of advanced communication systems and safety devices • Study on security enhancement • Study on electrification of rail systems • Public enlightenment about safety and security • Prevention measures against COVID-19 • Public enlightenment about COVID-19
4. Transport service and industry development	<ul style="list-style-type: none"> • Attract more railway passengers by improving LOS (level of service) • Introduce an online ticketing service • Introduce a smart card system • Introduce commuter services using existing railway facilities • Attract tourists, especially from abroad • Improve/enhance in-train service • Attract more cargo consigners by improving the service • Revise monthly/weekly “balance de cargas” system to increase efficiency • Urgent business plan: effective use of new passenger rolling stock • Non-rail business development: commercial facilities in stations, etc. • Promote national railway industries • Coordinate with the investment portfolio. • Introduce 3rd-party Logistics (3PL) service, possibly with non-state sector

Key areas	Issues to be addressed
5. Transport pricing and resource allocation	• Provision of an appropriate annual state budget for maintenance
	• Increase staff salaries to attract quality human resources to the rail sector
	• FDI can be considered in rail infrastructure development and service provision
	• Increase revenue from non-rail business (station building, etc.)
	• Consider impacts of rail investments on spatial development (increased land value), including the use of transport infrastructure to increase attractiveness to investors.
6. Institutional & regulatory development	• Legislative/regulatory frameworks for rail transport service provision, operation, and maintenance should be reformed, introducing FDI, and more scope for private-sector in providing rail transport infrastructure and services.
	• Coming shortage of human resources due to aging must be countered with long-term training programs in planning, management, and operations to improve staff capability

Source: TWG and JICA Study Team

Table 2.2.4 Planning Issues in the Port & Maritime Transport sector

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.

Key areas	Issues to be addressed
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).
	• 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

Table 2.2.5 Planning Issues in the Airport & Civil Aviation sector

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

Key areas	Issues to be addressed
	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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
5. Transport pricing & resource allocation	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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

Table 2.2.6 Planning Issues in the Logistics sector

Key areas	Issues to be addressed
1. Planning and coordination	<ul style="list-style-type: none"> • 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)

Key areas	Issues to be addressed
	<ul style="list-style-type: none"> • 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
2. Transport infrastructure development	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 3 National Transport Development: Visions, Objectives, Strategies & Goals

3.1 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 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, urgent projects profiled in the Master Plan during the preparation period can still be implemented with appropriate funding allocation.

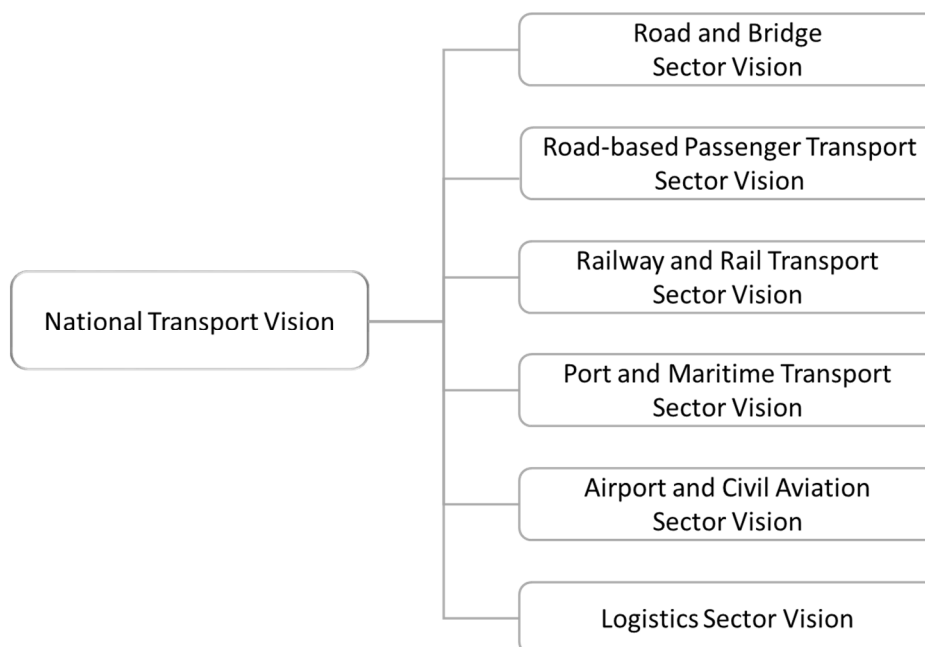
The following principles are employed in finding component projects in the master plan.

- 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

3.2 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,” and understanding of the planning issues.

The vision statements have been drafted according to the structure shown in Figure 3.2.1. 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 3.2.1 Vision statement structure

I. National transport development vision

The overall transport sector vision statement was drafted according to the principles that guide downstream objectives, along with strategies devised in a series of discussions & efforts by the Technical Working Group (TWG). The basic directions agreed upon by members of TWG 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 vital 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 Gualberto 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; similarly 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 economical 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.

Empresa under GEA, such as ETAG, ENOC, and EMCARGA, also provide cargo services with various Empresa 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.

3.3 Transport development objectives

3.3.1 Cross-sectoral objectives

Cross-sectoral objectives (overall policies) were guided by cross-sectoral transport planning issues & upstream policies. Table 3.3.1 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 3.3.1 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: TWG1 & JICA Study Team

3.3.2 Road & bridge sector

Based on understanding the planning issues and guided by the upstream policies, Road & Bridge sector objectives, strategies, and goals were drafted by TWG as shown in Table 3.3.2.

Table 3.3.2 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 canterers (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 (<i>Michi no Eki</i>) 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 behaviour.	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 (<i>Michi no Eki</i>) 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

3.3.3 Road-based passenger transport (bus) sector

Based on understanding the planning issues and guided by the upstream policies, the Road-based transport sector's objectives, strategies, and goals were drafted by TWG, as shown in Table 3.3.3.

Table 3.3.3 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. 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.
					1.2.1.2: Establish flexible intercity & interprovincial bus operation plans & fare systems responsive to demand. 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. 1.3.2: Make sustainable/effective city bus service operation plans.	Promote visualization of urban buses' demand, operation status & operating costs via a monitoring system to enable formulation/update of bus 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.	1.3.1.1: Visualization & monitoring of city bus demand, operation status & operating costs
					1.3.2.1: Create an efficient urban transport system featuring a network of trunk & feeder lines. 1.3.2.2: Improve public transport convenience by introducing a "clock-face schedule" & transfer fare discount system. 1.3.2.3: Expand public transport service area by eliminating non-serviced areas. 1.3.2.4: Establish a sustainable operation plan collaborating with truck-bus & taxi operators.
					1.4.1.1: Establish a comprehensive passenger transport network plan.
					1.4.2.1: Hold coordination meetings between EON & EPTs to review operation plans for intercity & city buses. 1.4.2.2: Refine route plans to achieve seamless access to intercity transport.
	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. 1.4.2: Strengthen connectivity between intercity & intracity buses, making transfers seamless.	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. Coordination meetings between EON & EPTs are to be held regularly to review intercity & intracity bus operation plans, & achieve seamless connectivity.	
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). 2.1.2.2: Establish a vehicle leasing system for individual business owners. 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. 2.2.2: Improve the waiting environment at major bus stops. 2.2.3: Provide real-time operation information by introducing a bus location system (mainly in major cities).	Renovate major interprovincial & intercity bus terminals to improve amenities, including real-time operation information. Create comfortable waiting environments with smart bus shelters at major urban bus stops & boost convenience with real-time information & links to last-mile transport. Improve convenience/visibility of urban public transport by providing real-time bus service information via ICT.	2.2.1.1: Rebuild/renovate major bus terminals. 2.2.1.2: Provide real-time bus operation info at major terminals. 2.2.2.1: Introduce smart bus shelters. 2.2.2.2: Prepare easy-to-understand route maps. 2.2.2.3: Improve last-mile transport by installing cycle-share & bicycle parking areas. 2.2.3.1: Digitize all bus operation data to provide online operation info (GTFS, General Transit Feed Specification). 2.2.3.2: Introduce dynamic bus operation info system (GTFS real-time) via GPS on buses. 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. 3.1.2: Ensure safety/security on buses. 3.1.3: Install CCTV at bus terminals in cooperation with the police.	Improve the safety/reliability of bus services by systematically implementing safety training for drivers & mechanics. Improve passenger safety & security by installing monitored onboard cameras in buses. Improve safety & security via the installation of monitored CCTV at bus terminals.	3.1.1.1: Reduce the number of traffic accidents per 1 million-km bus service (1.76 for EON in 2018). 3.1.2.1: Install monitored cameras on buses. 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. 3.2.2: Build a bus system with long-term resistance to infectious diseases & disasters.	Promote a safe/secure passenger environment by installing COVID-19 countermeasures & providing information on bus congestion. 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.	3.2.1.1: Introduce COVID-19 countermeasures (partitions, thermometers, disinfectant, etc.). 3.2.1.2: Provide information on bus congestion. 3.2.2.1: Phased launch of contactless payments. 3.2.2.2: Infection control manuals for bus operators. 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. 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. 4.3.1.2: Develop intercity bus manufacturing. 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.
	5.2 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.	5.1.2: Explore mixed cargo/passenger services to provinces. 5.2.1: Provide various services & fare systems for foreign passengers.	Study new revenue sources such as bus parcel service to provinces. 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.	5.1.1.2: Offer logistics services to local cities in collaboration with other public corporations. 5.2.1.1: Offer profitable airport transfers. 5.2.1.2: Create a flexible bus fare system for foreign passengers. 5.2.1.3: Introduce various service levels, including luxury buses. 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. 6.1.1.2: Establish vehicle standards & license system to ensure safety. 6.1.1.3: Establish operation planning/monitoring system.

Source: TWG & JICA Study Team

3.3.4 Railway & rail transport sector

Based on understanding the planning issues and guided by the upstream policies, the Rail transport sector's objectives, strategies, and goals were drafted by TWG, as shown in Table 3.3.4.

Table 3.3.4 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 1.2.1.2: Establish an accounting system of services' incomes & expenditures by 2026 1.2.1.3: Build a set of performance indicators for rail transport services by 2026 using a new accounting system. 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 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/Cayo, 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. Urgent repair of significantly deteriorated facilities to ensure the safety	2.1.2.1 Comply with annual repair plans 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. 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. 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. 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). 3.1.5.2: Reduce accident (no. of incidents per 100,000 train-km) to 3.0 in 2026 and 2.5 in 2030 3.1.5.3: Continuous advertising campaign on railway safety 3.1.5.4 Continuous upgrading of the rail safety based on the research. 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. Incorporate strategic environmental assessments (SEA) into the planning process. 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. 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. 3.2.3.2: Build treatment facilities for polluting waste in workshops & scrubbing areas as soon as possible. 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 3.2.4.2: Install LED lighting to reduce electricity consumption. 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. 3.2.6.2: Complete installation of GPS on existing locomotives. 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. 3.3.2.2 Install diligence systems using CCTV at major CCDs by 2030. 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: <ul style="list-style-type: none"> • travel time • punctuality • frequency • carrying capacity • security • intermodality • 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 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 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. 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. 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) 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 4.2.5.2: Achieve a TAC of locomotives of 70% in 2030. 4.2.5.3: Annually carry out more than 445 overhauls of freight cars. 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)	Taking into account 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. 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 4.3.2.2: Increase revenue from non-rail business vs. 2020. 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. 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 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. 4.3.4.2: Provision of train operation information and e-ticketing by 2024. 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. 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. 4.4.1.2: Complete the investment program at Ciénaga Workshop by 2023. 4.4.1.3: Conduct investment at Sagua Workshop for repair/construction of freight wagons by 2030. 4.4.1.4: Conduct a rehabilitation program for railway workshops in Luyano & San Luis with AFD (French aid agency). 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. 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. 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. 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). 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. 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. 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. 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. 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. 6.4.3.2: Improve student facilities & accommodations. 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

3.3.5 Port & maritime transport sector

Based on understanding the planning issues and guided by the upstream policies, the Port & Maritime Transport sector's objectives, strategies, and goals were drafted by TWG, as shown in Table 3.3.5.

Table 3.3.5 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. 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. 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. 1.1.3.2: Make a new Cienfuegos cruise passenger terminal development plan by 2025. 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. 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. 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 1.4.1.2: Hold quarterly high-level meetings. 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. 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. 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: 1) Extension of Casassa Port 2) Santiago de Cuba Port container terminal (new development) 3) Upgrade of Cienfuegos Port 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) Roofed storage capacity in main ports: from 122,000 tons (2022) to 163,000 tons (2030) 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:: 1) Repair/upgrade old warehouses 2) Build honey/alcohol tanks for exports 3) Repair/upgrade Guayabal port 4) Repair/upgrade Carupano port 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) Roofed storage capacity in main ports: from 122,000 tons (2022) to 163,000 tons (2030) 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: TAC auxiliary fleet: • 52-70% (2023) • 85% (2030) TAC cabotage fleet: • 50-70% (2023) • 85% (2030) TAC passenger fleet: • 75% (2023) • 85% (2030)
			2.4.2: As resources permit, gradually refit 14 vessels in mid-term, plus 24 new builds for the following uses: 1) Multipurpose freighters for the north coast 2) Support vessels for north coast tourism 3) Freighters for routes between Isla de Juventud, Batabanó, Cienfuegos, and Cayo Largo del Sur. 4) Auxiliary fleet to ensure port services. 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 • 50-40% (2022) • 50-55% (2023) • 100% (2030) 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. Social impacts should be carefully examined, particularly for large-scale developments.	3.1.1.1: Review/amend all proposed infrastructure projects per EIA findings. 3.1.1.2: Create MITRANS EIA unit. 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 3.2.2.2: Install LED lighting to reduce electricity consumption. 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. • 2025 - 0.018 liters/ton-NM* • 2030 - 0.016 liters/ton-NM * 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. 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. 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. 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. 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. 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. 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). 5.4.2: Invite international port operators/developers to new cruise ship berths.	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. To accommodate increasing cruise ship traffic, a new cruise ship berth can be developed by foreign investors.	5.4.1.1: Study on shipping lines to serve Mariel & Santiago de Cuba ports in 2023/2024. 5.4.1.2: Conduct a study on outsourcing of Santiago de Cuba port operation in 2025/2026. 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. 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. 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. 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 Empresa (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. 6.3.1.2: Based on the study, issue phased invitations to state & non-state enterprises.

Source: TWG & JICA Study Team

3.3.6 Airport & civil aviation sector

Based on understanding the planning issues and guided by the upstream policies, the Airport & Civil Aviation sector's objectives, strategies, and goals were drafted by TWG, as shown in Table 3.3.6.

Table 3.3.6 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 1.1.1.2: To set a flight planning for each season using slot coordination software in 2023 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 1.1.2.2: To complete an inventory survey of all airports by 2025 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. 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. 1.1.3.2: To implement a customer survey through the captive portals, which is expected to improve immediate customer service by 2023. 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. 1.1.3.4: To have a baggage tracking system in place upon arrival and departure by 2023 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. 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. 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 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 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 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. 1.2.1.3: In the year 2023, materialize the training of the first group of graduates in the above programs. 1.2.1.4: To have fully trained airports and air navigation specialists by 2025. 1.2.1.5: To continually improve the levels of competence of aeronautical personnel following the Cuban Aeronautical Regulations and international standards by 2025. 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 coordination 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. 1.3.1.2 To search business opportunities with international cooperation agencies and foreign investors. 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. 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. 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. 2.1.1.2: A coordination system between different O&M services providers for the airport operation and maintenance is established by 2023. 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), considering 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 2.2.1.2: Periodically update the demand forecast with close cooperation with MINTUR about the number of international visitors. 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 2.2.2.2: Immediate improvement of Cayo Largo (repair of the aprons, runways, and taxiways) in 2022-2023 2.2.2.3: Capacity improvement (check-in counters, waiting space, immigration gates, etc.) for passengers of Havana International Airport by 2025. 2.2.2.4: Capacity expansion of the existing air catering facilities in Havana and a new catering facility construction in Havana in 2025 2.2.2.5: Capacity improvement (check-in counters, waiting space, immigration gates, etc.) for passengers at VRA and SNU by 2026 2.2.2.6: Capacity improvements of other international airports based on the expected passenger demand by 2030. 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 2.2.3.2: Procurement of special fuel supply equipment for HAV and VRA airports in 2023 2.2.3.3: Progressive improvement (construction) of fuel facilities for other major airports through 2028 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 2.2.4.2: The process of checking, storage, distribution, and dispatch of incoming cargo is improved by using bar codes by 2023. 2.2.4.3: To install an automated palletizing and cargo weighing system in the export warehouse by 2023. 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. 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. 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 2.4.1.2: Introduction of electrified equipment to contribute to a reduction of greenhouse gases by 2023-2030. 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. 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
3.1.2: 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. 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. 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. 3.2.1.2: Complete the development of the national air navigation system roadmap for the aviation sector in 2023. 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 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 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 3.2.3.2: Install LED lighting to reduce electricity consumption. 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. 3.3.1.2: Update and development of national AVSEC standards in 2023 3.3.2.1: Complete the case study of other countries and airports in 2022. 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. 3.3.2.2 To carry out a control and diagnosis of all safety and security systems of facilities and key objectives in 2023. 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. 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. 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. 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 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 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 4.2.1.2: Prepare an intermodal facilities improvement plan for each of the four major airports by 2024 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. 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. 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 4.3.2.2: Prepare air cargo handling facilities and equipment improvement plan for three major airports in 2023-2024 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 5.1.1.2: Prepare a Cuba national airport tax pricing plan in 2023-2024 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 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 5.3.1.2: Prepare an airfare setting strategy and plan in 2023-2024 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 6.1.1.2: Prepare an airport business operation plan to include state and non-state companies in 2024~2026 for four major airports 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 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. 6.3.1.2: Complete the development of the legal framework plan in 2023-2024. 6.3.1.3: Introduction of updated framework plan in 2025-2026.

Source: TWG & JICA Study Team

3.3.7 Logistics sector

Based on understanding the planning issues and guided by the upstream policies, the logistics sector's objectives, strategies, and goals were drafted by TWG, as shown in Table 3.3.7.

Table 3.3.7 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. 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. 1.1.1.2: Online BC meeting for annual freight transport planning from 2023. 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. 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. 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. 1.2.3.2: Cargo demand-supply matching by 2026. 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. 1.2.4.2: Improve provincial freight transport service by inviting non-state providers from 2024. 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). 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. 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. 2.2.2: Build new warehouses with cutting-edge technology in strategically selected locations. 2.2.3: Improve packaging technology & services.	Improve/renew existing warehouses (many old/deteriorated), adding functionality to improve the quality of storage services. Select locations for new warehouses to enhance logistics efficiency. Prioritize storage for reefer cargo & special-handling goods, e.g., pharma. Improve packaging technology/services to boost the quality of cargo transport services.	2.2.1.1: Make a renewal plan for basic materials warehouses in 2023/2024. 2.2.1.2: Make renewal plan for warehouses under MINCIN in 2023/2024. 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). 2.2.3.1: 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. 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. 3.2.2: Make alternative transport plans. 3.2.3: Increase the capacity of storage facilities for food and other goods.	Enhance information distribution system to optimize role in natural disasters. Make alternative transport plans in advance so goods can be delivered even during a disaster. To prepare for emergencies, secure storage capacity for food & other essential goods.	3.2.1.1: Install weather & accident information sharing system for logistics providers, 2022-2026. 3.2.2.1: Update national logistics BCP) to prepare for natural disasters in 2024/2025. 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. 3.3.2: Real-time status monitoring of hazardous goods transport & storage.	Specify safe routes & times for the transport of hazardous goods. Introduce real-time monitoring (using ICT) of hazardous goods transport & storage status.	3.3.1.1: Make hazardous goods transport control & management plan in 2024/2025. 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. 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. 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. 4.1.1.2: Establish 3PL service companies based on the study. 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. 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. 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. 5.3.2: Leases for vehicles & equipment. 5.3.3: Financing by Cuban banks	Study financing methods with loans from overseas so vehicles & equipment can be procured quickly. Study/implement procurement methods by leasing vehicles & other equipment from overseas. Direct financing from domestic banks so transport equipment can be procured as scheduled.	5.3.1.1: Seek funding from overseas financing agencies for vehicles & infrastructure, 2022-2030. 5.3.2.1: Effective use of leasing arrangements for new vehicles, vessels & aircraft (2022-2030). 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

Chapter 4 Project Implementation

4.1 Overall implementation schedule

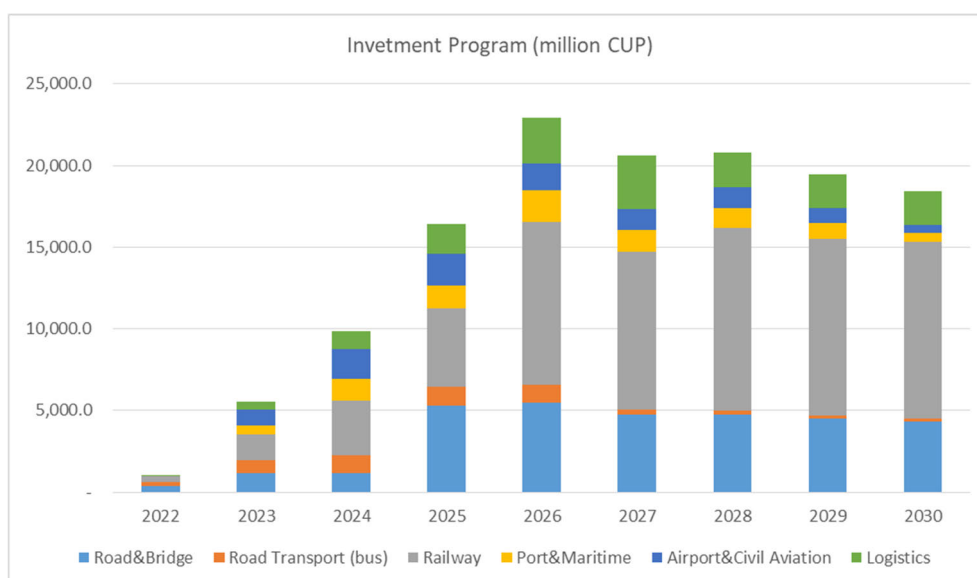
The first five years (2022-2026) are positioned as the preparation period, while accelerated growth is expected in the following years (2027-2030) based on stable investment in the transport sector.

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.

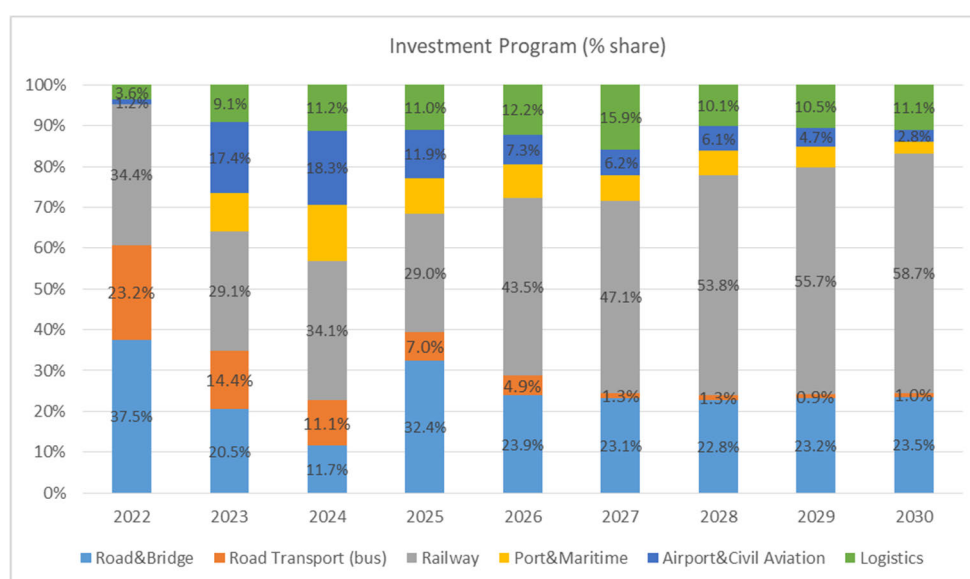
The latter four years will be a period of continuous investment following the plans prepared in the first five years.

As shown in Figure 4.1.1, investment in the railway sector accounts for approximately 46% of the total, followed by the road and bridge sector (about 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

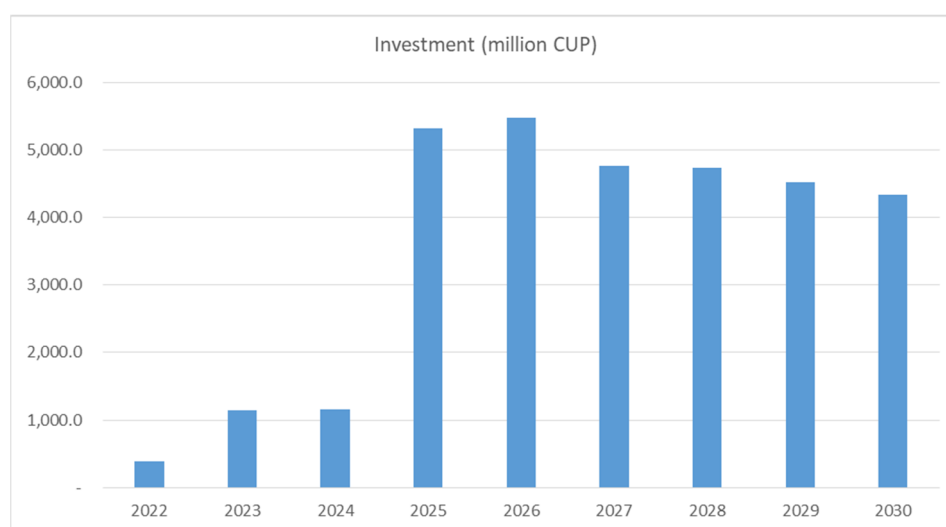
Figure 4.1.1 Expected funding for the transport sector

4.2 Road & Bridge sector

4.2.1 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-Eki⁶."



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 4.2.1 Expected funding for the Road & Bridge sector

4.2.2 Implementation schedule

Table 4.2.1 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.

⁶ 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 4.2.1 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 (MICHINO 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

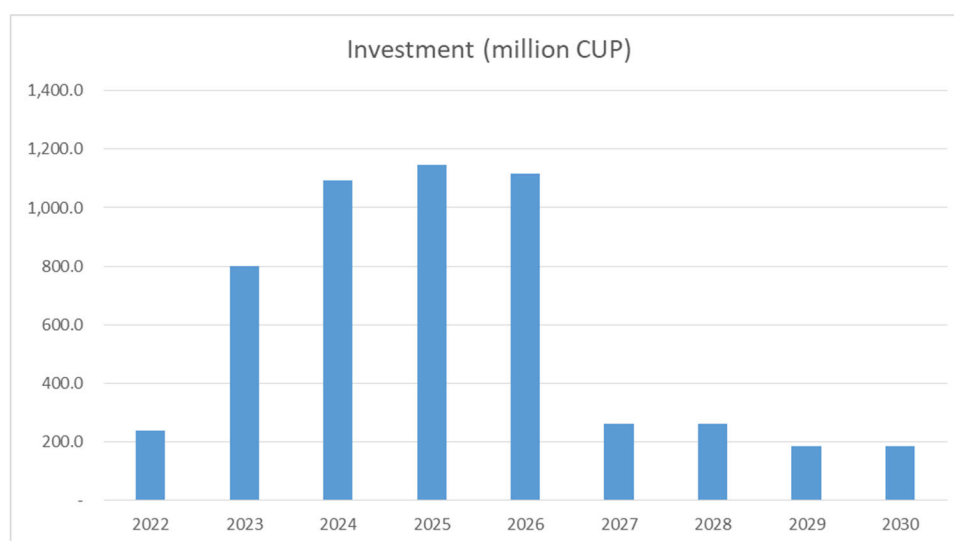
4.3 Road-based Passenger Transport (bus) sector

4.3.1 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. 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 4.3.1 Expected funding for the Road-based Passenger Transport sector

4.3.2 Implementation schedule

Table 4.3.1 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 4.3.1 Implementation schedule for the Road-based Passenger Transport sector

Project Code	Project Name	Preparation period					Acceleration period				million CUP	
		2022	2023	2024	2025	2026	2027	2028	2029	2030		
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%												

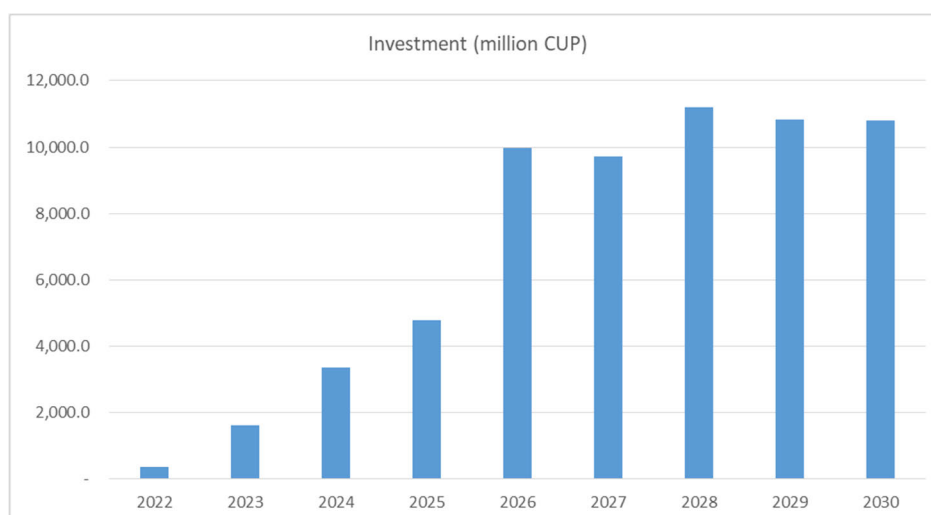
Source: TWG and JICA Study Team

4.4 Rail Transport sector

4.4.1 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. 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 4.4.1 Expected funding for the Rail Transport sector

4.4.2 Implementation schedule

Table 4.4.1 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 4.4.1 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 handling 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	Digital 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%	

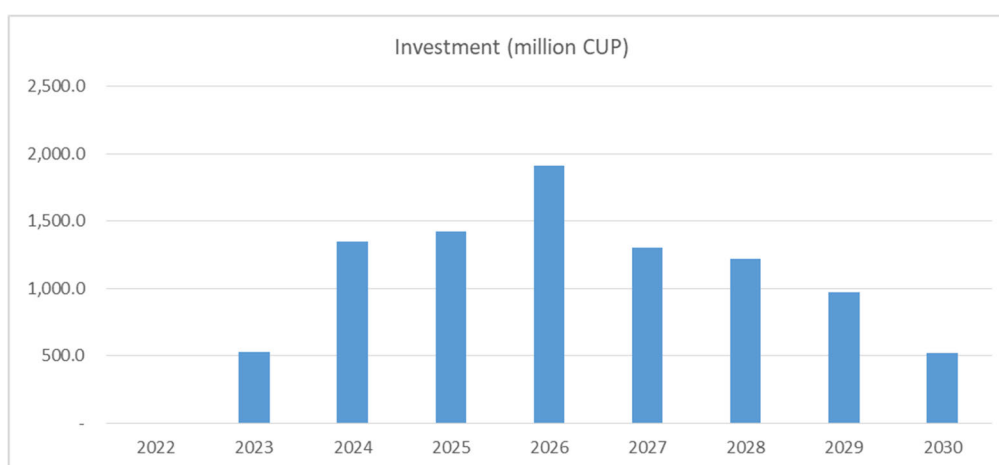
Source: TWG and JICA Study Team

4.5 Port & Maritime Transport sector

4.5.1 Expected funding for the Port & Maritime Transport sector

The total implementation budget is 9,237.4 million CUP. 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 4.5.1 Expected funding for the Port & Maritime Transport sector

4.5.2 Implementation schedule

Table 4.5.1 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 4.5.1 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%	

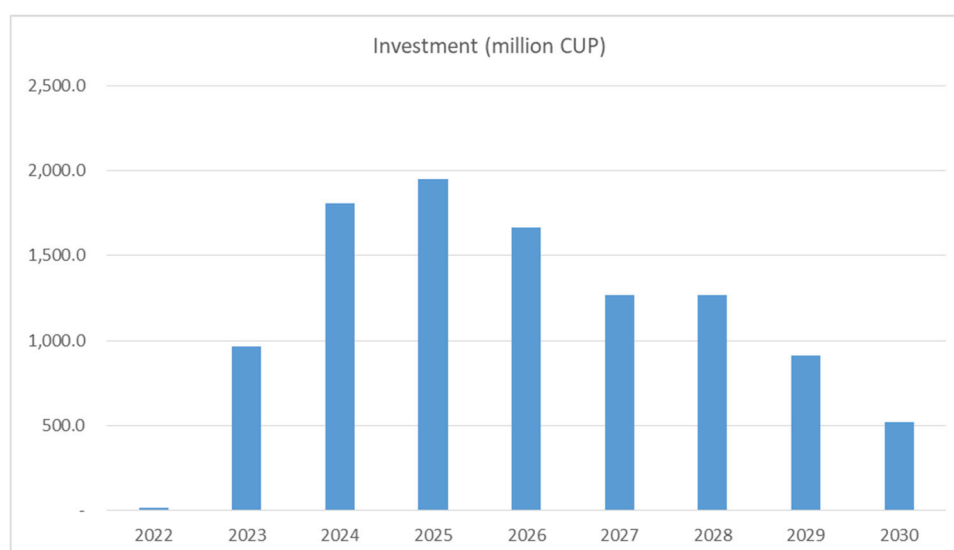
Source: TWG and JICA Study Team

4.6 Airport & Civil Aviation Sector

4.6.1 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 4.6.1 Expected funding for Airport & Civil Aviation sector

4.6.2 Implementation schedule

Table 4.6.1 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 4.6.1 Implementation schedule for Airport & Civil Aviation sector

Project Code	Name	Preparation period					Acceleration period				million CUP
		2022	2023	2024	2025	2026	2027	2028	2029	2030	
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%	

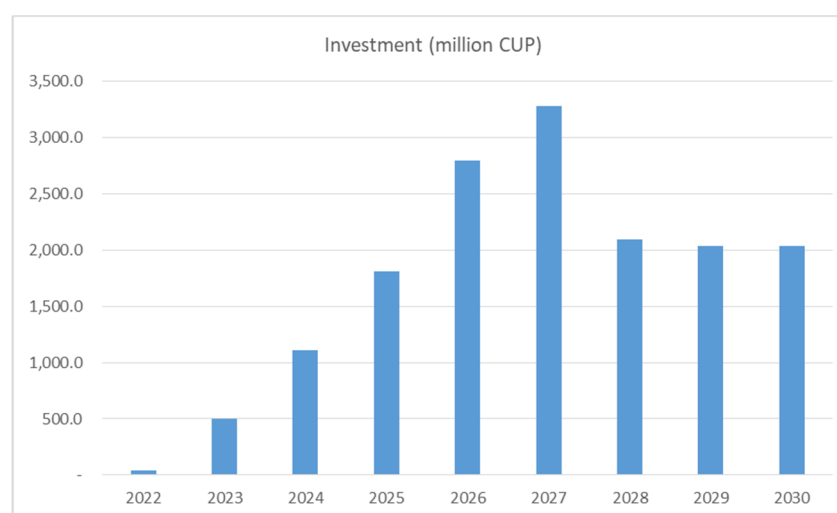
Source: TWG and JICA Study Team

4.7 Logistics Sector

4.7.1 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 4.7.1 Expected funding for the Logistics sector

4.7.2 Implementation schedule

Table 4.7.1 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 4.7.1 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 empresas 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

4.8 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 are 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" comprises 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 in the Transport Master Plan.

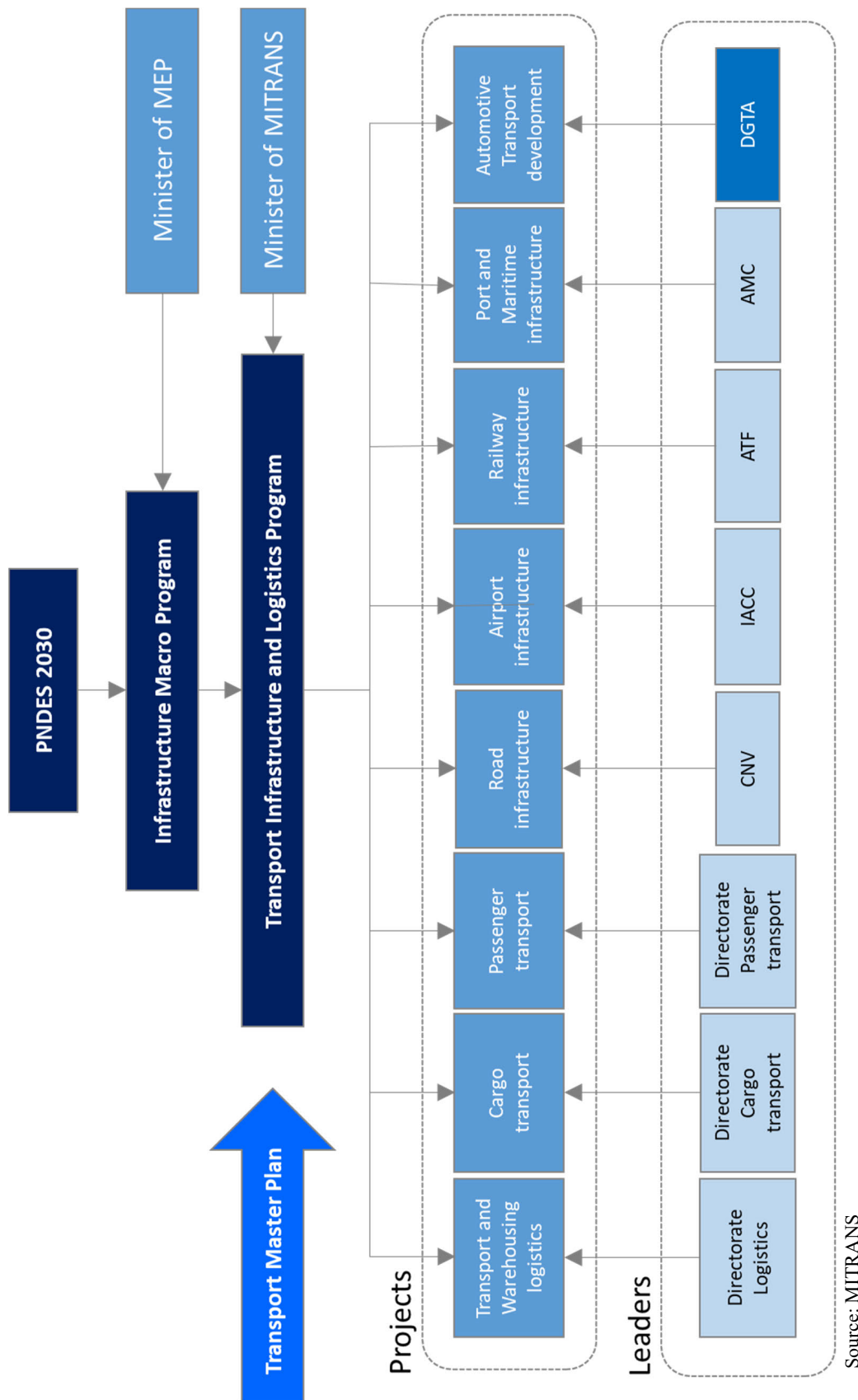


Figure 4.8.1 Simplified scheme for the implementation of the National Transport Master Plan