

## 7 SUB-ROADMAP FOR SMART SRP DEVELOPMENT

### 7.1 Introduction

7.1 Smart growth involves a broad spectrum of sustainable initiatives, which are applied in different development sectors. Smart development refers to the creation or retrofitting of an area that is environmentally responsible and resource efficient. Widespread Smart development is designed to reduce the overall impact of the built environment by efficiently using water and energy, protecting the health of the population, improving productivity, reducing pollution and solid waste, etc. With particular focus on the South Road Properties (SRP) area, the overall Smart development discussed in this chapter is on the efficient use of energy.

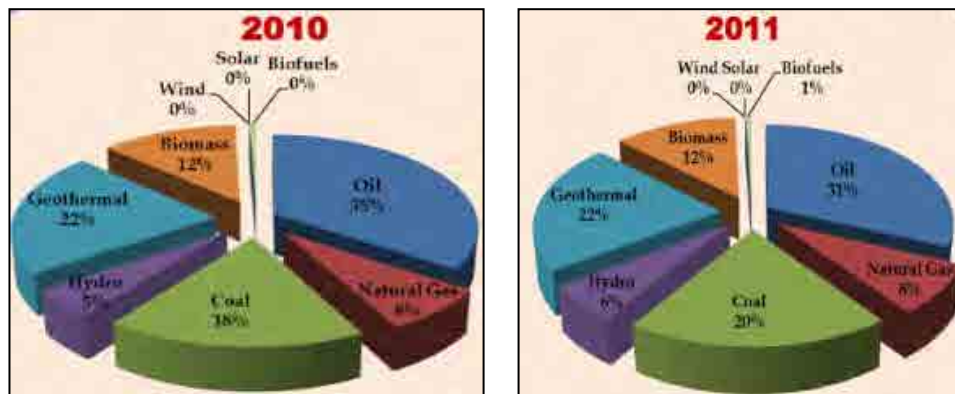
#### 1) Current Energy Situation and Forecast in the Philippines

##### (1) Outline of Current Energy Situation

###### (a) Current Energy Situation: Fuel Input Mix for Power Generation

7.2 The Philippines depends on fossil fuel for as much as 60% of its energy supply (see Figure 7.1.1 and Table 7.1.1). On the other hand, renewable energy (RE) including geothermal and biomass energy, accounts for a substantial share of up to 40% of total supply.

7.3 The Philippines' energy self-sufficiency ratio is as high as 60%. The development of domestic coal mines has raised the self-sufficiency ratio of coal. Meanwhile, the development of domestic coal mines and gassers is expected to continue to be pushed.



Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

**Figure 7.1.1 Current Energy Situation**

**Table 7.1.1 Current Energy Situation**

	2010	2011
Total Energy (MTOE)	39.29	39.40
Self-sufficiency	58.5	60.0
Shares (%)		
Renewable Energy (RE)	39.8	40.7
Green Energy (RE+Natural Gas)	47.8	48.7

Source: "Philippine Energy Plan (2012–2030)", Department of Energy.  
 Note: MTOE - million tons of oil equivalent.

## (b) Energy Demand and Energy Infrastructure in the Philippines

7.4 The total generation capacity of power plants in 2013 is shown in Table 7.1.2. In the Visayas region, 60% of electricity is supplied by fossil fuels (coal and oil) while geothermal energy shares as high as 37%. The Cebu area has no geothermal plant and electricity is supplied from power plants in Negros Island and Leyte Island through the power grid. Biomass shares only a small 2% while hydro, solar and wind power generation shares almost nil.

**Table 7.1.2 Power Generation Capacity in the Philippines, 2013 (MW)**

FUEL TYPE	LUZON		VISAYAS		MINDANAO		PHILIPPINES	
	MW	% Share	MW	% Share	MW	% Share	MW	% Share
Coal	4,531	36.16	806	32.91	232	11.32	5,568	32.71
Oil Based	1,778	14.19	670	27.39	625	30.50	3,074	18.05
Natural Gas	2,861	22.84	1	0.04			2,862	16.81
Geothermal	824	6.58	915	37.39	108	5.29	1,848	10.85
Hydro	2,462	19.66	11	0.47	1,047	51.09	3,521	20.68
Wind	33	0.26					33	0.19
Biomass	38	0.31	44	1.81	36	1.75	119	0.70
Solar					1	0.05	1	0.01
<b>TOTAL</b>	<b>12,528</b>		<b>2,448</b>		<b>2,049</b>		<b>17,025</b>	

Source: DOE List of Existing Power Plants as of May 2013  
 • Includes embedded generators  
 • Excludes off-grid generators

Interconnection Line Capacity

- Leyte-Luzon (440 MW)
- Leyte-Cebu (400 MW)
- Leyte-Bohol (100 MW)
- Cebu-Negros (200 MW)
- Negros – Panay (100 MW)

Source: "Investment Opportunities in the Philippine Energy Sector", Department of Energy Secretary Carlo Jericho L. Petilla, 2013.

## (c) Other Energy Characteristics

- (i) The household electrification level in the country is 70.18%.
- (ii) Since there are many disasters, such as typhoons, the importance of an off-grid supply is getting recognized.
- (iii) The Philippine Government supports the use of RE. In Cebu, however, it has hardly spread.
- (iv) Gas pipelines, which are popular in the urban areas in Japan, USA, etc. have not been built in the Philippines. The gas supply in the country is only through cylinders or tankers.
- (v) Among thermal consumer demands, electricity is fundamentally used for making hot water.
- (vi) Natural gas is utilized for cooking in commercial facilities. Natural gas that is used to fuel vehicles is known to have a higher energy efficiency than gasoline. However, its handling is difficult and its practical use has stagnated in the Philippines due to incidents of accidental explosions by gas leak, etc.
- (vii) Since incinerating garbage is basically not allowed, waste-to-energy measures are not popular.
- (viii) It is said that electricity energy loss is higher in the Philippines than in neighboring countries.

## (2) Energy Situation and Forecast

7.5 The following section provides an overview of the current energy situation and its forecast.

### (a) Total Primary Energy

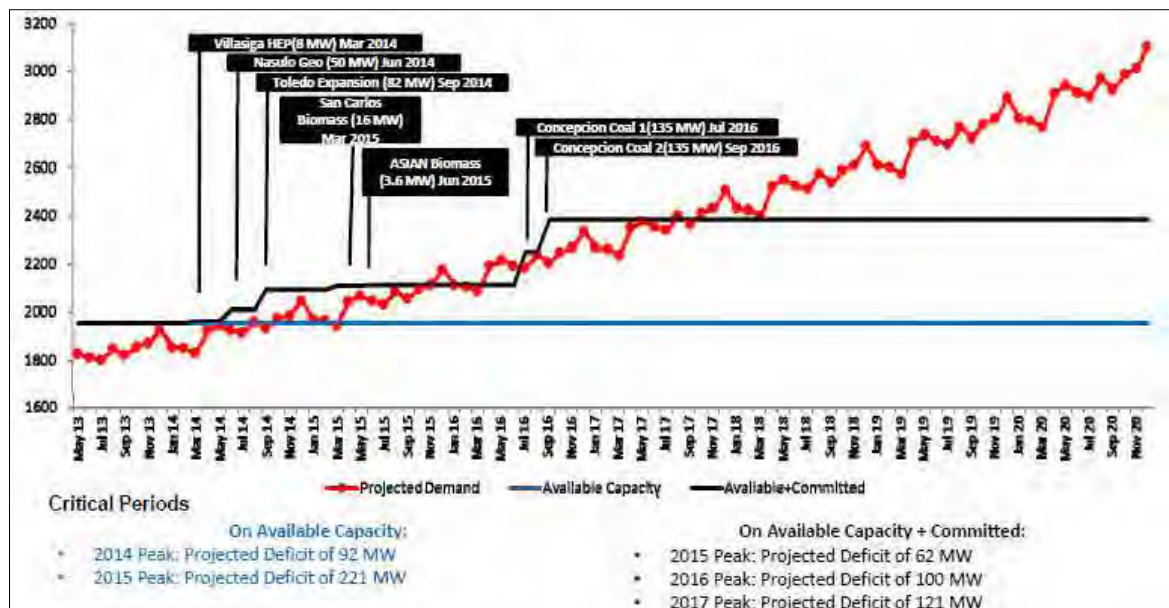
7.6 The increase in energy demand caused by modernization and the increase in population will be expected nationwide in the Philippines (see Figure 7.1.2). Supply cannot catch up with the growth in demand. Moreover, the cost of providing power rises with the cost of fuel.



Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

**Figure 7.1.2 Total Primary Energy Demand (Actual/Outlook)**

7.7 Electricity demand will be expected to continue to rise in the Visayas area, including Cebu Island (see Figure 7.1.3).

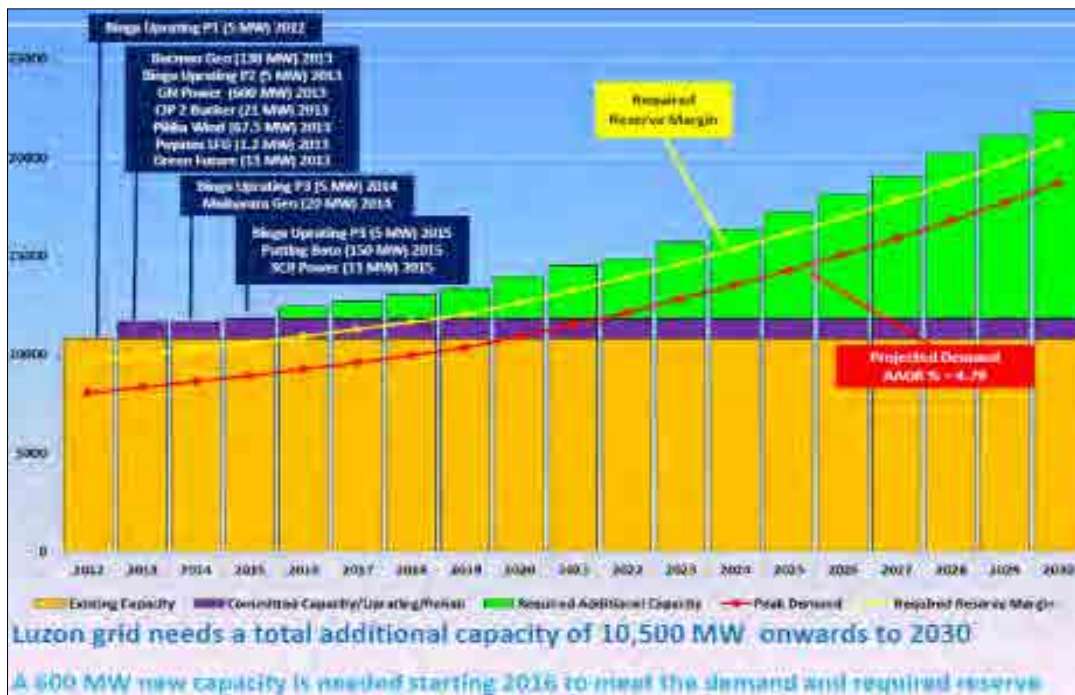


Source: "Investment Opportunities in the Philippine Energy Sector", Department of Energy Secretary Carlo Jericho L. Petilla, 2013.

**Figure 7.1.3 Visayas Supply-Demand Outlook 2013–2020**

(b) Power Supply and Demand Outlook (Luzon Electricity)

7.8 The power supply in the Luzon grid needs to be increased, reflecting the growth in demand (see Figure 7.1.4).

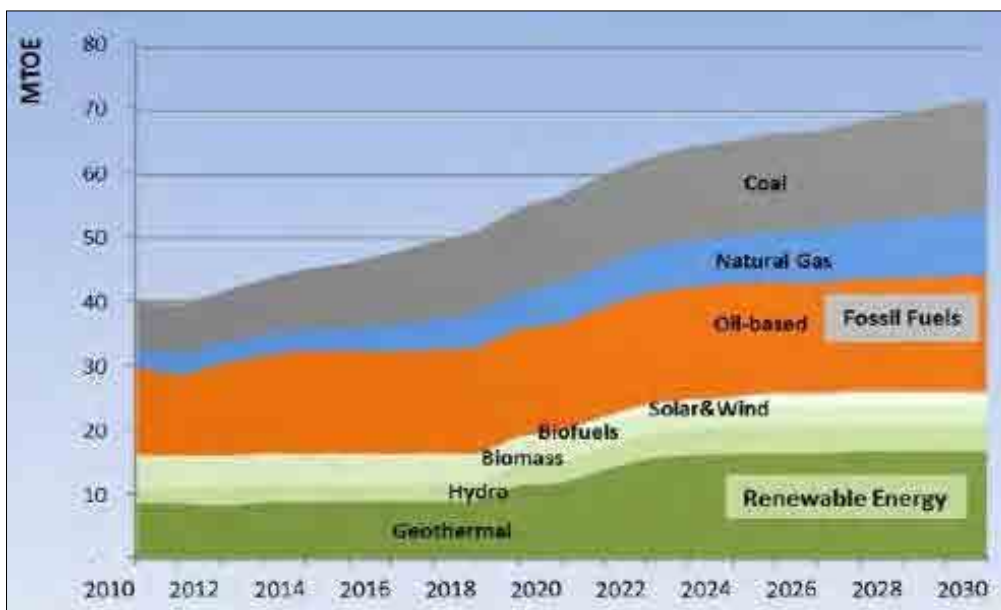


Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

Figure 7.1.4 Power Supply and Demand Outlook (Luzon Electricity)

(c) Total Primary Energy, by Fuel Type

7.9 In terms of primary energy, geothermal energy supply in the next 15 years is planned to be expanded (see Figure 7.1.5). Coal and natural gas supply is also expected to expand.

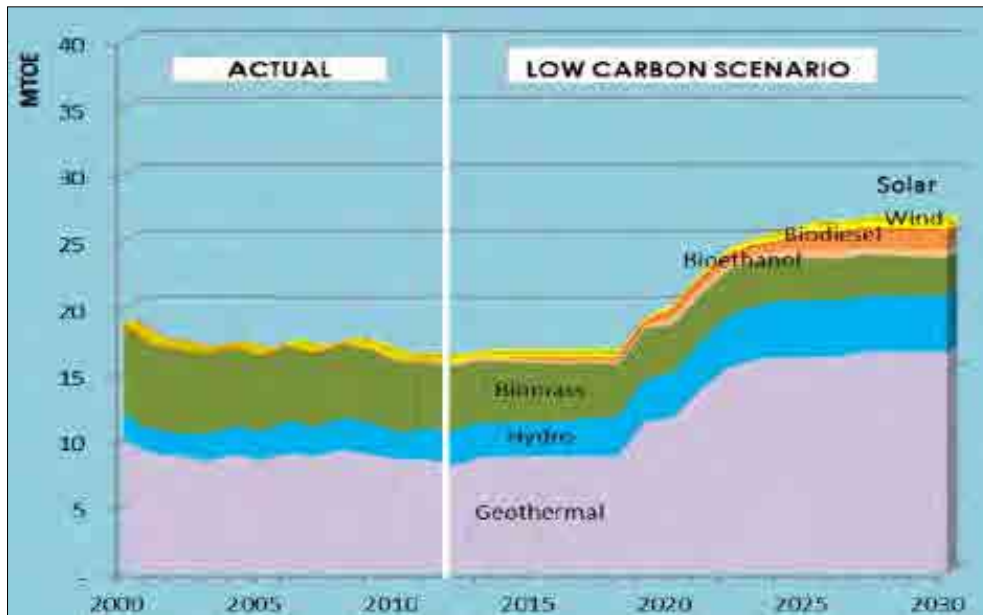


Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

Figure 7.1.5 Total Primary Energy, by Fuel Type (Forecast)

(d) **Total Renewable Energy**

7.10 In terms of RE supply, geothermal power is promoted aggressively (see Figure 7.1.6). Hydro and biomass are also planned to slightly increase.

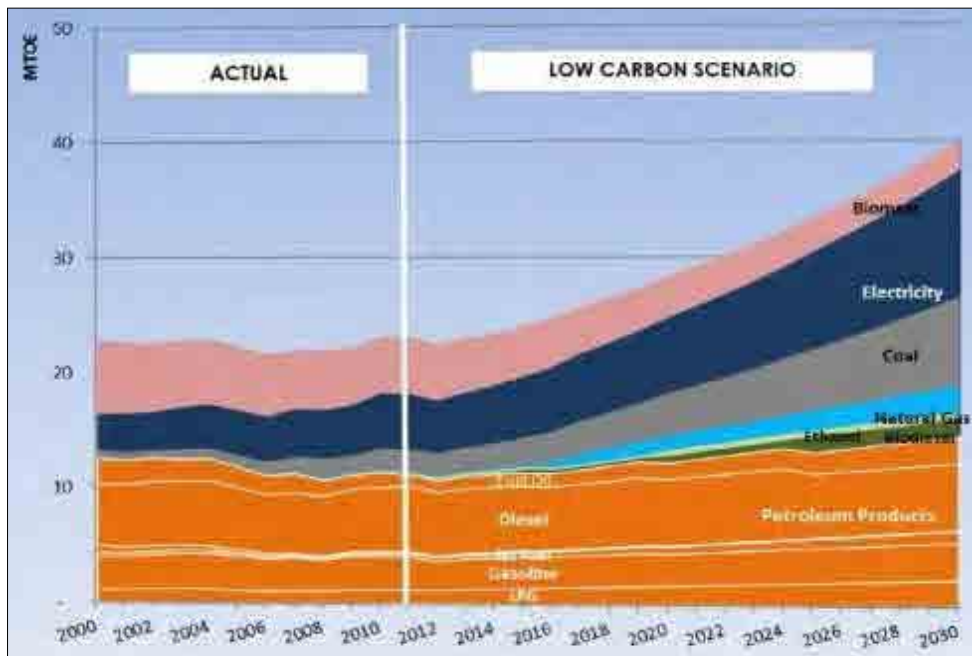


Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

**Figure 7.1.6 Total Renewable Energy (Actual/Outlook)**

(e) **Total Final Energy Consumption, by Fuel Type**

7.11 In the total final energy consumption mix, the shares of electricity and coal will increase (see Figure 7.1.7).

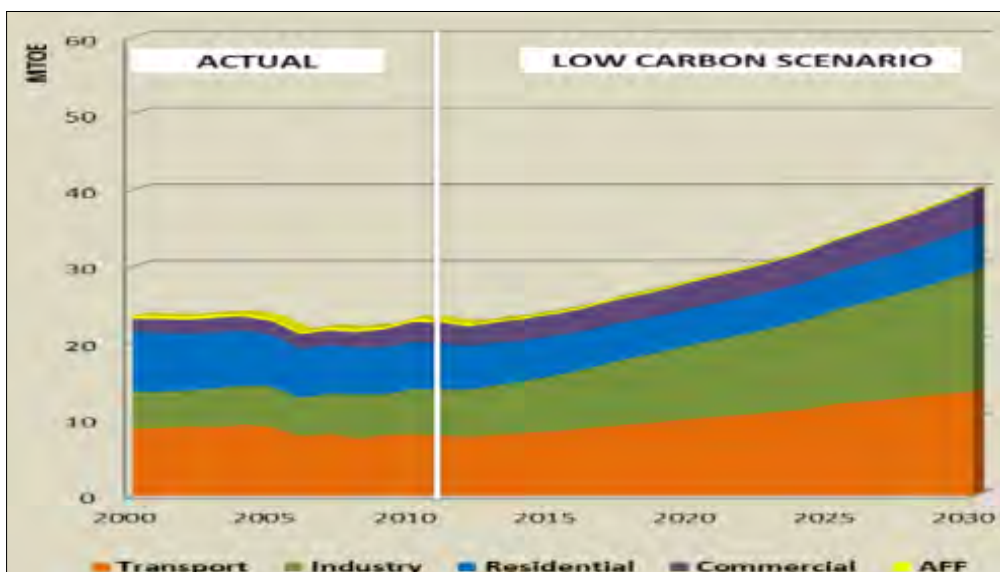


Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

**Figure 7.1.7 Total Final Energy Consumption, by Fuel Type (Actual/Outlook)**

(f) **Total Final Energy Consumption, by Sector**

7.12 By sector, the energy consumption of the transport and industry sectors will increase rapidly, while that of the residential sector will increase in a limited scale (see Figure 7.1.8).

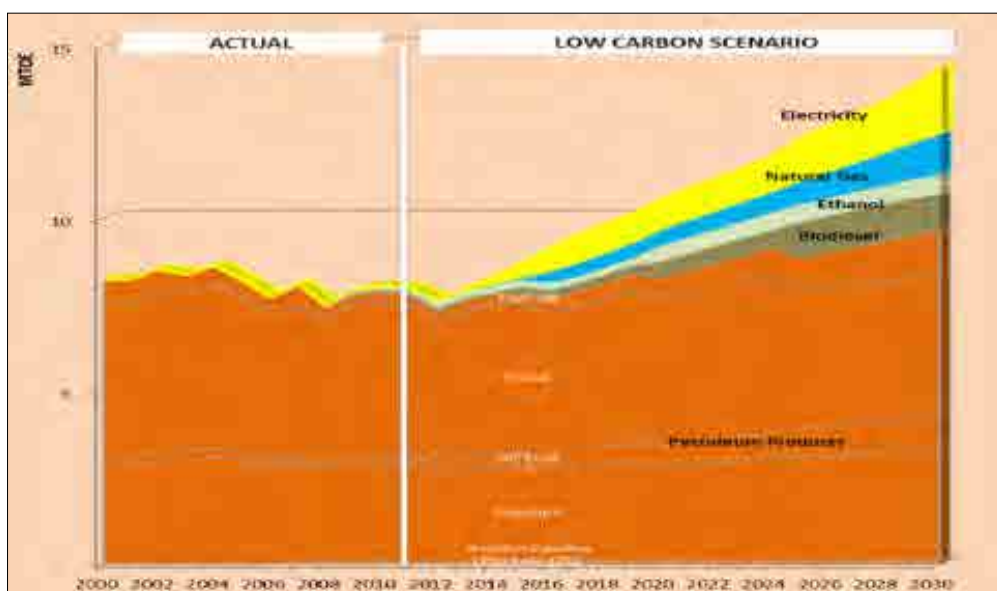


Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

**Figure 7.1.8 Total Final Energy Consumption, by Sector (Actual/Outlook)**

(g) **Transport Energy Demand, by Fuel Type**

7.13 Transport energy demand will continue its increasing trend. By type of fuel, diesel and gasoline take the large shares (see Figure 7.1.9). However, the growth of the share of electricity will increase rapidly, indicating the future penetration of electric vehicles (EV).



Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

**Figure 7.1.9 Transport Energy Demand, by Fuel Type (Actual/Outlook)**

**(h) (Reference) Target Number of Vehicles on Alternative Fuels**

7.14 A “30 by 2030” scenario (30% of all public utility vehicles running on alternative fuels nationwide by 2030) is projected (see Table 7.1.3).

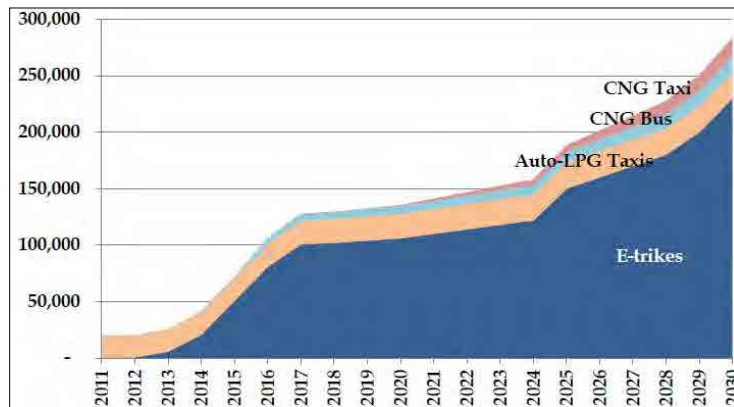
**Table 7.1.3 Target Number of Vehicles (Outlook)**

Type	2011	2015	2016	2020	2025	2030
<b>Number of Vehicles</b>						
<b>CNG</b>						
Bus	61	1,000	5,000	6,900	9,200	15,000
Taxi			100	1,000	6,000	16,000
Auto-LPG	19,052	20,200	20,500	21,700	23,200	23,000
E-trikes	630	50,170	80,730	106,000	150,000	230,000
<b>Bio-fuel Blending</b>						
Ethanol	10%	10%	10%	20%	20%	20%
CME	2%	5%	5%	10%	20%	20%

Source: “Philippine Energy Plan (2012–2030)”, Department of Energy.

**(i) (Reference) Alternative Vehicles for Transport**

7.15 Electric vehicles, such as “E-trikes,” will become popular (see Figure 7.1.10).

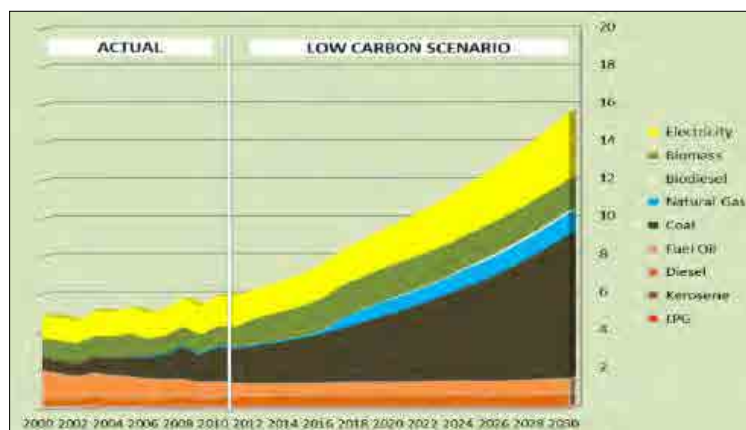


Source: “Philippine Energy Plan (2012–2030)”, Department of Energy.

**Figure 7.1.10 Alternative Vehicles for Transport (Outlook)**

**(j) Industry Energy Demand, by Fuel Type**

7.16 In the industry sector, large-scale expansion of coal use is expected (see Figure 7.1.11). Electricity use is also assumed to increase.

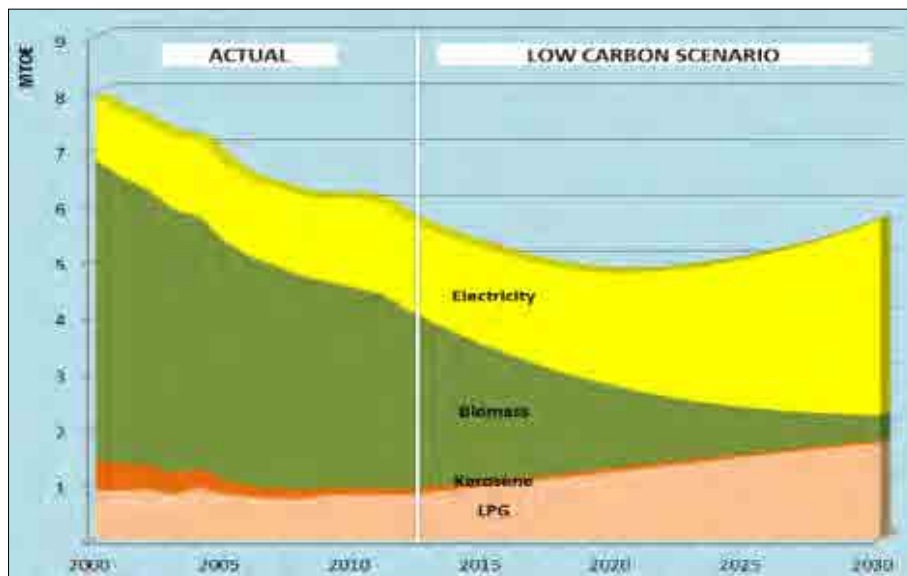


Source: “Philippine Energy Plan (2012–2030)”, Department of Energy.

**Figure 7.1.11 Industry Energy Demand, by Fuel Type (Actual/Outlook)**

**(k) Residential Energy Demand, by Fuel Type**

7.17 In the residential sector, the demand for biomass energy will decrease rapidly, while those for LPG and electricity are forecasted to increase (see Figure 7.1.12). In particular, household electrification is expected to be promoted quite strongly.

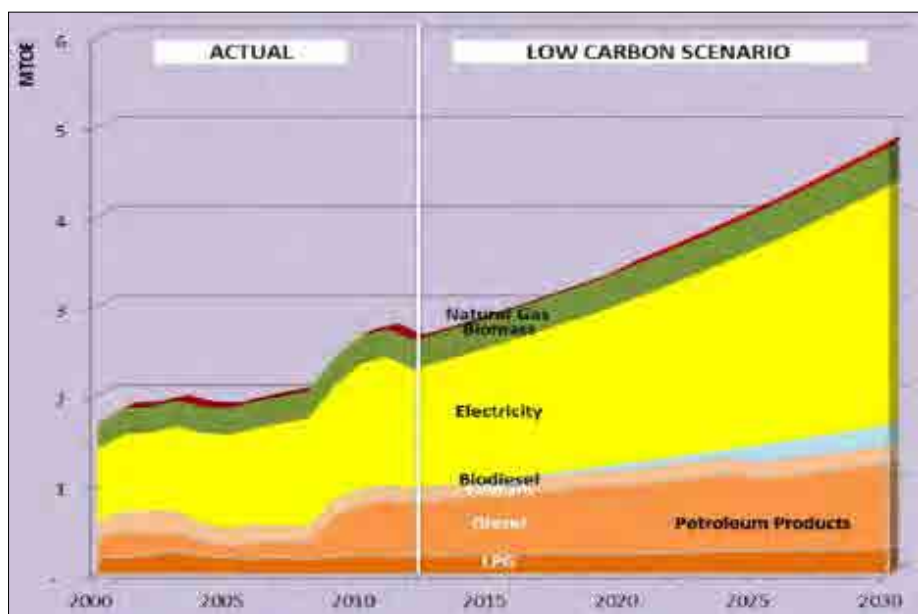


Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

**Figure 7.1.12 Residential Energy Demand, by Fuel Type (Actual/Outlook)**

**(l) Commercial Energy Demand, By Fuel Type**

7.18 Energy demand in the commercial sector will grow remarkably (see Figure 7.1.13). In addition to electricity, demand for diesel and other fuels is also expected to increase.



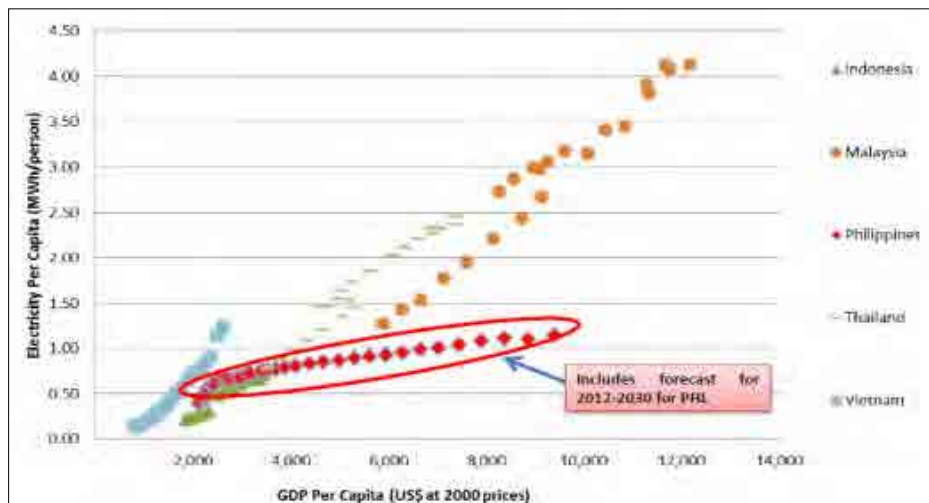
Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

**Figure 7.1.13 Commercial Energy Demand, by Fuel Type (Actual/Outlook)**



(m) **Electricity and GDP per Capita**

7.19 The Philippine Energy Plan aims to suppress the growth of electricity demand in proportion to GDP growth (see Figure 7.1.14).



Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

**Figure 7.1.14 Electricity and GDP per Capita**

**(3) Energy Supply Policy**

**(a) Power Market Structure in the Philippines**

7.20 Pursuant to Section 31 of the Electric Power Industry Reform Act of 2001 (EPIRA), the operating and regulatory policies and guidelines for the implementation of Retail Competition and Open Access (RCOA) were put in place to guide the retail market participants and ensure their smooth transition to the retail market.

7.21 Today, de-regulated energy suppliers for customers with monthly average peak demand of at least 1 MW, retail electricity suppliers (RES), and local RES, etc. are registered by the Energy Regulatory Commission (ERC) and have started supplying electricity (see Table 7.1.4 and Table 7.1.5). RES are defined by ERC as follows:<sup>1</sup>

- (i) **Retail Electricity Supplier (RES):** Any person or entity authorized by ERC to sell, broker, market or aggregate electricity to the end-users.
- (ii) **Local Retail Electricity Supplier (Local RES):** The non-regulated business segment of the distribution utility (DU) catering to the contestable market only within its franchise area, or persons authorized by appropriate entities to supply electricity within their respective economic zones.

**(b) Situation of Power Suppliers in Cebu City**

- (i) In Cebu and Mactan Island, power is distributed by three companies, namely: Visayan Electric Company (VECO), Cebu Electric Cooperative (CEBECO), and Mactan Electric Company (MECO).
- (ii) Many power generating companies exist, such as Korean Electric Power Company (KEPCO), SPC Power Corp. (SPC), Toledo Power Company (TPC),

<sup>1</sup>Source: "Revised Rules for the Issuance of Licenses to Retail Electricity Suppliers (RES)," Energy Regulatory Commission.

East Asia Utilities Corp., etc.

- (iii) Moreover, there are suppliers of dynamos, such as East Asia Utilities, etc.
- (iv) Shell and other companies supply oil and natural gas.
- (v) Since there are neither gas pipelines nor demand for warm air/water, there are few examples of heat supply services.

**Table 7.1.4 Summary of RCOA Registration (as of 30 April 2014)**

Participants	Applicant	Registered	Total Registered and Applicant
Retail Electricity Supplier	4	16	20
Local Retail Electricity Supplier	6	7	13
Retail Metering Service Provider	5	23	28
Contestable Customer	30	324	354
Supplier of Last Resort	6	3	9
Total	51	373	424

Source: "24th Electric Power Industry Reform Act Implementation Status Report," Department of Energy.  
 Note: RCOA – Retail Competition and Open Access.

**Table 7.1.5 Retail Electricity Suppliers' Market Share as of 30 April 2014**

Supplier	No. of CCs	% Share	GWh*	% GWh Share
Advent Energy, Inc.	7	2.16	21.53	0.99
Aboitiz Energy Solutions, Inc.	51	15.74	439.04	20.09
Direct Power Services, Inc.	31	9.57	141.75	6.49
Ecozone Power Management, Inc.	22	6.79	126.68	5.80
First Gen Energy Solution	0	0.00	0.00	0.00
Global Energy Supply Corporation	2	0.62	65.94	3.02
GNPower Mariveles Coal Plant Ltd. Co.	0	0.00	0.00	0.00
GNPower Ltd. Co.	0	0.00	0.00	0.00
KRATOS RES, INC.	0	0.00	0.00	0.00
Masinloc Power Partners Company Ltd.	1	0.31	57.21	2.62
MERALCO Local RES	190	58.64	1,150.96	52.67
Premier Energy Resources Corporation	0	0.00	0.00	0.00
Prism Energy, Inc	0	0.00	0.00	0.00
San Miguel Electric Corporation	6	1.85	112.29	5.14
SN Aboitiz Power-RES, Inc.	2	0.62	1.57	0.07
Trans-Asia Oil & Energy Development Corporation	2	0.62	34.12	1.56
TeaM (Philippines) Energy Corporation	9	2.78	33.95	1.55
VECO Local RES	1	0.31	0.00	0.00
Total	324	100.00	2,764.81	100.00

Source: "24th Electric Power Industry Reform Act Implementation Status Report", Department of Energy.

\*Note: GWh - gigawatt-hours

### (c) Price of Electricity

7.22 Electricity in Cebu costs PHP7.55/Kwh and PHP8.73/Kwh for residential and industrial consumers, respectively (see Table 7.1.6). These prices are slightly more expensive than in Manila.

**Table 7.1.6 Electricity Prices in Cebu (in CEBECO's Distribution Area)**

Purpose	Price	Comment
For Residence	PHP7.55/Kwh (100Kwh up)	It is a little more expensive than in Manila.
For Industry	PHP8.73/Kwh (1,200Kw up (Demand), 125,000Kwh up)	It is a little more expensive than in Manila.

Source: Interview with CEBECO.

**(d) Approved Feed-in Tariff Rates**

7.23 On July 27, 2012, ERC approved the initial Feed-in Tariffs (FITs) that shall apply to power generation from RE sources, particularly run-of-river hydro, biomass, wind and solar, as presented in Table 7.1.7 below. Slightly higher FITs have been proposed recently (see Table 7.1.8):

**Table 7.1.7 Renewable Energy FIT Rates and Installation Targets**

Resource / Technology	ERC Approved Feed-in Tariff Rates (PHP/kWh)	ERC Approved Feed-in Tariff Rates (USD/kWh)	Installation Targets
Run-of-River Hydropower	5.9	0.140	250
Biomass Energy	6.63	0.158	250
Wind Power	8.53	0.203	200
Solar Power	9.68	0.230	50
Ocean Energy	-		10
Total			760

Source: "Investment Opportunities in the Philippine Energy Sector", Department of Energy Secretary Carlo Jericho L. Petilla, 2013.

Notes: FIT rules approved by ERC on July 12, 2010 and took effect on August 12, 2010; ERC approved the FIT rates on July 27, 2012; Issuance of DC 2013-05-009 prescribing DOE Guidelines for the Selection Process of Renewable Energy Projects under FIT System and the Award Certificate for FIT Eligibility.

**Table 7.1.8 (Reference) Proposed FITs**

Resource	Proposed FITs (PHP/kWh)
Hydro	6.15
Biomass	7.00
Wind	10.37
Solar	17.98
Approved FITs (PHP/kWh)	
Hydro	5.90
Biomass	6.63
Wind	8.53
Solar	9.68

Source: Interview with Energy Regulatory Commission.

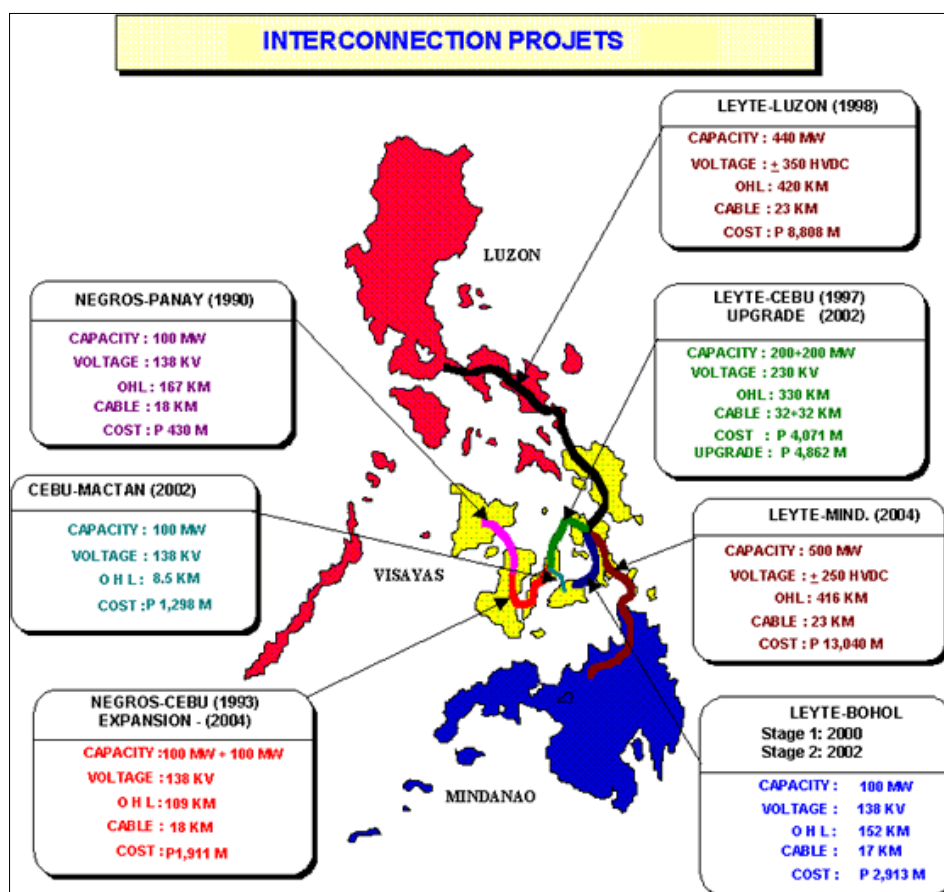
**(4) Energy Supply Infrastructure**

**(a) System for Electric Power Supply**

- (i) In the Philippines, the main supply of electricity is consolidated into a national power grid consisting of many interconnected power supply projects (see Figure 7.1.15). The separation policy for power generation, power transmission, and power distribution is implemented under the EPIRA Law (RA 9136).
- (ii) With the separation policy, investing together in a power generation enterprise, a power transmission enterprise, and a power distribution enterprise is forbidden. However, this does not necessarily regulate the power generation

enterprise and the power distribution enterprise being undertaken with the same capital.

- (iii) With the new type of energy service scheme, the RES which supports 1 MW up, consumers can contract relatively rational electric service. RES is due to be positioned institutionally.
- (iv) Although the FIT is introduced, the offer price of renewable energy is not necessarily as large as that of the usual commercial electric power.



Source: <http://www.geni.org/>

**Figure 7.1.15 Philippines Grid Interconnection**

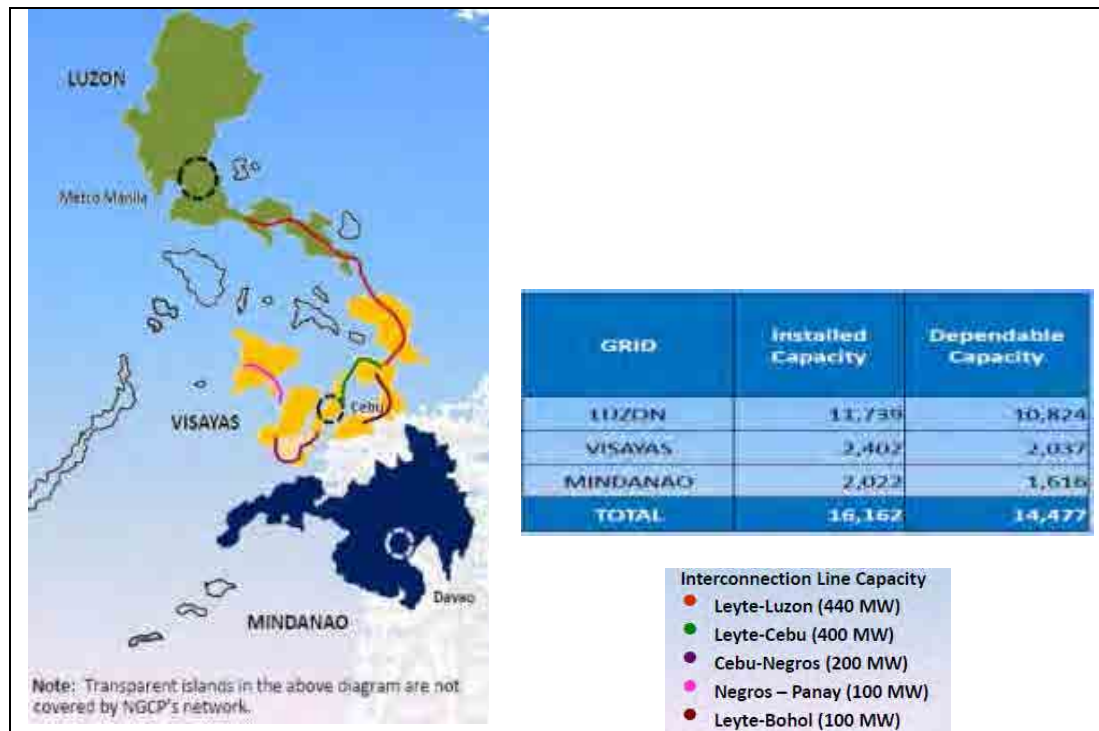
**(b) Overview of the Power System**

7.24 The national power grid is divided into three major island grids for Luzon, Visayas and Mindanao, with a total installed capacity of 16,162 MW, with the Luzon grid accounting for 73% of capacity (see Figure 7.1.16). These are further divided into regional/ provincial sub-grids.

7.25 The Visayas grid consists of the Cebu, Negros, Panay, Bohol and Leyte-Samar sub-grids, with the Cebu sub-grid sharing the largest capacity (see Table 7.1.9). Power to the grid is supplied by many power plants in the islands utilizing a combination of coal, diesel, geothermal, hydro, biomass, gas turbine and natural gas. Coal and diesel are the major sources of fuel for the power plants in Cebu, Panay and Bohol while geothermal power is mainly provided in the Negros and Leyte-Samar sub-grids.

7.26 The power supply in Visayas is dominated by a few large companies such

as PSALM, Global Business Power Corp., SPC Power Corp. (formerly Salcon Power Corp.), and Green Core Energy Development Corp. (see Table 7.1.10). Many smaller power companies contribute to the overall regional sub-grids, though in a much smaller scale.



Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

**Figure 7.1.16 Philippines Grid Interconnection**

**Table 7.1.9 List of Existing Power Plants in Visayas (per Regional Grid)**

Plant	Capacity (MW)			Location Municipality/Province	Owner	Owner Type	Type of Contract	Original Year Commissioned
	Installed	Dependable						
<b>Cebu Sub-Grid</b>	<b>974.2</b>	<b>867.7</b>						
<b>Coal</b>	<b>641.6</b>	<b>612.8</b>						
Toledo Power Corp. (Sangi Station)	88.8	60.0	4	Toledo City, Cebu	Global Business Power Corp.	Non-NPC/IPP		1993
Cebu TPP (Salcon)	106.8	105.8	2	Naga, Cebu	SalconPhils.	NPC-IPP	ROMM-ECA	September 1981
CEDC Coal	246.0	245.0	3	Toledo City, Cebu	Cebu Energy Dev't. Corp.	Non-NPC/IPP		Testing and commissioning
KEPCO Coal	200.0	200.0	2	Naga, Cebu	Kepeco-Salcon	Non-NPC/IPP		
<b>Diesel</b>	<b>274.9</b>	<b>210.1</b>						
Toledo Power Corp. (Carmen Station)	45.8	37.4	4	Toledo City, Cebu	Global Business Power Corp.	Non-NPC/IPP	BOO	1993
Cebu Private Power	70.0	61.7	10	Cebu City	Cebu Private Power	Non-NPC/IPP		1997
East Asia Utilities (MEPZA)	49.7	45.0	4	Cebu City	East Asia	Non-NPC/IPP		1998
Cebu DPPIU (Salcon)	43.4	35.0	6	Naga, Cebu	Atlas Consolidated Mining & Dev't. Corp.	NPC-IPP	ROMM-ECA	1978-1989
CEMEX	66	30	0	Naga, Cebu	CEMEX	Non-NPC/IPP	0	0
<b>Gas Turbine</b>	<b>55.0</b>	<b>42.0</b>						
Cebu Land-Based GT	55.0	42.0	2	Cebu	SPC Power Corp.	Non-NPC/IPP		May 1994
Hydro	1.7	1.7						
Mantayupam	0.5	0.5	2	Barili, Cebu	CEBECO I	Non-NPC/IPP		1985
Basak	0.5	0.5	2	Badian, Cebu	CEBECO I	Non-NPC/IPP		1986
Matutinao	0.7	0.7	3	Badian, Cebu	CEBECO I	Non-NPC/IPP		1990
Natural Gas	1.0	1.0						

Plant	Capacity (MW)			Location Municipality/Province	Owner	Owner Type	Type of Contract	Original Year Commissioned
	Installed	Dependable						
Desco Natural Gas	1.0	1.0	1	Bogo City, Cebu	DESCO Inc.	Non-NPC/IPP	0	Feb 2012
<b>Panay Sub-Grid</b>	<b>497.5</b>	<b>414.3</b>						
<b>Diesel</b>	<b>318.5</b>	<b>238.3</b>						
Panay Power Corp.	94.9	87.0	14	Ingore, Lapaz, Iloilo City	Global Business Power Corp.	Non-NPC/IPP		1999
PB 103	30.0	15.4	4	Estonia, Iloilo	PSALM	NPC		April 1981
Panay DPPI	29.2	10.0	10	Dingle, Iloilo	SPC Power Corp.	Non-NPC/IPP		May 1981/Aug 1983/1993
PB 101	32.0	15.1	4	Iloilo	PSALM	NPC		1978/1986/1989
PB 102	32.0	24.0	4	Obrero, Iloilo	PSALM	NPC		April 1981
12.5 MW Bunker Fuel (GBPC)	12.6	10.0	5	Nabas, Aklan	Global Business Power Corp.	Non-NPC/IPP		Aug 2006
5 MW Bunker Fuel (GBPC)	5.0	4.5	4	New Washington, Aklan	Global Business Power Corp.	Non-NPC/IPP		Sep 2006
Guimaras Power Project	3.4	3.0	4	San Miguel, Jordan, Guimaras	Trans-Asia	Non-NPC/IPP		April 2005
PDPP III (Pinamican)	66.4	60.0	4	Dingle, Iloilo	SPC Power Corp.	Non-NPC/IPP		Tomsierred March 2005
Enervantage DPP	11.0	7.3	3	Capiz, Panit-an	Enervantage Suppliers Co, Inc.	Non-NPC/IPP		
<b>Coal</b>	<b>164.0</b>	<b>164.0</b>						
PEDC Coal	164.0	164.0	2	Iloilo City Panay	Panay Energy Dev't Corp.	Non-NPC/IPP		
<b>Biomass</b>	<b>15.0</b>	<b>12.0</b>						
Casa Bioenergy	15.0	12.0	1	Passi, Iloilo, Panay	Central Azucarera De San Antonio Inc.	Non-NPC/IPP		
<b>Negros Sub-Grid</b>	<b>222.6</b>	<b>209.7</b>						
<b>Geothermal</b>	<b>192.5</b>	<b>189.0</b>						
Negros GPPI (Palinpinon)	192.5	189.0	7	Valencia, Negro Or.	Green Core Energy	Non-NPC/IPP		May/July/Aug 1983
Northern Negros GPP	0.0	0.0		Bago City, Northern Negros	Energy Development Corp.	Non-NPC/IPP		January 2007
Hydro	0.8	0.4						
Amlan HEP	0.8	0.4	3	Negros Or.	ICS Renewable	Non-NPC/IPP		May 1961
<b>Biomass</b>	<b>29.3</b>	<b>20.3</b>						
San Carlos Bioenergy	8.3	8.3	1	San Carlos, Negros Occ.	Bronzeoak Philippines, Inc.	Non-NPC/IPP		Feb. 2009
First Farmers Biomass Cogen	21.0	12.0	1	Talisay City, Negros Occ.	First Farmers Holding Corp.	Non-NPC/IPP		Feb 2009
<b>Leyte-Samar Sub-Grid</b>	<b>722.7</b>	<b>588.0</b>						
<b>Geothermal</b>	<b>722.7</b>	<b>588.0</b>						
Leyte GPP	112.5	107.0	3	Tongonan, Leyte	Green Core Energy	Non-NPC/IPP		3/10/1983 6/18/1983
Unified Leyte	610.2	481.0	18	Tongonan, Leyte	Energy Devt. Corp.	NPC-IPP	BOO-PPA	July 1996 / 1997
<b>Bohol Sub-Grid</b>	<b>30.9</b>	<b>23.7</b>						
<b>Diesel</b>	<b>22.0</b>	<b>15.0</b>						
Bohol DPP	22.0	15.0	4	Tagbilaran City	SPC Power Corp.	Non-NPC/IPP		1978
<b>Hydro</b>	<b>8.9</b>	<b>8.7</b>						
Janopol	5.2	5.0	4	Bohol	Janopol Mini Hydro Corp.	Non-NPC/IPP		May 1992
Sevilla Hydroelectric Plant	2.5	2.5	2	Bohol, Sevilla	Sevilla Mini Hydro Corp.	Non-NPC/IPP		Nov 2008
Loboc HEP	1.2	1.2	3	Loboc, Bohol	Sta. Clara International Inc.	Non-NPC/IPP		April 1968
<b>Total Visayas</b>	<b>2,447.9</b>	<b>2,103.3</b>						

Visayas Sub-Grid	Installed Capacity	Dependable Capacity	% Share, Installed	% Share, Dependable
Cebu	974.2	867.7	39.80	41.25
Negros	222.6	209.7	9.09	9.97
Panay	497.5	414.3	20.32	19.70
Bohol	30.9	23.7	1.26	1.13
Leyte-Samar	722.7	588.0	1.26	1.13
<b>Total Visayas</b>	<b>2,447.9</b>	<b>2,103.3</b>		

Source: [https://www.doe.gov.ph/doe\\_files/pdf/01\\_Energy\\_Situationer/2012-Power-Plants-Visayas.pdf](https://www.doe.gov.ph/doe_files/pdf/01_Energy_Situationer/2012-Power-Plants-Visayas.pdf)

**Table 7.1.10 2012 List of Existing Plants in Visayas (per Company)**

Companies	Market Share per Company (Control)			
	Capacity, MW		Number of Unit/s	Location
	Installed	Dependable		Municipality /Province
<b>PSALM</b>	<b>760</b>	<b>624</b>		
Cebu TPP (Salcon)	107	107	2	Naga, Cebu
Cebu DPP (Salcon)	43	36	6	Naga, Cebu
Unified Leyte	610	481	18	Tongonan, Leyte
<b>Global Business Power Corp.</b>	<b>657</b>	<b>609</b>		
Toledo Power Corp. (Sangi Sta.)	89	60	4	Toledo City, Cebu
CEDC Coal	246	246	3	Toledo City, Cebu
PEDC Coal	164	164	2	Iloilo City, Panay
Panay Power Corp.	95	87	14	Ingore, Lapaz, Iloilo City
Toledo Power Corp. (Carmen Sta.)	46	37	4	Toledo City, Cebu
12.5 MW Bunker Fuel (GBPC)	13	10	3	Nabas, Aklan
5 MW Bunker Fuel (GBPC)	5	5	1	New Washington, Aklan
<b>Salcon</b>	<b>373</b>	<b>327</b>		
KEPCO Coal	200	200	2	Brgy Colon, Naga, Cebu City
Panay DPP1	29	10	5	Dingle, Iloilo
Bohol DPP	22	15	4	Tagbilaran City
Panay Diesel PP III	66	60	8	Diingle, Iloilo
Cebu Land-Based GT	55	42	2	Cebu
<b>Green Core/Energy Dev't. Corp.</b>	<b>305</b>	<b>296</b>		
Palinpinon GPP	193	189	7	Valencia, Negros Oriental
Leyte GPP	113	107	3	Tongonan, Leyte
Northern Negros GPP	0	0	0	Bago City, Northern Negros
<b>NAPOCOR</b>	<b>96</b>	<b>57</b>		
PN 103	32	16	4	Estancia, Iloilo
PN 101	32	16	4	Iloilo
PB 102	32	24	4	Obrero, Iloilo
<b>Others</b>	<b>257</b>	<b>191</b>		
Cebu Private Power	70	62	10	Cebu City
East Asia Utilities (MEPZA)	50	45	4	Cebu City
Guimaras Power	3.4	3.0	0	San Miguel, Jordan, Guimaras
Enervantage DPP	11	7	2	Capiz, Panit-an
Cemex	66	30	0	Naga, Cebu
Janopol	5.2	5.0	4	Bohol
Sevilla HEP	2.5	2.5	2	Bohol, Sevilla
Amlan HEP	0.8	0.4	3	Negros Oriental
Loboc HEP	1.2	1.2	3	Loboc, Bohol
Mantayupan	0.5	0.5	2	Barili, Cebu
Basak	0.5	0.5	2	Badian, Cebu
Matutinao	0.7	0.7	3	Badian, Cebu
San Carlos	8.3	8.3	1	San Carlos, Negros Occidental
First Farmers	21	12	1	Talisay City, Negros Occidental
Casa	15	12	1	Passi, Iloilo, Panay
Desco Natural Gas	1.02	1.02	1	Bogo City, Cebu
<b>Total</b>	<b>2,448</b>	<b>2,103</b>		

Source: [https://www.doe.gov.ph/doe\\_files/pdf/01\\_Energy\\_Situationer/2012-Power-Plants-Visayas.pdf](https://www.doe.gov.ph/doe_files/pdf/01_Energy_Situationer/2012-Power-Plants-Visayas.pdf)  
 Note: Excluding off-grid generators. Release date: May 2013.

## (5) Energy Supply Policy

### (a) Plans and Programs for Energy Efficiency

7.27 Cumulative energy savings of about 10% of the total annual energy demand is expected in all economic sectors (see Table 7.1.11). The transport sector will continue to account for the largest share.

7.28 As embodied in DOE's Philippine Energy Plan (2012–2030), a set of plans and programs for promoting RE and energy efficiency has been laid out. These are enumerated in the following sections.

**Table 7.1.11 Cumulative Target Energy Savings by Sector (KTOE)**

Sector	2012	2015	2020	2025	2030
Agriculture	16	17	20	25	30
Industrial	157	197	283	408	583
Commercial	127	164	241	345	482
Residential	140	179	265	401	588
Transport	408	516	689	894	1,169
Total	848	1,073	1,499	2,072	2,850
MW Deferred Capacity	384	486	679	938	1,291
CO <sub>2</sub> Equivalent, tons CO <sub>2</sub>	1,413,303	1,786,955	2,496,928	3,451,188	4,747,802

Source: "Philippine Energy Plan (2012–2030)", Department of Energy.

### (b) Plans and Programs for Renewable Energy

- (i) Promote the National Renewable Energy Program (NREP);
- (ii) Triple installed capacity by 2030;
- (iii) Implement the RE law policy mechanisms;
- (iv) Continuous assessment of RE resources;
- (v) Evaluate new and emerging technologies; and
- (vi) Develop/ Tap local capacity and expertise.

### (c) Plans and Programs for Energy Efficiency as a Way of Life

- (i) Advocate passage of Energy Efficiency and Conservation Bill;
- (ii) Promote private Energy Service Companies (ESCO) as a new business market industry model;
- (iii) Continue implementation of the National Energy Efficiency and Conservation Program (NEECP);
- (iv) Information, Education and Communication (IEC) Campaign;
- (v) Government Energy Management Program (GEMP);
- (vi) Demand Side Management Program (DSM); and
- (vii) Expand coverage of energy labelling and standardization.

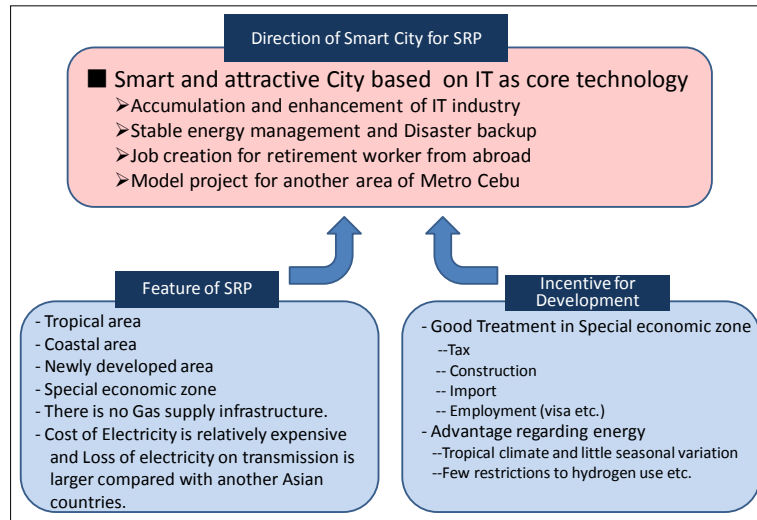
## 7.2 The Concept of a Smart South Road Properties (SRP)

### 1) Considering the Concept of a Smart City

7.29 Cebu City intends to promote SRP as a base for the growing IT industry in the province and for hosting retired technical and skilled overseas workers. Therefore, SRP should aim to be an IT-concentrated industry accumulation model area for Metro Cebu.



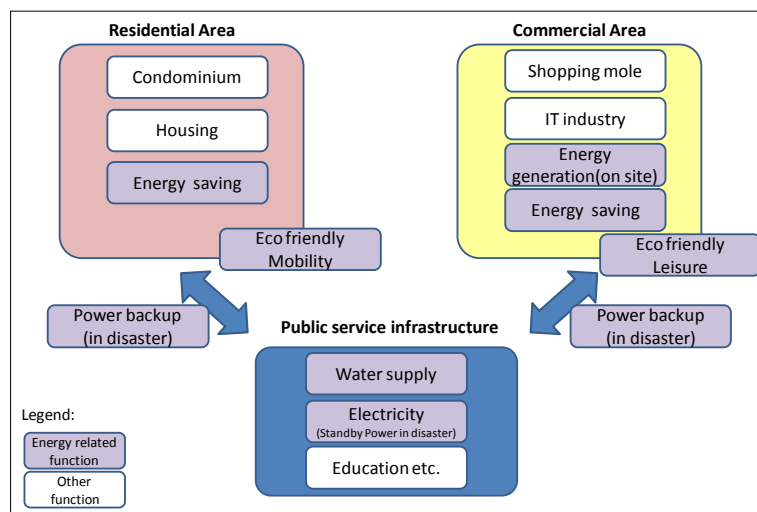
7.30 To that end, mechanisms for a stable electric supply and management, disaster response, etc. need to be put in place (see Figure 7.2.1). Utilizing PEZA incentives will be beneficial for this purpose.



Source: JICA Study Team.

**Figure 7.2.1 Direction for Smart Development in SRP**

7.31 A Smart City includes residential and commercial areas. It is necessary to provide adequate public services including water supply, sewage, power supply, and other services including education in order to utilize infrastructure efficiently (see Figure 7.2.2).

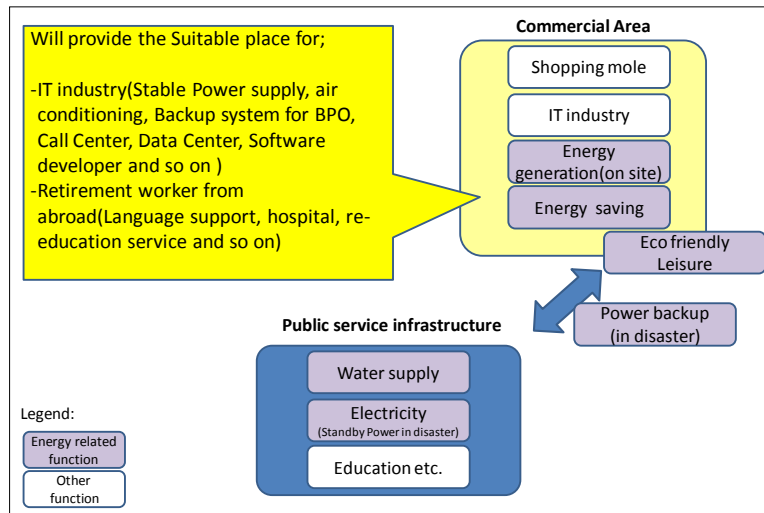


Source: JICA Study Team.

**Figure 7.2.2 Basic Concept of SMART Energy Development in SRP**

7.32 The commercial area should provide suitable places for:

- (i) IT industry (e.g., stable power supply, air conditioning, backup system for BPO, call centers, data centers, software developers, etc.); and
- (ii) Retired workers from abroad (e.g., language support, hospital, re-education service, etc.) (see Figure 7.2.3).

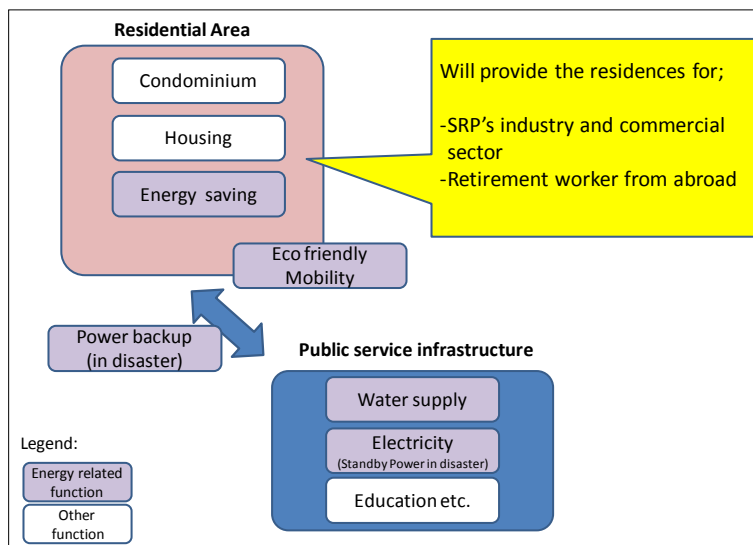


Source: JICA Study Team.

**Figure 7.2.3 Concept of Services in Commercial Areas in SRP**

7.33 The residential areas will provide appropriate living areas, amenities and conditions for:

- (i) SRP’s industry and commercial sector; and
- (ii) Retired workers from abroad (see Figure 7.2.4).



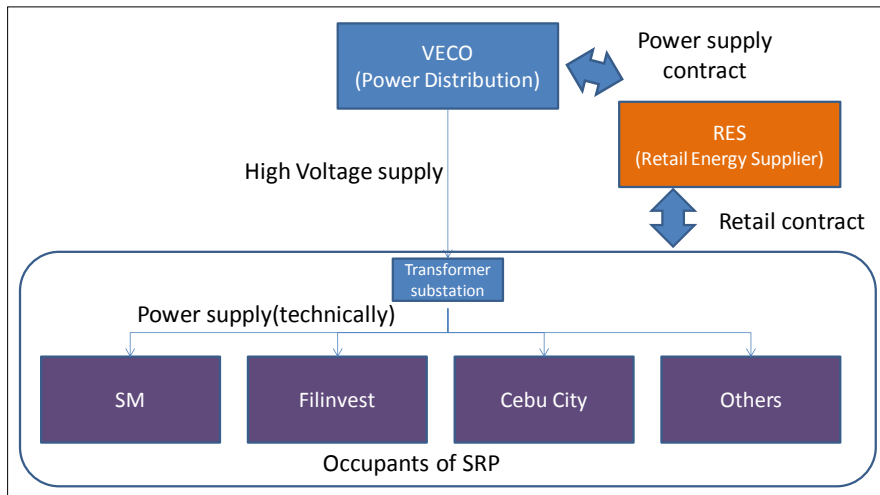
Source: JICA Study Team.

**Figure 7.2.4 Concept of Services in Residential Areas in SRP**

7.34 To realize the Smart City concept, a stable electric supply and efficient power management are especially required. For this purpose, partnerships among enterprising RES and electricity distribution companies can be promoted (see Figure 7.2.5).

7.35 Although renewable energy and energy storage technologies are still expensive and their practical use is not progressing, it is still necessary to leave room to fully utilize them in the future.

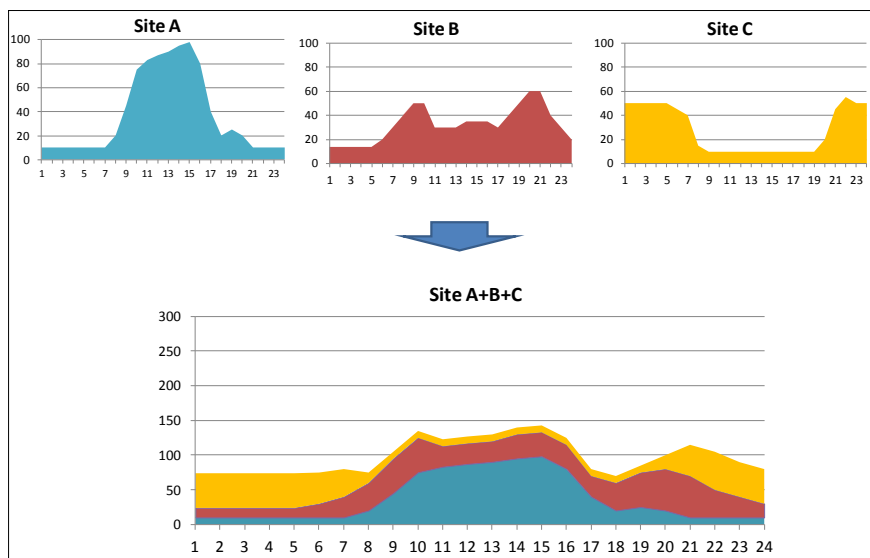
7.36 As much as possible, the provision of electric services which will create local employment should be considered.



Source: JICA Study Team.

**Figure 7.2.5 Energy Distribution Framework in SRP**

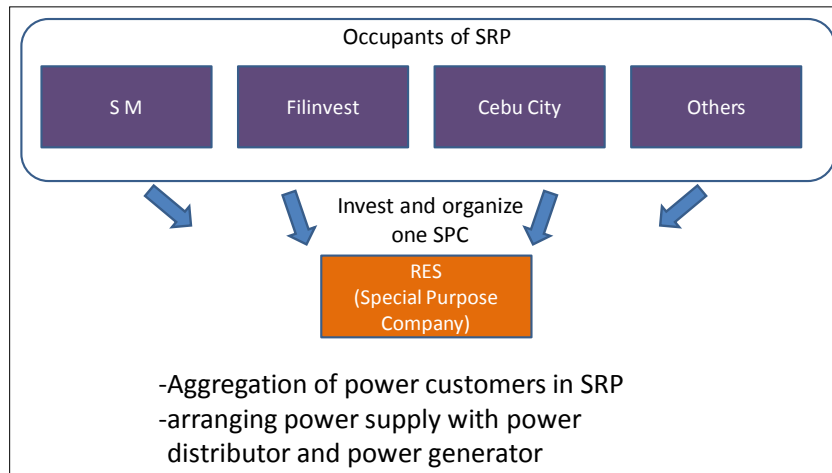
7.37 It is possible to generate relatively less deflect electricity demand by combining various types of demand curve components, even if each of the facilities has a large fluctuation (see Figure 7.2.6). Therefore, the combination enables to relatively decrease peak time consumption, generates averaged and smooth electricity demand, and enables consumers to enjoy low unit price.



Source: JICA Study Team.

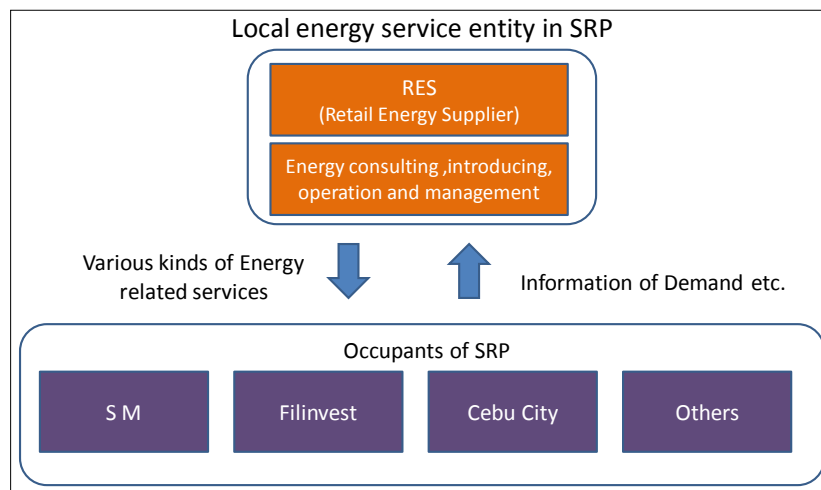
**Figure 7.2.6 Example of Combination of Demand**

7.38 Applying RES possibilities, various types of energy-related services can be provided effectively to consumers (see Figure 7.2.7 and Figure 7.2.8).



Source: JICA Study Team.

**Figure 7.2.7 Indicative Energy Distribution for Occupants in SRP**

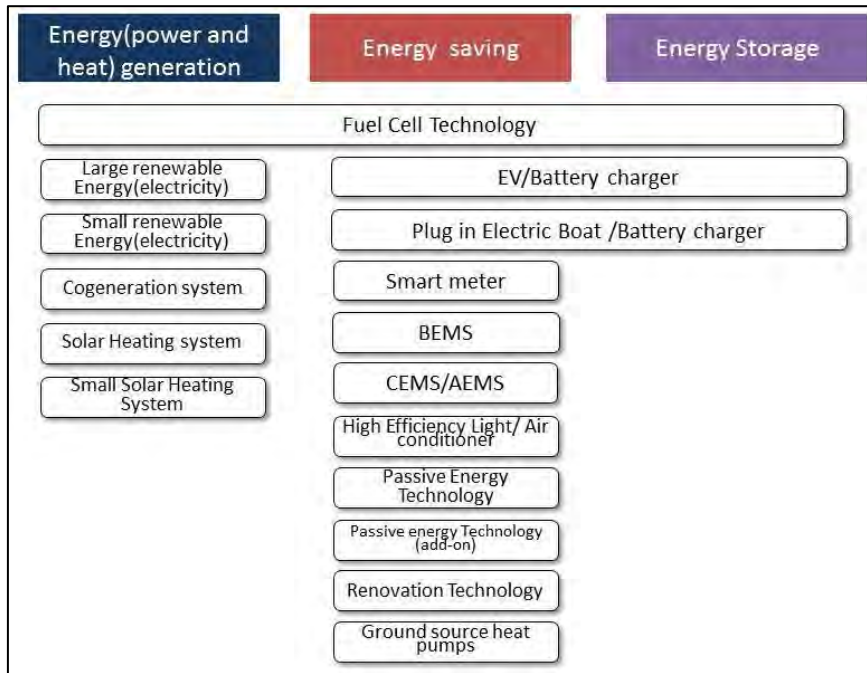


Source: JICA Study Team.

**Figure 7.2.8 Indicative Role of Local Energy Service Entity in SRP**

## 2) Selecting the Energy Technology for a Smart City

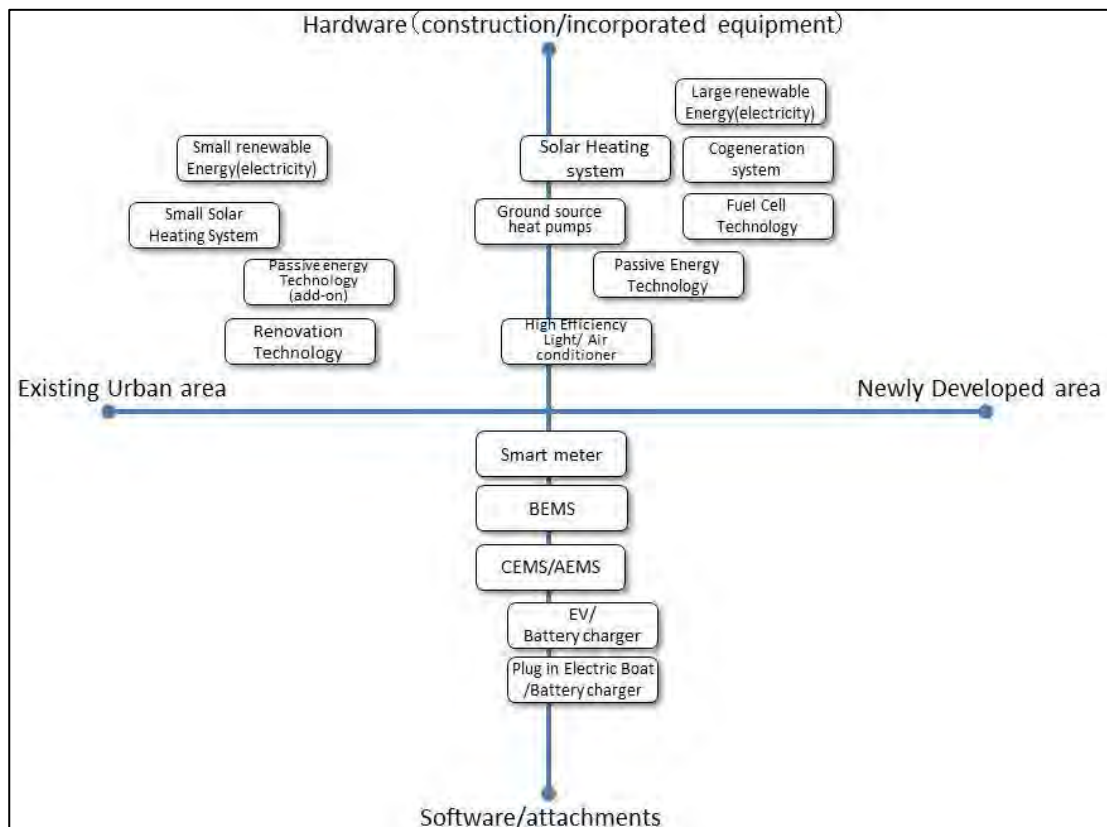
7.39 This section will discuss technology elements which could be applied to a Smart City. The major technology elements often considered are shown in Figure 7.2.9. These are extracted mainly from Japanese technology, being considered to have fewer barriers for introduction, and applicable to SRP. These energy-related technology elements can be classified into three types, namely: energy generation, energy saving and energy storage.



Source: JICA Study Team.

**Figure 7.2.9 Examples of Smart Energy Technology Elements in Japan**

7.40 In the following chart (see Figure 7.2.10), the technology elements for energy are biaxially sorted by the axis of existing urban area/newly developed area and the axis of hardware/software requirements.



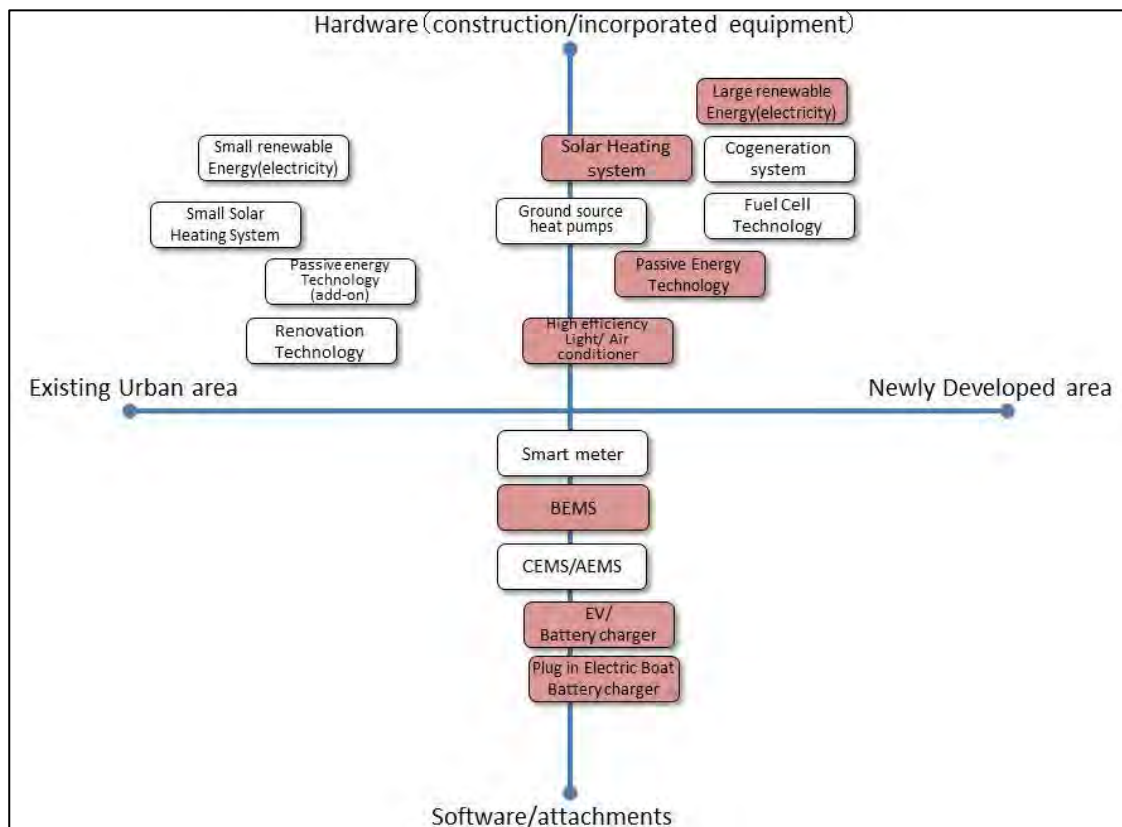
Source: JICA Study Team.

**Figure 7.2.10 Mapping of Smart Energy Technology Elements**

7.41 SRP is a newly developed area which requires comprehensive development of both software and hardware components. No gas infrastructure has been installed. As SRP is located in a tropical zone with no distinct rainy season, it has a large potential to utilize solar heat energy.

7.42 On the demand side, a large potential demand is expected for air conditioning and lighting for shopping malls, offices and other uses. Also, considering that SRP plans to develop leisure facilities, its transportation system should have a desirably low impact on the environment.

7.43 As a result, the technology elements that have been selected as suitable for SRP development are shown in Figure 7.2.11. These are Large Renewable Energy (electricity), Solar Heating System (Solar Cooling System), Passive Energy Technology (Total Heat Exchanger), High Efficiency Light/Air Conditioner (this time lightning only), BEMS (Building Energy Management System), EV/ Battery Charger, and Plug-in Electric Boat/ Battery Charger.



Source: JICA Study Team.

**Figure 7.2.11 Mapping of Smart Technology Elements Suitable for SRP**

7.44 For each technology element, if introduced in SRP, the target demand and energy saving effects, benefits, etc. are summarized in Table 7.2.1.

**Table 7.2.1 Overview of Smart Technology Elements Suitable for SRP**

No.	Component Technology	Explanation	Supplier (in Japan)
1	Large Renewable Energy (electricity)	Solar electric panels have become widespread and their prices have gone down in Japan. Thus, applying low-cost solar electric panels in SRP will be considered.	Next Energy and Resource Co., Ltd.
2	Solar Heating System (Solar Cooling System)	Solar energy is able to generate hot water. Applying an absorption refrigerator, cool water can be generated from hot water. Thus, fossil fuels are replaced with renewable solar energy.	Terada Iron Works Co., Ltd.
3	Passive Energy Technology (Total Heat Exchanger)	Total heat exchanger ventilates and keeps temperature and humidity under control. It supports less energy air conditioning management and maintains comfort at the same time.	Mitsubishi Electric Corporation
4	High Efficiency Light/ Air Conditioner (this time lightning only)	Remote dimmer controllable high efficiency lights such as cold cathode fluorescent lamps (CCFL) enable considerable energy savings compared with conventional fluorescent bulbs/tubes.	Hohkohsya Co., Ltd.
5	BEMS	For lighting, air conditioning, elevators and other electric appliances, electric consumption is visualized and optimized by remote control.	JIT Consulting Ltd.
6	EV/Battery Charger	Electric Vehicles (EV) can be installed in SRP for transportation inside leisure facilities, between shopping malls and leisure facilities, and more. EV is applicable for taxi, jeepney bus service, and/or car sharing service without exhausting fossil fuel; utilizing renewable energy; and organizing a model for easing traffic and reducing automobile exhaust.	NTT Data Customer Service Corporation
7	Plug-in Electric Boat/Battery Charger	Eco-friendly plug-in electric boat can be introduced as a transportation mode between Cebu City and SRP, Mactan Island and SRP, for small-scale cruising, etc. Plug-in electric boat can be introduced as a model service of carbon emission reduction.	Tokyo University of Marine Science and Technology

Source: JICA Study Team.

## (1) Technology Element No. 1: Large Renewable Energy (Electricity)

### (a) Description of the Technology

7.45 Lower costs and Japanese high quality in generated electricity have been realized basically by applying silicon crystal solar cell modules (see Figures 7.2.12 to 7.2.14). This technology continues to become widespread not only in Japan but in many other countries as well.



Source: Next Energy & Resources Co., Ltd.,  
[http://www.nextenergy.jp/service/mega\\_solar.php](http://www.nextenergy.jp/service/mega_solar.php)

**Figure 7.2.12 Solar Cell Modules**



Source: Next Energy & Resources Co., Ltd.  
[http://www.nextenergy.jp/service/mega\\_solar.php](http://www.nextenergy.jp/service/mega_solar.php)

**Figure 7.2.13 Module Stand**



Source: Next Energy & Resources Co., Ltd.  
[http://www.nextenergy.jp/service/mega\\_solar.php](http://www.nextenergy.jp/service/mega_solar.php)

**Figure7.2.14 Power Monitor**

**(b) Target Demand**

7.46 Daytime solar power electricity covers daytime cooling demand in the shopping malls, leisure facilities and residences. Adequate solar radiation intensity all year round can be expected as no distinct rainy season is observed in Cebu Island. The system can be used both as an interconnected system with the grid and as an independent power system.

**(c) Expected Energy Saving Effects**

7.47 Introduction of solar power generation system can cover the electricity demand for air conditioning because a reasonable amount of cooling demand all year round can be expected in the daytime. Electricity generated from the fossil fuels can be substituted by this system's implementation.



Source: West Holdings Corporation.

**Figure 7.2.15 Mega Solar Power Generation System with Floating Frame on Water**



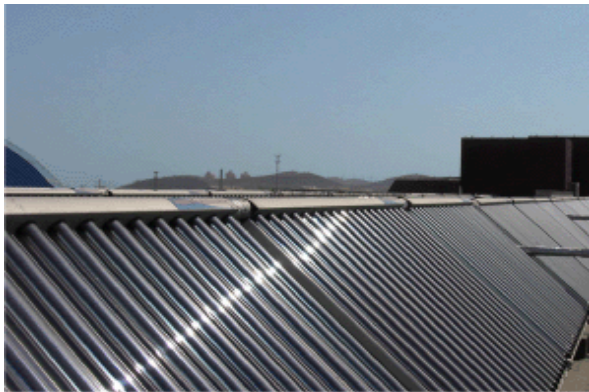
## (2) Technology Element No. 2: Solar Heating System (Solar Cooling System)

### (a) Description of the Technology

7.48 This solar heating system can collect heat efficiently, concentrating sunlight. High efficiency is attained with a combination of parabola reflectors and evacuated glass tubes (see Figures 7.2.16 and 7.2.17).

7.49 Applying evacuated glass tubes minimizes outside heat radiation loss and enables high temperature heat collection (up to 200°C in the air).

7.50 Cold heat will be generated from a combination of the solar heating system and adsorption refrigerator solar cooling system (see Figure 7.2.18).



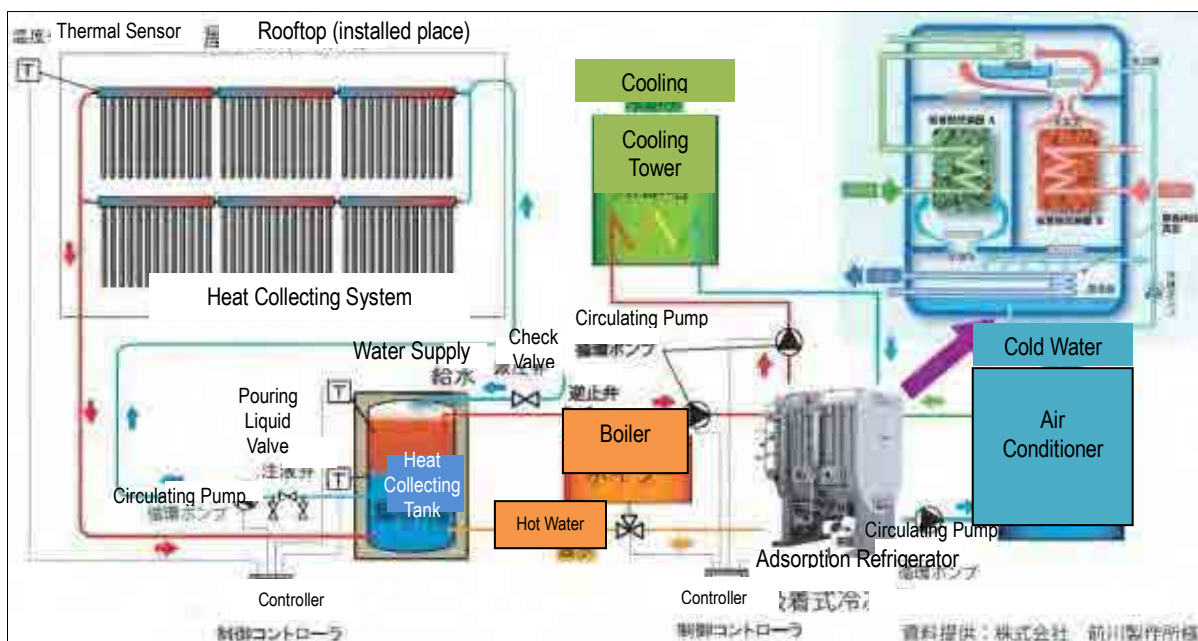
Source: Terada Iron Works Co.,Ltd.  
<http://www.solars.jp/images/freezer/freezerimg03zoom.jpg>

**Figure 7.2.16 Solar Heating System**



Source: Terada Iron Works Co.,Ltd.  
<http://www.solars.jp/images/freezer/freezerimg03zoom.jpg>

**Figure 7.2.17 Evacuated Glass Tubes**



Source: Terada Iron Works Co.,Ltd.  
<http://www.solars.jp/images/freezer/freezerimg03zoom.jpg>

**Figure 7.2.18 Combination of Solar Heating System and Adsorption Refrigerator (Solar Cooling System)**

(b) **Target Demand**

7.51 Cooling air conditioning demand in daytime in the shopping malls, leisure facilities and residences can be partially covered by the solar heating system. Utilizing high efficiency solar heat collecting system and adsorption refrigerator, daytime sunlight heat is transferred into cold air.

7.52 Considerable constant sunlight is expected in Cebu Island, having no distinct rainy season.

(c) **Expected Energy Saving Effects**

7.53 Large cooling air conditioning demand can be expected all year round. The same level of daytime cooling air conditioning demand from fossil fuels will be replaced by renewable energy with the introduction of this system.

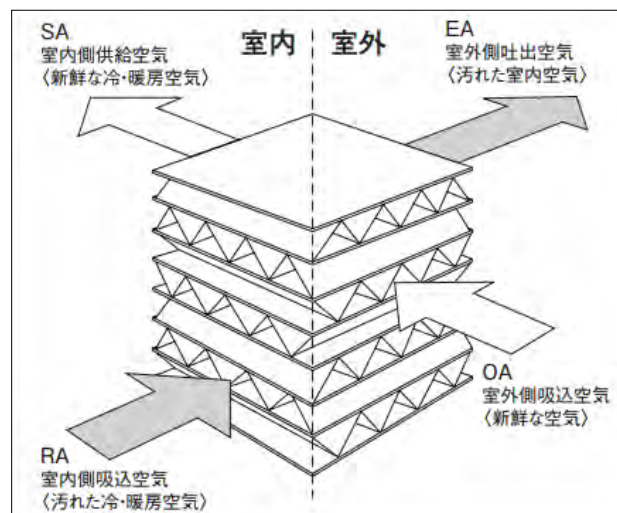
7.54 Energy conversion efficiency from sunlight is around 50%. Applying the solar heating system, heat conversion efficiency is not decreased so much during cloudy periods. The cooling air conditioning system's efficiency is a little less than 20% when utilizing the adsorption refrigerator.

**(3) Technology Element No. 3: Passive Energy Technology (Total Energy Exchanger)**

(a) **Description of the Technology**

7.55 The total heat exchanger can supply air conditioned fresh air without energy loss (temperature and humidity).

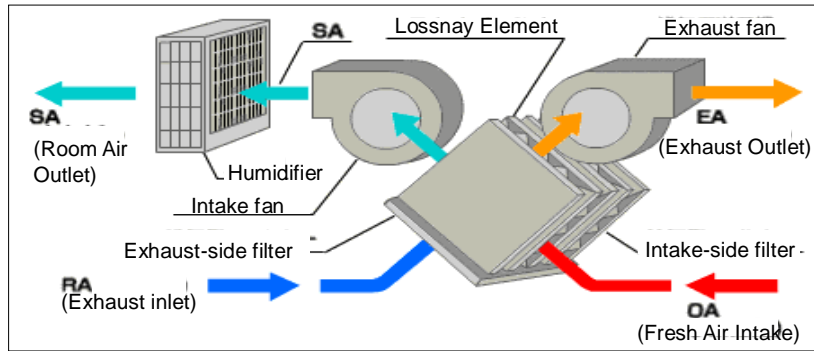
7.56 The total heat exchanger consists of sheeting panel and spacing panel made with specially-treated paper (see Figure 7.2.19). Intake fresh air and exhaust room air are absolutely separated from each other by the sheeting panel. It exchanges air conditioned hot or cool air and fresh air without leaking energy and humidity, thus realizing energy savings (see Figure 7.2.20).



Source: Mitsubishi Electric Corporation.  
<http://www.mitsubishielectric.co.jp/lossnay/what/>

**Figure 7.2.19 Image of Total Heat Exchanger**

7.57 The total heat exchanger saves heating/cooling energy at ventilation. This equipment is called the “lossnay element.”



Source: Mitsubishi Electric Corporation.  
<http://www.mitsubishielectric.co.jp/lossnay/what>

**Figure 7.2.20 Air Flow**

**(b) Target Demand**

7.58 With the warm temperature and high humidity of the tropical climate in the Philippines, air conditioning demand is constant and large. Good ventilation controlling the air conditioned temperature (cooling) and humidity will enable to reduce energy consumption of the air conditioning system.

**(c) Expected Energy Saving Effects**

7.59 The total heat exchange system saves up to 68% energy (while cooling) than the conventional system.

**(4) Technology Element No. 4: High Efficiency Light**

**(a) Description of the Technology**

7.60 CCFL lighting technology is a long-life, adjustable, high efficiency lighting based on back lighting application of liquid crystal display (see Figures 7.2.21 to 7.2.25). CCFL lighting can provide appropriate illumination on demand using its dimmer control.



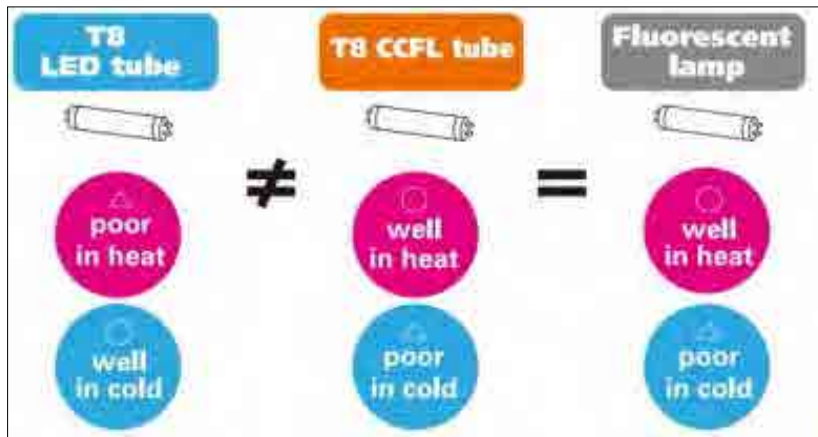
Source: Hohkohsya.Co.,Ltd.  
[http://www.solana.asia/catalog/thai\\_catalog\(english\).pdf](http://www.solana.asia/catalog/thai_catalog(english).pdf)

**Figure 7.2.21 CCFL Lighting**



Source: Hohkohsya.Co.,Ltd.  
[http://www.solana.asia/catalog/thai\\_catalog\(english\).pdf](http://www.solana.asia/catalog/thai_catalog(english).pdf)

**Figure 7.2.22 Features of CCFL**



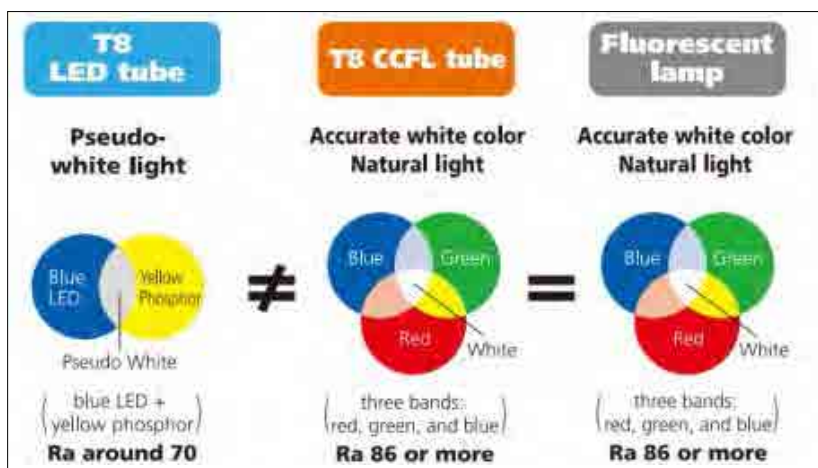
Source: Hohkohsya.Co.,Ltd.  
[http://www.solana.asia/catalog/thai\\_catalog\(english\).pdf](http://www.solana.asia/catalog/thai_catalog(english).pdf)

**Figure 7.2.23 Characteristics of CCFL for Temperature**



Source: Hohkohsya.Co.,Ltd.  
[http://www.solana.asia/catalog/thai\\_catalog\(english\).pdf](http://www.solana.asia/catalog/thai_catalog(english).pdf)

**Figure 7.2.24 Light Distribution of CCFL**



Source: Hohkohsya.Co.,Ltd.  
[http://www.solana.asia/catalog/thai\\_catalog\(english\).pdf](http://www.solana.asia/catalog/thai_catalog(english).pdf)

**Figure 7.2.25 Natural Light Quality of CCFL**

**(b) Target Demand**

7.61 High efficiency lighting is expected to be utilized in shopping malls and hotels where illumination that resembles natural light tends to be preferred.

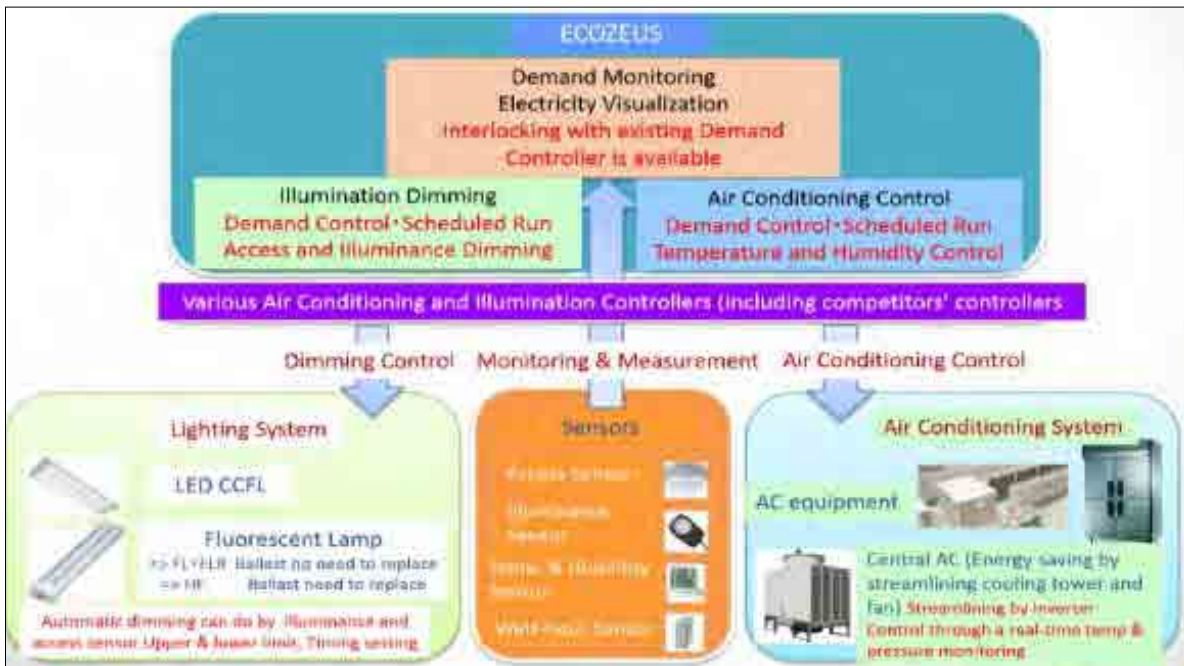
(c) **Expected Energy Saving Effects**

7.62 The CCFL's energy saving efficiency is as high as that of LED, and 20-40% more efficient and 4-5 times longer than the life of a fluorescent lamp.

**(5) Technology Element No. 5: BEMS**

(a) **Description of the Technology**

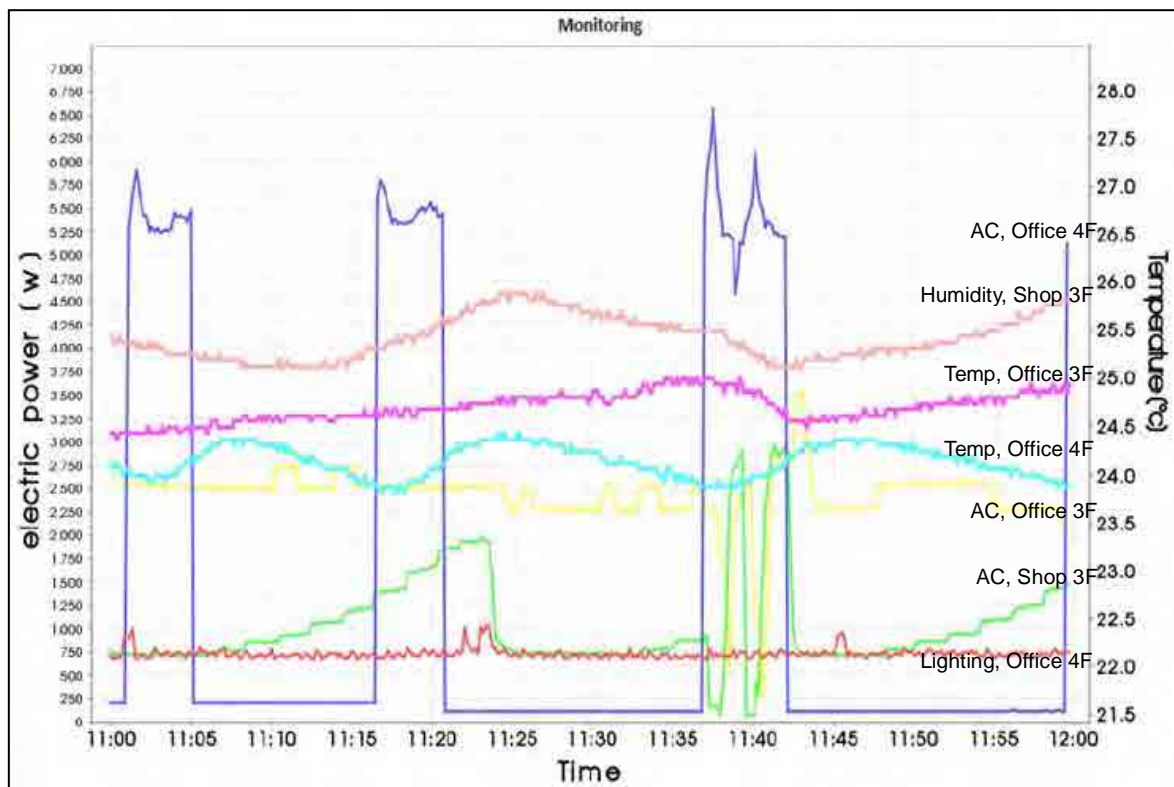
7.63 The Building Energy Management System (BEMS) is an energy-consumption solution for optimal control (see Figure 7.2.26). BEMS is a crucial basic technology element for a Smart building and a Smart city.



Source: JIT Consulting, Inc.

**Figure 7.2.26 Function of BEMS (Example)**

7.64 Power consumption monitoring is a fundamental technology element to optimize energy savings. Control based on monitoring the actual operation of equipments and appliances is essential for energy saving, even if such equipment and appliances are already the sophisticated energy-saving types (see Figure 7.2.27).



Source: JIT Consulting, Inc.

**Figure 7.2.27 Monitoring Graph of Power and Temperature**

**(b) Target Demand**

7.65 For lighting, air conditioning and other electric appliances, energy consumption is monitored and optimized remote control will be established at shopping malls and leisure facilities. Implementing several kinds of sensors and emergency supervisory equipments will be installed.

**(c) Expected Energy Saving Effects**

7.66 By installing BEMS, around 10-30% energy savings can be achieved with optimization of lighting, air conditioning and more. Energy saving efficiency varies according to the type of equipments, for example, air conditioning system such as air-cooled or water-cooled.

**(6) Technology Element No. 6: EV/ Battery Charger**

**(a) Description of the Technology**

7.67 The EV has been highly profiled as a clean vehicle (see Figures 7.2.28 and 7.2.29). EVs do not consume fossil fuels directly. Hence, they do not emit CO<sub>2</sub>, NO<sub>x</sub> or exhaust gas. Vehicle operating cost, mainly consisting of fossil fuel, can be largely reduced.



Source: NTTDATA Customer Service Corporation.  
<http://www.ttkk.co.jp/product/energy/charger/>

**Figure 7.2.28 EV Battery Charger**



Source: Honda Motor Co., Ltd.

**Figure 7.2.29 (Reference) Fuel Cell Vehicle/ Smart Hydrogen Station**

**(b) Target Demand**

7.68 As a model case, rapid battery chargers will be installed and EVs will be distributed in SRP. The system provides comfortable transportation such as for shopping and transportation, and users are able to charge comfortably on pay basis. EV is applicable for taxi, jeepney, bus, and/or for car sharing service without exhausting fossil fuel, utilizing renewable energy, and serving as a model for easing traffic and reducing automobile exhaust.

**(c) Expected Energy Saving Effects**

7.69 Total CO<sub>2</sub> emission from EV is reduced to less than one third compared to a conventional gasoline-fueled vehicle, even with applying thermal power generation on the grid. From the financial standpoint, mileage energy cost can be reduced to less than one tenth.

**(7) Technology Element No. 7: Plug-in Electric Boat/ Battery Charger**

**(a) Description of the Technology**

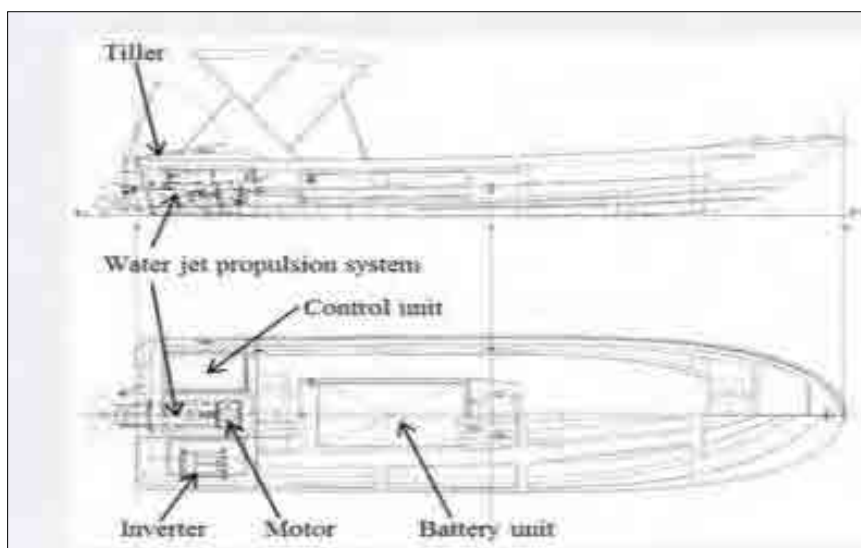
7.70 The Tokyo University of Marine Science and Technology has created a new type of electric boat called "RAICHO (Type S)" in 2011 (see Figures 7.2.30 and 7.2.31). "RAICHO" utilizes a lithium-ion battery with normal plug-in charging system or rapid charging system.

7.71 This charging system is based on the Japanese "Chademo Protocol" which is compatible to the EV charging system.



Source: Tokyo University of Marine Science and Technology.  
<http://www2.kaiyodai.ac.jp/~takamasa/kaiyodai-ees-project/kaiyodai-ees-projectE24-3.html>

**Figure 7.2.30 Plug-in Electric Boat “RAICHO”**



Spec:

Length	8.04 m
Beam	2.24 m
Depth	0.85 m
Weight	1.3 ton
Motor output	40 kW
Speed	
(Half load)	10 knots
(Full load)	8.5 knots
Navigation service	
(10 knots)	45 minutes
(6 knots)	2.5 hours
Battery capacity	23 kWh
Crew	8

Source: Tokyo University of Marine Science and Technology.  
<http://www2.kaiyodai.ac.jp/~takamasa/kaiyodai-ees-project/kaiyodai-ees-projectE24-3.html>

**Figure 7.2.31 Shape and Structure of the Plug-in Electric Boat**

**(b) Target Demand**

7.72 The electric boat can serve as transportation between SRP and Mactan Island, as Cebu’s sightseeing leisure cruise from SRP, and as inter-transportation in SRP, etc.

**(c) Expected Energy Saving Effects**

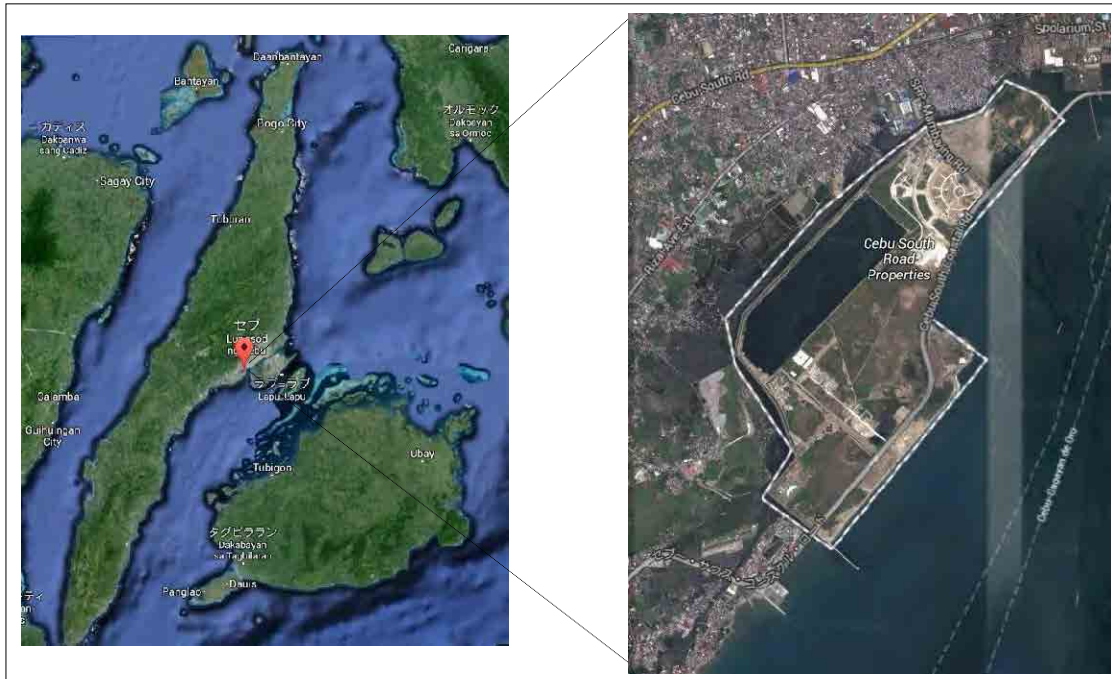
7.73 The energy saving efficiency and CO<sub>2</sub> reduction from the electric boat depend on the power generation choice. Even using thermal power generation, CO<sub>2</sub> emission can be reduced by 50–70% compared to using a normal oil engine. When renewable energy is applied, the system is 100% CO<sub>2</sub> free.

**7.3 Current Situation of South Road Properties (SRP)**

**1) Overview of SRP**

7.74 SRP is a 300-ha, newly developed reclamation area and its connecting road located in Cebu Island's eastern coast, south of central Cebu City (see Figure 7.3.1).





Source: google map.  
<https://maps.google.com/>

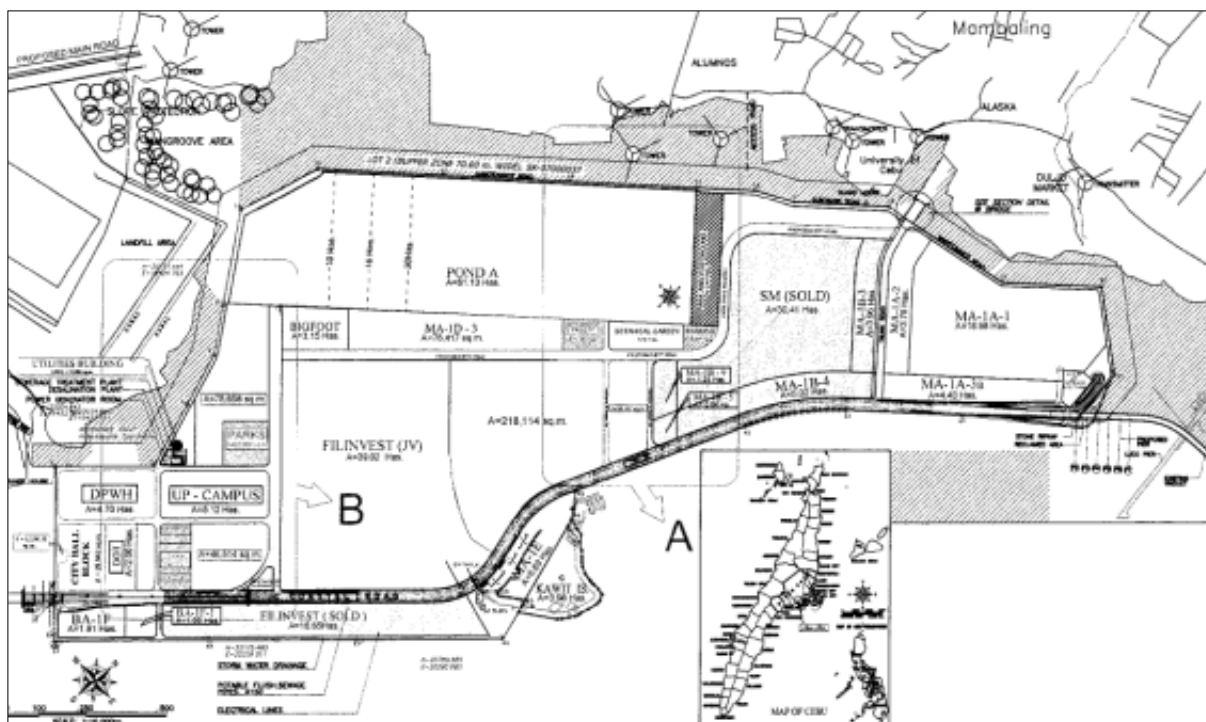
**Figure 7.3.1 Location of South Road Properties**

7.75 SRP was constructed under a Japanese yen loan. Cebu City is supposed to finish repayment of the loan to JBIC (the business has been transferred to JICA now) by 2025.

7.76 Part of the reclamation has not been completed due to shortage of funds.

7.77 Development in SRP has been proceeding. A large-scale shopping mall, residential buildings mainly targeting wealthy foreigners such as retired Japanese, etc., offices for national government agencies, a university, and more have been constructed (see Figure 7.3.2).

7.78 “Pond A” on the map is the uncompleted reclamation area (see Figure 7.3.3). This pond is filled with brackish water. Therefore, when some facilities will be installed, preliminary tests should be performed from the viewpoint of lifetime.



Source: City of Cebu.

**Figure 7.3.2 SRP Map**



Source: JICA Study Team

**Figure 7.3.3 Pond A in SRP**

## 2) Current Occupants in SRP

7.79 Table 7.3.1 lists down the present occupants of SRP. The facilities of these private companies and public institutions are now in various stages of development (see Figures 7.3.4 to 7.3.8). Other amenities are also found within SRP (see Figure 7.3.9). Also, noticeable is one particular site of environmental concern is a garbage dumpsite, which has a negative impact on SRP (see Figure 7.3.10).

**Table 7.3.1 List of Current SRP Occupants**

Facility Type	Occupancy	Measure	The Land Area of Possession(m <sup>2</sup> )
Shopping Mall, etc.	SM Prime Holdings, Inc.	Sale	30 ha (304,100 m <sup>2</sup> )
Residence	Filinvest Land, Inc.	Joint Venture	40 ha (400,000 m <sup>2</sup> )
Integrated Resort	Filinvest Land, Inc.	Sale	10.6 ha (106,148 m <sup>2</sup> )
Movie Studio	Bigfoot Studios, Inc.	Lease (2007–2032)	3.1 ha (31,127 m <sup>2</sup> )
University	University of the Philippines	Donation	5 ha (51,372 m <sup>2</sup> )
Business (Department of Public Works and Highways)	National Government	Donation	5 ha (42,936 m <sup>2</sup> )
Business (Department of Health)	National Government	Donation	2 ha (20,000 m <sup>2</sup> )
Business (Court of Appeals)	National Government	Donation	0.7 ha (7,123 m <sup>2</sup> )

Source: City of Cebu.



Source: City of Cebu.

**Figure 7.3.4 Development Image of SRP**



Source: JICA Study Team.

**Figure 7.3.5 SM Shopping Mall**



Source: JICA Study Team.

**Figure 7.3.6 Filinvest Residences**



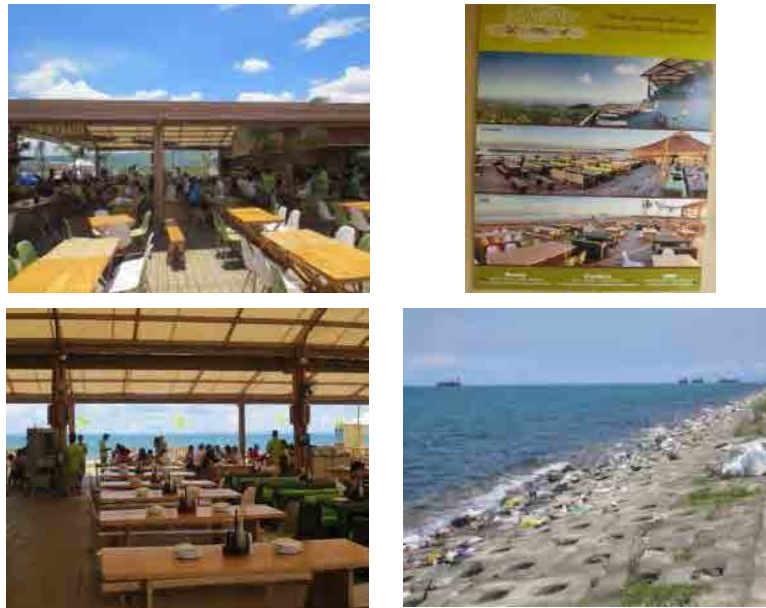
Source: JICA Study Team.

**Figure 7.3.7 Bigfoot Studios, Inc.**



Source: JICA Study Team.

**Figure 7.3.8 Pilipinas Water Resources, Inc**



Source: JICA Study Team.

**Figure 7.3.9 Seaside Restaurant**



Source: JICA Study Team.

**Figure 7.3.10 Garbage Dumpsite in SRP**

### 3) Energy Situation in SRP

#### (1) Energy Supply

7.80 The power supply situation in SRP is characterized by the following:

- (i) No gas supply infrastructure has been installed (e.g., neither LNG terminal nor gas pipeline).
- (ii) SRP is a seaside coastal area rich in land to accommodate RE facilities. Therefore, it has potential for developing RE, such as solar energy (electricity and heat), wind power, tide power, wave power, etc.
- (iii) Basic electricity supply infrastructure such as grid, utility poles, substations, etc. have already been installed.

#### (2) Energy Demand

7.81 Energy demand in SRP is described as follows:

- (i) A shopping mall, leisure facilities and residences have large energy demand.
- (ii) The estimated electricity demand as a whole in SRP is 50~60 MW. At present, the electricity demand is about 2 MW at most because most facilities are still under construction.

- (iii) The average daily maximum temperature in SRP is over 30°C all year round. Therefore, demand for air conditioning (basically cooling) exists throughout the year.
- (iv) The major portion of energy demand will go to cooling air conditioning (electricity), refrigeration equipment cooling (electricity), and lighting. The other part is, for example, office devices and cooking gas (propane), etc.
- (v) Heat demand is less required. If any, hot water and heat are often supplied by electric heaters in the Philippines.
- (vi) A seasonal fluctuation of power demand is not obvious. Peak demand in diurnal variation pattern is estimated at 1:00–3:00 pm, the hottest hours, because cooling air conditioning systems would be hard at work.

#### **4) Registered as PEZA Special Economic Zone**

7.82 The Philippine Government has a policy for providing a globally competitive environment for investments. One of the administrators of this policy is PEZA, an attached agency of DTI. SRP is registered as a PEZA Special Economic Zone.

7.83 The following section describes the relevant PEZA investment incentives that can be used for installing the Smart City technologies in SRP and for inviting service providers.<sup>2</sup>

##### **(1) Activities Eligible for PEZA Registration**

- (a) **Economic Zone Development and Operation:** Manufacturing Economic Zone Development/ Operation - development, operation and maintenance of an economic zone for export manufacturing enterprises, inclusive of the required infrastructure, facilities and utilities such as light and power system, water supply and distribution system, sewerage and drainage system, pollution control devices, communication facilities, paved road network, administration building. Eligible firms shall qualify for registration as “Manufacturing Economic Zone Developer/ Operator.”

##### **(2) Fiscal Incentives**

###### **(a) Economic Zone Developer/ Operator**

7.84 A Manufacturing Economic Zone Developer/ Operator is given the following incentives:

- Special 5% tax on gross income and exemption from all national and local taxes, except real property tax on land owned by the Economic Zone Developer. (“Gross Income” refers to gross sales or gross revenues derived from the registered activity, net of sales discounts, sales returns and allowances and minus cost of sales or direct costs but before any deduction is made for administrative expenses or incidental losses during a given taxable period);
- VAT Zero rating of local purchases; and
- Exemption from expanded withholding tax.

##### **(3) Non-Fiscal Incentives**

- Simplified import;

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<sup>2</sup> Source: Philippine Economic Zone Authority (<http://www.peza.gov.ph/>).

- Non-resident foreign nationals may be employed; and
- Special non-immigrant visa with multiple entry privileges.

## **7.4 Programs and Projects by Planning Term**

### **1) Short-Term Projects**

7.85 In the short term, an effort to create an optimal energy supply-demand structure should be mounted within SRP as a unified area. When creating such a structure, a united cooperative organization should be organized. It is effective to build an energy service system reasonably utilizing RES or similar systems. Thus, demand is considered for the whole area and the corresponding supply is totally managed as an area. This can be a prototype model for area energy management. On this basis, establishing an arena to discuss and build a flexible and open consultative mechanism for both the power distribution company and the consumers will be one of the main outputs of this project.

7.86 When the platform is consolidated, starting with the step by step introduction of energy saving technology is effective from a cost perspective. Then, RE technology such as solar heating system, which can be introduced on site and corresponds to appropriate demand, should be introduced with minimum energy loss.

7.87 On the other hand, the share of RE such as geothermal has become already quite large in the Philippines. The electricity distribution companies have struggled with the handling of RE. The FIT price of solar, wind and other variable power source is set relatively low. Connecting these variable power sources to the grid costs high and the infrastructure has not developed enough. Therefore, in this area, it is not likely to introduce RE technology on a large scale and applicable to the other areas.

7.88 Following the construction of an energy management platform, visualizing a system for energy consumption especially for electricity should be prioritized. It is necessary to develop a demand control system utilizing means suitable for the SRP area. As discussed above, it is most important in the short term to build the platform for an energy management system and to prevent energy loss.

7.89 For introduction of technology elements, development of infrastructure including heat utilization, energy saving, wastewater treatment and more should be considered and promoted. For this purpose, it is useful to apply for the support provided by the Japanese Government, such as support for small- and medium-scale enterprises to export their technologies to East Asian countries, infrastructure development support applying PPP and other subsidiaries. Furthermore, utilizing the JCM (Joint Crediting Mechanism) scheme can be considered to reduce CO<sub>2</sub> emission with the introduction of Japanese technology if an agreement is made by the governments of the Philippines and Japan.

### **2) Long-Term Projects**

7.90 For long-term implementation, the knowledge acquired in efforts of SRP as a model area can be applied to other similar areas in Metro Cebu.

7.91 For example, the commercial areas near Cebu City or other PEZA areas can apply for the same incentives for development as SRP. And then, it will widely spread through other areas because the cost of the component technologies will adequately decrease and the know-how to use these technologies will be better understood.

7.92 It is necessary to promote the orientation which improves the self-sufficiency rate

of energy, raises the practical use rate of RE, and encourages energy savings for every sector. In order to do that, for example, the domestic resources and RE development as well as the continuous electric power regulation reform should be implemented

**Table 7.4.1 Sub-Roadmap Projects for Smart SRP Development**

Implementation Period	Projects
Short-Term Projects	(a) Establishment of unified management system of energy supply and demand in SRP (b) Building an energy management platform to visualize energy demand and supply (c) Introduction of individual technology elements and infrastructure which are suitable for each area
Long-Term Projects	(a) Expansion of knowledge and know-how obtained from SRP efforts to Cebu City and the whole Metro Cebu area (b) Establishment of the most suitable energy management scheme based on resource development in the Philippines, development of renewable energy, and trend of power system reform

Source: JICA Study Team.



## 8 SUB-ROADMAP FOR METROPOLITAN GOVERNANCE

### 8.1 Background

8.1 The legal framework for LGUs in the Philippines is the Local Government Code of 1991 (Republic Act No. 7160). LGUs are political and administrative units with three levels: provinces, municipalities/cities, and barangays. Cities are either independently-chartered (quasi-provinces by themselves) or component (that is, under the general supervision of the provincial government). Municipalities have the same administrative relationship with the province as the component cities, and they often aspire for city-hood. Section 29 of the Code defines the inter-LGU relationships.

8.2 There are three independent cities in the Metro Cebu area, namely: Cebu City, Lapu-Lapu, and Mandaue. There are also four component cities (Carcar, Naga, Talisay, and Danao). The remaining six LGUs comprising Metro Cebu are municipalities. This mixed status makes it more difficult to set up a metropolitan body. Under the Local Government Code, the Provincial Governor can exercise general supervision over municipalities, but not when it comes to independent cities such as Cebu City, Lapu-Lapu or Mandaue.

8.3 The Constitution acknowledges the motivations for cooperation and collaboration among contiguous LGUs, and sets out a method by which this can be done. Article X, Section 11, states:

*The Congress may, by law, create special metropolitan political subdivisions, subject to a plebiscite as set forth in Section 10 hereof. The component cities and municipalities shall retain their basic autonomy and shall be entitled to their own executive and legislative assemblies. The jurisdiction of the metropolitan authority that will thereby be created shall be limited to basic services requiring coordination.*

8.4 Short of creating a metropolitan body via a Congressional enactment, Section 33 of the Local Government Code offers a legal basis for creating a cooperation mechanism among LGUs. It states:

*Local government units may, through appropriate ordinances, group themselves, consolidate, or coordinate their efforts, services, and resources for purposes commonly beneficial to them. In support of such undertakings, the local government units involved may, upon approval by the Sanggunian concerned after a public hearing conducted for the purpose, contribute funds, real estate, equipment, and other kinds of property and appoint or assign personnel under such terms and conditions as may be agreed upon by the participating local units through Memoranda of Agreement.*

8.5 Metro Cebu has some experiences of region-wide development administration. The regional administration offices were organized for management of ODA projects, including the Central Visayas Rural and Urban Project Office (CVURPO) in 1981, the Central Visayas Regional Projects Office in 1983, and the Metro Cebu Development Council (MCDC) in 1997. The MCDC was designed as a coordinating body tasked with coordination, preparation, and monitoring of development planning, programs and projects and their implementation.<sup>1</sup> It should be noted that the MCDC had no implementation

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<sup>1</sup> Ruben G. Mercado, "Metropolitan Cebu: The Challenge of Definition and Management," *Discussion Paper Series No. 98-15* (Revised) (1998); Glenda R. Gonzales, "Metro Cebu: A Metropolitan Area in Need of Coordinative Body," *Discussion Paper Series No. 2004-49* (2004).

powers. With the completion of the CVRP, MCDC became moribund.

8.6 Several bills for the creation of a metropolitan body were filed in Congress by legislators coming from Cebu. The first bills were filed in 2001 (authored by Rep. Raul V. Del Mar in the House of Representatives and by Senator Sergio Osmeña III in the Senate). Since these bills (HB No. 372 and SB No. 436) remained un-acted, they were later re-filed by the same authors. More than 13 years have passed and the bills are still pending. This implies a lack of urgency, if not broad support, for such a metropolitan body for Cebu.

8.7 After a hiatus of almost two decades, the private sector took the initiative to do something about the urgent need to undertake an integrated and coordinated development for Metro Cebu. Thus was created the MCDCB in 2011. Through the leadership of Roberto Aboitiz, the active participation of the governor and mayors in 14 LGUs were engaged, as well as those of the officials of the line agencies, both at the national and regional levels. MCDCB used a step by step approach, relying heavily on the principles of stakeholder participation.

## 8.2 Review of the Development Management Institutions

8.8 Development management organizations at the national and Metro Cebu levels were studied. The summary of the research results are shown in Table 8.2.1.

**Table 8.2.1 Matrix of Organizations Reviewed**

	Planning and Coordination	Investment Programming	Project Preparation	Implementing Bodies
National	<ul style="list-style-type: none"> <li>NEDA</li> </ul>	<ul style="list-style-type: none"> <li>Government Appropriations Act (GAA) formulation process</li> <li>Infrastructure Bill formulation process</li> <li>NEDA Investment Coordinating Council (ICC)</li> </ul>	<ul style="list-style-type: none"> <li>National Line Agencies (NLAs)</li> </ul>	<ul style="list-style-type: none"> <li>Government Corporations and Commissions</li> <li>Development Authorities</li> <li>Agri Crop-Specific Agencies</li> <li>Metro Manila</li> <li>Mindanao</li> <li>Southern Philippines</li> <li>Special Economic Zones, Development Institutes and Development Centers</li> </ul>
Metro Cebu	<ul style="list-style-type: none"> <li>NEDA, Region 7</li> <li>Regional Development Council (RDC)</li> <li>LGUs</li> <li>Regional Line Agencies (RLAs)</li> <li>1994 Study of Cebu Integrated Area Development Master Plan</li> <li>MCDCB Visioning Study</li> </ul>	<ul style="list-style-type: none"> <li>NEDA Region 7 Investment Programming in late 1970s</li> <li>MCLUTS</li> <li>JICA Roadmap Study for Sustainable Urban Development (ongoing)</li> </ul>	<ul style="list-style-type: none"> <li>CVURPO (EO 694)</li> </ul>	<ul style="list-style-type: none"> <li>Metro Cebu Development Council/Metro Cebu Development Project I to III</li> <li>Central Visayas Regional Projects Office/Cebu Hillyland Project (EO 907)</li> </ul>
Lessons Learned	<ul style="list-style-type: none"> <li>Decentralization is a WANT.</li> <li>The funds pie in regional budgeting process is too small to meet NEEDS.</li> <li>RDC needs to be complemented with more detailed and area-specific investment programming activities.</li> <li>RDC needs to be complemented with project preparation</li> </ul>	<ul style="list-style-type: none"> <li>Investment programming has to span a long period of time to take into account the project preparation, budgeting and loan negotiation cycles.</li> <li>Investment programming must be on a sustained basis.</li> <li>Investment programming must</li> </ul>	<ul style="list-style-type: none"> <li>Project preparation is centralized at the NLAs</li> <li>Project preparation capabilities at the regional level has to be developed at the LGUs and RLAs</li> <li>Project preparation must</li> </ul>	<ul style="list-style-type: none"> <li>It is government policy not to subsidize government corporations that provide basic utilities such as power and water.</li> <li>It is government policy to dismantle government monopolies in the provision of basic infrastructure and services.</li> <li>It is government policy to partner with the private sector in the provision of key infrastructure (PPPs).</li> <li>The need for some form of metro-wide management of some urban services such as traffic, drainage, sewerage, etc has been recognized.</li> </ul>

	Planning and Coordination	Investment Programming	Project Preparation	Implementing Bodies
	<p>capabilities.</p> <ul style="list-style-type: none"> <li>RDC needs to take more initiative in sub-regional planning and investment programming.</li> <li>LGUs need capacity building in terms of planning technology updates.</li> <li>RLAs need capacity building in terms of planning technology updates.</li> </ul>	<p>undergo constant updating.</p> <ul style="list-style-type: none"> <li>Investment programming must include capacity building and institutional development.</li> <li>Investment programming must include the role of the private sector and civil society.</li> </ul>	<p>be a sustained activity at the LGU and RLA levels.</p> <ul style="list-style-type: none"> <li>The reason why some projects from Congress initiatives have problems is because of inadequate project preparation (because there is no such capability at the local/regional levels of government).</li> <li>Consulting firms have a role to play in project preparation.</li> </ul>	<ul style="list-style-type: none"> <li>It is government policy to devolve governance. A metro-wide management body must build up and not diminish the mandates of LGUs listed in the Local Government Code of 1991.</li> <li>A metro-wide management body must be acceptable by the concerned political leaders.</li> <li>Strong leadership/champion (political or private) is needed to orchestrate metro-wide management of development in order to put in check parochial interests.</li> <li>Development bodies come and go. The survivors are observed to have clear and strong legal mandates, clear purpose and a structure that matches the purpose. The survivors also evolve over time adjusting to changing conditions and purpose of the organization.</li> <li>The trend to decentralize development initiatives have waned over the years.</li> </ul>

Source: JICA Study Team.

8.9 There are also secondary planning activities being undertaken simultaneously by the LGUs of Metro Cebu, the Regional Line Agencies (RLAs) such as DWPH, DENR, DILG, etc. DOTC, however, has no unified regional presence, but fragmented into its line and attached agencies. Occasionally, special-purpose planning activities occur, such as the Study of Cebu Integrated Area Development Master Plan (1994), Metro Cebu Land Use and Transport Study (MCLUTS, 1981), and the MDCDB/JICA Visioning Study (2013).

8.10 Regional, urban, or area-focused initiatives have not really deepened despite more than three decades of attempts and decentralization policies. This is because of the absence of regional budgeting. While the approval of the RDC (and NEDA Region 7) is needed for inclusion of development projects in the capital investment program of the national government, the final decision on priorities lie in the central offices of the RLAs. Appropriations are enacted annually, whereas investment programs require a multi-year budget. As required by law, the LGUs have formulated their respective land use plans and controls. They are generally paper plans, i.e., complied with on paper but more often powerless suggestions.

8.11 The implementation of projects, particularly those with infrastructure mandate, is carried out by the NLAs via the creation of ad hoc Project Management Offices (PMOs). There are few instances of programmatic execution (i.e., multi-sector projects with integrated budget/funding). The first example of such area-wide planning and execution is the Bicol River Basin Development Project, circa 1975. A similar endeavor was the CVURPO (created under EO 694), the Metro Cebu Development Council for the Metro Cebu Development Project I to III, and the Central Visayas Regional Projects Office for the Cebu Hillyland Project (EO 907). To put some continuity and replicate analogous programs, a National Council for Integrated Area Development was created in 1978, but subsequently abolished in 1988.

8.12 Based on precedence, funding and execution of multi-sector projects is still possible under present conditions. The pre-condition is a program loan from an ODA entity (such as JICA and ADB), where the lender insists on a single-point of accountability. In

such a case, the lead agency (where most of the loan amounts would be channeled) can form a PMO for implementation coupled with the formation of a Project Steering Committee. The membership in the Committee shall come from the agencies involved, and could include private sector members. The joint PMO shall be staffed by direct-hire contractual personnel plus secondment of organic personnel from participating agencies.

### **8.3 Needs for Metropolitan Governance in Metro Cebu**

8.13 Rapid urban growth has been observed throughout the globe and particularly in Asia in the last decades.<sup>2</sup> Metro Cebu has shown a population growth of around 2.8% per year, higher than those of the national average as well as Metro Manila in the last two decades. The population growth and expansion of urban areas in the last decades have raised the needs for metropolitan governance in Metro Cebu. In Metro Cebu, urban population accounts for 80% according to the Population Census of 2010 and urbanized area is estimated at about 15.1% of total land in 2014.<sup>3</sup> Though the demographic trend indicates a declining population growth in the core city of Cebu, the suburban areas are experiencing sprawl. The adjacent LGUs such as Consolacion, Liloan, and Lapu-Lapu are growing rapidly at more than 4% per year. Population density of the inner cities such as Mandaue has reached more than 100 persons per hectare.<sup>4</sup>

8.14 As a result of such rapid growth, various development issues have appeared or are anticipated in Metro Cebu. It is anticipated that the living environment of the inner cities of Cebu and Mandaue has started declining due to congestion, while suburbanization is accelerated in surrounding cities and municipalities with increasing subdivision development. Traffic congestion and longer commuting time have become a daily concern of people. Development of roads and infrastructure and public services provision hardly match the demand generated by the expansion of the urban areas. The planners of the surrounding LGUs identified rapid population inflow, a lack of social housing and increase of informal settlements as development issues, and pointed out the need for development control.<sup>5</sup>

8.15 These problems and issues are not solved by separate action of each LGU, due to their characteristics of economic and spatial interconnectedness and interdependence. Thus, metropolitan governing institutions to guide and regulate development are urgently required for an integrated and balanced development of Metro Cebu. In particular, there are six areas identified where interventions are required at the metropolitan level. The following sections discuss each of the following issues in detail:

- (i) Coordination of development planning (especially land use) and growth management;
- (ii) Transport planning and traffic management;
- (iii) Affordable housing (for low-income households);
- (iv) Disaster risk reduction and environmental management – flood control, water resource management, and solid waste management;
- (v) Enhancing competitiveness; and
- (vi) Strengthening public finance and project financing.

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<sup>2</sup> Kenneth Newton, "Metropolitan Governance," *European Political Science* 11 (2012), 409-419; Aprodicio A. Laquian, "The Planning and Governance of Asia's Mega-Urban Regions" (United Nations Expert Group Meeting on Population Distribution, Urbanization, Internal Migration and Development, New York, January 21–23, 2008).

<sup>3</sup> Urban area data from JICA Study Team, Interim II Report (2014).

<sup>4</sup> National Statistics Office, Housing and Population Census 1990, 2000, and 2010.

<sup>5</sup> JICA Study Team, Interim II Report (2014).

## **(1) Coordination of Planning and Development for Growth Management**

8.16 Coordination of planning and development is critical in order to address the development issues mentioned above, and achieve a balanced growth of Metro Cebu. The fact that there is only limited area available for development in Metro Cebu due to protection areas and high risk of disaster further increases the importance of coordination of planning and development for the sake of environmental management.

8.17 Particularly, land use and transport planning must be coordinated for the balanced growth of Metro Cebu. In the Philippine planning system, CLUPs are prepared by LGUs. A CLUP is a long-term physical development plan entailing policies of settlement, protection land, production land, and infrastructure, of which the planning period is usually 10years.<sup>6</sup> Not all the LGUs in Metro Cebu have effective CLUPs. Because there had been no coordination efforts of their plans until the MDCDB initiated land use coordination workshops, their land use policies are inconsistent and a number of similar or overlapping projects, such as reclamation and port development are proposed by the LGUs. Hence, coordination of land use, transportation, and infrastructure among the LGUs in Metro Cebu is essential for more effective use of limited resources of the LGUs, provision of better basic services, and improved competitiveness.

## **(2) Transport and Traffic Management**

8.18 Needless to say, transport planning and management is a key component to be considered in metropolitan governance, for the sake of balanced growth and improvement of competitiveness. Since the transport network determines the future urban structure of Metro Cebu and affects development of more or less all the LGUs, public transport such as mass rail transit system specifically and road networks should be deliberated from the aspects of the metro-wide competitive strategy and land use policies of each LGU.

8.19 Traffic management is required, since traffic congestion within and toward the core cities is one of issues which need a collaborative action at the metropolitan level. Currently, each LGU is responsible for traffic management in their jurisdiction. The traffic management systems of the two core cities of Cebu and Mandaue are not integrated. Similarly, operation of public utility vehicles (i.e., jeepneys) is also delegated to the LGUs, which results in inefficient and inconsistent operation at the boundaries of the LGUs. A small step like traffic management, such as coordination of operation of traffic signals and information of traffic congestion, which could expect quick results in the traffic situation, would be a good first action to initiate metropolitan level coordination and cooperation.

## **(3) Affordable Housing for Low-Income Households**

8.20 Meanwhile, good quality and sufficient quantity of affordable housing should be strategically developed, together with transport development to reduce the backlog of housing and fulfill increasing demand from the population growth. Future residential areas will be located in the hazard free areas, and be identified in the land use plan in order to prevent unregulated development in steep slope or environmentally sensitive areas.

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<sup>6</sup> Department of the Interior and Local Government, Bureau of Local Government Development, A Rationalized Local Planning System in the Philippines, 1st Edition (2008).

8.21 The locations of affordable housing development should be carefully examined in relation with transport planning and future land use. Considering the limited land for development in Metro Cebu, efficient use of land should be promoted in the urban centers by densification such as high-rise housing in mixed-use development. Affordable housing for low-income families should be incorporated in transit-oriented development (TOD) together with development of mass rail transit to reduce traffic flows and vehicle dependency. The housing development entailing mixed housing types for the affordable and the high-end in TOD model would be a good candidate for the public-private partnership projects.

#### **(4) Disaster Risk Reduction and Environmental Management: Flood Control, Water Source Protection, and Solid Waste Management**

8.22 The Philippines is one of the most disaster-prone countries in the world. The still vivid memory of Super typhoon Yolanda in 2013 calls for integrated disaster risk reduction and management at the metropolitan level in preparation for mega disasters. Among disasters, flood is the most serious one affecting Metro Cebu. Flooding is getting more severe and more frequent every year and the inundation areas are expanding, due to the poor or lack of drainage system, clogging, and slow runoff and declined capacity of water flow in rivers and culverts. The drainage plans which were separately prepared by each LGU without coordination with neighboring LGUs and catchments lead to incompatible designs of the drainage systems. Hence, a required action for metropolitan management identified with flood control is firstly to harmonize the LGUs' drainage plans.<sup>7</sup>

8.23 Environmental management is a quintessential field proposed for metropolitan management because of externality issues. In the case of Metro Cebu, the major issues with respect to environment include watershed management such as enforcement of land use control over subdivision development in watershed areas, a metro-wide water use and development strategy, regulation of pollutions such as prevention of contamination of water, and waste water management. Development control of watershed is not only important for flood control but also critical for water supply in Metro Cebu, in order to improve the water retaining capacity and the recharge rate of groundwater, which is the main water source there. Despite increasing water demand, salinity intrusion and contamination of groundwater are already reported. The projection of water demand and supply in this study shows that water demand will exceed the supply by 2020. Because water scarcity has been the longstanding major development issue in Metro Cebu, integrated measures should be taken for preservation of water resources and development. Meanwhile, wastewater management also has to be promoted at the metro level to prevent contamination of aquifers and seawater.<sup>8</sup>

8.24 The analysis of the solid waste management in Metro Cebu in the Interim II Report identifies a need for metro-wide solid waste management. The report points out inefficient and irrational practices of development of multiple small-scale sanitary landfills by LGUs. Although LGUs are mandated to complete solid waste treatment within their jurisdictions, not many LGUs have financial and technical capacities for the

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<sup>7</sup> JICA Study Team, Interim II Report (2014).

<sup>8</sup> For detailed discussion on drainage, water supply, and waste water management, see JICA Study Team, The Roadmap Study for Sustainable Urban Development in Metro Cebu, Interim II Report (2014).

operation of sanitary landfills. The current institutional setup for solid waste management in Metro Cebu is based on municipal cooperation in which the LGUs prepared ad hoc MOUs among themselves concerning conditions of usages of sanitary landfills, transport routes and contracting out to private service providers such as garbage collection and recovery. In Metro Cebu, independent cities such as Cebu, Mandaue, and Lapu-Lapu are not under the supervision of the Provincial Solid Waste Management Board, which are responsible for coordination of solid waste management by LGUs. Therefore, it is suggested to develop a metro-wide sanitary landfill and establish a Metro Cebu solid waste management institution.

## **(5) Competitiveness**

8.25 Competitiveness of a metropolitan area matters to survival in the globalized world. Although Metro Cebu, the second largest urban area in the Philippines, has been an attractive destination of FDI due to its endowment of highly skilled labor and tourist resources, deterioration of the urban environment and insufficient infrastructure could bring about adverse impacts on its competitiveness.

8.26 The macroeconomic situation in the last decade has provided a favorable environment for Metro Cebu. In the 1990s, Metro Cebu attracted FDI into the Mactan Economic Zones, taking advantage of the existence of international gateways such as the Mactan Cebu International Airport and the seaport. After a decade, increase of labor costs in China and other countries in Southeast Asia, and development of the IT industry enhanced the attractiveness of Metro Cebu because of its abundant and relatively cheap well-educated English-speaking human resources and the national policy to promote IT and knowledge-based industry.<sup>9</sup>

8.27 However, due to the lack of a metropolitan level strategy for economic development, these economic infrastructures are developed independently without linking it with the regional strategy. Various SEZs including manufacturing and the BPO industry have been important industrial bases of the Metro Cebu economy. Not many policies for strengthening competitiveness of Metro Cebu are found outside SEZs. According to a PEZA officer, firms in SEZs rarely establish business relationships with those outside the zones. Thus, there exist only weak industry connections between enterprises in SEZs and outside firms. Similarly, the input-output table shows that BPO brings about only limited impacts on other industries.<sup>10</sup> A metropolitan strategy for economic competitiveness is necessary in order to compete with not only Metro Manila but also other mega cities in Asia. Taking advantage of the current economic assets, more proactive strategic policies should be sought, including the development of industrial clusters to connect SEZ firms with firms outside SEZs and other knowledge industry based BPO.

8.28 For example, Melbourne's "Globalisation, Competitiveness and Metropolitan Strategy" identified economic drivers in terms of three factors, namely economic bases of knowledge (quality access), production (low cost), and resource (low risk). They include development of industry clusters, provision of institutional support, political stability and leadership, entrepreneurial and collaborative culture, low incident of corruption, streamlined legal framework, adequate and skilled human resources, and

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<sup>9</sup> JICA Study Team, Interim II Report (2014).

<sup>10</sup> Nedelyn Magtibay-Ramos, Gemma Estrada and Jesus Felipe, "An Input-Output Analysis of the Philippine BPO Industry," *Asia-Pacific Economic Literature* Vol. 22, Issue 1, (2008), 41–56.

efficient infrastructure, etc.<sup>11</sup> For promotion of a metro-wide competitiveness strategy, competitive advantages and weaknesses of Metro Cebu should be evaluated as benchmarks in comparison with other global cities.

## **(6) Needs for Fiscal Improvement and Project Financing**

8.29 Due to rapid population growth and expansion of urban areas, there are high needs for investment in infrastructure development in metropolitan areas. In developing countries, the required investment need in infrastructure is estimated at about 5% of GDP.<sup>12</sup> Moreover, global competition pushes metropolitan areas to improve amenities by providing parks and cultural facilities, in addition to basic infrastructure such as transportation, water supply, etc. The demand for public spending is also increased by purposes of redistribution and correction of negative externalities including social housing and environmental management.<sup>13</sup> Metro Cebu is no exception from such cases. A mounting task ahead in development of infrastructure such as public transport system, water supply, and drainage networks calls for improvement of fiscal capacities and development of innovative tools to finance infrastructure in the region.

8.30 Although what types of fiscal tools are available at the metropolitan level depends on the institutional design of metropolitan governance, at first, fiscal capacity of the LGUs in the region should be improved by raising local tax collection rate such as property taxes, user charges and fees. Non-property taxes, such as business taxes, motor vehicle taxes, and carbon emission taxes may be introduced within the core cities. User charges have advantages in improving efficiency and from the user pay principle. Inter-governmental transfers would be one option to address redistribution and externality issues.<sup>14</sup> Figure 8.3.1 to Figure 8.3.3 present the current fiscal status of the LGUs in Metro Cebu. The best practices in Metro Cebu and other areas should be promoted throughout the region. For example, Mandaue has a GIS-based tax collection system which could be expanded to the other LGUs.

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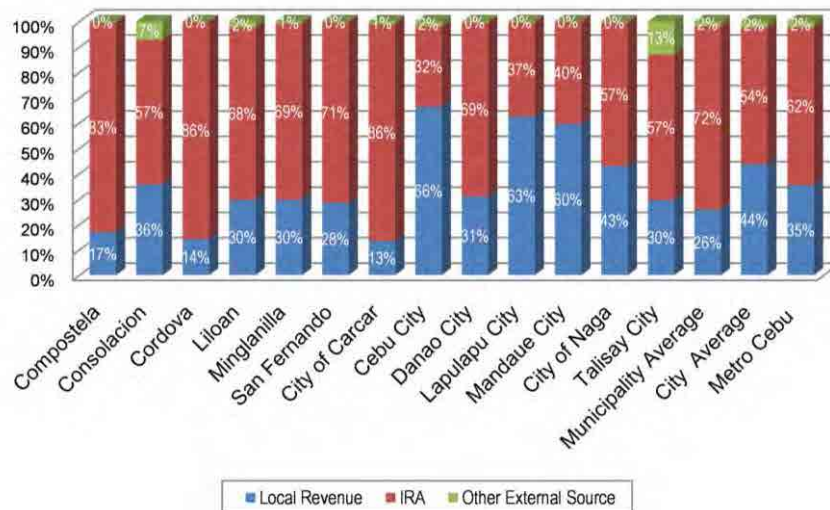
<sup>11</sup> Department of Infrastructure, Victorian Government, *Globalisation, Competitiveness and Metropolitan Strategy: Planning Melbourne for the 21st Century*, Technical Report 3 (2000).

<sup>12</sup> Gregory K. Ingram, Zhi Liu, and Karin L. Brandt, "Metropolitan Infrastructure and Capital Finance" in *Financing Metropolitan Governments in Developing Countries*, ed. Roy W. Bahl Johannes F. Linn, and Deborah L. Wetzel (Cambridge, MA: Lincoln Institute of Land Policy, 2013).

<sup>13</sup> Roy W. Bahl, Johannes F. Linn, and Deborah L. Wetzel, "Governing and Financing Metropolitan Areas" in *Financing Metropolitan Governments in Developing Countries* (2013); Richard M. Bird and Enid Slack, "Metropolitan Public Finance: An Overview" in *Financing Metropolitan Governments in Developing Countries* (2013).

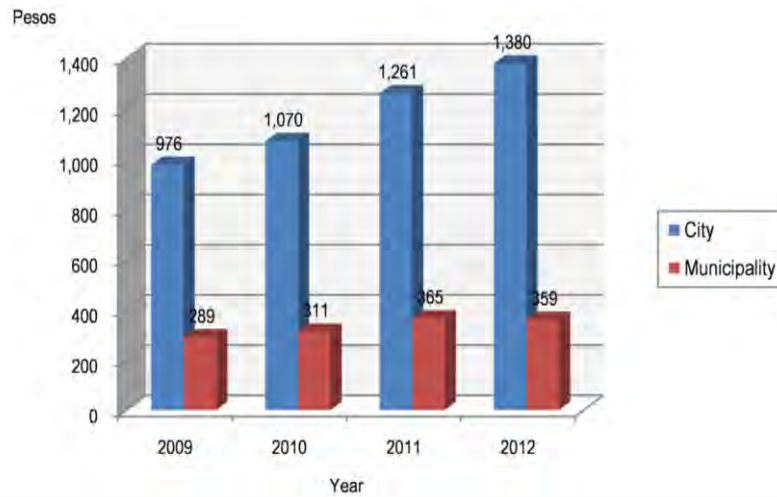
<sup>14</sup> *Ibid.*





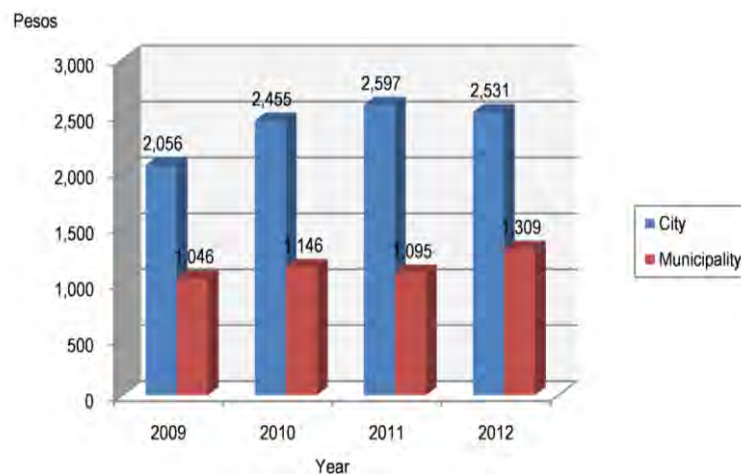
Source: LGUs in Metro Cebu.

**Figure 8.3.1 Share of Local Revenue, IRA and Other External Sources to Total Revenue in 2012**



Source: LGUs in Metro Cebu.  
 Note: The data of 2009 do not include Lapu-Lapu City data.

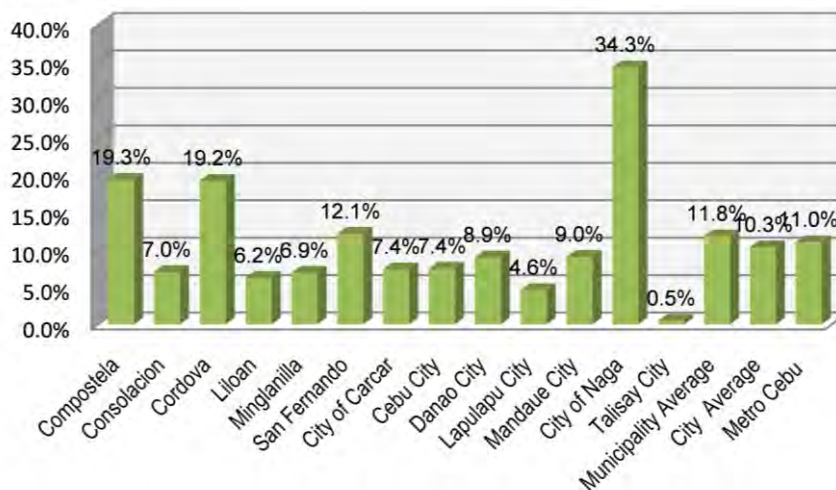
**Figure 8.3.2 Local Revenue Per Capita by City/ Municipality, 2009-2012**



Source: LGUs in Metro Cebu.  
 Note: The data of 2009 do not include Lapu-Lapu City data.

**Figure 8.3.3 Total Expenditure Per Capita by City and Municipality, 2009-2012**

8.31 Infrastructure development requires a large capital investment which often exceeds the financial and technical capacities of the LGUs to implement it (see the current capita investment share of LGUs in Figure 8.3.4). The potential financial tools for capital investment projects may include borrowing, intergovernmental transfer, ODA, special district or single-purpose districts, development charges/ taxes, PPP, and enterprises, in addition to own sources. Nevertheless, it is not an available option for local governments in developing countries to borrow from international and domestic bond markets and often the central government has to back up the local government bonds.<sup>15</sup>



Source: LGUs in Metro Cebu.

**Figure 8.3.4 Share of Capital Investments to Total Revenue, 2012**

8.32 Among them, the creation of enterprises has advantages in reducing the financial risk of local governments. For example, Chinese local government founded local investment corporations for management and financing of infrastructure projects, taking public land and utility firms as starting assets.<sup>16</sup> On the other hand, in Japan, a number of public and social housing projects were constructed by semi-public development corporations or under PPP arrangement, often together with mass rail transit development or redevelopment of central business districts (CBDs). These approaches combined with real estate development in cooperation with the private sector may be a good approach for Metro Cebu where the housing backlog is accumulated and demand for housing is expected to increase in the future. These financial tools for capital investment programs should be carefully explored in Metro Cebu to encourage infrastructure investment.

## 8.4 Models of Institutions for Metropolitan Governance

8.33 This section will explore different models of metropolitan governance institutions in search of appropriate models for Metro Cebu. At first, the theoretical framework and global trend of metropolitan governance will be discussed. Based on the theoretical framework, this section presents metropolitan governance models and analyzes characteristics of each model through case study. The issues of institutional process will be analyzed in a succeeding section as well.

<sup>15</sup> Ibid.

<sup>16</sup> Ingram, Liu, and Brandt, "Metropolitan Infrastructure and Capital Finance" in Financing Metropolitan Governments in Developing Countries (2013).

## 1) Theoretical Framework for Metropolitan Governance<sup>17</sup>

8.34 Metropolitan regions across the globe have sought appropriate metropolitan governance mechanisms since urbanization started in the 20th century, in order to respond to various needs and problems appearing in the rapidly changing metropolises. As a result of experiences and research, three approaches to metropolitan governance have emerged: consolidation model, fragmentation model, and new-regionalism model.<sup>18</sup>

8.35 The consolidation model aims to establish a metropolitan government body by merging municipalities or introducing a new overarching institution in a metropolitan region. The assumption underlying this model is that numerous local government bodies in the region undermine efficient delivery of public services and result in inconsistent policies between municipalities. The size of local governments is usually too small to achieve economies of scale in public service delivery. Segregation of workplace and residence between core cities and suburban municipalities not only generates a disparity in tax bases and financial burden among local governments but could also worsen socioeconomic inequality and segregation. Elected officials of each locality are often swayed by parochial interests of their own constituents, while neglecting acting upon metro-wide issues such as land use, public transportation, and environment. Thus, a consolidated metropolitan government body is proposed to resolve a dilemma among local governments and achieve economic efficiency and more equitable and balanced development.<sup>19</sup>

8.36 The second approach, the fragmentation model, is derived from public choice theory. In particular, Tiebout's famous model of "voting with their feet" encourages regional fragmentation for improved public service provision and democracy through creation of market-like competitions among local governments. In the fragmentation model, local autonomy in a decentralized setting enables local government bodies to provide a diverse set of public services in order to satisfy the constituents' needs and interests. Responding to such differentiated public services among localities, residents move from one municipality to the other where they feel more satisfied with the services in terms of the amount of taxes they paid. This mechanism leads to improved efficiency in public service provision through a better match between articulated residents' preferences and a set of the services provided. The competition in attracting residents and firms which emerge among local governments requires better responsiveness of the governments and eventually promotes democracy and self-governing at the local level, with proximity between the government and people required to make this system work. In the fragmented model, local governments voluntarily seek for inter-municipal cooperation on public service provision for efficiency.<sup>20</sup>

8.37 Until the 1990s, these two theses dominated the discussion on metropolitan governance. Yet, both of the two approaches have their pros and cons. The consolidation model of a metropolitan government body is criticized for bureaucratic inefficiency and distance from the residents. The attempts to create consolidated government bodies indeed ended unsuccessful in Western Europe in the 1970s. Though the fragmentation model is more prevalent in the U.S., decentralization in Asia, which was introduced in the

<sup>17</sup> This section primarily relies on discussion of the articles of Kübler (2012) and Sellers and Hoffmann-Martinot (2008).

<sup>18</sup> Daniel Kübler, "Introduction: Metropolitanisation and metropolitan governance," *European Political Science: EPS* 11 (2012), 402–408; Jeffrey Y. Sellers and Vincent Hoffmann-Martinot, "Metropolitan Governance" in *Decentralization and Local Democracy in the World: First Global Report by United Cities and Local Governments*, ed. United Cities and Local Governments; World Bank. (Washington D.C.: United Cities and Local Government and the World Bank, 2008), 254–279.

<sup>19</sup> *Ibid.*

<sup>20</sup> *Ibid.*

1990s with democratization in the Philippines and Indonesia, pushed fragmentation of governance. The existence of too many local governments, however, has become a major concern in inefficiency of public services after introduction of decentralization policy.<sup>21</sup> The public choice-fragmented model of metropolitan governance is also attacked for issues of equity, and spillover effects of segregation and sprawl.<sup>22</sup>

8.38 Mediating the aforementioned two approaches, the third approach to metropolitan governance--the new regionalism model--had appeared in the last two decades. Against a background of accelerating globalization and conceptual shift from government to governance, the new regionalism model proposes an alternative metropolitan governance of more flexible, localized policy-focused networks and cooperation. This is a hybrid model to respond to the criticism against inefficiency and undemocratic nature of a metropolitan government as well as to deal with the problems of hyper fragmentation of local governance. Globalization in economic landscape and the development of the concept of new public management such as “steering” government also supported the appearance of the new regionalism model of metropolitan governance.<sup>23</sup> According to Sellers and Hoffmann-Martinot, the model of new regionalism is characterized by (i) pragmatic arrangements, (ii) application of the existing sub-region government body for metropolitan governance, (iii) enhancement of democratic legitimacy, (iv) primacy of mission over management, such as planning, coordination, and integration of policies of local governments, and (v) cooperation with the private sector. Kübler additionally points out that even in a politically highly fragmented region, certain power-sharing mechanism can initiate consensus-based decision making at the metropolitan level under the new regionalism model.<sup>24</sup> The concept of the new regionalism model has become popular in the theory as well as practices of metropolitan governance in the world.

## 2) Institution Models for Metropolitan Governance

### (1) Institution Models for Metropolitan Governance<sup>25</sup>

8.39 Metropolitan governance institutions are broadly divided into two models: (i) metropolitan authority model, which is to establish a certain form of formal authority covering a metropolitan area, and (ii) inter-municipal cooperation model, which is to manage metropolitan issues and development through inter-municipal cooperation. Four models of metropolitan governance institutions are presented in Table 8.4.1. The monosectoral authority (or special district) model is added as part of the metropolitan authority model. The inter-municipal model is divided into inter-municipal association model and inter-municipal agreement model. Each model is characterized by five attributes as described below.

#### 8.40 Key Characteristics of Metropolitan Government Models

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<sup>21</sup> Laquian, “The Planning and Governance of Asia’s Mega-Urban Regions”; Eduardo Rojas, “Introduction: The Metropolitan Regions of Latin America: Problems of Governance and Development,” in *Governing the Metropolis: Principles and Cases* ed. Eduardo Rojas, Juan R. Cuadrado-Roura, and José Miguel Fernández Güell (Washington D.C.: Inter-American Development Bank, 2008).

<sup>22</sup> Michael Howell-Moroney. “The Tiebout hypothesis 50 years later: Lessons and lingering challenges for metropolitan governance in the 21st century,” *Public Administration Review* 68 (2008), 97-109.

<sup>23</sup> Kübler, “Introduction: Metropolitanisation and metropolitan governance”; Sellers and Hoffmann-Martinot. “Metropolitan Governance”; Brenner Neil, “Decoding the Newest “Metropolitan Regionalism” in the USA: A Critical Overview,” *Cities* 19 (2002), 3-21.

<sup>24</sup> Kübler Daniel, “Governing the Metropolis: Towards Kinder, Gentler, Democracies,” *European Political Science: EPS* 11 (2012), 430-445.

<sup>25</sup> The discussion of section 8.4 2) is based on: Jeroen Klink, “Recent Perspectives on Metropolitan Organization, Functions, and Governance,” Christian Lefevre “Democratic Governability of Metropolitan Areas,” and Richard Bird and Enid Slack, “Fiscal Aspect of Metropolitan Governance” in *Governing the Metropolis: Principles and Cases*.

- (a) **Territorial Match with Metropolitan Areas:** Whether or not the territory of a metropolitan governance institution matches the boundary of a metropolitan area.
- (b) **Multipurpose:** What types of functions/ tasks is a metropolitan governance institution responsible for?
- (c) **Political Legitimacy:** How does a metropolitan governance institution obtain political legitimacy?
- (d) **Financial Resources:** What types of financial resources does a metropolitan governance institution have?
- (e) **Intergovernmental Relationships:** How are intergovernmental relationships between a metropolitan governance institution and central/ regional/ provincial/ local governments?

8.41 In the real world, however, metropolitan regions develop a variety of forms of governance. As many scholars agree, selection of a governance model highly depends on the local situations, namely a constellation of local and central politics, history and culture, economic composition, civil society, relationships between local and central governments, etc., rather than design of the model itself.<sup>26</sup> Moreover, institution building of metropolitan governance is a long process and the form of metropolitan governance evolves as time goes by.

**Table 8.4.1 Institution Models for Metropolitan Governance**

Models	Metropolitan Authority Model		Inter-municipal Cooperation Model	
	Metropolitan Authority	Monosectoral Authority/ Special District	Inter-municipal Association	Inter-municipal Agreement
Territorial Match with Metropolitan Area	Matched	Not always	Not always	No
Multipurpose	Multi-purpose	Mono-purpose	Multi-purpose	Multi-/ Mono-purpose
Political Legitimacy	Direct/ Indirect	Indirect	Indirect	Indirect
Financial Resources	Own resources/ central/ provincial government	Own resources/ central/ provincial government	Provincial / local government	Local government
Intergovernmental Relationships	Autonomous/ part of provincial government	Autonomous/ part of central/ provincial government	Association of local governments	Selected local governments
Examples	<ul style="list-style-type: none"> <li>• Madrid</li> <li>• Greater London Authority</li> <li>• Vancouver</li> <li>• Portland</li> <li>• Metro Manila Development Authority</li> </ul>	<ul style="list-style-type: none"> <li>• Transport authority</li> <li>• Special district (water, drainage and sewerage, school, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Bologna</li> <li>• Metro Naga Development Council</li> </ul>	<ul style="list-style-type: none"> <li>• Law No. 662 of 1996 for joint-planning in Italy</li> <li>• Various cases in the U.S.</li> </ul>

Source: JICA Study Team, developed based on Rodriguez and Oviedo (2001) in Klink (2008) and Lefevre (2008).

## (2) Metropolitan Authority Model

### (a) Metropolitan Authority

8.42 The metropolitan authority model is basically to create a new form of government body for metropolitan management. In general, this is to transform a two-tier government structure in which a “supramunicipal” government is created above the local governments, since not many local governments and citizens

<sup>26</sup> Daniel Kübler, “Problems and prospects of metropolitan governance in Sydney: towards ‘old’ or ‘new’ regionalism?” (Kensington, NSW: City Futures Research Centre, University of New South Wales, 2005); Klink, “Recent Perspectives on Metropolitan Organization, Functions, and Governance”; Lefèvre, “Democratic Governability of Metropolitan Areas.”

agree with amalgamation of municipalities.<sup>27</sup> A metropolitan authority is established to cover the entire metropolitan area where the authority is responsible for development planning, economic development, land use, transportation, environmental management, public and social services, etc. The authority has its own financial resources from taxes, user charges, and other revenues and transfer from the central government. Strong political legitimacy can be established through direct election of a leader and council members of the authority. The authority can be autonomous or founded under a regional government, such as a province. Establishing a metropolitan authority is a typical practice for metropolitan management, which has been adapted in urban areas all over the world. However, it has been criticized for inefficiency and ineffectiveness in public service delivery and other expected roles.

8.43 A type of a metropolitan government also varies from strong to weak depending on what attributes an authority poses. Recently, a new type of “weak” authority, for example which does not have functions of project implementation or relies on consensus of local government, has become more prevalent than a “strong” authority with autonomy and responsibilities covering most government functions.<sup>28</sup> An example of a strong metropolitan government is Comunidad Autónoma de Madrid (CAM), while the examples of weak institutions include the Greater London Authority, Metro Vancouver, the Metropolitan District of Portland, and the Metro Manila Development Authority.

**(i) Case I: The Greater London Metropolitan Governance**

8.44 In the case of London, the current Greater London Authority (GLA) was founded in 2000. It comprises the City of London and 32 London boroughs of which total population is about 7.6 million. The GLA consisting of the Mayor of London and the London Assembly who are directly elected, is a strategic regional authority, with powers over planning, transport, policing, economic development, housing, environment, health, fire and emergency planning, and culture (see Table 8.4.2). Three functional bodies—Transport for London, the Mayor's Office for Policing and Crime, and London Fire and Emergency Planning Authority—are responsible for delivery of the services in these areas. The planning policies of the Mayor of London are detailed in a statutory London Plan that is regularly updated and published.<sup>29</sup>

8.45 London originally had a two-tier system of local government, with the Greater London Council (GLC) sharing power with the City of London Corporation (governing the small City of London) and the 32 London borough councils. The GLC was abolished in 1986 by the Local Government Act 1985. This GLC was indeed more powerful than the GLA, which has limited autonomy due to the control of the central government providing the grant which accounts for about half of its budget. The GLC employed nearly 10,000 staff, compared with about 600 of GLA.<sup>30</sup> Thus, the GLA, as well as many of

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<sup>27</sup> Lefèvre, “Democratic Governability of Metropolitan Areas.” Exceptions include the cases in Canada, Melbourne and Adelaide in Australia, and Japan where several municipalities were merged to create a larger municipality often covering a metropolitan area.

<sup>28</sup> Lefèvre, “Democratic Governability of Metropolitan Areas.”

<sup>29</sup> The Greater London Authority. <https://www.london.gov.uk/>. [accessed in November 2013].

<sup>30</sup> The numbers of GLC and GLA staff are from Lefèvre, “Democratic Governability of Metropolitan Areas” and Kübler, “Governing the Metropolis: Towards Kinder, Gentler, Democracies.”

the current metropolitan government bodies, focused on setting policy directions and strategies, or the “steering” function, rather than implementation. However, such weakness of the GLA is somewhat compensated by a strong position of the mayor who is directly elected by citizens.<sup>31</sup>

**Table 8.4.2 The Greater London Model of Governance**

Service/Function	G London Authority	Boroughs
Education		✓
Housing	✓	
Planning applications		✓
Strategic planning	✓	
Transport planning	✓	
Passenger transport	✓	
Highways	✓	
Fire	✓	
Social services		✓
Libraries		✓
Leisure and recreation		✓
Waste collection		✓
Waste disposal		✓
Environmental health		✓
Revenue collection		✓

Source:[http://en.wikipedia.org/wiki/Greater\\_London\\_Authority](http://en.wikipedia.org/wiki/Greater_London_Authority) as of Oct 2014.

(ii) **Case II: The Metro Vancouver**

8.46 The Greater Vancouver region has a long history of metropolitan governance institutions. Going back to the beginning of the 20th century, two metropolitan-wide service districts for sewerage and drainage, and water were founded and the Greater Vancouver Regional District (GVRD) was created by the Province of British Columbia in 1965, based on the organization known as the Lower Mainland Regional Planning Board. In 2007, the GVRD adopted the name of Metro Vancouver to promote the “Vancouver brand” more effectively at national and international levels.<sup>32</sup> Metro Vancouver has an area of 2,877 km<sup>2</sup> and about 2.4 million population including from the core city of the metropolitan, the City of Vancouver with 600,000 population to the smallest municipality of about 1,000 population.<sup>33</sup>

8.47 Metro Vancouver is a federation of local governments, which has two statuses as a political body and corporate entity under the provincial legislation, and provides public services and formulates policies of 24 local government bodies,<sup>34</sup> through operation of four corporations, the Greater Vancouver Sewerage and Drainage District (GVS and DD), the Greater Vancouver Water District (GVWD), the Greater Vancouver Regional District (GVRD), and Metro Vancouver Housing Corporation (MVHC), a subsidiary of the GVRD.

8.48 In 2014, the Board consisted of 38 directors from each municipality who are elected from the municipal council members, i.e., a mayor and

<sup>31</sup> Kübler, “Governing the Metropolis: Towards Kinder, Gentler, Democracies.”

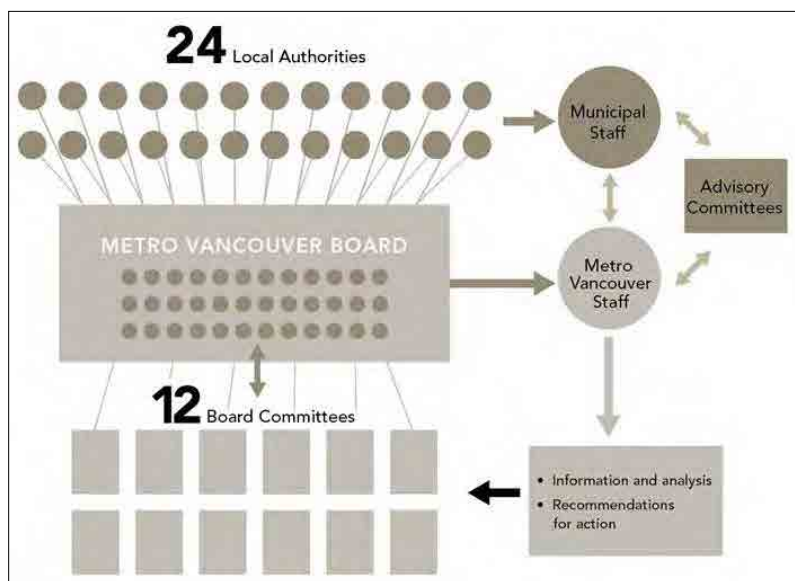
<sup>32</sup> Metro Vancouver.<http://www.metrovancouver.org/about/Pages/default.aspx>. [accessed in November 2014].

<sup>33</sup> Metro Vancouver. “Metro Vancouver Sustainability Framework” (Metro Vancouver, 2010).

<sup>34</sup> Including 22 municipalities, one First Nations (Aboriginal government), and one unincorporated municipality.

councilors, as shown in Figure 8.4.1. The number of directors allocated to each municipality depends on the municipality’s population. Each director is allowed one vote per 20,000 people in their municipality, up to a maximum of five votes. The schedule of board meetings starts in December, with elections of a chair and vice chair. After the inaugural meeting, the chair determines committees and their membership that implement the board’s business. The committees of the board examine priorities, policies and activities for the organization, and make recommendations to the Metro Vancouver Board which makes decisions. Currently there are 12 committees, e.g., water, sewage, etc.

8.49 Metro Vancouver has three roles to perform: core service provision, policy formulation, and arena of political forum. Table 8.4.3 below presents an overview of the sectors concerned in each role. It should be noted that regional economic development is not among them.<sup>35</sup>



Source: Metro Vancouver. <http://www.metrovancouver.org/about/Pages/default.aspx>. [accessed in November 2014].

**Figure 8.4.1 Metro Vancouver Structure**

<sup>35</sup> Metro Vancouver. <http://www.metrovancouver.org/about/Pages/default.aspx>. [accessed in November 2014].



**Table 8.4.3 Metro Vancouver’s Role in Regional Systems**

	Core Services	Policy	Political Forum
Water	✓	✓	✓
Sewerage	✓	✓	✓
Solid Waste	✓	✓	✓
Parks and Greenways*	✓	✓	✓
Housing	✓	✓	✓
Growth Management		✓	✓
Air Quality		✓	✓
Ecological Health		✓	✓
Food		✓	✓
Climate Change and Energy		✓	✓
Culture		✓	✓
Regional Emergency Management		✓	✓
Economic Development			✓
Labor Relations	✓		

Source: Metro Vancouver, 2010. Metro Vancouver Sustainability Framework.

Note: \* These are regional parks and greenways and do not include the many municipal parks in the region.

8.50 Metro Vancouver employs more than 1,200 staff.<sup>36</sup> The draft budget of 2015 is CAD657.1 million and Metro Vancouver is operated under a balanced budget. The capital expenditure is estimated at nearly half of the budget, or CAD341.8 million. The main revenue sources are mostly property taxes and user charges and fees: property taxes for parks, air quality, and regional growth planning (GVRD members), sewer levy (GVS and DD members), solid waste tipping fee (GVS and DD members), water sales (GVWD members), housing rents (MVHC members), external revenues, reserves and other sources. Water sales and sewer levy generates the two largest incomes, which account for 37% and 29%, respectively, and also receive the similar portions of the expenditure.<sup>37</sup> There are periodic contributions from higher levels of government for major construction projects.

8.51 The governance of Metro Vancouver is a collaboration model based on consensus among the local government bodies in non-hierarchical relationships.<sup>38</sup> Collaborative governance in Metro Vancouver has developed over a long time through joint-service provision and planning. The metro-wide growth management initiative has started in the 1970s and its aspiration produced the first plan for that purpose, “Livable Region Plan 1976/1986.”<sup>39</sup> This collaboration was initiated locally and supported by the province.<sup>40</sup> In the Canadian constitution, local governments are not autonomous but under the

<sup>36</sup> Metro Vancouver, <http://www.metrovancouver.org/about/Pages/default.aspx>. [accessed in November 2014].

<sup>37</sup> Metro Vancouver, “2014 Budget in Brief” (Metro Vancouver, 2013).

<sup>38</sup> Kellas Hugh, “Collaborative Governance for a Sustainable Metro Vancouver” in *Inclusion, collaboration and urban governance: challenges in metropolitan regions Brazilian and Canadian experiences*, ed. organizers: Terry McGee, Erika de Castro. (Vancouver: The University of British Columbia; Rio de Janeiro: Observatório das Metrôpoles; Belo Horizonte: Ed. PUC Minas, 2010); Shore Linda, “Overview of the Greater Vancouver Regional District” (International Experience of Metropolitan Management 2006 Report of Metropolitan Management Challenges in China, 2007); Patrick J. Smith, “Greater Vancouver: l’exception canadienne métropolitaine” (paper presented at international conference: Metropolitan Governance: Seeking Consistency in Complexity Montreal, Quebec, October 7-8, 2004).

<sup>39</sup> Cameron Owens, “Challenges in Evaluating Livability in Vancouver, Canada” (Case study prepared for Planning Sustainable Cities: Global Report on Human Settlements, 2009).

<sup>40</sup> Smith. “Greater Vancouver: l’exception canadienne métropolitaine.”

province, they are sometimes called “creature of the province.” Canadian provinces have authority over regulation of local governments, including creation and amalgamation of them.<sup>41</sup> The province of British Columbia supported regional planning efforts covering neighboring municipalities from the 1940s and establishment of regional districts in the 1960s by the provisions. The GVRD was founded by the provincial legislation as a regional district, which is not a government but functional entity, for the anticipated competition with the province.<sup>42</sup>

8.52 Metro Vancouver’s collaborative governance is recognized internationally and the region won the title of one of the most livable cities in the world. Three key factors are identified for successful collaborative governance, including relationships between Metro Vancouver and governments, clear decision-making process and accountability in legislation and formal agreements, and political leadership. Metro Vancouver established long-term and strong partnerships with the municipalities. According to Shore of the GVRD, such strong partnerships are derived from:

- services being delivered by those entities that possess the required degree of technical expertise and those that have the legislative responsibilities;
- service delivery that balances social, economic and environmental priorities;
- sensitivity to local municipal issues;
- all members benefiting from joint borrowing on collective credit;
- every municipality having a voice at the table;
- thorough and inclusive approach to decision-making;
- a unified approach to dealing with senior governments; and
- the regional board balancing parochial.<sup>43</sup>

8.53 This model is, however, not without flaws. The limitations or weaknesses of the collaborative governance are identified: relationships with the province, weak implementation and mixed outcomes in growth management, time consuming process for consensus building, and the issue of accountability. Because of neglected relationship building and partly due to the authority of the province, Metro Vancouver has not built collaborative relationships with the province. A lack of good coordination with the province are manifested in inconsistency found between Metro Vancouver’s land use plan or growth policy and the transport policy of the Greater Vancouver Transportation Authority (TransLink) under the supervision of the province. The province’s roles which significantly affect Metro Vancouver’s functions include: (i) sets Metro Vancouver’s governance arrangements, (ii) approves regional plans for liquid and solid waste, (iii) sets environmental standards, and (iv) provides important regional services like highways, public transit and protection of agricultural land.<sup>44</sup>

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<sup>41</sup> Robert Yong, “Multilevel Governance and Public Policy in Canadian Municipalities: Reflections on Research Results” (presented at the panel on The Politics of Multilevel Governance Canadian Political Science Association Victoria, June 6, 2013), 1.

<sup>42</sup> Smith. “Greater Vancouver: l’exception canadienne métropolitaine.”

<sup>43</sup> Shore Linda. “Overview of the Greater Vancouver Regional District.”

<sup>44</sup> Kellas, “Collaborative Governance for a Sustainable Metro Vancouver”; Smith, “Greater Vancouver: l’exception canadienne

8.54 Secondly, Metro Vancouver's consensus based-collaboration model lacks an implementation mechanism. The enforcement of the Regional Growth Strategy relies on the municipalities' land use regulation and control, and development of transport networks by TransLink. Nevertheless, the municipalities do not necessarily follow the Strategy but prefer seeing expansion of development in their jurisdiction. In Canada, the financial bases of municipalities are limited; approximately 50% of their income comes from property taxes.<sup>45</sup> However, Metro Vancouver does not provide any financial support to the municipalities in implementation of the growth management policy. In addition to the issues in the transport policy, agricultural land, an important green land, should be coordinated with the province.<sup>46</sup> Thus, various evaluations of growth management indicated more or less mixed outcomes. Moreover, because the collaborative governance relies on informal consensus, enforcement of regional policy requires enactment of legislation by the province or any other formal agreements with local governments and other organizations. The weak collaboration between Metro Vancouver and the province also matters here. Legislative relations with the province are often described as "unilateral."<sup>47</sup>

8.55 As a consensus-based, collaborative federation, it takes considerable time to find solutions which satisfy all of its members. Very high levels of agreement and commitment are required by participating municipalities in Metro Vancouver on policy and actions.<sup>48</sup> Though one point of view considers that bottom-up solutions and policies are more likely implemented, because of consensus and less ambitious goals, there is a risk that the mixed outcomes of the policy implementation may discourage people to participate in a lengthy planning process.<sup>49</sup>

8.56 Finally, the issue of accountability gradually came up with the expansion and complexity of responsibilities of Metro Vancouver. The growth of the region and organization in terms of population, responsibilities, and complexity of tasks obscure who is responsible for and doing what in the eyes of citizens. It also touches an efficacy of this model: whether or not the collaboration model contributes efficiency when the region grows further. Another concern is the political legitimacy of Metro Vancouver, such as political representation, because unlike the Greater London Authority led by a directly elected mayor, Metro Vancouver is run by the Board consisting of representatives of the local government bodies.<sup>50</sup>

### (iii) Case III: The Metro Manila Governance

8.57 Since 1975, there existed three metropolitan governance institutions for the management of Metro Manila. The first metropolitan authority in Manila was the Metropolitan Manila Commission (MMC), which was founded in 1975

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métropolitaine"; Ray Timalty, "Growth Management in the Vancouver Region" The Assessment and Planning Project BC Case Report No. 4 (2002).

<sup>45</sup> Yong, "Multilevel Governance and Public Policy in Canadian Municipalities: Reflections on Research Results."

<sup>46</sup> Timalty, "Growth Management in the Vancouver Region."

<sup>47</sup> Smith, "Greater Vancouver: l'exception canadienne métropolitaine."

<sup>48</sup> Kellas, "Collaborative Governance for a Sustainable Metro Vancouver."

<sup>49</sup> Timalty, "Growth Management in the Vancouver Region."

<sup>50</sup> Smith, "Greater Vancouver: l'exception canadienne métropolitaine."

by Presidential Decree 824. After the People Power Revolution of 1986, MMC was replaced by the Metropolitan Manila Authority (MMA) organized under Executive Order No. 392, Series of 1990. MMA was a rather transitional organization and was abolished with the creation of the current Metropolitan Manila Development Authority (MMDA) in 1995 by Republic Act 7924.<sup>51</sup>

8.58 MMC was created as a tool for treating Metro Manila as a special development and administrative region in order for certain basic services to be more efficiently and effectively planned, supervised and coordinated by a development authority without prejudice to the autonomy of the affected LGUs. It is a public corporation created under RA 7924, embracing the Cities of Caloocan, Manila, Mandaluyong, Pasay and Quezon and the Municipalities of Las Pinas, Makati, Malabon, Marikina, Muntinlupa, Navotas, Paranaque, Pasig, Pateros, San Juan, Taguig and Venezuela. In the case of MMDA, the voting power in the Board or Mayors' Council is cooperative: one-member, one-vote. They are all equal, regardless of financial contribution, land area, population size, and economic size. In the case of MMDA, no representative from civil society is allowed in its governing board (called the Metro Manila Council).

8.59 Generally, MMDA performs planning, monitoring and coordinative functions, and in the process, exercises regulatory and supervisory authority over the delivery of metro-wide services within Metropolitan Manila without diminution of the autonomy of the LGUs concerning purely local matters. Metro-wide services under its jurisdiction are those services which have metro-wide impact and transcend legal political boundaries or entail huge expenditures such that it would not be viable for said services to be provided by the individual LGU. These services shall include:

- **Development Planning:** the preparation of medium- and long-term development plans including development, evaluation and packaging of projects; investment programming and coordination; and monitoring of plan, program and project implementation.
- **Transport and Traffic Management:** the formulation, coordination and monitoring of policies, standards, programs and projects to rationalize the existing transport operations, infrastructure requirements, the use of thoroughfares, and promotion of safe and convenient movement of persons and goods, which include provision for the mass transport system and the institution of a system to regulate road users; administration and implementation of all traffic enforcement operations, traffic engineering services and traffic education programs, including the institution of a single ticketing system in Metropolitan Manila.
- **Solid Waste Disposal and Management:** the formulation and implementation of policies, standards, programs and projects for proper sanitary waste disposal. It includes the establishment and operation of sanitary landfill and related facilities and the implementation of other alternative programs intended to reduce, reuse and recycle solid waste.
- **Flood Control and Sewerage:** which includes the formulation and

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<sup>51</sup> Rosario G. Manasan and Ruben G. Mercado, "Governance and Urban Development: Case Study of Metro Manila" Discussion Paper Series No. 99-03 (Manila: Philippine Institute for Development Studies, 1999).

implementation of policies, standards, programs and projects for an integrated flood control drainage and sewerage system.

- **Urban Renewal:** zoning and land use planning, and shelter services which include the formulation, adoption and implementation of policies, standards, rules and regulations, programs and projects to rationalize and optimize urban land use and provide direction to urban growth and expansion, the rehabilitation and development of slum and blighted areas, the development of shelter and housing facilities and the provision of necessary social services.
- **Health and Sanitation:** urban protection and pollution control which includes the formulation and implementation of policies, rules and regulations, standards, programs and projects for the promotion and safeguarding of the health and sanitation of the region and for the enhancement of ecological balance and the prevention, control and abatement of environmental pollution.
- **Public Safety:** which includes the formulation and implementation of programs and policies and procedures to achieve public safety, especially preparedness for preventive or rescue operations during times of calamities and disasters such as conflagrations, earthquake, flood and tidal waves; and coordination and mobilization of resources and the implementation for rehabilitation and relief operations in coordination with national agencies concerned.<sup>52</sup>

8.60 The comparison of the three metropolitan governance institutions is provided in Table 8.4.4 as compiled by Manasan and Mercado. The current MMDA does not have strong authority unlike the MMC led by then First Lady Imelda Marcos, for the local autonomy of the LGUs granted by the Local Government Code of 1991 is inalienable under the Philippine political system. Though MMDA has to rely on the LGUs to implement their policies to a certain extent, the LGUs are not necessarily supportive of the enforcement of metro-wide actions.<sup>53</sup> It results in weak performance of MMDA. Moreover, the separation of the executives, who are appointed by the President, and the Metro Manila Council, who are the mayors and local councilors from the LGUs, does not encourage collaboration among the LGUs on the metropolitan policy making and implementation.<sup>54</sup> MMDA is also criticized for issues of accountability in their operation.<sup>55</sup> Considering the highly fragmented local governance in the Philippines, an integration mechanism should be provided to local politicians with incentives to cooperate in decision making and implementation of projects at the metropolitan level. For example, introducing an appropriate design of election of the executives of MMDA could also enhance political legitimacy of the authority.

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<sup>52</sup> Metro Manila Development Authority. <http://www.mmda.gov.ph/> [accessed in November/ December 2014].

<sup>53</sup> Nathaniel von Einsiedel, "METRO MANILA: A Case Study in Metropolitan Planning and Governance" (presented at the East West Center KMC Workshop, February 2009).

<sup>54</sup> Sellers and Hoffmann-Martinot, "Metropolitan Governance."

<sup>55</sup> Klink, "Recent Perspectives on Metropolitan Organization, Functions, and Governance."

**Table 8.4.4 Comparison of Metro Manila Governance Institutions**

Metro-wide Institutions	Metropolitan Manila Commission (MMC)	Metropolitan Manila Authority(MMA)	Metropolitan Manila Development Authority (MMDA)
Law	Presidential Decree 824	Executive Order No. 392	Republic Act 7924
Period	1975-1989	1990-1995	1995-present
Legislative Powers	Legislative power	None	None
Executive Structure	Governor Vice Governor Commissioners for <ul style="list-style-type: none"> <li>• Planning</li> <li>• Operations</li> <li>• Finance</li> </ul> All appointed by the President	<ul style="list-style-type: none"> <li>• Chairman of Council - elected by member-mayors</li> <li>• General Manager- appointed by the President</li> </ul>	<ul style="list-style-type: none"> <li>• Chairman - appointed by the President with cabinet rank</li> <li>• General Manager - appointed by the President</li> </ul>
Major Functions	<ul style="list-style-type: none"> <li>• Delivery of metro-wide services</li> <li>• Coordination of other services</li> <li>• Development planning</li> </ul>	<ul style="list-style-type: none"> <li>• MMA gives jurisdiction over delivery of basic urban services requiring coordination but de facto MMA was limited to coordination</li> <li>• Development planning</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery of metro- wide services</li> <li>• Coordination of other services</li> <li>• Development planning</li> </ul>
Intergovernmental Relations	<ul style="list-style-type: none"> <li>• Local legislative councils abolished</li> <li>• City and municipal mayors also act as area managers</li> <li>• Sectoral Departments coordinated by Metro Governor of National Government</li> </ul>	<ul style="list-style-type: none"> <li>• Local legislative councils retained</li> <li>• City and municipal mayors sit in the metro council</li> <li>• Sectoral departments coordinate program implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Local legislative councils retained</li> <li>• City and municipal mayors sit in the metro council</li> <li>• Sectoral departments coordinate program implementation with MMDA</li> </ul>
Sources of Revenue	<ul style="list-style-type: none"> <li>• Own taxes</li> <li>• Share in proceeds of LGU taxes (e.g., 45% of RPT)</li> <li>• IRA</li> <li>• Central government subsidies</li> <li>• LGU contributions - 20% of all regular revenue</li> </ul>	<ul style="list-style-type: none"> <li>• Share in proceeds of LGU taxes (e.g., 35% of RPT)</li> <li>• IRA</li> <li>• Central government subsidies</li> <li>• Lower LGU contribution - 15 % of all regular revenue but unable to collect after LGC implementation</li> </ul>	<ul style="list-style-type: none"> <li>• IRA</li> <li>• Central government subsidies</li> <li>• Lower LGU contribution - 5 % of all regular revenue net of IRA</li> </ul>
Other Characteristics	<ul style="list-style-type: none"> <li>• Personality centered</li> <li>• Single tier legislative council</li> </ul>	<ul style="list-style-type: none"> <li>• Basically weak legally and institutionally</li> </ul>	<ul style="list-style-type: none"> <li>• Stronger than MMA but weaker than MMC</li> </ul>

Source: Manasan and Mercado, "Governance and Urban Development: Case Study of Metro Manila," reproduced and edited Table 9 Comparative Overview of Metro Manila Commission (P.D. 824), Metro Manila Authority (E.O. 392), and Metro Manila Development Authority (R.A. 7924).

**(b) Monosectoral Authority/ Special District**

8.61 A monosectoral authority or special purpose district can be established within a metropolitan area for provision of a certain public service, such as transport, water, sewage, drainage, and school. Considering economies of scale and externality, many special districts are designed to provide monosectoral service and receive user fees and charges, and occasionally subsidies and grant from the central and regional governments. Besides special districts for public service provision, there are other types of the districts such as special economic zones. The disadvantages of monosectoral authority or special district include: coordination issues among separate authorities, dispersed government systems, accountability issues, and efficiency and responsiveness to the people's demands.<sup>56</sup>

8.62 In Metro Cebu there exist several monosectoral authorities/ special purpose districts, namely: the Cebu Port Authority (CPA), the Mactan Cebu International Airport Authority (MCIAA), and the Metro Cebu Water District (MCWD). CPA and MCIAA are under the supervision of DOTC. The characteristics of these three authorities are summarized in Table 8.4.5.

<sup>56</sup> Bird and Slack, "Fiscal Aspect of Metropolitan Governance" in *Governing the Metropolis: Principles and Cases*.

**Table 8.4.5 Monosectoral Authorities/ Special Districts in Metro Cebu**

Monosectoral Authorities / Special Districts	Cebu Port Authority (CPA)	Mactan Cebu International Airport Authority (MCIAA)	Metro Cebu Water District (MCWD)
Foundation	Separated from the Philippine Ports Authority (PPA) by Republic Act 7621 of 1992, and started operation in 1995	Started operation in 1990 with the enactment of Republic Act 6958 of 1990	Founded by Resolution No. 873 in 1974 based on the Osmeña Waterworks Systems (OWS)
Status	Government corporation	Government corporation	Transformed from a quasi-public corporation to a government corporation in 1992
Intergovernmental Relations	Under the supervision of DOTC	Under the supervision of DOTC	Autonomous
Jurisdiction	All ports, seas, lakes, rivers and all other navigable inland waterways within the province of Cebu, the City of Cebu, and all other highly urbanized cities which may be created after the enactment of RA 7621	Mactan International Airport in the Province of Cebu and the Lahug Airport in Cebu City, and such other airports as may be established in the Province of Cebu	The cities of Cebu, Talisay, Mandaue and Lapu-Lapu, and the municipalities of Consolacion, Liloan, Compostela, and Cordova
Purposes and Objectives	<ul style="list-style-type: none"> <li>To integrate and coordinate the planning, development, construction and operations of ports and port facilities within its territorial jurisdiction;</li> <li>To enhance the flow of international and domestic commerce passing through or utilizing the regional ports; and</li> <li>To promote regional development by providing support services to sustain the growth of export and other priority industries in the region.</li> </ul>	<ul style="list-style-type: none"> <li>MCIAA primarily shall undertake the economical, efficient and effective control, management and supervision of the airports;</li> <li>Encourage, promote and develop international and domestic air traffic in the Central Visayas and Mindanao regions; and</li> <li>Upgrade the services and facilities of the airports and formulate internationally acceptable standards of airport accommodation and service.</li> </ul>	<ul style="list-style-type: none"> <li>To provide piped water supply; and</li> <li>To provide wastewater treatment services (domestic and industrial).</li> </ul>
Governing Body	<p>The Cebu Port Commission</p> <ul style="list-style-type: none"> <li>Chairman – DOTC Secretary</li> <li>6 Commissioners <ul style="list-style-type: none"> <li>Ship Owners and Shipping Operators</li> <li>Cargo Handling Labor Sector</li> <li>Business Sector</li> </ul> </li> <li>Vice-Chairman – shall be elected from among the members of the Cebu Port Commission and shall be designated concurrently as the CPA General Manager.</li> </ul>	<p>Board (11 members)</p> <ul style="list-style-type: none"> <li>Chairman – DOTC Secretary</li> <li>Vice-Chairman – General Manager</li> <li>9 members <ul style="list-style-type: none"> <li>Assistant Secretary of the Air Transportation Office</li> <li>Secretaries of <ul style="list-style-type: none"> <li>Department of Finance,</li> <li>Department of Justice</li> <li>Department of Tourism</li> </ul> </li> <li>4 members from the private sector recommended by the governor of the Province of Cebu.</li> <li>The governor of the Province of Cebu (or representative).</li> </ul> </li> </ul>	<p>Board</p> <ul style="list-style-type: none"> <li>Chairman – appointed by the mayor of Cebu City</li> <li>Vice-Chairman</li> <li>Secretary</li> <li>2 members</li> </ul>

Source: Cebu Port Authority (CPA), <http://www.cpa.gov.ph> [accessed in December 2014]; Mactan Cebu International Airport Authority (MCIAA), <http://www.mciaa.gov.ph/Index.html>. [accessed in December 2014]; Metro Cebu Water District (MCWD), <http://www.mcwd.gov.ph>. [accessed in December 2014].

### (3) Inter-municipal Cooperation Model

#### (a) Inter-municipal Association

8.63 In recent years, flexible arrangements for metropolitan governance, so called “new regionalism,” has emerged around the world. This model is to establish an inter-municipal association or council based on voluntary cooperation and collaboration among local governments. This type of association differs from a formal government such as a metropolitan authority which has an established jurisdiction over the metropolitan area discussed before. Its decision making

mechanism relies on consensus among local governments, respecting autonomy of local governments. An inter-municipal association or council becomes a venue for coordination and cooperation of planning and implementation of development plans, projects and programs.<sup>57</sup> Primary financial sources of the associations are often contributions from local government members. The examples of inter-municipal associations include Bologna and Milan, Italy, and the Metro Naga Development Council (MNDC) of the Philippines.

(i) **Case IV: European Experiences**

8.64 French urban areas and Italian metropolises have developed metropolitan governance structures based on intermunicipal cooperation. In France, communautés d'agglomération and communautés urbaines are organized for the urban areas with population from 50,000 to 500,000 and the ones with over 500,000 population. The councils representing the municipalities manage public transport, environment, social housing, planning and economic development, sewerage, and waste disposal in these urban communities. Their funding sources are composed of own taxes, business tax from the municipalities, and grants.<sup>58</sup>

8.65 The Accordo per la Città Metropolitana (the Agreement for the Metropolitan City, ACM) is an open-ended metropolitan governance institution founded in 1994 involving the 48 municipalities and the Province of Bologna that are able to leave the agreement at their will. The ACM, which emerged from the metropolitan conference, is rather a political forum where the participating municipalities discuss metropolitan issues in the economic, social, technical, and financial areas.<sup>59</sup>

(ii) **Case V: Metro Naga Development Council**

8.66 MNDC was established in 1993, based on a memorandum of agreement (MOA) among the LGUs in Metro Naga, Camarines Sur, Bicol Region (Region V). The MOA was signed with the witness of the secretary of the Department of Local Government and later affirmed by then President Fidel V. Ramos.<sup>60</sup> Currently, MNDC consists of Naga City and the 15 municipalities of Bombon, Bula, Calabanga, Camaligan, Canaman, Gainza, Libmanan, Magarao, Milaor, Minalabac, Ocampo, Pamplona, Pasacao, Pili and San Fernando, covering about 742,000 population in 2010 and an area of 1,260 km<sup>2</sup>.<sup>61</sup> MNDC is placed under NEDA and also accommodates representatives from the national line agencies and up to 25% representatives from the private sector.<sup>62</sup>

8.67 The initiative to create this metropolitan governance began with the oil shortage caused by the Gulf War in 1991. Under the leadership of Naga City, the LGUs cooperated in setting a distribution system of oil in accordance with

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<sup>57</sup> Kübler, "Introduction: Metropolitanisation and metropolitan governance"; Sellers and Hoffmann-Martinot, "Metropolitan Governance"; Lefèvre, "Democratic Governability of Metropolitan Areas."

<sup>58</sup> Lefèvre, "Democratic Governability of Metropolitan Areas."

<sup>59</sup> Klink, "Recent Perspectives on Metropolitan Organization, Functions, and Governance."

<sup>60</sup> Naga City. "The Metro Naga Development Council: Treading New Grounds The Very Heart And Soul of The Mind is To Promote The Spirit of Sharing Within Its Member LGUs." (n.d.)

<sup>61</sup> Metro Naga Facebook. [https://www.facebook.com/metronagabikol/info?tab=page\\_info](https://www.facebook.com/metronagabikol/info?tab=page_info)

<sup>62</sup> Naga City, "The Metro Naga Development Council: Treading New Grounds."



needs and priorities, to cope with the oil crisis. The two other events, the newly enacted Local Government Code of 1991 and the demands from the senior citizens in Metro Naga to provide the same senior benefits as the citizens in Naga City, encouraged and accelerated the formulation of cooperative governance at Metro Naga. Thus, MNDC is characterized by strong local cooperative initiatives and a leading role of Naga City.<sup>63</sup>

8.68 For the sake of sustainable development focusing on development of people, economy and environment, MNDC underlines the importance of integrated approach and partnerships among the member LGUs. It holds up the two operating principles of “resource sharing” and “role definition” of the member LGUs.<sup>64</sup> The roles of each LGU are identified by MNDC, taking account of their characteristics and development potentials, and priority investment programs and projects are prepared in accordance with them. The Common Fund and general allotments are equally distributed to the member LGUs for project implementation. The purposes for cooperation and programs and projects MNDC are summarized in Table 8.4.6. MNDC also assists in problem solving among the LGUs in Metro Naga and lobbying activities for national government agencies to obtain resources and projects from them.<sup>65</sup>

**Table 8.4.6 Objectives and Programs and Projects of MNDC**

Objectives	Programs and Projects
(i) To formulate and implement an equitable and complementary development program;	(i) Metro Naga Emergency Rescue Network;
(ii) To establish the Metro Naga Common Fund through contributions of the members which shall be no less than 2% of the LGUs Economic Development Fund (or 2% of 20% of their respective IRA);	(ii) Metro Naga Senior Citizens Program;
(iii) To participate in the identification, preparation and implementation of development programs, projects and activities;	(iii) Metro Naga Equipment Pool;
(iv) To supervise, implement, assist and/or coordinate programs, projects and activities of the Council within their respective territorial jurisdiction in coordination with the Council; and	(iv) Metro Naga Enterprise Development Program;
(v) To extend technical, resource, financial and other forms of assistance to member-LGUs to the extent allowed by the general welfare of their respective constituents.	(v) Metro Naga Employment and Placement Assistance Program;
	(vi) Metro Naga Water supply Enhancement Project;
	(vii) Metro Naga Project Assistance Fund;
	(viii) Support to Health Services; and
	(ix) Resource/Project Accessing.

Source: Ruben G. Mercado and Victor B. Ubaldo, “Metropolitan Naga: A Continuing Challenge of Local Autonomy and Sustainability,” Discussion Paper Series No. 98-13 (Revised) (Manila: Philippine Institute for Development Studies, 1998), 3-4.

8.69 The funding sources of MNDC include the Common Fund which consists of contributions from the member LGUs, and the annual General Appropriations Act (GAA), which was approved by the Congress under Executive Order No. 102. In addition, there are other funds including the President’s Contingency Fund of PHP500,000 as the initial assistance and PHP100,000 prize of winning the 1994 Galing Pook Award. In the 1999 budget of total PHP6.04 million, the Common Fund and GAA accounted for 22.4% and 77.6%, respectively.<sup>66</sup> Naga City provided more than half of the total Common Fund from 1993 to 1997.<sup>67</sup>

<sup>63</sup> Ibid.

<sup>64</sup> Ibid.

<sup>65</sup> Ibid.

<sup>66</sup> Naga City, “The Metro Naga Development Council: Treading New Grounds.”

<sup>67</sup> Mercado and Ubaldo, “Metropolitan Naga: A Continuing Challenge of Local Autonomy and Sustainability.”

8.70 MNDC's initiatives have been recognized domestically and internationally. Its success can be attributed to the factors of strong leadership and long-term vision, innovative local governance mechanism, and role definition of the member LGUs, among others. The leadership role of Naga City as "big brother" is indispensable in the development of MNDC. At the same time, Naga City, realizing the need for cooperation in solving development issues such as congestion, informal settlements, water, and economic development, envisioned a long-term common future of Metro Naga. Based on the synergy of locally initiated intergovernmental cooperation, MNDC has developed an innovative local governance mechanism, especially for resource pooling and maximization of assets, which brings about more benefits to each of the LGUs than the required contribution, and for partnerships among the LGUs and with the private sector and civil society organizations (CSOs). The clearly defined roles of the LGUs lead to more organized investment plans and harmonized implementation of development projects, which results in integrated development of the entire region.<sup>68</sup>

8.71 Recently, MNDC has participated in the "Local Governance Support Program for Local Economic Development Batch II Project" from 2012 to 2014, funded by the Government of Canada and implemented with DILG. In their program of "Tooling Up for Tourism for Balanced Local Development" for promotion of local economic development, MNDC in cooperation with the private sector is working on development of the Mt. Isarog Ecotourism Circuit and the Naga City Urban Tourism Circuit.<sup>69</sup>

**(b) Inter-municipal Agreement**

8.72 The inter-municipal agreement model is that local governments make inter-municipal agreements or develop voluntary cooperation arrangements, and based on the agreements, jointly provide public services, and develop and implement spatial plan and projects. This is the most flexible model with a wide variety of forms, including PPP and informal consensus to more formal written agreements. Financial resources are basically contributions from local governments.

**(i) Case VI: Italian Initiatives for Territorial-Based Joint Planning**

8.73 Inter-municipal cooperative agreements can be promoted by preparing the legal framework at the national level. In Italy, the Law No. 662 of 1996 and Inter-ministerial Committee for Economic Programming Resolution of 1997 introduced the legal framework for negotiated programming and joint planning of economic development, namely institutional program agreement, framework program agreement, program contract, area contract, and territorial pact. These institutional tools encourage cooperation among various stakeholders from local governments, the private sector, business and professional associations, etc. for integration of development in industry, agriculture, tourism, and infrastructure sectors. In addition, a new initiative for territorial-based development called the territorial integrated programs (PIT) was launched in

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<sup>68</sup> Ibid.; Naga City, "The Metro Naga Development Council: Treading New Grounds."

<sup>69</sup> Local Governance Support Program for Local Economic Development (LGSP-LED). <http://www.lgsp-led.ph/> [accessed in December 2014].

1999.<sup>70</sup>

### 3) Issues and Problems in the Development of Metropolitan Governance

8.74 This section examines issues and problems concerned with institutions of metropolitan governance. There are eight issues identified for development of metropolitan governance institutions in Metro Cebu, as discussed below.

#### (1) Functional, Political and Social Legitimacy

8.75 Institutions for metropolitan governance must be established on functional, political, social legitimacy.<sup>71</sup> At first, needs for metropolitan institutions are translated into functional legitimacy, such as demands for integrated and balanced growth, logic of efficiency or economies of scale, and necessity for policy and cooperation to address externality issues. Functional legitimacy of metropolitan institutions is validated only by effective implementation of expected functions. It means that the metropolitan governance institutions have to be functional in their given tasks and mandates.

8.76 In order to establish functional and effective metropolitan institutions, responsibility and tasks of each government or organization, i.e., what functions and authorities are integrated at or devolved to the metropolitan institutions, have to be clearly delineated. However, determining distribution and transfer of authorities is primarily a political process. In countries where a strong local autonomy is guaranteed in a decentralized political system, such as the Philippines, political legitimacy of metropolitan institutions should be confirmed by acceptance of the metropolitan institutions by all local governments in a metropolitan area, appropriate coordination and decision making arrangements to mediate power differences between a core city such as Cebu City and other LGUs, and foundation of democratic institutions.

8.77 Lastly, social legitimacy means whether or not Metro Cebu is acknowledged as one integrated community sharing culture, history, and future, or in other words, whether or not citizens have a sense of belonging to Metro Cebu.<sup>72</sup> According to the HIS in this Study, the Mega Cebu Vision 2050 is recognized by only about 5% of the respondents. Thus, upon building a metropolitan regime in the future, it is necessary to improve the awareness of the community as Metro Cebu.

#### (2) Selection of a Model and Development Process of Metropolitan Governance Institution

8.78 Selection of metropolitan governance institutions is influenced by political and socioeconomic conditions of the region and the existing and historical cooperative relations and coordination system among governments. There is neither a one-size-fits-all answer nor right answer in the selection of a metropolitan institution. In addition, a long period of time is required to build an institution of metropolitan governance.<sup>73</sup> Because necessity and legitimacy of metropolitan institutions are not given from the upper level of the government, it is not desirable to force the region to adopt a certain type of institution as the case of Metro Manila. Rather, an appropriate

<sup>70</sup> Francesca Governa and Carlo Salone, "Italy and European Spatial Policies: Polycentrism, Urban Networks and Local Innovation Practices," *European Planning Studies* 13 (2005), 256-283.

<sup>71</sup> Lefèvre, "Democratic Governability of Metropolitan Areas."

<sup>72</sup> Ibid.

<sup>73</sup> Klink, "Recent Perspectives on Metropolitan Organization, Functions, and Governance"; Lefèvre, "Democratic Governability of Metropolitan Areas."

form of metropolitan institution emerges from a process where regional problems and issues are clarified and discussed, and consensus of relevant organizations is formed through deliberation and experiences of intergovernmental cooperation in implementation of actual projects and programs. Therefore, designing a process is crucial for the establishment of metropolitan institutions.<sup>74</sup>

8.79 In fact, many of the existing metropolitan institutions were born as a result of the past experiences of regional cooperation and collaboration to deal with some problems and implement projects. Therefore, successful metropolitan institutional development requires a preparation period toward metro-wide cooperation. That process should be supported and accelerated by providing incentives to encourage inter-municipal cooperation, setting up forums where stakeholders are networked and issues and policies are discussed, and taking action to achieve goals at the metropolitan level.<sup>75</sup> Through trials and errors in such a process, the most appropriate metropolitan institutions will be explored and then established with confidence and consensus of stakeholders. In particular, a first step toward metropolitan institutions may be to examine coordination and decision making mechanisms by sector, to share information and enhance capacity of relevant organizations, through planning and implementation of projects at the metropolitan level.

### **(3) Local Initiatives**

8.80 The successful cases of metropolitan governance, such as Metro Vancouver and MNDC illuminate the importance of local initiatives. The global trend of the metropolitan institutions has shown a shift from a strong authority model, often imposed by the central government, to a weak authority or inter-municipal association model, both of which depends on local governments to implement their policies and projects, except in the cases of capital regions. A lack of local initiatives in building metropolitan governance institutions tends to lead to disappointment at the lower level of performance and to less efficient outcomes. Weak support among the local actors also means insufficient political legitimacy.<sup>76</sup>

8.81 In the highly fragmented political system of the Philippines particularly where local autonomy of the LGUs is protected, it is impossible for a metropolitan institution to conduct metro-wide activities and fulfill its mandates without the cooperation and consensus of the LGUs. Thus, if the political culture of a metropolitan area has not yet grown to be conducive to the establishment of a metropolitan institution, preparatory activities over a certain period of time are required to nurture collaborative relationships and a cooperative environment. Meanwhile, incentives or mechanisms to motivate inter-municipal cooperation may be incorporated in the design of the metropolitan institution. Local initiatives should be supported not only by local government bodies but also by civil society and the private sector.

### **(4) Role of the State**

8.82 The role of the central government is also important in institution building for metropolitan governance.<sup>77</sup> Though initiatives from local governments are primarily a driving force in the institutional development, creation of a new metropolitan authority

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<sup>74</sup> Lefèvre, "Democratic Governability of Metropolitan Areas."

<sup>75</sup> Kübler, "Problems and Prospects of Metropolitan Governance in Sydney: Toward 'old' or 'new' regionalism?"

<sup>76</sup> Lefèvre, "Democratic Governability of Metropolitan Areas."

<sup>77</sup> Ibid.

such as the Metro Cebu Development Agency should be approved by Congress. The national line agencies, e.g., NEDA and DPWH, have essential roles to play in facilitating discussion, assisting coordination, and providing support in the devolution of authority and allocation of roles and functions, securing financial resources, and providing capacity building for project implementation. The central government might have to intervene when a problem arises among local governments.

8.83 In fact, the existing metropolitan governance institutions in the Philippines are connected to the state. The current MCDCB is installed under the RDC; the chairperson of MMDA is appointed by the President; and MNDC receives allotments from the central government. Given the expected growth of the urban areas, the need to develop a legislative framework at the national level might increase to encourage establishment of metropolitan governing institutions or inter-municipal cooperation in the long run.

8.84 In addition to the central government, the provincial government is also expected to take a leading role in institutional building of the metropolitan governance system and in the policy development process, since the development of the metropolitan area, which is the center of economic, political and social activities there, significantly influences the prospect of the province.

#### **(5) Leadership and Decision Making Process**

8.85 In order to integrate different opinions and demands from diverse organizations, groups, and citizens concerned with metropolitan governance, a strong leadership is indispensable. Leadership can be performed by an individual or organization, who has strong power to take action and integrate concerned parties.<sup>78</sup> In the process of the institutional building, a role of champion should be performed to facilitate the foundation of the metropolitan governance system, by one or a collective group of concerned parties, such as a mayor from a core city, governor, or other non-governmental organizations including NGOs, academic and research institutions, etc.

8.86 A common method for selection of leaders of metropolitan institutions is indirect election in a board, council, or assembly. The issues related to the selection method to be carefully examined include: the composition of members of such decision making body, i.e., whether or not local council members and/or the private sector representatives should be involved in addition to mayors, and distribution of votes among LGUs in proportion to population of local governments. If strong authority is given to a leader, it may be necessary to set up a decision making process to promote consensus building. Or direct election by citizens could be installed in the long run, to enhance political legitimacy and to balance with the strong leadership.

#### **(6) Accountability and Civil Society Involvement**

8.87 One of the important issues in setting metropolitan institutions is accountability. A metropolitan authority is often criticized because its roles and functions are not clear to the citizens due to distance from citizens. Metropolitan institutions focusing on metro-wide issues are not directly involved in local matters and leaders of the institutions are not selected by residents. There are not many chances for the public to scrutinize policies and decision makers of a metropolitan institution, because of lack of

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<sup>78</sup> Ibid.

sufficient information and lower level of interests in them.<sup>79</sup> In particular, as the public choice theorists criticized, a weakness of a metropolitan authority model is flexibility, accessibility, and accountability. Compared with a fragmentation governance model, a consolidated authority of metropolitan governance is less flexible in responding to needs and interests of citizens. Thus, these factors may become constraints for a metropolitan authority to reflect the voice of citizens.<sup>80</sup>

8.88 Metro-wide policies do not necessarily bring about benefits to the residents and sometimes contradict against the local interests of certain municipalities within a metropolis. The NIMBY (“Not In My Backyard”) attitude is a well-known problem in metropolitan governance, for example in the case of the development of a landfill. Metropolitan governing institutions must be accountable to residents by explaining their policies, increasing awareness of metro-wide issues and benefits, and gaining support from them. Accountability in metropolitan governance should be improved by disclosing information, improving access from citizens, and involving NGOs, community associations, and the private sector in the decision making process.

## **(7) Funding Sources**

8.89 Securing financial resources matter to the performance and sustainability of metropolitan governance. This issue of financial resources is related to the selection of a governance system to a certain extent. In the case of a metropolitan authority, the primary concern in finance is determination of financial bases, namely taxation power, revenue sharing with the local governments, user charges and fees from public service provision, and other own financial resources.<sup>81</sup> On the other hand, a critical financial issue of inter-municipal associations is how much contribution local governments should make. For example, the major revenues of MMDA entail transfer from the central and local governments, traffic management income and fines, and other fees and charges, while MNDC receives allotments from the central government and contributions from the member local governments, and established a joint development fund. The contribution of the LGUs to MNDC is set at 2% of the Economic Development Fund of each LGU, taking account of the fluctuation of IRA every year. Naga City occasionally contributes to MNDC more than 2%.<sup>82</sup>

8.90 It is important to take account of the promotion of cooperation between the central government and LGUs, and partnership with the private sector, for utilization of loans, grants, and PPP into project implementation. The capital investment required for infrastructure development at the metropolitan level may exceed the financial capacity of the LGUs and their pooling of resources and funds, despite the LGUs’ consolidated efforts to increase local revenue. Thus, seeking access to funds of the line agencies and the private firms is crucial for a metropolitan governance institution.

## **(8) Capacity Building and Institutional Development**

8.91 The development of a metropolitan governance institution is a long-term process. In the process, an appropriate governing structure, including locally tailored decision making and cooperation mechanisms, shall be explored through experiencing implementation of projects and other actual tasks. A collaborative culture and a sense

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<sup>79</sup> Ibid.; Klink, “Recent Perspectives on Metropolitan Organization, Functions, and Governance.”

<sup>80</sup> Klink. Ibid.

<sup>81</sup> Bird and Slack, “Fiscal Aspect of Metropolitan Governance” in *Governing the Metropolis: Principles and Cases*.

<sup>82</sup> Naga City, “The Metro Naga Development Council: Treading New Grounds.”

of belonging to the metropolis should be nurtured as well. The participating LGUs have to learn and gain technical expertise to handle local and metropolitan development issues and management skills such as facilitation of meetings and joint implementation of projects and consensus building. Specifically, the current metropolitan governance institutions more or less count on the LGUs for implementation of policies and projects, while focusing on policymaking and coordination functions. For balanced growth of a metropolitan area, the member LGUs need to have sufficient capacity to fulfill their expected roles. Thus, it is necessary to provide local governments with capacity building for planning, coordination, implementation, and financing of the metro-wide projects. In addition, capacity building training and awareness raising campaigns on metropolitan development should be provided to the stakeholders, such as the provincial government, line agencies, NGOs, and CSOs.

## **8.5 Institution Building for Metropolitan Governance**

### **1) Options for Metropolitan Governance in Metro Cebu**

8.92 There are four models proposed for metropolitan governance in Metro Cebu. The following sections discuss each of the four models.

#### **(1) Inter-municipal Association Model: Metro Cebu Development League**

8.93 As a model of inter-municipal association, the Metro Cebu Development League (MCDL) is proposed (see Figure 8.5.1). In this model, local governments, central government agencies, the private sector, NGOs and CSOs will found a league for the development of Metro Cebu based on cooperation agreements. Policy networks organized by sector under this arrangement will take a lead role in planning, designing and implementing policies and projects. A core organization or institution will be determined among stakeholders or newly formed in each policy network. A development fund will be also created.

##### **(a) Expected Functions and Structure of MCDL**

8.94 The policy networks would include, but not limited to, the following sectors:

- Transport planning and traffic management;
- Water, wastewater, and drainage;
- Solid waste management;
- Urban development and housing;
- Development planning and land use;
- Disaster risk reduction and management (DRRM) and environment management;
- Competitiveness;
- Health, sanitation and public safety; and
- Project implementation and financing.

8.95 Each policy network shall be led by a key organization/ group responsible for facilitation and coordination of planning, policy making, and project implementation. MCDL will manage and coordinate the entire networks, and the development fund.

8.96 The development fund shall be established primarily by contributions from

the member LGUs and other organizations. The amount of the contributions from the LGUs shall be determined by examining the financial capacity of the LGUs, the demand for the investment in Metro Cebu development, and the prospect of receiving allotments from the central government and contributions from other organizations such as private or non-profit organizations. The financial assessment of the LGUs and efforts for local revenue increase should be conducted before the establishment of the development fund.



Source: JICA Study Team.

**Figure 8.5.1 Inter-municipal Association: Metro Cebu Development League**

8.97 The advantages of this model entail flexibility and institutional building through an experimental process of trial and error. The open-ended policy networks enable a wide variety of stakeholders, including the public and private sector organizations, and NGOs to participate in policy making process. As a result, accountability of MCDL can be improved. Though it is difficult to design an appropriate metropolitan governance institution from the beginning, this flexible setting is adjustable through learning by doing and additional policy networks can be added as needed. Considering the local political and social situation in Metro Cebu, establishment of a metropolitan agency might not be expected in the near future. Development of political networks can contribute to consensus building and creation of environment favorable to more consolidated actions among the LGUs for metropolitan governance. On the other hand, one of the weaknesses of this model is sustainability and commitment of the member LGUs. As experienced by MNDC, the roles of each member LGU should be clarified, with the provision of the necessary technical and financial supports. The contributions to the development fund and sharing of benefits from participation in MCDL can also work to consolidate the commitment from them.

8.98 The MCDL model may be a good candidate for Metro Cebu. The current structure of focus area-based committees (FABCOMs) in MDCB can be a



foundation for more integrated policy networks by strengthening their functions and expanding their activities. The policy networks can be applied as a transitional model to develop a metropolitan authority in the future.

## **(2) Metropolitan Authority Model: Metro Cebu Development Authority**

8.99 A model of a metropolitan authority, the Metro Cebu Development Agency (MCDA) is another option for metropolitan governance in Metro Cebu. MCDA can be evolved from MCDL and established by integrating its association into a consolidated formal governmental organization. Unlike MMDA, MCDA will be operated on the basis of cooperation and decision making by consensus of the local governments, similar to the Metro Vancouver model. The departments of MCDA, which are reorganized policy networks or core organizations in MCDL, will be relatively autonomous in the provision of public services.

8.100 Local initiatives and consensus of stakeholders are indispensable in the establishment of a metropolitan authority. Because institutional building is fundamentally a political process, its functions and authority devolved or consolidated must be deliberated among the member LGUs and agreed by them. The LGUs are still expected to play active roles in the implementation of policies and projects, since it is less likely that the authority has the implementation capacity. From the lessons of MMDA, it is suggested to select a chairperson locally, through direct/ indirect election by the Board or based on certain rules agreed by the members. A participation mechanism of the private sector, NGOs and CSOs, and citizens in policymaking has to be developed to address the issues of accountability. It is also essential to examine if establishment of MCDA is a socially, politically and functionally legitimate action. Continuous efforts are required to improve the legitimacy of the authority after its establishment. The organizational structure of MCDA should be periodically reviewed to adjust to changes of needs and demands and the political, social and economic circumstances.

8.101 Establishment of a metropolitan authority is less likely to happen immediately, considering the current social and political circumstances and the past attempts. Thus, incremental development from the inter-municipal cooperation model of MCDL to the metropolitan authority of MCDA is more favorable and realistic, as discussed.

### **(a) Expected Functions and Structure of MCDA**

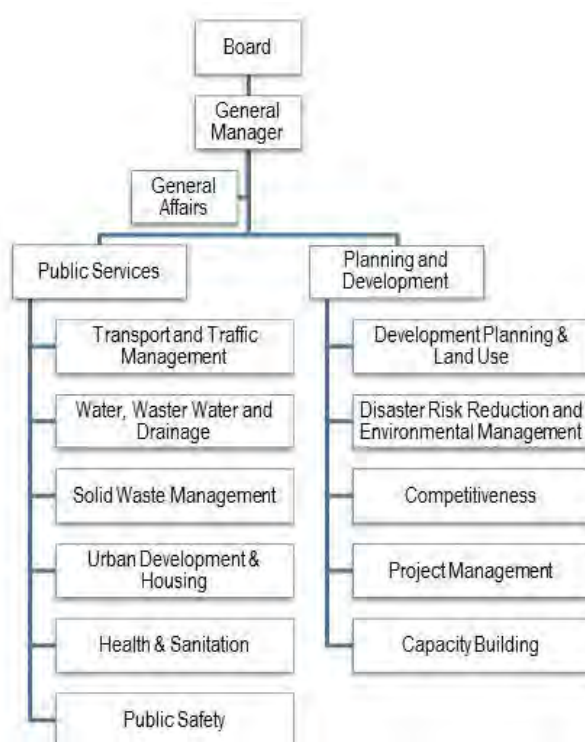
8.102 This is one example of the expected functions and structure of MCDA (see Figure 8.5.2). MCDA would be tasked with the two mandates of (i) planning and development of the physical, economic and social structure of Metro Cebu to accelerate development and to address common development challenges and common benefits, and (ii) provision of a management institution for the urban development of Metro Cebu.

8.103 The expected scope of MCDA's functions are as follows:

- Development planning (short-, medium- and long-term), investment programming and project preparation;
- Transport and traffic management;
- Flood control, wastewater and septage/ sewerage management;
- Solid waste disposal and management;

- Urban renewal, zoning and land use planning, including socialized housing;
- Health and sanitation and environmental pollution;
- Public safety;
- Disaster risk reduction and management, and environmental management;
- Competitiveness and economic development;
- Project management and financing; and
- Capacity building.

8.104 The governing board of MCDA will be the Metro Cebu Council (MCC) composed of the chairperson, representatives from the member LGUs, private sector, civil society sector, and national line agencies. The chairperson will be selected through election in the board or the rules agreed by the member LGUs, such as rotation among the member LGUs. The direct election of the chairperson may be considered in the long run to enhance political legitimacy.



Source: JICA Study Team.

**Figure 8.5.2 Organizational Structure of Metro Cebu Development Authority (Example)**

### **(3) Monosectoral Agency/ Special Purpose District**

8.105 Special purpose districts specified for provision of certain public services, such as transport planning and traffic management, water supply and wastewater treatment, and provision of social housing, can be established. These sectoral authorities will be core organizations that will play a lead role in each policy network, and become the backbone. A case study for the transport sector is discussed below.

(a) **Case:** Institutional Reforms in Transport Planning and Traffic Management

#### **(i) Introduction**

8.106 In the Interim II Report, institutional reforms in transport planning and

traffic management (TPTM) have been discussed. The discussions took into account the initial results of a questionnaire survey administered among the LGUs in Metro Cebu. The survey seeks to solicit information on the existence of a transport planning unit and/or traffic management unit, traffic code or ordinance and TPTM resources. It was found that only Cebu City has a comprehensive organizational set-up to handle TPTM functions. The other respondents who completed and returned the questionnaire at the time, namely: Lapu-Lapu City, Consolacion and Cordova, merely focus on traffic enforcement.

8.107 The initial survey results was sufficient for the Study Team to recommend some institutional changes involving passage of a traffic code or ordinance and the creation of a transport planning and traffic management body in each city and municipality as needed.

8.108 The purposes of this analysis are:

- To give an update on subsequent responses to the questionnaire survey;
- To review other related initiatives; and
- To give the status of implementation of the recommended reforms.

(ii) **Existing Situation**

(b) **Update on Questionnaire Survey**

8.109 Responses have been received from the cities of Danao, Mandaue, and Talisay. The respondents gave similar responses. Units that exist focus on enforcement activities, backed up by a traffic code or ordinance. There are no units responsible for transport planning and traffic engineering.

(c) **Current Related Initiatives**

8.110 The ADB-funded Davao Sustainable Urban Transport Study has proposed that Highly Urbanized Cities (HUCs) be vested by DOTC with the functions of preparing public transport plans and programs for submission to DOTC for approval.<sup>83</sup> The plans and programs as approved by DOTC shall be the bases of LTFRB in effecting public transport route changes. While only HUCs are covered in the proposal, there is no reason why it should not be extended to other cities, and even municipalities, considering that the Local Government Code has vested all LGUs with transport planning functions without any distinction as to their classification.

(i) **Proposed Institutional Reforms**

8.111 Based on the Local Government Code and the foregoing considerations, the following functions have been identified to be performed by each city or municipality in the area of transport planning:

- Provide inputs into the preparation/updating of the CLUP;
- Prepare/Update the public transport network;
- Coordinate with LTFRB in the adoption of the city's public transport network, and with public transport operators in the provision of facilities like

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<sup>83</sup> Annex C, ADB-funded TA- 8195 PHI: Davao Sustainable Urban Transport TA Extension Report, July 2014.

terminals and waiting areas and in the filing of franchise applications for new/amended routes;

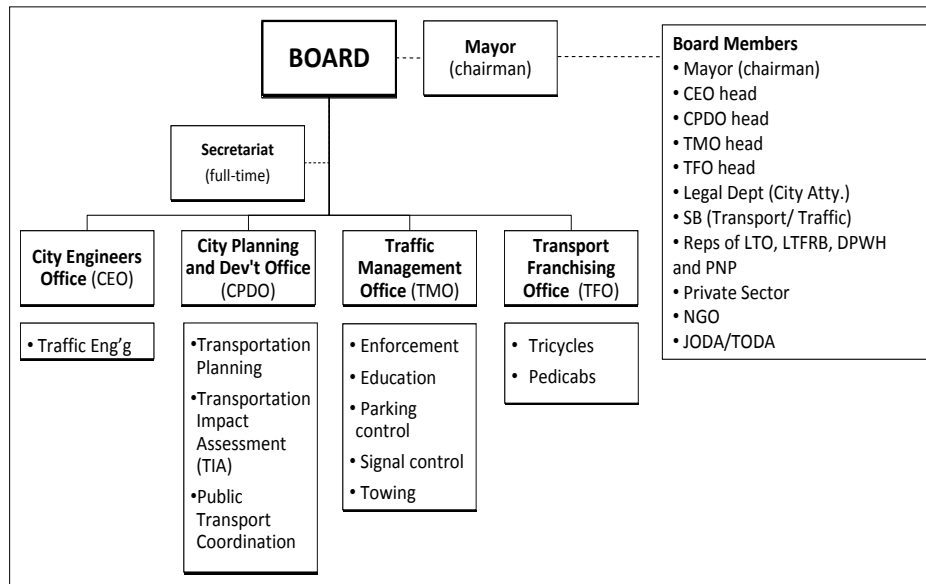
- Evaluate Traffic Impact Assessment (TIA) reports;
- Appear in the hearings of LTFRB to ensure that the issuance of franchises is consistent with the plans of the city; and
- Evaluate requests for variances from the zoning ordinance that are likely to have a significant transportation impact.

8.112 In the area of traffic management, the following functions have been identified:

- Prepare traffic engineering schemes;
- Install and maintain traffic signals, traffic signs, road markings and other devices;
- Recommend ordinances in support of traffic management schemes;
- Help review TIA reports particularly as to the traffic impacts of proposed projects;
- Formulate and implement a traffic education program;
- Assign personnel to control traffic at intersections and other locations requiring such control;
- Enforce traffic rules and regulations; and
- Operate towing units if applicable.

8.113 Two types of organizational structure are considered suitable for a city or municipality to perform the foregoing functions. One option is the creation of an entirely new body to handle all the transport planning and traffic management functions, as practiced by the cities of Cebu and Davao and as proposed by the JICA-funded Small-Scale Traffic Improvement Measures for Metro Manila (2002). The other option is shown in Figure 8.5.3, which has been recommended as part of the World Bank- funded Transport Planning and Traffic Management of Philippine Cities (2008). Common to the two organizational options is the creation of a board that serves as the policymaking body of the LGU in the fields of transport planning and traffic management. The composition of the board is shown in Figure 8.5.3. It has the following functions:

- Review and approve all transport and traffic management plans prepared by the various offices of the city government;
- Cooperate with sectoral committees mandated to review and approve the transport sector components of the City's CLUP and CDP;
- Coordinate, monitor and evaluate the planning and implementation of the city's transport and traffic management plans;
- Review and approve the annual work programs and budgets of offices charged with the planning and implementation of transport and traffic management plans;
- Develop and prescribe internal operating rules and procedures; and
- Perform other related functions.



Source: JICA Study Team.

**Figure 8.5.3 Typical Transport Planning and Traffic Management Body**

8.114 A Secretariat is also proposed to be created to assist the Board, which will be vested with the following functions:

- Serve as the technical arm of the TPTM Board in performing the latter's functions;
- Provide administrative services; and
- Provide management information services.

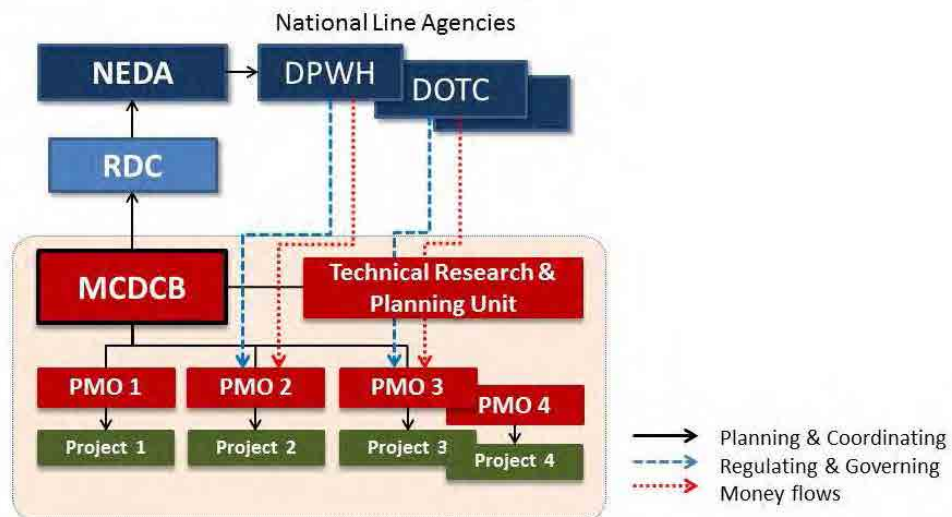
(ii) **Status of Implementation**

8.115 Many LGUs have expressed interest in implementing the recommended institutional reforms. However, this could not be implemented immediately due to budgetary constraints. Once technical personnel are on board, it is understood that these personnel would have to undergo training to equip them with sufficient knowledge in transport planning and traffic management.

8.116 Two academic institutions have been identified to conduct such training. One is the School of Urban and Regional Planning, University of the Philippines (UP) Diliman, which regularly conducts the Short Course on Urban Transport Planning, or SCOUT for short. The other institution is the National Center for Transportation Studies (NCTS), also in UP Diliman, which offers regular and advanced courses in traffic management.

**(4) Project Management Setup**

8.117 For implementation of projects in the Roadmap and of government agencies, a technical research unit will be established in MDCDCB. This office will support and coordinate project implementation across project management offices. A project management setup is proposed in Figure 8.5.4 and its logical framework for foundation of the PMO is presented in Figure 8.5.5.

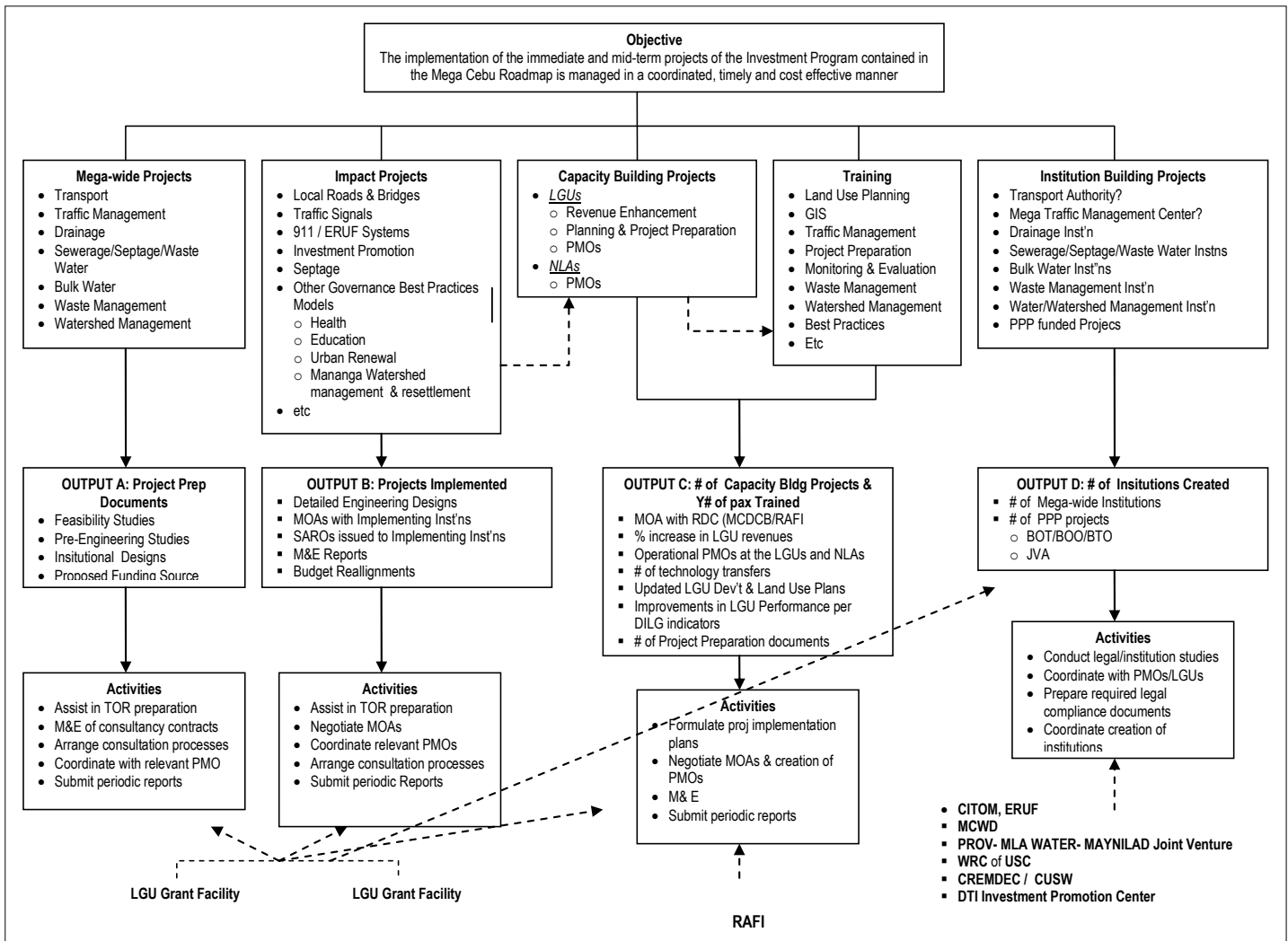


Source: JICA Study Team.

**Figure 8.5.4 Project Management Setup**

8.118 The projects identified in this Study can be implemented without need of resolving a priori the issue of metropolitan governance. There are existing laws that mandate agencies to undertake these projects. In general, the proximate source of funding is also the implementing entity. This “project-based” implementation model is summarized in Table 8.5.1 below.

8.119 For public sector entities, their ultimate funding source is the taxpayers. National agencies received capital funding for projects from the National Treasury through a legal authorization document called the GAA which is enacted by Congress on a yearly basis. Local agencies get their monies from their respective LGU treasuries—which collect local taxes, receive grants, and fund transfers from the National Government through their respective IRA. Government corporations, whether local or national, generate funds from their respective business activities, aside from additional contributions from their respective tier of governments. Any of these entities can incur loans from domestic and international sources. They can also tap private sector in accordance with the BOT Law.



Source: JICA Study Team.

**Figure 8.5.5 Metro Cebu PMO Logical Framework**

**Table 8.5.1 Interim Implementation Arrangements**

Project	Description	Funding	Ownership and Delivery Mechanism
Cebu BRT (committed, but not part of the JICA Study)	Reworking of existing roads, construction of bus stations on medians, acquisition of big buses, upgrade of the city signaling system, O&M of the BRT	DOTC Budget + IBRD Loan	DOTC shall form a Project Management Office in Cebu, which shall be manned by DOTC and City staff, and direct-hire personnel as well as Consultants. A more permanent body, along the lines of a Transport Authority, should be formed.
Traffic Engineering and Management	Geometric improvements of roads, upgrade and expansion of the SMART signalling system + traffic enforcement	DWPH+ LTO+LGUs+ traffic fines and revenues	See above. Private organization can be set up (similar to MAPA of Makati) with cities and business groups as incorporators.
Grade Separation at Key CBD Intersections	Engineering and construction of grade separations in 3 intersections within Cebu City	DPWH Region 7 budget + JICA Loan	A PMO shall be set up by DPWH Region 7, with internal and direct-hire personnel, reinforced by CMS consultants.
4th Mactan Bridge	Engineering and construction of a new bridge on the northernmost part of Mactan (near Consolacion)	DPWH Region 7 budget + JICA Loan	A PMO shall be set up by DPWH Region 7, with internal and direct-hire personnel, reinforced by CMS consultants.
Water Supply	Currently provided by 2 Water Districts, 2 LGU waterwork units, and several private entities		Responsibility lies with the existing Water Districts and LGUs, according to service coverage area; Dominant player is MCWD.
Distribution Block System	Construction of 6 distribution blocks + supporting well		MCWD

Project	Description	Funding	Ownership and Delivery Mechanism
	development, 4 reservoirs and water pipes		
Mananga II Dam	To impound water from the river, in order to supply 77,000 m <sup>3</sup> /day to MCWD service area. Project cost ~ PHP2.3 billion	Cebu Province budget+ PPP	MCWD as 1 <sup>st</sup> option; 2 <sup>nd</sup> option is to create a PMO under the province which will oversee tendering for PPP implementation with assistance from the PPP Center.
Lusaran Dam	Potential for 108,000 m <sup>3</sup> /day water supply for the needs of Metro Cebu. Project cost ~ PHP2.3 billion		
Kotkot Dam	Potential for 54,000 m <sup>3</sup> /day.		
Sewerage			
Septage Treatment Plants	Build septage treatment plants in 7 locations (North 1, North 2, Center 1, Center 2, Mactan, South 1, South 2)	LGU funding+ PPP arrangement	Cooperation between benefitting LGUs with intermediation of Cebu Province and MCDCB. For example, Liloan and Consolacion can join hands for North 2; Naga and Minglanilla for South 1, etc.
Drainage System	Construction of rain water impounding reservoirs	DPWH budget	A PMO shall be set up by DPWH Region 7, with internal and direct-hire personnel, reinforced by CMS consultants
	Construction of drainage systems, by cluster or sub-basin	DPWH budget + LGUs	Same as above.
	Declogging of rivers and drainage pipes	LGUs with support from DPWH	Same as above.

Source: JICA Study Team.

## 2) Development Process of Metropolitan Governance

8.120 In Metro Cebu, an inter-municipal cooperation model of metropolitan governance institution is recommended to be developed first, rather than a metropolitan authority. Thus, the institutional development process for metropolitan governance begins with strengthening MCDCB and then developing policy networks that will form a framework of the metropolitan institution later.

### (a) Step I: Strengthening MCDCB

8.121 Step I is to strengthen the current MCDCB by providing capacity building. MCDCB will be the foundation of an inter-municipal cooperation metropolitan governance, such as MCDL. In addition, MCDCB is important to implement the priority projects and programs of the Roadmap immediately after its completion. In this period, the roles of LGUs and the investment plan in the growth of Metro Cebu in accordance with the Roadmap are clarified. The next section will discuss how to enhance MCDCB.

### (b) Step II: Development of Policy Networks

8.122 Policy networks are developed by sector, consisting of forums where policies and project planning and implementation are discussed and implementing agencies and stakeholders are networked. In each policy network, an organization which is most strongly involved in the sector will play a lead role. The FABCOMs of MCDCB will be enhanced and expanded to develop the policy networks. In this step, the LGUs and other stakeholders may make certain voluntary cooperation agreements for a specific sector. The governing mechanism for MCDL can be explored such as contributions of the member LGUs, mutual development fund, and priority projects and programs. In this step, collaborative political culture will be nurtured in Metro Cebu and major issues should be addressed towards a more integrated model of metropolitan governance.



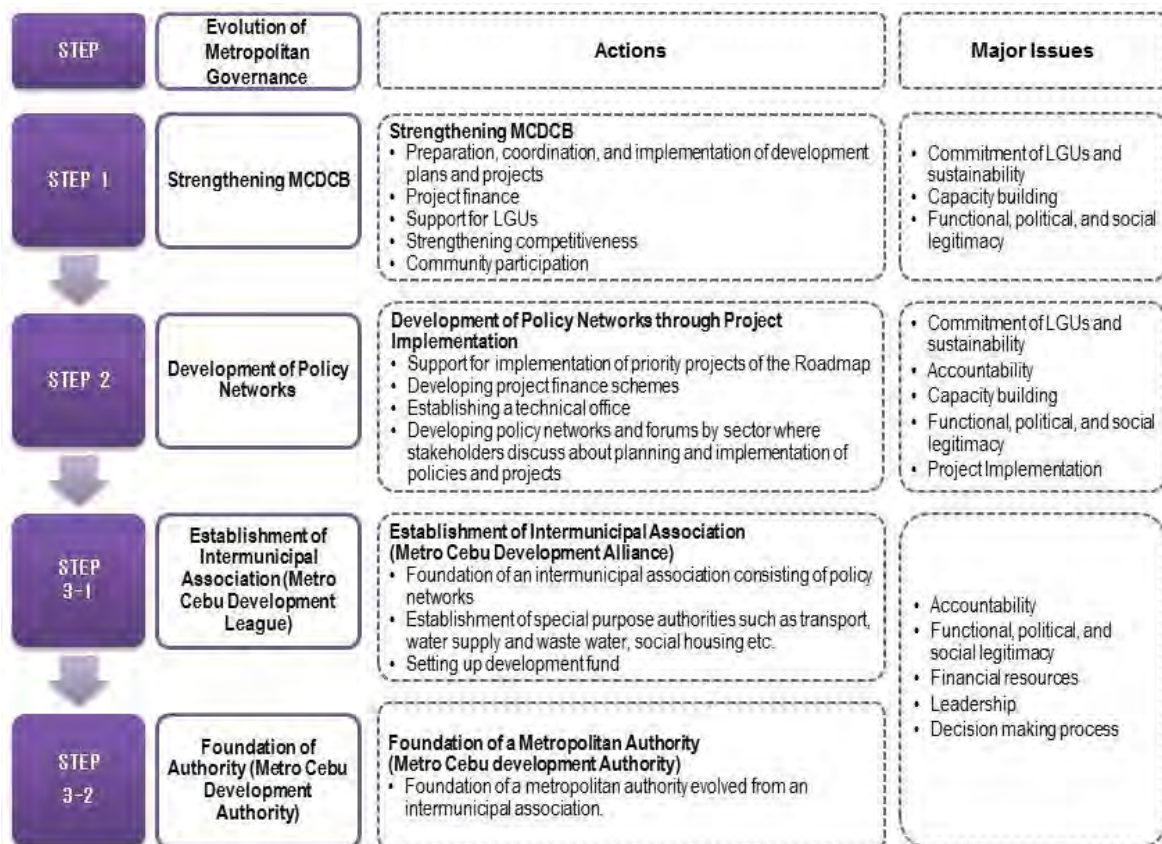
(c) **Step III:** Establishment of Inter-municipal Association (MCDL)

8.123 MCDL will be founded based on cooperation in those policy networks among LGUs and other organizations. MCDL can be developed at the same time when the policy networks are formulated. The policy networks may be reorganized and links among policy networks can be integrated through coordination of policies and project implementation. It is expected that some of the lead organizations in the policy networks will be established as a special authority, such as one which will be responsible for traffic management, water supply and sewerage systems, or social housing provision.

(d) **Step IV:** Establishment of Metropolitan Authority (MCDA)

8.124 Furthermore, as an evolved model of the inter-municipal association, MCDA shall be established for management of the metropolitan area. However, its need, effectiveness and legitimacy concerns must be assessed by scrutinizing the existing political and social situations before making a decision. In addition, there may be a case of installing a metropolitan authority directly from the policy networks, bypassing the inter-municipal association.

8.125 With necessary interventions and adjustments such as strengthening functions, capacity building, and restructuring organizational structure, MCDCB is expected to take a role of secretariat in the foundation and management of policy networks and the inter-municipal local association model. The development process of institutions for metropolitan governance is summarized in Figure 8.5.6.



Source: JICA Study Team.

**Figure 8.5.6 Development Process of Metropolitan Governance Institution**

### 3) Strengthening MCDCB Functions

8.126 The first step in the development of metropolitan governance is to strengthen the functions of MCDCB. Impending issues for implementation of the projects in the Roadmap include building capacity and expanding activities and functions of MCDCB. The areas which need strengthening are as follows:

- (a) **Coordination for Metro-wide Development Plans and Projects:** to support preparation, coordination and implementation of development plans and projects at the metropolitan level;
- (b) **Project Finance:** to develop appropriate project financing schemes such as PPP, for implementation of projects including those proposed in the roadmap;
- (c) **Support for LGUs:** to provide technical advice for development planning and project implementation, identification of project funding, and assistance to capacity building of LGUs;
- (d) **Strengthening Competitiveness:** to conduct and support investment promotion activities, and develop a one-stop center for improvement of competitiveness of Metro Cebu;
- (e) **Community Participation:** to raise awareness on Metro Cebu, and create a sense of unity and belonging to Metro Cebu, through dissemination of the Mega Cebu Vision 2050 and information of the Roadmap, and awareness campaign; and
- (f) **Improvement of the Functions of FABCOMs:** to strengthen the current functions and invigorate activities of the FABCOMs toward development of policy networks.

## 8.6 Sub-Roadmap for Metropolitan Governance

### 1) Goals and Objectives of the Sub-Roadmap for Metropolitan Governance

8.127 The sub-roadmap for metropolitan governance aims at integrated, coordinated and participative governance for sustainable development of Metro Cebu. Harmonized and sustainable development of Metro Cebu requires an effective and sound metropolitan governance which enables various development projects and economic activities of diverse actors to be coordinated and integrated and interrelated and complicated urban problems to be addressed under a holistic approach. The vision of the sub-roadmap for metropolitan governance for 2050 is as follows:

#### (1) Vision of the Sub-Roadmap for Metropolitan Governance

8.128 To develop collaborative, innovative, and accountable metropolitan governance built on participation and partnerships among the LGUs, the private sector, and citizens, for sustainable and integrated development of a competitive, equitable, and livable Metro Cebu.

8.129 The Mega Cebu visioning study conducted by JICA in 2013 identified strategies and targets, and development directions under the four thematic fields of organization, planning, information and management.<sup>84</sup> These four themes will be the pillars for metropolitan governance institution building for Metro Cebu, as presented in Figure 8.6.1.

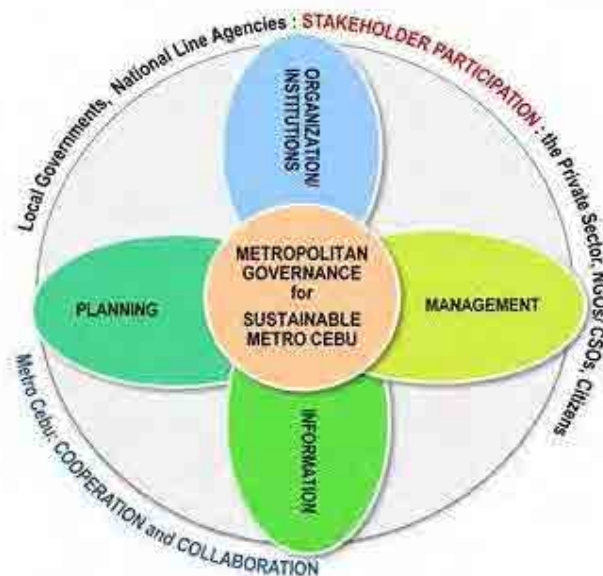
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<sup>84</sup> NIKKEN SEKKEI Research Institute and PADECO Co., Ltd. "Data Collection Survey on Urban Sustainable Environmental Development Strategy in Metro Cebu."(JICA, 2013).

## (2) Strategies and Targets

8.130 Establishment and reinforcement of the governance system and organizations for Metro Cebu through cooperation among the province and 13 LGUs.

- (a) **Organization:** Strengthening the mandate of the organization of a Metro Cebu planning and development body;
- (b) **Planning:** Formulation of a Comprehensive Metropolitan Urban Development Master Plan and Action Plan;
- (c) **Information:** Establishment of an Integrated Metro Cebu Knowledge and Operations Center for the information dissemination, education, branding and marketing; and
- (d) **Management:** Management of programs and projects with guidelines for selection, evaluation and monitoring, and establishment of innovative financing and budgeting system, such as PPP.



Source: JICA Study Team.

**Figure 8.6.1 Four Key Areas for Development of Metropolitan Governance**

8.131 The sub-roadmap for metropolitan governance is divided into three terms: (i) short-term up to 2020, (ii) mid-term until 2030, and (iii) long-term up to 2050. The goals, objectives, and projects and programs in this sub-roadmap by term are discussed in the subsequent sections.

### 2) Sub-Roadmap until 2020

8.132 The following goals, objectives, and projects of the sub-roadmap until 2020 are proposed:

#### (1) Short-Term Goals by 2020

- To develop basic inter-municipal cooperation metropolitan governance institutions for planning, coordination, and project implementation, by identifying the roles of the stakeholders, implementing the priority projects and programs, and providing capacity building.

## **(2) Short-Term Objectives by 2020**

- To strengthen MCDCB through project implementation and capacity building;
- To identify the roles of the LGUs, the private sector, and CSOs in the development of Metro Cebu;
- To implement the strategic priority projects in the Roadmap under the inter-municipal cooperation;
- To develop policy networks for preparation, coordination, and implementation of policies and projects; and
- To establish an inter-municipal association (Metro Cebu Development League) consisting of policy networks.

## **(3) Proposed Projects and Programs**

### **(a) Capacity Building Programs on Metropolitan Management and Governance**

8.133 This will provide capacity building programs and training for relevant organizations, namely MCDCB and the LGUs in Metro Cebu. MCDCB is expected to play a lead role in project implementation of the Roadmap and in building metropolitan institutions. The LGUs shall be also involved in project implementation and contribute to the development of Metro Cebu. Thus, it is necessary to provide capacity building training for MCDCB and the LGUs immediately after the completion of the Roadmap. The capacity building programs would cover the topics of development planning, land use, transport management, project design and financing, business promotion, etc.

### **(b) Preparation Study on Metropolitan Governance Institutions**

8.134 After the completion of the Roadmap, a preparation study on metropolitan governance institutions should be conducted. Building sound and appropriate metropolitan governance requires sufficient preparatory works and careful examination of governance institutions appropriate to social, economic, and political circumstances of Metro Cebu. The scope of this study shall entail analysis of the existing situation, such as political support and awareness on metropolitan issues and needs, examination of institutional options and financial resources, design of an institutional development process and transitional forms of institutions, and an action plan.

### **(c) Establishment of Metro Cebu Information and Knowledge Center for Urban Management**

8.135 A center for growth management, the Metro Cebu Information and Knowledge Center for Urban Management will be established in order to integrate land use, infrastructure development, and environmental management and to regulate development activities by adapting the GIS. The information of development and spatial data will be stored at the Center and used to establish development regulations and manage development activities. Information on disaster management such as hazard maps and records of the past disasters will also be compiled. The member LGUs shall be given access to the database of the Center, while providing local information to the Center. Eventually, the other metro-wide systems such as development permit system and the system for tax collection (e.g., property, business, and development taxes) shall be integrated in

the Center.

**(d) Foundation of the Metro Cebu Traffic Management Center**

8.136 The Metro Cebu Traffic Management Center shall be founded to improve traffic conditions especially in the urban center by integrating the existing traffic control center. This center can be a transitional operation center until a transport authority will be established to be responsible for planning, regulation and operation of the transport sector in Metro Cebu, including the mass transit system proposed in the Roadmap.

**(e) Development of the Global Competitive Center for Metro Cebu**

8.137 It is necessary to develop an investment promotion center, the Global Competitive Center for Metro Cebu, to attract investments and promote industrial development in Metro Cebu. The Center would function as a one-stop shop and be engaged in branding and marketing, consulting services, and other business promotion activities.

**(f) Management/ Coordination of the Priority Project Implementation**

8.138 The priority projects identified in the Roadmap shall be managed and coordinated by PMOs to achieve balanced development of Metro Cebu. The implementation of the priority projects will provide good opportunities to learn intergovernmental cooperation, project financing schemes and management skills, and explore an appropriate institutional setting for metropolitan governance. While implementing the priority projects, institutional issues in concerned sectors should be addressed and efforts must be undertaken to develop institutional assets which could be applied for institutional building for metropolitan governance. Policy networks shall be developed in the process of project preparation and implementation.

**3) Sub-Roadmap until 2030**

8.139 The proposed goals, objectives, and projects of the sub-roadmap until the mid-term target year 2030 are as follows:

**(1) Mid-Term Goals by 2030**

- To consolidate the metropolitan governance institutions, which strategically invest in and implement projects using the Metro Cebu development fund, conduct monitoring and evaluation of development, and update integrated metro-wide development roadmap and investment plans for balanced growth of Metro Cebu.

**(2) Mid-Term Objectives by 2030**

- To strengthen the metropolitan governance institutions based on the evaluation of MCDL's performance so that they are able to lead planning and development of land use, transport, infrastructure, public service provision, environment, and competitiveness in Metro Cebu;
- To establish the Metro Cebu Development Fund for the implementation of projects and programs;
- To conduct monitoring and evaluation of development and the progress in implementation of the Roadmap, and update it under the initiatives of MCDL; and

- To conduct a study on foundation of a metropolitan governance institution, which is evolved from the inter-municipal association, and prepare for its foundation.

### **(3) Proposed Projects and Programs**

#### **(a) Strengthening the Metropolitan Governance Institutions**

8.140 The performance of the metropolitan governance institutions shall be evaluated to take necessary measures for improvement of the metropolitan governance institutions of MCDL. Based on the evaluation of its public service provision, project implementation, status of development, intergovernmental cooperation, etc., MCDL shall be improved by restructuring its organization, conducting capacity building and training, updating investment plans, etc.

#### **(b) Establishment of Monosectoral Authority/ Special Purpose Districts, or Other Core Organizations in Policy Networks**

8.141 Monosectoral authorities or special purpose districts will be established from core or key organizations of policy networks. Previously founded centers, such as the Metro Cebu Traffic Management Center, will be upgraded or reorganized into authorities. These sectoral agencies shall be established along with the progress in project implementation. For example, a transport authority has to be founded with the construction of mass transit systems; a wastewater treatment district shall be established with development of a wastewater treatment plant. The need, timing and design of the authorities should be carefully examined before their establishment.

#### **(c) Establishment of the Metro Cebu Development Fund**

8.142 In order to accelerate implementation of development projects, the Metro Cebu Development Fund shall be established. The member LGUs and other relevant organizations are expected to contribute to establishment of the Fund. Various projects and programs will be implemented using the Fund to address metropolitan issues. An investment plan should be developed to determine the priority projects in Metro Cebu. Equal distribution of the benefits across the member LGUs should be adopted as a principle of operation of the Fund.

#### **(d) Preparation of the Development Regulations and Guidelines**

8.143 Consolidated development regulations and guidelines should be prepared for development control and protection of the environment in Metro Cebu. The results of monitoring and evaluation of development shall be applied for that purpose. Nevertheless, it is the LGUs that enforce such development regulations through land use control and regulation of development permits. Thus, the consensus among the LGUs is indispensable for preparation of regulations and guidelines. Necessary technical and operational capacity of the LGUs should be enhanced for enforcement of the regulations by providing capacity building and training.

#### **(e) Monitoring and Evaluation of the Development**

8.144 Monitoring and evaluation of the development are necessary for the balanced growth of Metro Cebu. The Metro Cebu Information and Knowledge Center for Urban Management, once it is established, is expected to play a key role

in monitoring and evaluation through analysis of GIS data accumulated there. This monitoring and evaluation would provide important inputs for the preparation of development control regulations and updating of the Roadmap.

**(f) Review and Update of the Metro-wide Roadmap**

8.145 The Roadmap shall be reviewed and updated every five years. A decade after its completion, the Roadmap or any other metro-wide development plans including action and investment plans would require a comprehensive review. Meanwhile, during the updating of the CLUP of each LGU, the land use and development of Metro Cebu and metro-wide impact of certain developments in each LGU should be examined for a more consistent spatial structure and land use development. Technical support shall be provided to the LGUs, if necessary.

**(g) A Study on Development of a Metropolitan Authority (Metro Cebu Development Authority)**

8.146 A study on the development of MCDA shall be conducted. If the performance evaluation of the metropolitan governance institutions, i.e., MCDL, reveals that the current institutions would not be able to address metro-wide issues and identifies a need to develop a more consolidated authority, a study should be conducted to examine an appropriate organizational structure of the authority, mandates and authority, financial sources, decision-making mechanism, expected impacts and cost caused by it, required legal action, and an institutional development plan.

**4) Sub-Roadmap until 2050**

8.147 The following goals, objectives, and projects of the sub-roadmap until the long-term target year of 2050 are proposed:

**(1) Long-Term Goals by 2050**

- To build collaborative, innovative, and accountable metropolitan governance institutions which could contribute to building competitive, livable, and sustainable Metro Cebu.

**(2) Mid-term Objectives by 2030**

- To scale up the functions of the metropolitan governance institutions to integrate all development and investment plans and activities, and to achieve efficient and strategic use of financial and human resources and environmental and spatial assets in Metro Cebu; and
- To establish MCDA evolved from the inter-municipal association.

**(3) Proposed Projects and Programs**

**(a) Establishment of a Metropolitan Authority, the Metro Cebu Development Authority**

8.148 MCDA shall be established from MCDL. From the study and evaluation of the performance of MCDL, the appropriate organizational structure and decision making process should be determined. The monosectoral authorities and special purpose districts such as the transport authority and water district can be integrated into MCDA. Upon its establishment, various issues concerned with the

authority, in particular, political, functional and social legitimacy and accountability must be addressed.

**(b) Provision of Capacity Development and Institutional Development to MCDA**

8.149 Capacity building, training and institutional development support should be provided for MCDA to assist in its transition and commencement of its operation. The areas of the capacity building and institutional development shall be determined in line with the mandates and functions of MCDA.

**(c) Assessment of Development Progress and Issues, and Update of Metro-wide Development Plans and Roadmap of Metro Cebu**

8.150 The development progress and issues in Metro Cebu will be evaluated to revise metro-wide development and investment plans. A new Roadmap should be prepared by defining an updated vision, goals, socioeconomic framework, and sub-roadmaps.

**(d) Assessment of Performance of MCDA**

8.151 The performance of MCDA shall be periodically assessed and measures should be taken to address its issues and constraints, if needed. The performance evaluation would cover public service provision, information dissemination and accountability, project implementation, carbon emission, public finance, livability, etc.



## **9 SELECTION OF SHORT-TERM PRIORITY PROJECTS**

### **9.1 Rationale**

9.1 There are huge backlogs in infrastructure development in Metro Cebu which degrade people's lives and the metropolitan economy. One reason is the incomplete implementation of the projects proposed under the Metro Cebu Development Project (MCDP) and the absence of a follow-on project of that magnitude since the project ended in the late 1990s. Therefore, some projects identified in the Roadmap Study need to be implemented early in order to jumpstart MCDCB's initiatives for the Mega Cebu Vision 2050.

9.2 The Study developed the Roadmap towards 2020, 2030 and 2050 and the sectoral sub-roadmaps that include proposed projects for short, medium and long term implementation. Candidate projects for the pre-feasibility study (Pre-FS) were identified from among the key sectors in the Study, including public transport, road network, water supply, stormwater and wastewater management, solid waste management, etc.

9.3 To enable early project implementation, Japan's ODA loan can be tapped as one of the possible resources. For bilateral project coordination, proposed projects must at least be prepared at pre-FS level with supporting documents including engineering design, cost estimate, implementing body, economic/ financial analysis, and natural/ social environmental considerations.

### **9.2 Identification of Projects Subject to Pre-FS**

9.4 The short-term priority projects have been extensively discussed at the following three meetings:

- (i) 1st JICA study seminar on January 30, 2014 (90 participants);
- (ii) MCDCB's first workshop on February 27, 2014 (50 participants); and
- (iii) MCDCB's second workshop on March 7, 2014 (50 participants).

9.5 At the meetings, JST presented the following suggested criteria for identifying projects needing pre-FS:

- (i) Importance among the key sectors under the Mega Cebu development context;
- (ii) Urgency to solve apparent critical problems;
- (iii) Balanced development in Metro Cebu;
- (iv) Scale of projects which are beyond the city's/municipality's financial capability and suitable for Japan's ODA loan; and
- (v) Readiness of projects for plan preparation.

9.6 At the first workshop, numerous project ideas were expressed among the participants. Some similar project ideas were consolidated. As a result, some 50 projects were identified in the long list.

9.7 At the second workshop, the participants were grouped according to four key sectors and metropolitan management. They discussed the nature of the projects as to their metropolitan significance and prioritization perspective. This resulted in a shorter list of 20 priority projects, as shown in Table 9.2.1. However, only the project names were listed without the project profiles.

**Table 9.2.1 Priority Projects Identified by Workshop Participants on March 7, 2014**

1. Public Transport	2. Road Network	3. Water	4. Solid Waste Management	5. Metro Management
2.1.1 Consolacion International Port	1.1.1 3rd Cebu-Mactan Bridge/ Bridge or Tunnel from Cebu City to Cordova/ 3rd Mactan Bridge with Rail	3.1.1 Additional water supply intended for central area (preferably from dam/surface)/ Expansion of distribution lines to cater to more people	4.1.1 Sanitary Landfill	5.1.1 Intelligent Operations Center
2.3.8 Carcar City Public Transport Building and Facilities	1.2.1 Coastal Road (Cebu City–Mandaue-Liloan)	3.1.4 Ecotourism Parks that also serve to protect key waterways/ ecological preservation - green open space/ wildlife corridor along 5 rivers (mountain to coast)	4.1.2 SWM Technology Processing Plastic Waste	5.1.2 Development of SRP/Creative Design Hub in SRP/ Filling up of Pond along SRP/ Economic Incentive for Investors
2.5.1 Network Efficiency Improvements/ Area/ Automated Transport Control/ Intelligent Transport System (ATC/ITS)	1.2.4 Scenic Coastal Road (Mandaue Reclamation, around Cansaga Bay)	3.2.1 Septage and Sewerage Treatment Plants/ Minglanilla Sewerage and Drainage Project	4.1.3 Multiple MRF/ Solid Waste Transfer Station with Landfill and Toxic Landfill Dumpsites	5.1.3 Heritage District (San Nicolas/ Parian)
2.5.2 Strategic Parking Plans	1.3.1 (Inner) Circumferential Road/ Cebu Circumferential Road		4.1.4 Waste to Energy Facility	5.1.4 Mega Cebu Land Use Plan
2.5.4 Long-Term Plan: Demand Management and Reducing the Need to Travel	1.3.5 Green Corridor/ Green Loop			
	1.4.1 Access from SRP to Pardo (4th Access)			
	1.4.5 Access Road from Brgy. Tungkop and Tulay, Minglanilla to SRP			

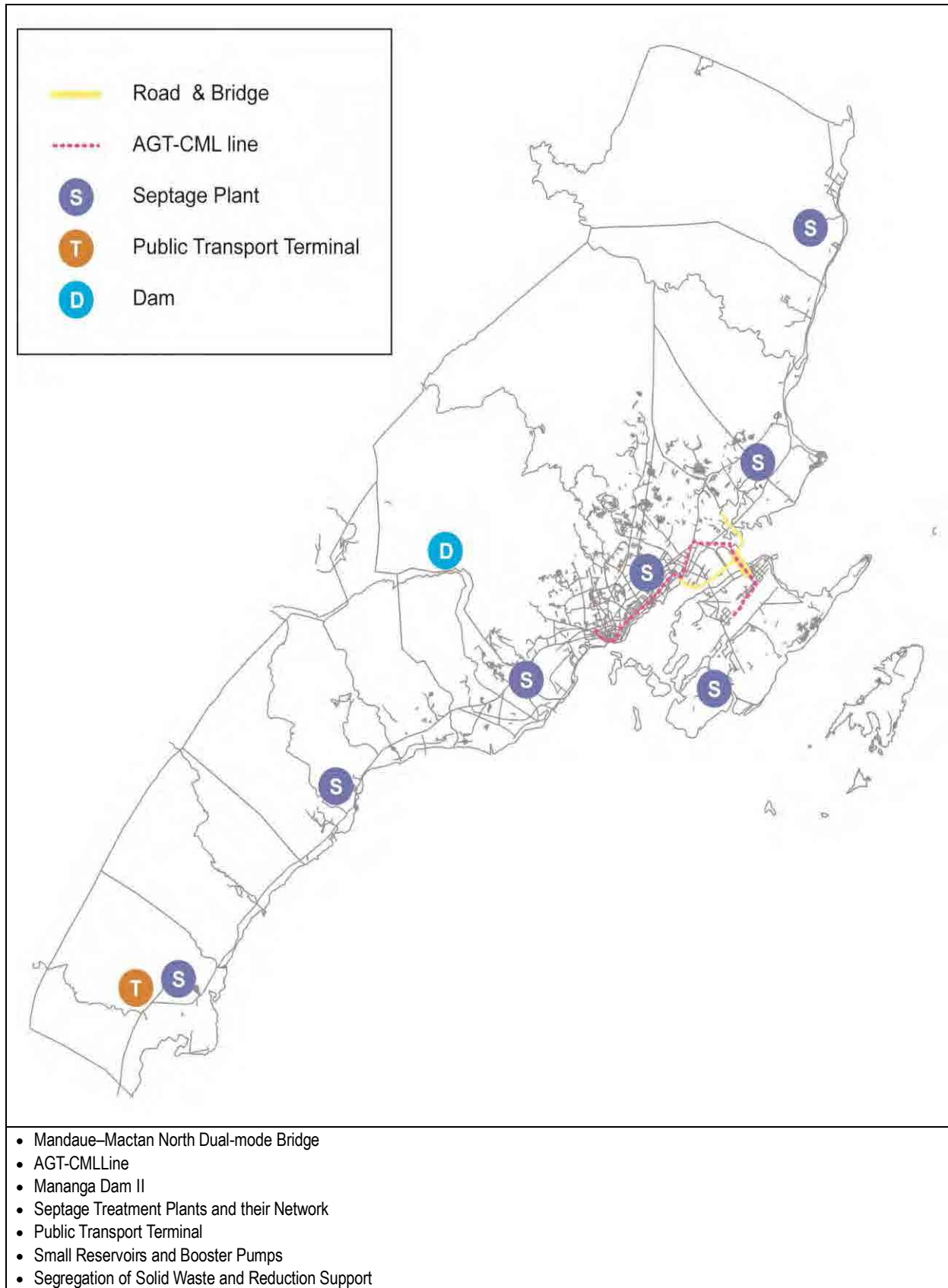
Source: Ramon Aboitiz Foundation, Inc. (RAFI).

9.8 JST recommended the following projects subject to pre-FS for inclusion in the priority project list, except for metropolitan management project (see Figure 9.2.1 for their site locations):

- (i) Mactan dual-mode bridge (9.1.1 in Table 9.2.1);
- (ii) Public transport terminals (10.3.8);
- (iii) Mananga II Dam (11.1.1);
- (iv) Small reservoirs and booster pumps (11.1.1);
- (v) Septage treatment plants (11.2.1);
- (vi) Solid waste separation and reduction support (12.1.2 and 12.1.3); and
- (vii) Metro Cebu urban development body.

9.9 With regard to the Mactan Dual-Mode Bridge, JST received a comment that the project viability largely depends on the rail project. In response, the AGT-CML Line Project has been additionally examined.

9.10 The rest of the priority projects were subjected to further study such as project profiling and implementation modalities, for possible inclusion in the final Roadmap.



Source: JICA Study Team.

**Figure 9.2.1 Location of Priority Projects Subject to Pre-FS**



## 10 MANDAUE–MACTAN DUAL-MODE BRIDGE

### 10.1 Project Background and Location

10.1 The Mactan link is strategically important to the Metro Cebu economy. In Mactan Island are located an international airport, three industrial estates, and many world-class resort hotels.

10.2 The First Mandaue–Mactan Bridge was built in 1972 with a 2-lane carriageway. In 1990, one vessel accidentally hit the bridge during Typhoon Ruping, rendering the bridge structure weak and able to allow only trucks of less than 5 tons. In 1993, the government decided to build the second bridge through a Japanese ODA loan. The Second Mandaue–Mactan Bridge or Marcelo Fernan Bridge was opened in 1999 with a 4-lane carriageway. Since its structural weakness is obvious even by ocular survey, the First Mactan Bridge should be closed for full rehabilitation, in theory. As a matter of fact, however, the Second Mactan Bridge alone cannot cope with the present inter-island traffic. As a practical solution, a new bridge will be constructed as soon as possible while the old bridge will be carefully operated with partial repair and maintenance works. When a new bridge is available, the old bridge can be closed for full rehabilitation or replacement at the responsible agency's discretion.<sup>1</sup>

10.3 The traffic survey in February 2014 shows that the daily traffic on the second bridge is larger than that of the first bridge, i.e., 41,549 vehicles and 38,284 vehicles, respectively. The first bridge shows a daily traffic congestion of less than 20 km/hour, particularly in the afternoon from Mandaue to Mactan. After some years, both bridges would be congested due to population growth and increased airport passengers generated by Cebu's booming industrial and tourism industries. A new bridge will be necessary to serve this increased Mactan link traffic.

10.4 A new international container port is planned at Tayud, Consolacion. In February 2014, NEDA's PPP Center approved the project proposal from DOTC. After the container terminal relocation, the Cansaga Bay Bridge and the Cebu North Coastal Road between Mandaue City and Liloan would become more important.

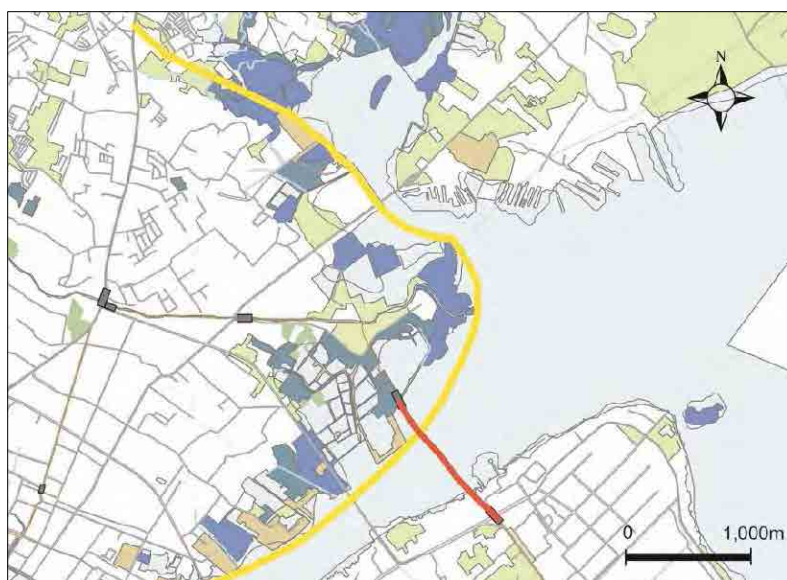
10.5 To strengthen the local road network around Cansaga Bay and Mactan Strait, Mandaue City proposes the Scenic Coastal Road. Along the road, the city intends to promote reclamation with urban development and preserve mangrove forests as water parks. The section between the Second Mandaue–Mactan Bridge and the Cansaga Bay Bridge of the Scenic Coastal Road can offer a diversion route between North Cebu Province and Mactan Island, particularly between the new Consolacion container terminal and Mactan Export Processing Zone (EPZ) I and II. This can mitigate road traffic congestion at the center area of Mandaue City. Therefore, part of the Scenic Coastal Road is considered an important access road to the new bridge.

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<sup>1</sup> DPWH Central Visayas Office will start to repair the First Mactan Bridge in 2015. It costs PHP154 million. Only one vehicle lane will be operated during repair works. Subsequent repair works from 2016 are still uncertain.

10.6 The Mactan Cebu International Airport (MCIA) handled 7.0 million passengers in 2014. MCIA will construct a new terminal under a PPP scheme and the existing and new terminals will handle over 20 million passengers. Cebu is a convenient destination by seaways as well as sea-cum-roads or vehicles on Roll-On/Roll-Off (RO-RO) ships at short seaways. Air travel is deemed more affordable for time-conscious people. Considering the huge volume of traffic across the Mandaue–Mactan link brought about by the increasing population, physical and economic development in Metro Cebu, a high-capacity bridge is needed. Therefore, it is suggested that a new bridge be designed to have a vehicle carriageway and railway substructure.

10.7 Taking the aforementioned into account, the most suitable alignment for the new bridge is about 900 m north from the second bridge. This alignment is not new since the JICA-assisted DPWH Master Plan of High Standard Highway in 2010 had already planned a new bridge on the same alignment. The dual-mode bridge of road and rail, however, is a new concept. Figure 10.1.1 shows the location of the bridge along the Scenic Coastal Road.



Source: JICA Study Team.

**Figure 10.1.1 Dual-Mode Bridge and Scenic Coastal Road Development Plan**

## 10.2 Traffic Demand Forecast

10.8 Road traffic on the Mactan link has been increasing sharply. For instance, vehicular traffic increased by 4.6 times between 1992 and 2014.

10.9 Recent data point to the phenomenal growth of motorcycle traffic. The February 2014 traffic survey counted 25,355 motorcycles passing daily on the first bridge and 20,073 motorcycles on the second bridge. One can presume that many commuters cannot rely on the existing public transport services anymore and, thus, resort to their own means of affordable transport. In the 1990s, when the second bridge was designed and constructed, motorcycles were marginal. They were omitted in transport planning works. Today, the motorcycle is a prevailing means of transportation, at least at the Mactan link. It must be an important consideration in demand and capacity analysis. According to relevant DPWH guidelines, one motorcycle is calculated as 0.4 passenger car.

10.10 A multi-regression model is developed to explain past traffic trends and predict

future traffic demand. The model has two coefficients indicated in the formula below: aggregated population of Cebu City, Mandaue City and Lapu-Lapu City, and MCIA passengers. As a result, the correlation between the Mactan link traffic and the two coefficients in the past is sufficiently high ( $R^2=0.98$ ).

$$(Formula) \quad Y = 0.01486 \times X1 + 0.007775 \times X2$$

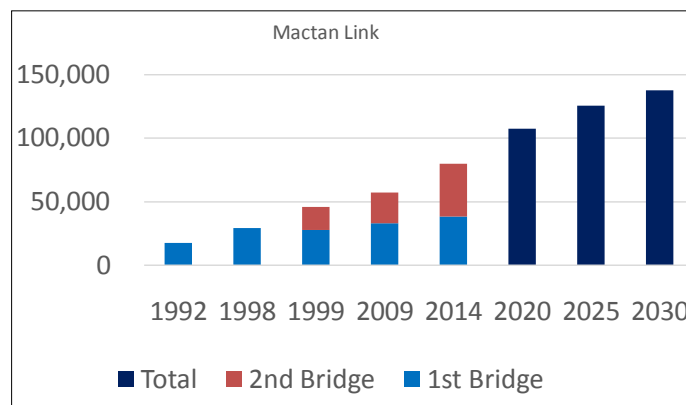
Where: Y means Mactan Link vehicular traffic/ day

X1 means aggregated population of Cebu, Mandaue and Lapu-Lapu

X2 means MCIA passengers

10.11 The model projects 107,217 vehicles/ day in 2020 or 34% bigger than the 2014 traffic (see Figure 10.2.1). The existing two bridges cannot support the year 2020 projected traffic. It is suggested that a new bridge start operating in 2020.

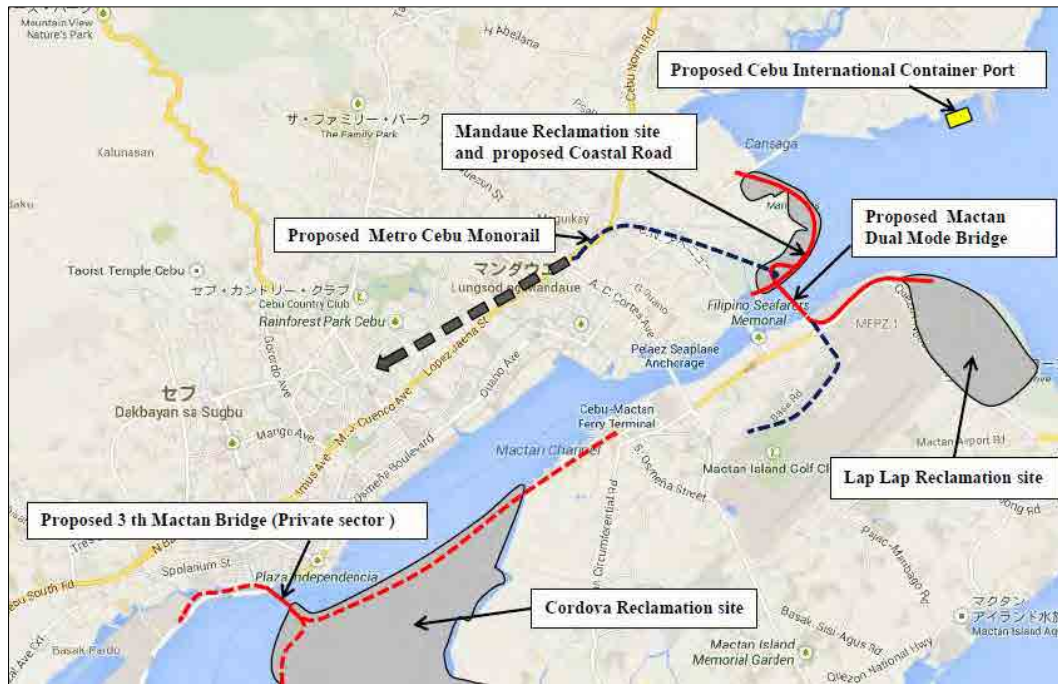
10.12 The model projects 137,371 vehicles/ day in 2030 or 72% bigger than the 2014 traffic. It should be noted that the model does not pay attention to vast reclamation potentials of Mactan Island.



Source: JICA StudyTeam.

**Figure 10.2.1 Mactan Link Traffic (Past Records and Demand Forecast)**

10.13 There is a so-called Third Mactan Bridge Project proposed between Cebu City and Cordova. There is a distance of approximately 10 km between the proposed dual-mode bridge and the third bridge which will be able to promote development at the southern part of Mactan Island including reclamation (see Figure 10.2.2). These two projects have different demand segments and both will be necessary in the Metro Cebu urban structure.



Source: JICA StudyTeam.

**Figure 10.2.2 Proposed Dual-Mode Bridge and Proposed Third Mactan Bridge**

## 10.3 Project Plan

### 1) Project Site

10.14 The Dual-Mode Bridge will utilize a combination of road and Automated Guideway Transit (AGT) system. The AGT system will be connected from MCIA via Mandaue to the Cebu CBD. The road will be connected from the industrial area of Lapu-Lapu City in Mactan to Mandaue’s Scenic Coastal Road and also with the Cebu North Coastal Road. The proposed new international container port is located nearby.

### 2) Selection of Main Bridge Type

10.15 The study has compared some bridge types. The comparison aspects are technical applicability particularly under aviation height restriction of 45 m due to MCIA operation, construction cost, and applicability to JICA STEP loan.<sup>2</sup> The comparison results are shown in Table 10.3.1. A high strength boltless steel truss with steel box girder bridge is recommended as the main bridge structure. Since it is boltless, the bridge can be constructed for a short period on site while saving maintenance cost through a longer interval of periodic maintenance.

<sup>2</sup> Special Terms for Economic Partnership (STEP) is extended to the projects for which Japanese technologies and know-how are substantially utilized, based on the recipient countries' request to utilize and transfer excellent technologies of Japan. STEP's preferential conditions to the Middle Income Countries including the Philippines are interest rate of 0.1%, repayment period of 40 years, and grace period of 10 years.



**Table 10.3.1 Comparison of Main Bridge Types**

	Bridge Type	Span	Aviation Height Restriction	Cost (PHP Bil)	Applicability to JICA STEP Loan
1	Extradosed Girder Bridge	200 m (380 m)	Tower height is less than 45 m	9.22	△
2	High Strength Boltless Steel Truss with Steel Box Girder	250 m (420 m)	Highest point of truss is less than 45 m	7.24	◎ Recommended
3	Pre-stressed Concrete Stayed Cable Bridge	300 m (500 m)	Tower height is more than 45 m	16.91	X

Source: JICA StudyTeam.

### 3) Project Description

10.16 The proposed bridge and approach length is approximately 420 m main bridge (center span 250 m) + 3 km (approach viaduct and Scenic Coastal Road viaduct) and will have a four-lane roadway and a two-way AGT.

10.17 Detailed descriptions of road, structure and principal materials are indicated below. The main bridge perspective is shown in Figure 10.3.1 and its design in Figure 10.3.2.

#### (a) Road Characteristics

10.18 This connecting road will have the following characteristics:

- (i) Design Speed 80 km/h (Main Road) 40 km/h (Ramp)
- (ii) Right-of-Way Width W = 30 m
- (iii) Lane Number and Width W = 3.5 m x 4 lanes
- (iv) Horizontal Alignment for Main Road Minimum Curve Radius R = 300 m
- (v) Horizontal Alignment for Ramp Minimum Curve Radius R = 40 m
- (vi) Vertical Alignment for Main Road Maximum Gradient i = 4 %
- (vii) Vertical Alignment for Ramp Maximum Gradient = 6 %
- (viii) Marine Navigation Restriction H = 23 m, W=200 m
- (ix) Aviation Height Restriction H = 45 m from mean sea level
- (x) Within 4 km radius of runway

#### (b) Structure Type

10.19 The structure type of this bridge and viaduct is as follows:

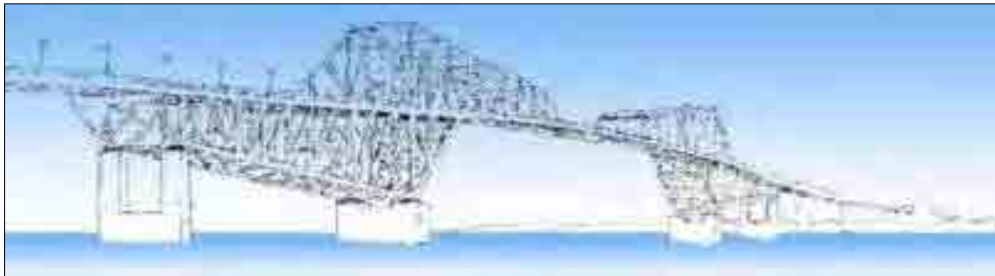
- (i) Approach Road Viaduct: Concrete T-shaped Pier with P/S Concrete Beam  
 Cast-in-Place Concrete Pile  
 Pre-stressed Concrete AASHTO Standard I-Girder
- (ii) Steel Truss Bridge: Steel Pipe Sheet Pile Caisson Foundation  
 High Strength Boltless Steel Truss with Steel Box Girder
- (iii) Side Span: Steel Pipe Sheet Pile Caisson Foundation  
 High Strength Boltless Steel Box Girder

#### (c) Principal Materials

10.20 The structure's principal materials are shown below:

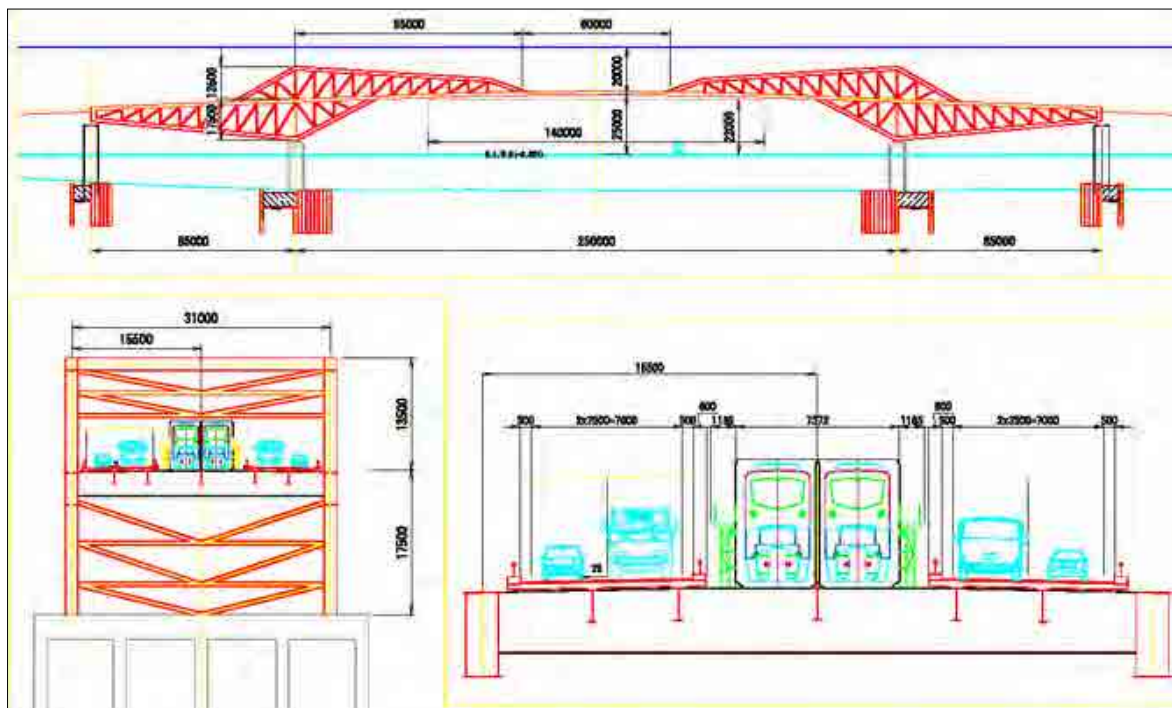
- Concrete ck = 400 kg/cm<sup>2</sup>
- Prestressing Steel Wire 12-φ12.7mm

- Reinforcing Steel Bar SD 345
- Structural Steel SS 400, SM 490, SBHS 700W  
 (SBHS=Steel for Bridge High Performance Structure)



Source: JICA StudyTeam.

**Figure 10.3.1 Mandaue–Mactan Dual-Mode Bridge Perspective**



Source: JICA StudyTeam.

**Figure 10.3.2 Main Bridge Design by High Strength Boltless Steel Truss with Steel Box Girder**

#### 4) Project Costs

##### (a) Civil Works Cost

10.21 The civil works cost is estimated for a bridge structure design that can already accommodate an AGT system. Inasmuch as the AGT is basically under DOTC, the coordination between DPWH for the bridge and DOTC for the mass transit will bring about huge savings and ease of implementation for both.

10.22 The following civil works cost for the Dual-Mode Bridge is estimated based on component costs listed in Table 10.3.2:

- Main Bridge: 420 m x 31 m x PHP420,000/m<sup>2</sup> = PHP5,468,400,000
- (Cost for AGT Part: 420 m x 9.9 m x PHP420,000/m<sup>2</sup> = PHP1,746,360,000)
- Approach Bridge: 395 m x 31 m x PHP150,000/m<sup>2</sup> = PHP1,836,750,000

- (Cost for AGT Part:  $395 \text{ m} \times 9.9 \text{ m} \times \text{PHP}150,000/\text{m}^2 = \text{PHP}586,575,000$ )
- Ramp Bridge:
  - A-ramp:  $434 \text{ m} \times 7 \text{ m} \times \text{PHP}90,000/\text{m}^2 = \text{PHP}273,420,000$
  - B-ramp:  $257 \text{ m} \times 7 \text{ m} \times \text{PHP}90,000/\text{m}^2 = \text{PHP}161,910,000$
  - C-ramp:  $228 \text{ m} \times 7 \text{ m} \times \text{PHP}150,000/\text{m}^2 = \text{PHP}239,400,000$
  - D-ramp:  $218 \text{ m} \times 7 \text{ m} \times \text{PHP}150,000/\text{m}^2 = \text{PHP}228,900,000$
  - E-ramp:  $499 \text{ m} \times 7 \text{ m} \times \text{PHP}150,000/\text{m}^2 = \text{PHP}523,950,000$
  - F-ramp:  $802 \text{ m} \times 7 \text{ m} \times \text{PHP}150,000/\text{m}^2 = \text{PHP}842,100,000$
- Scenic Coastal Road Viaduct:
  - $2,100 \text{ m} \times 17 \text{ m} \times \text{PHP}90,000/\text{m}^2 = \text{PHP}3,213,000,000$
- Total Civil Works Cost:  $\text{PHP}12,787,830,000$  (AGT Part =  $\text{PHP}2,332,935,000$ )

**Table 10.3.2 Unit Cost for Each Case of Bridge and Viaduct Construction**

Item	Unit Cost (PHP)	Note
Lane at-grade	10,000 *	With reference to NRIMP 2 Marcos Highway Rehabilitation Project and CLEX Feasibility Study
Viaduct: Second Level (over land)	90,000 *	With reference to C2/R7 Flyover Projects and NLEX-SLEX Connector Projects
Viaduct: Second Level (over water)	150,000 *	Additional cost to account for crane way in canal/construction from barges and soft ground conditions
Long Span Bridge: Fourth Level (over water)	420,000 *	Additional cost to account for crane way in canal/erection or construction from barges and sub-structure need special method
On/off Ramp: Second Level	150,000,000 **	Assuming 6.0 m width, 250.0 m long ramp
On/off Ramp: Third Level	300,000,000 **	Assuming 6.0 m width, 500.0 m long ramp

Source: JICA StudyTeam.

Note: \* (PHP/m<sup>2</sup>);\*\* (PHP/ramp).

10.23 To stress the importance of combining the bridge and AGT structures, the cost of the dual-mode structure would mean a reduction of about 12% construction cost as compared to the case if both structures would be built separately. This cost is estimated as follows:

- (i) Main Bridge:  $420 \text{ m} \times 31 \text{ m} \times \text{PHP}420,000/\text{m}^2 = \text{PHP}5,468,400,000$
- (ii) Reduced cost for main bridge =  $\text{PHP}656,208,000$
- (iii) Approach Bridge:  $395 \text{ m} \times 31 \text{ m} \times \text{PHP}150,000/\text{m}^2 = \text{PHP}1,836,750,000$
- (iv) Reduced cost for approach bridge =  $\text{PHP}220,410,000$
- (v) Total  $\text{PHP}876,618,000$  is the savings for a combined structure.

**(b) Right-of-Way (ROW) Cost**

10.24 It is reported that the landowners for the proposed Mandaue Scenic Coastal Road between the second bridge and the Cansaga Bay Bridge and the ramp site of the dual-mode bridge at the Mandaue side are Mandaue City and the Philippine Government. Land acquisition is necessary only for the Lapu-Lapu side.

10.25 Based on the unit costs in Table 10.3.3, the ROW cost for the Dual-Mode Bridge is estimated below.

10.26 ROW Cost :  $474 \text{ m} \times 30 \text{ m} \times \text{PHP}6,000/\text{m}^2 = \text{PHP}85,320,000$

**Table 10.3.3 Unit Costs for ROW Acquisition**

Item	Unit Cost (PHP/m <sup>2</sup> )	Note
CBD Cebu City	50,000	Assumption based on RDO No.81
Other Cebu City	15,000	Assumption based on RDO No.81
Center of Mandaue City	10,000	Assumption based on RDO No.81
Other Mandaue City and Lapu-Lapu City	6,000	Assumption based on RDO No.81
All other LGUs	2,000	Assumption based on RDO No.81

Source: JICA Study Team.

**(c) Project Cost**

10.27 The project cost for the Dual-Mode Bridge is summarized in Table 10.3.4.

**Table 10.3.4 Summary of Project Costs for Dual-Mode Bridge**

Category	Foreign Currency (JPY million)	Local Currency (PHP million) <Tax>	Total Amount (JPY million)
1. Civil Works	25,000	512 <1,406>	29,412
2. Price Escalation	1,808	61 <167>	2,333
3. Contingency	1,250	26 <70>	1,471
4. Engineering Services	807	408 <28>	1,809
5. Land Acquisition	0	85 <0>	196
6. Administrative Cost	0	256 <0>	588
Total	28,865	1,348 <1,671>	35,809

Source: JICA Study Team.

Notes:

1. Exchange Rate: PHP1.00 = JPY2.30 (USD1.00 = JPY103.00) (USD1.00 = PHP45.00)
2. Base Year: March 2014
3. Price Escalation: 1.3% for Foreign and 2.1% for Local Currency
4. Physical Contingency: 5% for Foreign and Local Currency
5. Administration Cost: 2% of Civil Works
6. The amount of <tax> is a separate item of Local Currency

**(d) Maintenance Cost**

10.28 Routine maintenance cost is applied at 0.2% of civil works cost per year and periodic maintenance cost is applied at 1% of civil works cost every 10 years.

## 10.4 Project Implementation Schedule

10.29 The standard project implementation schedule for this project is as follows (see Table 10.4.1):

- (i) JICA Preparatory Study: 7 months
- (ii) NEDA Approval: 3 months
- (iii) Loan Agreement (EN and LA): 1 week
- (iv) Procurement of Consultant for D/D: 9 months
- (v) D/D and Tender Documents: 12 months
- (vi) Tendering (PQ and Bidding): 6 months
- (vii) Construction: 24 months

**Table 10.4.1 Implementation Schedule of the Dual-Mode Bridge Project**

	2015	2016	2017	2018	2019	2020	2021
JICA Preparatory Study	■						
NEDA Approval		■					
Loan Agreement		▲					
Procurement of Consultant for D/D		■					
D/D and Tender Document			■				
Tendering (PQ & Bidding)				■			
Construction				■	■	■	
Operation						■	■

Source: JICA Study Team.

## 10.5 Economic Assessment of the Dual-Mode Bridge Project

### 1) Project Costs and Implementation Period

10.30 Table 10.5.1 presents the estimated economic project costs for the Dual-Mode Bridge. At this preliminary cost stage, an equivalent of 85% of the financial cost for civil works, physical contingencies, and engineering services was adopted for conversion to its economic terms. Likewise, the conversion factor applied to the operating and maintenance (O&M) cost is also 85% (see Table 10.5.2).

10.31 The implementation period of the project is assumed to commence in the last quarter of 2018 for construction and operation to start in 2020.

**Table 10.5.1 Estimated Economic Cost of the Dual-Mode Bridge Project  
(In constant 2014 prices)**

Items	Financial Cost (PHP million)	Economic Cost (PHP million)
Civil Works	10,455	9,239
Land Acquisition	85	85
Physical Contingency	35	30
Total Construction Cost	10,575	9,354
Engineering Services	767	652
Administrative Cost	210	210
Total Project Cost	11,552	10,216

Source: JICA Study Team's estimates.

**Table 10.5.2 Estimated Operating and Maintenance Cost**

Items	Financial Cost (PHP million)	Economic Cost (PHP million)
Routine Maintenance 2022–2047	614	522
Periodic Maintenance 2022–2047	256	217
Total O&M Cost	870	739

Source: JICA Study Team's estimates.

## 2) Economic Benefits of the Project

10.32 The main economic benefits of the project emanate from the savings owing to the reduction in vehicle operating cost (VOC) and value of time cost (VOT). The construction of the new bridge connection between Mandaue City (and rest of Metro Cebu) and Lapu-Lapu City is expected to reduce traffic volume on the other two bridges and segments of the road network, which in turn will result in shorter travel times and faster vehicle operating speed. The shorter travel time translates to lower traveling time costs, while the faster vehicle speed implies lower operating costs. The values of these economic benefits are based on available information on time cost and VOC per trip.

10.33 In addition to these benefits, other positive impacts are accrued with the project but cannot be quantified at this point in time such as the reduction in carbon dioxide emissions, savings from accidents that are avoided, reduction in road maintenance for many sections of roads in the area network, and other benefits.

10.34 In the process of calculating the core benefits of the project, the unit VOCs and VOTs were estimated. The unit VOCs were based on the average operating costs of a representative set of vehicles (see Table 10.5.3) commonly used in the Philippines. The cost items that were considered in the computation were: (i) fuel cost, (ii) lubricant cost, (iii) tire cost, (iv) repair cost, (v) depreciation cost, (vi) capital opportunity cost, (vii) overhead cost, and (viii) crew cost. The results of the computation were consolidated and expressed as a function of travel speed.

**Table 10.5.3 Unit VOC in the Philippines, 2013**  
 (In PHP /1,000 km)

	Speed	Motor cycle	Car	HOV/Van	Jeepney	Standard Bus	Small Truck	Big Truck
	(km/hour)							
Financial Cost	5	11,868	37,303	59,561	50,300	100,491	162,488	197,130
	10	6,918	22,622	33,840	30,010	58,068	88,321	110,870
	20	4,353	14,851	20,616	19,095	36,479	50,749	67,278
	30	3,476	12,129	15,284	15,651	29,529	37,314	48,920
	40	3,001	10,721	12,527	13,658	25,930	31,121	40,103
	50	2,785	9,944	11,247	13,647	25,399	27,899	36,175
	60	2,764	10,011	10,616	14,674	26,609	26,349	34,154
	70	2,824	10,337	10,436	16,275	28,685	25,536	33,826
	80	2,946	10,838	10,629	18,134	31,186	26,123	35,285
Economic Cost	5	10,353	27,333	50,773	44,244	85,799	151,082	178,178
	10	6,038	16,746	28,298	25,742	49,323	81,375	99,240
	20	3,803	11,145	17,081	16,308	30,827	46,187	59,533
	30	3,038	9,188	12,595	13,361	24,941	33,756	43,107
	40	2,625	8,182	10,318	11,663	21,888	28,035	35,274
	50	2,437	7,658	9,223	11,658	21,473	24,994	31,702
	60	2,421	7,744	8,669	12,580	22,519	23,447	29,762
	70	2,473	8,024	8,474	13,973	24,316	22,571	29,308
	80	2,581	8,454	8,544	15,527	26,491	22,937	30,423
90	2,756	9,083	8,987	16,854	28,449	23,928	32,533	

Source: DPWH.

10.35 The time value is calculated based on the average labor productivity in the Philippines (see Table 10.5.4). However, these values represent the value of time while working and not the travel time cost. The average value of travel time per mode of transportation is the product of value of time/ hour and the share of business trip and “to work” trip. Unit value of time (VOT) is assumed to grow in line with per capita GRDP of the Metro Cebu area at approximately 6%.

**Table 10.5.4 Present and Future Time Value by Modes**  
 (In PHP / hour)

Years	Private	Public		
	Car	Jeepney	Mini Bus /Bus	Others
2013	93	137	521	34
2020	140	207	783	51
2025	187	277	1,048	69
2030	250	370	1,403	92

Source: JICA Study Team's estimates.

### 3) Result of Economic Evaluation

10.36 Total economic benefits that will accrue to the project in the landmark year of 2030 are shown in Table 10.5.5, although it is expected that these benefits will continue to accrue during the project life of 30 years with an assumed growth of 6% (following the assumed GRDP growth).

**Table 10.5.5 Daily Economic Benefits Generated by the Project  
 (In PHP million)**

Indicators	Without Project	With Project	Difference
VOC	85	37	47
VOT	9,415	9,364	4
Total	9,500	9,401	51

Source: JICA Study Team's estimates.

10.37 The results of the economic analysis are shown in Table 10.5.6. The project yielded an EIRR of 19%, which is just bordering the hurdle social discount rate of 15% set by NEDA. The construction cost of the dual-mode bridge is higher than the cost of just a plain bridge. Nevertheless, this cost would favorably mean a savings with the integration of the structures vis-a-vis a separate structure for a bridge and a separate structure for a mass transit system.

10.38 With the bridge designed to accommodate a mass transit system in the near future, any benefit to be accrued by the transit system would have to be shared with the bridge as well, thereby driving up the viability of the dual-mode bridge.

**Table 10.5.6 Preliminary Results of the Economic Evaluation for Dual-Mode Bridge Project**

EIRR (%)	NPV (PHP million)	B/C Ratio
19%	2,025	1.43

Source: JICA Study Team's estimates.

10.39 A sensitivity analysis conducted to determine the sensitivity of the EIRR to changes, such as increase in costs by 20%, would decrease the EIRR to 17%.

## 10.6 Social and Natural Environmental Impact

### 1) Resettlement

10.40 According to Mandaue City, no private land lot is reported around the proposed bridge and along the proposed Mandaue Scenic Coastal Road between the Cansaga Bay Bridge and the Second Mactan Bridge. This was confirmed by ocular survey.

10.41 There are informal settler families (ISFs) around the proposed bridge in Lapu-Lapu City. Ten houses of ISFs are to be relocated by the project.<sup>3</sup> The 270-m long existing road from the coastline to Quezon National Highway needs to be widened by 10 m. The road faces the sites of a shopping mall and a veneer wood factory.

10.42 The project can revitalize the local economy during construction and operation. A positive impact rate is given.

### 2) Land Use Transformation

10.43 Mandaue City plans the Scenic Coastal Road together with a reclamation project (Mandaue's Global City Project, 131 ha). Since the proposed bridge project includes part of the Scenic Coastal Road, it can accelerate reclamation and urban development from waters, wetlands and underutilized lands to commercial and business, residential, agro-industrial, tourism, and protected mangroves. Therefore, the project will give a large

<sup>3</sup> According to Lapu-Lapu City, Barangay Ibo where the proposed bridge is located has informal settlers of 222 households in a government land of 2,000 m<sup>2</sup>. They have stayed at the site for 17 years.



impact.

10.44 On the other hand, limited changes will be brought about by the project in Lapu-Lapu City because adjacent lands are mostly urbanized. Lapu-Lapu City expects the bridge project to stimulate the development move of the city's north reclamation project (400 ha). But the impact is uncertain due to a considerable distance of over 2 km between the proposed bridge and the proposed reclamation.

### **3) Effects on the Protected Area**

10.45 There are extensive mangrove habitations around the proposed bridge in Mandaue City. Although the city plans a water amenity park, it may be in violation of the related environmental rules and regulations when cutting down massive mangroves.

10.46 Bridge construction may give an adverse impact to the marine environment. Even after bridge construction, the adjacent reclamation project may result in a prolonged impact.

## **10.7 Some Considerations for Implementation**

10.47 The pre-FS concludes that the new bridge can be prepared toward the year 2020 to avoid traffic congestion at the Second Mactan Bridge. Taking the dilapidated condition of the First Mactan Bridge into account, the project is urgently needed. The project has the local support from the two cities of Mandaue and Lapu-Lapu. Social and natural impacts are not serious.

10.48 A dual-mode bridge can enjoy construction cost reduction when no considerable time lag occurs between road and rail operations. If rail operation lags behind road operation by 10 years or more, there may no longer be a cost reduction effect due to the depreciation of infrastructure. Without a viable rail project in the short term, therefore, an exclusive road bridge should be constructed.

10.49 The Philippines has no experience in constructing a dual-mode bridge. It is suggested that the project be undertaken by consultants and construction firms who have rich experiences in dual-mode bridge construction abroad.

10.50 There is a move to construct a toll bridge and its approach viaduct/causeway between Cebu City and Cordova. It is 9 km away from the proposed dual-mode bridge. Anticipated traffic demand segments are different from each other and such a far bridge cannot work as an alternative to the First Mactan Bridge. Therefore, it is suggested that the proposed dual-mode bridge be constructed regardless of a private sector-led toll bridge between Cebu City and Cordova.



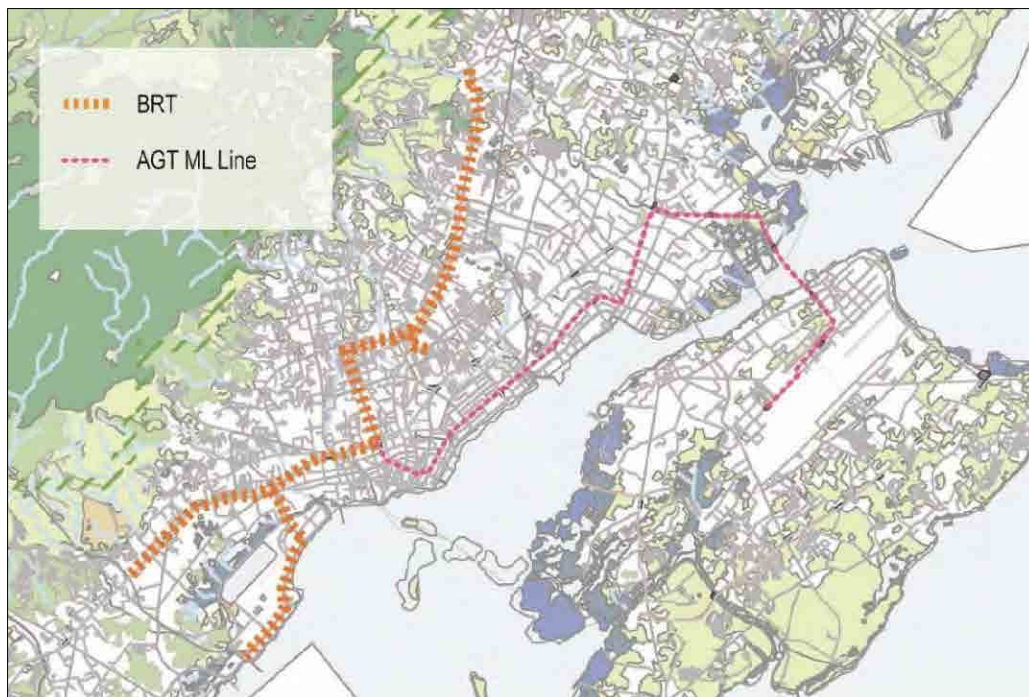
## 11 AGT-CML LINE

### 11.1 Introduction

#### 1) Purpose

11.1 The purpose of this pre-FS is to examine the prima facie viability of a rail-based transit system—more specifically an AGT system—in Metro Cebu. The specific alignment of this AGT system was recently floated by a representative of the Japan Transport Planning Association during a presentation in Cebu on January 28, 2014. It has some similarities to the cross-channel proposal for a monorail made by the Japan External Trade Organization (JETRO) sometime in March 1999, and the existing Seaside Line of Yokohama. The three projects cross a wide body of water.

11.2 The chosen alignment is 19.16 km long with 13 stations. As shown in Figure 11.1.1, the Mactan terminus is near the MEPZ II, while the Cebu City terminus is on Osmeña Boulevard and Natalio Bacalso Avenue where the Cebu Bus Rapid Transit (BRT) turns toward Puente Osmeña. The depot location can be located somewhere near the proposed Dual-Mode Bridge in Mandaue, where some underutilized lands are available. This project is named as the AGT-Cebu-Mandaue-Lapu-Lapu (or AGT-CML) Line.



Source: JICA Study Team.

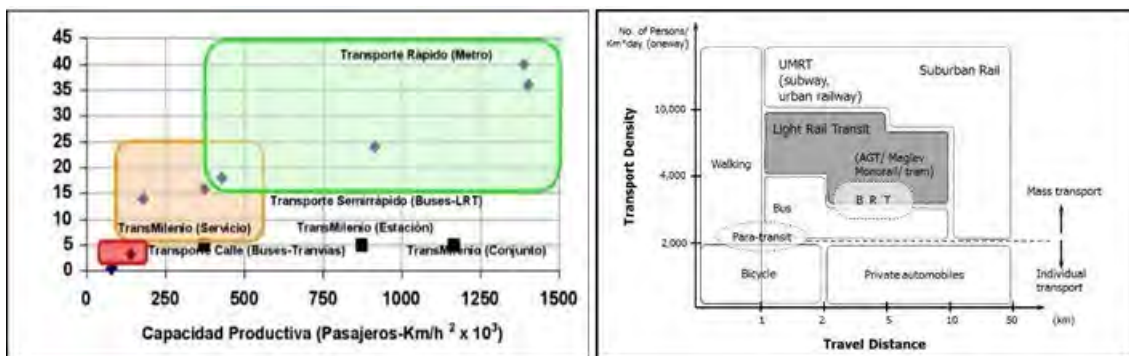
**Figure 11.1.1 Alignment of AGT–CML Line**

#### 2) Basic Premise

11.3 The underlying imperative for the two studies are the same: that a metropolis the size of Metro Cebu needs a rail-based mass transit aside from, or in addition to, the Cebu BRT project being implemented by DOTC and the City of Cebu. This principle is illustrated in Figure 11.1.2, which shows two views on the capacity limits of different transit modes. The first chart also situates the famous high-capacity Bogota BRT, which is often cited as a model for the Cebu City BRT.

11.4 The road network of Cebu and the numerous at-grade intersections would constrain the BRT to a practical limit of 4,000 passengers per hour per direction (pphd). In contrast, the World Bank feasibility study on the Cebu BRT stated a maximum capacity of 12,000 pphpd on a 30-second headway.

11.5 By way of historical background, the Light Rail Transit Line 1 (LRT1) of Metro Manila started with a line capacity of 20,000 pphpd and later upgraded to 37,000 pphpd. The Metro Rail Transit Line 3 (MRT3) was built with 26,000 pphpd, but is currently down to 19,000 due to numerous breakdowns. Hence, even granting the claimed higher BRT potentials of 8,000 pphpd, it is obvious that it cannot serve the long-term requirements of Metro Cebu. A rail transit is in its future; the only question is when. The idea of a Cebu LRT was first entertained in the 1990s, or nearly 25 years ago.



Source: JICA Study Team.

Figure 11.1.2 Limits of Different Transit Modes

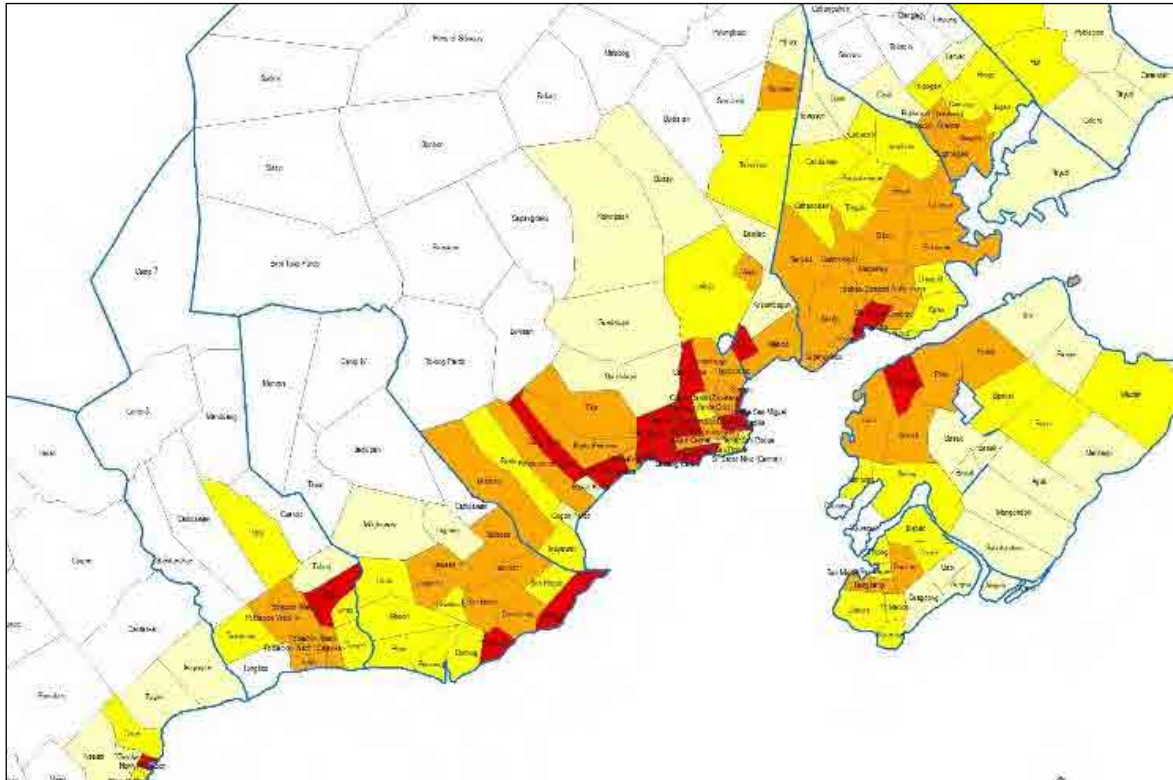
## 11.2 Metro Cebu Context

### 1) Demographics

11.6 Of Metro Cebu's estimated population of 2.55 million in 2010, about 61% was concentrated in the three cities of Cebu, Mandaue and Lapu-Lapu whose combined land areas represent 34% of the total. With a few exceptions, the other 10 LGUs started their urbanization journeys as bedroom communities.

11.7 The southern cluster of LGUs, starting from Talisay to Carcar, accounts for nearly 23% of population and 34% of land area; while the northern cluster has nearly 15% and 30% of population and land area, respectively. Thus, the north has very low density. Future urban developments could, perhaps, bring the proportion for the three central cities down to 50%. Such a de-concentration is desirable, but difficult to realize because of inherent weaknesses in land use planning and control against the tide of strong private sector interests. In the Philippines, the private sector leads urban developments. Large-scale property developments, as well as reclamation projects, are on-stream in Lapu-Lapu and Mandaue, while large buildable areas are still available in the SRP. This demographic profile delineates the possible area where the AGT can be viable.

11.8 Population density is the first filter. Low density cannot justify the provision of a fixed guided mass transit. Conversely, high density predisposes the city to such a system. Figure 11.2.1 shows the population density of Metro Cebu in 2010. From the map, it is obvious that only the contiguous red and orange areas need to be shortlisted. These are in the four cities of Talisay, Mandaue, Lapu-Lapu, and Cebu City—where density is likely to go up further due to the aforementioned property development.



Source: JICA Study Team.

**Figure 11.2.1 Population Density in Metro Cebu, 2010**

11.9 The second factor are the locations of major traffic generators, as well as trends in property development. Schools and universities attract large “To-School” trips, while CBDs attract “To-Work” trips. The University of Cebu is said to have an enrollment of 42,000 students in its four campuses (the Main Campus along Sanciangko Street, the Banilad Campus along Gov. M. Cuenco Avenue, the UC-LM Campus in Lapu-Lapu/Mandaue, and the UC-METC along Alumnos St., Mambaling). On the other hand, the University of San Carlos has about 19,000 students in five campuses (the Downtown Campus along P. del Rosario St., the Talamban Campus along Gov. M. Cuenco Avenue, the North Campus along Gen. Maxilom Avenue, the South Campus along corners J. Alcantara St. and V. Rama Avenue, and the Montessori Academy along F. Sotto Drive). The Cebu Institute of Technology reports an enrollment of about 9,000 students on its N. Bacalso Avenue campus. The University of San Jose Recoletos has three campuses: the main campus is located along corner P. Lopez and Magallanes St., Cebu City, the Basak Campus in Basak, Pardo, Cebu City, and the Balamban Campus.

11.10 The major business centers (and traffic generators) are the Cebu Business Park, the MEPZ, the SM and Ayala Malls, and other high-density urban pockets too numerous to be mentioned.

## 2) Current Public Transport Patronage

11.11 Narrowing the focus to the three cities, one needs to overlay the corridors of high public transport ridership. In this case, these would be streets with highest volumes of public utility vehicles or PUVs (i.e., jeepneys and multi-cabs). These are shown in Table 11.2.1 below. They are indicators of the need for a higher-capacity mode of public transport. While some examples in more developed countries introduced a fixed guideway mass transit in new routes which had no established history of demand, it would be dangerous to

do so in the case of developing countries, as the investment required is too large. In short, mass transit should follow demand, rather than precede or create it.

**Table 11.2.1 Road Sections with Highest PUV Volumes**

Name of Road Links	Pax/Day (2-way)	No. of PUVs (Highest Direction)	Implicit Headway (sec)
1. M.J. Cuenco Avenue	169,950	3,452	3.5
2. M.C. Briones Street	67,200	2,850	4.3
3. Gen. Maxilom Extension	123,750	2,131	5.4
4. V. Gullas Street	57,560	2,026	4.7
5. Sanciango Street	56,900	1,993	5.1
6. Colon Street	100,800	1,749	5.1
7. Legaspi Street	57,100	1,724	5.6
8. N. Bacalso Avenue	95,400	1,521	6.4
9. Mabini Street	56,300	1,420	6.6
10. Lapu Lapu Street	48,400	1,359	6.1

Source: JICA Study Team.

### 3) Demand from Previous Studies

11.12 A survey of PUVs in 2010 showed only one PUV route (Route #23D) between Mactan and Cebu City, with 182 units in operation, and 894 PUVs on 12 routes between Mactan and Mandaue. The latter routes have strong overlaps with the proposed AGT line. The latest data from LTFRB added another 393 PUVs, for an aggregate number of 1,469 units. A passenger count survey made on the Second Mandaue-Mactan Bridge (M. Fernan Bridge) showed 51,417 passengers carried on 4,085 trips by this mode. If this load profile applied also to Osmeña Bridge, then the estimated daily passenger volume on PUVs would be 80,000 at the most. On the other hand, the 2014 HIS under this Roadmap Study showed a volume of 106 thousand passengers a day on-board jeepneys and multicabs crossing the two bridges. This sets an upper limit to the base demand for the AGT line. It also narrows the choice to a low-to-medium capacity system. It is almost the same, albeit shorter, as the un-implemented BRT route (see Figure 11.2.2) mooted in the DOTC-commissioned “Public Transportation Strategic Plan for Metro Cebu” (October 2011). The latter assumed use of the Fernan Bridge.



Source: The Development of Public Transport Strategic Plan for Metro Cebu, DOTC, 2011.

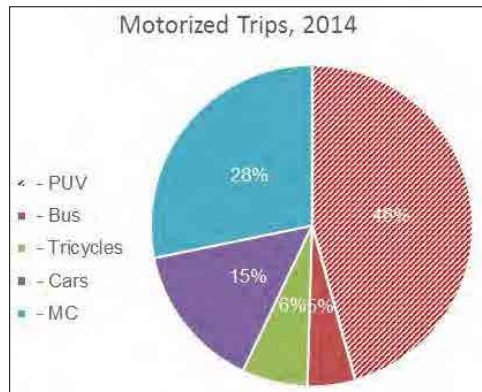
**Figure 11.2.2 Proposed Medium-to-High Capacity PT Lines**

### 4) Demand Analysis under the Roadmap Study

11.13 The 2014 HIS revealed a very high level of daily trips of 8.98 million/day for a population of 2.9 million. The proportion of non-motorized trips was 21%. Of the motorized trips (78.9% of total) of 7.1 million/day, 45% rely on PUVs (which number nearly 10,000

units of jeepneys and multi-cabs), 15% on cars, and 28% on motorcycles. The bus has a small share of 4.7%. The use of 2-wheeled motorcycles is unusually high for a Philippine city. This group is expected to graduate to 4-wheeled vehicles as their income rises.

11.14 The average trip rate for motorized trips is 2.43, which is higher than in Metro Manila despite the higher incomes of the latter. Figure 11.2.3 illustrates the composition of daily trips. The general trend is for the trip rate to go up with higher incomes. Car owners take 8.1 trips a day compared to 2.4 trips for those without vehicles. Assuming a constant trip rate of 2.43, the total number of motorized trips by 2050 would be 12.1 million, or 71% higher than the 2014 level.



Source: JICA Study Team.

**Figure 11.2.3 Trip Composition, 2014**

11.15 If the share of private vehicles (cars and motorbikes) remain at 43%, the road network of Metro Cebu would choke. A workable target is to limit their modal share to 30% (which is about the current situation in Metro Manila). This can only happen if a good and efficient mass transit system is put in place. A 20% share for cars would appear modest, but it implies 500,000 cars running on the streets of Metro Cebu or four times the current level. On the other hand, 20% for a mass rail transit (MRT) would need at least 84 km of grade-separated rail tracks. In this Study, the north-south axial railway, if fully-developed, would span 70 km, while the CML Line is 13 km. In comparison, the three urban rail transit lines of Metro Manila total only 50 km and took 25 years to put in place. Additional lines may be needed by Metro Cebu, especially if the BRT system fails to deliver on its promised service and in order to avoid the overloaded train situation of Metro Manila.

11.16 For Metro Cebu to avoid the crippling and costly traffic congestion of Metro Manila, at least 70% of daily urban trips must be carried by public transport. This means reducing the current 43% dependency on private transport. Reliance on PUVs implies an additional 13,000 multi-cabs by 2030 and 17,120 by 2050. With the limits on road building, the current mode of choice (jeepneys and multi-cabs) cannot fulfill this objective. A high capacity mode is the answer.

## 11.3 Transport System

### 1) Transport Capacity

11.17 Among the three core cities of Cebu, Mandaue and Lapu-Lapu, inter-city traffic demand largely differs. As the results of the screenline traffic survey in 2014 show, 892 thousand persons move across the border of Cebu City and Mandaue City daily while 318

thousand persons use the two bridges between Mandaue City and Lapu-Lapu City. Since there is nearly a three times difference in terms of daily person trips, having only one kind of mass transit system is not an adequate answer to meet the needs of both corridors.

11.18 The largest traffic generation/attraction facility in the northern part of Mactan is the MCI A. In 2015, the new airport concessionaire will start to construct the second passenger terminal in order for MCI A to serve 20 million passengers annually or an average of 55 thousand passengers daily. Three industrial estates are located near the airport where 80 thousand workers commute.

11.19 If a mass transit takes a share of 30% or about half of public transport demand in the major corridors until 2030, one LRT route may be enough between Mandaue and Lapu-Lapu but it is not enough between Cebu and Mandaue. Therefore, the Roadmap suggests one MRT line and one LRT line until 2030.

## 2) AGT Advantages

11.20 AGT falls under the category of a monorail technology (single track), as opposed to a light or heavy rail technology (dual steel tracks). It is a driverless (thus, automated), grade-separated transit system in which the rail vehicles move along a fixed guideway.

11.21 AGT, in turn, covers a wide range of capacities and designs, from small-capacity people mover systems (APT), like those commonly found at airports, to higher mass transit systems like the Vancouver SkyTrain. Many higher capacity AGT systems used in first mass transit can be also be classified as Light Metros. Kobe's Port Liner is the world's first mass transit AGT, which began operating in 1981. It connects Kobe's main rail station, Sannomiya Station, with the dockyard areas and Kobe Airport to the south. Many similar systems have been built elsewhere in Japan. The VAL (Véhicule Automatique Léger) system in Lille, France, opened in 1983, is often cited as the first AGT installed to serve an existing urban area. The AGT system pilot-tested by the Department of Science and Technology (DOST) in Diliman, Quezon City is closer to a small-capacity people mover on a straddle-type guide beam.

11.22 Japan is the acknowledged world leader in monorail technology, with more urban revenue systems in operation than in any country. It has adopted a new standard for AGT, which it calls as New Transit System (NTS). This latest version no longer looks like the conventional straddle-type or suspended-type monorail due to the addition of a central emergency evacuation walkway between the two guide beams. Another improvement is the use of rubber-tired wheels for greater stability. Product-wise, the technology is positioned between the conventional monorail and LRT.

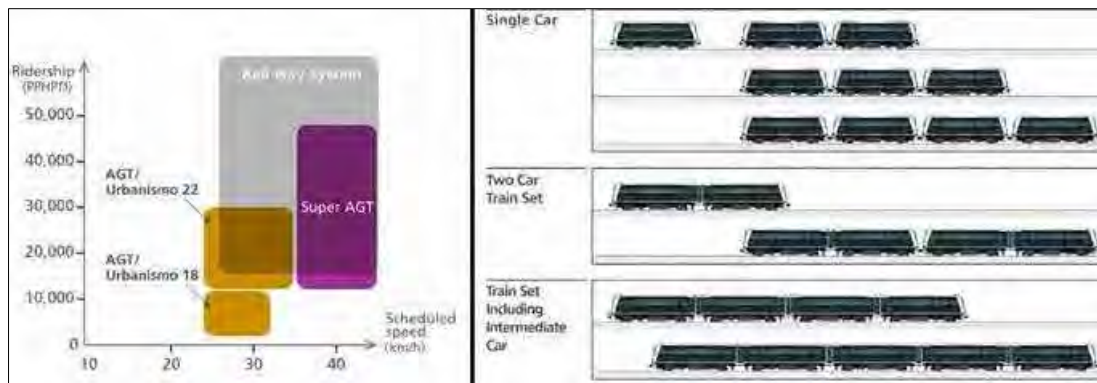
11.23 According to the Japan Transportation Planning Association, AGT's main advantages over other transport modes are as follows:

- (i) Environmentally friendly operation such as less air pollution than jeepneys and buses due to electric power and less noise and vibration than MRT due to rubber tires;
- (ii) Safe operation in an emergency such as earthquake, heavy rain and flood and strong wind and, thus, driverless operation is possible;
- (iii) Simple system structure without catenary for electricity supply;
- (iv) Easy to turn around (turnaround radius is 30 m, much shorter than MRT's 160 m); and
- (v) Easy to change train configuration to meet peak and off-peak demands even within the same day, unlike monorail.



### 3) Rail Vehicles

11.24 The choice of AGT vehicles will be a function of demand, target line capacity, and manufacturer's standard. The alternatives are shown in Figure 11.3.1.



Source: Mitsubishi Heavy Industries.

**Figure 11.3.1 AGT Railcars, Capacity Speed and Train Combination**

11.25 A train may consist of two single railcars, or joined to form four railcars. A longer train formation would affect station and platform designs. A typical AGT available in the market is the Urbanismo-18, which is 8.5 m long with a crush capacity of 84 passengers, while the longer (at 11.2 m) Urbanismo-22 can carry 141 passengers. In comparison, the proposed Cebu BRT vehicle is 13.7 m long, while Manila's LRT1 is 26 m long. The shorter vehicle lengths allow for tight radii of curvature. Up to six cars can be formed into an AGT train.

11.26 The internal layout provides more room for standees than for seated passengers (see Figure 11.3.2). This is typical for urban transit. Two sliding doors allow for efficient entry and exit of passengers at stations.



Source: Mitsubishi Heavy Industries.

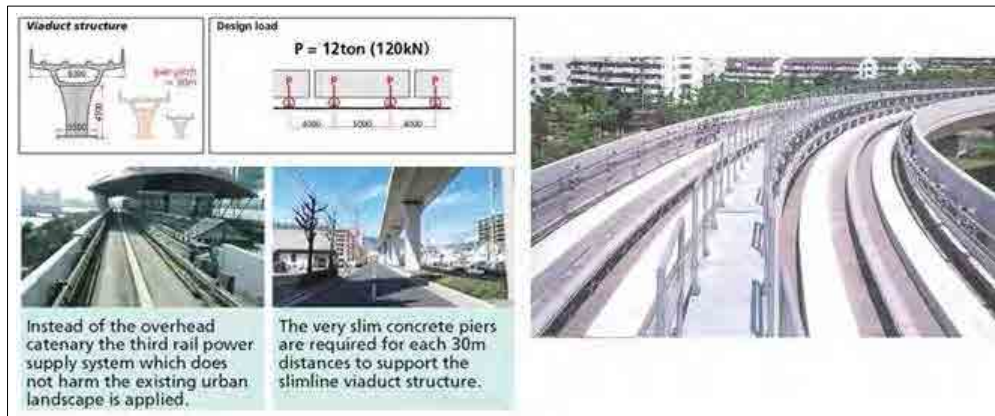
**Figure 11.3.2 Internal Layout of the AGT Railcars**

### 4) The Guideway

11.27 The AGT line is to be built on elevated guideways along existing roads, hence will add to existing transport capacities. Its introduction need not require displacement of PUVs. In comparison, the Cebu BRT will be on-road and meant to replace jeepney capacity on their routes.

11.28 The single-track feature leads to a narrower and slim carriageway. Visual intrusion, therefore, will be more acceptable to Cebu citizens who found the utilitarian flyovers of DPWH objectionable. The viaduct width is 8.4 m (compared to 10.0 m for Manila's LRT). Vehicle weight entails an axle load of 12 tons, and results in slim concrete piers, which means minimal disruption during construction on existing narrow Cebu urban roads.

11.29 The typical civil works for AGT are shown in Figure 11.3.3. The actual design of stations shall be location-specific and can depart from utilitarian design to incorporate neighborhood aesthetics and cultural features.



Source: Mitsubishi Heavy Industries.

**Figure 11.3.3 Typical Carriageway and Station for AGT**

## 5) Depot

11.30 Preferably, the depot should be located in an industrial area and away from residential areas. A suitable site needs to be explored in Mandaue City near the proposed Dual-Mode Bridge.<sup>4</sup> The depot (shown in Figure 11.3.4) will house the Operation Control Center, which would "drive" the trains remotely, aside from the maintenance shops, stabling yard, and administration building.



Source: Mitsubishi Heavy Industries.

**Figure 11.3.4 Depot Requirements**

<sup>4</sup> The Mandaue City Development Council (chaired by the Mayor) on February 20, 2015 decided to promote the Mandaue–Mactan North Dual-Mode Bridge and the AGT-CLM Line and allocate a depot site of 6 ha near the bridge.

## 11.4 Transport Demand

11.31 A simulation was made on the basic assumption that the AGT Line gets top priority and is built first to function as a major trunk rail line instead of merely an airport feeder service particularly between Cebu City Center and Mandaue City Center, until the MRT Central Line is introduced.

11.32 Table 11.4.1 shows the projected ridership on the AGT Line and the other two lines in the urban core, using a fare of PHP20 plus 0.50/pax-km. As expected, the demand on the AGT Line starts high (see Table 11.4.2).

**Table 11.4.1 Daily Ridership on 3 Central Urban Transit Lines**

Year	MRT Central Line	MRT Mactan Line	AGT-CML Line
2014 (notional)			198,000
2030	921,000	Not yet built	222,000
2050	1,130,000	350,000	363,000
Line Length (km)	21.2	21.5	19.2

Source: JICA Study Team.

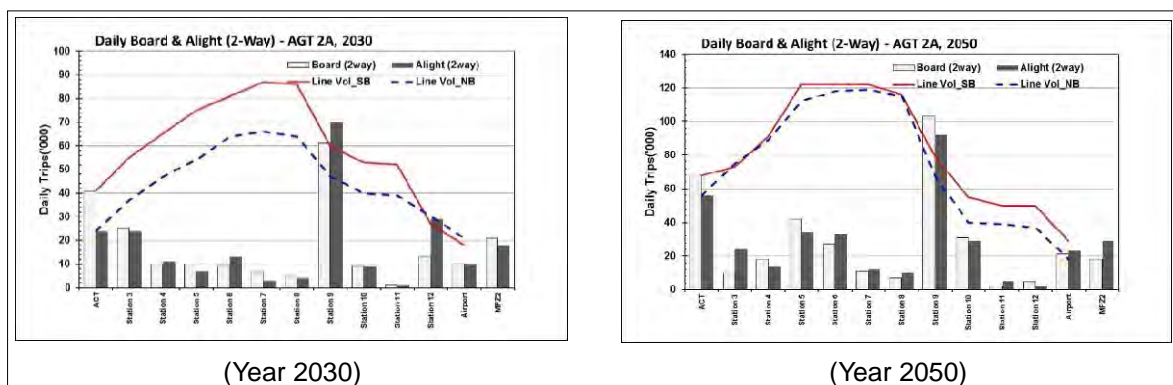
**Table 11.4.2 Daily Ridership by Station on AGT-CML Line, Year 2030 and Year 2050**

Station Name	Distance (km)	Year 2030				Year 2050			
		Board (2way)	Alight (2way)	Line Vol_SB	Line Vol_NB	Board (2way)	Alight (2way)	Line Vol_SB	Line Vol_NB
ACT, Cebu	1.48	41,000	24,000	41,000	24,000	68,000	56,000	68,000	56,000
Independence Park	1.58	25,000	24,000	55,000	37,000	10,000	24,000	73,000	75,000
Station 3	1.10	10,000	11,000	65,000	47,000	18,000	14,000	91,000	89,000
Station 4	1.62	10,000	7,000	75,000	54,000	42,000	34,000	122,000	112,000
Station 5, Mandaue	1.51	9,000	13,000	81,000	64,000	27,000	33,000	122,000	118,000
CICC	1.41	7,000	3,000	87,000	66,000	11,000	12,000	122,000	119,000
Station 7	1.30	5,000	4,000	86,000	64,000	7,000	10,000	116,000	115,000
MC Briones	1.81	61,000	70,000	60,000	47,000	103,000	92,000	79,000	67,000
Station 9	1.90	9,000	9,000	53,000	40,000	31,000	29,000	55,000	40,000
Depot	1.37	1,000	1,000	52,000	39,000	2,000	5,000	50,000	39,000
MEPZ 1, Lapu-Lapu	1.66	13,000	29,000	27,000	30,000	5,000	2,000	50,000	37,000
Airport	2.42	10,000	10,000	18,000	21,000	21,000	23,000	29,000	18,000
MEPZ 2		21,000	18,000			18,000	29,000		
Total Pax		222,000	223,000			363,000	363,000		

Source: JICA Study Team.

Note: Fare level – PHP20 plus PHP0.50/km.

11.33 The station-to-station passenger volume are very uneven, with only three stations (out of 13) registering decent traffic (see Figure 11.4.1). There is also wide variations in northbound and southbound traffic as to make train operations challenging. It implies soft demand during off-peak hours and operational implication of deploying different train combinations during the day, say 2-car trains during off-peak and 3-4 car trains during peak hours.



Source: JICA Study Team.

**Figure 11.4.1 Station Loadings and Line Volumes, Year 2030 and Year 2050**

## 11.5 Financial and Economic Analyses

### 1) Project Cost

11.34 The 19.16-km AGT line is estimated to cost USD819 million, as shown in Table 11.5.1. If the train fleet is reduced to match demand, the initial cost of rolling stock goes down to USD100.4 million as the minimum unit. In such a case, project cost also goes down to USD660 million, which is nearly a 19.4% reduction in initial investments. Other cost items will remain the same, since they are a function of the track infrastructure.

**Table 11.5.1 Capital Cost of AGT–CML Line**

Item No.	Particulars	Financial Cost	Economic Cost	
1	Civil Works	322.1	341.4	Foreign content ~30%
	Viaduct <sup>a</sup>	252.9	260.5	
	Stations	65.0	67.0	
	Depot Building	4.2	4.3	
2	Rolling Stock (Trains)	270.0 <sup>b/</sup>	295.7	RS=USD104 million – minimum unit
3	Electromechanical System			Foreign content-95%
	Signalling & Telecommunications	96.0	114.2	
	Power System	15.0	17.8	
	Depot equipment	5.8	6.9	
	Other E&M	15.2	18.1	
4	AFCS (Smart card ticketing)	5.0	6.0	
5	Right-of-Way/Land	13.4	13.4	
6	Taxes	99.6	0	VAT and import taxes
	Total (in USD)	818.6	814.7	

a - Excludes the cost of bridge across Mactan, but includes viaduct and track costs.

b - For 30 train-set of 6-car/train; Urbanismo-22

Source: JICA Study Team.

11.35 To convert the financial cost into economic values, the imported items (mostly electromechanical) were subjected to shadow pricing such that a dollar is valued 1.2 times their original face amounts. It is assumed that imported contents account for 30% of civil works and 95% of electromechanical system. This translates to USD814.7 million in economic terms. No shadow pricing was applied on unskilled labor because the AGT would employ only minimal workers of such type.

11.36 By way of reality check, Table 11.5.2 compares the project cost of similar urban rail

systems built in the last 10 years. Every system has some unique features, so that some caution is called for in interpreting the comparative data.

**Table 11.5.2 Selected Cost Indices of Transit Projects**

	Project/Line	Length (km)	Cost/km (USD)	Capacity (pphpd)	Cost/km/pphpd
1	Cebu AGT: Case 1-A	19.16	42.7m	15,000	2,848
2	Manila LRT 1 – South Extension	11.7	106.8m	32,000	3,337
3	Manila LRT 2	13.8	54.3m	24,700	2,198
4	Kuala Lumpur Monorail	8.6	36.0m	2,800	12,857
5	Mumbai Monorail Phase 1	19.54	22.0m	9,000	2,444
6	Macau AGT	20.2	69.3m	14,200	4,880
7	Cebu BRT	21	10.1m	4,000	2,513

Source: Various data collected by JICA Study Team.

11.37 At USD818.6 million, the cost per track km is USD43 million. It is higher than the monorail system in Kuala Lumpur which costs about USD36 million/km in 2003. The no-frills Phase 1 of Mumbai’s monorail system costs the least, at USD22 million/km. The project cost for the proposed Cebu AGT can be deemed acceptable, although on the high side. The investment required to deliver per unit of capacity is lower than the LRT (which has a higher upside capacity), but higher than BRT whose capacity limit is lower.

## 2) Financial Evaluation

11.38 This section looks at the financial performance outlook of the project, as if it were a commercial enterprise.

11.39 The calculated annual revenues for the AGT is shown in Table 11.5.3, based on a tariff of PHP20 plus PHP0.50/km after 4 km. These values are on the high side, compared to the present fares on Manila’s LRT.

**Table 11.5.3 Projected Revenue from Farebox (In PHP million)**

Year	Case 1-A	Case 1-B	Case 2-A	Case 2-B
2020	444.8	185.6	1,508.4	666.0
2025	567.3	237.5	1,550.7	667.8
2030	723.8	304.0	1,594.6	669.7
2035	930.6	390.1	1,795.0	753.9
2040	1,196.6	502.6	2,020.7	848.7
2045	1,538.8	646.3	2,275.0	955.5
2050	1,978.9	831.1	2,561.5	1,075.8

Source: JICA Study Team.

11.40 The operating cost for the AGT was calculated based on the following assumptions that are anchored on real rail systems:

**Table 11.5.4 Operating Cost Assumptions for AGT**

Parameter	Value	Remarks
Power Consumption - Traction	2.50	Kwh / car-km
Power Consumption – Station	0.78	Million kwh/station/year
Power consumption - Depot	2.30	Million kwh/year
Power Cost/kwh	8.00	Pesos/kwh
Cost of Railcar	1.50	Million USD / car
Maintenance - Regular		
- Track infrastructure	0.2%	Of initial cost, every year
- Rolling stock	2.0%	Of initial cost, every year
Maintenace – Periodic		
- Track infrastructure	1.0%	Of Initial cost, every 10 years
- Rolling stock	10.0%	Of initial cost, every 8 years
Manpower	585	Headcount @ PHP460k/yr
Overhead & Miscellaneous	15%	Of cash operating cost
Security & Janitorial	10.0	PHP, in millions/yr, per station

Source: JICA Study Team.

11.41 Based on the preceding data, the annual operating expenses and cash operating margins, excluding depreciation, can be estimated. The results are summarized in Table 11.5.5.

**Table 11.5.5 Pro-Forma Financial Results for AGT (In PHP million)**

Year	AGT–CML Line		
	Income	Expenses	Net
2020	1,508.4	925.9	582.5
2025	1,550.7	941.6	609.1
2030	1,594.6	941.6	653.0
2035	1,795.0	988.8	806.2
2040	2,020.7	1,036.1	984.7
2045	2,275.0	1,083.3	1,191.8
2050	2,561.5	1,083.3	1,478.3

Source: JICA Study Team.

11.42 From the pro-forma financial statements, the financial internal rate of return (FIRR) can be calculated. The FIRR is the generally-accepted measure of viability. It excludes debts from the equation, i.e., project cost is funded with 100% equity. The results show a negative figure of -1.4%. The FIRR shows a slight improvement, to +1.0%, when the cost of track infrastructure is excluded. This ploy of excluding the civil works cost is usually done under a PPP modality to improve financial viability to bidders. It was used in justifying the Cebu BRT study.

11.43 The poor commercial viability of the rail project is not surprising, as most rail projects rarely pay for themselves as proven in the heavily-patronized LRTs/MRTs of Metro Manila. By way of comparison, the Cebu BRT claims an FIRR of 35% by excluding infrastructure cost and assuming market monopoly in the route of operation.

### 3) Economic Evaluation

11.44 Investment in mass transit is typically made by the public sector, and evaluated within a cost-benefit framework. The valuation of benefits is not as straightforward as the cost elements. There are different approaches. In Japan, the accepted methodology is based on generalized cost from zone i to zone j with and without the project. In an urban setting with hundreds of zones, the computation becomes a tedious exercise. Thus,

planners resort to the use of computer demand models, where travel choice of different users for rail or other mode is differentiated by their generalized costs or utility functions. This is not possible to perform for the AGT Project, considering time and data constraints.

11.45 Past rail feasibility studies for Metro Manila, while approximating the generalized cost approach, fall back on estimation of user benefits (or consumer surplus) coming from shorter travel times for passengers who take the rail, and for non-rail riders who also benefit because of the ripple effect in reduced vehicle travel times. The latter in turn reduces vehicle operating cost. Recently, the environmental benefits from reduced carbon emissions have been added into the benefit column. For example, the LRT2 Extension project had estimated reduction of carbon emission by 1.5 thousand tons a year, priced at PHP829/ton, for a benefit value equal to a miniscule PHP1.2million. In the case of Cebu BRT, the carbon benefits were allegedly around 100 thousand tons a year and were valued upwards of PHP100million/year.

11.46 For simplicity, and as befits a quick assessment, this study resorted to heuristics instead of the preceding complicated estimation. Recent studies on mass transit projects provide some unit valuations. This is justified by the fact that all the claimed benefits are a function of the number of passengers captured by the project and who shifted from other transport modes. The aggregate economic benefits from the Manila LRT2 extension project prepared by JICA in 2011 translated into an average of PHP50/ passenger. It can be considered constant unit benefits. The corresponding valuation in the Cebu BRT started with PHP15 but increasing rapidly to about PHP300/ passenger at later years. The latter can be called increasing unit benefits.

11.47 The economic internal rate of return (EIRR) values for the ATG-CML Line Project under the two variants of economic valuations are 6.4% at constant unit benefits and 17.4% at increasing unit benefits. It appears that the project exceeded the threshold level of 15%, which is the current hurdle rate of NEDA.

11.48 One is tempted to conclude that the AGT project is economically viable at 17.4%. If we accept the assumptions, then it is viable. But under the other situations, it is not viable. The underlying assumptions for the AGT project are:

- The AGT line deserves priority in development, notwithstanding several other rail lines under planning; and
- The AGT line would attract more passengers than currently carried by PUVs that regularly ply the two Mactan bridges.

#### **4) Social and Natural Environmental Analyses**

11.49 The AGT-CML Line does not require new ROW acquisition because the alignment is over the existing roads and the river buffer zone of Butuanon River. A depot site (6 ha) is planned near the proposed dual-mode bridge in Mandaue City. Currently, the site is on grass and wetlands and no house is there. The site will be developed in conjunction with the Mandaue Scenic Coastal Road and the riparian environmental improvement project along Butuanon River.

11.50 Due to its simple and elevated structure, the AGT-CML Line would not give any adverse impact to the natural environment. Rubber tires could mitigate noise and vibration to a large extent. Almost all passengers would be transferred from road vehicles such as jeepneys, motorcycles and cars. Therefore, this modal shift could contribute to lower

carbon emission in the metropolis.

11.51 For safe and efficient construction works, road traffic control would be undertaken on the AGT alignment. Traffic congestion would be worse temporarily. In addition, noise and dust would be generated from the construction site. On the other hand, during the AGT operation, existing jeepney routes would be reorganized to avoid competition and road traffic would be reduced. As a result, road traffic flow would be in good order.

11.52 Finally, many foreign cities which introduce AGT systems have experienced urban environmental improvement and beautification. Metro Cebu can expect the same development effects.



Source: JICA Study Team.

**Figure 11.5.1 Yokohama's AGT on Seaside Line**

## 11.6 Some Considerations for Implementation

11.53 The AGT-CML Line is designed to serve two major corridors in Metro Cebu: Cebu City to Mandaue City, and Mandaue City to Lapu-Lapu City. It is designed to meet the latter demand as transport system capacity. Traffic demand forecast shows the highest traffic sections along Ouano Avenue in Mandaue City.

11.54 The assumption behind the traffic demand forecast is to develop the AGT-CML Line first in the early 2020s and the MRT Central Line (Consolacion–Talisay City) by 2030. In fact, the MRT Central Line has more than double the capacity of the AGT–CML Line and, thus, requires more than double the investment (USD1,774 million). If the MRT Central Line would be delayed in development, the AGT-CML Line must cope with excessive passengers than its designed capacity. As a result, heavily crowded situations may happen like the LRT/MRT services in Metro Manila (see Figure 11.6.1).



Source: JICA Study Team.

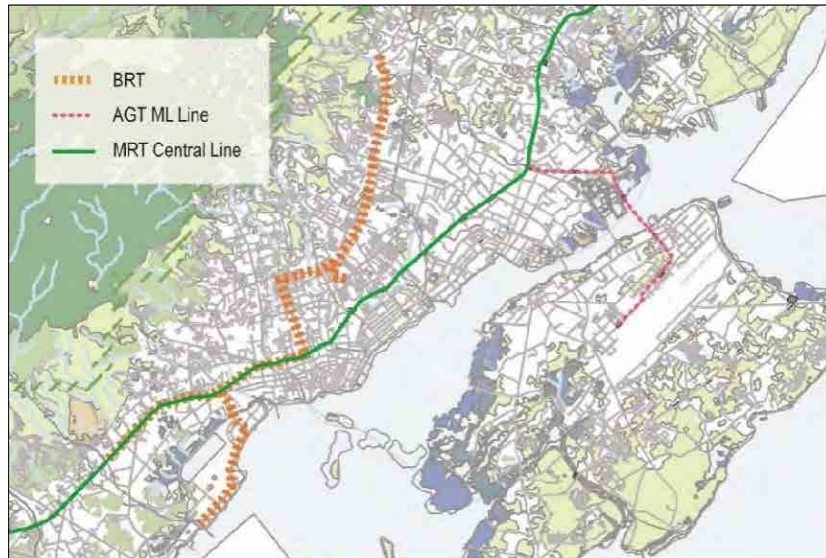
**Figure 11.6.1 Typical Scene of Overcrowding on Metro Manila's Urban Rails**

11.55 When both the AGT-CML Line and the MRT Central Line are in operation, the two lines will run parallel between Cebu City and Mandaue City with a space of less than 1 km



(see Figure 11.6.2). Metro Manila’s experience shows that each station’s catchment area is more or less within a 500 m radius by walk. Therefore, the two lines will be able to provide highly accessible rail services under a competitive environment.

11.56 The idea of constructing the two lines together is worth considering although it requires a huge investment of USD2.6 billion. In order to reduce construction cost, one idea is to make the AGT-CML Line a totally feeder line of the MRT Central Line to MCI A. With this idea, rail services between Cebu City and Mandaue City would be degraded. But it could cut total construction cost by USD200–300 million provided that additional investment for capacity expansion of the MRT Central Line could be included.



Source: JICA Study Team.

**Figure 11.6.2 The Case of Early Construction of the MRT Central Line with the AGT-CML Line**

11.57 In the Philippines, there is almost no possibility of purely private investment in urban rail due to low tariff setting. However, Metro Cebu will not be able to maintain people mobility at the present level without an urban rail network in the future. A more detailed study is necessary to design an overall rail network including the AGT Line with a doable PPP scheme.

11.58 The project implementation schedule for the AGT-CML Line is shown in Table 11.6.1.

**Table 11.6.1 Implementation Schedule of the AGT-CML Line Project**

	2015	2016	2017	2018	2019	2020	2021
Feasibility Study		██████████					
Detailed Engineering Design			██████████				
PPP Arrangement			██████████				
Construction				██████████	██████████	██████████	
Commercial Operation							██████████

Source: JICA Study Team.



## 12 MANANGA II DAM PROJECT

### 12.1 Background and Objectives

12.1 Water supply is one of the critical development constraints in Metro Cebu. Even in the best case scenario where the pipelined projects for additional sources materialize, water shortage is expected to occur by 2020. The JICA Study Team examined several potential sources and recommended the immediate development of the Mananga II Dam Project to ensure sufficient water supply 2020 hence.

12.2 JST then proceeded with an assessment of the viability of the Mananga II Dam Project covering the engineering, economic, financial, institutional and environmental aspects of the project. This technical note provides results of the feasibility study and options for the implementation of the project. The study benefitted from in-depth consultations held with key stakeholders from the public and private sectors<sup>5</sup> and supported with information from household interviews.

### 12.2 Description of Mananga Dam II Project

12.3 The development of the Mananga River for municipal water supply has been repeatedly studied over the last 30 years. This study recommends the construction of a 76 m-high dam, which is expected to yield 68,000 m<sup>3</sup>/day. The location of the Mananga II Dam is 1.0 km upstream near Camp IV (Km 19) in Barangay Buot in Cebu. Figure 12.2.1 shows the location of Mananga II Dam.



Source: JICA Study Team.

**Figure 12.2.1 Location of Mananga II Dam**

12.4 The estimated project costs for the Mananga II Dam Project is approximately PHP4.8 billion including land acquisition.<sup>6</sup> The following table gives the breakdown of the project cost.

<sup>5</sup> As for details, please refer to the Main Text of the Final Report.

<sup>6</sup> Cost of preliminary studies and resettlements are **not** included.

**Table 12.2.1 Project Cost of Mananga II Dam**

Category	Foreign Currency (JPY million)	Local Currency (PHP million)	Total Amount (JPY million)	Total Amount (PHP million)
1. Construction Cost	3,060	2,410	9,586	3,540
2. Price Escalation	306	241	959	354
3. Contingency	153	121	481	178
4. Engineering Services	306	241	959	354
5. Land Acquisition (8 ha)	0	280	758	280
6. Administrative Cost	0	72	196	72
Total	3,825	3,365	12,939	4,778

Source: JICA Study Team.

12.5 The construction cost includes renewal of the equipment of the existing water treatment plant, which is estimated to cost PHP517 million and a useful life of 15 years. The annual operating and maintenance cost assumed is 3% of the construction cost, equivalent to PHP106 million per year.

12.6 Project development is scheduled to start in 2015; construction is scheduled from 2017 to 2022, including detailed design from 2017–2018; and operation will start in 2023 (see Table 12.2.2).

**Table 12.2.2 Implementation Schedule of Mananga II Dam Project**

No.	Item	Year	Financial Cost (PHP mil )	2015	2016	2017	2018	2019	2020	2021	2022
1	Preliminary Studies (Hydrological analysis, geographical survey, F/S etc.)	2	-	←							
2	Preparation for design and bidding	2.5	354			71	142	142			
3	Construction (price escalation, contingency and admin cost are included)	3	4,144						663	1,782	1,699
4	Purchase of land for water treatment plant (8 ha)		280	←							
5	Total (2+3+4)		4,778								

Source: JICA Study Team.

## 12.3 Economic Evaluation

### 1) Approach and Methodology

12.7 JST used the standard approach and methodology for economic analysis. Essentially, economic costs and benefits were compared using the discounted cash flow analysis. To quantify benefits, the team used willingness-to-pay values as proxy of the economic value to the consumers for having reliable piped water supply.

12.8 This is a very conservative approach considering other significant economic benefits of a water supply project, such as health benefits and environmental benefits—especially with the high depletion rate of scarce groundwater sources in Metro Cebu.

12.9 Following are the basic assumptions used in the economic analysis:

- (i) Project schedule: design and construction period is five years from 2017 to 2022; operation will start in 2023;

- (ii) Project evaluation period is 30 years including construction and operation period;
- (iii) All costs and benefits are expressed at 2014 price level in Philippine currency;
- (iv) Useful life of civil works and equipment are:

Item	Useful Life
Civil Works	50 years
Equipment	15 years

- (v) Financial costs of the projects were converted to economic costs using the standard conversion factor (SCF) of 85%. This is to account for shadow pricing of unskilled labor, foreign exchange and for transfer payments such as exclusion of taxes;
- (vi) Assumed annual inflation rate during the project life is 3%, which is the target inflation rate of the Government from 2015-2016;
- (vii) Assumed GRDP growth rates are:

Year	Annual Growth Rate
2010 to 2020	8.3%
2020 to 2030	7.8%
2030 to 2050	5.8%

- (viii) Social Discount Rate used is the NEDA-prescribed rate of 15%. The SDR is used as the discount rate and is also the benchmark against which the economic rate of return is compared; and
- (ix) Beneficiaries are households within the MCWD franchise area.

12.10 The feasibility indicators adopted are:

- (i) EIRR - Economic Internal Rate of Return;
- (ii) NPV - Net Present Value; and
- (iii) B/C - Cost-Benefit Ratio

## 2) Project Costs

12.11 The economic costs are summarized in Table 12.3.1. Relocation and resettlement will be required to secure the project ROW. However, the costs related thereto will not be attributed to the project, considering that the City will have to relocate the affected households with or without the project since the site is classified as a protected area.

**Table 12.3.1 Economic Cost of Mananga II Dam Project**

Category	Foreign Currency (JPY million)	Local Currency (PHP million)	Total Amount (JPY million)	Total Amount (PHP million)
1. Construction Cost	2,601	2,049	8,148	3,009
2. Price Escalation	260	205	815	301
3. Contingency	130	103	409	151
4. Engineering Services	260	205	815	301
5. Land Acquisition (8 ha)	0	238	644	238
6. Administrative Cost	0	61	167	61
Total	3,251	2,861	10,998	4,061

Source: JICA Study Team.

## 3) Economic Benefits

12.12 In most economic analyses of projects, benefits are more difficult to identify and

quantify than costs. This is because environmental projects, such as water supply and sanitation has many benefits that are not quantifiable. These may include depletion premium for groundwater sources, health benefits, creation of jobs, increase in industrial and agricultural productivity, increase or improvement in land values, optimization of local resources or creation of a better quality of life for the people. Although these benefits are real, quantification is difficult and requires a lot of time to undertake.

12.13 For this project, only the quantifiable economic benefits are included in the analysis. The analysis is, therefore, very conservative. Quantified economic benefits were based on the willingness-to-pay value as described below:

### **(1) Willingness-to-Pay (WTP)**

12.14 WTP is the proxy measurement of the economic value expressed as "consumers' surplus" and is the amount that the beneficiaries are willing to pay in return for the product or services they receive. The concept of WTP is widely used as numerical expression of economic benefits in evaluating projects. If the price or tariff in this case is set higher than the WTP, the users would not buy the service and would look for substitute service providers. Therefore, WTP is considered as the maximum satisfaction that the users can achieve in various forms from the project in question.

12.15 The WTP survey was carried out in October 2014.<sup>7</sup> The survey targeted 416 households in the MCWD franchise area, including both served and unserved households.

12.16 According to the survey results, 85% of respondents indicated their willingness to pay for the project. Of these, 18% expressed WTP of over PHP100 in addition to the current monthly water payment; 44% from PHP50-100; 33% below PHP50; and the rest, or 3.4%, did not indicate any specific amount. Based on these, JST set PHP100 as the additional WTP amount of consumers.

12.17 Regarding the current water cost, the survey showed that the average amount is higher than PHP600/ month since almost 10% pay more than PHP1,000. Some 42% of respondents pay less than PHP500, hence the median value is between PHP401 and 500. JST conservatively set PHP400 as the average cost, thereby bringing the WTP value to PHP500 /household /month.

### **(2) Number of Target Households**

12.18 The total number of households assumed to benefit from the project is based on the projections of MCWD of households connected for given years, as shown in Table 12.3.2 below.

### **(3) Total Benefit**

12.19 The total benefit is summarized in the following table.

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<sup>7</sup> For details, please refer to the Final Report on the WTP Survey (Volume 3: Database Formation).

**Table 12.3.2 Total Benefit of Mananga II Dam Project in Benchmark Years**

Year	WTP ('000 PHP) (A)	No. of Households (B)	Total Benefit ('000 PHP) (C)=(A)x(B)
2023	6.0	148,827	892,962
2030	6.0	154,545	927,270
2040	6.0	154,545	927,270
2050	6.0	154,545	927,270

Source: JICA Study Team.

#### (4) Savings from Purchase of Bottled Water

12.20 Another expected benefit is savings from the purchase of bottled drinking water. With reliable water supply, some households may shift to tap water for drinking. The WTP survey shows that 35% of respondents spend PHP100-200/month for bottled water and 51% spend more than PHP200.

12.21 However, since a more detailed analysis is necessary to estimate the savings, these were not included in the quantified benefits.

#### 4) Results of Economic Evaluation

12.22 The result of the economic analysis is presented in Table 12.3.3 and the cost-benefit stream in Table 12.3.4.

12.23 The EIRR of the project is 16.2%, higher than the SDR of 15%, thus the project is highly economically feasible. It should be noted that this is a very conservative estimate as the quantified benefit relies only on the WTP values.

**Table 12.3.3 Results of Economic Evaluation of Mananga II Dam Project**

EIRR (%)	NPV (‘000 PHP)	B/C
16.2%	186,258	1.08

Source: JICA Study Team.

**Table 12.3.4 Cost-Benefit Stream of Mananga II Dam Project**

Unit: PHP'000

Year	Cost			Benefit				Net Cash Flow	
	Investment Cost	O&M Cost	Total	WTP	No. of Households	Benefit from WTP	Total		
-5	2017	60,205.5	0	60,205.5	0	0	0.0	-60,205.5	
-4	2018	120,411.0	0	120,411.0	0	0	0.0	-120,411.0	
-3	2019	358,411.0	0	358,411.0	0	0	0.0	-358,411.0	
-2	2020	563,584.0	0	563,584.0	0	0	0.0	-563,584.0	
-1	2021	1,514,632.0	0	1,514,632.0	0	0	0.0	-1,514,632.0	
0	2022	1,444,184.0	0	1,444,184.0	0	0	0.0	-1,444,184.0	
1	2023	0.0	90,100	90,100.0	6.0	148,827	892,962	892,962	802,861.9
2	2024	0.0	90,100	90,100.0	6.0	149,631	897,784	897,784	807,684.2
3	2025	0.0	90,100	90,100.0	6.0	150,439	902,633	902,633	812,532.6
4	2026	0.0	90,100	90,100.0	6.0	151,251	907,507	907,507	817,407.1
5	2027	0.0	90,100	90,100.0	6.0	152,068	912,408	912,408	822,308.0
6	2028	0.0	90,100	90,100.0	6.0	152,889	917,335	917,335	827,235.3
7	2029	0.0	90,100	90,100.0	6.0	153,715	922,289	922,289	832,189.3
8	2030	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
9	2031	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
10	2032	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
11	2033	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
12	2034	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
13	2035	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
14	2036	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
15	2037	439,450.0	90,100	529,550.0	6.0	154,545	927,270	927,270	397,720.0
16	2038	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
17	2039	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
18	2040	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
19	2041	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
20	2042	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
21	2043	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
22	2044	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
23	2045	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
24	2046	0.0	90,100	90,100.0	6.0	154,545	927,270	927,270	837,170.0
Total		4,500,878	2,162,400	6,663,278	144	3,686,085	22,116,508	22,116,508	15,453,231
PV@15%		2,102,041	250,613	2,352,654	-	-	-	2,538,913	186,258

Source: JICA Study Team.

## 5) Sensitivity Analysis

12.24 JST also conducted a sensitivity analysis, assuming changes in cost between -10% and +20% and changes in benefits between 0 and -10%.

12.25 The result of the analysis is summarized in Table 12.3.5. Note that the switch over value or the point at which the EIRR will break even at 15% is 5%.



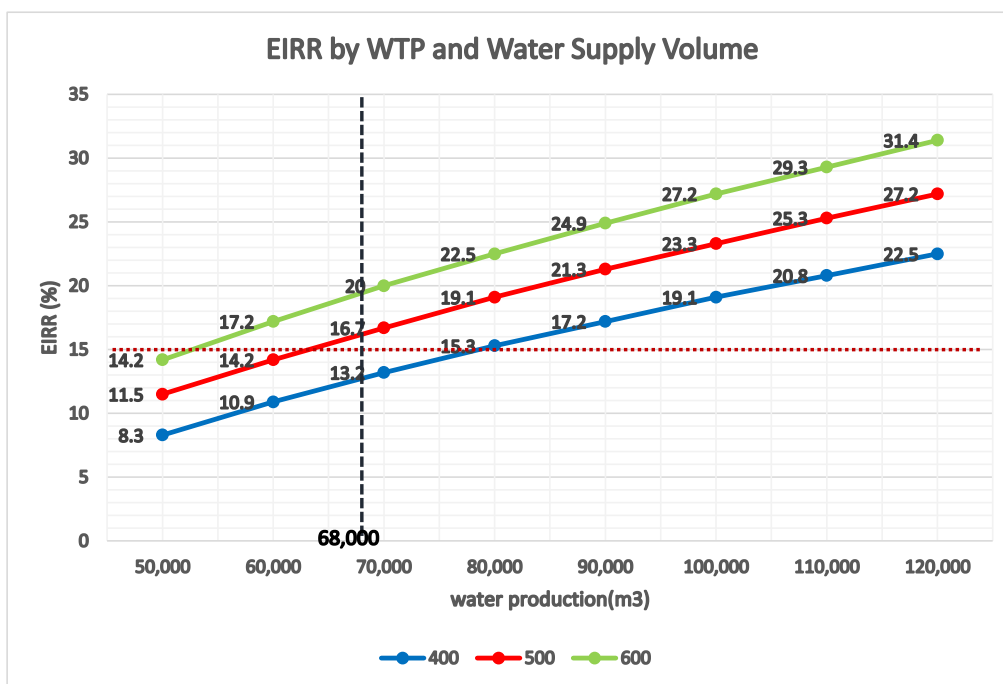
**Table 12.3.5 Sensitivity Analysis (Cost and Benefit)**

Changes in Total Benefit \ Changes in Total Cost	-10%	0%	+10%	+20%
	0%	18%	16.2%	14.7%
-10%	16.2%	14.5%	13.1%	11.8%

Source: JICA Study Team.

12.26 A sensitivity analysis was also conducted assuming changes in WTP unit price between PHP400 and 600 and changes in water supply volume between 5,000 m<sup>3</sup>/day and 120,000 m<sup>3</sup>/day.

12.27 The following figure shows the results.



Source: JICA Study Team.

**Figure 12.3.1 EIRR by WTP and Water Supply Volume**

## 6) Other Economic Benefits

12.28 As previously mentioned, there are a number of unquantified economic benefits accruing from this project. While the WTP is supposed to distill in one figure the value of the water to consumers taking into account the cost of unsafe water, productivity losses and inconvenience, still health costs may not have been fully valued considering that the real cost of morbidity and mortality was not taken into account at the time the survey was conducted.

12.29 Moreover, given how critical the water condition in Cebu is, the biggest value that has not been accounted for is the depletion premium for groundwater sources—both in terms of what the replacement costs will be once the resource is depleted and the environment cost of this irreversible condition.

12.30 For the purpose of showing how significant these benefits could be, the following parallels are drawn from related studies:

(a) In the 2008 Study of the Water and Sanitation Program (WSP), Economic Impacts of

Sanitation in the Philippines, the estimated health costs of not having clean water were as follows:

**Table 12.3.6 Costs of Not Having Clean Water**

Impact	USD 2005 (estimate of WSP)	PHP (2005)	PHP (2014)
	Per Capita per Year		
Health Care Costs	0.4	22.03	32.32
Productivity Costs	0.7	38.56	56.56
Premature Death Costs	11	605.93	888.75

Source: Economic Impacts of Sanitation in the Philippines.

12.31 The national estimate of the health cost/household amounts to about PHP4,888 /year.

- (b) In a study presented in a conference of the Partnership for Environmental Management for the Seas of East Asia (PEMSEA), Economic Valuation of Groundwater in Metro Manila and Adjacent Areas,<sup>8</sup> the depletion premium and the marginal external cost (MEC) or the environmental cost of over-extraction (e.g., land subsidence, which can cause shoreline changes further aggravating flooding problems) were estimated, with the end view of informing policy formulation for resource management including use of pricing tools. The study divided Metro Manila into two areas and estimated the additional charges that NWRB should be imposing on groundwater extractors to account for the depletion premium and the environment cost (see Table 12.3.7).

**Table 12.3.7 Groundwater Charges to Account for Depletion and Environment Cost (PHP/m<sup>3</sup>, 2009 Prices)**

Install Additional Wells	Area A	Area B
Municipal	9.00	4
Industrial	34.20	17.21
Commercial	27.48	16.04

Source: JICA Study Team.

12.32 If these costs are accounted for in the economic analysis, the EIRR is expected to increase significantly.

## 12.4 Environmental and Social Considerations

12.33 The Mananga II Dam Project falls in Category A or Environmentally Critical Projects given that the project will inundate an area more than 25 ha and will impound more than 20 million m<sup>3</sup> of water.<sup>9</sup> The pre-feasibility studies that were conducted for the Mananga II Dam noted a number of environmental components/ aspects/ parameters that will be taken into consideration in the EIA study, such as baseline data/information, predicted impacts and measures. However, these data/information need updating as these were gathered 10–15 years ago. To determine the required information, probable impacts and mitigation/enhancement measures for the construction of the dam under the current situation, a scoping meeting should be conducted with DENR, experts, and the stakeholders. Overall, the environmental impacts of the Mananga High Dam construction were rated as moderate for the variants with no provision for environmental flows and low

<sup>8</sup> Authored by Maricor Ebarvia, paper presented in the 2009 PEMSEA International Conference.

<sup>9</sup> A Project Thresholds for coverage screening and categorization, in the Philippine EIS System, DENR.

for the variants which include the release of environmental flows according to the Water Resources Management Action Plan for Central Cebu (2005–2030) (MCWD, 2006).<sup>10</sup>

## 1) Socioeconomic Considerations

### (1) Impact of Dam Impoundment

12.34 The larger part of the impoundment area is classified as secondary forest land, which is important for the livelihood of the local population but, at the same time, categorized as highly susceptible for landslides. The inundated area is approximately 125 ha with a dam height of 76 m. The socioeconomic costs as well as benefits of a 43 m, 73 m and 83 m dam were previously estimated,<sup>11</sup> but in this Roadmap, a 76 m height is deemed optimal.

12.35 Reduced river flows may negatively affect the downstream surface water availability and the recharge of the coastal aquifer, which in turn will affect the water supply to the local population. Positive socioeconomic impacts are the generation of employment opportunities and the improved water supply to a larger number of people. With the estimated yield of 68,000 m<sup>3</sup>/day, the dam can provide the needs of roughly over 450,000 people assuming average consumption of 150 liters/capita/day (lpcd).

12.36 Other socioeconomic impacts have been identified for this project but need further study. These are as follows:

- (a) Under the administration of former Mayor Alvin Garcia (1995-2001), a resettlement plan was prepared for the relocation of the affected population by the Mananga II Dam Project. A committee or technical working group was tasked to facilitate the relocation, which led to the purchase of a lot in Barangay Sinsin and the preparation of a residential subdivision plan.<sup>12</sup>
- (b) As shown in the GIS map prepared by JST, the number of houses/ buildings that will be inundated is about 272.<sup>13</sup> These are located in Barangays Buot and Pamutan in Cebu City and Camp 4 in Talisay City. The estimate of affected households needs to be confirmed with the affected barangays in order to validate on the map the location of households as well as unoccupied structures such as farm look-out sheds.

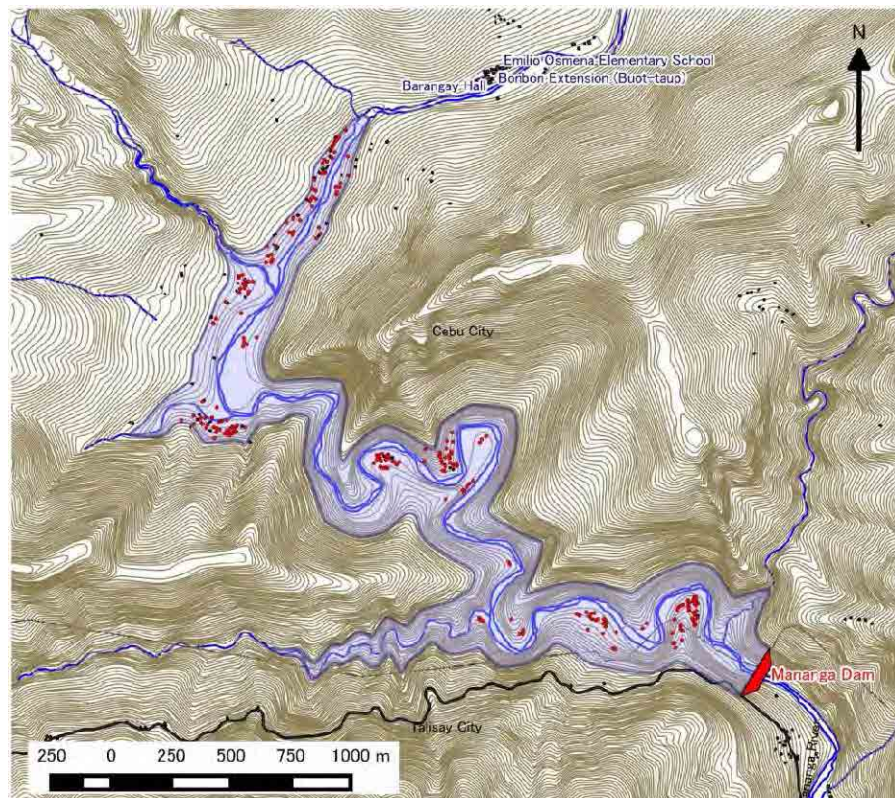
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<sup>10</sup> “[t]he reservoir impoundment area is, to a large extent, reforested area in which the biodiversity has improved in the last couple of decades. [w]ater quality problems are not expected, provided that the vegetation cover is removed from the reservoir area before impoundment starts. [e]xecution of the project will greatly reduce the amount of water reaching the coastal zone; this will negatively affect the recharge of the coastal aquifer and outflow to the sea. [n]egative impacts on the riverine ecology are expected to be minimal, since the lower reaches of the river already run dry during the greater portion of the year in Cebu.

<sup>11</sup> Water for Cebuanos – Excerpt from Water Remind Study 2008.

<sup>12</sup> As recollected by Professor Fe Walag, University of San Carlos, Water Resource Center (USC-WRC) who was involved in the undertaking of past studies for the Mananga Dam project and watershed management.

<sup>13</sup> The GIS indicated 235 points (smaller than 10 m<sup>2</sup>) and 37 polygon (larger than 10 m<sup>2</sup>) buildings to be inundated. This needs to be further verified as to how many families live or just use the buildings for sand and gravel gathering or farming purpose.



Source: JICA Study Team.

**Figure 12.4.1 Inundated Area for Mananga II Dam (73 m Height)**

- (c) The income sources of the affected population are most likely dependent on fruits (mangoes, coconuts), rice, corn and vegetables, charcoal, etc. sand and gravel quarrying and services. Some also do crop rotation. According to the Buot barangay captain, one third of the residents may not have land titles. After the issuance of the Central Cebu Protected Landscape (CCPL), no one was allowed to have a land title. However, even with the CCPL, no controls were exercised over resettlement. Recent settlers come from as far as Negros and Mindanao.<sup>14</sup> A sound resettlement action plan needs to be prepared based on repeated consultations with affected people. The resettlement plan should have a precise inventory of affected households, which has not been done yet. The Brgy. Sinsin relocation site (presumably comprising 90 ha) should also be validated as to its availability for present / future relocation should the Mananga II Dam Project push through. This should also be assessed in terms of how such relocation site within the CCPL could be utilized. The estimated unit cost of relocation will be based on guidelines, such as those of the Division for the Welfare of the Urban Poor (DWUP). According to the ADB Cebu Water Supply Project Report in 1991 done by Electrowatt, resettlement cost is estimated at over PHP46.5 million, which includes farm replacement, crop compensation, and resettlement assistance,<sup>15</sup> while the Water for Cebuano Report (2006) indicated the socioeconomic cost of the 73 m height dam would be PHP236 million.<sup>16</sup>

<sup>14</sup> Interview with Buot barangay captain on July 31, 2014.

<sup>15</sup> ADB (1991) Cebu Water Supply Project Report, "Feasibility Study for a Dam on the Mananga River, Volume 2."

<sup>16</sup> Water for Cebuano Water Resources Management Action Plan for Central Cebu (2005–2030) – Excerpt from Water Remind Study 2006.

## **(2) Relevant Legislations / Policies of Procedures for Resettlement**

12.37 There are three relevant primary legislations/policies that provide the legal basis or reference for resettling affected residents in the Mananga Dam II project site, namely:

- (a) National Integrated Protected Areas System Act of 1992 known as NIPAS Act (RA 7586) and CCPL Act (RA 946) - The NIPAS Act set aside areas by reason of their unique physical and biological significance, managed to enhance biological diversity and protected against destructive exploitation. The CCPL, which is within the NIPAs network of protected areas, elaborated the protection of watershed areas primarily to conserve Metro Cebu's water resources. While the NIPAS/CCPL did not strictly prohibit occupants in the area, it could regulate settlements and human activities through its Management Plan/ Zoning and system of tenurial/ rental agreements. Unfortunately, the Management Plan did not include provisions that call for the preservation of the Mananga area for the dam project. Fortunately, the Protected Area Management Board (PAMB) could still come up with specific policies/strategies, as will be enunciated in the CCPL Management Plan, that will consider preserving the area for the Mananga II Dam development.

12.38 Disaster Risk Reduction Management Act of 2010 known as DRRM Act (RA 10121) - The DRRM Act empowers the LGUs to identify danger/hazard risks areas and to institute programs/ projects/ strategies to reduce communities' vulnerabilities to these dangers (such as flooding and landslide). Such strategies may include relocation/ resettlement of communities. The Campo 4 (dam site) has been subjected to a number of landslides and flooding, which prompted local officials to issue warnings and the possibilities of relocating families away from these danger areas. The areas around Buot and Sinsin had also experienced flooding (along river) and landslide.

12.39 The local DRRM councils of both Talisay and Cebu Cities could include the Campo 4 and riverbanks of Brgys. Buot and Pamintuan in their local risk map and declare such areas as non-habitable areas. The Talisay City local DRRM office, while acknowledging the areas in Campo 4 as hazard risk areas for landslide and flooding, is not aware of any concrete plan to relocate vulnerable households. The DRRM plan for 2014 only provides for construction of evacuation centers which only provides short-term and temporary housing for affected families.

12.40 The Cebu City Government considers the upland not priority areas as the focus is on the lowland urban areas where calamities and natural disasters are more pronounced.

- (b) Urban Development Housing Act of 1992 known as UDHA (RA 7279)

12.41 The UDHA (RA 7279) mandated the LGUs to undertake the following responsibilities:

- (i) Resettlement of persons living in danger areas (esteros, railroad tracks, garbage dump, riverbanks shorelines and waterways) and public places (sidewalks, roads, parks and playgrounds); and
- (ii) In coordination with NHA, provide relocation or resettlement sites with basic services and facilities and access to employment opportunities sufficient to meet the basic needs of the affected families.

12.42 The UDHA also requires LGUs to conduct the following:

- (i) Beneficiary listing (coming up with a master list of beneficiaries within one year from the effectivity of the law);
- (ii) Land inventory (within the territorial jurisdiction of LGUs);
- (iii) Identification of socialized housing sites; and
- (iv) Acquisition of identified socialized housing sites.

12.43 The LGUs' socialized housing program will be elaborated in their Local Shelter Plan (LSP).

12.44 Both the Cebu City and Talisay City Governments have prepared LSPs, but these LSPs failed to elaborate on the need to resettle households living in danger areas:

- (i) Cebu City LSP listed the barangays with families living in danger zones, but Buot was not on the list, as were most of the upland barangays; and
- (ii) Talisay LSP did not consider households living in danger areas as potential beneficiaries for resettlement, but counted 63 families in Campo 4 as socialized housing beneficiaries.

12.45 The LSPs of Cebu City and Talisay City could be updated to consider households within the Mananga Dam II project area as potential beneficiaries of the socialized housing program given that those living along the riverbanks are within dangerous flood risk areas.

### **(3) Local Institutional Arrangements for Resettlement**

12.46 While the Socialized Housing Program of Metro Cebu cities have certain accomplishments to boast (based on the number of beneficiaries given housing assistance and settlement sites developed), the sheer number of potential beneficiaries (underprivileged, homeless, squatters and those living in danger areas) and limited government resources hinder the effective and successful delivery of the program. Often, resettlement in Metro Cebu cities (Cebu, Mandaue, Lapu-lapu) generally refers to relocation of squatters and impoverished persons/households due to the following:

- (i) The lot owners (private or government) got court orders for eviction and demolition of the squatters, as the squatted land/property will be for utilization/development; and
- (ii) Occurrence of disasters/calamities such as fires, flooding and landslide.

12.47 Thus, LGU responses are more reactive instead of being proactive. While social housing/resettlement programs are implemented in coordination with national government housing agencies, such as the NHA and HUDCC, local city departments have their respective roles and responsibilities (see Table 12.4.1).

**Table 12.4.1 Role of LGUs in Resettlement Issues**

Department	Mandate	Resettlement Related Role
Department of Engineering and Public Works (DEPW)	Provide engineering services to the LGU concerned, including investigation and survey, engineering designs, feasibility studies, and project management.	<ul style="list-style-type: none"> <li>• Undertake investigation, survey of housing sites</li> <li>• Prepare plans, estimates, program of works for site development works and housing construction</li> <li>• Undertake development/ construction works for LGU-administered housing projects, and others.</li> </ul>
Division for the Welfare of the Urban Poor (DWUP)	Implement the City's socialized housing program and provide services towards addressing the tenurial and housing needs of the homeless citizens.	<ul style="list-style-type: none"> <li>• Primary/Lead agency that undertakes the housing program</li> <li>• Identify SHP beneficiaries</li> <li>• Inventory SHP sites, lot acquisition</li> <li>• Secure permits/ clearances for housing development including titling of lots and others.</li> </ul>
Department of Social Welfare and Services	Develop and implement comprehensive programs of social welfare services to facilitate the integration of the most disadvantaged and distressed Filipinos into the mainstream of society.	<ul style="list-style-type: none"> <li>• Provides livelihood training, capability-building, skills enhancement of settlers</li> <li>• Establishes/ Develops social welfare services in settlement sites and others.</li> </ul>

Source: JICA Study Team.

## 2) Environmental Impacts

12.48 The survey done by the Mines and Geosciences Bureau (MGB) to understand the risk of landslides, floods, etc. already identified Buot and Pamutan (Cebu), and Campo 4 (Talisay) barangays as highly susceptible to these risks.<sup>17</sup> Cebu City prepared the local shelter plan in Sinsin in order to promote relocation from those areas to a less risky area, which is also relevant to the area that will be inundated by Mananga II Dam. The PHIVOLCS survey on active faults was done after the earthquake in Bohol in 2013. These studies done by MGB and PHILVOCS have to be studied further.

12.49 According to satellite images, lineaments are identified in the Mananga area (see Figure 12.4.2), which are also subject to ground verification. If these lineaments are active, the dam needs to be designed to avoid them. Both the Electrowatt (1991) and the Bechtel (2001) feasibility studies exhibited preliminary background (environmental setting) and assessment of environmental impacts. However, in the absence of a comprehensive EIA study, many environmental issues and concerns could not be known. These preliminary studies (IEE) in 1991 and 2001 are no longer relevant given changes in environmental conditions. The project was up to the Project Feasibility Study stage and did not prosper to the next level of securing of development permits and clearances, including the conduct of an EIA study and the procurement of an ECC. It is the understanding among stakeholders that the EIA study and securement of the ECC will be undertaken prior to the implementation of the project.

<sup>17</sup> From the MGB geologic map, there are several NE-SW trending faults mapped. One is quite near (almost within) the proposed site. These faults need to be revisited especially those near the proposed site. In addition, the study done by JST using very high resolution satellite data shows a NW-SE trending lineament whose NW extension is marked by a high erosion area and active slides in Brgy. Sinsin. The lineament is about 500 m west of the site and is about 6 km +/- 1 km long. As an update, JST found a PHIVOLCS report dated September 6, 1996 on the preliminary investigation of active faulting within the Mananga Dam site. The 3-day ocular inspection of the area in October 2014 did not find geomorphic evidence of active faulting within the dam site itself. However, data suggest "active faulting along a segment of the Lutac-Jaclupan Fault, and along fault traces in the Buot area, which are possible extensions of the Cantabaco Fault." Active traces of the Lutac-Jaclupan Fault were found in the Jaclupan-Toong area about 2.5 km downstream of the dam site. Two potentially active traces of the Cantabaco Fault are about 2.5 km upstream of the site. The NE-trending portion of Mananga River in Brgy. Bonbon passes through the Malubog Formation whose rocks include mudstone and shale. When soaked in water, the mudstone swells and become slippery. Over time, this may cause the overlying materials to slip down the impounded water with massive force endangering the stability of the dam, or push the impounded waters over the dam. High erosion in Brgy. Sinsin (especially along the NW extension of the observed lineament) and in Brgy. Bonbon may cause rapid shallowing of the area behind the dam. This may necessitate dredging. When the dam is built, the downstream portion especially at the mouth (seaside) might be deprived of silt encouraging coastal erosion in places near the river mouth.



Source: JICA Study Team.

**Figure 12.4.2 Lineaments in Mananga Dam Area based on the Satellite Image**

## 12.5 Financial Analysis

12.50 This section will discuss the financial analysis and recommend an appropriate financing strategy for the Mananga II Dam Project.

### 1) Financial Analysis

#### (1) Methodology and Assumption

12.51 JST carried out the incremental discounted cash flow analysis and used the following basic assumptions:

- (i) Project schedule: construction period is five years from 2017 to 2022; operation will start in 2023;
- (ii) Project evaluation period is 30 years including the construction and operation period;
- (iii) Project cost is shown in Table 4.2.1. Construction cost includes renewal of the equipment of the water treatment plant, which costs PHP517 million. O&M cost is 3% of the construction cost, or equivalent to PHP106 million/year;
- (iv) All costs and benefits are expressed in 2014 price level in Philippine currency;
- (v) Useful life of civil works and equipment are:

Item	Useful Life
Civil Works	50 years
Equipment	15 years

- (vi) Assumed annual inflation rate during the project life is 3%, which is the target rate of the Government from 2015-2016;



(vii) Assumed GRDP growth rates are:

Year	Annual Growth Rate
2010 to 2020	8.3%
2020 to 2030	7.8%
2030 to 2050	5.8%

(viii) Beneficiaries are households within the MCWD franchise area;

(ix) Financing structure is summarized in the following table.

	Weight	Cost of Capital	Loan Maturity
Equity	30%	15%	-
Debt	70%	9%	20 years
WACC		10.8%	

12.52 The financial viability indicators used are:

- (i) FIRR - Financial Internal Rate of Return; and
- (ii) NPV - Net Present Value.

## (2) Revenue

12.53 The projected revenues are based on the water sales of the estimated production of the dam, that is, 68,000 m<sup>3</sup>/ day, less 20% for NRW consideration. The annual billed water volume used for this analysis is presented in Table 12.5.1.

12.54 Regarding the water tariff, the average monthly rate in 2013 was calculated by using actual MCWD data. The value is PHP22.90/m<sup>3</sup>. However, based on the results of the WTP survey, PHP100 is the willingness to pay in addition to the current monthly payment. On the assumption that the average monthly consumption is about 15 m<sup>3</sup>, average additional WTP is PHP7.00/m<sup>3</sup>. Hence, PHP30 (22.9+7=29.9) /m<sup>3</sup> is used as the tariff consumers are willing to pay.

12.55 In this analysis, water tariff is assumed to be raised every five years according to inflation rate. Tariff projections based on current and WTP levels are summarized in Table 12.5.2.

**Table 12.5.1 Assumed Billed Water**

Daily Water Production	Annual Billed Water (NRW: 20%)
68,000m <sup>3</sup>	19,856,000 m <sup>3</sup>

Source: JICA Study Team.

**Table 12.5.2 Average Water Tariff**

Year	2013	2023–27	2028–32	2033–37	2038–42	2043–47	2048–52
Monthly average tariff (PHP)	22.9*	30.8	35.7	41.4	47.9	55.6	64.4
Tariff at WTP level	30	40.3	46.7	54.2	62.8	72.8	84.4

Source: JICA Study Team.

Note: \*Calculated based on MCWD Databook 2013.

12.56 The total annual revenue was computed based on the above tariff and assumed billed water. The revenue of benchmark year is presented in Table 12.5.3.

**Table 12.5.3 Total Revenue in Benchmark Year**

Year	Revenue (PHP)	
	Tariff at PHP22.90	Tariff at PHP30
2023	611,082,003	800,544,109
2030	708,411,523	928,050,031
2040	952,045,850	1,247,221,637

Source: JICA Study Team.

### (3) Results of Financial Analysis

12.57 As indicated in the basic assumptions, the cashflow analysis was premised on a financing structure composed of 30% equity at 15% rate of return and 70% debt at 9% of interest rate with a tenor of 20 years. In this case, Weighted Average Cost of Capital (WACC) is computed at 10.8%.

12.58 JST computed the FIRR using 2013 tariffs and WTP tariff level. In case of 2013 tariffs, the FIRR is below the WACC but when WTP is considered, the FIRR goes up to 13.07% which is higher than the WACC; which means that the tariff of PHP30/m<sup>3</sup> makes the project financially feasible. The results are summarized in Table 12.5.4.

**Table 12.5.4 Financial Analysis Results for Mananga II Dam Project**

Tariff (PHP/ m <sup>3</sup> )	FIRR (%)	NPV (PHP)
P <sub>0</sub> : 22.9	9.63%	39,463,424
P <sub>1</sub> : 30	13.07%	1,943,498,766

Source: JICA Study Team.

12.59 If the tariff is pegged at PHP22.90/m<sup>3</sup>, the project will require a subsidy amounting to 12% of project cost.

### (4) Sensitivity Analysis

12.60 Sensitivity analysis was conducted using the WTP tariff level applied to the following scenarios: change in cost between -10% and +20% and change in revenues between -20% and +10%. The results are summarized in Table 12.5.5.

**Table 12.5.5 Result of Sensitivity Analysis**

Changes in Total Revenue \ Changes in Total Cost	-10%	0%	+10%	+20%
	+10%	15.73%	14.38%	13.21%
0%	14.35%	13.07%	11.96%	10.99%
-10%	12.89%	11.68%	10.63%	9.71%
-20%	11.33%	10.20%	9.21%	8.35%

Source: JICA Study Team.

Note: Only capex is included.

12.61 Even under the scenario where the cost increases by 20%, the FIRR keeps higher than the WACC, which makes the project financially viable.

12.62 Table 12.5.6 summarizes the results of the financial and sensitivity analyses.

**Table 12.5.6 Summary of Financial Analysis**

WACC based on indicative financing:	30% equity at 15% required rate of return 70% debt at 9% interest rate and tenor of 20 years <b>WACC= 10.8%</b>
Tariff required to achieve financial viability in worst case scenario	Sensitivity scenario, 20% increase in project cost- PHP30/m <sup>3</sup>
WTP tariff	PHP30/m <sup>3</sup>

Source: JICA Study Team.

## 2) Financing Strategy

12.63 The implementing agency has two options in funding the project: (1) pure public financing, or (2) Public Private Partnership (PPP).

### (1) Pure Public Financing

12.64 The traditional way is for the implementing agency to fund the project from its balance sheet. Usually the Implementing Agencies (IA) are required to put up 10% equity and the rest can be sourced from debt financing. Sources for the latter and current indicative terms are shown in Table 12.5.7.

**Table 12.5.7 Financing Sources and Indicative Terms**

Water District	Provincial Government
Local Water Utilities Administration (LWUA) <ul style="list-style-type: none"> <li>• Interest Rate - about 9% p.a.</li> <li>• Tenor - 25 years</li> <li>• Collateral - none required; step-in rights in case of default</li> </ul> *LWUA has resource constraints. Availability of funds adequate for the project's capital requirements should be ascertained first.	Municipal Development Fund Office (MDFO) <ul style="list-style-type: none"> <li>• Interest Rate - about 9% p.a.</li> <li>• Tenor 15-20 years</li> <li>• Collateral - IRA Intercept</li> </ul> *MDFO has adequate resources, however, the amount of the loan will be based on the Province's borrowing capacity.
Government Financial Institutions (GFIs) for Relending of ODA Funds <ul style="list-style-type: none"> <li>• Interest Rate - 9.5 -10% p.a.</li> <li>• Tenor - 15-20 years</li> <li>• Collateral - assignment of revenues; make an arrangement with LWUA to take over for and in behalf of the lender.</li> </ul>	
Private Financial Institutions (PFIs) <ul style="list-style-type: none"> <li>• Interest Rate - usually offers a variable rate, with a one-time option to fix the rate; current 90-day rate is at 3.7% to 4.7% p.a.</li> <li>• Tenor - 10 years (if funded through Philippine Water Revolving Fund, Development Bank of the Philippines or MDFO can provide the liquidity cover)</li> <li>• Collateral - assignment of revenues; may secure guarantee cover from LGU Guarantee Corp. or other providers.</li> </ul>	

Source: JICA Study Team.

### (2) Public-Private Partnership

12.65 The other option is to implement the project through a PPP arrangement, a financing and procurement strategy that involves a long-term contract between the government implementing agency and a private proponent. Depending on the financial viability of the project, the private sector involvement can include full cost financing, design, construction, operation and maintenance. Even if the project is marginally financially viable—given affordability of tariff concerns--the project can still be implemented through a PPP arrangement. Government can provide a viability gap fund (VGF) or employ credit enhancements for private sector financing, for example bridge the project's negative flows in the initial years of operation; in effect subordinating public resources to that of the private sector's full cost recovery. Notwithstanding government support, PPP arrangement still offers significant benefits to the implementing agency, particularly relief from burden of financing, sharing of risks and access to technology, management expertise and efficiencies from private sector

operation.

### **(3) Recommendations on Financing Strategy for Mananga II Dam Project**

12.66 The project is a good candidate for a PPP arrangement, given the following considerations: it is best operated using commercial principles; the project is financially viable; dam technology is tried and tested, therefore making technical risks predictable and mitigate-able; and generally other project risks can also be identified and managed with relative ease. Moreover, the project can draw lessons learned from precedents on PPP bulk water supply projects.

12.67 The financial analysis anchors the recommendations on the PPP structure for the project. Admittedly, the financial analysis is preliminary and expectedly has a margin of error. If in the more in-depth analysis the subsidy requirement becomes substantial and the implementing agency does not have the resources therefor, the implementing agency may consider applying for national government support. This scenario is not far-fetched. Recent programs demonstrate that there are no legal impediments to getting direct national government support. For example, under the Salintubig Program (targeting waterless municipalities, defined as with less than 50% of the population having access to safe water supply), water districts operating in waterless municipalities are entitled to grants or highly concessional financing, on-grant or on-lent by LWUA.

12.68 While this example apparently targets poor communities, there are other socioeconomic and inclusive development goals that warrant national government subsidy such as development of tourism, sustaining high growth areas by providing adequate infrastructure support and environment protection and climate change adaptation. For instance, the National Sewerage and Septage Management Program (NSSMP) may provide up to 40% grants for sewerage projects in highly-urbanized cities to address degradation of bodies of water and, relatedly, to address growing incidence of waterborne diseases.

12.69 The national government support is best programmed under DPWH. DPWH has ongoing capital investment programs for local water supply and sanitation projects. It is administering the NSSMP and an infrastructure fund for basic services supporting tourism growth areas. Given the economic significance of Metro Cebu, it should not be difficult to rationalize national government support.

## **12.6 Institutional Arrangements**

### **1) Legal Basis**

12.70 The following legal bases identify which agencies have the mandate to implement the dam project

- (a) **Presidential Decree 198:** PD 198 is a special charter that enabled the creation of water districts and LWUA, a specialized financing and regulatory body for water service providers but de-facto focused on water districts. The franchise given to water districts authorizes them to develop water sources, transmit and distribute the water to consumers, as well as provide sewerage or septage management services for proper wastewater treatment and disposal. Water districts, by jurisprudence, are classified as government-owned and controlled corporations. They operate autonomously and do not get any equity, capital or operating subsidy from the national government. However,

there is no preclusion from law for them to get such support from the national government. In fact, Section 76 of PD 198 allows national government support for financially non-viable water districts, provided the support will not exceed the cost of source development and transmission lines.

12.71 Water districts, as corporate entities can borrow, issue bonds and incur other indebtedness to implement projects, enter into joint venture arrangements or into PPP arrangements using the JV Guidelines for GOCCs and the BOT Law and its implementing rules and regulations, respectively.

- (b) **Republic Act 7160 or the Local Government Code:** The LG Code vests authority to LGUs (provinces, cities and municipalities) to provide basic services to their constituents, including among others, water supply and sanitation services. It also allows LGUs to enter into PPP in providing these services, either through joint venture or other modalities defined in the BOT Law. These arrangements have had several precedents in various sectors, including water supply. Closer to home is the example of the Carmen Bulk Water Supply Project. The Province of Cebu implemented the project through a joint venture with a private proponent. A special purpose joint venture company was registered with the Securities and Exchange Commission using the Corporation Code of the Philippines, wherein the Province took a 49% equity share in the company.

12.72 Furthermore, the province also has the authority to incur financial obligations through direct credit or bond issuance to fund such projects or enter into PPP arrangements using the LG Code or the BOT Law and its implementing rules and regulations. However, should the province decide to use the LG Code as legal basis, it has to adopt through an ordinance a PPP Code that establishes implementing guidelines.<sup>18</sup>

- (c) **Presidential Decree 1067 or the Water Code of the Philippines:** The Water Code governs the ownership, appropriation, utilization, exploitation, development, conservation and protection of water resources. The Code requires the approval of DPWH and NWRB for the development of the dam. DPWH's review and approval includes ensuring technical integrity, as well as an assessment of the operation and maintenance technical capability of the implementing agency of the dam. If the existing staff of the implementing agency does not have the required technical capability, then one of the recommendations will be proper staffing requirements. NWRB's review and approval will focus on water allocation and use.

(d) **Other Laws Related to Project Implementation**

- (i) **Republic Act 9184 or Government Procurement Reform Act:** This law governs the bidding, selection and contracting process for goods, services, infrastructure projects and consulting services funded by government resources. Award to the winning bidder is usually based on lowest calculated bid that meets the minimum specifications, scope or work or bill of quantities and is within the approved budget for the contract.
- (ii) **Republic Act 7718 or the BOT Law:** The BOT Law and its Implementing Rules and Regulations provide the policy, approvals and procurement process of infrastructure projects implemented through the different modes of PPP. It has

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<sup>18</sup> The PPP Center prepared an LGU PPP Code that could be adopted by the Province.

robust guidelines on, among others: qualification of proponents; government approvals; government support, undertakings and incentives; bidding, evaluation and contract award; and contract monitoring and transfer of assets. Hence, it conveys a transparent and comprehensive development process. Award to the winning bidder is based on the technical proposal's compliance with the minimum performance standards and specifications and compliance with the financial bid parameter, such as lowest tariff, lowest subsidy, or highest premium paid to the government.

- (iii) **Executive Order 423:** Section 8, Joint Venture Guidelines for Government Owned and Controlled Corporations - This executive issuance defines joint venture as an arrangement whereby a private sector entity/ies on one hand, and a Government Entity/ies on the other hand, contribute money/ capital, services, assets (including equipment, land, intellectual property or anything of value), or a combination of any or all of the foregoing to undertake an investment activity. The implementing guidelines cover procurement, government exposure, contractual arrangement for forming the joint venture, and government approvals.

## 2) Options on Institutional Arrangements

12.73 Given the aforementioned agency mandates, below are options on institutional arrangements for the execution of the project.

- (i) By Metro Cebu Water District (MCWD);
- (ii) By the LGU (e.g., Cebu City or Provincial Government); or
- (iii) Joint implementation of MCWD and LGU.

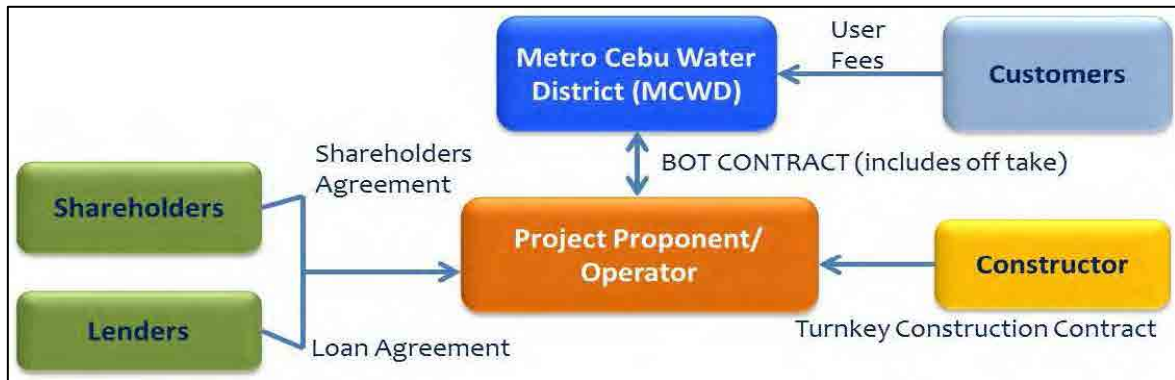
### (1) Implementation by MCWD

12.74 The simplest option is for MCWD to implement the project as it is the direct user of the project's output. In the past, MCWD entered into bulk water supply agreements using RA 9184 by treating the agreement as a simple supply contract. This is also the legal basis used for the purchase agreement between MCWD and the Carmen bulk water supply JV company of the Province and the private proponent. RA 9184 requires the agency to set and fix a single purchase price within the approved budget for the contract, over the entire life of the contract. MCWD prefers this legal basis because the approvals required are up to the Board level only.

12.75 However, for the Mananga II Dam Project, the administrative ease of using RA 9184 is trumped by the inflexibility in risk management, which will directly impinge on the cost of the service. The project has huge investment requirements but a long economic life. In order for the tariff not to rise sharply, it is best for the cost recovery period to match the economic life of the project. There should also be mechanisms to mitigate the risks over the life of the project through defined and enforceable recourses, such as a parametric rate adjustment formula, so that the required equity return and cost of financing will be competitive.

12.76 The BOT Law offers a better framework and enabling provisions to be more creative in structuring the project, ensuring more rational risk sharing and, consequently, less stringent security package for the proponent. For example, because there is a rate adjustment formula tied to risks that will increase cost of delivering the output—such as inflation, cost of financing—the tariffs will not be priced as high as when they are fixed, thus the proponent is required to impute potential risks over the

life of the contract. Another example, the BOT Law allows MCWD to impose claw back provisions in case profits beyond an agreed rate of return are generated or in case the proponent realizes gains from re-financing. The BOT Law also avoids the conflict of interest that is inherent in a joint venture arrangement—where the water district is part owner of the facility and at the same time the off-taker of the output. Figure 12.6.1 shows the potential contractual structure of the project. The project proponent can be allowed to sell to the other LGUs using individual independent agreements.

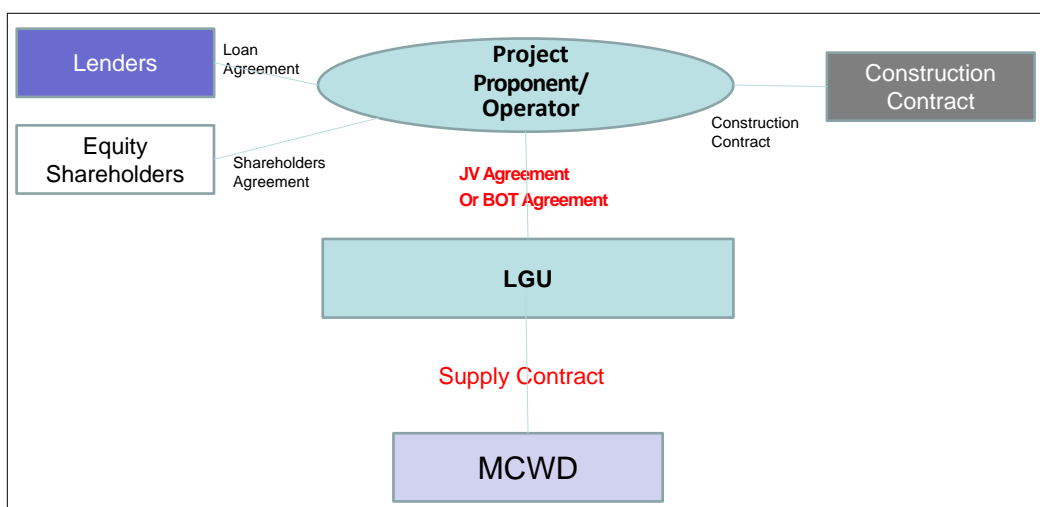


Source: JICA Study Team.

**Figure 12.6.1 Sample Contract Arrangement for MCWD**

**(2) Implementation by LGU**

12.77 The second least complicated is for Cebu City or the Province to implement the project. However, apart from the contract for the development of bulk water, it has to enter into a second set of contracts for the supply of water to MCWD and other municipalities outside of the MCWD franchise area. This is the arrangement with the Carmen Bulk Water Supply Project. Since the JV Company for the Carmen project is private (Cebu Province has a 49% stake only in the company), MCWD is not allowed to sole source the contract thereto and so had to conduct public bidding for a supply contract using RA 9184. Cebu City or the Province can use the same scheme for Mananga II Dam Project using as legal basis, the Local Government Code.



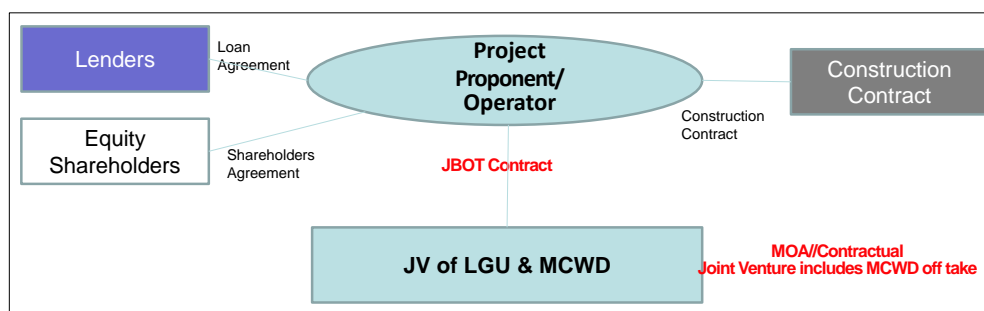
Source: JICA Study Team.

**Figure 12.6.2 Sample Contract Arrangement for the Province**

### (3) Joint Implementation by MCWD and LGU

12.78 The third option will require a more complex setup but has the advantage of having risks shared by more parties. The most expedient mechanism to formalize the joint execution of MCWD and LGU is through a Memorandum of Agreement (MOA), an agreement akin to a contractual joint venture. The use of a MOA for similar arrangements has had precedents and is the recommended mechanism by DILG. Note that although the parties are defined as corporate bodies, DILG’s administrative interpretation of the LG Code constrain LGUs from forming subsidiary or public special purpose vehicles using the Corporation Code of the Philippines. DILG has issued opinions confirming this limitation, such as DILG Opinion no. 97-1995,<sup>19</sup> where the Department clarified: “the creation of the proposed corporation is, however, not feasible under the law. May we call your attention to Section 16, Art. XII of the 1987 Constitution, thus: The Congress shall not, except by general law, provide for the formation, organization, and regulation of private corporations. Government-owned or controlled corporations may be created or established by special charters in the interest of the common good and subject to the test of economic viability.”

12.79 The MOA should be carefully crafted to define the roles, responsibilities, authorities, equity and revenue sharing, and risk allocation, among others<sup>20</sup> as there is no governing law to fall back on (unlike the corporate form which is governed by the Corporation Code) should there be omissions or differences in the interpretation of rights and liabilities. The MOA will not create a juridical entity, hence each party retains its legal personality. It will be advisable for the parties to decide who between them will be the lead entity to represent the “partnership” in contractual arrangements, and who will hold in trust assets accruing to the partnership. This role should be explicitly stated in the MOA. The JV partnership can then enter into a PPP contract using the structure shown in Figure 12.6.3.



Source: JICA Study Team.

**Figure 12.6.3 Structure of a PPP Agreement with JV Partnership of Province and MCWD**

### 3) Roles of MDCDB and Other Stakeholders

12.80 MDCDB, having been created by a MOA among LGUs, national government agencies and private and civil society stakeholders, cannot assume the implementing agency role for the project. However, it can still play a critical role in the project implementation. It can help with the advocacy for the project, particularly fostering social acceptance from displaced communities, coordination of requisite actions for ROW acquisition, and lobbying for viability gap funding from the national government should it be

<sup>19</sup> This refers to the query of the Vice-Mayor of Santiago, Isabela on whether the Mayor’s plan to create a corporation wholly owned by the City, to be known as the Santiago Agro-Industrial Service Corporation, is proper.

<sup>20</sup> DILG opined that Corporation Code cannot be used to establish subsidiary or even special purpose government corporations.



necessary. It can also assist the implementing agency with facilitation of decisions, inputs, approvals from the various stakeholders and approving authorities, such as the Regional Development Council and Investment Coordination Committee. Furthermore, at execution stage it can serve as the stakeholders' monitor to ensure the project implementation is on track.

12.81 The roles of other stakeholders are summarized below:

- (i) Talisay City will have some barangays that will be submerged because of the dam. The City buy in for the project is, therefore, critical. It is necessary for it to cooperate in promoting social acceptability of the project.
- (ii) Danao, Naga, Carcar and San Fernando LGUs may be buyers of the output, too. If so, it is necessary to get their financial commitment for the minimum off-take volume.
- (iii) DPWH can potentially be the source of the subsidy from the national government.
- (iv) NWRB is the focal agency that can rationalize the water resource allocation. It has the power to require closure of wells if they are over-extracted or if saline intrusion is imminent.

## 12.7 Key Considerations and Recommendations

12.82 This conclusion chapter presents key considerations and recommendations based on the result of analyses and discussions with concerned agencies.

### 1) Key Considerations

12.83 In a consultation with MCWD, the Chairman of the Board expressed two critical considerations in the decision to implement the dam project, as follows:

- (i) The absorptive capacity of the distribution network has to be taken into account. This is why MCWD is prioritizing investments in the distribution network, of about PHP4 billion from 2015–2020. The investments will come from internal cash generation (50%) and debt financing (50%). This is an important element in the overall investment programming scheme, considering that the benefits from the bulk water supply project is contingent on MCWD's ability to distribute it.
- (ii) The Chairman suggested encouraging Cebu City Government to implement the project under a PPP arrangement, similar to the joint venture arrangement for the Carmen Bulk Water Project between the Province and the private proponent. This is one way of sharing the fiscal burden and accelerate investments. However, the City Government has to commit to all the due diligence work, approval process, procurement and obligations of being a JV partner, among others, having an equity stake. In the case of the Carmen project, the Province put in 49% of the 30% equity for the project. Moreover, even if the City agrees, the viability of the venture depends on a stable revenue stream from MCWD as the institutional buyers of the output. Therefore, MCWD remains to be the linchpin. MCWD has to have the ability to pay for the minimum off-take volume and price necessary for financial viability.
- (iii) MCWD posits that the viability of doing the Mananga Dam Project hinges on leveling the playing field with competing private service providers. These private providers have the luxury of selecting clients—in particular, catering to commercial clients only. In the case of MCWD, they are required to serve domestic clients (85% of its market) who have less ability to pay compared to commercial clients. MCWD relies on cross subsidy from the commercial sector to enable them to keep the domestic tariffs low.

Moreover, private water service providers' extraction of water, mostly groundwater sources, is de facto unregulated. NWRB has not monitored extraction and has not enforced the agreement to impose a moratorium on new wells. Thus, for both financial and environment protection considerations, some of these groundwater wells may have to be closed.

## 2) Recommendations

- (i) As for the financial aspect, the financial viability of the Mananga II Dam Project makes it a good candidate for implementation using a PPP arrangement. This arrangement can relieve the implementing agency from assuming full fiscal and management burden, as well as assumption of all project risks. In a PPP, these are shared with the private proponent.
- (ii) The BOT Law offers the most robust enabling provisions and flexibility in creatively structuring the project. Box 1 summarizes the development process of the project using the BOT Law. However, the implementing agency is ultimately free to choose the legal basis it is most comfortable with. In case an LGU implements the project and chooses the LG Code, it should pass an ordinance adopting a PPP Code. The concerned LGU is encouraged to adopt transparency and competition measures; for example, adopting the Swiss Challenge provisions of the BOT Law for negotiated contracts.
- (iii) The table below summarizes the advantages and disadvantages of the three options on the implementation arrangement:

**Table 12.7.1 Advantages and Disadvantages of the Three Institutional Options**

	Options on Implementing Agencies		
	MCWD	LGU	Joint MCWD and LGU
Pros	<ul style="list-style-type: none"> <li>• Most simple and expedient, having two contracting parties only; and MCWD being the direct user of the output.</li> <li>• MCWD has financial and technical capability to manage project risks.</li> <li>• May use BOT Law or JV Guidelines for GOCCs.</li> </ul>	<ul style="list-style-type: none"> <li>• LGU in a better position to arrange for relocation of affected households.</li> <li>• Allows MCWD to focus on the expansion of distribution network.</li> <li>• May use BOT Law or JV arrangement under the Local Government Code.</li> </ul>	<ul style="list-style-type: none"> <li>• Risks are shared between MCWD and LGU.</li> <li>• LGU in a better position to arrange for relocation of affected households.</li> <li>• In case viability gap fund is necessary, MCWD and LGU will share the cost.</li> </ul>
Cons	<ul style="list-style-type: none"> <li>• Will split MCWD attention between the bulk water supply project and expansion of distribution network.</li> <li>• Should it be necessary, MCWD will bear viability gap fund solely.</li> </ul>	<ul style="list-style-type: none"> <li>• Will require two separate but integral agreements; one for the bulk water development and the other, the supply contract with MCWD.</li> <li>• Supply contract with MCWD will be procured separately.</li> <li>• Should it be necessary, LGU will bear viability gap fund solely.</li> </ul>	<ul style="list-style-type: none"> <li>• Will require two related agreements: MOA between the LGU and MCWD and the PPP agreement with private proponent.</li> <li>• BOT Law is the common legal basis. Should the MCWD and LGU opt for JV guidelines, LGU has to pass an ordinance adopting the provisions of JV Guidelines for GOCCs.</li> </ul>

Source: JICA Study Team.

12.84 From the above table, the joint implementation of MCWD and LGU appears to be the most advantageous considering shared risks and the LGUs' imprimatur for relocation of affected households, which in the past was a major hurdle in implementing the project.

- (i) MCWD has to ensure that its distribution network has the capacity to absorb the bulk water supply.

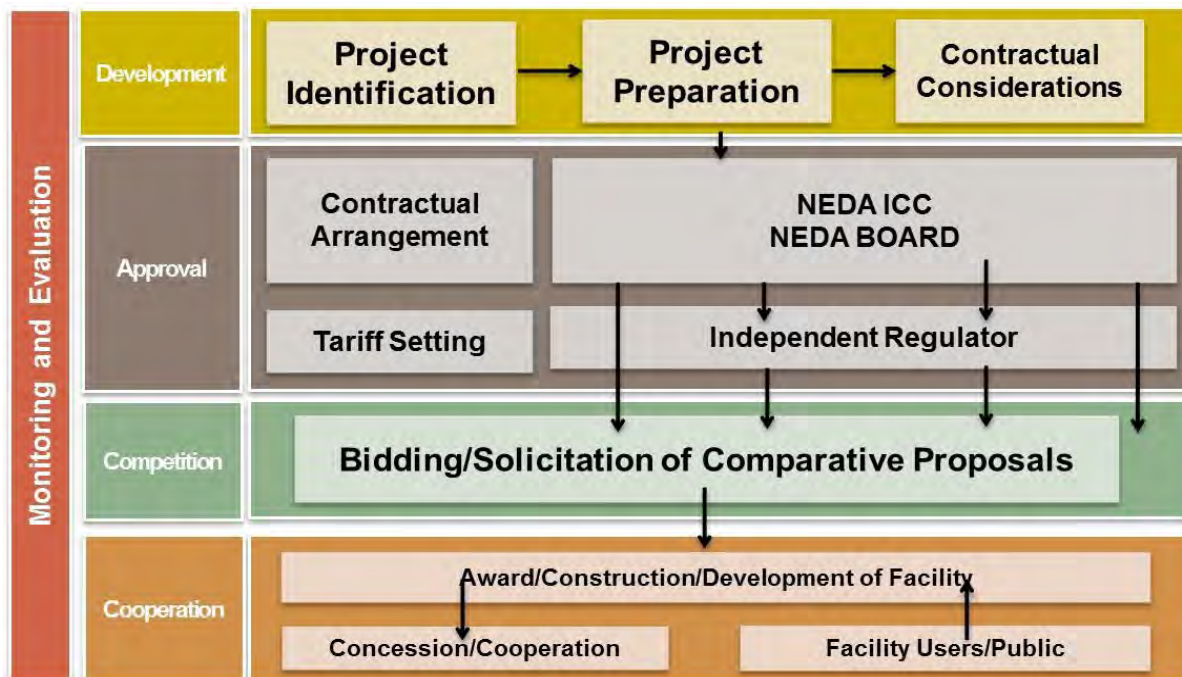
- (ii) To ensure the environment benefits of the surface water supply source, MCWD should engage NWRB in assessing the current state of groundwater resources, determine what wells should be closed and shift those reliant on the wells to MCWD's water supply.
- (iii) MDCDCB coordination and facilitation role is critical to the project. One of the major hurdles is securing the commitment of the City Government to relocate the communities in the Mananga watershed. The commitment should entail funding the relocation and implementing the relocation within the timing required in the implementation schedule of the Mananga II Dam Project.

## Box : PPP Implementation Process<sup>21</sup>

### A. PPP Project Development Process

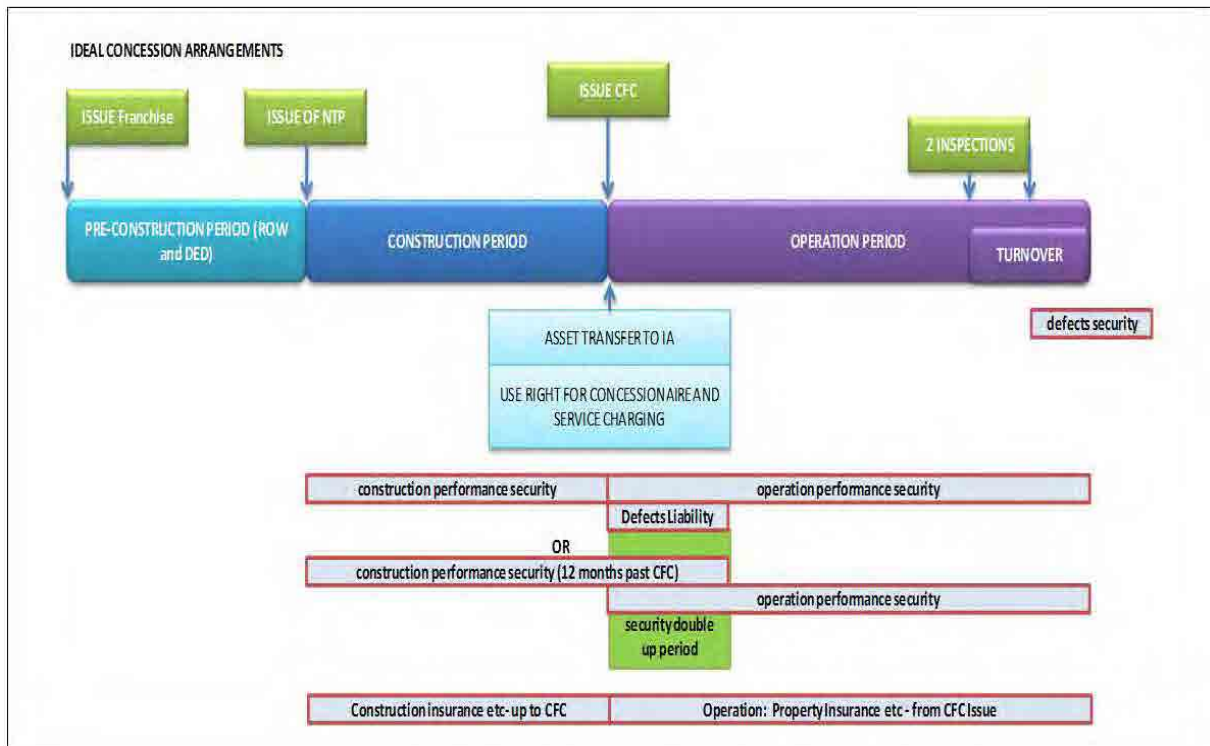


### B. PPP Process Framework

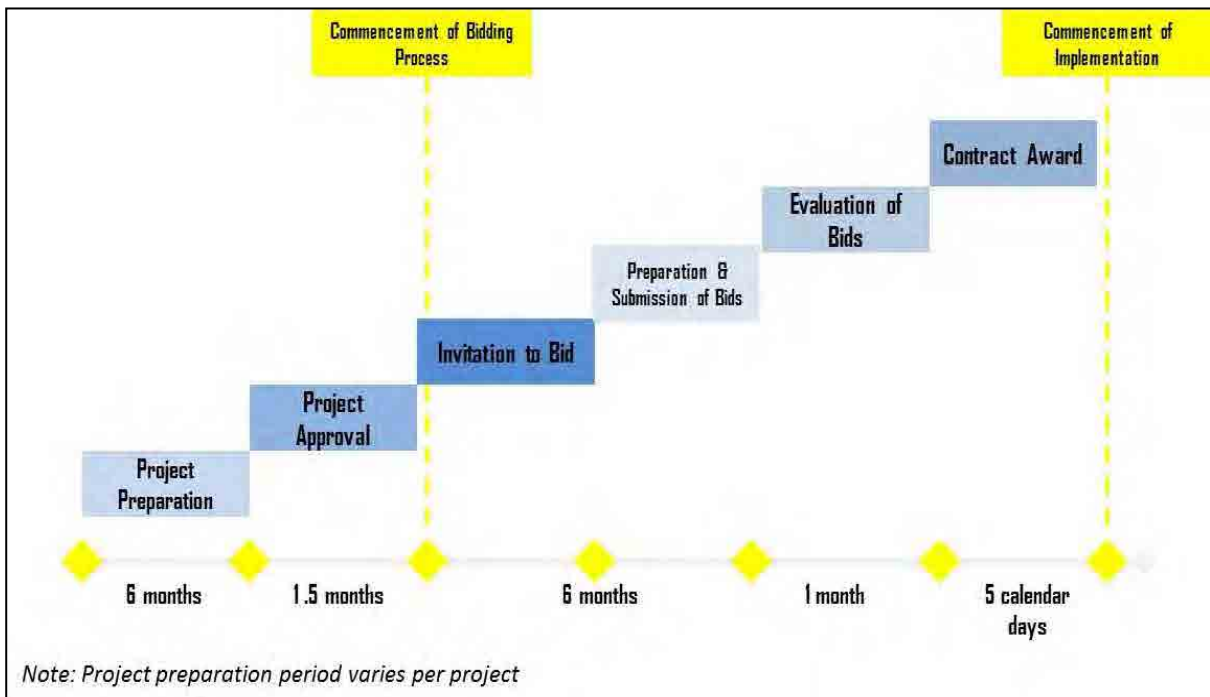


<sup>21</sup> Source: PPP Center of the Philippines. Figures by JICA Study Team

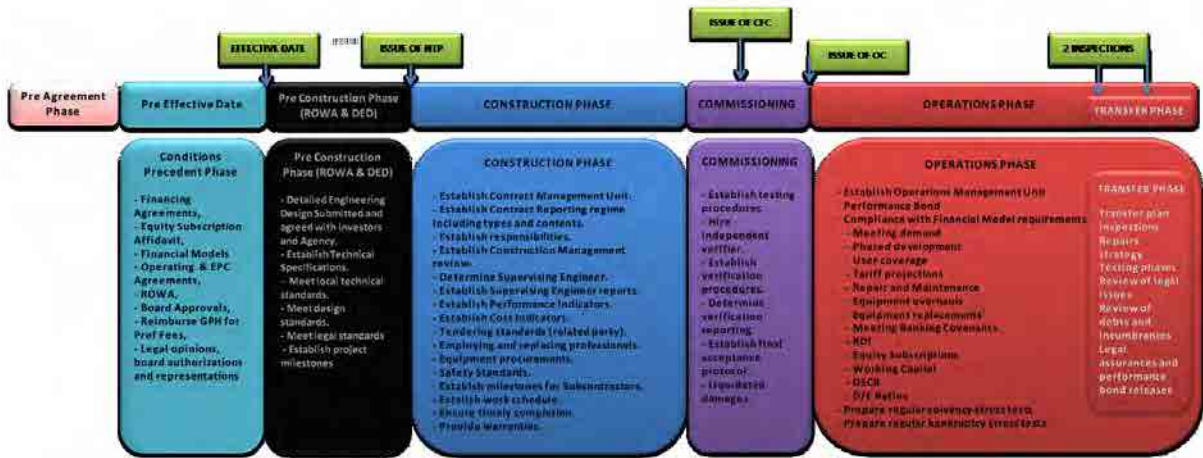
### C. Ideal Concession Agreement



### D. Procurement Process: Solicited Proposal



### E. Contract Management Process



## 13 METROPOLITAN INITIATIVES' PROJECTS

### 13.1 Public Transport Terminals

#### 1) Public Transport Terminals in Metro Cebu

13.1 Public transport terminals support the development of and demand for road-based public transport by way of:

- (a) Collecting many types of public transport vehicles to different destinations and from different origins;
- (b) Providing convenient transfer to other public transport vehicles and routes;
- (c) Allowing bigger public transport vehicle units; and
- (d) Mitigating road traffic congestion due to avoidance of roadside parking.

13.2 In Metro Cebu, the Cebu South Bus Terminal was opened in 1992 and the Cebu North Bus Terminal in 1994, both under the MCDP. As subordinate terminals, PUJ terminals were constructed such as the Citilink Terminal and Lapu-Lapu PUJ Terminal. Nowadays, large-scale shopping malls also provide PUJ terminals within their compounds such as Ayala Center Cebu and SM City Cebu.

13.3 However, there are no bus/PUJ terminals along the Cebu North Road between Consolacion and Danao and along the Cebu South Road between Talisay and Carcar. On these corridors, public transport users, mainly of jeepneys, board and alight on the roadsides. This is a common practice but it places passengers in danger and causes traffic congestion. It also discourages bus usage because buses cannot move flexibly like jeepneys.

13.4 In order to improve road-based public transport in Metro Cebu, the following measures are important:

- To strengthen the two existing bus terminals (the Cebu North Bus Terminal and the Cebu South Bus Terminal) in terms of capacity and service; and
- To develop new public transport terminals between Consolacion and Danao, and between Talisay and Carcar.

#### 2) Local Needs for Public Transport Terminal

13.5 During the outreach meetings and other consultation meetings, JST understood that there are some public transport terminal needs particularly at Mandaue, Minglanilla and Carcar. Their terminal needs are reported below:

##### (1) Mandaue City

13.6 The North Cebu Bus Terminal is located at M. Logarta Avenue (Corner Albano St.), Mandaue City. It is located within the Mandaue Reclamation Area and near the Cebu North Road.

13.7 Compared with the Cebu South Bus Terminal, the terminal area is small (0.6 ha), underutilized and provides poor passenger service such as no air conditioned waiting room. Since there are many improvement needs, the North Bus Terminal Management Board under Mandaue City conducted the North Bus Terminal Improvement Study in 2012. However, no concrete improvement plan has been

prepared.

13.8 The most important planning issue is whether the terminal will be expanded or not. Since Mandaue City needs some more time to make a decision, the terminal is not suitable to be subject to a pre-FS in this report.

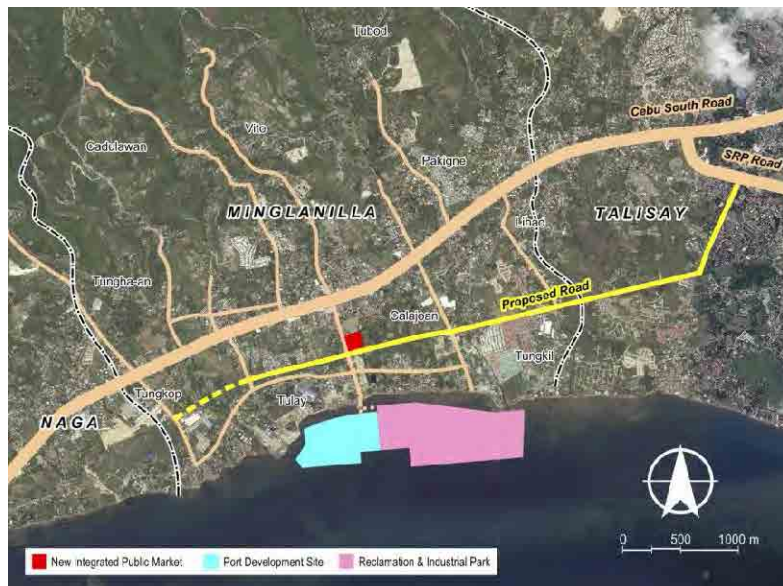
## (2) Minglanilla Municipality

13.9 The municipality is now experiencing strong urbanization pressure. There are as many as 54 subdivision projects under planning, construction or already developed. The municipality is emerging as a bedroom town in Metro Cebu.

13.10 Due to the municipality's weak road network, all the subdivisions converge to the Cebu South Road or have approach roads to the Cebu South Road. In fact, they depend on only one trunk road. What makes matters worse is that there is no public transport terminal. All buses and jeepneys stop and take on passengers at the roadsides. They cause and suffer from traffic congestions during peak hours.

13.11 Minglanilla is developing a new 4.5 ha municipal center along the abandoned railway ROW (30 m wide) which will be a parallel trunk road to the Cebu South Road. A public transport terminal is designed beside a new public market in a superblock of 1.1 ha. This superblock is under construction and was expected to open in April 2014. Therefore, Minglanilla public transport terminal is not suitable to be examined for a pre-FS in this report.

13.12 The Minglanilla Municipal Center is worth paying attention to not only for a public transport terminal but also as an attempt to develop a sub-center of Metro Cebu. Related figures are illustrated below.



Source: JICA Study Team based on the meeting with Minglanilla Officials.

**Figure 13.1.1 Development Direction for Metro Cebu Public Transport Terminals**





Source: Minglanilla Municipality.

**Figure 13.1.2 New Municipal Center of Minglanilla**

### (3) Carcar City

13.13 Carcar City is a historical town. It has an important position in the Cebu Island transport system on the east-south coastal corridor and in connection with the east-west coastal corridor. But there is no public transport terminal in the municipality. Provincial buses and jeepneys are temporarily stationed at the roadsides.

13.14 Carcar has recently prepared the new city center plan which includes a public transport terminal and a diversion road from the Cebu South Road, among others. However, it is a concept-level document and no implementation arrangement has yet been done.

13.15 Carcar City Architect Richeto C. Alcorido's Office and JST have agreed to conduct a pre-FS for transport improvement of the proposed Carcar New City Center.

### 3) Carcar Public Transport Terminal Project

#### (1) Project Location and Layout Plan

13.16 The proposed Carcar New City Center is located within two barangays (Valladolid and Poblacion 3) comprising a total area of 34.7 ha (see Figure 13.1.3). The center area is located near the existing city hall.

13.17 There are many centuries-old houses along the national road within a 1.5 km stretch. To divert public vehicle traffic, a new road with a public transport terminal will be constructed. The road will start from Poblacion III to Poblacion II. Provincial vehicles coming from Cebu City going to Argao and vice-versa will have to pass the new road.

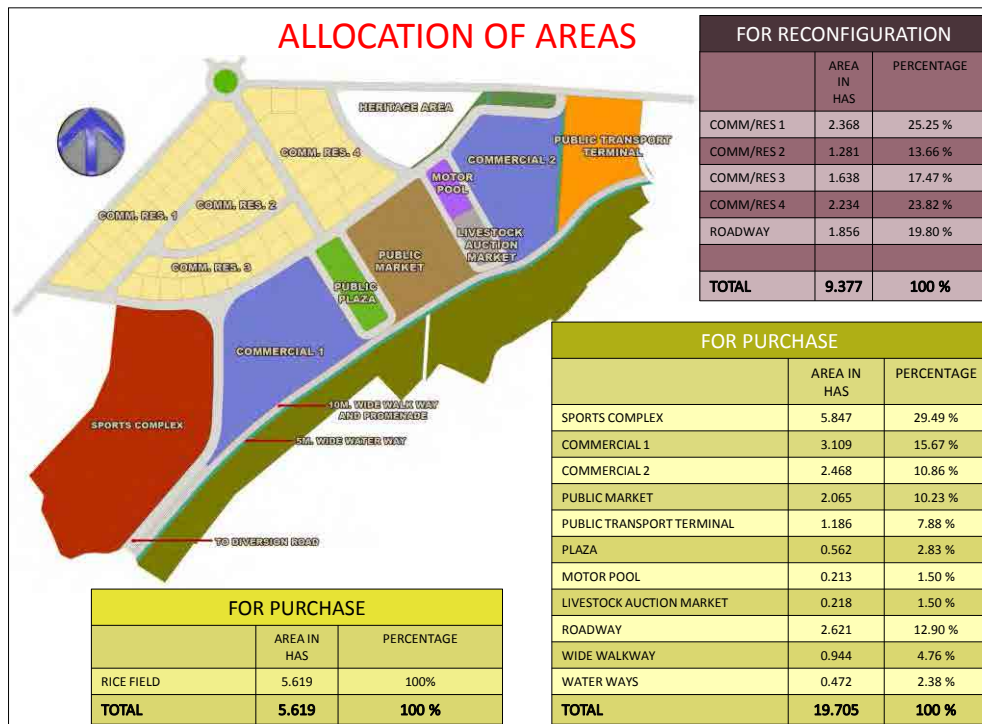
13.18 A new rotunda (roundabout) is introduced at the intersection of the provincial road and the roads leading to Dapdap and Liburon (see Figure 13.1.4). From this rotunda will be an axial road extending the Dapdap road to a terminating public plaza. Across the City Center will traverse an alternate road connecting the provincial highway at Sitio Lamakan, Valladolid to the diversion road (under construction) at Sitio Barraca.

13.19 A most unique and potentially iconic feature of this New City Center is the almost kilometer-long landscaped walkway paved with sand-based pavers alongside a waterway that defines the development's perimeter facing the glorified rice field. This walkway and the waterway becomes an endearing symbol of Carcar's vitality and affinity for what is beautiful and what is healthy.



Source: Carcar City.

Figure 13.1.3 Location of New Carcar City Center



Source: Carcar City.

Figure 13.1.4 Layout Plan of New Carcar City Center

## **(2) Land Preparation**

13.20 Within a total area of 34.7 ha, 19.8 ha are to be acquired from private landowners through direct purchase and to be converted from agricultural use into a mix of institutional, commercial, and residential uses. Another 5.6 ha are also to be similarly acquired from private landowners to be retained as irrigated rice field buffer to ensure that the remaining rice fields are preserved for posterity. Some 9.3 ha owned by several private owners located adjacent to the development area on one side and by the provincial road on the other is to be reconfigured to allow for proper horizontal circulation through a new layout of roads to enhance its property value toward a more rationalized development and become an integral part of the main development area. These three main areas form a contiguous whole envisioned to become the New City Center.

13.21 Some lands are currently under expropriation by the relevant law, since land acquisition was not agreed between some landowners and the Carcar City Government.

## **(3) Traffic Demand**

13.22 There are three types of inter-city passenger transport services available in Carcar City: provincial bus, public utility bus (PUB) mainly connecting with Cebu City, and public utility jeepney (PUJ). The 2010 daily traffic is illustrated in Figure 13.1.5.

13.23 Since Carcar is located at the southern edge of Metro Cebu, at a considerable distance of 35 km from Cebu City, less PUJ traffic than PUB is observed. Over 600 provincial buses pass through Carcar.<sup>22</sup> Since Carcar is a diversion and conversion point of the southeast coastal corridor towards Argao and the southwest coastal corridor towards Barilir/Aloguisan, the proposed public transport terminal is deemed to benefit those provincial bus passengers.

13.24 For intra-city public transport service, it is reported that there are approximately 200 *trisikads* and 500 tricycles operating in the municipality.

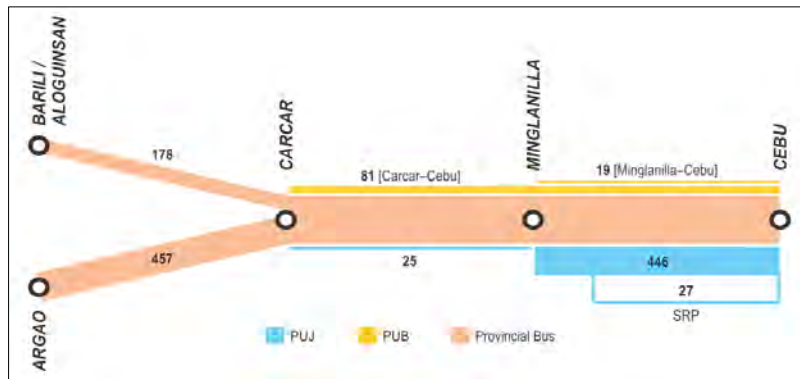
13.25 Given that the number of public transport vehicles would be proportionate to the population of Carcar City, inter-city public transport vehicles could increase accordingly. This simple projection is depicted in Figure 13.1.6.

## **(4) Terminal Layout**

13.26 The proposed public transport terminal has an area of 1.2 ha, which is equivalent to the Cebu South Bus Terminal. In the plan, restaurants and other passenger service facilities are located within the terminal (see Figure 13.1.7). For long-distance travelers using provincial buses, separate passenger waiting lounges are allocated at the second floor.

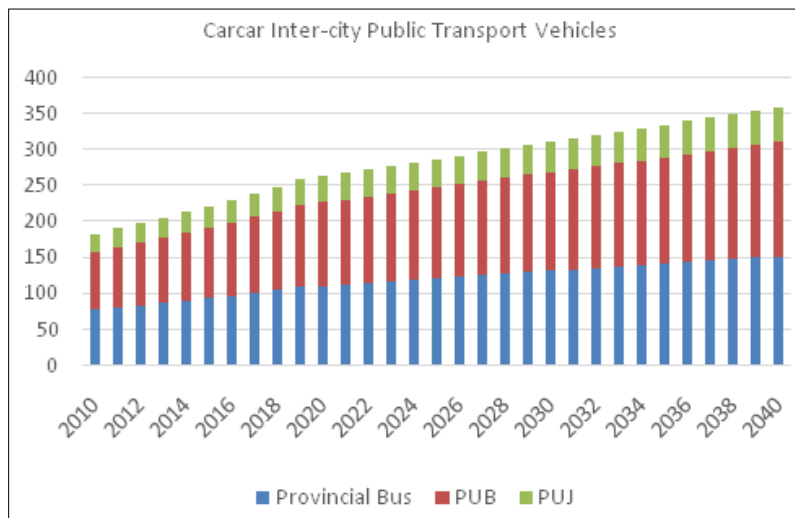
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<sup>22</sup> The volume of provincial buses surveyed by the DOTC study seems bigger than actual. According to JST's interview, the Cebu South Bus Terminal handles more or less 200 buses daily. Some of them do not reach Carcar on their routes.



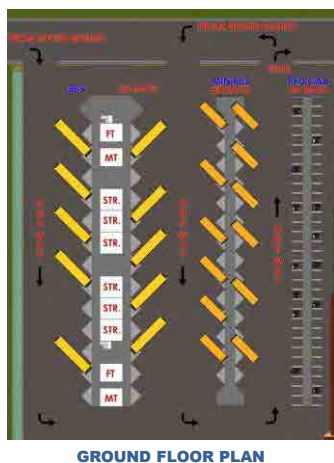
Source: The Development of Public Transport Strategic Plan for Metro Cebu (DOTC, 2011).

**Figure 13.1.5 Public Transport Traffic in 2010**



Source: JICA Study Team.

**Figure 13.1.6 Carcar Public Transport Traffic, 2010-2040**



Source: Carcar City.

**Figure 13.1.7 Layout and Image of Public Transport Terminal in Carcar City**

**(5) Project Costs and Revenue**

13.27 The construction cost of the proposed public transport terminal is estimated at PHP141million, consisting of land acquisition (PHP24 million), land development (PHP16 million), utilities and drainage (PHP11 million), and building (PHP90 million).

13.28 The project management cost is estimated at 11% of the construction costs (5% for consulting fee, 5% for financing cost, and 1% for contingency).

13.29 The main revenue source of the project is from the collection of terminal fees. If the terminal fees are set the same as that of the Cebu North Bus Terminal, the terminal fee structure is as follows:

- (i) Long-distance big bus (over 100 km, 50 and above pax capacity): PHP120/trip;
- (ii) Long-distance mini bus (over 100 km, less than 50 pax capacity): PHP100/trip;
- (iii) Big bus (less than 100 km, 50 and above pax capacity): PHP100/trip;
- (iv) Mini bus (less than 100 km, less than 50 pax capacity): PHP80/trip;
- (v) Entry fee for other vehicles such as jeepney, taxi, tricycle: PHP10/trip;
- (vi) Overnight parking fee for big bus/truck (max. 12 hours): PHP80/night;
- (vii) Overnight parking fee for mini bus (max. 12 hours): PHP60/night; and
- (viii) Overnight parking fee for others such as PUJ, taxi (max. 12 hours): PHP50/night

#### **(6) Implementation Schedule**

13.30 Taking the experience of MCDP and MCDP II in the development of the Cebu South Bus Terminal and the Cebu North Bus Terminal into account, the following three-year timeline is adequately set:

- (i) Selection of project consultant: 6 months;
- (ii) Detailed Design, O&M Planning, Bidding, Contract Negotiation: 18 months; and
- (iii) Construction: 12 months.

13.31 The earliest possible time for the terminal to be operational is in 2018. However, this will depend on the progress of land expropriation and fund preparation.

### **4) Economic Assessment of Carcar Public Transport Terminal**

#### **(1) Project Costs and Implementation**

13.32 The total cost for the proposed terminal facility for Carcar City is PHP141 million. This places the estimated economic cost of the project at PHP31 million. The project implementation schedule for the terminal project is for construction to start in 2017 and for the terminal to start operation in 2018. The project implementing body is the City of Carcar.

13.33 Annual operating and maintenance cost of this project was assumed to be 5% of capital cost based on the experience of similar terminals in Cebu City.

#### **(2) Economic Benefits**

13.34 The main economic benefits of the project emanate from the savings owing to the reduction in vehicle operating cost (VOC) and value of time cost (VOT). The terminal would basically take away the haphazard parking of public vehicles on the national highway at Carcar and reduce the proliferation of motorcycles, pedicabs and tricycles that are weaving in and out of traffic. Removing the latter modes from the highway would reduce congestion on this road and increase the speeds of all vehicles traversing this section.

13.35 Aside from these benefits, other positive impacts are accrued to the project but cannot be quantified at this time such as the reduction in carbon dioxide emissions,

savings from accidents that are avoided, reduction in road maintenance for many sections of roads in the area network, and other benefits.

13.36 Similar to any transport infrastructure, the unit VOCs and VOTs were used in the estimation. The unit VOCs were based on the average operating costs of a representative set of vehicles (see Table 6.1.1) commonly used in the Philippines. The cost items that were considered in the computation were: (i) fuel cost, (ii) lubricant cost, (iii) tire cost, (iv) repair cost, (v) depreciation cost, (vi) capital opportunity cost, (vii) overhead cost, and (viii) crew cost. The results of the computation were consolidated and expressed as a function of travel speed. The time values by mode, given in Table 6.1.2, were likewise used in the estimation of the project's EIRR.

### (3) Economic Evaluation

13.37 The daily economic benefits that will accrue to the project are shown in Table 13.1.1. This will continue to be realized during the project life with an assumed annual growth of 6%.

**Table 13.1.1 Daily Economic Benefits Generated by the Public Transport Terminal Project (In PHP million)**

Indicators	Without Project	With Project	Difference
VOC	3.8	1.5	2.3
VOT	35.6	26.8	8.9
Total	39.6	28.4	11.2

Source: JICA Study Team's estimates.

13.38 The project yielded an EIRR of 18%, which is just bordering the hurdle social discount rate of 15% set by NEDA (see Table 13.1.2).

**Table 13.1.2 Preliminary Results of the Economic Evaluation of the Public Transport Terminal Project**

EIRR (%)	NPV (PHP million)	B/C Ratio
18%	212	2.30

Source: JICA Study Team's estimates.

## 5) Environmental Assessment

### (1) Environmental and Social Considerations

13.39 The proposed Carcar New City Center is located within two barangays (Valladolid and Poblacion 3) comprising a total area of 34.7 ha. The proposed public transport terminal<sup>23</sup> has an area of 1.2 ha. Restaurants and other passenger service facilities are planned to be located within the terminal. The Carcar City Government may apply for an ECC for the entire New City Center Mixed-Use Development Project or it could also apply separately for the Transport Terminal.

13.40 Should the ECC be applied for the entire New City Center development, the required EIA document will be a full-blown EIS study (that already includes the transport terminal). For a separate Transport Terminal ECC, the required EIA document will be an IEE.

<sup>23</sup> Located within the Carcar New City Center.

13.41 One of the important and critical social considerations for this Carcar Transport Terminal Project is the possible adverse effects of resettlement/relocation of affected residents, lot owners and establishments. Rightful compensation and amicable settlement should be the proper course of action and not forced eviction/relocation (through expropriation and other means).

13.42 Illegal conversion of prime agricultural lands will go against the general principles of sustainable development and in violation of the Cebu Province Environment Code which promotes smart growth development along with preservation of natural lands and agricultural reserves/prime agricultural lands.

13.43 The public transport terminal and Carcar's New City Center should carefully consider the implications of their development proposals.

## **(2) Environmental Impact Assessment**

13.44 Following are some of the initial critical considerations in undertaking the EIA study for the proposed new Transport Terminal Project in Carcar City:

- (i) Present land use of the primary and secondary impact areas -- Prime agricultural and irrigated rice lands is by law protected and non-negotiable for conversion. Its conversion to a commercial center or transport terminal is, therefore, illegal. Thus, it should be clarified whether or not the proposed terminal will be located in a rice land area. It should also be clarified if people and establishments would be displaced and if this would require a resettlement plan;
- (ii) Impact on local traffic;
- (iii) Solid waste disposal;
- (iv) Liquid effluents -- The plans to be submitted for ECC requirement should also include details for a wastewater treatment facility/ sewage treatment plant per requirement of EMB Region 7. This also includes provision for a water recycling system;
- (v) Solid waste management plan;
- (vi) Noise and air pollution control and management;
- (vii) Oil and grease (including cooking oils, kitchen wastes from eateries within the terminal);
- (viii) Passenger safety hazards and comfort;
- (ix) Water conservation and energy efficiency; and
- (x) Green and disaster-resilient building practices mainstreamed into project plans, design, and operations of the Transport Terminal -- Should the Cebu Provincial Government be involved in this project in whatever capacity (joint venture, PPP, etc.), a provincial ordinance requires the consideration of such provisions.