7.6.2 Water Supply and Sewerage System

(1) Water Demand Forecast

Water demand in the study area is projected for five areas as shown in Figure 7.6.8.

Source: MPA Study Team

Figure 7.6.8 Study Area for Water Supply

1) PDAM Water

The water demand forecast until year 2030 is computed based on the following target parameters:

a) Population

Population projection until 2030 was taken from the socio-economic indicators in the JABODETABEK MPA study and adopted as future population in this Study.

b) Service Ratios

The target service ratio in DKI Jakarta is set at 100 % in 2030. Regarding the other areas, Decree No. 610/2002 of West Java Province is used as reference. The decree stated that the target service ratio for 2025 is 50% - 70 %. Accordingly, the target service ratio is set as presented in Table 7.6.9:

Table 7.6.9 Target Service Ratios

	2025 Target (from Decree No. 610/2002)	2030 Target (from MPA Study)
Bekasi	60%	70%
Karawang	50%	60%
Bogor	50%	60%
Tangerang	60%	70%

Source: MPA Study Team based on West Java Province Decree No. 610/2002

c) Per Capita Consumption

The standard set for per capita consumption is indicated in the Ministry of Public

Works (PU) guidelines as presented in Table 7.6.10:

Table 7.6.10 Ministry of Public Works (PU) Standards for Per Capita Consumption

City Scale	Per Capita Consumption
Metropolitan	190 l/c/d
Big city	170 l/c/d
Medium city	150 l/c/d
Small city	130 l/c/d

Source: Petunjuk Teknis Perencanaan Rancangan Teknik SPAM, Ministry of Public Works 1989

Accordingly, the target per capita consumption for domestic use in 2030 is set as follows:

DKI Jakarta:		190 l/c/d
Other areas:	(150 + 130) /2 =	140 l/c/d

d) Volumetric Ratio of Non-domestic Purpose Water against Domestic Purpose

The following ratios were taken from the on-going study "Integrated Water Resources Management in the 6Cis River basin".

DKI Jakarta:	40 %
Bekasi, Bogor, Tangerang:	20%
Karawang:	10%

e) Per Capita Consumption (Combined Domestic and Non-domestic Purpose Water)

The combined target per capita consumption in 2030 is determined as follows:

DKI Jakarta:	190 x 1.4 = 270 l/c/d
Bekasi, Bogor, Tangerang:	140 x 1.2 = 170 l/c/d
Karawang:	140 x 1.1 = 155 l/c/d

f) Non-Revenue Water (NRW) Ratio

According to the Decree No. 610/2002 of West Java Province, NRW ratio will be reduced to 20 % in 2025.

Reduction of NRW is one of the most important policy for the PDAMs in the study area where the water resources is not abundant. 41,000 of water leakages were repaired in west Jakarta in 2010. The NRW ratio in west Jakarta has been decreased from 50.6 % in 2005 to 42.3 % in 2010, namely 1.66% per year. The experiences in municipal water works bureau in Japan show that the NRW ratio can be reduced to around 15 % by conducting the extensive NRW reduction measures such as detection and repair of water leakages and renewal of the deteriorated water distribution pipeline.

Thus, the target NRW ratio for 2030 is set at 15%.

g) Special Demand for the New Airport and Seaport in Karawang

In Karawang, the plan is to construct a new international airport and seaport. Thus,

the water demand for these development areas is considered as special demand in addition to the demand calculated in a) to f).

This special demand is presented in Table 7.6.11, based on the existing consumption rates of SHIA and Tanjung Priok Port:

Table 7.6.11 Forecast Water Consumption Rates as Special Demand for the New Airport and Seaport

	2020	2030
New International Airport in Karawang	200 l/s	400 l/s
New Port in Cilamaya	200 l/s	400 l/s
Total of Special Demand in Karawang	400 l/s	800 l/s

Source: MPA Study Team based on the existing consumption rates of Soekarno-Hatta International Airport (SHIA) and Tanjung Priok Port

The projected water demand for each area is shown in Table 7.6.12.

Table 7.6.12 Demand Projection for PDAM Water

DKI Jakarta (PAM JAYA)

	2010	2015	2020	2030
Population	9,588,198	9,788,157	9,888,617	9,882,852
Service population	5,177,468	6,411,121	7,614,153	9,882,852
Service ratio (%)	54.0	65.5	77.0	100.0
Per capita consumption (l/c/d)	141	173	206	270
Base Demand (m^3/day)	731,035	1,111,667	1,565,453	2,668,370
NRW (%)	47.6	39.5	31.3	15.0
Water Demand (m^3/day)	1,395,804	1,836,545	2,279,115	3,139,259
Water Demand (l/s)	16,155	21,256	26,379	36,334

Bekasi (PDAM Kota Bekasi, PDAM Kabupaten Bekasi)

	2010	2015	2020	2030
Population	4,966,040	5,712,165	6,328,925	7,257,394
Service population	1,087,772	1,938,032	2,908,274	5,080,176
Service ratio (%)	21.9	33.9	46.0	70.0
Per capita consumption (l/c/d)	125	137	148	170
Base Demand (m^3/day)	136,486	264,744	429,658	863,630
NRW(%)	18.5	17.6	16.7	15.0
Water Demand (m^3/day)	167,447	321,360	516,075	1,016,035
Water Demand (l/s)	1,938	3,719	5,973	11,760

Karawang (PDAM Kabupaten Karawang)

	2010	2015	2020	2030
Population	2,125,234	2,427,793	2,745,944	3,387,961
Service population	369,216	680,504	1,062,309	2,032,776
Service ratio (%)	17.4	28.0	38.7	60.0
Per capita consumption (l/c/d)	78	97	116	155
Base Demand (m^3/day)	28,673	66,006	123,578	315,080
NRW(%)	39.0	33.0	27.0	15.0
Water Demand (m^3/day)	47,018	98,534	169,304	370,683
Water Demand (l/s)	544	1,140	1,960	4,290
Special Demand (l/s)	0	0	400	800
Water Demand (l/s)	544	1,140	2,360	5,090

Bogor (PDAM Kota Bogor, PDAM Kabupaten Bogor)

	2010	2015	2020	2030
Population	7,456,375	8,171,934	8,947,497	10,086,428
Service population	1,479,923	2,442,249	3,572,187	6,051,857
Service ratio (%)	19.8	29.9	39.9	60.0
Per capita consumption (l/c/d)	115	129	143	170
Base Demand (m^3/day)	170,813	315,209	509,787	1,028,816
NRW(%)	33.7	29.0	24.3	15.0
Water Demand (m^3/day)	257,533	443,988	673,757	1,210,371
Water Demand (l/s)	2,981	5,139	7,798	14,009

Tangerang (PDAM Kota Tangerang, PDAM Kabupaten Tangerang)

	2010	2015	2020	2030
Population	5,940,791	6,694,089	7,507,241	8,988,129
Service population	810,740	1,856,622	3,139,791	6,291,690
Service ratio (%)	13.6	27.7	41.8	70.0
Per capita consumption (l/c/d)	151	156	161	170
Base Demand (m^3/day)	122,734	289,705	504,540	1,069,587
NRW(%)	26.0	23.3	20.5	15.0
Water Demand (m^3/day)	165,955	377,627	634,817	1,258,338
Water Demand (l/s)	1,921	4,371	7,347	14,564

Note: The water supply service in DKI Jakarta is being undertaken by two concessionaires under the concession agreements.
Source: MPA Study Team

2) Industrial Water

Projection of industrial water demand is carried out by adding the projected incremental water demand to the current usage volume. The incremental industrial water demand was derived from the incremental industrial land area and unit water demand. Referring to the basic planning of existing industrial estate in the JABODETABEK MPA, the current unit water demand is set at 35 m^3/day per sector of the industrial area. The projected industrial water demand is shown in Table 7.6.13.

Table 7.6.13 Projected Industrial Water Demand

	2010	Incremental (2010 - 2020)		**2020**	Incremental (2010 - 2030)		**2030**
	Present Use (l/s)	Industrial Area (ha)	Water Demand (l/s)	Water Demand (l/s)	Industrial Area (ha)	Water Demand (l/s)	Water Demand (l/s)
DKI Jakarta	2,393	0	0	2,393	7,250	2,900	5,293
Bekasi	2,242	3,370	1,348	3,590	9,200	3,680	5,922
Karawang	3,630	620	248	3,878	2,240	896	4,526
Bogor	3,969	1,290	516	4,485	3,730	1,492	5,461
Tangerang	5,082	1,520	608	5,690	4,830	1,932	7,014
Total	17,316	6,800	2,720	20,036	27,250	10,900	28,216

Note: Unit incremental water demand: 35m^3/day / ha = 0.4 l/s /ha
Source: Predicted incremental industrial area: Derived from MPA Study Team

3) Total Water Demand

The total water demand came from the combined demand of PDAM water (Table 7.6.12) and industrial water (Table 7.6.13), as shown in Table 7.6.14.

Table 7.6.14 Water Demand for PDAM and Industrial Water

	Description	2010	2020	2030
		Present Use (m^3/sec)	Water Demand (m^3/sec)	Water Demand (m^3/sec)
DKI Jakarta	PDAM	16.2	26.4	36.3
	Industrial	2.4	2.4	5.3
	Total	18.5	28.8	41.6
Bekasi	PDAM	1.9	6.0	11.8
	Industrial	2.2	3.6	5.9
	Total	4.2	9.6	17.7
Karawang	PDAM	0.5	2.4	5.1
	Industrial	3.6	3.9	4.5
	Total	4.2	6.2	9.6
Bogor	PDAM	3.0	7.8	14.0
	Industrial	4.0	4.5	5.5
	Total	6.9	12.3	19.5
Tangerang	PDAM	1.9	7.3	14.6
	Industrial	5.1	5.7	7.0
	Total	7.0	13.0	21.6
	Total	40.8	69.9	110.0

Source: MPA Study Team

(2) PDAM Water Supply Development Strategy

1) DKI Jakarta

The forecast water demand, production capacity and connection expansion plan are shown in Table 7.6.15.

Table 7.6.15 Facility Expansion Plan for DKI Jakarta

		2010	2015	2020
Service Population		5,177,468	6,411,121	7,614,153
Water Demand (l/s)		16,155	21,256	26,379
Production Capacity (l/s)	Existing 3 WTP	14,600	14,600	14,600
	Cilandak WTP and Tangerang	3,275	3,275	3,275
	Jatiluhur Project (up to 2nd phase)		4,000	8,000
	Kalian Project (1st phase)			1,600
	Total	17,875	21,875	27,475
Number of House connections	Existing house connections	690,329	690,329	690,329
	New connections		164,487	324,891
	Total	690,329	854,816	1,015,220

Source: MPA Study Team, Pam Jaya

The 1st phase of "DKI Jakarta – Bekasi – Karawang Water Supply (Jatiluhur)" Project (the Jatiluhur Project) (Capacity: 4,000 l/s) is expected to be completed in 2015 and the 2nd phase (Capacity: 4,000 l/s) in 2020. The 1st phase of Karian Project (Capacity: 1,600 l/s) is expected to be completed in 2020.

Jatiluhur Project itself is a bulk water supply system that delivers treated water to the receiving points in DKI Jakarta. It is necessary to construct a facility within DKI Jakarta for the delivery of water to the customers.

It is noted that the water supply service in DKI Jakarta is being undertaken by two concessionaires under the concession agreements. The setting of water tariff is subject to approval of the local government, while the water charge paid to the concessionaires is subject to change in accordance with the concession agreements.

The two concessionaires are responsible for investment on the distribution facilities based on the agreed investment plan, as well as operation of the facility and customer services such as tariff collection.

2) Bekasi

The forecast water demand, production capacity and connection expansion plan are shown in Table 7.6.16.

Table 7.6.16 Facility Expansion Plan for Bekasi

		2010	2015	2020
Service Population		1,087,772	1,938,032	2,908,274
Water Demand (l/s)		1,938	3,719	5,973
Production Capacity (l/s)	Existing capacity	2,510	2,510	2,510
	Tegal Gede Project (PPP)		560	560
	Jatiluhur Project (up to 2nd phase)		500	1,000
	IKKs (200 l/s / IKK x 10 IKKs)		200	2,000
	Total	2,510	3,770	6,070
Number of House connections	Existing house connections	155,396	155,396	155,396
	New connections		121,466	260,072
	Total	155,396	276,862	415,468

Source: MPA Study Team, PDAM Kab./Kota Bekasi

Tegal Gede Project with a capacity of 560 l/s has commenced construction in 2011 and is expected to be completed in 2015. The 1st phase of Jatiluhur Project (Capacity: 500 l/s) is expected to be completed in 2015 and the 2nd phase in 2020.

Jatiluhur Project itself involves a bulk water supply system that delivers the treated water to the receiving points in Kota/Kabupaten Bekasi. It is necessary to construct a facility within Kota/Kabupaten Bekasi for the delivery of water to the customers.

In addition, a small-scale rural water supply project (SPAM IKK) has to be implemented in areas where water supply facilities are not yet available. SPAM IKK is an individual water supply system for supplying water to “Ibu Kota Kecamatan (Central town of the regional districts). The national program for development of SPAM IKK is being implemented by Cipta Karya since 2005. More than 100 SPAM IKKs are being constructed every year in Indonesia. The capacity range of each SPAM IKK is 50 l/s to 200 l/s. In Bekasi, ten SPAM IKKs, each with a capacity of 200 l/s, are expected to be implemented in 2020, totaling to 2,000 l/s of capacity.

3) Karawang

The forecast water demand, production capacity, and connection expansion plan are shown in Table 7.6.17.

Table 7.6.17 Facility Expansion Plan for Karawang

		2010	2015	2020
Service Population		369,216	680,504	1,062,309
Water Demand (l/s)		544	1,140	2,360
Production Capacity (l/s)	Existing capacity	815	815	815
	Jatiluhur Project (up to 2nd phase)		500	1,000
	IKKs (100 l/s / IKK x 6 IKKs)			600
	Total	815	1,315	2,415
Number of House connections	Existing house connections	46,152	46,152	46,152
	New connections		38,911	86,637
	Total	46,152	85,063	132,789

Note: Out of 2,360 l/s of demand in 2020, 400 l/s is for the new air port and new port.
Source: MPA Study Team, PDAM Karawang

The 1st phase of Jatiluhur Project (Capacity: 500 l/s) is expected to be completed in 2015 and the 2nd phase (Capacity: 500 l/s) in 2020.

Jatiluhur Project is a bulk water supply system that can deliver treated water to the receiving points in Karawang. It is necessary to construct a facility within Karawang for the delivery of water to the customers.

It is noted that out of the total demand of 2,360 l/s in 2020, 400 l/s is for the new airport and seaport. This demand is to be met by the treated water from the 2nd phase of Jatiluhur Project. Thus, the scheduled implementation of the 2nd phase of Jatiluhur Project has to be in coordination with the construction of water transmission facilities to the new airport and seaport.

In addition, SPAM IKKs need to be implemented in areas where water supply facility is not constructed. Six SPAM IKKs with a capacity of 100 l/s each are expected to be implemented in 2020, totalling to 600 l/s of capacity.

4) Bogor

The planned water demand, production capacity and connection expansion plan are shown in the Table 7.6.18.

Table 7.6.18 Facility Expansion Plan for Bogor

		2010	2015	2020
Service Population		1,479,923	2,442,249	3,572,187
Water Demand (l/s)		2,981	5,139	7,798
Production Capacity (l/s)	Existing capacity	3,791	3,791	3,791
	Upgrading existing capacity		1,000	2,000
	IKKs (200 l/s / IKK x 10 IKKs)		400	2,000
	Total	3,791	5,191	7,791
Number of House connection	Existing house connection	197,323	197,323	197,323
	New connection		128,310	278,969
	Total	197,323	325,633	476,292

Source: MPA Study Team, PDAM Kab./Kota Bogor

Existing production capacity in Bogor is expected to be upgraded by 1,000 l/s in 2015 and 2,000 l/s in 2020. In addition, SPAM IKKs (Small scale rural water supply project) need to be implemented in the areas where water supply facility is not constructed. Ten SPAM IKKs with a capacity of 200 l/s each are expected to be implemented in 2020, totalling to 2,000 l/s of capacity.

5) Tangerang

The planned water demand, production capacity and connection expansion plan are shown in the Table 7.6.19.

Table 7.6.19 Facility Expansion Plan for Tangerang

		2010	2015	2020
Service Population		810,740	1,856,622	3,139,791
Water Demand (l/s)		1,921	4,371	7,347
Production Capacity (l/s)	Existing capacity	2,565	2,565	2,565
	Tangerang Selatan Project (PPP)		900	900
	Kalian Project (1st phase)			2,650
	IKKs (200 l/s / IKK x 7 IKKs)		1,000	1,400
	Total	2,565	4,465	7,515
Number of House connection	Existing house connection	115,820	115,820	115,820
	New connection		149,412	332,722
	Total	115,820	265,232	448,542

Source: MPA Study Team, PDAM Kab./Kota Tangerang

Tangerang Selatan Project with capacity of 900 l/s has commenced in 2011 and is expected to be completed in 2015. The 1st phase of Karian Project with capacity of 2,650 l/s is expected to be completed in 2020. In addition, SPAM IKKs have to be implemented in areas where water supply facilities are not yet available. Seven SPAM IKKs, each with a capacity of 200 l/s, are expected to be implemented in 2020, with a total capacity of 1,400 l/s.

(3) Key Project for PDAM Water Supply Development Strategy

As described in Table 7.6.12, the PDAM service ratio is planned to be increased in 2020 as shown in the Table 7.6.20 below.

Table 7.6.20 Planned PDAM Service Ratio up to 2020

	2010(Present)	2020
DKI Jakarta (PAM JAYA)	54.0 %	77.0 %
Bekasi (PDAM Kota Bekasi, PDAM Kabupaten Bekasi)	21.9 %	46.0 %
Karawang (PDAM Kabupaten Karawang)	17.4 %	38.7 %
Bogor (PDAM Kota Bogor, PDAM Kabupaten Bogor)	19.8 %	39.9 %
Tangerang (PDAM Kota Tangerang, PDAM Kabupaten Tangerang)	13.6 %	41.8 %

Source: MPA Study Team

To achieve the above service ratio, production capacity of each PDAM is planned to be increased as shown in Table 7.6.15 to Table 7.6.19.

Out of these expansion plans, Jatiluhur Project (1st phase and 2nd phase) is one of the key schemes in view of its scale (10,000 l/s in total capacity) and beneficiary area (Jakarta, Bekasi, Karawang). Thus, Jatiluhur Project is selected as a priority project of the water supply sector in MPA.

Jatiluhur Project itself is a bulk water supply system that delivers treated water to the receiving points in Jakarta, Bekasi and Karawang. It is necessary to construct a facility within these areas for the delivery of water to the customers. Thus, part of construction works for transmission/distribution facility, with integration of Jatiluhur Project, is proposed as a priority project of the water supply sector in MPA.

Table 7.6.21 shows the target effect indicator for water supply sector in MPA.

Table 7.6.21 Target Effect Indicator for Water Supply

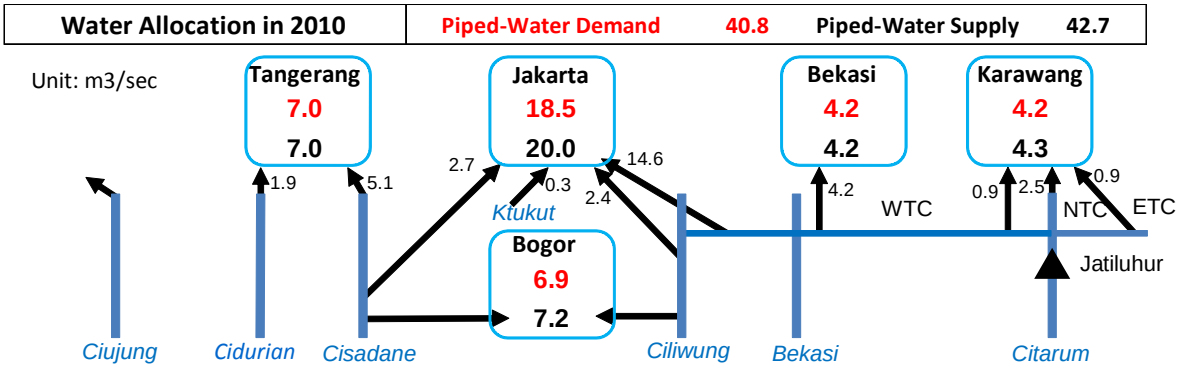
SECTOR	**TARGET EFFECT INDICATOR (Narrative)**	**TARGET EFFECT INDICATOR (Quantitative)**		**DESCRIPTION**
		2010(Base)	2020(Target)	
Water Supply	Improve piped water service coverage (DKI Jakarta)	**54 %**	**77%**	Piped-water supply will be improved from 40.8 m^3/s (2010) to 68.3 m^3/s (2020).

Source: MPA Study Team

(4) Water Allocation Strategy until 2020 (Target Year of Master Plan 2020)

As described in the above section, the total demand for PDAM and industrial water through the piped water system is projected to be 40.8 m^3/sec in 2010, 69.9 m^3/sec in 2020, and 110.0 m^3/sec in 2030.

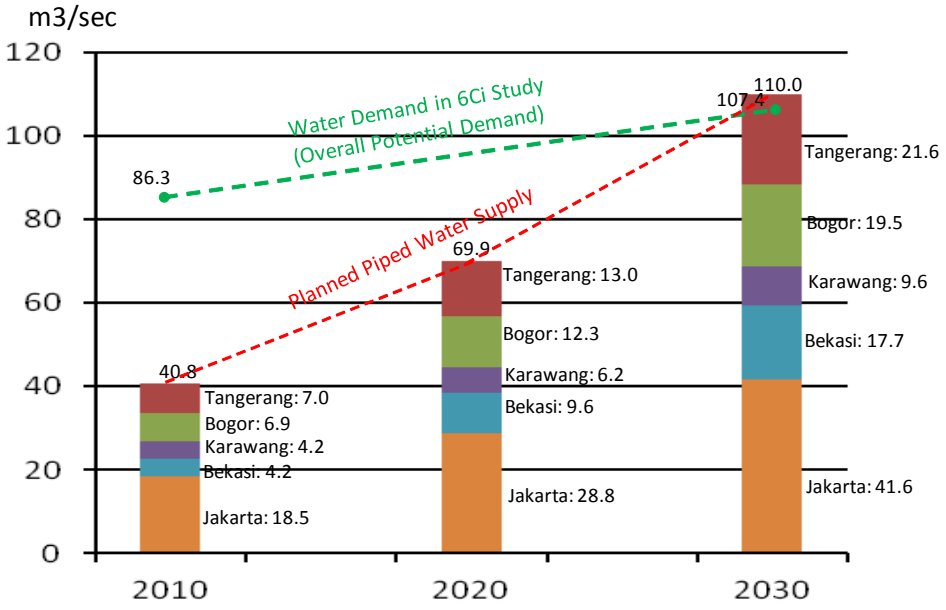
Based on the information from PJT-II and BBWS Ciliwung Cisadane, the present demand (2010) for PDAM and industrial water through the piped water system, is being met by utilization of river water, as shown in Figure 7.6.9.



Source: PJT-II, BBWS Cilliwung-Cisadane

Figure 7.6.9 Present Water Allocation

Figure 7.6.10 shows the present and future status of total demand for PDAM and industrial water through the piped water supply system and the overall potential water demand. The overall potential water demand is derived from the on-going study, "Draft Pola for Water Resources Management in the 6Cis River Basin Territory funded by ADB (hereinafter referred to as 6Cis Study)". The assumption for the potential demand forecasting is that all the households are to be supplied with water in accordance with the guidelines of the Ministry of Public Works.



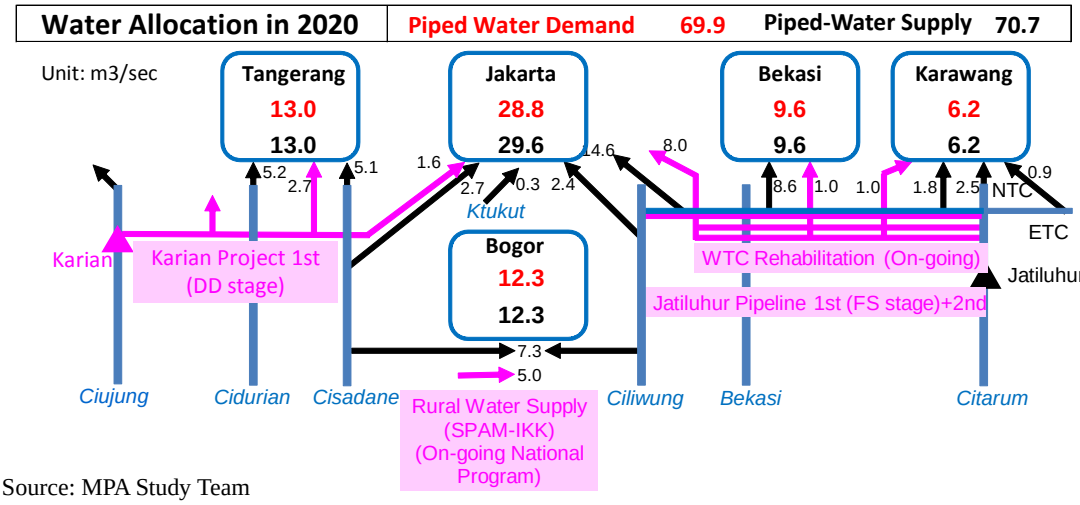
Source: MPA Study Team

Figure 7.6.10 Water Demand and Supply Condition

The actual water demand (i.e., as supplied by the piped water system) is suppressed due to lack of piped water supply system in some areas. Some of the potential demand is being met by utilization of groundwater.

It is planned to decrease the difference between the potential demand and the actual demand by constructing an additional piped water supply system. The planned water

allocation for 2020 (target year in Master Plan 2020) is shown in Figure 7.6.11. The Water allocation is under the authority of PU. PU is required to function as a coordinator of the related local governments.



Source: MPA Study Team

Figure 7.6.11 Water Allocation Plan in 2020

As shown in the above figure, several development projects are being implemented or planned as follows:

1) Rehabilitation of West Tarum Canal (WTC)

The water supply from Jatiluhur Dam will be increased by reducing the water leakage from the canal.

2) Karian Project

The water supply from the planned Karian Dam will be conveyed to Tangerang and DKI Jakarta.

3) Rural Water Supply Project (SPAM IKK)

The national program for the construction of small-scale water supply facilities (capacity of each project is usually up to 200 l/s) for rural areas is being implemented utilizing national and regional budgets.

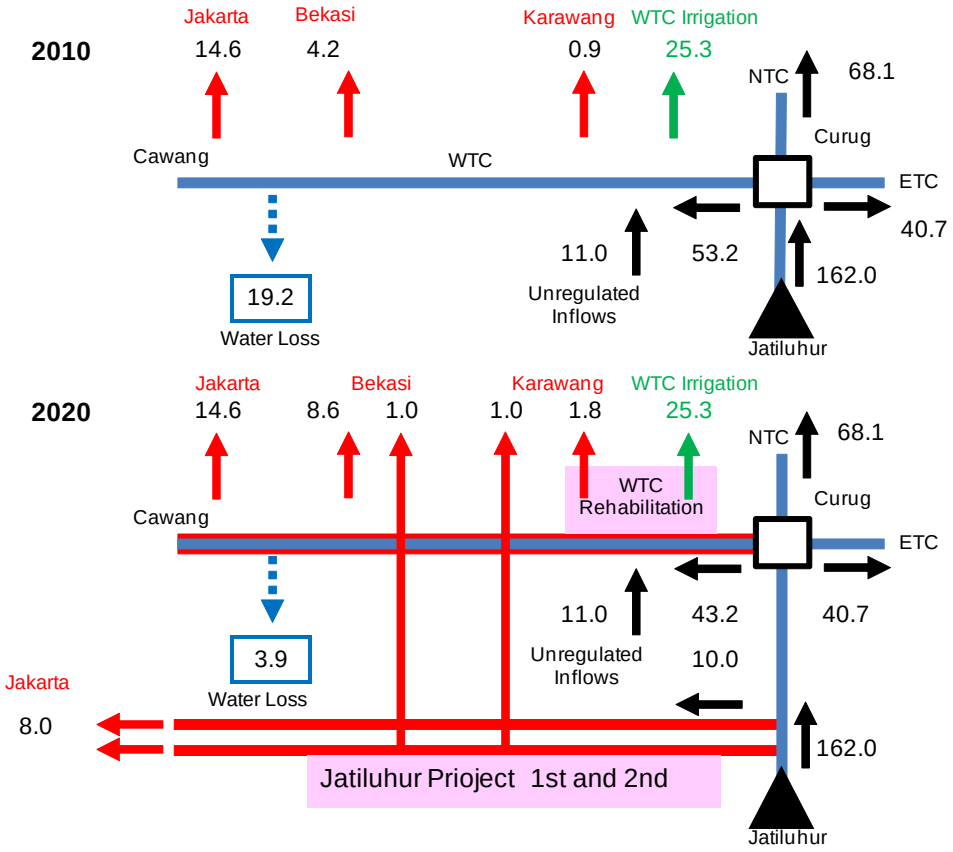
4) Jatiluhur Project

Treated bulk water will be supplied from a water treatment plant by constructing the downstream of Jatiluhur Dam that will convey, water to the receiving points in DKI Jakarta, Bekasi and Karawang.

The capacity of the 1st phase is 5,000 l/s (4,000 l/s for DKI Jakarta and 500 l/s each for Bekasi and Karawang). The 2nd phase is planned to have the same capacity as the

1st phase.

The water balance of WTC in the second half of July when the water supply balance is most critical is shown in Figure 7.6.12.



Source: PJT-II, MPA Study Team

Figure 7.6.12 Envisaged Water Balance in WTC

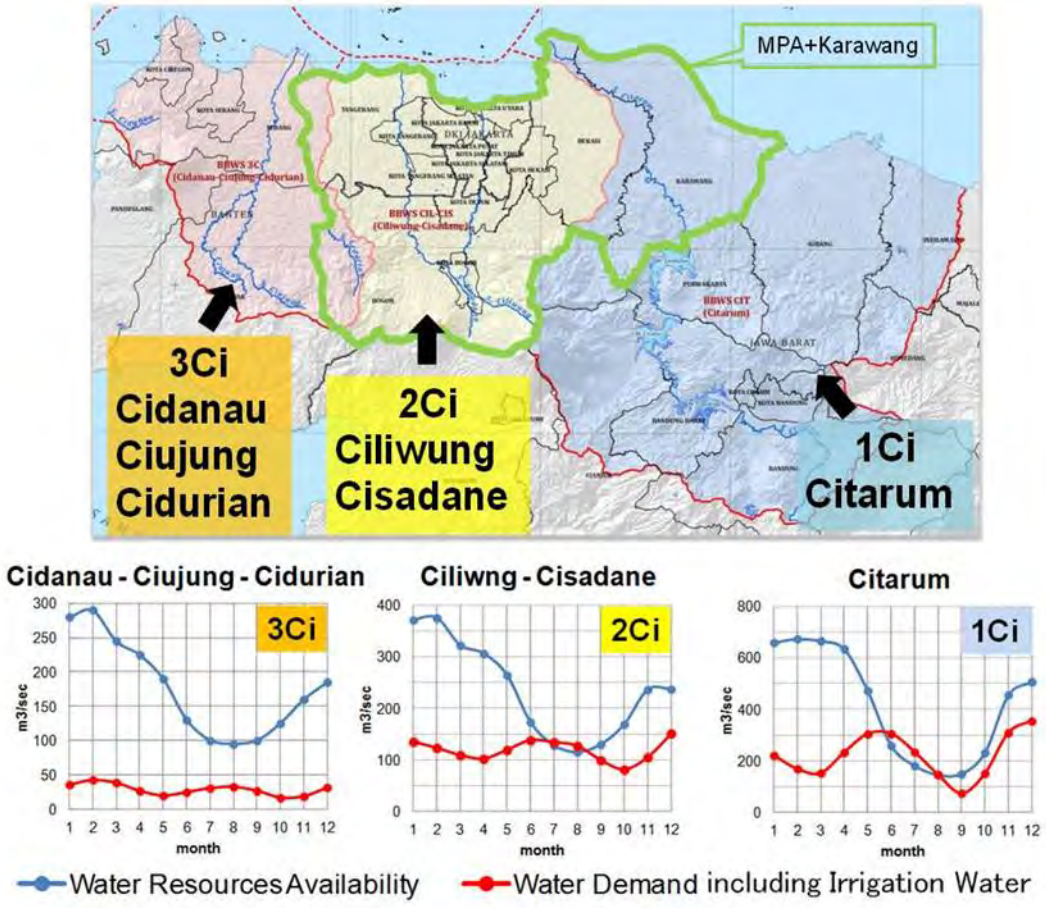
The four projects in Figure 7.6.12 are indispensable in achieving the planned piped water supply for JABODETABEK MPA and Karawang. Out of these projects, 1), 2), and 3) are already in the implementation stages, while implementation of Jatiluhur Project has not commenced yet. The 1st phase of Jatiluhur Project has been decided as a "Fast Track Project" by the JABODETABEK MPA Steering Committee. Thus, it is proposed that its 2nd phase be selected as a "Priority Project".

A4 (1)	DKI Jakarta – Bekasi – Karawang Water Supply (Jatiluhur) as FTP 6.1
A4 (2)	Rehabilitation of Water Distribution Facilities in DKI Jakarta, Bekasi and Karawang, with the integration of DKI Jakarta – Bekasi – Karawang Water Supply (Jatiluhur)

(5) Future Water Allocation Strategy up to 2030

As shown in Figure 7.6.13, the present water balance in 1Ci (Citarum River Basin Territory) and 2Ci (Ciliwung-Cisadane) are already in critical levels, while 3Ci (Cidanau-Ciujung and Cidurian) has excess water supply available. Thus, it is proposed that the future water demand in JABODETABEK MPA after 2020 is met by the water supply developed in 3Ci basin.

A4 (4) Development of Water Supply Systems for Large-scale Infrastructure Development



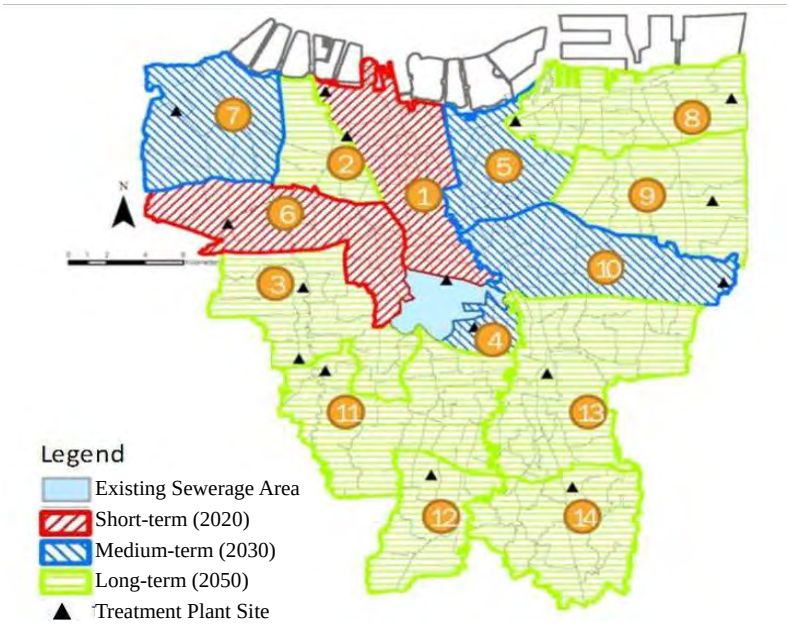
Source: Draft Pola for Water Resources Management in the 6 Cis River Basin Territory, Oct 2011

Figure 7.6.13 Potential Water Resource for JABODETABEK MPA Area and Karawang

(6) Sewerage Development Strategy

1) Strategy

Currently, the Wastewater Management Master Plan in DKI Jakarta is being formulated with target years of 2020 (short-term), 2030 (mid-term), and 2050 (long-term). In 2020, the plan is to increase the sewerage coverage ratio from 2% to 20% and reduce the BOD levels (as river water quality indicator) from 60 mg/l to 45 mg/l. The sewerage coverage area is divided into 14 zones as shown in Figure 7.6.14.



Source: The Project for Capacity Development of Wastewater Sector through Reviewing the Wastewater Management Master Plan in DKI Jakarta, 2011

Figure 7.6.14 Planned Sewerage Zones in DKI Jakarta

The reasons for selecting sub-zones 1 and 6 as locations of the sewerage system for construction in 2020 are as follows:

- These areas are the core districts of DKI Jakarta, the capital city, thus, there is a need for immediate implementation.
- The sub-zones population density is high, thus, the immediate effects of implementation are expected.
- There are several commercial/business companies that can provide a stable source of revenues from the collection of wastewater tariff.
- The land area for wastewater treatment plant is secured.
- The river water quality in the area is heavily degraded, thus, the need for immediate improvement is required.

The construction of a sewerage system for these areas is prioritized and selected as a priority project of sewerage sector in MPA.

Table 7.6.22 shows the target effect indicator for sewerage sector in MPA.

Table 7.6.22 Target Effect Indicator for Sewerage System

SECTOR	TARGET EFFECT INDICATOR (Narrative)	TARGET EFFECT INDICATOR (Quantitative)		DESCRIPTION
		2010(Base)	2020(Target)	
Sewerage System	Improve sewerage coverage ratio	**2%**	**20%**	Population using sewerage system will be expanded from 0.1 million (2010) to 2 million (2020) people.

Source: MPA Study Team

2) Sewerage System

In other areas with no sewerage system plans, wastewater disposal is still being done undertaken by individual septic (on-site) systems. Regarding on-site systems, the following measures are planned for implementation:

- Replacement of conventional septic tanks with modified septic tanks, as the household's wastewater treatment facility;
- Introduction of regular de-sludging for the households;
- Promotion of the individual treatment plant (ITP) in housing development areas;
- Promotion of the replacement of remaining septic tanks of commercial and public building to ITPs; and
- Expansion of the capacity of sludge treatment plants.

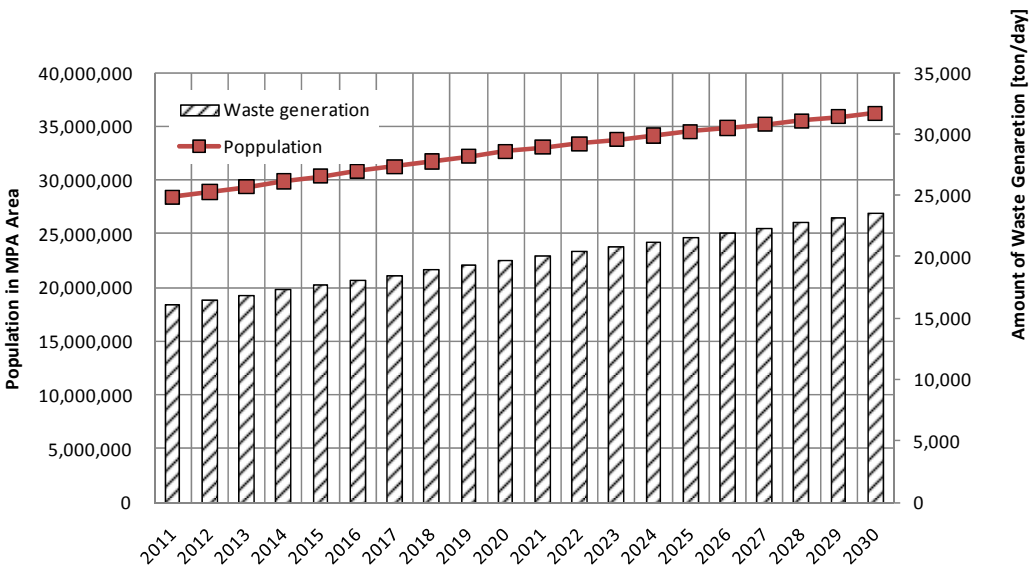
A4 (3) Development of Sewerage System in DKI Jakarta

7.6.3 Waste Management System

(1) Future Prediction of Non Hazardous Solid Waste

1) Amount of Solid Waste

The population in this Study is presented in the previous section. In the SAPROF Study, the amount of solid waste has been estimated in DKI Jakarta. The assumption of the increasing rate of unit generation in JABODETABEK is the same with that of DKI Jakarta due to their almost similar economic development conditions. The unit generation rate has been determined in each area. The amount of solid waste in JABODETABEK area was preliminary as shown in Figure7.6.15.

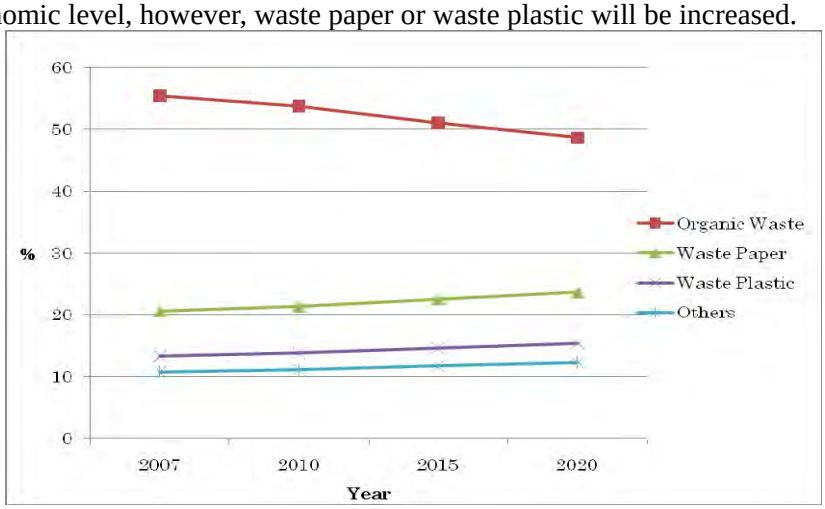


Source: MPA Study Team based on the hearing data from each municipality

Figure 7.6.15 Preliminary Estimated Waste Generation Amount in JABODETABEK Area

2) Waste Characterization

There is no recent waste characterization survey data in each municipality and regency except for DKI Jakarta. In DKI Jakarta, historical waste characterization data is available in the SAPROF Study. The latest projection of future waste characterization is shown in Figure 7.6.16. Organic waste will be decreased due to increase in economic level, however, waste paper or waste plastic will be increased.



Source: JBIC SAPROF Final Report (2008)

Figure 7.6.16 Waste Characterization in DKI Jakarta

(2) Future Waste Stream Based on the Strategy and Target

According to the Strategic Plan of Cipta Karya (2010 to 2014), five conceptual policies have been established as follows;

Policy 1 :Reduction of solid waste quantity as much as possible at source

Policy 2 :Improve Community and Entity/Private Sector Involving in

Managing Partnership

Policy 3 :Improve Services Area and Quality of Management System

Policy 4 :Institution, Regulation and Law Development

Policy 5 :Development of Budget Sources Alternative

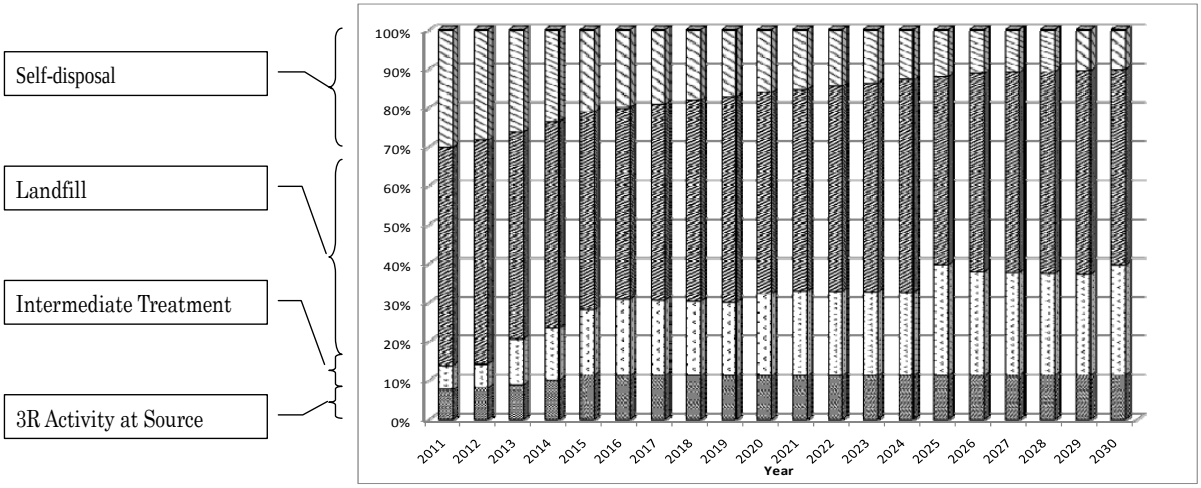
In relation to the policies mentioned above, as countermeasure for the direction of the solid waste management, the characteristics of each area in JABODETABEK should be considered. The Ministry of Public Works (PU) Regulation No.21, 2006 set the target as the collection rate (amount of collected waste per total amount of generated waste) of 80% in urban area and 50 % in rural area until 2015 and source reduction rate (amount of reduced waste at source per total amount of generated waste) of 20%. Currently, the collection rate in DKI Jakarta is more than 80%, while in South Tangerang City or Bogor Regency, it is less than 50%. Considering the current rates of collection and source reduction, the projected 2020 source reduction and collection rates are shown Table 7.6.23.

Table 7.6.23 Source Reduction and Collection Rate in JABODETABEK

	2010		2020	
	Source Reduction rate	Collection rate	Source Reduction	Collection rate
DKI Jakarta	4%	80%	3%	95%
Bekashi City	11%	44%	15%	60%
Bekashi Regency	7%	65%	10%	71%
Tangerang City	6%	72%	8%	80%
Tangerang Regency	16%	23%	23%	40%
South Tangerang City	10%	50%	14%	60%
Bogor City	6%	69%	8%	80%
Bogor Regency	14%	28%	24%	40%
Depok City	10%	49%	14%	60%
Karawang Regency	10%	49%	15%	60%

Source: MPA Study Team

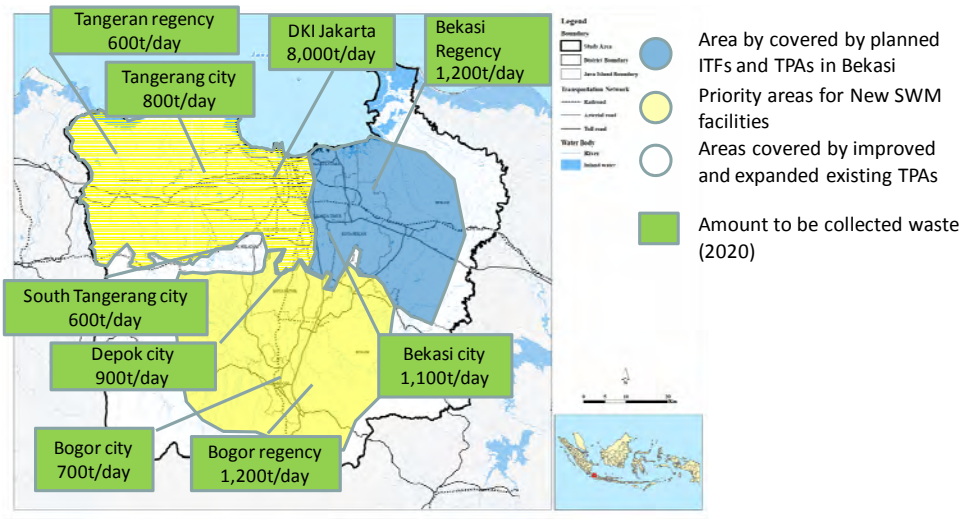
Based on the source reduction and collection rates, the future trend of solid waste handling and treatment methods are described in Figure 7.6.17.



Source: MPA Study Team

Figure 7.6.17 Trend of Handling and Treatment Method of Solid Waste in JABODETABEK Area

Currently, each city and regency has its own M/P. They are either revising the current M/P or preparing new M/P of solid waste management. The future plan of JABODETABEK MPA should be consistent with these M/Ps in consideration of the current situation. One of the most critical issues of solid waste management is the selection of landfill sites and intermediate treatment facilities. Currently, in eastern area in JABODETABEK, there is an Integrated Solid Waste Treatment and Disposal Facility (TPST) in Bekasi City; however, sanitary landfill site including TPST are not available in other areas. Though it is necessary to develop suitable waste treatment and disposal facilities, a step-by-step approach is more practical considering the current solid waste management situation. The areas in western and southern parts of JABODETABEK are selected as priority areas for development due to unavailability of sanitary landfill. The amount of solid waste to be collected and the priority areas are shown in Figure 7.6.18.



Source: MPA Study Team

Figure 7.6.18 Image of Future Waste Stream in JABODETABEK Area (2020)

(3) Issues and Measures

To achieve the goal of a better urban environment which will provide a secure, clean, safe, and smart life, it is important to keep the environment clean through the improvement of solid waste treatment facilities. Only 40% of solid waste in JABODETABK MPA was treated as reported in the 2010 data, so the remaining solid waste materials were dumped in prohibited sites and were not treated. Solid waste causes environmental degradation, such as water pollution, odor, etc. Construction of sanitary landfills is necessary as a measure to achieve a clean environment. Table 7.6.24 shows the target effect indicator for solid waste treatment.

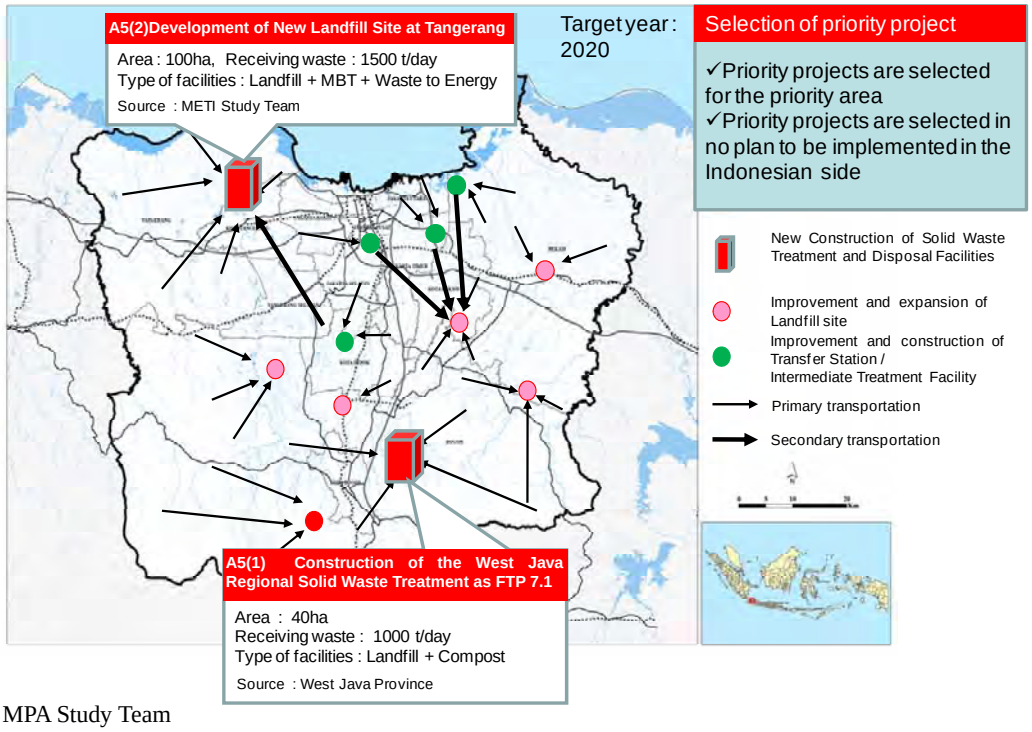
Table 7.6.24 Target Effect Indicator for Solid Waste

SECTOR	TARGET EFFECT INDICATOR (Narrative)	TARGET EFFECT INDICATOR (Quantitative)		DESCRIPTION
		2010 (Base)	2020 (Target)	
Waste Manage-ment System	Treated/disposed volume	**4,500 tons/day**	**9,000 tons/day**	Treated/disposed rate will be enhanced from 40% (2010) to 60% (2020).

Source: MPA Study Team

(4) Scenario in Selecting

Considering the current situation, a regional solid waste management facility should be developed in each of the priority area of the western and southern in JABODETABEK in the short term. In this context, two priority projects are preliminary proposed as shown in Figure 7.6.19.



Source: MPA Study Team

Figure 7.6.19 Selection of Priority Projects in JABODETABEK Area (2020)

This project aims to provide intermediate treatment and final disposal facilities for solid waste management in Bogor City and Regency and Depok City. Solid waste is transported from Bandung to Legok Nangka.

A5(1) Construction of the West Java Regional Solid Waste Treatment as FTP 7.1

Introduction of solid waste treatment and disposal facility is a key measure for achieving an eco-friendly city and in pursuit of making a clean and green city. Construction of final disposal facilities at landfill site of about 100 ha will be e carried out for solid waste in the western part of JABODETABEK, namely, Tangerang and South Tangerang.

A5(2) Development of New Landfill Site at Tangerang

Table 7.6.25 Collected Amount of Waste and the Indicator of Suitably Treated and Disposal Rate

Area		Collection Amount (2020)	Suitably Treated or Disposed Amount (2020)	Suitably Treated or Disposed Rate (2011)	Suitably Treated or Disposed Rate (2020)
MPA (North and East)	DKI Jakarta Bekasi City Bekasi Regency	10,300[t/day]	6,500[t/day]	59%	63%
MPA (West)	Tangerang City Tangerang Regency South Tangerang City	2,200[t/day]	1,500[t/day] by A.5(2) Priority Project	0%	68%
MPA (South)	Depok City Bogor City Bogor Regency	2,800[t/day]	1,000[t/day] by A.5(1) Priority Project	0%	36%

Source: MPA Study Team

(5) Technical Options

To realize the priority projects, technical options for solid waste management should be considered. The options that will be considered are follows;

1) Collection and Transportation System

Current collection and transportation system (transfer station to the landfill site) is divided into primary collection by RT/RW and secondary collection by cleansing departments. It is important to reduce and separate solid waste at source in consideration of an effective and efficient collection and transportation system. The possible options to be considered are summarized as follows:

Option 1: Commingled collection for primary and secondary collection;

Option 2: Separate collection for primary collection by handcart divided into partitions, and separate collection for secondary collection using different type of collection vehicle for each type of waste;

Option 3: Separate collection for primary collection by handcart divided into partitions, and separate collection for secondary collection in different date for each type of waste; and

Option 4: Collection by collection vehicles divided into partitions for each type of waste.

Table 7.6.26 Source Reduction and Collection Rate in JABODETABEK (Collection Method Options)

Separated Collection Method		Advantage	Disadvantage
Option 1	Each type of waste is discharged without separation	- Convenient for waste dischargers and collectors - Adequate collection service is provided to waste discharger	- No separation for each type of waste for easy handling at the later stage
Option 2	Each type of separated waste discharged is collected by a collection vehicle determined for its type.	- Adequate collection service is provided to waste discharger - Convenient for waste generator	- Not cost effective waste collection due to the increase of collection frequency
Option 3	Discharged separated waste is collected by a collection vehicle. The type of waste to be collected is determined by the date.	- Cost effective - Decrease of burden of checking activities by collectors	- Frequency of collection service will decrease - Cooperation from the waste discharger is necessary
Option 4	All types of separated waste discharged are collected in the respective portion of a collection vehicle that has been divided by partitions for each type of waste.	- Adequate collection service is provided to the waste dischargers - Convenient for waste generators	- The space for each type of separated waste on a collection vehicle is small - There is a possibility of mixing of waste on the collection vehicle

Source MPA Study Team

2) Treatment and Disposal

Though sanitary landfilling is required according to Solid Waste Management Law No.18, 2008, considering the transportation cost of solid waste to be disposed in the landfill site or the future availability of landfill site, the investigation of introduction of ITF is necessary. The SAPROF Study investigated the introduction of ITF and compared some technical options, including composting, methane fermentation with power generation, incineration with power generation, mechanical bio treatment and RDF power generation, methane fermentation and RDF power generation. As a result, mechanical bio treatment and RDF power generation after manual sorting were recommended as the most suitable technology considering technical, financial and environmental aspects.

Table 7.6.27 Source Reduction and Collection Rate in JABODETABEK (Technical Options)

Item	Technical (waste reduction rate)	Financial	Environment/Social
Option 1 : composting	59%	USD 16/t with income (USD 20/t without income)	Less noise and water pollution than other options
Option 2 : methane fermentation with power generation	77%	USD 21/t with income (USD 26/t without income)	Less noise than other options
Option 3 : incineration with power generation	88%	US$D 3/t with income (USD 62/t without income)	
Option 4 : mechanical bio treatment and RDF power generation	98%	USD 17/t with income (USD 32/t without income)	
Option 5 : methane fermentation and RDF power generation	98%	USD 22/t with income (USD 32/t without income)	

Source: JBIC SAPROF Final Report (2008)

According to the field study, DKI Jakarta generated more non-organic waste than in other cities and regencies. In that case, the calorific value of waste in DKI Jakarta is lower than the organic waste for compost or soil conditioner which has higher calorific value. To consider each area's characteristics, it is necessary to consider suitable option for each area.

In addition, separation system near generation source is necessary as a suitable treatment method. In each sorting facility, rich biodegradable waste or recyclable waste materials are separated at source or at different generation sources, such as market area, residential area or office area, to minimize the burden of sorting activities.

(6) Improvement of Institutional System

1) Legal System and Capacity Development

Solid Waste Management Law No18, 2008 has been prepared as the fundamental law at the national level. The following administrative tools should be prepared and revised or updated periodically every two or three years:

- Solid waste management guidelines for each city and regency;
- Operation and management manuals of the ITF and TPA; and
- Solid waste data base of each city and regency (each type and amount of generated, collected, recycled and disposed solid waste, inventory of staff, equipment and facilities, etc.).

2) Financial Mechanism

- Increase or Introduction of waste collection service fee

Based on the polluters pay principle, the waste collection service fee should be set to cover the operation and maintenance fee. Main options to waste collection service fee are described as follows:

Table 7.6.28 Main Options to Collect Waste Collection Service Fee

Item	Contents	Advantage	Disadvantage
Direct collection from waste dischargers	The collectors of waste collection service fee will collect the waste collection service fee from each waste generators	The system is easy to establish.	Human resource is necessary for fee collection.
Collection of a service fee included on utility bills e.g. water and/or electricity supply	Waste collection service fee will be included with the service fee of water and electricity supply	The collection will be easy due to the utilization of other established collection system.	Demarcation of the fee for solid waste management service
Charge to medium (garbage bag, ticket, etc)	Waste discharger has to purchase the ticket or garbage bag to discharge the waste which is part of the waste collection service fee.	It will make an incentive to reduce the waste, if the fee depends on the amount of discharged solid waste.	The shops which sell the garbage bag or ticket are necessary and it will take a time to disseminate the information to the public due to slightly complicated system.

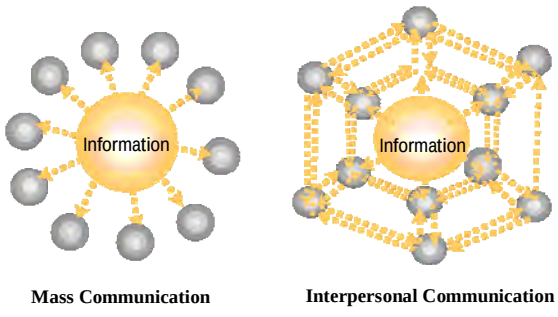
Source MPA Study Team

- Set up the suitable tipping fee:

Currently, there are no sanitary landfill sites or controlled landfill sites except for Bantargebang. In 2013 after five years from the promulgation of Solid Waste Management Law No.18, 2008, existing dumping sites are required to be changed to sanitary landfill site. In this context, the tipping fee for landfill site will be increased due to the increase of the operation and maintenance cost.

3) Socialization Activities (Cleansing Campaign, Waste Reduction at Source and Environmental Education)

Waste scattering in canals, rivers, and roadside, is evidently the prevailing situation in the area. Public socialization and community activities are significant to improve solid waste management in JABODETABEK area. There are some activities, such as the information dissemination through newspaper or community participation project regarding waste sorting activity. The former is one of the mass communication tools and the latter is one of the interpersonal communication tools. It is necessary to continue the both activities connectively.



Source: MPA Study Team

Figure 7.6.20 Communication Procedure

7.6.4 Flood Management System

(1) Framework for Flood Control

1) Objectives of Flood Management

Flood management infrastructure provides a secure value-chain foundation for industrial production, distribution networks, commercial and marketing, and social welfare and safety of the people. Flood management is indispensable in achieving the vision of the acceleration and expansion of Indonesia's economic development for the overall strengthening of sustainable global competitiveness towards an innovation-driven economy (MP3EI). One of the objectives of flood management is to build comprehensive safety programs, against flood disasters for JABODETABEK MPA, for investment and industry in order to ensure:

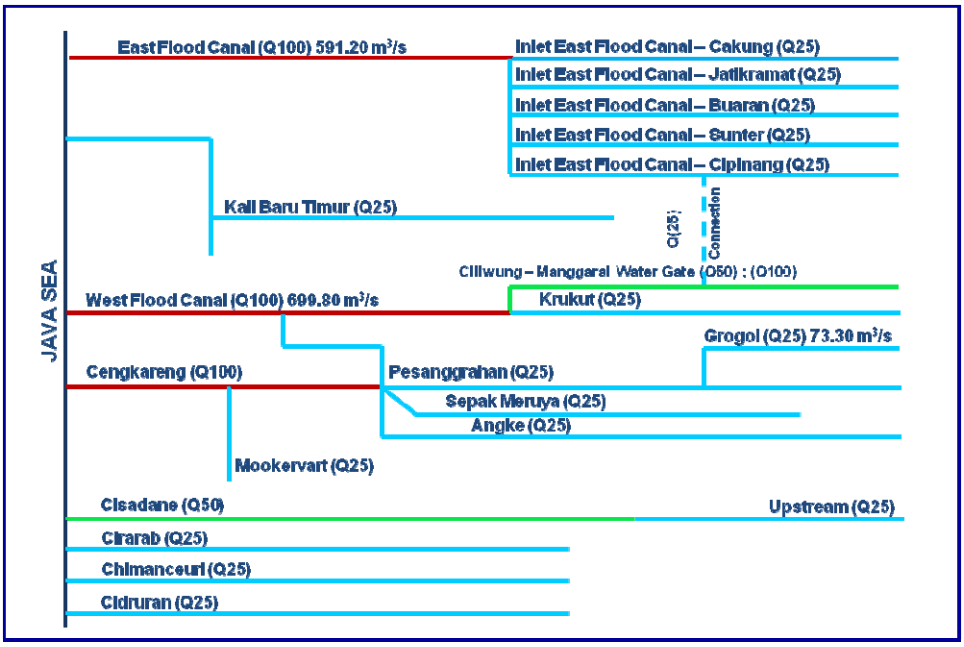
- Safety to reduce risks in investment and production facilities;
- Safety of life support systems against damages, such as utilities, transport systems, schools, hospitals, homes, etc.; and
- Safety of life of investors, business workers, residents, etc.

2) Target Flood Control Level

The recommended target design flood control level for JABOTABEK by JICA (the Study on Comprehensive River Water Management Plan in Jabotabek, 1997) with return periods ranging from 25 years to 100 years is also applied to JABODETABEK.

- CBL Floodway: 50-year flood,
- East Flood Canal System (EFC): 100-year design food,
- West Flood Canal System (WFC): 100-year design flood,
- Cengkareng Floodway System : 100-year design flood,
- The Cisadane River: 50-year design flood for downstream, 25-year design flood for the first stage, upstream,
- The Cidrurian River: 25-year design flood,
- The Cimanceuri River: 25-year design flood, and
- The Cirarab River: 25-year design flood.

The design flood distributions of EFC, WFC and Ciliwung River are illustrated in Figure 7.6.21.



Source: The Study on Comprehensive River Water Management Plan in Jabotabeck, JICA, 1997.

Figure 7.6.21 Target Design Flood Diagram

The target design flood control level for the micro-drainage with return periods ranging from 10 years to 25 years is applied to DKI Jakarta area in accordance with the design standards of Indonesia.

(2) Flood Control Strategy

The flood control strategy for DKI Jakarta and upper catchment area in JABODETABEK formulated by the GOI is outlined below, addressing the main issue of timely implementation in order to overcome the challenges.

<u>Urban Excess Water Management in and around DKI Jakarta</u>

- Drain out the retained water to the sea through the river and drainage systems using pumps;
- Develop multipurpose water retention areas (parks and other public facilities) to reduce the peak runoff into the rivers and drainages;
- Carry out integrated and efficient management of pumping systems;
- Stop land subsidence through strict control of groundwater use together with transfer from groundwater to surface water supply, and decrease water loss; and,
- Clarify the role and legal responsibilities of the government and private sector for flood control.

<u>Flood Control in DKI Jakarta and Catchment in JABODETABEK area</u>

- Control peak runoff into the rivers and drainages by providing multipurpose

retarding basins and regulating ponds, and preservation of watersheds; and,

- Rehabilitation of the rivers and drainages to increase drainage capacity.

(3) Issues and Measures

To achieve the goal of a better urban environment for a secure, clean, safe and smart life, it is indispensable to reduce the risk of flood. DKI Jakarta has been hit by the large-scale floods until now. The floods have damaged the urban function. To secure a normal function as a capital city in DKI Jakarta, the measures to reduce flood damage are necessary. The existing pumping capacity will be doubled in 2020 in DKI Jakarta as shown in Table 7.6.29.

Table 7.6.29 Target Effect Indicator for Flood Control

SECTOR	TARGET EFFECT INDICATOR (Narrative)	TARGET EFFECT INDICATOR (Quantitative)		DESCRIPTION
		2010 (Base)	2020 (Target)	
Flood Manage-ment System	Capacity of discharging flood water to the sea	**pumping capacity of 60 m^3/s**	**pumping capacity of 126 m^3/s**	Reduce the risk of flooding in line with the Master Plan by PU/DKI Jakarta. Polder and retention pond are provided to secure pumping capacity.

Source: MPA Study Team

(4) Scenario in Selecting Fast Track and Priority Projects

The locations of the alternative macro- and micro-drainage systems in DKI Jakarta are illustrated in Figure 7.6.22.

Source: MPA Study Team

Figure 7.6.22 Location Map of Alternative Drainage Systems in DKI Jakarta

The following conditions are assumed in the selection of Fast Track and Priority Projects:

- The flood control structural measures (macro-drainage) in the JICA Master Plan of 1997 is currently effective;
- The interconnection of the Ciliwung River to the East Flood Canal (EFC) through the Cipinang River, which is the key for the effectiveness of the EFC, shall be completed before normalization of the middle stretch of the Ciliwung River from Manggarai Water Gate to Kalibata Bridge;
- The DKI Jakarta Urgent Flood Mitigation Project (JUFMP) will restore the discharge capacity of the existing system to the original design stage. The project is scheduled for implementation by DKI Jakarta Emergency Dredging Initiative (JEDI) and for financing by the World Bank at the start of mid 2012;
- The flood control measures, included in the DKI Jakarta Spatial Plan (micro-drainage) and the Pola (policy plan) of Balai Besar Wilayah Sungai Ciliwung Cisadane (macro-drainage), will be implemented first;
- The flood inundation issues in DKI Jakarta will be resolved by the integration of flood-control capabilities of the major rivers (macro-drainage), comprehensive management of the urban excess water and the sea dike system along the north coast; and,
- JABODETABEK MPA focuses on flood control in DKI Jakarta.

The JUFMP-JEDI project consists of two components: (i) Structural Measures such as urgent dredging of selected waterways and retention basins, rehabilitation of embankment and repair of pumping stations and trash racks identified, and construction of Confined Disposal Facilities (CDFs) for dredged materials; and (ii) Non-Structural Measures such as capacity building and project implementation support. The structural measures cover four drains of national importance under the Directorate General of Human Settlements (DGCK), four floodways under Directorate General of Water Resources (DGWR), five major drains under DKI Jakarta, and five retention ponds (waduks) under DKI Jakarta.

The total solution plan for the Ciliwung River flood control covers:

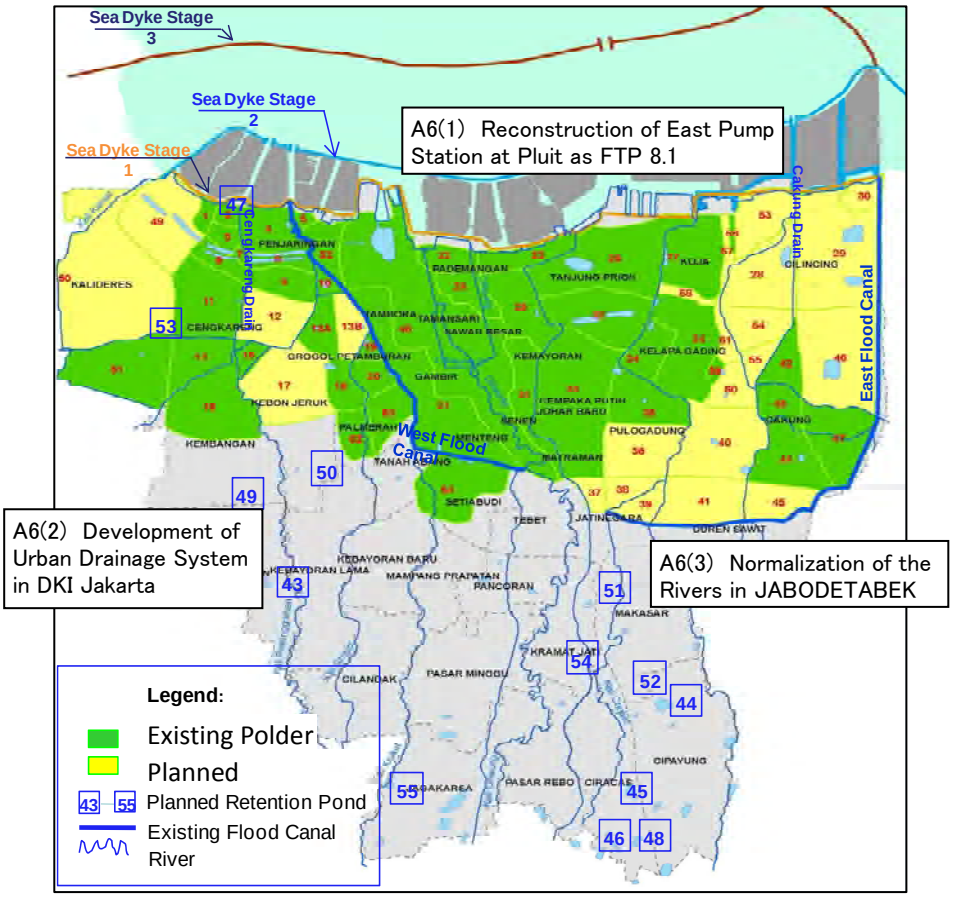
- Shortcut of the Ciliwung River along the stretch of Kota Baru and Kalibata,
- Resettlement of illegal residents along the Ciliwung River and the WFC,
- Construction of rental housing for the residents subject to resettlement,
- Normalization of river channel of the Ciliwung River in the middle stretch from the Manggarai water gate to the Kalibata bridge,
- Additional water gates each for the Manggarai Gate and the Karet Water Gate,
- Re-programming of the discharge capacity of the Ciliwung River,

- Increase of the height of the bridges interrupting the flood discharge crossing the WFC and the Ciliwung River,
- Revitalization of the in-situ dams, construction of filtration wells and, ditch dams and reforestation in the middle and upstream portions of the Ciliwung River, and
- Tunnel diversion interconnection of the Ciliwung River to EFC through the Cipinang River.

The total solution plan is being executed by Balai Besar Wilayah Sungai Ciliwung Cisadane, Directorate of River and Coastal Area, the Ministry of Public Works except for the interconnection of the Ciliwung River to EFC which was cancelled in November 2011.

(5) Fast Track and Potential Priority Projects Identified

The Study has identified the Fast Track and potential Priority Projects as illustrated in Figure 7.6.23.



Source: The map of sea dike stage plan and polders in DKI Jakarta, and location of FTP and potential priority projects according to the MPA Study Team.

Figure 7.6.23 Location Map of Fast Track and Potential Priority Projects

To achieve the goal of a better urban environment for a secure, clean, safe, and smart life, the Study has identified the fast track projects and potential priority projects for flood control, which were categorized into two as shown in Table 7.6.30. The two categories are urban excess water management (micro-drainage) and flood control of rivers (macro-drainage). The fast track project is an urgent project in which construction works should start in 2013. Potential priority project should be commissioned until 2020.

Table 7.6.30 List of Potential Priority Projects for Flood Control

Urban Excess Water Management (Micro-drainage) - Development of Urban Drainage System in DKI Jakarta: potential priority project A6(2)
Flood Control (Macro-drainage) - Reconstruction of East Pump Station at Pluit as FTP 8.1: first fast-track project -Normalization of the Rivers in JABODETABEK: potential priority project A6(3), Source: Balai Besar Wilayah Sungai Ciliwung-Cisadane

Source: MPA Study Team

1) Project Features of Urban Excess Water Management (Micro-drainage)

This project aims to implement the key new polders and retention ponds listed in the Spatial Plan of DKI Jakarta 2011-2030. The spatial plan is consistent with the Flood Control and Drainage Master Plan of DKI Jakarta 2030.

The project is composed of the following components:

- Key new polders and retention ponds selected from the lists in the Spatial Plan 2011;
- New trunk drainage systems (open channel or tunnel) which discharges the urban excess water in West and Central Jakarta to the Java Sea;
- Replacement of the pumps in Melati Pump Station (12.88 m^3/s);
- Local retention ponds with pumps in the isolated business and commercial areas which inadequately discharge excess water to the existing flood and drainage canals; and,
- Integrated management and operation system of the new and existing pumps and gates which were established under PPP.

Each polder system planned by DKI Jakarta is composed of micro-drainage, sub-micro drainage, macro-drainage, retention ponds (waduk), dikes and pump stations depending on the site conditions. The new trunk drainage systems are alternatives to the multi-purpose deep tunnel (for road, public utilities, water supply, waste water and storm drainage) which is planned below WFC and the Ciliwung River with a design discharge capacity of 250 m^3/s. The multi-purpose deep tunnel was excluded from the Spatial Plan 2011-2030 because the sea dike plan was included in the Spatial Plan in

November 2011. Also, some functions of the tunnel overlap with those of the sea dike plan. The sea dike plan is planned to be implemented in three stages in 2030.

The trunk drainage systems are planned as open channels. One trunk drainage system aims to drain the excess water to the Java Sea from the areas of the Manggarai I Gate to Pasar Ikan Gate by a new pump station at Pasar Ikan (35 m^3/s) and by expanding the existing Cideng River and connecting the drainages. The other drainage system aims to drain the excess water to the Java Sea from the area of the Manggarai II Gate to Marina Gate by a new pump station at Marina (70 m^3/s) and by expanding the existing Ciliwung River and connecting to the drainages. Replacement of Melati Pump Station (12.88 m^3/s) is also included. The two pump stations at Pasar Ikan and Marina are planned by the Ministry of Public Works. The two pump stations would not be necessary if the sea dike plan scheduled for Phase 2 will commerce in 2020 as planned in the Spatial Plan of DKI. Reconstruction of Pluit East Pump Station is scheduled to be implemented as a fast-track project. Reconstruction of Pluit Central Pump Station (16.8 m^3/s) and West Pump Station (18.0 m^3/s) are also not necessary if the sea dike plan scheduled for Phase 2 is operational in 2020.

The director of river and coastal of the Ministry of Public Works noted that the sea dike plan might not be implemented as scheduled by DKI Jakarta because commitment of external loans is generally delayed. Construction of Pasar Ikan Pump Station, Marina Pump Station, Pluit Central Pump Station and Pluit West Pump Station will be implemented as planned by the ministry.

The design flood with a 100-year return period for WFC will be attained if the elevation of the existing bridges which confines the flood flow in WFC will be increased.

The excess water stored inside the isolated retention ponds is to be discharged by pumps to WFC or to the new trunk drainage system. Installation of each new gate for Manggarai I (448 m^3/s) and Karet Weir (423 m^3/s) is on-going as planned in the total solution plan for the Ciliwung River.

Ten percent of DKI Jakarta area will be required to be converted into retarding basins or retention ponds but only 5% is estimated for possible conversion due to land use and resettlement issues. Construction of underground retention ponds will be necessary in the near future where construction of open retention ponds is difficult.

The integrated management and operation system aims to achieve the systematic and optimum operation and maintenance of the new and existing drainage pumps and gates

in the service area of WFC downstream Ciliwung River, and EFC as a group, which are operated independently with their own respective information. This system is equipped with a regional real-time information system of meteorology, hydrology and river systems. It also aims to minimize the life cycle cost of the pumps and gates and shares with the potential risks in the operation and maintenance of the facilities among the public and private sectors.

A6(2) Development of Urban Drainage System in DKI Jakarta

2) Project Features of Flood Control (Macro-drainage)

The flood in the north-western part of DKI Jakarta will not be mitigated without operation of pump stations due to significant land subsidence in the area, where the mean sea level is higher than the water level of the existing drainage system. To secure normal functions of the capital, the flood inundation in DKI Jakarta should be mitigated. The original discharge capacity will be restored by protecting inland drainage area from intrusion of sea water.

The project for reconstruction of East Pump Station has already started, namely Pluit Pump Station. Pluit Pump Station is an essential facility with a total drainage capacity of 47.3 m^3/s.

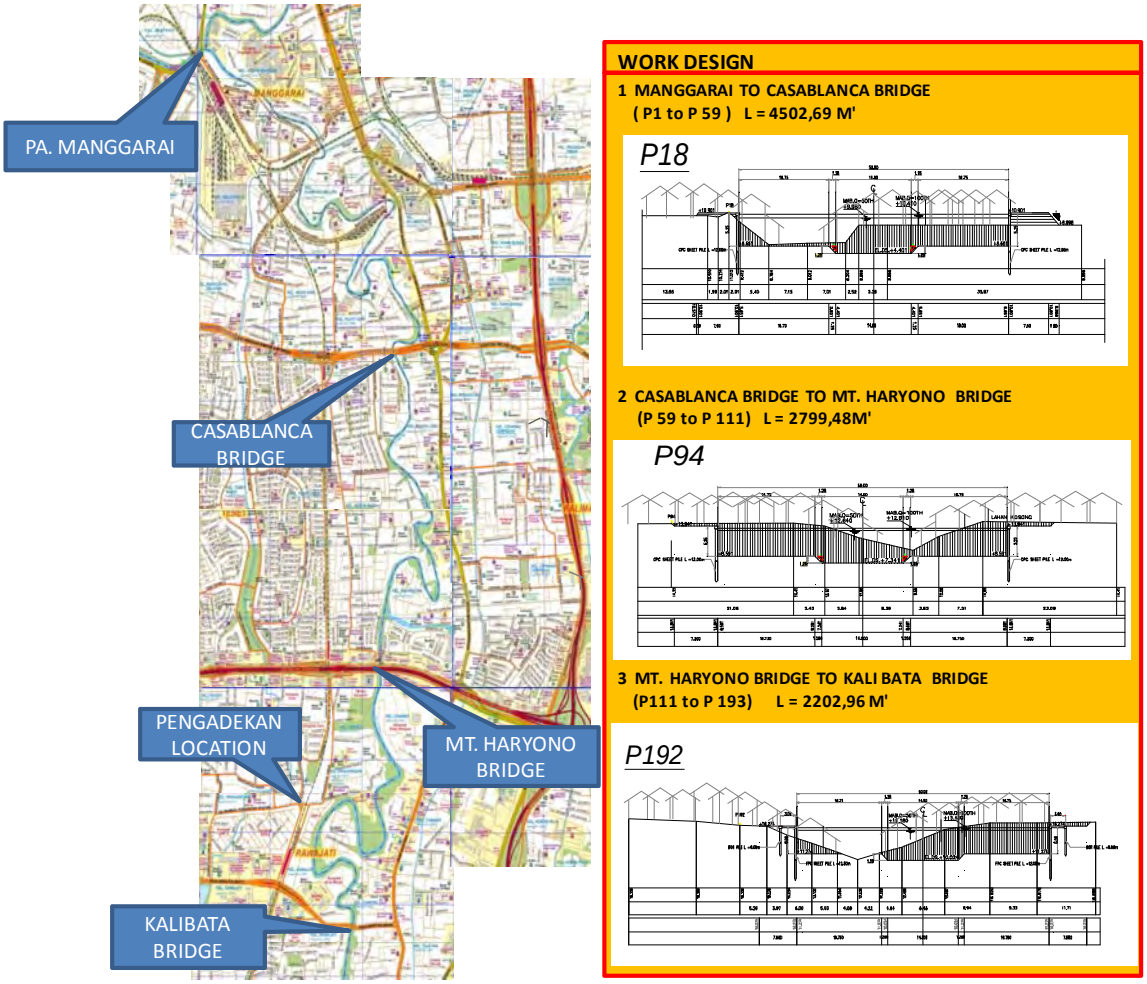
A6(1) Reconstruction of East Pump Station at Pluit as FTP 8.1

Among the rivers flowing into JABODETABEK area, the Ciliwung River, which traverses the center of the state capital, often causes flood damages during the rainy season. Flood control is required to protect the business and economic center from flood damages. Currently, the flood discharge from the Ciliwung River has been partially diverted to the WFC through the Manggarai Water Gate. However, flood still occurs in DKI Jakarta.

The project aims to mitigate flood in the central economic and business areas of DKI Jakarta by normalizing the river channel through the widening of river channel, river shortcut, and reconstruction of bridges.

The project is composed of the normalization of the channel of the Ciliwung River stretching from Manggarai Gate to Kalibata Bridge with total length of 9.6 km. The design flood of the section in the Ciliwung River is measured at 557 m^3/s with a return period of 100 years. The design cross-section of the normalization component is shown in Figure 7.6.24.

A6(3) Normalization of the Rivers in JABODETABEK



Source: Balai Besar Wilaya Sungai Ciliwung Cisadane

Figure 7.6.24 Alignment of the Reform Component of the Ciliwung River

3) Options to Stop Land Subsidence

Alternative measures to control land subsidence due to excessive groundwater pumping are:

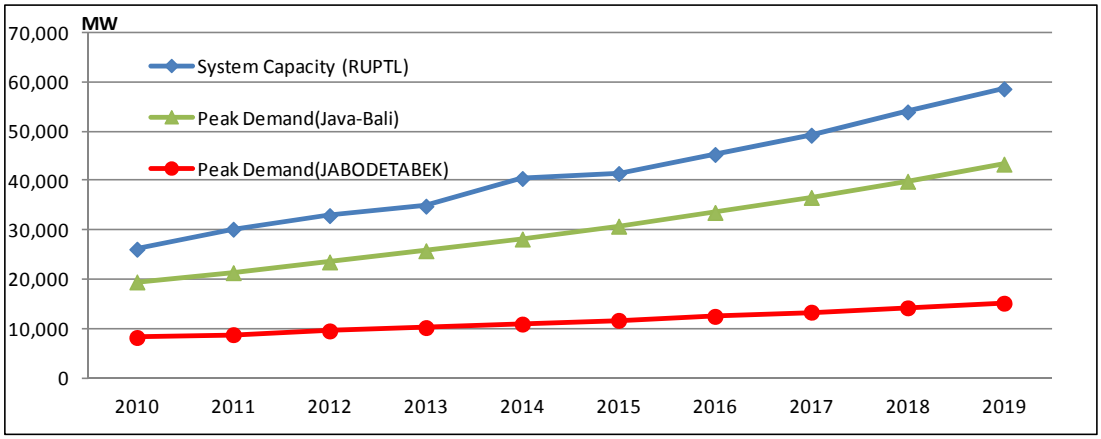
- Emergent rehabilitation of the existing sea wall,
- Gradual reduction and discontinuance of the existing groundwater extraction for the municipal water supply system from 2015 to 2030 (DKI Jakarta Governor Regulation No.37/2009 and Regional Regulation No.17/2010) and switching to the new surface water source,
- Partial transfer of the existing irrigation water rights to the DKI Jakarta municipal water,
- Introduction of water recycling in industries,
- Reduction of water losses, and
- Construction of a new sea dike system.

7.6.5 Electric Power Infrastructure

(1) Power Generation Strategy

1) System Capacity and Peak Demand of Java-Bali System

The peak demand of Java-Bali System is shown in Table 4.9.2. The ongoing and planned generation capacity of Java-Bali System is shown in Table 4.9.6. Although the development of power generation plants has not been progressing as planned due to various reasons, the total figures of peak demand and schedule of new generations were reviewed in PLN RUPTL 2011-2020. As a result, the system capacity of Java-Bali System with new generation plants were incorporated and the peak demand in Java-Bali System showed rational relationship as shown in Figure 7.6.26. Figure 7.6.25 also shows the relationship of the peak demand of JABODETABEK area with Java-Bali System's capacity and demand.



Source: PLN RUPTL 2011-2020 and JICA Study Team

Figure 7.6.25 System Capacity and Peak Demand in Java-Bali System

The Target Effect Indicator for Power Supply for JABODETABEK area is shown in Table 7.6.31 on the basis of Figure 4.9.3 and Figure 4.9.4. In addition to secure reserve margin, power supply capacity for JABODETABEK area will be enhanced with growth of Java-Bali Power System capacity from 6,130 MW (2011) to 16,219 MW (2020).

Table 7.6.31 Target Effect Indicator for Power Supply for JABODETABEK area

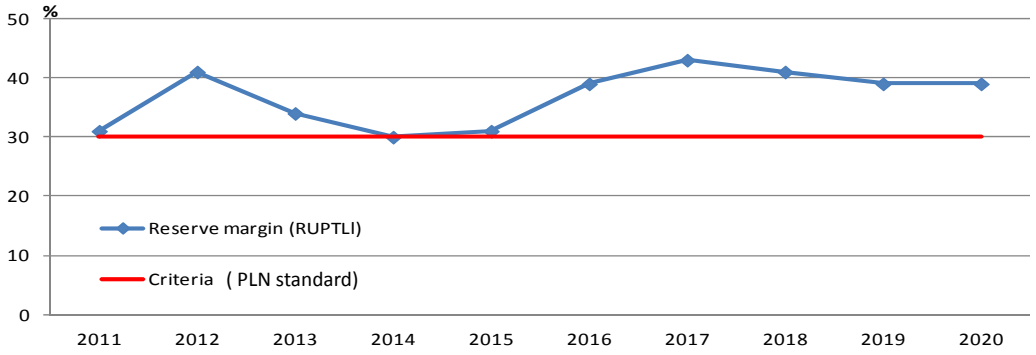
SECTOR	TARGET EFFECT INDICATOR (Narrative)	TARGET EFFECT INDICATOR (Quantitative)		DESCRIPTION
		2010(Base)	2020(Target)	
Electric Power Infrastructure	Secure reserve margin for peak demand	**More than 30%**	**More than 30%**	Secure 30% of reserve margin (Peak Demand/ System Capacity) in Java-Bali System.

Source: MPA Study Team

To meet the constantly growing power demand in Java-Bali System, the electric power supply shall also be increased with a sufficient reserve margin for generation capacity. PLN uses the loss of load probability (LOLP) criteria in power generation development planning. In order to achieve the target of LOLP < 0.274 (i.e., one day loss per year), PLN calculated the reserve margin of the system to be around 35% (at least 30%) according to PLN RUPTL 2011-2020.

On the basis of the data in Figure 7.6.26, the reserve margin of the Java-Bali System is shown in Figure 7.6.26. Although the system reserve margins computed for 2013, 2014 and 2015 show values less than 35%, the results still exceed 30%.

The above figures did not include the increase of system capacity (3,000 MW) of Sumatra-Java HVDC interconnection scheduled to commence in 2016, which is expected to contribute to the improvement of power supply conditions in Java-Bali System.

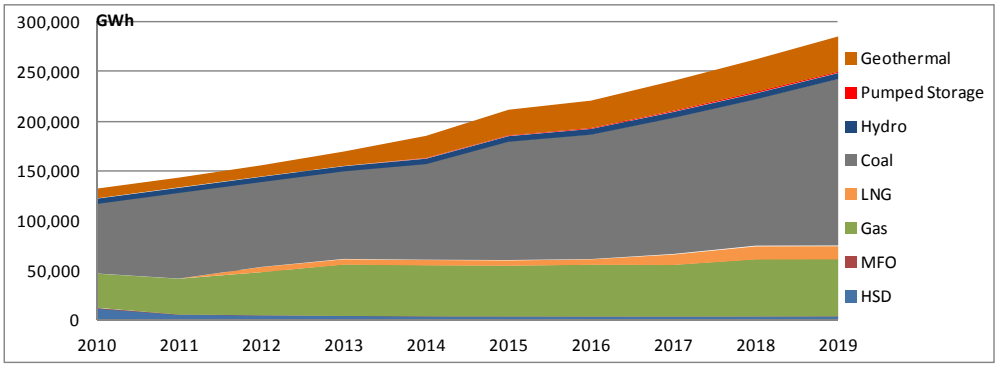


Source: PLN RUPTL 2011-2020 and JICA Study Team

Figure 7.6.26 Reserve Margin of Java-Bali System

2) Primary Energy Mix Strategy

The GOI and PLN plan to develop power generation plants through the use of various energy sources, (i.e. Coal, Fuel Oil, Natural Gas, Hydro power, Geothermal energy etc.) as shown in Figure 7.6.27.



Source: PLN RUPTL 2011-2020

Figure 7.6.27 Composition of Power Production by Type of Fuel, Java-Bali System (GWh)

The energy policy of GOI is to decrease the ratio of fuel oil and increase the ratio of renewable energies like geothermal energy or clean energies which emit less greenhouse gases (GHGs) like natural gas. The target ratio of primary energy to be used for electric power generation in 2020 is shown in Table 7.6.32. Results showed that coal-based power plants will increase, exceeding more than half of the total primary energy to meet the rapidly growing electric power demand.

Table 7.6.32 The Target of Primary Energy Ratio for Power Generation (Electricity base:%)

Year	Oil (BBM)	Coal (Batubara)	Natural Gas	Hydro	Geothermal
2011	21.6	50.2	17.3	6.0	4.9
2020	0.8	64.2	16.8	5.8	12.4

Source: PLN RUPTL 2011-2020

The primary energy mix shall be decided based on the following economical, technological and environmental aspects:

a) High oil prices, vulnerability to international oil market price fluctuations

PLN and other electricity producers plan to drastically decrease the ratio of` fuel oil in the long-term due to high market prices. But the use of Natural Gas (NG) as an oil substitute cannot be sufficiently secured due to the decrease in available volume of NG and delay of supply by NG distributor. The natural gas reserve in Indonesia is quite large, but the natural gas supply for power generation is constrained by the presence of long-term contracts with overseas buyers and competition from industrial users of gas such as the fertilizer industry and other petrochemical industries.

One of the measures to overcome the shortage of NG is mainly through the Gas-fired Combined Cycle Power Plants in JABODETABEK MPA is under the operation of the Floating Storage of Regasification Unit (FSRU), which is scheduled to start in early 2012 in Jakarta Bay.

b) Clean Coal Technology (CCT)

The proportion of coal-fired plants is high due to the availability of abundant volume of coal mined in Indonesia and the staggered development of power plants using other sources of fuel/energy. Low quality (calorie) coal is used for domestic power generation, while higher quality coal is used for export.

The recent trend of PLTU Coal-fired Power Plant is the Ultra-Super Critical (USC) Pressure Steam technology which achieves 7% or 8% higher thermal efficiency with low quality coal firing than Conventional Steam Pressure Plant as shown in Table 7.6.33.

This CCT contributes to global sustainability by reducing the emission of Green House Gas (GHG). The first large scale coal-fired IPP base power plants utilizing USC technology were contracted with PLN by a Japanese Consortium in 2011.

Table 7.6.33 Comparison of Conventional-type and USC-type Coal fired Power Plant

Type	Conventional (Sub-Critical) Pressure Steam	USC (Ultra Super Critical) Steam Pressure
Temperature (°C)	450 - 566	530 - 620
Pressure (bar)	Less than 160	Around 250
Efficiency (%)	38 - 40	45 - 48
Carbon emission		4% lower than SC

Source: MPA Study Team

D1 (1) Development of Central Java Coal-fired Power Plant as FTP 9.6

D1 (2) Construction of Indramayu Coal-fired Power Plant as FTP 9.2

D1 (3) Development of Banten Coal-fired Power Plant as FTP 9.3

D1 (4) Development of Gas-fired Power Plant and FSRU (Floating Storage Regasification Unit) as FTP 9.4

D1 (8) Development of West Java Coal-fired Power Plant with Clean Coal Technology

3) Geothermal Power Plants

Indonesia has the highest geothermal potential in the world. The potential was estimated to be more than 27,000 MW for electric power generation. GOI targeted to develop a 9,500 MW geothermal power plant in 2025: however, only 1,189 MW was installed as of 2010 according to Handbook of energy and economic statistic of Indonesia 2010 by the Ministry of Energy and Mineral Resources (MEMR).

Fast Track Program Stage 2 (FTP2) includes 21 geothermal power plants under IPP scheme as shown in Table 7.6.34. Geothermal generation has the largest share at 57.5%, all by IPP scheme.

Table 7.6.34 Overall Capacity Planned under Fast Track Project Stage 2 to be Developed in Java-Bali by PLN and IPP Scheme

	Coal (Batubara)	Natural Gas	Hydro	Geothermal	Total
	PLTU	PLTGU	PLTA	PLTP	
PLN	1,000				1,000
IPP	400		47	1,955	2,402
Total	1,400 (41.1%)		47 (1.4%)	1,955 (57.5%)	3,402 (100%)

Source: RUPTL 2011-2020

PLN aims to accelerate the development of power plants by itself and through cooperation with IPPs from whom PLN will purchase electric power.

Various presidential and ministerial regulations were issued and these regulations stipulate that:

a) The capacity and location of the power plants will be regulated by MEMR;

b) The government shall guarantee the business feasibility of PLN in accordance with the laws and provisions to be regulated by the Ministry of Finance (MOF); and

c) Power plants will benefit from MOF regulated import duty exemptions and other facilities.

Private sector involvement would typically involve a joint operating contract with PT. Pertamina Geothermal Energy (PGE) in exploitation of geothermal resources and in energy sales contract with PLN.

A long standing issue for private investment in geothermal power projects in Indonesia has been the high capital cost of producing geothermal power combined with the low tariff paid by PLN.

Although geothermal generation has relatively low operating costs, the costs of servicing interest and principal repayments for the debt become a major expense.

D1 (7) Other Renewable and Low-Carbon Emission Power Projects connecting to Java-Bali-Sumatra Power Network

(2) Renewable Energy Strategy

The potential of biomass was reported 49,810 MW, wind power also to be 9,290 MW and other alternative energies such as micro hydro, solar, and marine are also available according to RUPTL 2011-2020. The volume of potential and current utilization of renewable energy in Indonesia can be seen in Table 7.6.35 by RUPTL 2011-2020. The constraints encountered in developing geothermal power plants and hydropower were the difficulty in obtaining investment funding and the fact that a large number of potential geothermal power plants and hydropower plants are located in protected forests and even conservation forests.

Table 7.6.35 Potential and Current Utilization of Renewable Energy in Indonesia

Type of Energy	Unit	Potential	Developed	Developed Ratio %
Micro Hydro	MWe	500	86.1	17.22
Biomass	MWe	49,810	445.0	0.89
Solar Power	kWh/m^2/day	4.80	12.1	-
Wind Power	MWe	9,290	1.1	0.01
Marine Power	GWe	240	1.1	0.01

Source: PLN RUPTL 2011-2020

D1 (5) Development of Rajamandala Hydroelectric Power Plant as FTP 9.5

(3) Transmission and Distribution System Development Strategy

Table 7.6.36 shows the length of transmission lines in Java-Bali Systems which transmit electricity from power generation plants to the distribution substations. These include the second 500 kV northern route transmission line to meet the capacity necessary for transmitting electric power from the large scale coal-fired power plants located in Tanjung Jati, Batang, Cirebon and Indramayu etc. to the substations in JABODETABEK MPA.

The construction schedule of the 500 kV transmission lines with necessary substations shall meet the commencement schedule of commercial operation of these power plants. PLN plans to construct the second 500 kV northern transmission line, which divided into four sections based on the PLN RUPTL2011-2020, in accordance with the commencement of commercial operation of each, as follows:

1) Inside DKI Jakarta System, the construction is currently in progress for the short and medium terms. As for the long term, PLN plans to build a 500 kV ring inside DKI Jakarta finally in 2018.
2) Tanjung Jati-Ungaran(Central Java) in 2013.
3) Ungaran-Mandirancan-Indramayu: Ungaran-Mandiracan in 2016 and Mandiracan-Indramayu in 2017
4) Indramayu- Jakarta (Cibatu) in 2017

The preparatory study for Section 3) and 4) were prepared by JICA

The 500 kV DC transmission line interconnects South Sumatra and Java, including the submarine cable passing through the Sunda Strait.

PLN applied the criteria N-1 (one line among N number of lines is stand-by) for transmission lines higher than 20 kV.

Table 7.6.36 Planned Length of Transmission Lines in Java-Bali 2011-2020 (Unit: km)

Line Voltage	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
500 kV AC	82	172	374	12	459	738	538	20	40	40	2,496
500 kV DC						300					300
150 kV AC	1,509	1,950	657	1,562	1,593	490	174	342	210	106	8,593
75 kV AC		110		100							210
Total	1,591	2,232	1,031	1,674	2,052	1,528	712	362	250	146	11,578

Source: PLN RUPTL 2011-2020

Table 7.6.37 shows the planned capacity of the transformers and substations in the Java-Bali System to meet the increasing demand and supply of electric power. PLN plans a

70% loading rate in substations with two transformers and 60% in substations with three transformers.

Table 7.6.37 Planned Capacity of Transformers and Substations in Java-Bali 2011-2020 (Unit: MVA)

Transformer	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
500/150 kV	8,660	1,830	5,000	2,000	4,000	5,500	3,500	500	1,500	1,000	33,490
150/70 kV											
150/20 kV	7,916	7,710	1,560	3,900	2,850	3,990	2,970	3,630	3,300	3,510	41,336
70/20 kV	440	120	80	60		30	30	90	180	60	1,090
Total	17,016	9,660	6,640	5,960	6,850	9,520	6,500	4,220	4,980	4,570	75,916

Source: PLN RUPTL 2011-2020

The 500 kV lines in JABODETABEK MPA, as mentioned in Section 4.9.4, show the critical phenomenon of Distribution System Voltage Drop. To remedy this voltage drop, various countermeasures will be considered including the enhancement of 500 kV transmission lines, compensation of reactive power and correction of power flow balance between northern and southern lines etc.

D1 (6) Construction of Java-Sumatra Interconnection Transmission Line as FTP 9.1

D2 (2) Improvement of JABODETABEK Power Supply Quality

(4) Demand Side Management (DSM) Strategy

As mentioned in 4.9.6, the importance of DSM with an increasing awareness of energy conservation in this country shuld can never be ignored. A nationallevel promotional campaign is essentially needed to save the development of new power generating plants. Several international institutions are assisting in energy conservation like:

1) JICA executed a promotional survey of energy conservation in 2007-2009 and proposed the three approaches of “Energy Management Advisory System”, “Labelling System for Electrical Appliances” and “Demand Side Management”

2) Asian Development Bank(ADB) also encourages the following points to be considered in the Road Map for Java-Bali Electricity Distribution Performance Improvement Project :

   a) Promote efficient lighting in all areas -use of Compact Fluorescent Lamps (CFLs) for all residential customer;

   b) Develop appliances and equipment labeling and minimum energy performance standards ;

   c) Make buildings more energy efficient for better lighting and heat management ;

d) Make power generation and distribution improve energy transformation losses ;

e) Facilitate financing of energy efficiency investment - funding and other financial package for small and medium-sized enterprises, etc.; and

f) Raise energy efficiency awareness by product labelling to customers and education and training plan for energy managers in industries.

(5) Risk Management

PT. PLN formed a Risk Management Division which is responsible for monitoring and evaluating risk management, recommending necessary risk mitigation measures, and reporting periodically to the Board of Directors. It is crucial to manage and mitigate the various risks to the lowest acceptable residual level.

PLN RUPTL 2011-2020 identifies the following risks:

1) Risk in Power Development

a) Delay in PLN project - license approval, development funding, construction, cost over-run, mistake in design, safety, performance, social and environment;

b) Delay in IPP including geothermal power plant similar to PLN projects; and

c) Risk in power demand - error in demand forecast (including economic growth).

2) Financial Risk- Risk in liquidity including cash flow, subsidy reception, fund liquidation, investment loans, and liquid assets.

3) Operational Risk:

a) Production and operational risk like shortage/ scarcity of primary energy, smoothness of equipment operation, damage to equipment / facilities operations, leakage of confidential corporate information, and human error;

b) Risk of disaster either natural or man-made (like sabotage);

c) Risk of environment like demand of the community in power transmission due to health influence, waste, and noise pollution;

d) Risk of regulation, law, tariff, subsidy certainty, and change order;

These risks will be evaluated according to the level of risk, which is the product of probability of occurence and the magnitude of its influence. Then the appropriate mitigation activities will be taken.

7.7 RISKS AND CONSIDERATIONS

7.7.1. Financial Aspects

Chapter 8 of this report indicates that many MPA Projects (Potential Priority and Fast Track Projects) will be financed by private entities. In fact, GOI has serious budgetary constraints and could not be able to finance all MPA Projects. In order to fulfill the gap between necessary investment amount and the government's affordable fund, effectively, mobilization of private funds is indispensable. For that purpose, it is important that GOI secure sound investment environment and properly address the risks which private entities cannot manage by their own efforts.

Based on this recognition, this section tries to assess the appropriateness of the current investment regulatory framework, identify significant projects risks, and figure out the measures to encounter these risks. At the end of this section, necessary actions by the GOI, in terms of private investment mobilizations are summarized.

(1) Regulatory Framework

The Study Team recognizes that GOI has already established basic legal and regulatory frameworks for private investment. Especially, it is well-known that GOI has been elaborating to build a framework to accelerate PPP projects. The following are key the key laws and regulations regarding infrastructure investment projects:

- Law No. 25 of 2007 on Capital Investment
  This law stipulates the basic framework for the private investment in infrastructure.
- Presidential Regulation No.67/2005 concerning the cooperation between the Government and Business Entities in the Provision of Infrastructure
  This regulation stipulates the basic framework for PPP projects to be procured by line Ministries, State-Owned Enterprises, and Local Governments.
- Presidential Regulation No.13/2010 on amendment to Presidential Regulation No.67/2005 concerning the cooperation between the Government and the Business Entities in the provision of infrastructure
  This regulation is the first amendment to the Presidential Regulation No.67/2005
- Presidential Regulation No. 56/2011 concerning second amendment to Presidential Regulation No.67/2005 concerning the cooperation between the Government and the Business Entities in the provision of infrastructure
  This regulation is the second amendment to the Presidential Regulation No.67/2005
- Regulation of the Head of BAPPENAS No.4/2010 concerning general guide to the implementation of cooperation with the Government in the provision of infrastructure business entity

This regulation stipulates basic procedures for PPP projects procurement by the public contracting agencies.

- Presidential Regulation No. 78/2010 on infrastructure guarantee under PPP schemes provided by the Infrastructure Guarantee Company

  This regulation stipulates the basis of Indonesia Infrastructure Guarantee Funds (IIGF), which provides project guarantees against contracting authorities' defaults.

These law and regulations have already been implemented and in that sense, the basic investment frameworks are present. However, in spite of these efforts, the number of PPP projects has not been dramatically improved. The Study Team has conducted interview with key government officers and private investors regarding the causes and backgrounds, and identified that the following institutional issues need to be properly addressed in order to further accelerate PPP projects:

1) Land Acquisition

Land acquisition process is often delayed and undermines the smooth implementation of projects. Although the amendment of Law on Land Acquisition was approved in the Parliament in 2011, it has not been enacted as of June 2012. Also, if the contents of the law is examined, it dose not necessarily accelerate the project because the new law stipulated more complicated court procedures. The Presidential Regulation on PPP mentions that the project process shall start after the implementation of land acquisition. However, it does not directly deal on how to speed up the land acquisition process. Without drastically change on the law and the procedures, it is anticipated that investors cannot take an active positive participation in infrastructure investments.

2) Viability Gap Funding

The current financial laws do not allow the government to provide cash grant or subsidy (this is often called as "Viability Gap Funding" or "VGF" to private entities. It is common in foreign countries, that government provides VGF to private entities to secure financial viability of projects. Since this is not allowed in Indonesia, GOI has to take an approach to provide "physical supports", this means that some parts of the project facilities will be constructed by the government. However, this makes the project more complicated and increases the risk of quality and schedule control. It also makes the risk sharing between the public and private sectors ambiguous. It is desirable that GOI will revise the existing laws to allow provision of VGF to private entities.

3) Budgeting for PPP-specific Feasibility Study by contracting agencies

In order to create sufficient interests and boost the confidence of investors to invest in projects, it is important that a project is well-planned and thoroughly studied. It means the contracting agencies, such as line ministries and local governments need to conduct a detailed feasibility study (F/S) which is specific PPP. It will be the basis for investors to consider whether they will participate in the project or not. However, it is often the case that sufficient studies are not conducted due to lack of budget. Therefore, it is important to establish a system and procedure to provide budget for PPP-specific F/S to be conducted by contracting agencies. Procedures of existing PDF (Project Development Facilities) shall also be reviewed if necessary.

In addition to the above items, it is also necessary to create laws and regulations distinctive to the existing laws while the deregulation of existing laws, such as conditions/requirements of urban development, asset ownership, infrastructure investments, and tax duties, is desired. For example, in a new law or regulation on urban development and new administrative area, it is desirable to develop a legal framework which provides a basis of development and secures the rights and benefits of investors. It might also be necessary to build a system which provides incentives to investors (e.g. Corporate Tax, Custom Duty, and Asset Tax). In order to achieve smooth and rational developments, deregulations are also necessary regarding conditions/requirements of urban development, asset ownership, infrastructure investments, and tax duties.

(2) Major Risks and Countermeasures

There are various risks associated with a project. Some risks are common in many projects while other risks are specific to a project. However, in either case, it is necessary that appropriate risk sharing between the public and private sector shall be made and the risks which should be borne by the public are appropriately addressed.

The Study Team has identified major risks which can give significant impact to the project and where private investors have no control. The characteristics of the risks and countermeasures are summarized as follows:

1) Inter-Ministerial Coordination Risk

There are many ministries related with MPA projects. Although meetings of steering committee and technical committee were held several times, there is a possibility that the results of the discussion in the meeting were not properly reflected in the plans of each ministry and local governments. For example, all Fast Track Projects and Priority Project, which require public commitment, should be properly addressed in the

ministries' development plan. In fact, some of the projects were not mentioned in the ministries development plan at all. Also, if the projects are to be implemented by PPP, it should be listed in the PPP Book developed by BAPPENAS. Without this kind of inter-ministerial coordination, a project might not be successfully realized. It is expected that Coordinating Ministry of Economic Affairs (CMEA) takes leadership in this role and conducts appropriate coordination among ministries concerned.

2) Demand Risk

The risk sharing on project demand differs in every case. For power plant projects, where off-take contracts are closed, the risks are shouldered by the government. On the other hand, in many transportation projects, such as toll road projects, the risks are on the private sides. However, in either case, detailed demand risk assessment should be conducted by the government during the study stage. For example, even in transportation projects, it is necessary that contracting agencies collect basic data, such as O-D data and current traffic volume, to be able to make an estimation of the project demand. This study should also be shared to private entities as a basis to conduct their own project demand projection. It seems that this detailed demand analysis is not being done by the contracting agencies which make it a hindrance for private entities to make an investment decision. To avoid this situation, it is necessary to allocate budget for the detailed demand forecast study and provide the result to potential investors.

3) Construction Delay Risk (Land Acquisition and Permits)

As mentioned above, delay of land acquisition often hinders smooth implementation of projects. Also, it was pointed out that issuance of permits by related agencies, (e.g., Ministry of Forestry) is often delayed. Delay of construction gives serious impact to the project since it will require review of the financial plan, including borrowing arrangements with financial institution. In terms of land acquisition, it is definitely necessary to amend the existing laws and regulations to allow contracting agencies to speed up the process. Also, it is important to establish an incentive system for local governments, which actually conduct negotiation with land owners and residents on project sites. In terms of permits, closer coordination with related ministries shall be taken during the study and procurement (bidding) stages. It seems that the communication and coordination between contracting agencies and permission-issuing agencies are not considered well in these stages. Thus, it is necessary to review the permit procedure and also to establish a process which enables proper communication and coordination between contracting agencies and permission-issuing agencies during the planning and procurement stages.

4) Inter-Project Schedule Coordination Risks

Many MPA projects are related with other in terms of functions and schedules. For example, construction of access road is required for new seaport and airport. Also, many MPA projects are related with "Non-MPA" project. The typical example is the improvement of road networks. Some projects are under the control of a single ministry but many projects are under the control of several ministries. In order to successfully implement these inter-related projects, proper coordination and synchronization shall be taken among related projects. Without appropriate coordination, there is a possibility that the project can not realize its expected functions, due to delay of related projects. It will surely give a serious negative impact on the financial plan of the investors. Therefore, it is desirable that a "Stakeholders Committee", where all stakeholders gather, discuss, and make necessary arrangements, be organized in key projects.

5) Contracting Agency's Default Risk

There are possibilities that contracting agencies cannot fulfill their obligations which are stipulated in their agreements with the private entities. These may include, securing land, getting/issuing permits, constructing some project facilities, and providing services and other benefits. If default happens, appropriate measures toward private investors shall be taken. At present, Indonesia Infrastructure Guarantee Fund (IIGF) provides a guarantee in cases of government default. It is expected that application of IIGF's facilities will be expanded to various projects. However, it is also true that coverage of IIGF's guarantee facility is limited and not all of projects adopt IIGF's facility. In order to improve this guarantee function, firstly, it is necessary to strengthen IIGF in terms of its coverage area and human resources. At the same time, capacity development of public officers applying for IIGF is necessary, since necessary conditions and requirements need to be fulfilled to acquire the guarantee. On the other hand, it is also necessary to consider measures to secure the implementation of contract other than by IIGF, since its application is still limited.

There are many other risks which should be borne and properly addressed by the government. However, the risks mentioned above are typical and the most important risks for which GOI must take immediate actions. It is reported that as of April 2012, KP3EI (Komite Percepatan dan Perluasan Pembangunan Ekonomi Indonesia) is holding a series of meetings regarding "debottlenecking" of infrastructure projects. It is important to monitor the progress of discussion, understand the concrete measures and actions for debottlenecking, and gives feedback from MPA side if necessary.

(3) Actions Required for GOI

The following are the summary of discussion in this section regarding the actions required for GOI in terms of risk mitigation and acceleration of investment for MPA projects;

- Laws and regulations regarding land acquisition shall be reviewed and amended to speed up the land acquisition process.
- A government facility which provides VGF (direct grants to private entities) shall be established.
- Procedures for PPP F/S shall be formalized and access to budget for line Ministries and Local Governments to conduct PPP F/S shall be secured. The detailed demand forecast study shall be included in PPP F/S.
- Appropriate Inter-Ministerial coordination shall be taken through the initiative of CMEA.
- It is necessary to review the permit procedure and also to establish a process which enables proper communication and coordination between contracting agencies and permission-issuing agencies during the planning and procurement stages.
- "Stakeholders Committee", where all stakeholders gather, discuss and make necessary arrangements, shall be organized for key projects.
- Measures to secure implementation of contract obligation by contracting agencies shall be strengthened, including expansion of IIGF's functions.

7.7.2 Social and National Environmental Aspects

Law No. 32/2009 on Environmental Protection and Management enacted in October 2009 is the revised version of Law No. 23/1997 concerning Environmental Management enacted in 1997.

This revised law stipulates that environmentally sustainable growth be pursued through compilation of an environmental plan and through reinforced reasonable use, development, maintenance, recovery, monitoring, and management of the environment. And it is characterized by a strong advocacy on transparency, wider participation, accountability, and fairness in environmental protection and management.

Further, the revised law provides that environmental assessment (AMDAL) be implemented for any business project or activity potentially having material impact on the environment. It also requires the implementation of an environmental management initiative (Upaya Pengelolaan Lingkungan/UKL） and an environmental monitoring initiative (Upaya Pemantauan Lingkungan /UPL) for any business project or activity potentially having little impact on the environment.

The following Table 7.7.1 shows the laws and regulations relevant to AMDAL.

Table 7.7.1 Laws, Regulations and Decrees regarding AMDAL

Category	No.	Outline
Law	No.32/2009	Environmental protection and management (Amendment to No.23/1997)
Government Regulation	No.27/1999	Process for the conduct of AMDAL (Amendment to No.51/1993)
State Minister of Environment Decree	No.11/2006	List of specific business/activities that require an AMDAL (Amendment to No.17/2001)
	No.08/2006	Guidelines for AMDAL preparation
	No.45/2005	Guidelines on the environmental management plan(RKL) and environmental monitoring plan(RPL)
	No.05/2008	AMDAL committee (Amendment to No.40/2000)
	No.2/2000	Guidelines for AMDAL evaluation
	No.13/2010	Guidelines on UPL and UKL (Amendment to No.86/2002)
Environmental Impact Management Agency(BAPEDAL) Decree	No.299/11/1996	Technical guidelines on social assessment in AMDAL
	No.124/1997	Guidelines on public health assessment in AMDAL
	No.08/2000	Public involvement and information transparency in AMDAL
Governor of DKI Jakarta Decree	No.2863/2001	Classification of business and/or activity requiring an environmental impact assessment in DKI Jakarta Province
	No.99/2002	Mechanism for implementing analysis on AMDAL and UPL

Source: Formulated by MPA Study Team based on various materials

The AMDAL documentation consists of five documents, namely: ANDAL Terms of Reference (KA), Environmental Impact Assessment (ANDAL), Environmental Management Plan (RKL), Environmental Monitoring Plan (RPL), and the Executive Summary (Table 7.7.2).

Table 7.7.2 Required Documents for AMDAL

Document	Content
ANDAL Terms of Reference (KA)	Framework for the implementation of the study. The description of KA includes background of proposed project, purpose and significance of the study to be implemented, scope of the study, methodology of the study, budget and schedule of the study, reference, profile of the study team, and related attached materials.
Environmental Impact Assessment (ANDAL)	Detailed information regarding the background and legal evidence of the proposed project, purpose and significance of the proposed project and study, methodology of the study as to geography, chemistry, biology, social economy, social culture, and public health, baseline of the environment, prediction of significant impact on environment, and assessment on the significance of impact, etc. Reference and related attached materials are also included in ANDAL. In the event that volume of the attached material is too large, to set separate volume is available.
Environmental Management Plan (RKL)	Outline of the methodology, place and period regarding countermeasure and management of the significant impact to the environment recognized and assessed by ANDAL.
Environmental Monitoring Plan (RPL)	Outline of content, place and frequency for the monitoring targeted for the evaluation of effectiveness of management plan described by RKL.
Executive Summary	Overview of significant impact on environment predicted and evaluated by ANDAL and management and monitoring plan shown in RKL and RPL.

Source: Formulated by MPA Study Team based on Head of BAPEDAL Decree No.9/2000

The types and sizes of business projects that require the implementation of AMDAL based on State Minister of Environment Decree No.11/2006 are enumerated below.

A. Activities Likely to have Impacts on the Environment

Shown in Table 7.7.3 are the types and sizes of business projects that require the

implementation of AMDAL listed in accordance with the classification of the Attached Materials I of the State Minister of Environment Decree No.11/2006. The list shall be revised once every five years (Article 8).

Table 7.7.3 Type of Business and/or Activity Requiring AMDAL

	Type of Business and/or Activity
a.	Defence Sector
b.	Agriculture Sector
c.	Fisheries Sector
d.	Forestry Sector
e.	Transportation Sector
f.	Satellite Technology Sector
g.	Industrial Sector
h.	Public Works Sector
i.	Energy and Mineral Resources Sector
j.	Tourism Sector
K,	Nuclear Development Sector
l.	Hazardous Waste Management Sector
m.	Generic Engineering Sector

Source: Formulated by MPA Study Team based on the State Minister of Environment Decree No.11/2006 Attached Materials I

It is with the provision that in case the project met the conditions listed below, it shall be excluded from the list (Article 7).

a. When it is proven that the impacts on the environment from such activities can be dealt with according to the scientific and technical assessment; and
b. When no impact on the environment is expected from the actual activities.

B. When the activities, though not falling under A. above, are to be carried out in sites adjacent to any areas as shown in Table 7.7.4 .

Table 7.7.4 List of Protection Areas

	Protection Areas
a.	Protection forest area
b.	Peat area
c.	Aquifer area
d.	Coastline
e.	River bank
f.	Area around lake/dam
g.	Area around spring water
h.	Nature reserve area(comprising of natural reserve, wildlife reserve, recreation forest, germplasm protection area and wildlife evacuation area)
i.	Marine nature reserve and other water area
j.	Mangrove forest in coastal area
k.	National Park
l.	Grand Forest Park
m.	Nature Recreational Park

Source: Formulated by MPA Study Team based on State Minister of Environment Decree No.11/2006 Attached materials II

C. These are cases where the project activities, though they are smaller in scale than those falling under A above, are considered to have large impact on the natural environment in light of the nature and scale of the project and the natural environment surrounding the project site and where the Governor of the Prefecture, the mayor of the city concerned or the Governor of the Special Province of Jakarta considers that AMDAL is necessary.

D. These are cases where the project activities, though not falling under none of A. above, but included in STEP 1-5 screening process stipulated in Attached Materials III of State Minister of Environment Decree No.11/2006, have received from other concerned Ministries demand for the implementation of AMDAL and the State Minister of Environment has also considered that such implementation of AMDAL is necessary.

Table 7.7.5 Screening Criteria of Type of Business and/or Activity

Category	Items to be Implemented	Remarks
STEP 1	Screening on the project site	
STEP 2	Screening on the project activities	In the event that the response is "YES, it is likely that the preparation of AMDAL is required.
STEP 3	As regards "Yes" items in STEP1 and STEP 2, the assessment of whether or not there may be major impacts on the natural environment shall be made in the light of the following points; a. The number of people to be impacted b. The area to be impacted c. The length of period where the natural environment is to be impacted and the intensity of such impacts d. Other environmental factors to be impacted e. Cumulative impacts f. Reversibility and irreversibility	
STEP 4	Investigation on whether or not similar project activities have caused the following phenomenon during the past decade shall be carried out; a. There have always been similar adverse impacts. b. There are no technology and means available by which the adverse impacts likely to be caused by the project activities can be alleviated.	
STEP 5	In the event that it falls under STEP 4, AMDAL becomes necessary.	

Source: Formulated by MPA Study Team based on State Minister of Environment Decree No.11/2006 Attached Materials III

The land in Indonesia has been administered based on the Basic Law of Land (Law No.5/1960 concerning Basic Agrarian Law) enacted in 1960 by the central government. In January 2012, Law No.2/2012 on Land Acquisition for Development for Public Interest was enacted. This law was re-promulgated as Revised Presidential Decree No.65/2006 Land Procurement for the Implementation of the Development for Public Interest that regulates the land acquisition in the development project for public purpose, which has much more compelling force. The following

Table 7.7.6 shows the laws related to land acquisition in Indonesia.

Table 7.7.6 Laws and Regulations regarding Land Acquisition

Category	No.	Outline
Laws	No.5/1960	Basic agrarian law
	No.51/1960	Prohibition to use land without permission from the rightful party or the proxy
	No.20/1961	Revocation of land rights and the objects thereon
	No.26/2007	Concerning spatial management (Amendment to Law No.24/1992)
	No.2/2012	Land acquisition for development for public interest
Government Regulations	No.24/1997	Land registration
	No.10/2011	Procedure for foreign loan procurement and grant acceptance (Amendment to Government Regulation No.2/2006)
State Minister of Agrarian Affairs Decree	No.5/1999	Guidelines to resolve problems of customary rights of common property (ULAYAT RIGHTS) of customary law community (ADAT-LAW COMMUNITY)
Head of National Land Agency Decree	No.3/2007	Guidelines for land acquisition for public interest

Source: Formulated by MPA Study Team based on various materials

The applicable projects regulated in Law No.2/2012 on Land Acquisition for Development for Public Interest are classified into 18 types as follows:

Table 7.7.7 List of Development for Public Interest

	Development for Public Interest
a.	National Defence and Security
b.	Public Road, Toll Road, Tunnel, Railroad, Railway station and Railway operation facilities
c.	Reservoir, Dam, Weir, Irrigation, Drinking water channel, Water drainage and Sanitation, and other water infrastructures
d.	Seaport, Airport and bus terminal
e.	Oil, Gas and Geothermal infrastructures
f.	Electric generator, Transmission, Relay station, Network and distribution
g.	Government's telecommunication and informatics network
h.	Place for waste disposal and treatment
i.	Government/Regional Government hospital
j.	Public safety facilities
k.	Government/Regional Government public cemetery park
l.	Social facilities, Public facilities and Public green open space
m.	Nature reserves and Cultural reserves
n.	Government/Regional Government/Village offices
o.	Urban slums area structuring and /or land consultation, and Housing for low income society with lease status
p.	Government/Regional Government education infrastructures or Schools
q.	Government/Regional Government sport infrastructures
r.	Public market and public parking area

Source: Formulated by MPA Study Team based on Law No.2/2012 on Land Acquisition for Development for Public Interest

Land acquisition for Public Interest is obligated to be organized by the Central Government. Further, the land is owned by the Central or Regional Government or State Owned Enterprise. Land acquisition is conducted based on Spatial Zoning Plan, National/Regional Development Plan, and Working Plan of every institution requiring land.

The procedures defined in this law are shown in the following description.

A. Planning

The institution requiring land makes a plan concerning the land acquisition for public interest in accordance with the provisions of regulations of law and based on Spatial Zoning Plan, development priorities stated in the Medium Term Development Plan, Strategic Plan, and Government Working Plan of the concerned institution. The plan is then prepared in a document of planning and this document is subsequently submitted to the Provincial Government.

B. Preparation

In this step, the institution requiring land, together with the Provincial Government, announce the development plan to the community and conduct initial data collection. This data is then used for public consultation in order to achieve agreement on the location for development. Request for location determination is proposed to the Governor based on this agreement and the Governor determines the location. If after 60 working days of public consultation there are parties that object to the development location plan, the public consultation is repeated with the objecting parties for 30 working days. If there is still objection, the Governor establishes a team to make inventory and clarification on the issues of objection, and make a recommendation, which is then issued in a letter of acceptance or rejection of objection by the Governor. If the objection is accepted, the Governor notifies the Institution requiring land to propose another location and if the objection is rejected, the Governor determines the development location. If there is objection to this decision, the objecting parties may file claim to the State Administrative Court, which will give decision within 30 working days. If there is still objection, the objecting party may file petition for appeal to the Supreme Court, which will give decision on the continuation or discontinuation of the land acquisition process.

C. Implementation

The institution requiring land proposes land acquisition implementation to land institution based on the determination of the development location.

This step includes:

Inventory and identification of land control, ownership, use, and utilization. Inventory and identification are prepared in order to determine the entitled parties for compensation delivery.

Compensation appraisal. Appraisal is conducted by the appraiser, who is determined by the land institution to appraise the objects of land acquisition.

Discussion for Compensation Delivery. This discussion is conducted in order to achieve an agreement on the form and/or amount of compensation based on the result of the appraisal. In the event agreement is not achieved, the entitled parties may file objection to the local district court and if there is still objection to the decision of the district court, the objecting party may file petition for appeal to the Supreme Court, whose decision is used as the basis for compensation delivery.

Compensation Delivery. The compensation is directly delivered to the entitled parties after release of rights and transfer of evidence of control or ownership to the land institution. If the entitled parties reject the form and/or amount of compensation, the compensation is entrusted to the local district court.

D. Transfer of Result

Land institution transfers the result of land acquisition to the institution requiring land after compensation delivery and release of rights or after compensation is entrusted to the district court. Subsequently, the institution requiring land may start the activities of development. The government will monitor and evaluate the activities of development, while the land institution will monitor and evaluate the result of transfer of land acquisition.

Observation as to whether or not Law No.2/2012 on Land Acquisition for Development for Public Interest is preserved in accordance with the regulation will be required in the future. Within one year from the establishment of the law (January 2012), regulation for implementation shall be proposed.

Necessity of AMDAL and potential of involuntary resettlement related to potential Priority Projects and Fast Track projects are shown in ANNEX-V. Through discussion on the details of the project and coordination with related organizations, applicable procedures related to AMDAL and involuntary resettlement are required to be taken.

CHAPTER 8 POTENTIAL PRIORITY AND FAST TRACK PROJECTS

8.1 PRIORITY PROJECTS AND FAST TRACK PROJECTS

(1) Sector Category

Chapters 1 to 7, showing current conditions and Master Plan of sector development, have addressed infrastructure sectors categorized in Minutes of Discussion for this study (refer to Chapter 1). Sectors for this chapter and the following chapters are categorized based on the positions of the projects in goals and programs of MPA Vision.

(2) Priority Projects

The overall infrastructure development plan of the MPA is formulated in line with its vision, concept and image as described in Chapter 7. The master plan for infrastructure development towards year 2020 is organized into major projects, which are expected to contribute to the establishment of the JABODETABEK MPA. In the study, priority projects for investment by the government and private sectors are nominated among the major projects. The priority projects are defined as those that will materialize before 2020.

(3) Fast Track Projects

The Fast Track Project (FTP) is defined as an urgent project for infrastructure development that would commence its construction work by end of 2013. One of the main objectives of the Study is to facilitate the smooth implementation of FTPs.

8.2 PROGRAMS AGREED IN THE FIRST STEERING COMMITTEE

The potential FTPs for nine sectors endorsed in the First Steering Committee Meeting held on March 17, 2011 are being reviewed based on their consistency and relevance with the overall infrastructure development plan and implementation schedule. The list of potential FTPs is given in Table 8.2.1 , and the features of the potential FTPs are described in Annex IV.

Table 8.2.1 List of Potential Fast-Track Projects (1/2)

SECTOR	POSSIBLE FAST-TRACK PROJECT
1.International Port	1.1 Improvement and expansion of Tanjung Priok Port
	1.2 Development of a new international port
2.Upgrading the Industrial Area to the East of Jakarta	2.1 Smart Community (including a pilot project of the “Smart Grid”)
	2.2 Improvement of road network within the industrial area to the east of Jakarta
3. Mass Transportation Network	3.1 Jakarta Mass Rapid Transit (MRT):S-NI, S-NII, E-W
	3.2 Improvement of the Jabodetabek Commuter Railway System
4. Road Network	4.1 Improvement of road network in Jabodetabek Area
5. Airport and Related Infrastructure	5.1 Construction of access railway to the Soekarno-Hatta International Airport
	5.2 Construction of Soekarno-Hatta International Airport

Table 8.2.2 List of Potential Fast-Track Projects (2/2)

SECTOR	POSSIBLE FAST-TRACK PROJECT
6. Water Supply and Sewage System	6.1 Water supply project to the Jabodetabek Metropolitan Area
7. Waste Management System	7.1 Construction of the West Java Regional Solid Waste Treatment and Final Disposal
8. Flood Management System	8.1 Reconstruction of East Pump Station at Pluit
9. Electric Power /Energy Infrastructure	9.1 Construction of Jawa-Sumatra Interconnection Transmission Line
	9.2 Construction of Indramayu Coal-fired Power Plant
	9.3 Development of Banten Coal-fired Power Plan
	9.4 Development of Gas-fired Power Plant and FSRU (Floating Storage Regasification Unit)
	9.5 Development of Rajamandala Hydroelectric Power Plant
	9.6 Development of Central Java Coal-fired Power Plant *

Remark: Marked with "*" is a newly listed project.
Source: Revised by the 5th technical committee based on the "Joint Press Release on the First Steering Committee of the Metropolitan Priority Areas for Investment and Industry, Annex I, March 17, 2011" and the 5th technical committee.

8.3 PROGRAMS AGREED IN THE SECOND STEERING COMMITTEE

The Study Team has formulated the programs and potential priority projects in line with its vision, concept and image. The 15 programs from (A.1 to D.2) in Table 8.3.1 were agreed upon between the Indonesian and Japanese governments in the Second Steering Committee Meeting held on September 22, 2011. The members of the Steering Committee also expressed their general supports to "the List of Potential Priority Projects", as shown in Table 8.3.2.

However, they mentioned the need for further discussions before they finally approve the list. The Steering Committee instructed the Technical Committee and the Study Team to further elaborate the list. In response to the instruction, the Study Team will scrutinize and elaborate the outline of scope and specifications, project implementation framework with preliminary cost estimate, and implementation schedule for the priority projects in the upcoming works of the Study. The project list shown in Table 8.3.2 was agreed upon in the Fifth Steering Committee Meeting held on April 24, 2012.

As shown in Table 8.3.2 the potential FTPs were included because they are part of the priority projects, which would commence by end of 2013. The features of the potential priority projects are described in Annex III.

Table 8.3.1 List of Programs in line with the MPA Vision and Concept (1/3)

A. BETTER URBAN ENVIRONMENT		
A.1 Development of MRT-based New Urban Transport System	Introduction of urban railway systems, mainly MRT, and improvement of existing commuter railway systems will increase connectivity, improve the quality of life, encourage economic development, and help ease traffic congestion by inducing modal shift from vehicles.	 Urban Flyover with Public Transportation System, Japan Source: http://www.city.fukui.lg.jp/
A.2 Development of Road Network in and around Jakarta	In order to alleviate serious traffic congestion in the city center, urban arterial roads and toll roads should be further developed and constructed. New roads are expected to be equipped with advanced intelligent transportation system (ITS).	 Tokyo Metro Source: Kinki Sharyo
A.3 Promotion of Urban Re-development	The existing city centers need to be redeveloped in order to create harmony between green open spaces and active urban functions such as for business, commercial and residential. The potential development is likely to be a pilot project with land re-adjustment, green area creation and housing.	 Source: Ministry of Land, Infrastructure, Transport and Tourism, Japan
A.4 Improvement of Water Supply and Sewerage Systems	Securing stable water supply and introducing a central sewerage system in the city center area will be essential for the sustainable economic growth of the city as well as improvement of the quality of life in the city.	 Large Scale Water Treatment Plant, Japan Source: http://www.pref.saitama.lg.jp/
A.5 Solid Waste Treatment	Introduction and improvement of solid waste treatment and disposal facilities are significant in creating an eco-friendly city or in pursuing a clean and green city.	 Solid Waste Treatment Plant, Japan Source: MPA Joint Study Team
A.6 Flood Management	Frequent flooding is a serious threat to the metropolitan area. Various measures for flood management, such as improvement of rivers and drainage channels, and construction of retention ponds and pumps for flood control need to be taken.	 Flood in Jakarta Source: MPA Joint Study Team

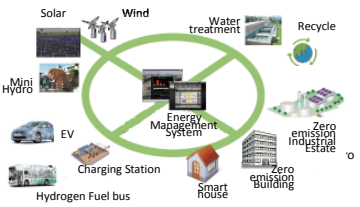
Source: MPA Study Team

Table 8.3.1 List of Programs in line with the MPA Vision and Concept (2/3)

B. New Growth Sub-Corridor for JABODETABEK MPA		
B.1 Development of New Growth Sub-Corridor for JABODETABEK MPA	The new growth Sub-corridor for JABODETABEK MPA will be advocated consisting of townships, high-tech industrial estates and administrative/ commercial cities. This will entail economic growth with a good connection between a new airport/seaport and the existing urban centers; improvement of the quality of life and safety; and eco-friendliness with utilization of geothermal energy etc.	 Source: http://www.duesseldorf-international.de/dus/
B.2 Development of New Academic Research Cluster	The New Academic Research Cluster will function as a catalyst that will turn Indonesia's resources into the country's major revenue sources, which will create an "Innovation-Based Industry" while the "innovation cluster will strength it as the center of excellence" as described in MP3EI. The bio-based industry in Indonesia will be innovated first by intensifying the link through technology transfer between existing biological resources and scientific research achievements with biotech business activities.	
B.3 Development of Road/Railway along New Growth Sub-Corridor for JABODETABEK MPA	The New Growth Sub-corridor for JABODETABEK MPA as supported by multi-modal transport will contribute to economic growth through reliability and cost effectiveness as required in today's supply chains.	 Railway/Road Bridge Sweden Source: www.vandierenmaritime.nl
C. MULTIPLE GATEWAYS (1)		
C.1 Development of Cilamaya Port	In order to meet the rapid increase of demand and improve the traffic congestion within the metropolitan area, the construction of a new port is urgently needed. Of the several potential candidate sites, Cilamaya was considered the most suitable site for new port development.	 New artificial island Container Terminal http://www.city.kobe.lg.jp
C.2 Improvement of Tanjung Priok Port	Next-generation high standard container terminal (automated processing, earthquake-resistant, deep berths for large vessels, etc.) would include state-of-the art technology, disaster resiliency and a synergetic logistics hub with the existing port.	 Source: JICA Jakarta Port Master plan

Source: MPA Study Team

Table 8.3.1 List of Programs in line with the MPA Vision and Concept (3/3)

C. MULTIPLE GATEWAYS (2)		
C.3 Development of New International Airport	The new international airport will fulfill its role as the gateway of JABODETABEK as well as Indonesia, and will be connected with efficient access roads/railways for better connectivity and enhancement of capacity.	 Suvarnabhumi International Airport Source: MPA Joint Study Team
C.4 Improvement of Soekarno-Hatta International Airport (SHIA)	The improvement of Soekarno-Hatta International Airport will address the constraints of the airport in terms of runway capacity, passenger terminal building and other relevant facilities. This improvement is urgently needed to cope with the rapid growth of demand.	 Source: http://www.angkasapura2.co.id/
D. LOW-CARBON ENERGY DEVELOPMENT		
D.1 Low-Carbon Power Supply Development	Further development of the power supply capacity is essential for economic growth and stable power supply. Low-carbon energy development will be advocated for sustainable growth.	 Siguragra Power Station Source: MPA Joint Study Team
D.2 Development of Smart Grid	The smart grid aims at stabilizing the power systems and reducing the discharge of carbon dioxide and conserving energy use. Accordingly, introduction of advanced and clean technologies will be needed, and an overall energy management system needs to be established.	 Source: METI, adopted by MPA Joint Study Team

Source: MPA Study Team

Table 8.3.2 List of Potential Fast-Track Projects (FTPs) and Priority Projects (1/5)

GOALS AND PROGRAMS	PROJECTS
A. BETTER URBAN ENVIRONMENT	
A.1 Development of MRT-based New Urban Transport System	**(1) Jakarta Mass Rapid Transit (MRT): N-S I, N-S II, E-W as FTP 3.1** This project is to introduce a rail-based mass rapid transit (MRT) System in Jakarta. The first priority was given to the Jakarta Mass Rapid Transit North – South Line and the second priority corridor is East – West Line. The North –South Line is divided into two sections, Phase I (Lebak Bulus – Bundaran HI) and Phase II (Bundaran HI – Kampung Bandan). **(2) JABODETABEK Railways Capacity Enhancement Project (Phase I) as FTP 3.2 and Further Improvement as Phase II** This project is to improve present commuter railway system in JABODETABEK. Procurement of rolling stock and improvement of railway facilities to remove bottlenecks regarding the railway operation for short-term plan of capacity enhancement as Phase I (FTP3.2). Further improvement would be as Phase II **(3) Development of Jakarta Monorail** Construction of the planned circular monorail has been suspended and recently DKI Jakarta has determined to cancel the project. The feasibility of the remaining section from Kuningan to Ragunan should be examined. **(4) Station Plaza Development and Park & Ride System Enhancement** The project is to improve accessibility of the citizens to the amenities located in the stations by solving congestion and to introduce multi-modal facility at the railway and MRT stations. The first priority of the development has been given to Dukuh Atas Station. **(5) Introduction of Common Ticketing System (Smart Card)** Smart cards and integrated ticketing have become widely used by public transit operators around the world. Card users may use their cards for other purposes than for transit, such as small purchases.
A.2 Development of Road Network in and around Jakarta	**(1) Improvement of Road Network in JABODETABEK-Enhancement of Road Network Capacity in JABODETABEK as FTP 4.1** This project aims to alleviate the traffic congestion at heavily congested intersections and railway crossings on major road networks in JABODETABEK, through the realization of construction of grade separated intersections and other at-grade countermeasure **(2) Development of Jakarta Outer Outer Ring Road** Jakarta Outer-Outer Ring Road is a planned toll road running in the outskirt of DKI Jakarta to provide detour when existing roads are congested and to contribute sub-center development in BODETABEK. **(3) Introduction of Intelligent Transport System (ITS) in JABODETABEK** Intelligent Transport System (ITS) aims to support a safe, smooth and pleasant transport with information technology. This includes variety of transport systems such as Electric Road Pricing (ERP), Traffic Information System (TIS) and Bus Fleet Management System (BFMS) /Bus Location System (BLS).
A.3 Promotion of Urban Re-development	**(1) Pilot Project of Urban Development/ Re-development** Urban re-development is crucial at the city center so as to harmonize between green open spaces and active urban functions such as business, commercial, and residential spaces. A pilot project is in the form of multi-purpose development consisting of land re-adjustment, creation of green-field and housing. Development plan of Maja area is proposed to be prioritized by concerned ministries/authorities of GoI.

Source: MPA Study Team

Table 8.3.2 List of Potential Fast-Track Projects (FTPs) and Priority Projects (2/5)

GOALS AND PROGRAMS	PROJECTS
A.4 Improvement of Water Supply and Sewerage Systems	**(1) DKI Jakarta – Bekasi – Karawang Water Supply (Jatiluhur) as FTP 6.1** This project is to supply bulk water to DKI Jakarta, Bekasi city/regency and Karawang regency. Treated bulk water will be supplied from a water treatment plant to be constructed at downstream of Jatiluhur dam. **(2) Rehabilitation of Water Distribution Facilities in DKI Jakarta, Bekasi and Karawang, with the integration of DKI Jakarta – Bekasi – Karawang Water Supply (Jatiluhur)** Rehabilitation/expansion of the facilities of the municipal water supply corporations(PDAMs) will be executed with the aim to increase sufficient water supply capacity to distribute the additional water purchased from the "DKI Jakarta – Bekasi – Karawang Water Supply (Jatiluhur) **(3) Development of Sewerage System in DKI Jakarta** The construction of sewerage facilities for collection and treatment of wastewater in DKI Jakarta will be conducted in line with "Wastewater Management Master Plan in DKI Jakarta" which is being formulated. **(4) Development of Water Supply Systems for Large-scale Infrastructure Development** Large-scale infrastructure development, such as a new airport, a new industrial estate, and a new requires additional water supply systems to ensure the sustainable operation of the infrastructure. This project is the second phase of the Jatiluhur Project under item A.4(1) including additional pipelines, water treatment plant and other water supply facilities.
A.5 Solid Waste Treatment	**(1) Construction of the West Java Regional Solid Waste Treatment as FTP 7.1** This project is to provide the intermediate treatment and final disposal facilities for solid waste management in Bogor city and regency and Depok city. Solid waste is transported from Bogor city and regency and Depok city to new solid waste treatment and solid waste from Bandung is transported to Legok Nangka. **(2) Development of New Landfill Site at Tangerang** Introduction of solid waste treatment and disposal facility is a key for the eco-friendly city and in pursuit of making clean and green city. Construction of final disposal facilities at landfill site of about 100 ha will be provided for solid waste in the western part of JABODETABEK; namely Tangerang and South Tangerang.
A.6 Flood Management	**(1) Reconstruction of East Pump Station at Pluit as FTP 8.1** This project is to reconstruct the pump house, located in the downstream area of the basin, in order to mitigate the flood inundation in Central Jakarta and ensure that the capital city is able to keep its normal function. **(2) Development of Urban Drainage System in DKI Jakarta** The urban flood inundation damages are expanding seriously due to increase of runoff inside business and commercial area. Construction and rehabilitation of ponds, drainage channel, and pumping station and water gates and establishing the integrated operation and management system are necessary for mitigating frequent flood damage.. **(3) Normalization of the Rivers in JABODETABEK** Frequent flooding is a serious threat to the metropolitan area. The normalization of rivers in JABODETABEK such as widening river channel, short cut and reconstruction of the bridges are required as Total Solution.

Source: MPA Study Team

Table 8.3.2 List of Potential Fast-Track Projects (FTPs) and Priority Projects (3/5)

GOALS AND PROGRAMS	PROJECTS
B. NEW GROWTH SUB-CORRIDOR FOR JABODETABEK MPA	
B.1 Development of New Growth Sub-Corridor for JABODETABEK MPA	**(1) Development of New Township** New Township will be designed as a model for better urban environment, low carbon energy consumption and amenity with relaxation and entertainment. Candidate site is Karawang area. **(2) Development of New Industrial Estate in the Vicinity of the New Airport** New industrial estate will promote location of high-tech, high value and export-oriented industry with advanced logistic management systems in Karawang area
B.2 Development of New Academic Research Cluster	**(1) Development of New Academic Research Cluster** The New Academic Research Cluster will function as a catalyst that will turn Indonesia's resources into the country's major revenue sources, which will create "Innovation-Based Industry" while "innovation cluster is strengthening as the center of excellence" as described in MP3EI. The bio-based industry in Indonesia will be innovated first by intensifying the link through technology transfer between existing biological resources and scientific research achievements with biotech business activities.
B.3 Development of Road/Railway along New Growth Sub-Corridor for JABODETABEK MPA	**(1) Construction of Second Jakarta-Cikampek Toll Road** To expand the capacity of Jakarta-Cikampek Toll Road, a second line will be developed in parallel with the existing line. **(2) Improvement of Road Network in JABODETABEK-Improvement of Road Network within the Industrial Area to the East of Jakarta as FTP 2.2** This project aims to alleviate the traffic congestion in Cikarang area through the improvement of road network by constructing the new road and flyover, and widening and upgrading of the existing roads. **(3) Construction of Access Road to New Cilamaya Seaport as FTP 1.2** New access road will connect the existing Jakarta-Cikampek Toll Road and the New Cilamaya Seaport. **(4) Construction of Freight Railway to New Cilamaya Seaport** New freight railway will connect the existing railway line in Karawang and extended to the New Cilamaya Seaport. **(5) Construction of Access Road to the New International Airport** New access road will connect the existing road network and the New Airport, branching off possibly from the existing Jakarta- Cikampek Toll Road. **(6) Construction of Jakarta-Bandung High Speed Railway via the New International Airport** Development of a high speed railway between Jakarta and Bandung that will connect with the new international airport. The section between Jakarta and Bandung is the first priority of the development. It can be extended to Cirebon via Kertajati.

Source: MPA Study Team

Table 8.3.2 List of Potential Fast-Track Projects (FTPs) and Priority Projects (4/5)

GOALS AND PROGRAMS	PROJECTS
C. MULTIPLE GATEWAYS	
Seaport	
C.1 Development of Cilamaya Port	**(1) Development of a New International Port as FTP 1.2** This project is to develop a new international port at off Cilamaya Coast in West Java Province. The new international port is planned to develop off shore reclamation land located in Cilamaya. (See B.3 (3) and (4)) **(2) Development of New Car Terminal at Cilamaya Port** Car terminal will be developed in Cilamaya Port to expand the capacity for export/import of finished automobiles. **(3) Development of Logistics Park (Supporting Facilities for the New Port)** Logistics Park will be developed in New Cilamaya Port for efficient logistics in JABODETABEK.
C.2 Improvement of Tanjung Priok Port	**(1) Improvement and Expansion of Container Terminal at North Kalibaru as FTP 1.1** The project aims to increase the container handling capacity to meet with the increasing demands. The location for expanding the international container terminal at Tanjung Priok is in North Kalibaru. **(2) Expansion of Car Terminal at Kalibaru** The existing ship building yard is located in the western part of the Tanjung Priok Port. By re-developing the yard, including building a new berth and reclamation, a New 2-Berth Car Terminal will be developed.
Airport	
C.3 Development of New International Airport	**(1) Development of New International Airport** A new international airport will fulfill its role as the gateway to JABODETABEK and also for Indonesia. The airport will be connected by efficient access roads/railways for better connectivity and enhancement of its capacity. Potentials for the development are particularly likely in the development of a New International Airport at Karawang, (See B.3 (5) and (6)), of which functions could be harmonized with the existing airport development plan beyond JABODETABEK.
C.4 Improvement of Soekarno-Hatta International Airport (SHIA)	**(1) Construction of Soekarno-Hatta International Airport as FTP 5.2** (Revitalization of Soekarno-Hatta International Airport terminals) The project is to expand the present Soekarno-Hatta International Airport to solve the current constraint on airport operation such as limited capacity of passenger terminal buildings and other relevant facility. (Expansion of Soekarno-Hatta International Airport) The project is to develop the third runway to expand the Soekarno-Hatta International Airport. **(2) Construction of Access Railway to Soekarno-Hatta International Airport as FTP 5.1** The project aims to improve access to the Soekarno-Hatta International Airport with reliable and fast railway system. It includes Express Service on dedicated elevated track and Commuter Service using the existing track.

Source: MPA Study Team

Table 8.3.2 List of Potential Fast-Track Projects (FTPs) and Priority Projects (5/5)

GOALS AND PROGRAMS	PROJECTS
D. LOW-CARBON ENERGY DEVELOPMENT	
D.1 Low-Carbon Power Supply Development	**(1) Development of Central Java Coal-fired Power Plant as FTP 9.6** Coal-fired Power Plant will be installed in Central Java. **(2) Construction of Indramayu Coal-fired Power Plant as FTP 9.2** Transmission line from Indramayu to Cibatu and one unit of Coal-fired Power Plant will be installed in Indramayu. **(3) Development of Banten Coal-fired Power Plant as FTP 9.3** One unit of Coal-fired Power Plant will be installed in Banten by Malaysian concessionaire. **(4) Development of Gas-fired Power Plant and FSRU (Floating Storage Regasification Unit) as FTP 9.4** Development of a new FSRU (Floating Storage Regasification Unit) or LNG receiving and re-gasification terminal as well as Combined Cycle Power Plants in Java in addition to the existing FSRU project under construction. **(5) Development of Rajamandala Hydroelectric Power Plant as FTP 9.5** Hydroelectric Power Station will be installed in Rajamandala. **(6) Construction of Java-Sumatra Interconnection Transmission Line as FTP 9.1** Transmission Line connecting Bangko Tengah substation in South Sumatra and X-Bogor substation crossing Sunda Strait including 2-AC/DC Converter Station and Substations. **(7) Other Renewable and Low-Carbon Emission Power Projects connecting to Java-Bali-Sumatra Power Network** Geothermal Power Plants will be installed in West Java and Central Java Province. **(8) Development of West Java Coal-fired Power Plant with Clean Coal Technology** Coal-fired Power Plant with clean coal technology will be installed in West Java Province.
D.2 Development of Smart Grid	**(1) Smart Community (including a pilot project for the Smart Grid) as FTP 2.1** This project aims at the spread of technologies of clean energy, so-called "Smart Community". Main targets are stabilization of the whole industrial estate power system independent of individual factories, reduction of CO_2 by the installation of renewable energy, and energy conservation and peak shift by energy management system. **(2) Improvement of JABODETABEK Power Supply Quality** Frequent drops of voltage due to fluctuating current within the distribution network pauses an obstacle in optimal operation of the power system. Improvement of transmission network and distribution system will enable the stable and high-quality power supply in JABODETABEK.

Source: MPA Study Team

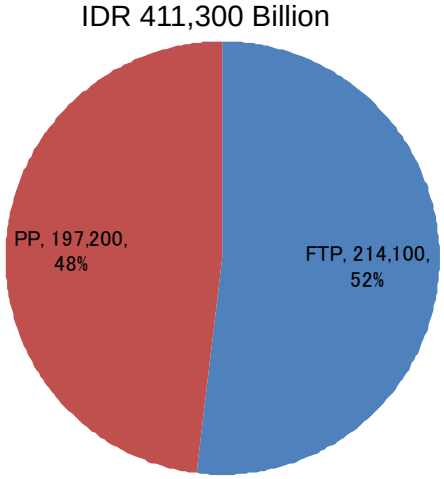
CHAPTER 9 FINANCIAL ARRANGEMENT FOR POTENTIAL PRIORITY AND FAST-TRACK PROJECTS

9.1 TOTAL REQUIRED AMOUNT OF FUNDS

The total required amount of funds for implementing the MPA projects is IDR 411,300 billion. The required fund amount for each MPA project is shown in Table 9.1.1.

9.1.1 Required amount of funds for Fast-Track Projects and Priority Projects

The breakdown of the total amount of funds is shown in Figure 9.1.1. Approximately 52 % of the total amount is for Fast-Track Projects (FTP), while 48% is for Priority Projects (PP)



Source: MPA Study Team

Figure 9.1.1 Ratio of FTP and PP for Total Required Amount of Funds

9.1.2 Required Amount of Funds for Each Category

MPA projects are categorized as follows from A to D:

A. BETTER URBAN ENVIRONMENT
- A.1 Development of MRT-based New Urban Transport System
- A.2 Development of Road Network in and around Jakarta
- A.3 Promotion of Urban Re-development
- A.4 Improvement of Water Supply and Sewerage Systems
- A.5 Solid Waste Treatment
- A.6 Flood Management

B. NEW GROWTH SUB-CORRIDOR FOR JABODETABEK MPA
- B.1 Development of New Growth Sub-Corridor for JABODETABEK MPA
- B.2 Development of New Academic Research Cluster
- B.3 Development of Road/Railway along New Growth Sub-Corridor for JABODETABEK MPA

C. MULTIPLE GATEWAYS

C.1 Development of Cilamaya Port

C.2 Improvement of Tanjung Priok Port

C.3 Development of New International Airport

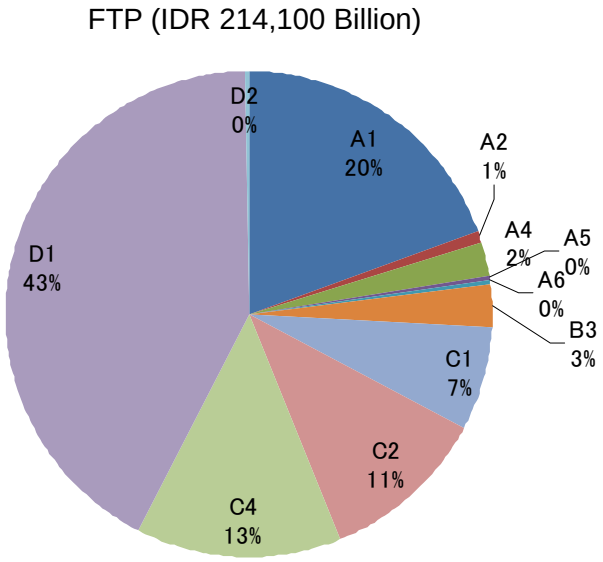
C.4 Improvement of Soekarno-Hatta International Airport (SHIA)

D. LOW-CARBON ENERGY DEVELOPMENT

D.1 Low-Carbon Power Supply Development

D.2 Development of Smart Grid

Figure 9.1.2 shows the breakdown of required funds for each FTP category. More than half of the funds required for FTPs are for categories D1 and A1. Also, there are no FTPs under categories A3, B1, B2, and C3. The allocation of funds for FTPs significantly varies from project to project.



Source: MPA Study Team

Figure 9.1.2 Breakdown of Required Funds for Each Category of FTPs

Table 9.1.1 Preliminary Cost Estimate and Funding Scheme for MPA Projects (1/3)

PROGRAMS	PROJECTS	INITIAL INVESTMENT COST (IDR BILLION)	PROJECT TYPE
A.1 Development of MRT-based New Urban Transport System	(1) Jakarta Mass Rapid Transit (MRT): N-S I, N-S II, E-W as FTP 3.1 (including price escalation and contingency)	33,300	Public
	(2) JABODETABEK Railways Capacity Enhancement Project (Phase I) as FTP 3.2 and Further Improvement as Phase II (including price escalation and contingency)	8,300	Public
	(3) Development of Jakarta Monorail	-	-
	(4) Station Plaza Development and Park & Ride System Enhancement	4,400	PPP
	(5) Introduction of Common Ticketing System (Smart Card)	500	Private
A.2 Development of Road Network in and around Jakarta	(1)a. Improvement of Road Network in JABODETABEK-Enhancement of Road Network Capacity in JABODETABEK as FTP 4.1 (including Price escalation and contingency)	1,790	Public
	(1)b. Improvement of Road Network in JABODETABEK-Enhancement of Road Network Capacity in JABODETABEK as FTP 4.1(Improvement of Intersection in DKI Jakarta)	110	Public
	(2) Development of Jakarta Outer Outer Ring Road	25,400	PPP
	(3) Introduction of Intelligent Transport System (ITS) in JABODETABEK	1,000	PPP
A.3 Promotion of Urban Re-development	(1)a. Pilot Project of Urban Development/ Re-development (Option I: Project for creating green open spaces of business and commercial area and development affordable housing in DKI Jakarta)	1,350	PPP
	(1)b. Pilot Project of Urban Development/ Re-development (Option II: Project for development of housings in multiple purpose complex)	750	PPP
A.4 Improvement of Water Supply and Sewerage Systems	(1) DKI Jakarta – Bekasi – Karawang Water Supply (Jatiluhur) as FTP 6.1	4,400	PPP
	(2) Rehabilitation of Water Distribution Facilities in DKI Jakarta, Bekasi and Karawang, with the integration of DKI Jakarta – Bekasi – Karawang Water Supply (Jatiluhur)	1,000	PPP (PPPB 2011)
	(3) Development of Sewerage System in DKI Jakarta (Zone 1, 6)	14,300	PPP (Zone 1) Public (Zone 6)
	(4) Development of Water Supply Systems for Large-scale Infrastructure Development	4,300	PPP

Source: MPA Study Team

Table 9.1.1 Preliminary Cost Estimate and Funding Scheme for MPA Projects (2/3)

PROGRAMS	PROJECTS	INITIAL INVESTMENT COST (IDR BILLION)	PROJECT TYPE
A.5 Solid Waste Treatment	(1) Construction of the West Java Regional Solid Waste Treatment as FTP 7.1	1,000	Public
	(2) Development of New Landfill Site at Tangerang	600	PPP
A.6 Flood Management	(1) Reconstruction of East Pump Station at Pluit as FTP 8.1	200	Public
	(2) Development of Urban Drainage System in DKI Jakarta	5,500	Public
	(3) Normalization of the Rivers in JABODETABEK	3,000	Public
B.1 Development of New Growth Sub-Corridor for JABODETABEK MPA	(1) Development of New Township	5,600	PPP
	(2) Development of New Industrial Estate in the Vicinity of the New Airport	1,700	PPP
B.2 Development of New Academic Research Cluster	(1) Development of New Academic Research Cluster	2,800	PPP
B.3 Development of Road/Railway along New Growth Sub-Corridor for JABODETABEK MPA	(1) Construction of Second Jakarta-Cikampek Toll Road	4,800	PPP
	(2) Improvement of Road Network in JABODETABEK-Improvement of Road Network within the Industrial Area to the East of Jakarta as FTP 2.2 (including price escalation and contingency)	200	Public
	(3) Construction of Access Road to New Cilamaya Seaport as FTP 1.2 (including price escalation and contingency)	5,900	PPP
	(4) Construction of Freight Railway to New Cilamaya Seaport（including price escalation and contingency)	3,400	Public (SOE)
	(5) Construction of Access Road to the New International Airport	2,200	PPP
	(6) Construction of Jakarta-Bandung High Speed Railway via the New International Airport	39,800	PPP
C.1 Development of Cilamaya Port	(1) Development of a New International Port as FTP 1.2	14,900	PPP
	(2) Development of New Car Terminal at Cilamaya Port	400	Private
	(3) Development of Logistics Park (Supporting Facilities for the New Port)	5,800	Private
C.2 Improvement of Tanjung Priok Port	(1) Improvement and Expansion of Container Terminal at North Kalibaru as FTP 1.1 (This amounts is showing the accumulated total of Phase 1-A and 1-B)	24,000	Public (SOE)

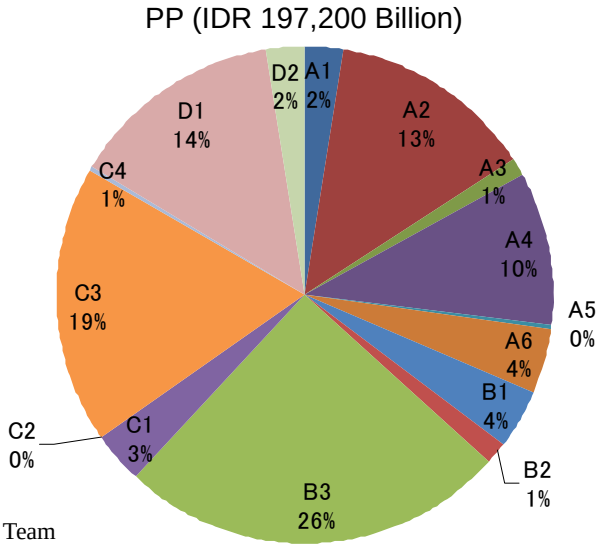
Source: MPA Study Team

Table 9.1.1 Preliminary Cost Estimate and Funding Scheme for MPA Projects (3/3)

PROGRAMS	PROJECTS	INITIAL INVESTMENT COST (IDR BILLION)	PROJECT TYPE
	(2) Expansion of Car Terminal at Kalibaru	200	Private
C.3 Development of New International Airport	(1) Development of New International Airport	35,300	PPP
C.4 Improvement of Soekarno-Hatta International Airport (SHIA)	(1)a Construction of Soekarno-Hatta International Airport as FTP 5.2 (Revitalization of Soekarno-Hatta International Airport Terminals)	16,400	Public (SOE)
	(1)b Construction of Soekarno-Hatta International Airport (Expansion of Soekarno-Hatta International Airport)	1,000	Public (SOE)
	(2)a Construction of Access Railway to Soekarno-Hatta International Airport as FTP 5.1 (Express)	10,300	PPP
	(2)b Construction of Access Railway to Soekarno-Hatta International Airport as FTP 5.1 (Commuter)	2,200	PPP
D.1 Low-Carbon Power Supply Development	(1) Development of Central Java Coal-fired Power Plant as FTP 9.6	30,100	IPP (IPP)
	(2) Construction of Indramayu Coal-fired Power Plant as FTP 9.2	20,400	Public (SOE)
	(3) Development of Banten Coal-fired Power Plant as FTP 9.3	8,600	IPP
	(4) Development of Gas-fired Power Plant and FSRU (Floating Storage Regasification Unit) as FTP 9.4	10,700	PPP or IPP
	(5) Development of Rajamandala Hydroelectric Power Plant as FTP 9.5	1,300	IPP
	(6) Construction of Java-Sumatra Interconnection Transmission Line as FTP 9.1	19,700	Public (SOE)
	(7) Other Renewable and Low-Carbon Emission Power Projects connecting to Java-Bali-Sumatra Power Network	7,100	PPP (PPP and Private)
	(8) Development of West Java Coal-fired Power Plant with Clean Coal Technology	20,300	PPP or IPP
D.2 Development of Smart Grid	(1) Smart Community (including a pilot project for the Smart Grid) as FTP 2.1	300	Private
	(2) Improvement of JABODETABEK Power Supply Quality	4,700	Public (SOE)
Grand Total		**411,300**	

Source: MPA Study Team

On the other hand, allocation of funds for PPs slightly varies among each PP, as shown in Figure 9.1.3. Category B3 is allocated the most funds with 26% of the total.

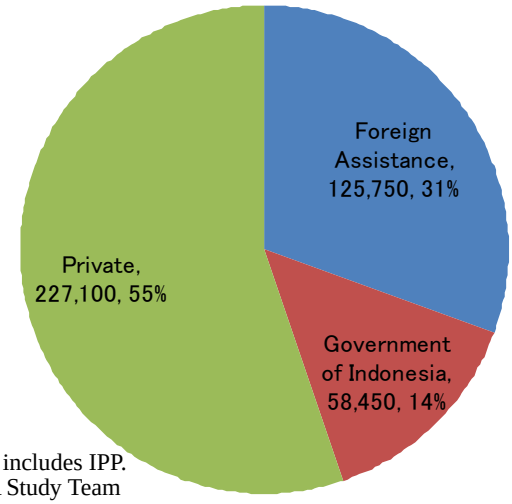


Source: MPA Study Team

Figure 9.1.3 Allocation of Fund for PP

9.2 BREAKDOWN OF SOURCES OF REQUIRED FUNDING FOR MPA PROJECTS

The total amount of required funds for implementing the MPA projects is IDR 411,300 billion, and its breakdown is shown in Figure 9.2.1. The share of private fund in fund sources to implement the MPA projects is 55%, and the share of public fund is 45%. Approximately 31% of the public funds are under foreign assistance.



Note: Private includes IPP.
Source: MPA Study Team

Figure 9.2.1 Breakdown of Sources of Funding for the MPA Projects

9.2.1 Allocation of Foreign Assistance, Government of Indonesia, and Private Funds for FTPs and PPs

The allocation of foreign assistance, Government of Indonesia, and private funds for FTPs, and PPs is shown in Table 9.2.1. Approximately 63% of foreign assistance funds are allocated for FTPs. On the other hand, approximately 74% of Government of Indonesia funds are allocated to PPs.

Table 9.2.1 Allocation of Foreign Assistance, Government of Indonesia, and Private Funds

Unit: IDR billion

Source of Funding	Amount of Funds	Percent of Total	Project Type	Amount of Allocated Funds for Each Project Type	Ratio of Funds for FTPs to Funds for PPs
Foreign Assistance	125,750	30.6%	FTP	78,850	62.7%
			PP	46,900	37.3%
Government of Indonesia	58,450	14.2%	FTP	15,050	25.7%
			PP	43,400	74.3%
Private	227,100	55.2%	FTP	120,200	52.9%
			PP	106,900	47.1%

Source: MPA Study Team

9.2.2 Breakdown of Foreign Assistance, Government of Indonesia, and Private Funds for Each Category

Table 9.2.2 is shows the allocation of foreign assistance, Government of Indonesia, and Private funds for each category.

(1) Allocation of Foreign Assistance funds

The category with the most allocated foreign assistance funds is A1 at IDR 36,300 billion (28.9%). However, the required amount for category A1, which includes MRT project is approximately IDR 33,300 billion in total; foreign assistance funds were not allocated to categories A3, B2, C2, and C4.

(2) Allocation of Government of Indonesia funds

The category with the most allocated Government of Indonesia funds is B3 at IDR 19,350 billion (33.1%). Category B3 includes road and railway projects along the new growth sub-corridor such as High-speed railway; therefore, the allocation of public funds for such is high. Categories C2, D1 and D2 were not allocated with public funds.

(3) Allocation of private funds

The category with the most allocated private funds is D1, at IDR 83,900 billion (36.9%). Category D1 includes power supply projects implemented by IPP, therefore, the allocation of private funds is high. Categories A6 were not allocated with private funds.

Table 9.2.2 Allocation of Foreign Assistance, Government of Indonesia, and Private Funds for Each Category

Unit: IDR billion

Source of Funding	A.1	A.2	A.3	A.4	A.5	A.6	B.1	B.2
Foreign Assistance	36,300	1,300	0	10,700	1,000	200	200	0
	28.9%	1.0%	0.0%	8.5%	0.8%	0.2%	0.2%	0.0%
Government of Indonesia	7,500	6,600	1,200	1,800	400	8,500	500	1,000
	12.8%	11.3%	2.1%	3.1%	0.7%	14.5%	0.9%	1.7%
Private	2,700	20,400	900	11,500	200	0	6,600	1,800
	1.2%	9.0%	0.4%	5.1%	0.1%	0.0%	2.9%	0.8%

Source of Funding	B.3	C.1	C.2	C.3	C.4	D.1	D.2	Total
Foreign Assistance	17,550	6,700	0	17,500	0	34,300	0	125,750
	14.0%	5.3%	0.0%	13.9%	0.0%	27.3%	0.0%	100.0%
Government of Indonesia	19,350	1,700	0	3,700	6,200	0	0	58,450
	33.1%	2.9%	0.0%	6.3%	10.6%	0.0%	0.0%	100.0%
Private	19,400	12,700	24,200	14,100	23,700	83,900	5,000	227,100
	8.5%	5.6%	10.7%	6.2%	10.4%	36.9%	2.2%	100.0%

Source: MPA Study Team

9.3 SOURCES OF FUND PER PROJECT TYPE

9.3.1 Public, PPP, and Private Funds for FTPs

(1) Public Fund

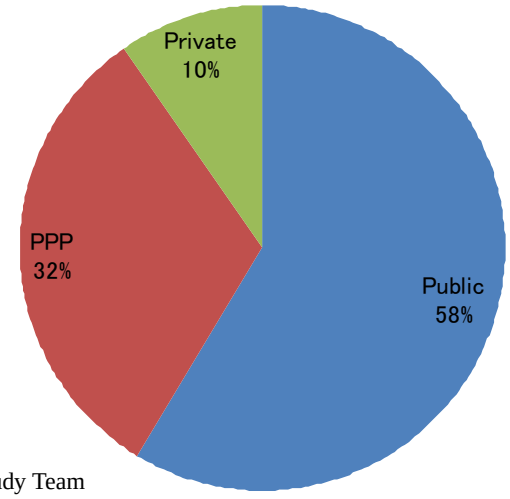
As shown in Table 9.3.1 and Figure 9.3.1, public, PPP and private funds comprise approximately 58%, 32%, and 10% of the total funds for FTPs, respectively. The breakdown of public funding for FTPs is 91% from foreign assistance and 9% from Government of Indonesia founds. Most of the funds for FTPs are from foreign assistance.

Table 9.3.1 Sources of Funds for FTPs

	Public		Private	Total
	Foreign Assistance	Government of Indonesia		
Public	72,150	7,050	46,200	125,400
PPP	6,700	8,000	53,100	67,800
Private			20,900	20,900

Remarks: The above mentioned public category includes the SOE project, private includes the IPP.
Source: MPA Study Team

Since the public category includes the projects implemented by SOE, private sources of funds could also be found under the public category.

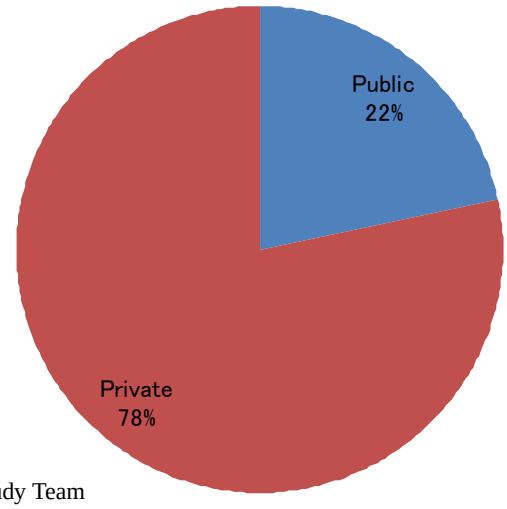


Source: MPA Study Team

Figure 9.3.1 Ratio of Fund Resources on FTP

(2) PPP

Of the total funding for FTPs, PPP funding is approximately 32%. The percentages of public and private funding in PPP are 22% and 78%, respectively. The breakdown of public funds resource is 46% coming from foreign assistance founds and 54% from Government of Indonesia founds.



Source: MPA Study Team

Figure 9.3.2 Ratio of Public Resource and Private Funding in PPP

(3) Private

Private funding is approximately 10% of the total funding for FTPs, It is the lowest funding source for FTPs.

9.3.2 Public, PPP, and Private Funds for PPs

(1) Public fund

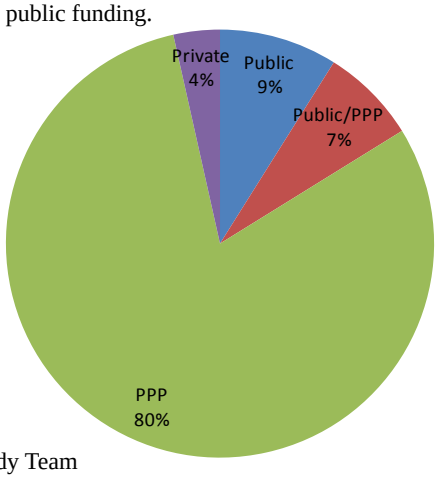
Public funding is 9% while PPP is approximately 80%, which is the highest, of the total funding for PPs. Public funding for PPs excludes foreign assistance funds.

Table 9.3.2 Fund Resources for PPs

	Public		Private	Total
	Foreign Assistance	Government of Indonesia		
Public	0	10,200	7,400	17,600
Public/PPP	10,700	1,800	1,800	14,300
PPP	36,200	31,400	90,800	158,400
Private	0	0	6,900	6,900

Remark: Public/PPP means that some part will be implemented through PPP, while the other part will be implemented through public funding.

Source: MPA Study Team



Source: MPA Study Team

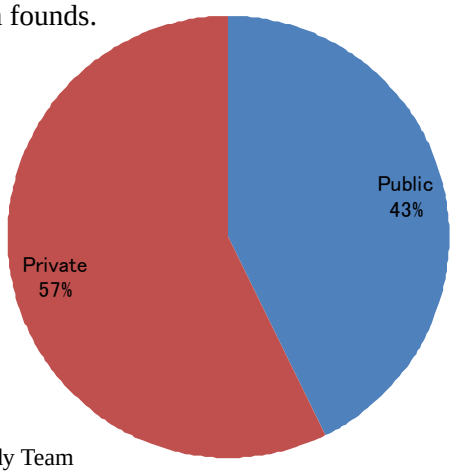
Figure9.3.3 Breakdown of Sources of Funds for PPs

(2) Public/PPP

A4 (3) is the only category under public/PPP. In such a case, some part of the project will be implemented through public funds, while the other part will be implemented through PPP scheme.

(3) PPP

The PPP funding has the most at 80% of the total funding for PPs. The percentages of public and private funds in PPP are 43% and 57% respectively as shown in Figure 9.3.4. The breakdown of public funding is 54% from foreign assistance funds and 46 % from Government of Indonesia founds.



Source: MPA Study Team

Figure 9.3.4 Ratio of Public and Private Funding for PPs

(4) Private

The percentage of private funding for PPs is 4%.

9.4 TOTAL AMOUNT OF REQUIRED FUNDS PER YEAR.

9.4.1. Total Amount of Required Funds for FTPs and PPs per Year

Table 9.4.1 shows the total amount of funds for FTP and PP per year.

Table 9.4.1 Total Amount of Funds (2011-2020)

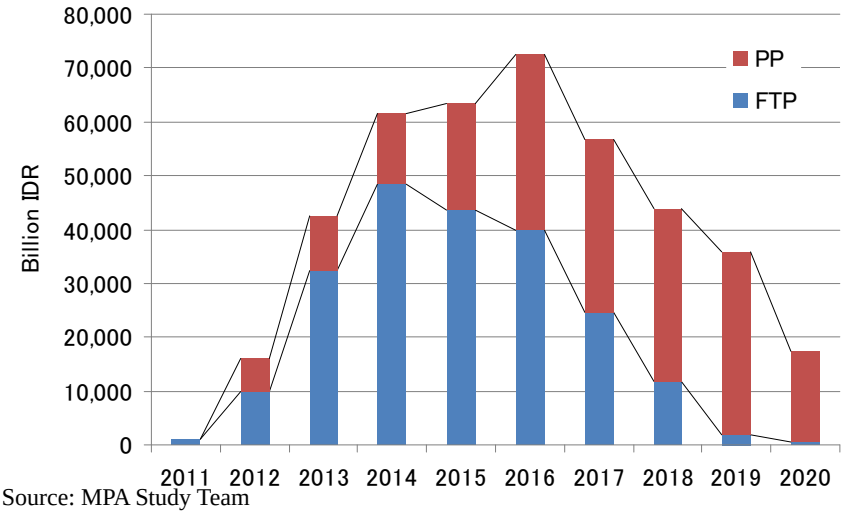
Unit: IDR billion

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Fast-Track Projects	1,110	10,030	32,355	48,315	43,685	39,805	24,605	11,835	1,840	520
Priority Projects	0	6,080	10,310	13,160	19,770	32,630	32,090	32,150	34,050	16,960
Total	1,110	16,110	42,665	61,475	63,455	72,435	56,695	43,985	35,890	17,480

Source: MPA Study Team

The total amount of required funds for implementing the MPA projects is highest in 2016 at IDR 72,435 billion. This amount is approximately seven times that 2011. Correspondingly, the total amounts of required funds for FTPs are highest in 2014 at IDR 48,315 billion. In the case of FTPs, the three years from 2014 to 2016 would require a significant amount of funds to implement the FTPs.

On the other hand, the total amount of required funds for PPs highest in 2019 at IDR 34,050 billion. In case of PPs, the four years from 2016 to 2019 would require a significant amount of funds to implement the PPs.



Source: MPA Study Team

Figure 9.4.1 Required Total Amount of Fund for PP and FTP

9.4.2 Total Amount of Fund on Fund Resources (2011-2020)

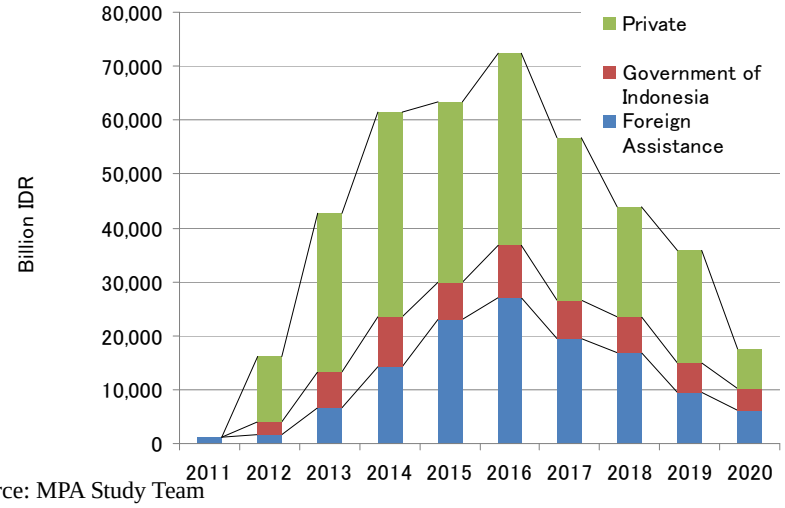
Table 9.4.2 shows the amount of funding from 2011 to 2020 to implement the MPA projects.

Table 9.4.2 Sources of Funding (2011-2020)

Unit: IDR billion

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Foreign Assistance	1,110	1,730	6,610	14,300	23,010	27,110	19,390	16,900	9,400	6,190
Government of Indonesia	0	2,210	6,745	9,315	6,995	9,715	7,235	6,605	5,500	4,130
Private	0	12,170	29,310	37,860	33,450	35,610	30,070	20,480	20,990	7,160
Total	1,110	16,110	42,665	61,475	63,455	72,435	56,695	43,985	35,890	17,480

Source: MPA Study Team



Source: MPA Study Team

Figure 9.4.2 Total Amount of Required Funds for PPs and FTPs per Resource

(1) Foreign Assistance funds

The amount of foreign assistance funding required for implementing the MPA projects is highest in 2016 at IDR 27,110 billion. This is approximately 24 times the amount of foreign assistance funding in 2011. In case of foreign assistance, the five years from 2014 to 2018 would require a significant amount of foreign assistance funds to implement the MPA projects.

(2) Government of Indonesia funds

The amount of funding from Government of Indonesia funds for implementing the MPA projects is highest in 2016 at IDR 9,715 billion. In case of funding from Government of Indonesia funds, the required amount of funds does not vary that much per year.

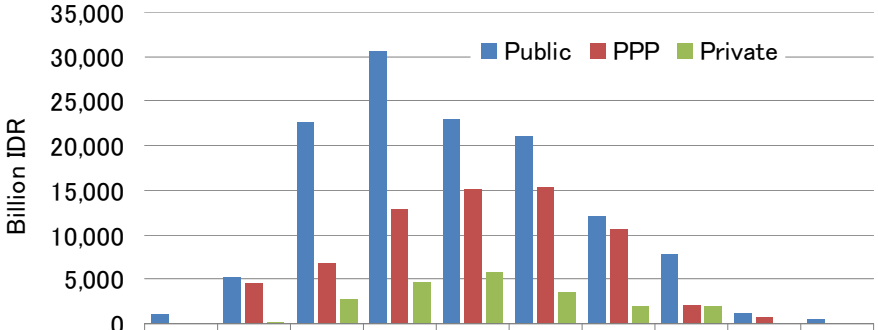
(3) Private funds

The amount of private funding for implementing the MPA projects is highest in 2014 at IDR 37,860 billion. The required amounts of private funds similarly reflect the trend of foreign assistance funding.

9.4.3 Required Amount of Funds for Each Project Type per Year

(1) Fast-Track Projects

For FTPs, public funding will rise from 2013 and reach a peak in 2014. Both private and PPP funding have a similar trend as that of public funding. However, the required funds each year for PPP are smaller than the required funds for the public and private types of projects.



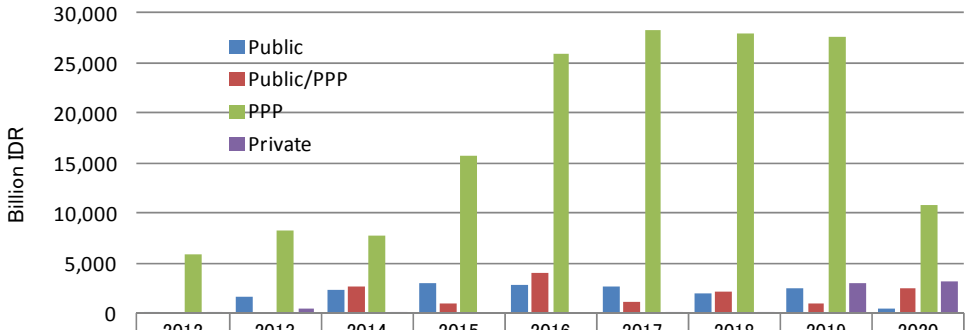
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Public	1,110	5,310	22,665	30,715	22,925	21,085	12,045	7,825	1,200	520
PPP	0	4,470	6,840	12,900	15,090	15,290	10,560	2,010	640	0
Private	0	250	2,850	4,700	5,670	3,430	2,000	2,000	0	0

Source: MPA Study Team

Figure9.4.3: Amount of Required Funds for FTPs

(2) Priority Projects

In the case of PPs, the amount of required funds for PPP is much higher than that for public, public/PPP, and private projects. In particular, the four years from 2016 to 2019 need a very big amount of funds to implement the PPP projects.



	2012	2013	2014	2015	2016	2017	2018	2019	2020
Public	90	1,650	2,400	3,080	2,810	2,640	1,990	2,440	500
Public/PPP	0	0	2,740	930	3,980	1,070	2,180	930	2,470
PPP	5,880	8,270	7,820	15,760	25,840	28,370	27,940	27,630	10,890
Private	110	390	200	0	0	10	40	3,050	3,100

Source: MPA Study Team

Figure9.4.4 Amount of Required Funds for PPs

CHAPTER 10 RISKS IN POTENTIAL PRIORITY AND FAST-TRACK PROJECTS

10.1 OVERVIEW

Chapter 10 addresses the risks which impede the implementation of potential priority and Fast-Track Projects (FTPs) according to potential investors, who are also members of the Study Team. The potential investors classified and analyzed the risks by development stage and by type of risks. There are three development stages, namely: Planning Stage, Construction Stage, and Operation Stage. There are five types of risks, namely: Financial Risks, Legal Risks, Engineering Risks, Institutional Risks, and Political Risks. The potential investors analyzed the 28 projects, which they have interest in, among the proposed potential priority and Fast-Track Projects. The specific risks of each project are detailed in the risk matrix of Annex VI.

10.2 RISKS AND CONSIDERATIONS

The common risks of the target projects, as extracted from the matrix by project in Annex VI, were addressed in order to find out what obstructs the participation of private sectors in such projects. The common risks are summarized by type of risk and by development stage in Table 10.2.1. A project is also mentioned for each risk as an example in the table. To select the projects in the table, higher priority is given to the fast-track projects, because smooth implementation of the fast-track projects including planning, construction, and operation by avoiding the foreseen risks is significant to establish MPA. About the risks in which an example of the fast track projects is not be found, the example is selected among the priority projects, which are linked with MRT project or new seaport project, to which both Indonesian government and Japanese Government give the highest priority. This Sub-section looks into each common risk.

Table 10.2.1 Matrix of Common Risks of Target Projects (1/2)

	Planning Stage	Construction Stage	Operation Stage
Financial Risks	• difficulty in land acquisition and expropriation (e.g. Construction of Access Railway to Soekarno-Hatta Airport)	• government performance guarantee is not issued (e.g. Development of New International Port)	• unprofitable operation due to low fee collection and high O&M cost (e.g. Development of New International Airport)
Legal Risks	• complicated procedure and risk allocation between public and private sectors (e.g. Construction of Access Railway to Soekarno-Hatta Airport) • time consuming process to obtain approval of forest development (e.g. geothermal plant)	• weak enforcement of laws and regulations mainly in environment protection (e.g. Construction of Access Road to Cilamaya Port)	• insufficient supporting measures for O&M such as extension of land right (e.g. Development of New Township)

Table 10.2.1 Matrix of Common Risks of Target Projects (2/2)

	Planning Stage	Construction Stage	Operation Stage
Engineering Risks	• weak in execution of planning and design for future operation and extension (e.g. Improvement of Road Network in JABODETABEK-Enhancement of Road Network Capacity in JABODETABEK)	• failure in project management for time, quality, cost, safety, of construction (e.g. Development of New International Airport)	• substandard operation due to system errors in traffic control system (e.g. Second Jakarta Cikmpek Toll Road) • negative environmental impact to water area (e.g. Development of Sewerage System in DKI Jakarta)
Institutional Risks	• insufficient coordination among the concerned agencies to reduce the risk of overlapping investment (e.g. Improvement of Road Network in JABODETABEK-Enhancement of Road Network Capacity in JABODETABEK)	• opposition by local residents due to insufficient information by government (e.g. Construction of Access Road to New Cilamaya Seaport)	• insufficient coordination on standard of infrastructure among stakeholders (e.g. Development of New Township)
Political Risks	• opposition to projects	• discontinuation of revenue subsidies due to political change	• disvaluationof O&M • impossibility of exit and transfer

Source: MPA Study Team

(1) Financial Risks

Financial risks are related with the profitability of the public sectors. Increase in expenses and decrease in revenues during the all the stages of the project are financial risks.

1) Planning Stage

Difficulty in land acquisition and expropriation are common major financial risk at this stage. Projects cannot start implementation until lands for the projects have been acquired. Delay in land acquisition forces the investors to wait and increase their indirect cost. Since administrative control is necessary for land acquisition and expropriation, such should be executed by the public sector. This risk can be seen in the projects including Construction of Access Railway to Soekarno-Hatta Airport. Two railways, i) Express Railway and ii) Commuter Railway, are planned for the access railway. Land acquisition in the access railway project is needed mainly in Express Railway.

2) Construction Stage

In case infrastructure development and operation are separated for PPP projects, basic infrastructure development is by the public sector. Without the completion of the development of basic infrastructure by the public sector, succeeding parts of the

infrastructure cannot be developed and the project cannot reach the operation stage. The private sector cannot shoulder the construction cost for the incomplete portion. Therefore, a government performance guarantee should be issued. This guarantee is necessary for the private sector to utilize the project finance scheme. This risk can be seen in the projects including Development of New International Seaport.

3) Operation Stage

In the operation stage, there is a risk of not being able to achieve the expected revenue from the project operations. Setting the price of services, such as of water and transportation, should be flexible, and the involvement of the private sector in decision making should be considered. Viable Gap Funding (VGF) by the government is also considered. This risk can be seen in the projects including Development of New International Airport.

(2) Legal Risks

The Legal risks are obstacles related to laws and regulations for the smooth implementation of projects.

1) Planning Stage

Risk allocation between the public and private sectors is not clear. The private sector including investors is afraid of undertaking more risks, which the public sector should take. Accordingly, unclear risk allocation leads to the loss of the private sector. Clarifying risk allocation between the public and private sectors is vital to attract the private sector to participate in the project. Deciding the right contract such as Model Concession Agreement is desirable. This risk can be seen in the projects including Construction of Access Railway to Soekarno-Hatta Airport.

Time consuming processes in obtaining various government approvals are also viewed as risks. In particular, it takes a great deal of time obtaining approvals for environmentally sensitive activities, especially those related to water use or forest area development. The projects including development of geothermal plant can have this risk.

2) Construction Stage

If contractors do not follow the laws and regulations on environment and labor, incidents such as accidents, human errors, and negative environmental impacts may occur. Enforcement of concerned laws and regulations during the construction stage is important in order to avoid such unwanted events. This risk can be seen in the projects including Construction of Access Road to Cilamaya Port.

3) Operation Stage

Sustainability of the project can not be secured due to legal matters. For instance, when the operational period is quite long, extension of land right can be considered. However, the current regulations regarding extension of land right are unclear. Support measures for O&M are also necessary. The projects including Development of New Township can have this risk.

(3) Engineering Risks

The common engineering risks in each development stage will influence the performance of infrastructure.

1) Planning Stage

Weak execution of planning and design is an engineering risk since facilities in the project would not function as expected. For instance, the attractiveness and efficiency of the new township would decrease if the proposed plan does not correspond with other projects such as road and railway construction. Insufficient understanding of tide movement could cause failure in constructing a berth that would be used for 24-hour operation in the seaport sector. In this regard, planning and design are important in engineering.

2) Construction Stage

The project management risks are mainly focused during the construction stage. The risks consist of delay of completion, low quality of structures, accidents, and negative environmental impacts such as noise and vibration. This risk can be seen in the projects including Development of New International Airport. In order to avoid such risks, a well experienced PMC should manage the construction works.

3) Operation Stage

Accidents due to substandard operations as well as negative environmental impacts are engineering risks during the operation stage. There is a possibility that water supply or power supply is interrupted during the operation stage. It negatively affects not only service providers but also service users. It would be inconvenient to the lives of service users and it would also burden service providers with additional expenses. Water pollution and traffic accidents are also considered risks during operation stage.

(4) Institutional Risks

Institutional risks are mainly related with insufficient coordination among stakeholders to support project implementation and enhance the value of the facilities developed in the

projects.

1) Planning Stage

The risks of insufficient coordination among concerned agencies are pointed out as an institutional risk in the planning stage. Coordination referred here is mainly related with the elaboration of planning and design as seen in the planning stage of engineering risks. The risk can be seen in the projects including Improvement of Road Network in JABODETABEK. The validity of the project should be discussed considering comprehensive views on the project's relation with other projects as well as considering merit and demerit of the project with regard to concerned agencies.

2) Construction Stage

Obtaining support from the concerned stakeholders is important to implement the project smoothly. However, there is a risk for objection by local residents during the construction stage. In order to obtain the understanding and support from the local residents, coordination among the stakeholders is necessary.

3) Operation Stage

Inconvenience and inefficiency to people's lives and business activities in the project area as caused by insufficient coordination among stakeholders are main risks during the operation stage. Without cooperation with the police, the traffic jams could occur during the operation stage of road projects. If various private developers are involved in a new township project, their applied standards of infrastructure development may vary among the areas, and it could cause inefficiency.

(5) Political Risks

Political risks are related with the use of influence or power of concerned politicians.

1) Planning Stage

In case political support is not given to the target projects as well as to other related projects, it is expected that implementation of such projects would be difficult. Even if political support is gained, political power would affect prices of services such as water and bus fees, and decision for the routes of railways and roads.

2) Construction Stage

In the construction stage, discontinuation of revenue subsidies such as service purchase fee can be taken in effect due to political change. Discontinuation of the subsidies influences the business environment of private sectors during the construction. It can lead the delay of the construction work.

3) Operation Stage

There is a risk of unsatisfactory operation and maintenance including inadequacy of budget and support if the concerned politicians disvalue operation and maintenance. Also, investors understand that political power might affect the transfer of the project from the private sector to the public sector in a BOT project.

CHAPTER 11 CONCLUSIONS AND RECOMMENDATIONS

11.1 CONCLUSIONS

The Master Plan for Establishing Metropolitan Priority Area for Investment and Industry in JABODETABEK Area was prepared by incorporating the professional views of the Study Team, fully considering the current setting of the area and current situations of infrastructure, and taking into account the future directions of the area specified in MP3EI.

The Study Team therefore recommends that the GOI implements the MPA Master Plan. The Study Team considers that implementation of the MPA Master Plan would ensure the promotion of investment and industry in the JABODETABEK MPA. Development issues, such as mitigation of traffic congestion and flood risks, assurance of smooth logistics flow, prevention of environmental pollution, water shortage, mitigate flood risks, and conservation of energy are to be solved by implementing the proposed Fast-Track Projects (FTPs) and Priority Projects (PPs). The Study Team therefore recommends that a monitoring mechanism for facilitating the proposed FTPs and PPs should be established.

11.2 RECOMMENDATIONS

(1) Promotion of Investment for Infrastructure Development

In order to attract investment and promote industries, the JABODETABEK MPA needs to develop more infrastructures to mitigate traffic congestion and flood risks, facilitate smooth logistics flow, prevent environmental pollution, meet the growing water demand, and save energy. Although GOI has recognized the necessity for the developments, it could not allocate adequate budget to develop such infrastructure due to the financial constraints. The breakdown of expenditures of the central government in 2011 shows that the expenditure share for development is 12%, which was less than that for fuel related subsidy of 27% and that for personnel expenditure of 21%. In order to implement development of necessary infrastructure under this financial situation, encouraging the involvement of private sectors is necessary. The government should promote the application of PPP scheme for its development projects.

(2) Transformation from Single-Core Urban Structure to Multi-Core Urban Structure

Densification in Jakarta has been progressing to date, and the flow of people and goods has been concentrated toward Jakarta. Traffic congestion and degradation of the living environment in Jakarta are becoming more serious year by year. If densification in Jakarta continues, traffic and living environmental problems as well as vulnerability to disasters

will be more serious. The JABODETABEK MPA should shift from a single-core urban structure to a multi-core urban structure, which involves a central city and small sub-centers in its suburbs. A multi-core urban structure should be adopted to lessen traffic congestion, protect the natural environment, and be more resilient to disasters.

In the transformation to a multi-core urban structure, the balance between development and protection should be addressed. Agricultural land along the seashore in the northeast and northwest of the JABODETABEK MPA as well as water resources in the south should be protected. Development in the east and west should be promoted in. Since promoting investment and industry is one of the objectives of MPA Master Plan, encouraging developments in the east is emphasized. The existing industrial estates are agglomerated, and new gateway functions are planned in the east.

(2) Necessity of Urban Transport Improvement

In line with the increase of personal income and surge in the number of cars and motorcycles in Jakarta Metropolitan Area, it is expected that the current motorcycle users would shift to using cars therefore exacerbating the current chronic traffic congestion. However, there have been no significant developments of road network in the urban area during this decade due to difficulty in the land acquisition process and limited budget of the transportation sector; On the other hand, some smaller metropolitan areas in Asia such as Delhi, Shanghai and Bangkok have expeditiously developed mass transit networks in recent years. Development of mass transit networks such as railways which have high capacity and minimal environmental impact, and are economically efficient is essential to achieve sustainable development of the region considering population size, density and growth of Jakarta Metropolitan Area.

(3) Necessity of Improving Logistics Networks

Jakarta Metropolitan Area is the capital of Indonesia having approximately 20% share of economic activities of the country. In addition, it is a connecting point of the Java and Sumatra economic corridors defined in the MP3EI. Thus, smooth movement of goods in the region is a national concern. The current demand of the two gateways of the region, Tanjung Priok Port and Soekarno-Hatta International Airport, exceeds their capacities. Such situations are obstacles to economic growth. The chronic traffic congestion in the region contributes to economic loss due to the long travel time. The development of new international gateways in addition to the existing airport and seaport, as well as highway networks such as toll roads and access roads at freight transport hubs, is essential for efficient movement of freight.

(4) Necessity of Urban Environment Improvement

Population in the JABODETABEK MPA was projected to increase from about 28 million in 2010 to about 33 million in 2020. Due to Indonesia's stable economic growth, share of the middle class in the population was expected to grow in 2020. In addition, promotion of investment and industry was proposed in the MPA Master Plan. Water demand, environmental problems such as discharge of wastewater and solid waste, and flood risks, are also increasing as both the population and economy grow. Therefore, water shortage, water pollution, odor from solid waste, and flood damage will be more serious. In order to avoid negative environmental impacts as much as possible, the urban environment should be improved by pursuing the following: the Jatiluhur projects in order to meeting future demand; sewerage development in accordance with the Sewerage Master Plan prepared by DKI Jakarta; solid waste management such as new landfill developments and intermediate treatment facilities; and flood control such as increase in the capacity of discharging flood water to the sea.

(5) Necessity of Analysis on Project's Modality and Financial Source

It is important to adopt the most appropriate modality and financial source for the MPA projects. The basic approach in considering the modality and financial source is as follows:

1) It is necessary to assess whether the project can be implemented by private initiative.
2) If the private sector can take the initiative, the necessary conditions including government supports shall be identified.
3) If it is difficult to effectively undertake through private initiative, the project shall be implemented by the public sector.

In order to figure out the most appropriate modality and financial source, it is necessary to conduct a detailed feasibility study which includes financial and project modality analyses.

(7) Solution to Issues in Promoting PPP Projects

The MPA projects are supposed to be implemented mainly through PPP. The GOI has serious budgetary constraints and cannot finance all the MPA projects on its own; therefore, GOI has been promoting PPP projects since 2004 in order to overcome this situation. However, despite of such expectations, the number of PPP has not increased significantly. It is recommended that GOI shall immediately address the following issues to successfully implement PPP projects:

1) Acceleration of land acquisitions

Land acquisition in many PPP projects is often delayed. This situation makes potential investors reluctant to participate in bidding and invest in the projects. In addition, it seems that the revision of the land acquisition law in 2012 has not been sufficient to solve this problem because it does not strengthen incentive and/or penalty functions to local governments, which actually conduct land acquisition administration. Therefore, GOI should act to realize smooth and timely implementation of land acquisition.

2) Development of "Implementation" skills of the Contracting Agencies

The government officers of GOI have little experience of PPP, although they are making efforts to obtain sufficient knowledge and skills of managing PPP, including F/S, procurement, contract agreement, and project monitoring. The inexperience still hinders smooth implementation of project. The capacity developments of PPP for officers in both central and local governments are expected.

3) Securing budget on appropriate timings by Government Contracting Agencies

In order to conduct PPP projects, the contracting agencies need to secure budget for F/S, transaction advisors, and governments supports. However, the budgeting process for PPP projects is not formalized and the Contracting Agencies often face difficulties in securing the appropriate amount of budget on time. It is recommended that the budgeting processes shall be formalized to realize appropriate budgeting process for PPP projects.

4) Clarifying demarcation of risks on private sectors

In many cases, it seems that private sectors take some risks which public sectors should take. One of the examples is the traffic demand risk. In some cases, it is quite difficult for a private entity to project the demand and estimate the project costs and revenues. In other cases, there is a risk of Contracting Agency's payment capacity. Contracting Agencies need to realize the appropriate risk sharing between the public and private. Moreover, the scope and conditions of the government's guarantee shall be improved in order to enhance the credibility and sureness of projects.

5) Allowance of providing direct subsidies to private entities by the government

In Indonesia's PPP projects, the governments are not allowed to provide direct subsidy (Viability Gap Funding) to private entities. Instead the government supports the projects by constructing some projects facilities. It, however, has risks of scheduling, quality matching and asset liability, so it makes private entities hesitant to participate in the projects. Therefore, it is necessary for GOI to review the existing laws and regulations and allow provision of direct subsidy to private entity.

(8) Monitoring of Fast Track Project

Successful implementation of Fast Track Projects is crucial for JABODETABEK MPA to take the first step for promoting investment and industry. To remove bottlenecks hindering the implementation of the projects and to implement the project smoothly, it is significant for the government to monitor fast track project. Monitoring and reporting system should be established to take appropriate remedy if there are any problems in the project implementation.

(9) Conducting of Feasibility Study for Priority Projects

Feasibility study should be conducted to realize the implementation of the proposed priority projects. Related institution, natural and social environmental impact, cost and benefit, possibility of fund raising, etc, should be thoroughly studied. Conducting of the feasibility studies allows new proposals for shortening of construction period and reduction of operational cost, which benefits for both public and private sectors.

(10) Implementation of Priority Projects and Fast Track Projects

Implementation of the proposed project for nine infrastructure sectors leads to solve the development issues and reach benchmark in 2020 expressed as target effect indicator. Furthermore, the project implementation is crucial for realizing MPA Vision 2030.

Table 11.1.1 Cost of Priority Projects and Fast Track Projects

GOALS AND PROGRAM		POTENTIAL PROJECTS	COST (Billion IDR)
A. BETTER URBAN ENVIRONMENT			
A.1	Development of MRT-based New Urban Transport System	(1) Jakarta Mass Rapid Transit (MRT): N-S I, N-S II, E-W as FTP 3.1	33,300
		(2) JABODETABEK Railways Capacity Enhancement Project (Phase I) as FTP 3.2 and Further Improvement as Phase II	8,300
		(3) Development of Jakarta Monorail	
		(4) Station Plaza Development and Park & Ride System Enhancement	4,400
		(5) Introduction of Common Ticketing System (Smart Card)	500
A.2	Development of Road Network in and around Jakarta	(1) Improvement of Road Network in JABODETABEK-Enhancement of Road Network Capacity in JABODETABEK as FTP 4.1	1,900
		(2) Development of Jakarta Outer Outer Ring Road	25,400
		(3) Introduction of Intelligent Transport System (ITS) in JABODETABEK	1,000
A.3	Promotion of Urban Re-development	(1) Pilot Project of Urban Development/ Re-development	2,100
A.4	Improvement of Water Supply and Sewerage Systems	(1) DKI Jakarta – Bekasi – Karawang Water Supply (Jatiluhur) as FTP 6.1	4,400
		(2) Rehabilitation of Water Distribution Facilities in DKI Jakarta, Bekasi and Karawang, with the integration of DKI Jakarta – Bekasi – Karawang Water Supply (Jatiluhur)	1,000
		(3) Development of Sewerage System in DKI Jakarta	14,300
		(4) Development of Water Supply Systems for Large-scale Infrastructure Development	4,300
A.5	Solid Waste Treatment	(1) Construction of the West Java Regional Solid Waste Treatment as FTP 7.1	1,000
		(2) Development of New Landfill Site at Tangerang	600
A.6	Flood Management	(1) Reconstruction of East Pump Station at Pluit as FTP 8.1	200
		(2) Development of Urban Drainage System in DKI Jakarta	5,500
		(3) Normalization of the Rivers in JABODETABEK	3,000
B. NEW GROWTH SUB-CORRIDOR FOR JABODETABEK MPA			
B.1	Development of New Growth Sub-Corridor for Jabodetabek MPA	(1) Development of New Township	5,600
		(2) Development of New Industrial Estate in the Vicinity of the New Airport	1,700
B.2	Development of New Academic Research Cluster	(1) Development of New Academic Research Cluster	2,800
B.3	Development of Road/Railway along New Growth Sub-Corridor for Jabodetabek MPA	(1) Construction of Second Jakarta-Cikampek Toll Road	4,800
		(2) Improvement of Road Network in JABODETABEK-Improvement of Road Network within the Industrial Area to the East of Jakarta as FTP 2.2	200
		(3) Construction of Access Road to New Cilamaya Seaport as FTP 1.2	5,900
		(4) Construction of Freight Railway to New Cilamaya Seaport	3,400
		(5) Construction of Access Road to the New International Airport	2,200
		(6) Construction of Jakarta-Bandung High Speed Railway via the New International Airport	39,800
C. MULTIPLE GATEWAYS			
<SEAPORT>			
C.1	Development of Cilamaya Port	(1) Development of a New International Port as FTP 1.2	14,900
		(2) Development of New Car Terminal at Cilamaya Port	400
		(3) Development of Logistics Park (Supporting Facilities for the New Port)	5,800
C.2	Improvement of Tanjung Priok Port	(1) Improvement and Expansion of Container Terminal at North Kalibaru as FTP 1.1	24,000
		(2) Expansion of Car Terminal at Kalibaru	200
<AIRPORT>			
C.3	Development of New International Airport	(1) Development of New International Airport	35,300
C.4	Improvement of Soekarno-Hatta International Airport (SHIA)	(1) Construction of Soekarno-Hatta International Airport as FTP 5.2	17,400
		(2) Construction of Access Railway to Soekarno-Hatta International Airport as FTP 5.1	12,500
D. LOW-CARBON ENERGY DEVELOPMENT			
D.1	Low-Carbon Power Supply Development	(1) Development of Central Java Coal-fired Power Plant as FTP 9.6	30,100
		(2) Construction of Indramayu Coal-fired Power Plant as FTP 9.2	20,400
		(3) Development of Banten Coal-fired Power Plant as FTP 9.3	8,600
		(4) Development of Gas-fired Power Plant and FSRU (Floating Storage Regasification Unit) as FTP 9.4	10,700
		(5) Development of Rajamandala Hydroelectric Power Plant as FTP 9.5	1,300
		(6) Construction of Java-Sumatra Interconnection Transmission Line as FTP 9.1	19,700
		(7) Other Renewable and Low-Carbon Emission Power Projects connecting to Java-Bali-Sumatra Power Network	7,100
		(8) Development of West Java Coal-fired Power Plant with Clean Coal Technology	20,300
D.2	Development of Smart Grid	(1) Smart Community (including a pilot project for the Smart Grid) as FTP 2.1	300
		(2) Improvement of JABODETABEK Power Supply Quality	4,700
T o t a l			**411,300**

Source: MPA Study Team

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ANNEX I

POTENTIAL INNOVATION WITH JAPANESE ADVANCED TECHNOLOGIES

ANNEX I. POTENTIAL INNOVATIONS FROM JAPANESE ADVANCED TECHNOLOGIES

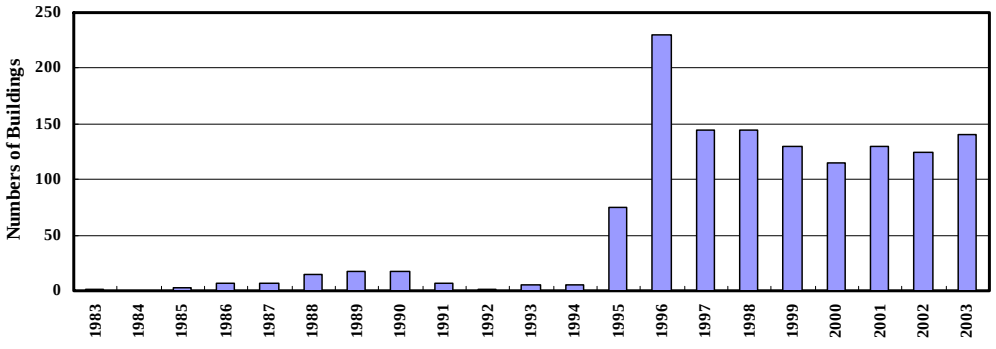
A.I.1 Safe and Secure Approach

Japanese advanced technologies could contribute to the realization of growth and promotion of the“safe and secure” approach in Indonesia. This can be achieved by working together utilizing Japanese technology and experiences as the driving force for the purpose of sustainable growth of Indonesia. Both the Government of Japan (GOJ) and the Japanese private sector will contribute to provide assistance in infrastructure development such as urban railways, urban transportation networks, water supply, and energy. Such infrastructure development would be in harmony with the environment. In line with the above concept, several Japanese advanced technologies, which can be applied toward sustainable growth of the JABODETABEK MPA, are introduced.

A.I.2 Technologies against Natural Disaster

(1) Seismic Isolation Technologies

In Japan, the number of seismically isolated buildings has been increasing every year since the occurrence of “The Southern Hyogo Prefecture Earthquake in 1995”. Recently, the number of detached houses with seismic isolation has also been increasing due to the frequent occurrence of earthquakes in the Japanese archipelago. Figure A.2.1 shows the number of constructed buildings with seismic isolation by year. The first seismically isolated building was built in 1983. After “The Southern Hyogo Prefecture eErthquake in 1995”, the construction of such buildings increased dramatically. Half of these are condominiums. Moreover, most hospitals were recently installed with seismic isolation systems.



Source: Technology Committee Report, 2005, Transition of Seismically Isolated Structures in Japan

Figure A.2.1 Chronology in the Number of Seismically Isolated Buildings in Japan

There are several conventional methods for strengthening existing buildings, such as: (i) providing additional reinforced concrete shear walls or steel bracing; (ii) thickening of existing walls; and (iii) enhancing shear capacity of columns by jacketing reinforced

concrete with steel plates or carbon fiber sheets. However, construction for such methods is mostly done inside the building, which causes inconvenience to the users or residents of the buildings to some extent. In order to avoid such disturbance on their daily lives, exterior strengthening methods or seismic isolation retrofitting are preferred at present. Such methods involve construction works that can be done outside the building or within a limited area as shown in Figure A.2.2.

Courtesy of Taisei Corporation

Figure A.2.2 Factory in Japan Equipped with Seismic Isolation System

(2) Underground River Channel with Flood Retarding Reservoir

Flooding is the most common type of natural disaster that befalls Tokyo Metropolitan Area. Increasing the coverage of ground pavement with asphalt and concrete causes the river system to frequently erode at its banks and inundate properties along the river course.

Courtesy of Taisei Corporation

Figure A.2.3 Underground River Channel

Widening of the river or raising the structures' levels is impractical because urban areas are densely built up along medium and small waterways. Accordingly, the Tokyo Government decided to construct underground rivers under two major ring roads, nos. 7 and 8. The underground river channel as shown in Figure A.2.3 provides flood prevention against an hourly rainfall of about 75 mm, which corresponds to a return period of once in 15 years.

A.I.3 Urban Transportation

(1) Tunnelling Technology for Urban Expressway

As illustrated in Figure A.3.1, the Yamate Tunnel in Tokyo Metropolitan Area was constructed for the purpose of alleviating heavy traffic congestion on the road networks of Tokyo. The tunnel was constructed just beneath the surface of the arterial road. In order to

minimize the adverse effects on arterial road traffic and surrounding environment, "Shield Tunnelling Method" which involves digging underground using a shield machine, was applied for the tunnel's construction.

a) Image of Yamate Tunnel **b) Shield Machine**

Courtesy to Metropolitan Expressway Company Limited

Figure A.3.1 Yamate Tunnel in Tokyo Metropolitan Area

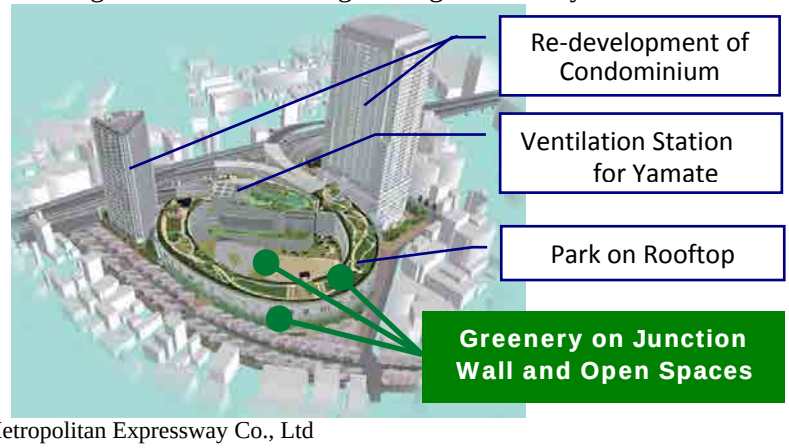
The merging/diverging sections of the entrance/exit were constructed using "Shield Tunnel Expansion Method" at deep undergrounds without opening cut from the ground surface, as illustrated in Figure A.3.2. This new technology minimizes the negative effects on surface traffic flow, and reduces duration of construction negative environmental impacts and total cost.

Courtesy of Metropolitan Expressway Co., Ltd.

Figure A.3.2 Shield Expansion Methods

(2) Junction at an Urban Area

The Ohashi Junction was constructed based on a completely new concept of "Junction at an urban Area", which involves innovative solutions for city planning, smooth traffic flow, environment along the road, and th neighboring community, as illustrated in Figure A.3.3.



Courtesy of Metropolitan Expressway Co., Ltd

Figure A.3.3 Bird's Eye View of Ohashi Junction in Tokyo Metropolitan Area

The junction was planned as a four-layer, loop-shaped structure, which resolved the elevation difference of 70 m between Yamate Tunnel and the existing viaduct. In order to ensure safe and comfortable driving in such road alignments, various driving support measures have been taken. The carriageways were fully covered with solid walls to reduce environmental impacts on the surrounding neighborhoods such as air pollution and traffic noise. The roof has been constructed as a park for local residents, aiming to provide green spaces in an already highly developed urban area.

The construction of the junction also involved coordination with neighbouring communities and hence, the scheme allows residents in the neighbouring communities to return to their homes after the completion of the redeveloped condominium building. This concept induces fairness in land acquisition, and it could reduce the risk of significant delay in project implementation. The situation before and after its implementation are shown in Figure A.3.4.

Courtesy to Metropolitan Expressway Co., Ltd

Figure A.3.4 Situation Before and After Construction of Ohashi Junction

A.I.4 Development of Areas around Railway Stations

The principal role of an urban railway is to transport commuters from suburban areas to the city center. However, transportation demand for people going on shopping or for recreation on holidays cannot be disregarded. It would be very meaningful to build department stores, hotels, and business establishments around railway stations in partnership with the public sector. Typical cases are commerce and business agglomerations at sub-center terminals, such as Shinjuku, Ikebukuro and Shibuya in Tokyo, which are in located at the outskirts of the central business district (Refer to Figure A.4.1).

Source: MPA Study Team

Figure A.4.1 Shops and Restaurants inside the Station

A.I.5 Emergency Disaster Prevention Measures in the Metro Project

Disaster prevention measures mainly take into consideration the evacuation of passengers in the event of an emergency such as flood, fire, earthquake, failure of traction power and terrorism. Some examples of disaster prevention measures are shown in Figure A.5.1.

Flood Protection Gate at Station Entrance

Flood Protection Gate Inside Tunnel

In-Train Handy Fire Extinguisher

Anti-Flood Panel at Station Entrance

Flood Protection Valve At Ventilation Shaft

Installation Point of Anti-Flood Panel

Water Laving Pump

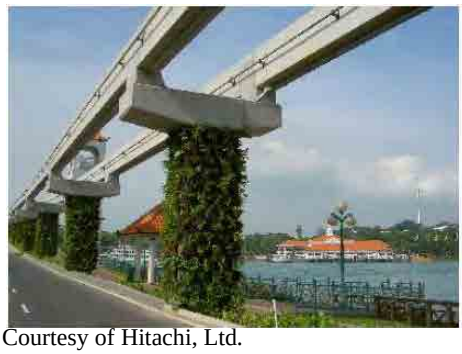
Fire Protection Gate Inside Station

Source: MPA Study Team

Figure A.5.1 Examples of Disaster Prevention Measures

A.I.6 Monorail System

The “Simple and Slim” concept of monorail systems enabled their construction using concrete with lesser weight and volume than other railway systems. In this regard, a monorail system can be implemented at a relatively shorter construction period and more economically. In addition, a monorail system also provides a better city view due to its less volume of structures, as shown in Figure A.6.1. These three advantages contribute to the fact that the Monorail System is an environmentally friendly system.



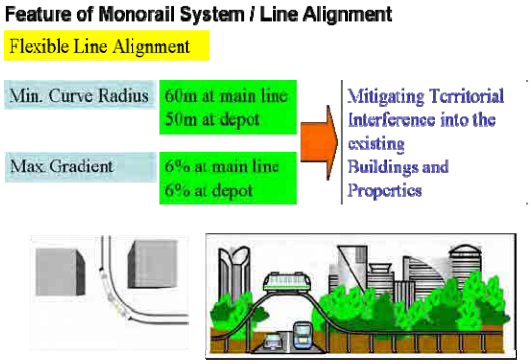
Courtesy of Hitachi, Ltd.

Figure A.6.1 Environmental-Friendly System of Monorail System

The features of a Monorail System are described as follows:

(1) Line Alignment

In an urban area that is covered with structures such as buildings, roads and bridges, the flexible line alignment of the monorail system mitigates the territorial interference with the existing buildings and properties as shown in Figure A.6.2.

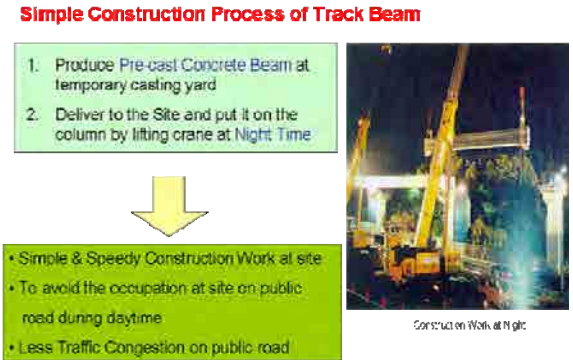


Courtesy of Hitachi, Ltd.

Figure A.6.2 Line Alignment Ability

(2) Duration of Construction

By using the precast concrete beams, which are produced at a temporary casting yard, the duration of construction for a monorail system can be up to 30-50% less than other railway systems as shown in Figure A.6.2.



Courtesy to Hitachi, Ltd.

Figure A.6.2 Short Construction Period

(3) Cost Saving

Past data on railway system construction in Japan show that the cost for beam structures used for monorail construction can save approximately 30% of the construction cost of other railway infrastructure.

(4) Passenger Carrying Capacity

A monorail is not a mass railway transport system, but it is capable of carrying a similar number of passengers. A monorail system with six cars and 90m long platform has the capacity of carrying 48,320 passengers per hour per direction (pphpd), with a minimum operating headway of 90 seconds and density of 6 passengers/m^2.

(5) Monorail Train Appearance

Monorail is a proven system that has been implemented in various cities around the world. Some examples of monorail trains are shown in Figure A.6.3.

Courtesy of Hitachi, Ltd.

Figure A.6.3 Monorail Train Appearance

A.I.7 Bi-Mode Super Express Train

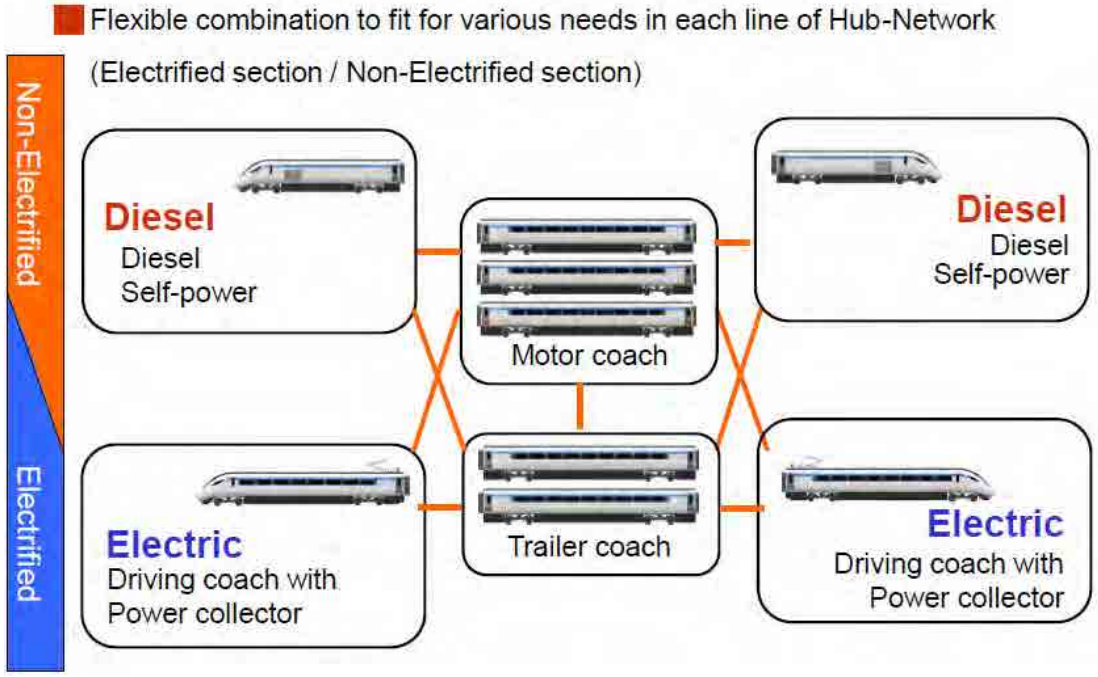
The "Bi-mode Super Express Trains" will be fully electric and "bi-mode" eco-friendly trains, which can switch from electric to diesel power. An illustration of the "Bi-mode Super Express Train" is as shown in Figure A.7.1.

Courtesy of Hitachi, Ltd.

Figure A.7.1 Bi-Mode Super Express Train

Shown in Figure A.7.2 are the features that increase the capacity and environmental performance of trains over their current designs, i.e., the ability to divide a train in order to serve different sub-routes; modular design with three different variants that can be powered by electricity, diesel or both; and a design speed of 200 km/h accommodating higher maximum speeds up to 250 km/h as shown in Figure A.7.2. The specifications also meet 'the flexibility to operate on inter-urban and commuter routes as well as long-distance journeys'.

The traction systems either 25 kV AC overhead or bi-mode 25kV AC overhead with diesel motors. All trains have at least one diesel motor for backup and depot use.



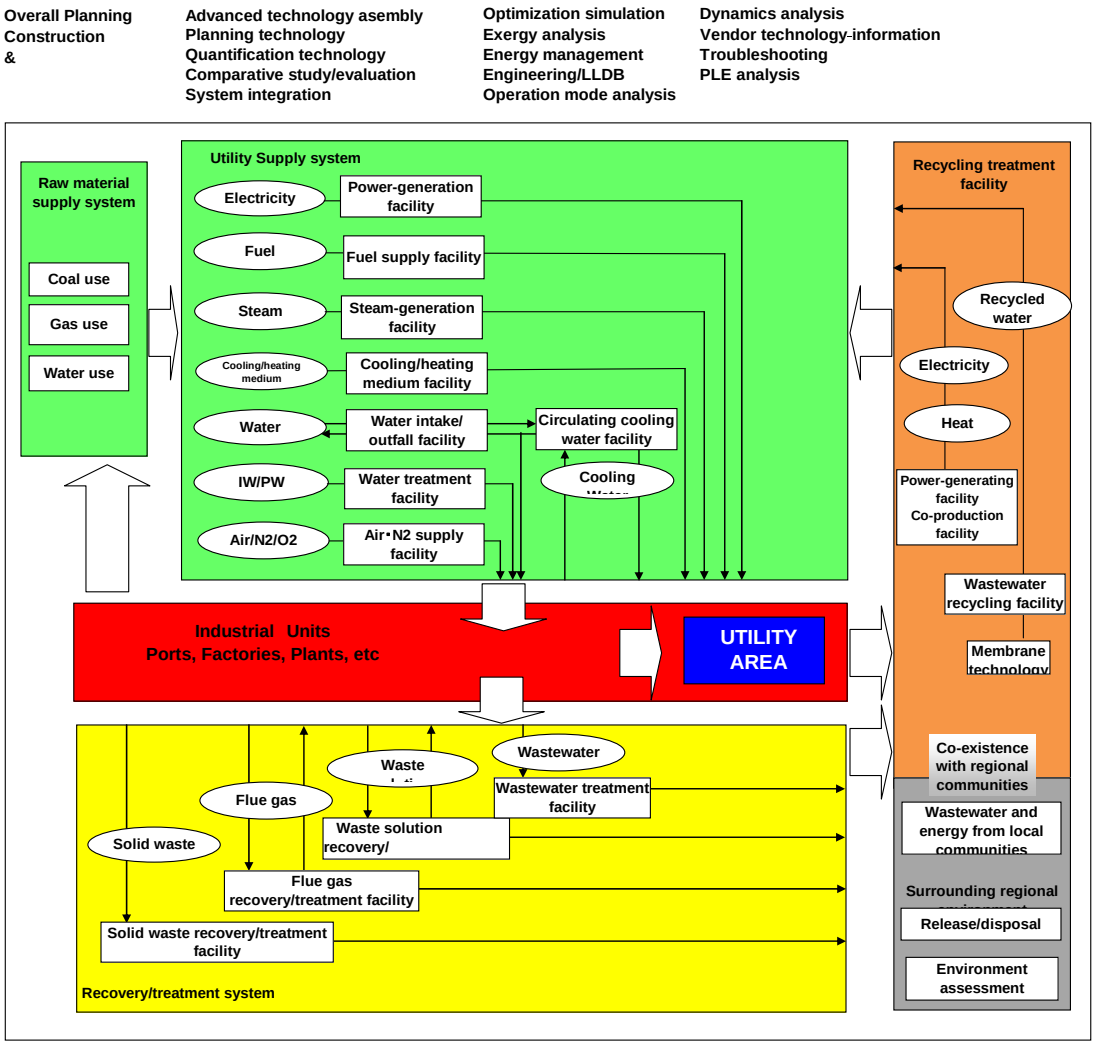
Courtesy of Hitachi, Ltd.

Figure A.7.2 Flexible Combination to Fit for Various Needs in Each Line of Hub-Network

The bi-Mode drive system can operate the same train on both the "Electrified" and "Non-electrified" sections. Initial investment cost is also reduced because it would be unnecessary to build electrification facilities along the wayside (e.g., Power sub-station, Power feeder line, and Cabling work).

A.I.8 Integrated Regional Utility System

The demand for energy integration and improvement of its efficiency are becoming more complicated and diverse due to serious environmental regulations and higher health, safety, and environment (HSE) requirements. In order to meet such complicated and diverse demands, the integration of various components of the latest available technologies in different fields is required. For example, an optimal regional utility system (integrated utility system) for industrial complexes and surrounding regional communities is introduced, as shown in Figure A.8.1.



Courtesy of Chiyoda Corporation

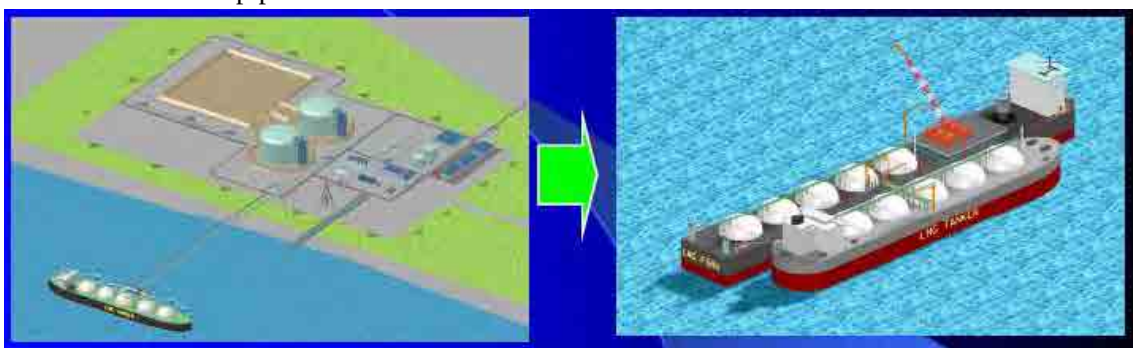
Figure A.8.1 Integrated Regional Utility System

The advantages of an integrated regional utility system are the following: (i) utilization of

unused heat sources, (ii) utilization of unused power sources, (iii) maximum utilization of facility capacity, (iv) sophistication of energy management, (v) improvement of industrial plant efficiency and operability using a hybrid system, (vi) utilization of various membrane technologies, (vii) water recycling and "Zero Liquid Discharge", (viii) reuse of unused wastewater, (ix) effective utilization of wide area energy through integration of energy from public and localized facilities, and (x) integration with new energy sources suited for dispersed and less environment-affecting regional energy utilization in order to fill the gap between the existing and planned energy supply scheme.

A.I.9 Floating Storage and Regasification Unit (FSRU)

The energy demand in Indonesia has been growing far more rapidly than the energy industry can accommodate. Thus, alternative resources are being studied by the energy industry in order to address the deficit in energy production. Liquefied Natural Gas (LNG) is one of the alternatives being explored. Recent advancements in technology have provided energy companies the ability to transport and deliver LNG to long distances. Moreover, because of the impending energy shortage, government agencies have relaxed the constraints, which have been imposed in recent years on granting offshore construction permits in relation to LNG terminals. An illustration of an FSRU is shown in Figure A.9.1. These terminals will help in the delivery of LNG to onshore locations via subsea pipelines and infrastructure..



Courtesy of Chiyoda Corporation

Figure A.9.1 Regional Gas Utilization Node: FSRU

A.I.10 Jet Fuel Supply System (Hydrant System)

The "Jet Fuel Supply System (Hydrant System)" with the latest technologies can provide reliable function based on its operations at Mombasa International Airport in Kenya, Narita and Chubu International Airports in Japan, and Surabaya, Padang and Denpasar Bali International Airports in Indonesia. The jet fuel supply system is as shown in Figure A.10.1.

Additionally, it can also provide the latest "Baggage Handling System with In-line Security Systems" according to the MPA Study Team's experience in Tokyo International Airport.

<Juanda International Airport Surabaya, Indonesia>

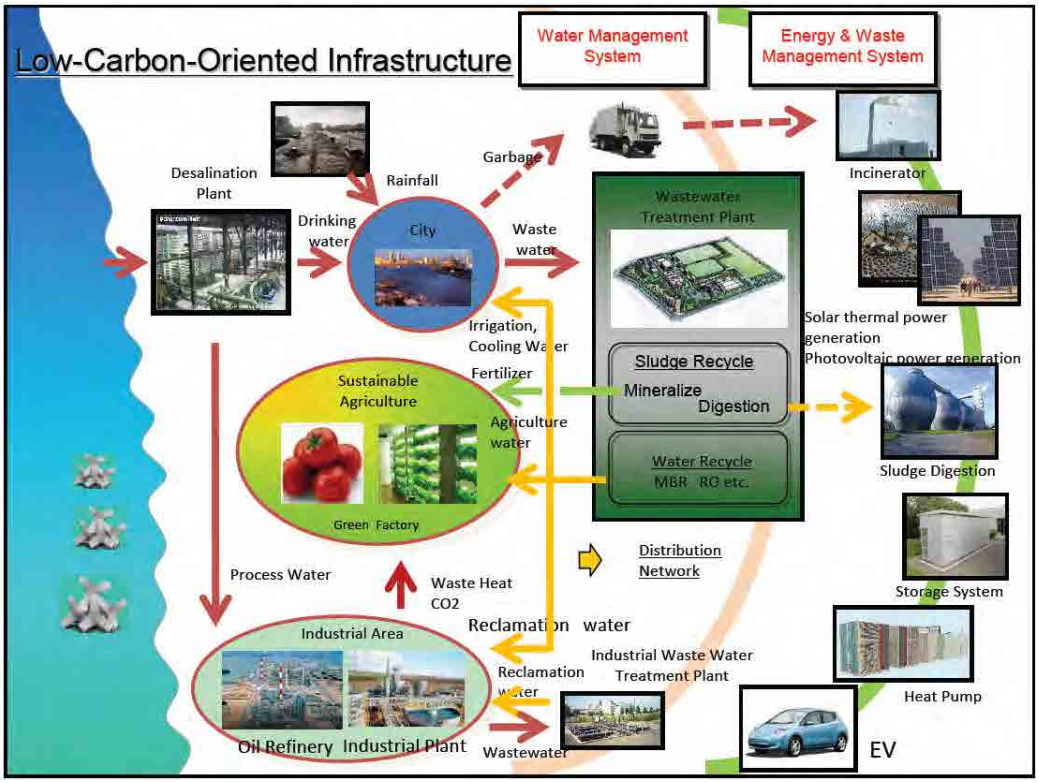
<Central Japan International Airport Nagoya, Japan>

Courtesy of JGC Corporation

Figure A.10.1 Jet Fuel Supply System

A.I.11 Low-Carbon Oriented Infrastructure

A "Japanese-style water supply model" can be established by integrating water supply business with advanced technologies such as photovoltaic power generation, electricity storage, energy saving equipment like heat pumps, vegetable plant factories, electric vehicles, and social infrastructure like new transportation systems. It also considers integrating such technology with information systems and operation and maintenance services, making it possible to provide significant contribution to city planning, which is aimed at low-carbon oriented and energy saving cities. A diagram of low-carbon oriented infrastructure is shown in Figure A.11.1.



Courtesy of JGC Corporation

Figure A.11.1 Low-Carbon-Oriented Infrastructure

ANNEX II

POPULATION FORECAST

ANNEX II. POPULATION FORECAST

A.II.1 Population of Indonesia by Province

(1) Penduduk Indonesia menurut Provinsi 1971, 1980, 1990, 1995, 2000 dan 2010

Provinsi	Penduduk					
	1971	1980	1990	1995	2000	2010*)
Aceh	2,008,595	2,611,271	3,416,156	3,847,583	3,930,905	4,494,410
Sumatera Utara	6,621,831	8,360,894	10,256,027	11,114,667	11,649,655	12,982,204
Sumatera Barat	2,793,196	3,406,816	4,000,207	4,323,170	4,248,931	4,846,909
R i a u	1,641,545	2,168,535	3,303,976	3,900,534	4,957,627	5,538,367
J a m b i	1,006,084	1,445,994	2,020,568	2,369,959	2,413,846	3,092,265
Sumatera Selatan	3,440,573	4,629,801	6,313,074	7,207,545	6,899,675	7,450,394
B e n g k u l u	519,316	768,064	1,179,122	1,409,117	1,567,432	1,715,518
L a m p u n g	2,777,008	4,624,785	6,017,573	6,657,759	6,741,439	7,608,405
Kep. Bangka Belitung	-	-	-	-	900,197	1,223,296
Kepulauan Riau	-	-	-	-	-	1,679,163
DKI Jakarta	4,579,303	6,503,449	8,259,266	9,112,652	8,389,443	9,607,787
Jawa Barat	21,623,529	27453525	35,384,352	39,206,787	35,729,537	43,053,732
Jawa Tengah	21,877,136	25372889	28,520,643	29,653,266	31,228,940	32,382,657
DI Yogyakarta	2,489,360	2,750,813	2,913,054	2,916,779	3,122,268	3,457,491
Jawa Timur	25,516,999	29188852	32,503,991	33,844,002	34,783,640	37,476,757
Banten	-	-	-	-	8,098,780	10,632,166
B a l i	2,120,322	2,469,930	2,777,811	2,895,649	3,151,162	3,890,757
Nusa Tenggara Barat	2,203,465	2,724,664	3,369,649	3,645,713	4,009,261	4,500,212
Nusa Tenggara Timur	2,295,287	2,737,166	3,268,644	3,577,472	3,952,279	4,683,827
Kalimantan Barat	2,019,936	2,486,068	3,229,153	3,635,730	4,034,198	4,395,983
Kalimantan Tengah	701,936	954,353	1,396,486	1,627,453	1,857,000	2,212,089
Kalimantan Selatan	1,699,105	2,064,649	2,597,572	2,893,477	2,985,240	3,626,616
Kalimantan Timur	733,797	1,218,016	1,876,663	2,314,183	2,455,120	3,553,143
Sulawesi Utara	1,718,543	2,115,384	2,478,119	2,649,093	2,012,098	2,270,596
Sulawesi Tengah	913,662	1,289,635	1,711,327	1,938,071	2,218,435	2,635,009
Sulawesi Selatan	5,180,576	6,062,212	6,981,646	7,558,368	8,059,627	8,034,776
Sulawesi Tenggara	714120	942,302	1,349,619	1,586,917	1,821,284	2,232,586
Gorontalo	-	-	-	-	835,044	1,040,164
Sulawesi Barat	-	-	-	-	-	1,158,651
M a l u k u	1,089,565	1,411,006	1,857,790	2,086,516	1,205,539	1,533,506
Maluku Utara	-	-	-	-	785,059	1,038,087
Papua Barat	-	-	-	-	-	760,422
Papua	923440	1,173,875	1,648,708	1,942,627	2,220,934	2,833,381
INDONESIA	119,208,229	147,490,298	179,378,946	194,754,808	206,264,595	237,641,326

Catatan : Termasuk Penghuni Tidak Tetap (Tuna Wisma, Pelaut, Rumah Perahu, dan Penduduk Ulang-alik/Ngelaju)
Sumber : Sensus Penduduk 1971, 1980, 1990, 2000 dan Sensus Penduduk Antar Sensus (SUPAS) 1995

(2) Rasio Jenis Kelamin menurut Provinsi 1971, 1980, 1990, 1995 dan 2000

Provinsi	1971	1980	1990	1995	2000
Nanggroe Aceh Darussalam	100.21	101.49	101.05	100.01	101.1
Sumatera Utara	101.32	100.72	99.76	99.24	99.8
Sumatera Barat	93.69	95.53	95.88	94.07	96.1
R i a u	104.63	103.99	105.16	102.77	104.4
J a m b i	107.45	105.65	104.32	101.65	104.2
Sumatera Selatan	99.51	102.05	101.19	102.08	101
B e n g k u l u	101.99	103.23	105.63	101.85	103.2
L a m p u n g	102.33	107.28	105.51	104.89	106.2
Kep. Bangka Belitung	-	-	-	-	104
DKI Jakarta	102.13	102.58	101.95	100.56	102.5
Jawa Barat	96.79	99.12	100.51	100.82	102.1
Jawa Tengah	95.25	96.62	97.47	96.76	99.2
DI Yogyakarta	94.28	96.25	96.71	98.34	98.3
Jawa Timur	94.32	95.51	95.96	96.24	97.9
Banten	-	-	-	-	101.5
B a l i	97.94	98.39	99.46	100.21	101
Nusa Tenggara Barat	97.45	98.29	95.51	92.59	94.2
Nusa Tenggara Timur	101.99	99.56	98.34	98.09	98.6
Kalimantan Barat	104.21	103.49	103.85	104.81	104.7
Kalimantan Tengah	101.75	106.32	106.63	104.91	106.8
Kalimantan Selatan	96.31	98.82	99.63	99.39	100.5
Kalimantan Timur	106.96	111.64	110.91	106.23	109.7
Sulawesi Utara	100.57	102.27	102.74	102.99	104.9
Sulawesi Tengah	104.63	106.44	105.08	102.67	104.7
Sulawesi Selatan	94.77	94.94	95.5	94.88	95.1
Sulawesi Tenggara	91.31	96.89	99.7	96.61	100.7
Gorontalo	-	-	-	-	101
M a l u k u	103	104.43	103.82	102.98	102.8
Maluku Utara	-	-	-	-	104.7
Papua	141.44	109.29	110.49	103.83	110.4
INDONESIA	97.18	98.82	99.45	99.09	100.6

Sumber : Sensus Penduduk 1971, 1980, 1990, 2000 , dan Sensus Penduduk Antar Sensus (SUPAS) 1995

(3) Angka Fertilitas Total menurut Provinsi 1971, 1980, 1985, 1990, 1991, 1994, 1998, dan 1999

Provinsi	1971	1980	1985	1990	1991	1994	1998	1999
Nanggroe Aceh Darussalam	6	5	4.79	4	3.76	3.3	2.78	2.69
Sumatera Utara	7	6	5	4	4.17	3.88	3.08	3
Sumatera Barat	6.18	6	5	4	3.6	3.19	2.94	2.87
R i a u	5.94	5	5	4	n.a	3.1	2.85	2.77
J a m b i	6.39	6	4.62	4	n.a	2.97	2.87	2.8
Sumatera Selatan	6	6	4.78	4	3.43	2.87	2.78	2.71
B e n g k u l u	7	6	5	4	n.a	3.45	2.83	2.77
L a m p u n g	6	5.75	5	4	3.2	3.45	2.74	2.66
DKI Jakarta	5	3.99	3.25	2	2.14	1.9	2	2
Jawa Barat	6	5	4	3	3	3.17	2.61	2.55
Jawa Tengah	5.33	4.37	3.82	3	2.85	2.77	2.41	2.37
DI Yogyakarta	5	3	2.93	2	2.04	1.79	2	2
Jawa Timur	4.72	4	3.2	2	2	2.22	2.02	2.02
B a l i	6	4	3.09	2	2	2.14	2	2
Nusa Tenggara Barat	7	6.49	6	5	3.82	3.64	3.12	3.05
Nusa Tenggara Timur	6	5.54	5.12	5	n.a	3.87	3.15	3.06
Kalimantan Barat	6	5.52	4.98	4	3.94	3.34	2.92	2.81
Kalimantan Tengah	7	5.87	5	4	n.a	2.31	2.86	2.81
Kalimantan Selatan	5	5	3.74	3	2.7	2.33	2.58	2.53
Kalimantan Timur	5	5	4.16	3	n.a	3.21	2.6	2.55
Sulawesi Utara	6.79	5	4	3	2.25	2.62	2.38	2.36
Sulawesi Tengah	6.53	5.9	5	4	n.a	3.08	2.78	2.72
Sulawesi Selatan	6	5	4	4	3.01	2.92	2.7	2.65
Sulawesi Tenggara	6	5.82	5.66	5	n.a	3.5	3	2.87
M a l u k u	7	6	5.61	5	n.a	3.7	2.92	2.82
Papua	7	5	5	5	n.a	3.15	3.03	2.96
INDONESIA	6	5	4	3	3	2.85	2.65	2.59

Sumber : Sensus Penduduk 1971, 1980, 1990 , Sensus Penduduk Antar Sensus (SUPAS) 1985 , Survei Demografi dan Kesehatan Indonesia (SDKI) 1991 dan 1994

(4) Migrasi Seumur Hidup (Life Time Migration) Tahun 1971, 1980, 1985, 1990, 1995, 2000 dan 2005

Provinsi		1971	1980	1985	1990	1995	2000	2005
Migrasi Masuk :								
1	Nanggroe Aceh Darussalam	61,906	146,307	159,495	194,709	228,641	100,166	1)
2	Sumatera Utara	547,405	570,863	485,155	459,652	552,450	447,897	447,332
3	Sumatera Barat	88,832	134,712	138,294	217,796	260,845	245,000	300,322
4	Riau	217,134	356,272	315,399	689,036	884,769	1,534,849	1,335,873
5	Jambi	160,041	298,366	344,905	473,434	482,795	566,153	551,469
6	Sumatera Selatan	333,875	617,745	576,482	936,817	1,038,898	987,157	902,044
7	Bengkulu	36,380	122,785	120,106	251,621	332,080	355,048	311,326
8	Lampung	1,003,550	1,793,053	1,861,253	1,730,903	1,923,928	1,485,218	1,596,545
9	Bangka Belitung	2)	2)	2)	2)	2)	94,334	95,129
10	Kepulauan Riau	3)	3)	3)	3)	3)	3)	542,811
11	DKI Jakarta	1,821,833	2,599,367	3,079,693	3,170,215	3,371,384	3,541,972	3,337,161
12	Jawa Barat	383,560	1,003,758	1,367,377	2,408,626	3,615,099	3,271,882	3,764,889
13	Jawa Tengah	260,308	350,724	530,385	516,315	672,978	708,308	741,588
14	DI Yogyakarta	101,204	180,367	229,125	266,500	347,245	385,117	466,941
15	Jawa Timur	297,948	465,949	567,143	575,541	808,995	781,590	660,663
16	Banten	4)	4)	4)	4)	4)	1,758,408	1,731,081
17	B a l i	22,758	65,271	53,897	124,919	157,902	221,722	249,951
18	Nusa Tenggara Barat	34,117	56,081	61,539	69,466	75,227	107,605	100,811
19	Nusa Tenggara Timur	13,039	42,614	42,469	48,159	57,915	106,053	102,222
20	Kalimantan Barat	24,342	112,244	85,164	199,829	250,617	269,722	263,080
21	Kalimantan Tengah	50,235	142,257	137,971	241,192	325,028	423,014	393,828
22	Kalimantan Selatan	67,285	145,417	182,663	274,745	321,955	360,324	400,562
23	Kalimantan Timur	40,857	296,963	384,418	604,549	741,109	856,251	990,736
24	Sulawesi Utara	50,356	91,460	74,819	89,096	76,084	147,091	165,689
25	Sulawesi Tengah	51,320	187,024	170,323	287,447	351,609	369,634	358,601
26	Sulawesi Selatan	71,411	118,984	132,060	225,279	304,296	273,875	341,770
27	Sulawesi Tenggara	26,024	106,027	160,035	237,602	260,141	366,817	341,057
28	Gorontalo	5)	5)	5)	5)	5)	26,888	39,487
29	Sulawesi Barat	6)	6)	6)	6)	6)	6)	6)
30	Maluku	43,530	130,109	119,244	186,735	160,477	75,540	73,356
31	Maluku Utara	7)	7)	7)	7)	7)	60,834	63,384
32	Papua	33,923	96,079	156,756	262,873	274,276	332,015	430,167
33	Papua Barat	8)	8)	8)	8)	8)	8)	8)
Migrasi Keluar :								
1	Nanggroe Aceh Darussalam	65,835	116,010	119,178	125,563	181,574	244,314	1)
2	Sumatera Utara	188,326	417,659	562,885	770,093	1,025,451	1,336,772	1,314,117
3	Sumatera Barat	324,897	558,804	559,636	642,908	837,493	937,799	921,180
4	Riau	41,636	86,540	93,745	127,672	169,941	164,358	208,049
5	Jambi	27,487	47,151	50,138	77,299	112,204	149,376	134,793
6	Sumatera Selatan	199,060	333,024	368,622	443,384	580,077	525,954	573,865
7	Bengkulu	24,753	39,019	39,664	46,720	66,762	73,390	82,703
8	Lampung	29,728	57,664	112,144	167,565	273,061	385,748	447,476
9	Bangka Belitung	2)	2)	2)	2)	2)	120,027	99,223
10	Kepulauan Riau	3)	3)	3)	3)	3)	3)	9,612
11	DKI Jakarta	132,215	400,767	593,936	1,052,234	1,589,285	1,836,664	2,045,630
12	Jawa Barat	1,192,987	1,487,935	1,660,517	1,751,879	1,891,615	2,046,279	1,984,620
13	Jawa Tengah	1,798,001	3,227,892	3,305,362	4,524,988	5,014,822	5,354,459	5,538,952
14	DI Yogyakarta	266,933	253,447	656,190	508,215	861,679	784,154	814,289
15	Jawa Timur	749,848	1,597,851	1,822,761	2,479,487	2,879,389	3,063,297	3,220,158
16	Banten	4)	4)	4)	4)	4)	475,440	444,503
17	B a l i	57,072	117,828	159,011	221,599	230,149	250,724	248,007
18	Nusa Tenggara Barat	12,764	44,487	42,163	96,774	107,261	145,546	143,435
19	Nusa Tenggara Timur	26,222	47,534	58,460	99,442	118,625	156,602	173,884
20	Kalimantan Barat	35,109	72,358	72,646	116,735	126,834	154,620	156,631
21	Kalimantan Tengah	11,514	25,086	35,590	47,700	57,448	53,291	87,712
22	Kalimantan Selatan	84,257	169,561	195,946	201,936	245,595	255,595	297,766

23	Kalimantan Timur	23,723	34,059	48,115	63,533	88,646	90,635	97,498
24	Sulawesi Utara	60,837	121,231	150,142	153,466	218,240	151,326	166,157
25	Sulawesi Tengah	34,274	33,912	31,513	48,360	47,793	74,463	75,776
26	Sulawesi Selatan	241,726	511,725	541,446	641,961	792,342	874,338	968,140
27	Sulawesi Tenggara	30,771	89,957	68,628	107,673	125,403	95,189	122,593
28	Gorontalo	5)	5)	5)	5)	5)	113,050	100,691
29	Sulawesi Barat	6)	6)	6)	6)	6)	6)	6)
30	Maluku	36,613	64,725	83,513	95,361	135,727	157,066	170,627
31	Maluku Utara	7)	7)	7)	7)	7)	43,712	47,039
32	Papua	6,449	15,559	25,495	30,786	47,356	46,824	46,882
33	Papua Barat	8)	8)	8)	8)	8)	8)	8)
				Migrasi Neto :				
1	Nanggroe Aceh Darussalam	-3,929	30,297	40,317	69,146	47,067	-144,148	1)
2	Sumatera Utara	359,079	153,204	-77,730	-310,441	-473,001	-888,875	-866,785
3	Sumatera Barat	-236,065	-424,092	-421,342	-425,112	-576,648	-692,799	-620,858
4	Riau	175,498	269,732	221,654	561,364	714,828	1,370,491	1,127,824
5	Jambi	132,554	251,215	294,767	396,135	370,591	416,777	416,676
6	Sumatera Selatan	134,815	284,721	207,860	493,433	458,821	461,203	328,179
7	Bengkulu	11,627	83,766	80,442	204,901	265,318	281,658	228,623
8	Lampung	973,822	1,735,389	1,749,109	1,563,338	1,650,867	1,099,470	1,149,069
9	Bangka Belitung	2)	2)	2)	2)	2)	-25,693	-4,094
10	Kepulauan Riau	3)	3)	3)	3)	3)	3)	533,199
11	DKI Jakarta	1,689,618	2,198,600	2,485,757	2,117,981	1,782,099	1,705,308	1,291,531
12	Jawa Barat	-809,427	-484,177	-293,140	656,747	1,723,484	1,225,603	1,780,269
13	Jawa Tengah	-1,537,693	-2,877,168	-2,774,977	-4,008,673	-4,341,844	-4,646,151	-4,797,364
14	DI Yogyakarta	-165,729	-73,080	-427,065	-241,715	-514,434	-399,037	-347,348
15	Jawa Timur	-451,900	-1,131,902	-1,255,618	-1,903,946	-2,070,394	-2,281,707	-2,559,495
16	Banten	4)	4)	4)	4)	4)	1,282,968	1,286,578
17	B a l i	-34,314	-52,557	-105,114	-96,680	-72,247	-29,002	1,944
18	Nusa Tenggara Barat	21,353	11,594	19,376	-27,308	-32,034	-37,941	-42,624
19	Nusa Tenggara Timur	-13,183	-4,920	-15,991	-51,283	-60,710	-50,549	-71,662
20	Kalimantan Barat	-10,767	39,886	12,518	83,094	123,783	115,102	106,449
21	Kalimantan Tengah	38,721	117,171	102,381	193,492	267,580	369,723	306,116
22	Kalimantan Selatan	-16,972	-24,144	-13,283	72,809	76,360	104,729	102,796
23	Kalimantan Timur	17,134	262,904	336,303	541,016	652,463	765,616	893,238
24	Sulawesi Utara	-10,481	-29,771	-75,323	-64,370	-142,156	-4,235	-468
25	Sulawesi Tengah	17,046	153,112	138,810	239,087	303,816	295,171	282,825
26	Sulawesi Selatan	-170,315	-392,741	-409,386	-416,682	-488,046	-600,463	-626,370
27	Sulawesi Tenggara	-4,747	16,070	91,407	129,929	134,738	271,628	218,464
28	Gorontalo	5)	5)	5)	5)	5)	-86,162	-61,204
29	Sulawesi Barat	6)	6)	6)	6)	6)	6)	6)
30	Maluku	6,917	65,384	35,731	91,374	24,750	-81,526	-97,271
31	Maluku Utara	7)	7)	7)	7)	7)	17,122	16,345
32	Papua	27,474	80,520	131,261	232,087	226,920	285,191	383,285
33	Papua Barat	8)	8)	8)	8)	8)	8)	8)

Catatan:

Migrasi seumur hidup adalah migrasi dimana tempat tinggal seseorang pada saat pencacahan berbeda dengan tempat lahirnya

1) NAD tidak termasuk dalam cakupan SUPAS 2005 karena peristiwa gempa bumi dan tsunami
2) Bangka Belitung masih bergabung dengan Sumatera Selatan
3) Kepulauan Riau masih bergabung dengan Riau
4) Banten masih bergabung dengan Jawa Barat
5) Gorontalo masih bergabung dengan Sulawesi Utara
6) Sulawesi Barat masih bergabung dengan Sulawesi Selatan
7) Maluku Utara masih bergabung dengan Maluku
8) Papua Barat masih bergabung dengan Papua

Sumber : Sensus Penduduk 1971, 1980, 1990, 2000 dan Survei Penduduk Antar Sensus (SUPAS) 1985, 1995, 2005

A.II.2 BAPPENAS Indonesia Population Projection 2005 - 2025

Provinsi	2005	2010	2015	2020	2025
(1)	(2)	(3)	(4)	(5)	(6)
11 Nanggroe Aceh Darussalam	4,083.6	4,432.4	4,765.6	5,071.1	5,348.7
12 Sumatera Utara	12,418.0	13,452.4	14,435.9	15,338.5	16,162.5
13 Sumatera Barat	4,567.2	4,892.4	5,205.6	5,495.0	5,761.0
14 Riau	4,835.9	5,423.0	5,988.7	6,539.3	7,091.3
15 Jambi	2,650.4	2,879.9	3,103.8	3,314.2	3,511.2
16 Sumatera Selatan	6,815.9	7,322.5	7,802.3	8,232.0	8,609.2
17 Bengkulu	1,566.2	1,691.6	1,811.0	1,921.3	2,023.6
18 Lampung	7,087.4	7,592.2	8,082.2	8,539.0	8,960.3
19 Kep. Bangka Belitung	1,074.8	1,153.5	1,226.1	1,288.6	1,341.1
21 Kepulauan Riau	1,278.9	1,579.6	1,933.2	2,337.1	2,793.3
31 DKI Jakarta	8,892.3	9,294.9	9,581.1	9,758.5	9,850.6
32 Jawa Barat	39,150.5	42,081.6	44,891.3	47,505.3	49,928.0
33 Jawa Tengah	31,873.5	33,094.6	34,116.4	34,891.6	35,457.0
34 DI Yogyakarta	3,365.5	3,534.6	3,686.9	3,814.1	3,918.6
35 Jawa Timur	36,481.8	37,469.7	38,258.6	38,760.1	38,962.0
36 Banten	9,071.1	9,964.3	10,886.7	11,803.9	12,699.8
51 Bali	3,405.4	3,584.8	3,735.1	3,855.7	3,954.6
52 N T B	4,149.1	4,503.2	4,830.6	5,124.3	5,390.5
53 N T T	4,279.5	4,704.8	5,125.5	5,523.8	5,895.2
61 Kalimantan Barat	4,037.2	4,388.5	4,723.0	5,028.2	5,303.6
62 Kalimantan Tengah	1,969.7	2,113.8	2,245.4	2,362.3	2,465.9
63 Kalimantan Selatan	3,296.6	3,545.1	3,781.6	3,997.3	4,190.4
64 Kalimantan Timur	2,887.1	3,235.1	3,588.0	3,938.3	4,285.1
71 Sulawesi Utara	2,143.8	2,249.3	2,345.2	2,426.8	2,494.0
72 Sulawesi Tengah	2,312.0	2,521.8	2,724.1	2,915.6	3,096.3
73 Sulawesi Selatan	7,489.7	8,010.7	8,498.8	8,935.9	9,322.1
74 Sulawesi Tenggara	1,945.2	2,161.4	2,372.8	2,574.5	2,767.5
75 Gorontalo	936.3	995.5	1,050.6	1,100.6	1,145.1
76 Sulawesi Barat	985.7	1,063.1	1,138.5	1,208.6	1,272.6
81 Maluku	1,264.8	1,358.3	1,451.5	1,540.2	1,623.2
82 Maluku Utara	914.1	990.5	1,069.0	1,146.9	1,222.2
91 Irian Jaya Barat	688.2	757.7	825.3	889.7	951.7
94 Papua	1,934.7	2,138.5	2,342.9	2,543.6	2,740.2
Indonesia	219,852.0	234,181.4	247,623.2	259,721.8	270,538.4

A.II.3 Population Census 2010

(1) DKI Jakarta

Kabupaten/Kota Administrasi	Penduduk			Sex ratio
	Laki-Laki	Perempuan	Laki-laki + Perempuan	
[1]	[2]	[3]	[4]	[5]
(01) KEPULAUAN SERIBU	10.695	10.376	21.071	103
(71) JAKARTA SELATAN	1.039.677	1.017.403	2.057.080	102
(72) JAKARTA TIMUR	1.368.857	1.318.170	2.687.027	104
(73) JAKARTA PUSAT	453.505	445.378	898.883	102
(74) JAKARTA BARAT	1.162.379	1.116.446	2.278.825	104
(75) JAKARTA UTARA	824.159	821.153	1.645.312	100
DKI JAKARTA	4.859.272	4.728.926	9.588.198	103

(2) Kabukaten Bogor

Kecamatan	SENSUS 2010			Sex Ratio
	Laki-Laki	Perempuan	Laki-Laki+ Perempuan	
[010] Nanggung	44.370	41.113	85.483	108
[020] Leuwiliang	58.839	55.244	114.083	107
[021] Leuwisadeng	37.080	33.800	70.880	110
[030] Pamijahan	69.079	64.755	133.834	107
[040] Cibungbulang	64.967	60.600	125.567	107
[050] Ciampea	75.527	71.081	146.608	106
[051] Tenjolaya	28.110	26.660	54.770	105
[060] Dramaga	50.995	49.657	100.652	103
[070] Ciomas	76.027	72.526	148.553	105
[071] Tamansari	47.590	44.309	91.899	107
[080] Cijeruk	41.038	36.985	78.023	111
[081] Cigombong	45.361	42.984	88.345	106
[090] Caringin	58.775	55.348	114.123	106
[100] Ciawi	53.067	49.434	102.501	107
[110] Cisarua	58.188	54.147	112.335	107
[120] Megamendung	50.477	46.058	96.535	110
[130] Sukaraja	86.748	82.123	168.871	106
[140] Babakan Madang	53.343	49.865	103.208	107
[150] Sukamakmur	38.310	35.531	73.841	108
[160] Cariu	23.244	22.930	46.174	101
[161] Tanjungsari	25.474	24.513	49.987	104
[170] Jonggol	62.690	60.363	123.053	104
[180] Cileungsi	125.043	120.998	246.041	103
[181] Klapanunggal	49.176	46.196	95.372	106
[190] Gunung Putri	155.133	157.549	312.682	98
[200] Citeureup	101.316	96.881	198.197	105
[210] Cibinong	166.455	160.590	327.045	104
[220] Bojonggede	121.542	115.834	237.376	105
[221] Tajurhalang	49.714	47.461	97.175	105
[230] Kemang	47.112	44.628	91.740	106
[231] Rancabungur	25.970	24.183	50.153	107
[240] Parung	55.449	52.239	107.688	106
[241] Ciseeng	50.673	46.848	97.521	108
[250] Gunung Sindur	52.844	49.997	102.841	106
[260] Rumpin	66.981	61.423	128.404	109
[270] Cigudeg	61.261	55.712	116.973	110
[271] Sukajaya	29.103	26.570	55.673	110
[280] Jasinga	48.170	44.863	93.033	107
[290] Tenjo	34.202	31.969	66.171	107
[300] Parung Panjang	56.808	52.991	109.799	107
JUMLAH	2.446.251	2.316.958	4.763.209	106

(3) Kabupaten Bekasi

Kecamatan	Penduduk			
	Laki-Laki	Perempuan	Laki-laki + Perempuan	Sex ratio
[1]	[2]	[3]	[4]	[5]
Setu	56.996	54.698	111.694	104
Serang Baru	52.770	51.170	103.940	103
Cikarang Pusat	28.356	28.139	56.495	101
Cikarang Selatan	74.340	69.285	143.625	107
Cibarusah	38.318	36.540	74.858	105
Bojongmangu	12.452	12.423	24.875	100
Cikarang Timur	46.965	44.583	91.548	105
Kedungwaringin	28.453	27.075	55.528	105
Cikarang Utara	120.805	109.916	230.721	110
Karangbahagia	46.036	44.414	90.450	104
Cibitung	100.129	95.516	195.645	105
Cikarang Barat	110.385	100.718	211.103	110
Tambun Selatan	211.498	205.412	416.910	103
Tambun Utara	69.087	67.593	136.680	102
Babelan	106.035	103.340	209.375	103
Tarumajaya	55.748	53.501	109.249	104
Tambelang	17.907	17.462	35.369	103
Sukawangi	21.845	21.241	43.086	103
Sukatani	35.930	34.249	70.179	105
Sukakarya	21.638	20.748	42.386	104
Pebayuran	47.362	45.100	92.462	105
Cabangbungin	24.194	23.666	47.860	102
Muaragembong	18.251	17.262	35.513	106
Kabupaten Bekasi	1.345.500	1.284.051	2.629.551	105

(4) Kota Bogor

Kecamatan	Laki-laki	Perempuan	Jumlah	Sex Ratio
(1)	(2)	(3)	(4)	(5)
[010] Bogor Selatan	93. 203	87.542	180.745	106
[020] Bogor Timur	47. 984	46.588	94.572	103
[030] Bogor Utara	86. 915	83.405	170.320	104
[040] Bogor Tengah	52. 206	49.997	102.203	104
[050] Bogor Barat	107. 072	103.378	210.450	104
[060] Tanahsareal	97. 268	93.508	190.776	104
KOTA BOGOR	**484. 648**	**464.418**	**949.066**	**104**

(5) Kota Bekasi

Kode	Kecamatan	Jumah Rumah Tangga	Jumlah Penduduk	Rata-rata Anggota Ruta
(1)	(2)	(3)	(4)	(5)
10	PONDOKGEDE	63.397	246.413	3,89
11	JATISAMPURNA	26.951	103.513	3,84
12	PONDOKMELATI	32.303	129.219	4,00
20	JATIASIH	49.966	199.496	3,99
30	BANTARGEBANG	30.215	95.957	3,18
31	MUSTIKAJAYA	41.161	160.381	3,90
40	BEKASI TIMUR	63.594	248.046	3,90
41	RAWALUMBU	57.614	207.484	3,60
50	BEKASI SELATAN	53.014	203.596	3,84
60	BEKASI BARAT	70.18	270.569	3,86
61	MEDAN SATRIA	42.077	161.617	3,84
70	BEKASI UTARA	77.101	310.198	4,02
75	**KOTA BEKASI**	**607.573**	**2.336.489**	**3,85**
KOTA BEKASI HASIL SP2000		828.717	1.663.802	3,93

(6) Kota Depok

Kecamatan	Jumlah Rumah Tangga	Jumlah Penduduk	Rata-Rata Anggota Rumah Tangga
(1)	(2)	(3)	(4)
[010] Sawangan	29,962	123,356	4.12
[011] Bojongsari	24,078	99,768	4.14
[020] Pancoran Mas	51,104	210,204	4.11
[021] Cipayung	30,487	127,707	4.19
[030] Sukmajaya	55,400	232,895	4.20
[031] Cilodong	31,726	123,713	3.90
[040] Cimanggis	62,813	242,214	3.86
[041] Tapos	57,321	216,581	3.78
[050] Beji	48,071	164,682	3.43
[060] Limo	22,564	87,615	3.88
[061] Cinere	26,949	107,830	4.00
KOTA DEPOK	440,475	1,736,565	3.94

(7) Kabupaten Tanerang

Kecamatan	Laki -laki	Perempuan	Jumlah	Sex Ratio
[1]	[2]	[3]	[4]	[5]
Cisoka	40.766	37.802	78.568	107,84
Solear	37.714	36.039	73.753	104,65
Tigaraksa	60.552	58.122	118.674	104,18
Jambe	20.641	19.453	40.094	106,11
Cikupa	116.387	108.859	225.246	106,92
Panongan	49.151	47.303	96.454	103,91
Curug	85.712	80.641	166.353	106,29
Kelapa Dua	90.645	91.966	182.611	98,56
Legok	50.636	47.019	97.655	107,69
Pagedangan	48.923	46.541	95.464	105,12
Cisauk	32.925	31.203	64.128	105,52
Pasarkemis	120.235	116.517	236.752	103,19
Sindang Jaya	39.183	37.689	76.872	103,96
Balaraja	57.814	53.474	111.288	108,12
Jayanti	32.273	31.060	63.333	103,91
Sukamulya	30.387	29.034	59.421	104,66
Kresek	30.778	29.731	60.509	103,52
Gunung Kaler	24.085	23.951	48.036	100,56
Kronjo	28.262	26.768	55.030	105,58
Mekar Baru	18.069	16.943	35.012	106,65
Mauk	39.411	37.895	77.306	104,00
Kemiri	21.021	19.363	40.384	108,56
Sukadiri	27.829	25.719	53.548	108,20
Rajeg	68.496	65.202	133.698	105,05
Sepatan	47.918	44.528	92.446	107,61
Sepatan Timur	42.362	40.089	82.451	105,67
Pakuhaji	53.169	50.152	103.321	106,02
Teluknaga	70.909	67.558	138.467	104,96
Kosambi	68.661	63.086	131.747	108,84
Kabupaten Tangerang	**1.454.914**	**1.383.707**	**2.838.621**	**105,15**

(8) Kota Tangerang

Kecamatan	Penduduk			
	Laki-Laki	Perempuan	Laki-laki + Perempuan	Sex ratio
[1]	[2]	[3]	[4]	[5]
Kecamatan				
Ciledug	75.511	71.943	147.454	104,96
Larangan	83.648	80.789	164.437	103,54
Karang Tengah	60.123	58.785	118.908	102,28
Cipondoh	108.701	105.668	214.369	102,87
Pinang	81.460	78.908	160.368	103,23
Tangerang	78.583	73.808	152.391	106,47
Karawaci	85.411	84.263	169.674	101,36
Jatiuwung	63.880	56.626	120.506	112,81
Cibodas	72.013	70.766	142.779	101,76
Priuk	66.273	62.777	129.050	105,57
Batu Ceper	46.567	43.814	90.381	106,28
Neglasari	53.858	49.598	103.456	108,59
Benda	43.610	40.332	83.942	108,13
Tangerang	919.638	878.077	1.797.715	104,73

(9) Kota Tangerang Selatan

Kecamatan	Laki -laki	Perempuan	Jumlah	Sex Ratio
[1]	[2]	[3]	[4]	[5]
Setu	33.260	31.725	64.985	104,84
Serpong	68.129	69.269	137.398	98,35
Pamulang	146.141	142.370	288.511	102,65
Ciputat	99.387	96.513	195.900	102,98
Ciputat Timur	93.057	90.273	183.330	103,08
Pondok Aren	155.838	151.316	307.154	102,99
Serpong Utara	62.889	63.402	126.291	99,19
Kota Tangerang Selatan	**658.701**	**644.868**	**1.303.569**	**102,15**

(10) Kabupaten Karawang

Kecamatan	Laki-laki	Perempuan	Laki-laki + Perempuan	Sex Ratio
(1)	(2)	(3)	(4)	(5)
PANGKALAN	17.929	17.312	35.241	104
TEGALWARU	17.847	16.486	34.333	108
CIAMPEL	19.573	19.764	39.337	99
TELUKJAMBE TIMUR	66.625	59.406	126.031	112
TELUKJAMBE BARAT	25.189	23.486	48.675	107
KLARI	78.753	75.956	154.709	104
CIKAMPEK	55.102	52.098	107.200	106
PURWASARI	32.083	31.001	63.084	103
TIRTAMULYA	22.619	21.552	44.171	105
JATISARI	36.933	35.055	71.988	105
BANYUSARI	26.100	24.947	51.047	105
KOTABARU	61.443	58.076	119.519	106
CILAMAYA WETAN	39.008	36.173	75.181	108
CILAMAYA KULON	30.953	28.811	59.764	107
LEMAHABANG	31.148	29.327	60.475	106
TALAGASARI	31.065	28.910	59.975	107
MAJALAYA	22.698	21.268	43.966	107
KARAWANG TIMUR	61.273	56.110	117.383	109
KARAWANG BARAT	79.800	75.744	155.544	105
RAWAMERTA	25.218	23.496	48.714	107
TEMPURAN	30.375	28.258	58.633	107
KUTAWALUYA	28.026	25.576	53.602	110
RENGASDENGKLOK	53.692	50.663	104.355	106
JAYAKERTA	31.292	28.670	59.962	109
PEDES	36.660	33.959	70.619	108
CILEBAR	20.544	18.915	39.459	109
CIBUAYA	24.981	23.633	48.614	106
TIRTAJAYA	31.955	29.922	61.877	107
BATUJAYA	37.951	37.461	75.412	101
PAKISJAYA	18.367	17.997	36.364	102
KARAWANG	1.095.202	1.030.032	2.125.234	106

(11) Provinsi Banten

Kabupaten/ Kota	Laki-laki	Perempuan	Laki-laki + Perempuan	Sex Rasio
(1)	(2)	(3)	(4)	(5)
[01] Pandeglang	586.869	558.923	1.145.792	105
[02] Lebak	618.636	585.044	1.203.680	106
[03] Tangerang	1.454.914	1.383.707	2.838.621	105
[04] Serang	713.490	689.738	1.403.228	103
[71] Kota Tangerang	919.638	878.077	1.797.715	105
[72] Kota Cilegon	191.729	182.735	374.464	105
[73] Kota Serang	296.806	280.155	576.961	106
[74] Kota Tangsel	658.701	644.868	1.303.569	102
BANTEN	5.440.783	5.203.247	10.644.030	105