

CHAPTER 15: FINANCING FOR IMPLEMENTATION OF ENVIRONMENTAL PROJECTS/PROGRAMS

15.1 Financial Structure of BMA

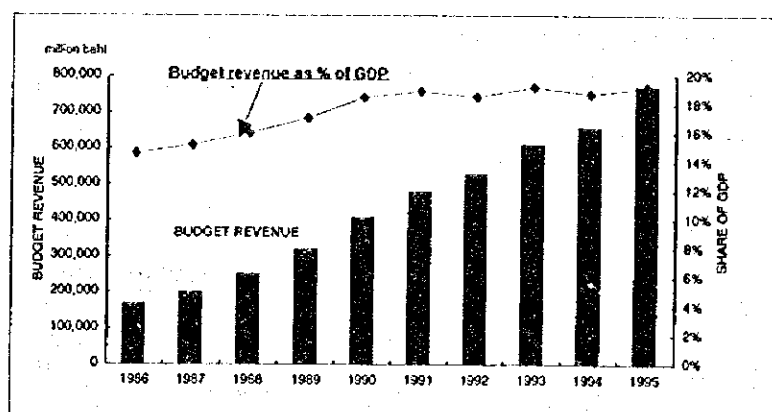
(1) Budget Revenue

1) Budget Revenue of Kingdom and BMA

Thailand has been enjoying a rapid economic growth at about 10 % of annual real growth rate during the last decade. Figure 15.1 shows the actual budget revenue of the central government and its share in the GDP at current price. The budget revenue increased at 4.3 times from 1986 to 1995 and its share of GDP, still, increased from 14.6 % in 1986 to 19.2 % in 1995. Thus, the central government gained the revenue, corresponding to the GDP growth.

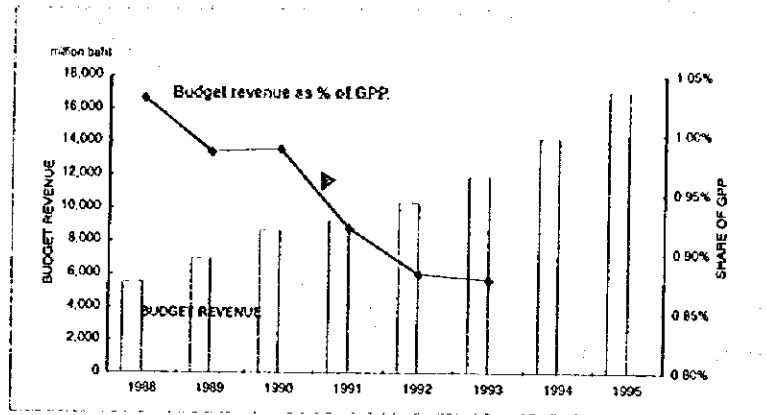
On the other hand, the real Gross Provincial Product (GPP) of BMA grew at a higher rate than that of the Kingdom during the same period. Figure 15.2 shows the budget revenue of BMA and its share in the GPP of BMA. The share of budget revenue extraordinary small, approximately 1 % of GPP. The growth of revenue of BMA was lower than that of GPP. Accordingly the share of budget revenue declined to 0.9 % of GPP in 1993.

In the fiscal year 1995, from October 1994 to September 1995, the budget revenue of the Kingdom amounted to 715,000 million baht, of which 572,000 million baht or 80 % of the total revenue was levied in Bangkok. On the other hand it was 17,000 million baht that BMA collected as the budget revenue in 1995. BMA has set the budget revenue of 1996 at 20,400 million baht.



Source: Statistics of BMA & Statistical Yearbook, Thailand

Fig. 15.1: Budget Revenue of Kingdom and Share of GDP



Source: Statistics of BMA & Statistical Yearbook, Thailand

Fig. 15.2: Budget Revenue of BMA and Share of GDP

2) Revenue of BMA

The source of budget of BMA is classified into two categories as follows:

- the revenue collected by BMA, and
- the revenue collected by other agencies

Revenue collected by BMA

In 1995, BMA collected the revenue of 3,383 million baht as the local tax, such as house and building tax, land development tax and signboard tax.

In addition to the local tax, BMA collected the revenue amounting to 1,652 million baht from the rental fee from BMA assets and fee, fine and service charges from miscellaneous activities. Though the contribution is very small, the users charges, such as collection fee of solid waste and night-soil, and car parking fee are included in the revenue (refer to Table 15.1).

The property-related tax is usually a major revenue in the local government. In Bangkok the share of the property-related tax is, however, very small in the taxation system, which was 18 % of the total budget revenue in 1995.

Revenue collected by Government Agencies

The following revenues are collected by the central government as the revenue of BMA:

- Value added tax (VAT)
- Vehicle tax
- Import-excise tax, etc.

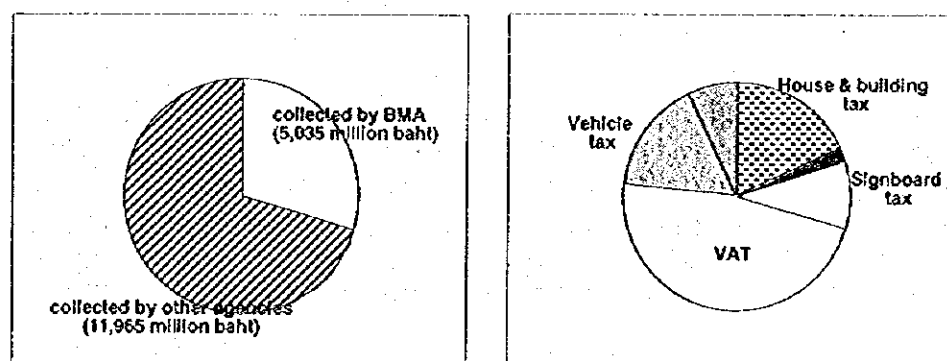
The central government collected the VAT, which is afterwards allocated between the central government and the local governments in the ratio of 9 : 1. The allocated VAT to the local governments is distributed to BMA and the other local governments. BMA shares 60 % among the local governments or 6 % of the total VAT collected.

In 1995 the revenue of BMA from VAT amounted to 8,000 million baht which contributed to 47 % of the revenue of BMA. Vehicle tax was 2,745 million or 16 % of the total revenue.

Table 15.1: Budget Revenue of BMA, 1995

Revenue item	Revenue (million baht)	Share
Tax collected by BMA		
Local development tax	120	0.7%
House & building tax	2,940	17.3%
Signboard tax	318	1.9%
Other tax	5	0.0%
Sub-total	3,383	19.9%
Tax collected by other government agencies		
VAT	8,000	47.1%
Vehicle Tax	2,745	16.1%
Import excise tax	370	2.2%
Consumption tax	850	5.0%
Sub-total	11,965	70.4%
Fees, charges of permits & services and fines	444	2.6%
Income from property	1,020	6.0%
Income from business & public utilities	33	0.2%
Miscellaneous income	155	0.9%
	17,000	100.0%

Source: Department of Finance, BMA



Source: Statistics of BMA & Statistical Yearbook, Thailand

Fig. 15.3: Budget Revenue of BMA by Revenue Item, 1995

Tax of BMA

Value Added Tax: was introduced instead of Business and Municipal Tax in 1992. The VAT is collected by the central government and allocated to the central government and the local governments under the provision of Administration Bangkok Metropolis Act (No. 2) B.E. 2534 and the act relating to Allocation of Value Added Tax to Local Administration B.E. 2534. The rate of allocation complies with the Ministerial Regulation under the act. As the new Ministerial Regulation has not been promulgated at present, the former rate is applied as follows:

- $7\% \times 90\% = 6.3\%$ to central government
- $7\% \times 10\% = 0.7\%$ to local governments
- of which
- $0.7\% \times 60\% = 0.42\%$ to BMA
- $0.7\% \times 40\% = 0.28\%$ to other local governments

Vehicle Tax: contains the tax and registration fee for motor car and wheeled vehicle levied under the provision of Land Transport Act B.E. 2522 and Motor Car Act B.E. 2522. Ministry of Transport and Communications is responsible to collect vehicle tax and fee including the management of registration of motor car.

House and Building Tax: was originally levied:

- on buildings or other structures and land appurtenant thereto
- on land not appurtenant to buildings or other structures

However, it was amended as follows:

- building and other structures, inhabited by the owners or occupied by their agents not for the purpose of warehouses and industries, shall be exempted from taxation.
- land without buildings and structures shall be exempted from taxation.

The rate of house and building tax is calculated at a rate of 12.5 % of annual income which would be expected by leasing the premises.

Local Development Tax: is the tax levied on the owners of lands, however, the land with buildings levied by House and Building Tax is exempted from taxation. Tax collected on land within municipal boundary is the revenue of the municipality.

The tax amount can be calculated by the medium value of land, which is regulated to be appraised by the Committee every four years. Actually the price of assets, however, is calculated by using the value evaluated during the period of four years from 1978 to 1981.

Signboard Tax: is levied on owners of signboard depending on the condition, size and category of signboard.

The schedule of signboard tax is classified into:

- Signboard with only Thai letters;
- Signboard with the mixture of Thai letters, marks and foreign letters; and
- Signboard without Thai letters.

(2) Budget Expenditures

The budget of BMA increased by about 2.0 times, exactly 198 %, from 8,600 million baht in 1990 to 17,000 million baht in 1995, including the current expenditure and investment expenditure are shown in Table 15.2. The share of each expenditure by sector has been constant except the expenditure for the general administration. Changes in the allocation of expenditure by sector are:

- the expenditure of the general administration increased by 2.87 times from 1990 to 1995 and its share of the total expenditure correspondingly increased from 16 % in to 23 %;
- the expenditure of "public works and traffic" has been constant at about 25 % and its growth rate was 192 % from 1990 to 1995, and;
- the remaining sectors such as drainage and waste water treatment, cleansing services and city orderliness operation, public health, social services and development and education decreased their share

By the expanding expenditure of general administration, BMA is forced to reduce the expenditure of other sectors.

Table 15. 2: Budget Expenditure of BMA by Sector (1990 - 1995)

Fiscal year	Public works & traffic	General administration	Drainage & waste water treatment	Cleansing service & city orderliness operation	Public health	Social service & development	Education	Total
Expenditure (million baht)								
1990	2,397	1,374	1,449	1,221	1,170	532	459	8,600
1991	2,370	1,741	1,316	1,466	1,299	498	449	9,140
1992	2,306	2,124	1,432	2,040	1,311	517	527	10,256
1993	3,056	2,365	1,497	1,886	1,759	685	593	11,840
1994	3,529	2,671	2,103	2,117	2,114	903	732	14,170
1995	4,597	3,947	2,332	2,261	2,174	888	802	17,000
Share								
1990	28%	16%	17%	14%	14%	6%	5%	100%
1991	26%	19%	14%	16%	14%	5%	5%	100%
1992	22%	21%	14%	20%	13%	5%	5%	100%
1993	26%	20%	13%	16%	15%	6%	5%	100%
1994	25%	19%	15%	15%	15%	6%	5%	100%
1995	27%	23%	14%	13%	13%	5%	5%	100%
Growth (1990 = 100)								
1990	100%	100%	100%	100%	100%	100%	100%	100%
1991	99%	127%	91%	120%	111%	94%	98%	106%
1992	96%	155%	99%	167%	112%	97%	115%	119%
1993	127%	172%	103%	154%	150%	129%	129%	138%
1994	147%	194%	145%	173%	181%	170%	160%	165%
1995	192%	287%	161%	185%	186%	167%	175%	198%

Source: Statistic Profile of BMA, Department of Policy and Planning

(3) Investment Budget and National Subsidies

The investment budget of BMA classified into the following five categories:

- Environment
- Landuse, traffic & infrastructure
- Human resource & social development
- Management & policy planning
- Finance

BMA allocated 2,397 and 2,853 million baht for the investment budget from their own budget in 1994 and 1995 respectively, which amounted to 17 % of the total budget. In addition to the own budget, BMA received the subsidy from the central government for development budgets (Table 15.3).

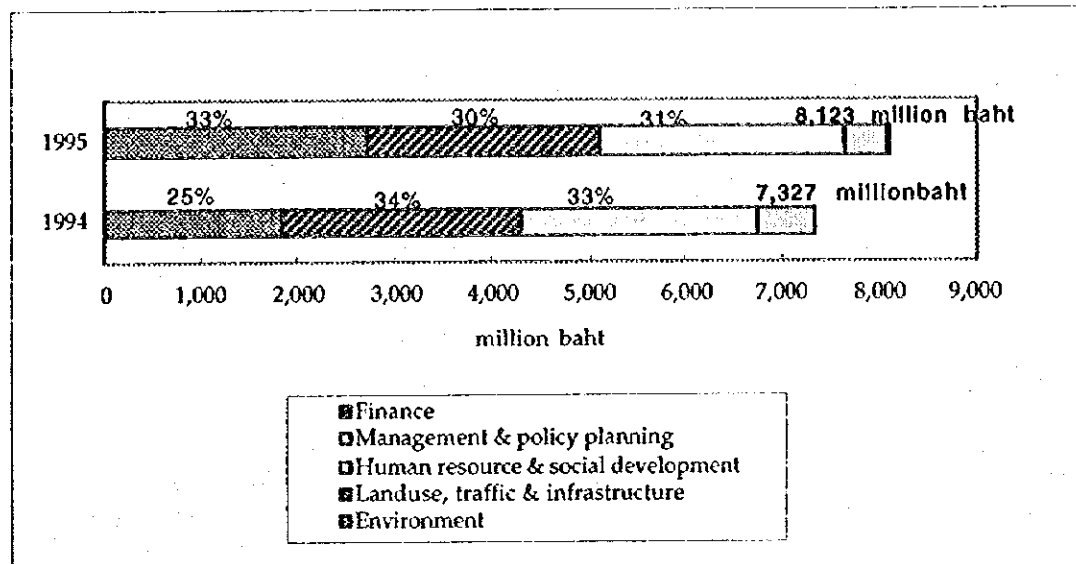
Adding the subsidies, total investment budget amounted to 7,327 and 8,123 million baht in 1994 and 1995 respectively, or 1,000 baht per person per year.

As the allocation of investment by category concerns, the share of environment sector increased both in the own budget and the subsidy in 1995. Accordingly the share of environment increased from 25 % in 1994 to 33 % in 1995 (Figure 15.4).

Table 15.3: Investment Budget of BMA and Subsidies from Central Government by Sector, Fiscal Year 1994 and 1995

Category	BMA Budget			Government Subsidy			Total Investment Budget		
	1994	1995	Total	1994	1995	Total	1994	1995	Total
Environment	585	973	1,558	1,232	1,716	2,949	1,818	2,689	4,507
Landuse, traffic & infrastructure	844	1,109	1,952	1,640	1,300	2,940	2,483	2,408	4,892
Human resource & social development	370	289	659	2,057	2,255	4,312	2,427	2,544	4,971
Management & policy planning	598	430	1,028	0	0	0	598	430	1,028
Finance		53	53		0	0	0	53	53
Total	2,397	2,853	5,250	4,929	5,271	10,200	7,327	8,123	15,450
Share of Investment Budget by Category									
Environment	24%	34%	30%	25%	33%	29%	25%	33%	29%
Landuse, traffic & infrastructure	35%	39%	37%	33%	25%	29%	34%	30%	32%
Human resource & social development	15%	10%	13%	42%	43%	42%	33%	31%	32%
Management & policy planning	25%	15%	20%	0%	0%	0%	8%	5%	7%
Finance	0%	2%	1%	0%	0%	0%	0%	1%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Share of BMA Budget and Central Government Subsidy by Category									
Environment	32%	36%	35%	68%	64%	65%	100%	100%	100%
Landuse, traffic & infrastructure	34%	46%	40%	66%	54%	60%	100%	100%	100%
Human resource & social development	15%	11%	13%	85%	89%	87%	100%	100%	100%
Management & policy planning	100%	100%	100%	0%	0%	0%	100%	100%	100%
Finance		100%	100%		0%	0%		100%	100%
Total	33%	35%	34%	67%	65%	66%	100%	100%	100%

Source: Statistics of BMA, 2536 and 2537



Source: Statistics, Department and Policy Planning, BMA

Fig. 15.4: Total Investment Budget of BMA by Sector including Subsidies from Central Government, Fiscal Year 1994 and 1995

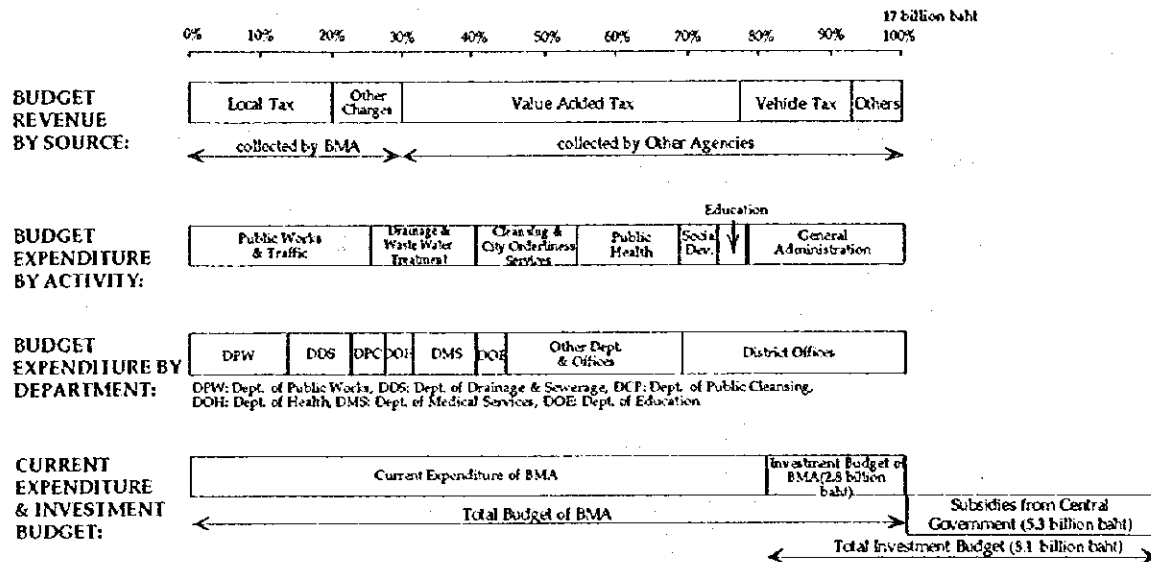
The subsidy from the central government rather concentrates in the investment for the human resource and social development.

The approximate share between the own budget and the subsidy by investment category is currently:

	BMA : National Government
• Environment	35 : 65
• Landuse, traffic & infrastructure	40 : 60
• Human resource & social development	15 : 85
• Management & policy planning	100 : 0
• Finance	100 : 0

Consequently, BMA and the central government share the budget of investment in BMA by 35 % and 65 % respectively.

Figure 15.5 shows the budget structure of BMA in 1995 in terms of the revenue source, the expenditure allocation by sector and by department, and the investment budget including the subsidies from national government.



Source: Statistics of BMA 2536 and 2537, Department of Policy and Planning, BMA

Fig. 15.5: Budget Structure of BMA, Fiscal Year 1995

(4) Issue on Financial Structure of BMA

A large amount of financial resources is required for BMA to invest in order to address the impacts of the discharges in the city resulting from rapid economic growth. BMA is, however, facing the following issues to be improved for the sound and effective financial management.

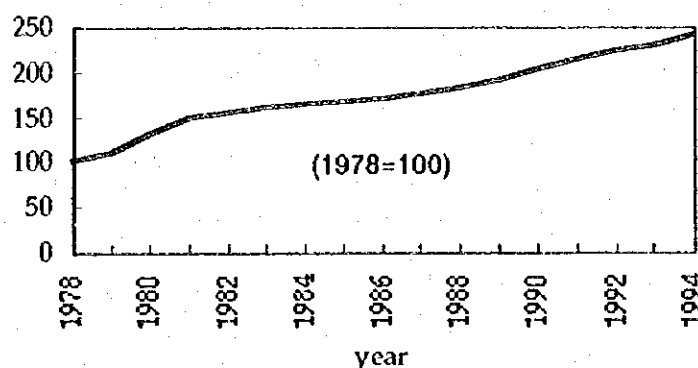
- Less Reflection to Increasing Asset Value;
- Poor Taxation Management;
- Dependency of BMA Budget to the Central Government;
- Insufficient Application of the Polluter-Pay-Principle; and
- lack of the External Financial Source

Less Reflection of Increasing Asset Value

- As the share of the property-related tax is very small in the taxation system in Thailand, the collected revenue hardly reflects the increased value of assets during the rapid growth of the economy even during the rapid growth of the economy in Bangkok.

Poor Taxation Management

- The revenue of BMA budget increased at a lower rate than the economic growth of BMA, probably because of the insufficient management system of tax collection.
- The lack of land-ownership map makes BMA difficult to legitimately collect house and building tax and land development tax.
- The value evaluation of assets for the taxation, that is regulated to be assessed every four years, has not been implemented during more than last ten years. BMA collects the tax by using the estimate of assets evaluated during the four years between 1978 and 1981. The following figure, for example, shows the index of the consumer price increase from 1978. The consumer price has increased by 2.4 times from 1978 to 1994.



Source: Statistic Year Book, Thailand

Figure 15.6: Consumer Price Index, 1978 = 100 (1978 - 1994)

Dependency of BMA Budget on the Central Government

- The percentage of BMA financial revenue is about 1 % of GDP of BMA.
- As the share of current expenditure in BMA budget amounts to almost more than 80 % of the total expenditure and therefore BMA can allocate less than 20 % for the investment budget.
- The investment budget of BMA heavily depends on the subsidy. More than 60 % of the financial source for investment is subsidized by the central government in 1995.

Insufficient Application of the Polluter Pays Principle

- BMA applies the PPP for solid waste management. In 1995, BMA collected 53.5 million baht as the service fee for the collection service of garbage. However the amount collected was less than 20 % that should-be-collected under the present tariff. Although the new tariff has been proposed, it has not yet enforced.

Lack of the External Financial Source

- BMA hardly absorbs external financial resources such as ODAs directly under the present regulation for local administration in Thailand, despite that BMA seeks those funds for investment onto social capital formation particularly for environmental improvement project.

15.2 Financial Capability of BMA for Environmental Improvement

(1) The Five-Year Strategic Plan and Financial Capability

In the Fifth five-year Plan of BMA during the period from October 1996 to September 2001, the total investment cost of development projects and programs for environment has preliminary been estimated to amount to approximately 120,500 million baht as shown in Table 15.4.

In the meanwhile, the GPP (Gross Provincial Product) in Bangkok Metropolis will continuously increase in the Five-year Plan period. Based on the socio-economic framework of the BEIP Study, the aggregate GPP during the period from 1997 to 2001 is estimated to amount approximately 10,000,000 million baht at a constant price of 1993 with an average growth rate of 8 %.

Adopting those projections, the total investment budget for environment will share 1.2 % of the total GPP of BMA during the Five-Year Plan period. There will be a significant deficit of budget under the present revenue structure of BMA, since the total budget revenue of the BMA was less than 1 % of GPP in 1995, of which the allocation to the investment budget was approximately 17 %.

Table 15.4: Investment Budget of Environment Sector in Fifth Five-Year Strategic Plan of BMA

	Total Budget			Fiscal Year				
	Investment	Operation	Total budget	1997	1998	1999	2000	2001
CATEGORY 1								
I Sewerage System	17,627	690	18,316	1,267	3,756	4,957	5,889	2,447
II Solid Waste Management	17,677	6,263	23,939	4,871	5,680	5,464	4,519	3,405
III Drainage and Flood Protection	23,637	0	23,637	3,022	5,307	5,238	5,088	4,982
IV Environmental Health	72	166	237	106	37	37	22	36
Sub-total	59,012	7,118	66,130	9,266	14,780	15,696	15,518	10,870
CATEGORY 2								
I Road & Highway	52,942	71	53,013	26,923	11,490	6,070	5,045	3,485
II Traffic and Transportation	1,058	303	1,361	1,058	93	94	57	59
Sub-total	54,000	373	54,373	27,981	11,583	6,164	5,102	3,543
Total	113,012	7,491	120,503	37,247	26,363	21,860	20,620	14,414

Source: BMA

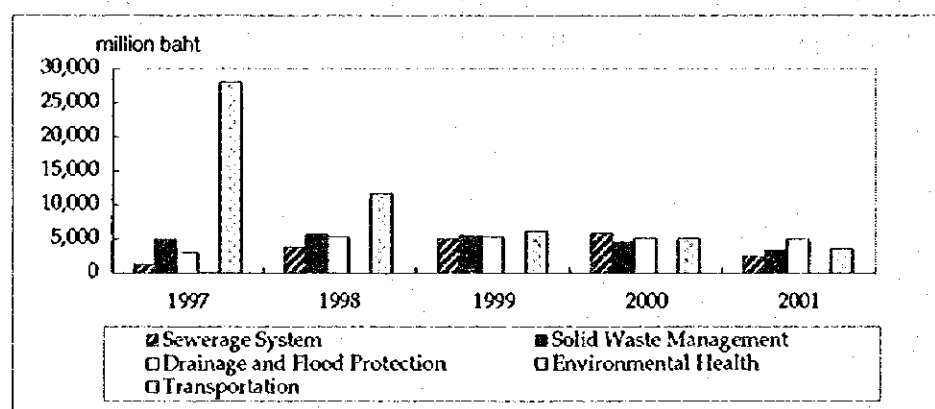


Fig. 15.7: Investment Budget of Environment Sector in Fifth Five-Year Strategic Plan of BMA

(2) Budgetary Demands for Proposed Projects/Programs of BEIP Study

The BEIP Study recommended the projects/programs for the environmental improvement in the Bangkok Metropolis up to the target year of 2011 (refer to Chapter 11). The cost estimates for those projects/programs are prepared in Table 15.5.

An amount of 935,380 million baht has been estimated for the projects/programs up to 2011, of which 47,330 million baht for the Urgent Actions (1997-2001), 415,450 million baht for the Medium-term Projects/programs (2002-2006) and 472,600 million baht for the Long-term Project/programs (2007-2011). As the costs for the projects listed in the Fifth Five-Year Plan of BMA are excluded in the estimates, the share of the Urgent Action period is very small.

Though the total investment amount seems to be enormous, it not so huge compared with the size of Bangkok economy. Problem is the priority of investment, cost/effectiveness of investment and the demarcation of the roles among public and private sectors.

Table 15.5: Cost Estimates for Projects/Programs of BEIP Study by Implementing Term and Agency (1997 - 2011)

	Cost and Allocation (million baht)					
	Total		BMA		Central Govern.	State Enter.
Urgent Actions (1997 - 2001)	47,330	5.1%	31,740	10.7%	2,320	8,680
Medium-term Projects/programs (2002 - 2006)	415,450	44.4%	122,730	41.5%	4,690	180,690
Long-term Projects/programs (2007 - 2011)	472,600	50.5%	141,140	47.7%	1,860	216,500
Total Cost of Projects/Programs	935,380	100.0%	295,610	100.0%	8,870	405,870

Source: BEIP Study

(3) Demarcation of Cost Burden for Environment Investment among BMA and Other Agencies

Adding the costs for the projects in the Fifth Five-Year Plan of BMA (refer to Table 15.4) and for the water supply system of the Five-Year Plan of MWA, the total investment costs of the environment sector are estimated to amount to 1,170,780 million baht up to 2011 in Bangkok as shown in Table 15.6 and 15.7. It will share 2.6 % of the aggregated GPP of Bangkok during the corresponding period.

Table 15.6: Environmental Investment Costs and GPP in Bangkok

million baht					
		Short-term (1997-2001)	Medium-term (2002-2006)	Long-term (2007-2011)	Total
1) Required Environment Investment Costs					
BMA Fifth Five-Year Plan	(a)	120,500			120,500
Investment Budget of MWA Five-Year Plan		114,900			114,900
Total Costs of Projects/Programs of BEIP Study	(b)	47,330	415,450	472,600	935,380
- BMA	(c)	31,740	122,730	141,140	295,610
- Central government		2,320	4,690	1,860	8,870
- State Enterprise		8,680	180,690	216,500	405,870
- Private Sector		4,590	107,340	113,100	225,030
Total Investment Cost	(d)	282,730	415,450	472,600	1,170,780
2) Required Investment Costs of BMA	(a)+(c)	152,240	122,730	141,140	416,110
3) Estimated GPP of BMA in Socio-economic Framework of BEIP Study					
Aggregated GPP (1993 price)	(e)	10,362,000	14,786,000	20,138,000	45,286,000
Increased GDP	(f)	2,187,000	6,611,000	11,963,000	20,761,000
4) Share of Environmental Investment Cost of GPP					
Total Environment Costs as Percentage of GPP	(d)/(e)	2.7%	2.8%	2.3%	2.6%
Total Environment Costs as Percentage of Increased GPP	(d)/(f)	12.9%	6.3%	4.0%	5.6%

Source: BEIP Study

Table 15.7: Environment Investment Costs in Bangkok including Projects/Programs of BEIP Study, Fifth Five-Year Plan of BMA and Five-Year Plan of MWA by Plan and Implementing Term (1/2)

	Cost and allocation (million baht)				
	Total Cost	BMA	Central Government	State Enterprise	Private
Plan 1: Sustainable Resource Utilization					
BMA 5th Five-year Plan (1997 - 2001)	0	0	0	0	0
Urgent Actions (1997 - 2001)	0	0	0	0	0
Medium-term Projects/programs (2002 - 2006)	90	0	90	0	0
Long-term Projects/programs (2007 - 2011)	4,390	4,390	0	0	0
Sub-total	4,480	4,390	90	0	0
Plan 2: Flood-free Urbanization					
- Flood Control					
BMA 5th Five-year Plan (1997 - 2001)	23,630	23,630	0	0	0
Urgent Actions (1997 - 2001)	1,190	1,190	0	0	0
Medium-term Projects/programs (2002 - 2006)	1,190	1,190	0	0	0
Long-term Projects/programs (2007 - 2011)	880	880	0	0	0
Sub-total	26,890	26,890	0	0	0
Plan 3: Environment-initiative Urban Transport (Eco-transport) System					
- Highway & Transportation					
BMA 5th Five-year Plan (1997 - 2001)	54,400	54,400	0	0	0
Urgent Actions (1997 - 2001)	480	240	240	0	0
Medium-term Projects/programs (2002 - 2006)	57,900	9,830	3,390	31,890	12,790
Long-term Projects/programs (2007 - 2011)	75,100	35,520	1,860	26,840	10,880
Sub-total	187,880	99,990	5,490	58,730	23,670
Plan 4: Pursuance of "Fresh and Clean Air Policy"					
- Air					
BMA 5th Five-year Plan (1997 - 2001)	240	240	0	0	0
Urgent Actions (1997 - 2001)	10,270	0	1,860	8,410	0
Medium-term Projects/programs (2002 - 2006)	5,460	0	1,300	0	4,160
Long-term Projects/programs (2007 - 2011)	0	0	0	0	0
Sub-total	15,970	240	3,160	8,410	4,160
Plan 5: Creation of Water-friendly Eco-city					
- Sewerage System					
BMA 5th Five-year Plan (1997 - 2001)	18,300	18,300	0	0	0
Urgent Actions (1997 - 2001)	23,020	23,020	0	0	0
Medium-term Projects/programs (2002 - 2006)	50,650	50,650	0	0	0
Long-term Projects/programs (2007 - 2011)	47,960	47,960	0	0	0
Sub-total	139,930	139,930	0	0	0
- Waterways					
BMA 5th Five-year Plan (1997 - 2001)	0	0	0	0	0
Urgent Actions (1997 - 2001)	380	380	0	0	0
Medium-term Projects/programs (2002 - 2006)	2,490	2,000	0	0	490
Long-term Projects/programs (2007 - 2011)	980	490	0	0	490
Sub-total	3,850	2,870	0	0	980

Table 15.7: Environment Investment Costs in Bangkok including Projects/Programs of BEIP Study, Fifth Five-Year Plan of BMA and Five-Year Plan of MWA by Plan and Implementing Term (2/2)

	Cost and allocation (million baht)				
	Total Cost	BMA	Central Government	State Enterprise	Private
Plan 6: Up-grading of Quality of Living Environment					
- Solid Waste Management					
BMA 5th Five-year Plan (1997 - 2001)	23,930	23,930	0	0	0
Urgent Actions (1997 - 2001)	9,370	4,690	90	0	4,590
Medium-term Projects/ programs (2002 - 2006)	38,710	22,570	0	0	16,140
Long-term Projects/ programs (2007 - 2011)	5,430	5,430	0	0	0
Sub-total	77,440	56,620	90	0	20,730
- Water Supply System					
BMA 5th Five-year Plan (1997 - 2001)	114,900	0	0	114,900	0
Urgent Actions (1997 - 2001)	90	0	0	90	0
Medium-term Projects/ programs (2002 - 2006)	59,400	0	0	59,400	0
Long-term Projects/ programs (2007 - 2011)	87,930	0	0	87,930	0
Sub-total	262,320	0	0	262,320	0
- Housing & Community Development					
BMA 5th Five-year Plan (1997 - 2001)	0	0	0	0	0
Urgent Actions (1997 - 2001)	180	0	0	180	0
Medium-term Projects/ programs (2002 - 2006)	194,190	31,030	0	89,400	73,760
Long-term Projects/ programs (2007 - 2011)	254,320	50,860	0	101,730	101,730
Sub-total	448,690	81,890	0	191,310	175,490
Special Special Projects/Programs					
BMA 5th Five-year Plan (1997 - 2001)	0	0	0	0	0
Urgent Actions (1997 - 2001)	2,260	2,220	40	0	0
Medium-term Projects/ programs (2002 - 2006)	1,070	1,070	0	0	0
Long-term Projects/ programs (2007 - 2011)	0	0	0	0	0
Sub-total	3,330	3,290	40	0	0
Total					
BMA 5th Five-year Plan (1997 - 2001)	235,400	120,500	0	114,900	0
Urgent Actions (1997 - 2001)	47,240	31,740	2,230	8,680	4,590
Medium-term Projects/ programs (2002 - 2006)	411,150	118,340	4,780	180,690	107,340
Long-term Projects/ programs (2007 - 2011)	476,990	145,530	1,860	216,500	113,100
Total	1,170,780	416,110	8,870	520,770	225,030

Source: BEIP Study

Considering the financial demarcation among the central and local governments and the private sector, the required investment of BMA amounts to 416,110 million baht or 36 % of the total, of which 295,610 million baht is the costs of proposed projects/programs listed in the BEIP Study and 120,500 million baht is the budget in the Fifth Plan of BMA.

Under the assumption that BMA would be subsidized at a rate of 65 % of total investment costs from the central government, BMA has to share the cost of 145,640 million baht over fifteen years up to 2011; 53,280 million baht, 42,960 million baht and 49,400 million baht for 1997-2001, 2002-2006 and 2007-2011, respectively as shown in Table 15.8.

Table 15.8: Required Investment Costs of BMA and Subsidies from Central Government (1997 - 2011)

		million baht			
		Urgent Actions (1997-2001)	Medium- term Projects /programs (2002-2006)	Long-term Projects /programs (2007-2011)	Total
Required Amount for Environmental Investment		152,240	122,730	141,140	416,110
- Required Investment of BMA	35%	53,280	42,960	49,400	145,640
- Required Subsidies from Central Government	65%	98,960	79,770	91,740	270,470

Source: BEIP Study

In the short-term, BMA will need the intensive budget allocation for infrastructure development such as solid waste, sewerage system, flood control and highways. At the same time, the institutional schemes for the new standards and regulations need to be prepared in order to enhance the private participation and maximize cost/effectiveness of investment in the long-term. Thereby, housing and community development such as Sub-center development should be started by the latter half of the Plan.

Provided that BMA will implement the projects/programs amounting to 416,110 million baht or 36 % of total environment cost as mentioned above, the remaining costs of 754,670 million baht have to be shared by national government, state enterprises and private sector. The major projects/programs required for each organization to implement are:

- The national government, besides providing the subsidies to BMA implementing projects, needs to be responsible for the investments of the programs related to policy making and research and technical development;
- "Mass Rapid System" for Environment-initiative Urban Transport has mainly to be invested by MRTA and private sector supported by MOTC and BMA.
- Regarding the "Sub-center Zone Development", it is necessary that BMA will strategically develop a part of infrastructure, however, NHA and private sector will have the major responsibility to implement the development; and
- MWA will implement the projects in its Five-Year Plan, 1997-2001, and will be required a further investments for the improvement/rehabilitation of the existing water supply system and development of the extended water resources in medium and long-term.

15.3 Measures to Strengthen Financial Capability of BMA

(1) Improvement Financial and Budgetary Institutions

In Thailand, the national budget revenue amounts to almost 20 % of the country's GDP, while the budget revenue of BMA is approximately 1 % of its GPP. Moreover 70 % of the revenue of BMA is a transferred tax from national government. The budgetary autonomy of BMA is very limited. On the other hand, the environment improvement is an urgent need for BMA.

According to the Fifth Plan of BMA and the BEIP Study, the total required environmental investment has been estimated to amount to 1,170,780 million baht over fifteen years from 1997 to 2011 in Bangkok. The amount is not unreasonably high compared with GPP of BMA. Its share of GPP is estimated at 2.6 %. The World Bank, for example, has reported that the environment projects would require the additional investment costs amounting to 2-3 % of the aggregated GDP in the developing countries in 2000 excluding the investment of highway and transportation sectors.

Although BMA's autonomy is very limited, BMA has to share the investment costs. It is required that BMA will itself strengthen the financial capability under the present taxation regulation and budgetary system. The Strategic Study for Financial Enhancement Program of BMA is proposed including:

- Improvement of Current Local Taxation System with the preparation of Land and Assets Ownership Map (Cadastral Map), Re-evaluation of Asset Value and Improvement of Tax Collection System;
- Implementation of the PPP for Solid Waste Management; and
- Utilization of External Financial Sources

(2) Potential Burden of the Environmental Costs in BMA

The future structure of the budget revenue and expenditure of BMA and its capability to burden the costs for the environmental improvement in Bangkok were projected in two cases, based on several assumptions.

1) "Status quo - Case" reflecting the future growth of economy in the socio-economic framework under the assumptions:

- the revenue of BMA will correspondingly increase and keep the same share of GPP;
- the expenditure will be allocated under the present budget structure and system; and
- the central government will subsidize the same portion (65 %) of the investment budget of BMA

Over fifteen years during from 1997 to 2011, the shortage of investment budget is estimated to accumulate to 87,900 million baht. Particularly, in the short-term, the deficit will be 39 % of the total budget revenue.

2) "Challenging - Case" enhancing the financial capability of BMA to enable to burden the environmental costs under the assumptions:

- the local tax revenue collected by BMA may increase twofold up to the target year of 2011 with an introduction of the effective system of tax management;
- the PPP will efficiently be applied to the solid waste management;
- the increased revenue resulting from the financial improvement will be strategically and intensively allocated to the environment investment;
- the central government will subsidize the same portion (65 %) of the investment budget of BMA; and

- the external finance resource will be utilized if necessary

Table 15.9 shows the required investment costs of environment sector, and the investment budget of BMA in "Challenging Case".

In the Short-term (1997-2001), total costs for the environment improvement is 282,730 million baht, of which the costs for the projects/programs that BMA is responsible to implement amount to 152,240 million. Given the subsidies of 98,960 million baht from central government, BMA itself needs the investment budget of 53,280 million baht.

On the other hand, if BMA could improve the tax collection system and would intensively allocate the incremental revenue to the environmental investment, the available resource is estimated at 22,300 million baht over five years.

Consequently, a significant deficit of 30,980 million baht would emerge in the investment budget, sharing 27 % of total BMA revenue.

In the Medium and Long-term (2002-2011), the balance is expected to improve gradually by the increase of tax revenue to be able to burden the costs for proposed projects/programs up to 2011. In the year of 2011, the accumulated deficit is estimated to decrease to 1,770 million baht or 0.3 % of total BMA budget revenue. The deficit born in the short term will be fulfilled with the surplus in 2011.

In the meantime, in order to finance the shortage for the initial investment of projects/programs, the external financial resources or the special subsidies from the central government would be necessary.

**Table 15.9: BMA Budget and Required Environmental Investment
-Challenging Case-**

		million baht			
		Urgent Actions (1997-2001)	Medium-term Projects /programs (2002-2006)	Long-term Projects /programs (2007-2011)	Total
1) BMA Budget Revenue in Challenging Case					
Estimated BMA Budget Revenue	(a)	115,100	182,300	255,800	553,200
Percentage of GPP		1.1%	1.2%	1.3%	1.2%
2) Source of Investment Budget of BMA					
Investment Budget of BMA	(b)	28,100	58,070	86,600	172,770
BMA	(b)/(a)	24.4%	31.9%	33.9%	31.2%
Investment Budget of Environment Sector	(c)	22,300	49,790	75,320	147,410
Budget	(c)/(b)	79%	86%	87%	85%
3) Require Amount for Environmental Investment of BMA					
Required Amount for Environmental Investment	(d)	152,240	122,730	141,140	416,110
- Required Investment of BMA	(e)=(d)x35%	53,280	42,960	49,400	145,640
- Required Subsidies from Central Government	(f)=(d)x65%	98,960	79,770	91,740	270,470
4) Balance between BMA Budget and Required Investment					
BMA Budget of Environment Investment	(c)	22,300	49,790	75,320	147,410
Required Investment of BMA	(e)	53,280	42,960	49,400	145,640
Balance of BMA Budget	(g)=(c)-(e)	-30,980	6,830	25,920	1,770
Percentage of BMA Total Budget Revenue	(g)/(a)	- 27%	4%	10%	0%

Source: BEIP Study

As shown in Figure 15.8 and 15.9, BMA's financial structure will change and the prospective improvement in the "Challenging-Case" is summarized as follows:

- BMA could receive about 45 % of the budget revenue from own revenue such as local tax and charges instead of 30 % in 1995;

- share of the BMA's budget revenue of GPP will increase from 1.0 % in 1995 to 1.3 % in 2011; and
- the investment budget will increase from 17 % to 34 % of total expenditure and more than 85 % of the investment budget could be allocated to environment sector in 2011

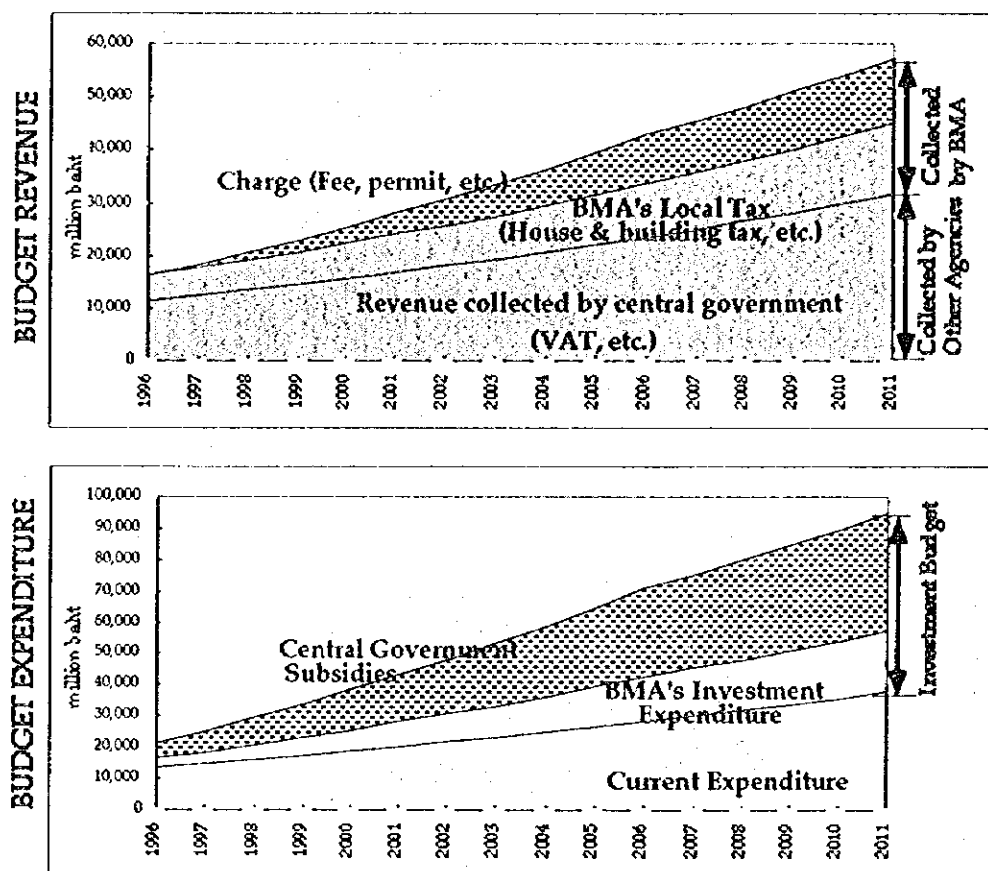


Fig. 15.8: Estimated Budget Revenue and Expenditure in Challenging Case

(3) Absorbed Capacity of External Resources

Absorbed capacity of the borrower is usually evaluated by using the index of "Debt Service Ratio (DSR)". It is generally accepted that the DSR of 20 % is the maximum limit of borrowing capacity for the financially sound management of public administrative bodies.

As BMA has not incurred any loans at present, the borrowing capacity of BMA is accordingly estimated at 13,000 million baht per annum or 65,000 million baht over 5 years during the Short-term between 1997 and 2001, assuming that the available loan conditions are as follows:

- repayment period; 20 years including grace period of 5 years; and
- interest rate; 8 % per annum

In the projection of "Challenging-Case", the deficit of the environment budget has been estimated at 30,980 million baht in the short-term. Provided BMA could borrow the external loan under the same condition above, DSR of BMA will be less than 10 % during the Medium-term which is sufficiently in the safety range of DSR.

A legislative framework is necessary to be developed for BMA to directly access to the external fund sources, and the absorptive capability of BMA needs to be strengthened to this end.

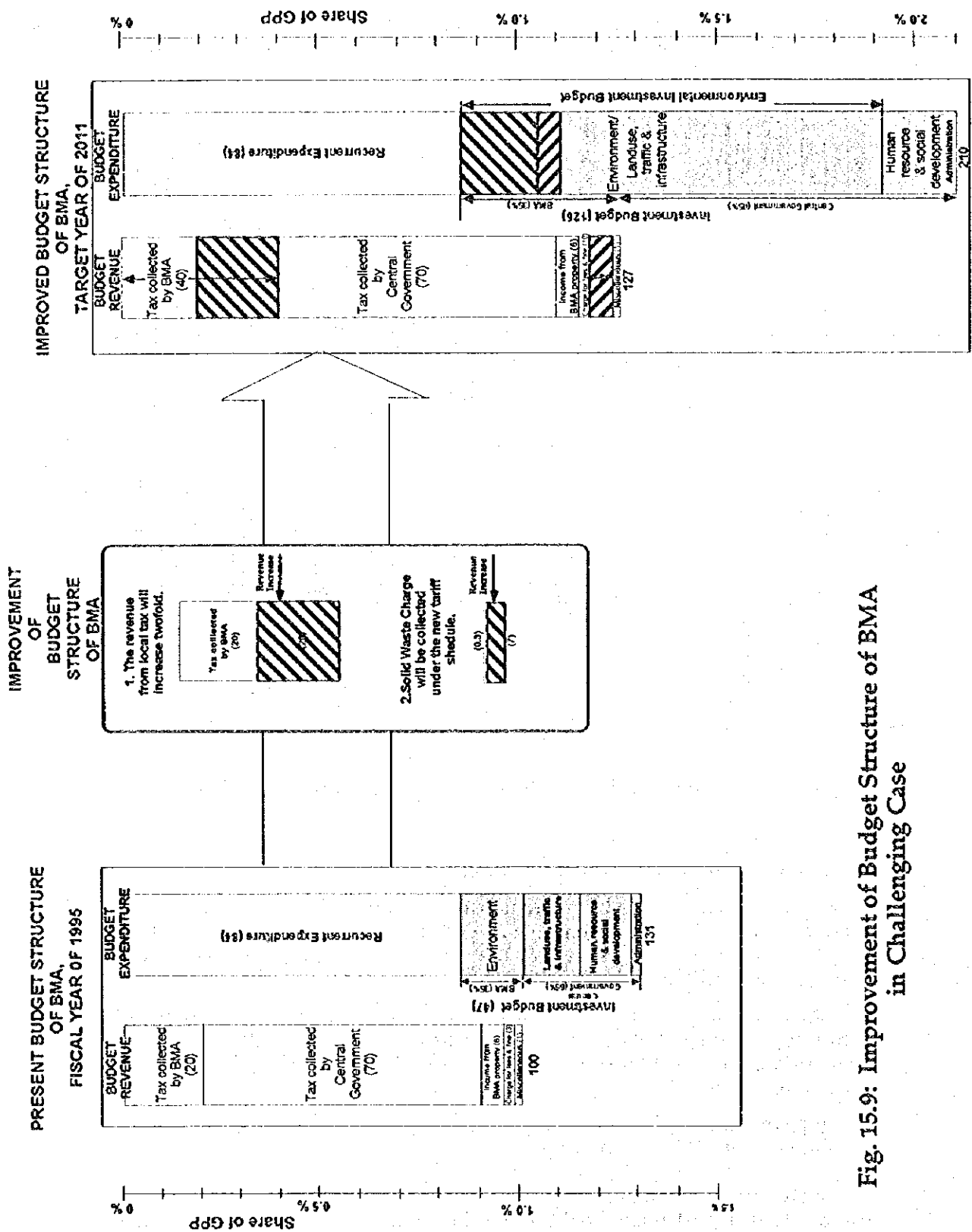


Fig. 15.9: Improvement of Budget Structure of BMA in Challenging Case

(4) Proposed Project (Cadastral Information System Project)

Cadastral Information System Project is proposed for BMA to manage taxation system efficiently. The components of the project will be:

- preparation of land-ownership map (Cadastral Map) ;
- re-evaluation of assets by using the Cadastral Map; and
- improvement of tax collection system by using the Cadastral Map.

The conceptual flowchart of the development of the Cadastral Map for tax assessment is prepared in Figure 15.10.

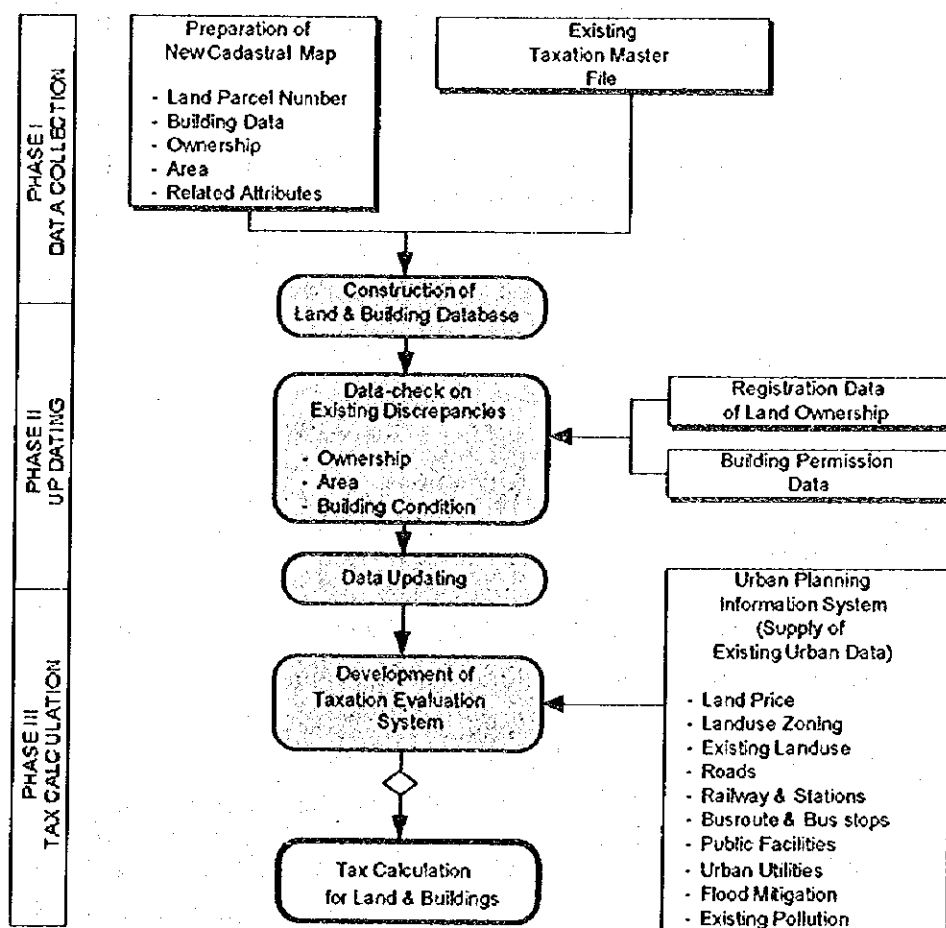


Fig. 15.10: Flowchart of the Development of Cadastral Map for Tax Assessment

15.4 Financial Evaluation of the Proposed Solid Waste Management Project: A Case Study

(1) Investment Costs and Revenue of Solid Waste Management of BMA

In Bangkok, the proposed investment costs of solid waste management is estimated at 77,440 million baht up to 2011, of which 23,930 million baht and 53,510 million baht are listed in the Fifth Plan of BMA and the proposed projects/programs of BEIP, respectively. It shares 6.6 % of the total environmental investment costs. Particularly in the short-term, 1997-2001, its share increases to 11.8 %.

On the other hand, the Polluter-Pay-Principle (PPP) has been introduced in solid waste management and the user charge are collected by BMA. Table 15.10 compares the collected user charges with the recurring costs of solid waste management in Department of Public Cleansing and District Offices of BMA. Even the recurring costs cannot be recovered by user charges, as the level of tariff is low and the collected charge is less than 20 % of the should-be-collected.

Table 15.10: Actual Recurring Costs and User Charge of Solid Waste Management of BMA, in 1994 and 1995

	million baht	
	1994	1995
1) Revenue		
Charge of Collecting Garbage	53.6	58.0
2) Recurring Cost		
Salary	138.4	138.5
Repairing Charge	87.8	88.7
Total	226.2	227.2

Source: BMA

In this "Case Study", it is examined whether the costs including the recurring costs can be recovered by user charges under PPP adopting several assumptions.

"Solid Waste Recycling Center" is excluded in the evaluation.

(2) Future Socioeconomic Framework and Service Level

In order to estimate the future revenues of user charge, population and number of household are estimated based on the socioeconomic framework and the result of the Home Interview Survey carried out in the BEIP Study as shown in Table 15.11.

Table 15.11: Socioeconomic Framework and Service Level

	Present 1995	Urgent Action 2001	Medium Term Plan 2006	Long Term Plan 2011
Number of Family Member (persons)	3.99	3.86	3.76	3.66
Number of Household (1,000)	2,037	2,341	2,596	2,870
Services-coverage-ratio	85%	90%	95%	95%
Charge-collecting-ratio	less than 20%	70%	80%	80%

Source: BEIP Study

In the evaluation the service level and charge-collection level are estimated to increase as the following assumptions:

- Currently the garbage collecting services are provided to approximately 85 % of the household and this ratio will increase to 90 % in 2001 and 95 % in 2006,
- The collected revenue is less than 20 % of should-be-collected amount at present. In the future it will be improved to collect 70 % and 80 % of the billing amounts in 2001 and 2006.

(3) General Assumptions

In order to evaluate financial viability, the following assumptions have been made:

- Project Life: 15 years up to 2016 based on the life period of facilities;
- Project Revenue and Cost are estimated by using market prices in September 1996 and evaluated by Thai Baht;
- Foreign Exchange Rate (as of September 30, 1996):
 US \$ 1.00 = Baht 25.42
 US \$ 1.00 = Japanese Yen 110.65
 Baht 1.00 = Japanese Yen 4.35
- A discount rate of 8 % is used considering the interest rate of available external loan;
- Inflation is not taken into account both in revenue and expenditure projections;
- Salvage Value (Undepreciated Value) is assumed to be a negative cost in the final year of the project life

(4) Costs

The costs of the following projects/programs are included in the evaluation:

Investment Costs in the Fifth Five-Year Plan of BMA (1997 - 2001)

- Incineration Plant 1 (1,350 t/day x 2)
- Nong Khaem Compost Plant (1,000 t/day)
- Other Projects
- Garbage Disposal Contract/on-going (3,500 t/day)
- Future Garbage Disposal contract 1 (6,500 t/day)

Investment Costs of the Projects/Programs proposed by BEIP Study (1997 - 2011)

- Bangkok Incineration Plant 2 (2,000 t/day)
- Bangkok Incineration Plant 3 (1,350 t/day)
- Bangkok Incineration Plant 4 (1,000 t/day)
- Tonburi Incineration Plant 2 (1,000 t/day)
- Procurement of Disposal Site
 -Ning Chok (3,200 t/day)
 -Ban Khuntien (3,500 t/day)
- Future Disposal Contract 2 (5,000 t/day)
- Future Disposal Contract 3 (5,000 t/day)

Operation and Maintenance Costs

- Salary and repairing charges of collection vehicles are estimated based on the actual expenditure of Department of Public Cleansing and the District Offices of BMA from Fiscal Year 1991 to 1995. Namely, an annual growth rate is estimated at 3 %.

- The operation & maintenance costs of additional facilities are included in each investment costs.

Table 15.12 shows the investment costs and operation and maintenance costs of solid waste management of BMA by implementation term up to 2011. Land equitation cost is not included.

Table 15.12: Costs of Solid Waste Management of BMA (1997 - 2011)

	million baht				
	Urgent Action 1997-2001	Medium Term Plan 2002-2006	Long Term Plan 2007-2011	Total	Reference 1)
1) Facility Development					
BMA 5th Five-year Plan	17,890	2,350	2,350	22,590	SW15
Incineration Plant	8,250	24,300	3,000	35,550	SW13, 24
Procurement of Disposal Site	0	3,950	3,900	7,850	SW11,12, 22, 23, 31
Disposal Contract	0	1,400	1,400	2,800	SW11,12, 22, 23, 31
Sub-total	26,140	32,000	10,650	68,790	
2) Recurrent Expenditure of BMA	1,279	1,483	1,719	4,481	

Source: BMA Fifth Five-Year Plan and BEIP Study

Note 1): Proposed Plan in projects/programs (refer to Chapter 11)

(5) Revenue

The revenues for the residential services are estimated by using the new tariff schedule, which is under the process of introduction in BMA (refer to Table 15.13) and the future tariff is projected to increase in accordance with the growth of income level as estimated in the socioeconomic framework as shown in Table 15.14.

Table 15.13: New Tariff Schedule of Garbage Collection

	Monthly rate
1) Less than 500 liter per day	
Less than 20 liter per day	Baht 40.0
Each 20 liter per day over 20 liter	Baht 40.0
2) Over 500 liter per day	
Less than one cubic meter per day	Baht 2,000.0
Each one cubic meter per day over one cubic meter	Baht 2,000.0

Source: BMA

Table 15.14: Tariff Schedule of Solid Waste Collection

	Present	Urgent	Medium	Long Term
	1995	Action 2001	Term Plan 2006	Plan 2011
1) Basic Monthly Tariff Schedule of Solid Waste Collection (baht per month)	12	51	66	82
2) Real growth rate of per capita GDP in Bangkok		6.1 % (1997-2001)	5.3 % (2002-2006)	4.5 % (2007-2011)

Source: BMA and BEIP Study

The amount of garbage from business sector is almost equivalent to the residential garbage in Bangkok according to the previous study; "Study on Bangkok Solid Waste Management", by JICA in 1991. In principle, the waste from the business such as industrial and commercial enterprises should fully be paid by polluters. In the evaluation, therefore, a half of the costs including the recurring expenditure to be recovered by business sector.

(6) Evaluation

1) Financing Plan

Other than user charge revenues, project costs of solid waste management is usually financed by:

- Budget expenditure of municipality or local government collected from tax and other charges;
- Subsidies from central government; and
- "Soft" loans at subsidized rates;

In the evaluation, the cash-flow of the projects/programs are examined in accordance with the following three steps:

- firstly, it is examined whether the user charges will be able to recover the costs including capital investment and recurring costs;
- secondly, an appropriate portion of the capital costs will be subsidized to recover the costs; and
- finally, the external loan is introduced to fulfill the deficit of cash-flow of the capital investment

2) Financial Evaluation

Cash-flow Statement I

The cash-flow of the revenues and costs are calculated as shown in Table 15.15. FIRR (Financial Internal Rate of Return) to the projects/program is estimated at 0.40 % and NPV (Net Present Value) is calculated to be -15,684 million baht using a discount rate of 8 %. It is approved that the costs of solid waste management including the capital investment and operation and maintenance can not be recovered by user charges considering the opportunity cost of capital.

Cash-flow Statement II

Assuming that a half of the capital cost will be subsidized, FIRR increases to 12.12 % and NPV is estimated to be 4,598 million baht as shown in Table 15.16. The result of calculation shows that it would be possible to manage solid waste service if BMA could seek some external fund source under the subsidized loan condition.

Cash-flow Statement III

In the cash-flow statement III, the external loan is applied for 40 % of the capital costs under the following loan conditions:

- repayment period of principal loan; 20 years including grace period of 5 years, and
- interest rate; 8 % per annum.

As the shortage of capital costs is financed by the soft loan, the increased user charge will recover the recurring expenditure and the principal repayments of loan in the latter part of the project period as shown in Table 15.17. Thereby, the accumulative cash-flow continuously shows surplus during the whole project period (refer to Figure 15.11).

It is noted that BMA need to recover the solid waste management costs by user charges as much as possible through the efforts:

- to apply new tariff schedule urgently and revise it timely in accordance with the growth of income level of household,
- to require the business sector to recover the full costs of their wastes under the PPP application, and
- to increase charge-collecting rate of the billings through the introduction of efficient management system of fee-collecting

(7) Further Study

The further study is required to implement in the proposed development studies of projects/programs of the BEIP focusing on:

- Institutional strengthening of BMA for solid waste management;
- Preparation for regulatory framework;
- Pricing, cost recovery and financing;
- Charge collecting system;
- Community participation; and
- Private sector participation

Table 15.15: Cashflow Statement I: User Charge

NPV (Discount Rate: 8 %):	million baht																			million baht
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FIRR: 0.40%																				
1 Facility Construction Costs (million baht)																				
1 BMA 5th Five-year Plan (SW15)	2,000	2,000	2,000	2,000	2,000															
1) Incineration Center 1	340	690	690	690	690															
2) Nong Khaen Compost Plant	720	720	720	720	720															
3) Other Projects	100	100	100	100	100															
4) Disposal Contract	3,850	3,510	3,510	3,510	3,510	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
5) Operation & Maintenance																				
Sub-total																				
2 Incineration Plant (SW13, 24)																				
Bangkok No.2	1,650	1,650	1,650	1,650	1,650	2,040	2,040	2,040	2,040	2,040										
Bangkok No.3						1,220	1,220	1,220	1,220	1,220										
Bangkok No.4						1,220	1,220	1,220	1,220	1,220										
Tonburi No.2						380	380	380	380	380										
Operation & Maintenance																				
Sub-total																				
3 Procurement of Disposal Site (SW22, 23, 31)																				
Nong Chok						270	270	270	270	270										
Bang Khunten						520	520	520	520	520										
Sub-total																				
4 Disposal Contract																				
Disposal Contract Phase 2						280	280	280	280	280										
Disposal Contract Phase 3						280	280	280	280	280										
Sub-total																				
Total of I	5,500	5,160	5,160	5,160	5,160	6,400	6,400	6,400	6,400	6,400										
II Recurrent Expenditure of BMA (million baht)																				
Salary	147	151	156	160	165	170	175	181	186	192	197	203	209	216	222	229	236	243	250	257
Repair	94	97	100	103	106	109	112	116	119	123	126	130	134	138	142	147	151	156	160	165
Total of II	241	248	256	263	271	279	288	296	305	314	324	334	344	354	364	375	387	398	410	422
III Revenue																				
Users Charge (Household)	476	561	659	770	897	1,004	1,122	1,253	1,398	1,554	1,655	1,763	1,879	2,001	2,141	2,237	2,338	2,443	2,553	2,667
Users Charge (Business)	713	842	988	1,156	1,346	1,505	1,683	1,879	2,097	2,330	2,483	2,645	2,818	3,002	3,211	3,355	3,506	3,664	3,829	4,001
Total of III	1,189	1,403	1,647	1,926	2,243	2,509	2,804	3,132	3,494	3,884	4,138	4,408	4,697	5,004	5,351	5,592	5,844	6,107	6,382	6,669
V Consumer																				
1 Population	8,421	8,573	8,727	8,884	9,044	9,189	9,336	9,485	9,637	9,761	9,898	10,036	10,177	10,319	10,496	10,496	10,496	10,496	10,496	10,496
2 Number of household	2,133	2,184	2,235	2,287	2,341	2,392	2,443	2,496	2,549	2,596	2,647	2,698	2,751	2,804	2,870	2,870	2,870	2,870	2,870	2,870
3 % of served household	86%	87%	88%	89%	90%	91%	92%	93%	94%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
4 Number of served household	1,835	1,900	1,967	2,036	2,107	2,176	2,248	2,321	2,396	2,466	2,514	2,563	2,613	2,664	2,727	2,727	2,727	2,727	2,727	2,727
5 Tariff per Household per Month	40	42	45	48	51	53	56	59	62	66	69	72	75	78	82	85	89	93	98	102
6 Total billings	881	968	1,063	1,167	1,282	1,394	1,516	1,648	1,792	1,942	2,069	2,204	2,348	2,502	2,676	2,796	2,922	3,053	3,191	3,334
7 Collecting revenue:	54%	58%	62%	66%	70%	72%	74%	76%	78%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
(% of Total billings)																				
VI Cash-flow																				
1 Cash-inflow (III)	1,189	1,403	1,647	1,926	2,243	2,509	2,804	3,132	3,494	3,884	4,138	4,408	4,697	5,004	5,351	5,592	5,844	6,107	6,382	6,669
2 Cash-outflow (I + II)	5,741	5,408	5,416	5,423	5,431	6,679	6,688	6,696	6,705	6,714	2,454	2,464	2,474	2,484	2,494	2,145	2,157	2,168	2,180	5,274
3 Net Cash-flow	-4,552	-4,005	-3,768	-3,497	-3,188	-4,170	-3,883	-3,565	-3,211	-2,830	1,684	1,945	2,223	2,520	2,857	3,447	3,687	3,939	4,201	11,943

Table 15.16: Cashflow Statement II : with Subsidies

NPV (Discount Rate: 8 %):		4,598 million baht																	FIRR: 12.12%					million baht				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20							
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016							
I	Cash-inflow																											
	1) User Charges	1,189	1,403	1,647	1,926	2,243	2,509	2,804	3,132	3,494	3,884	4,138	4,408	4,697	5,004	5,351	5,592	5,844	6,107	6,382	6,669							
	2) Subsidies	2,700	2,530	2,530	2,530	2,530	2,775	2,775	2,775	2,775	2,775	530	530	530	530	530												
	Total	3,889	3,933	4,177	4,456	4,773	5,284	5,579	5,907	6,269	6,659	4,668	4,938	5,227	5,534	5,881	5,592	5,844	6,107	6,382	6,669							
II	Cash-outflow																											
	1) Costs including Recurring Expenditure	5,741	5,408	5,416	5,423	5,431	6,679	6,688	6,696	6,705	6,714	2,454	2,464	2,474	2,484	2,494	2,145	2,157	2,168	2,180	5,274							
III	Net Cash-flow	-1,852	-1,475	-1,238	-967	-658	-1,395	-1,108	-790	-436	-55	2,214	2,475	2,753	3,050	3,387	3,447	3,687	3,939	4,201	11,943							

Table 15.17: Cashflow Statement III: with Subsidies and External Loan

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
I Cash-inflow																					
1) User Charges		1,189	1,403	1,647	1,926	2,243	2,509	2,804	3,132	3,494	3,884	4,138	4,408	4,697	5,004	5,351	5,592	5,844	6,107	6,382	6,669
2) Subsidies		2,700	2,530	2,530	2,530	2,530	2,775	2,775	2,775	2,775	2,775	530	530	530	530	530					
3) External Loan		2,160	2,024	2,024	2,024	2,024	2,220	2,220	2,220	2,220	2,220	424	424	424	424	424					
Total		6,049	5,957	6,201	6,480	6,797	7,504	7,799	8,127	8,489	8,879	5,092	5,362	5,651	5,958	6,305	5,592	5,844	6,107	6,382	6,669
2 Cash-outflow																					
1) Costs including Recurring Expenditure		5,741	5,408	5,416	5,423	5,431	6,679	6,688	6,696	6,705	6,714	2,454	2,464	2,474	2,484	2,494	2,145	2,157	2,168	2,180	5,274
2) Principal Repayment		5,741	5,408	5,416	5,423	5,431	6,679	6,688	6,696	6,705	6,714	2,454	2,464	2,474	2,484	2,494	2,145	2,157	2,168	2,180	5,274
3) Interest Payment		173	335	497	659	820	978	1,124	1,259	1,384	1,498	1,456	1,403	1,337	1,260	1,171	1,046	919	789	657	523
Total		5,914	5,743	5,912	6,082	6,252	7,914	8,203	8,482	8,751	9,009	4,854	4,959	5,051	5,133	5,202	4,756	4,668	4,578	4,467	-3,074
3 Net Cash-flow																					
1) Net Cash-flow		135	214	289	398	545	-409	-404	-355	-261	-129	238	404	599	825	1,103	836	1,176	1,528	1,895	9,742
2) Accumulated		135	349	638	1,036	1,582	1,172	769	413	152	22	260	664	1,263	2,088	3,191	4,027	5,203	6,731	8,626	18,368

Table 15.18: Loan Schedule

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
I Loan																					
1) Loan		2,160	2,024	2,024	2,024	2,024	2,220	2,220	2,220	2,220	2,220	424	424	424	424	424					
2) Repayment							257	392	527	661	796	944	1,092	1,240	1,388	1,536	1,565	1,593	1,621	1,649	1,678
3) Balance		2,160	4,184	6,208	8,232	10,256	12,219	14,048	15,741	17,300	18,723	18,203	17,535	16,718	15,754	14,641	13,077	11,484	9,863	8,213	6,535
II Interest																					
1) Interest Payment		173	335	497	659	820	978	1,124	1,259	1,384	1,498	1,456	1,403	1,337	1,260	1,171	1,046	919	789	657	523

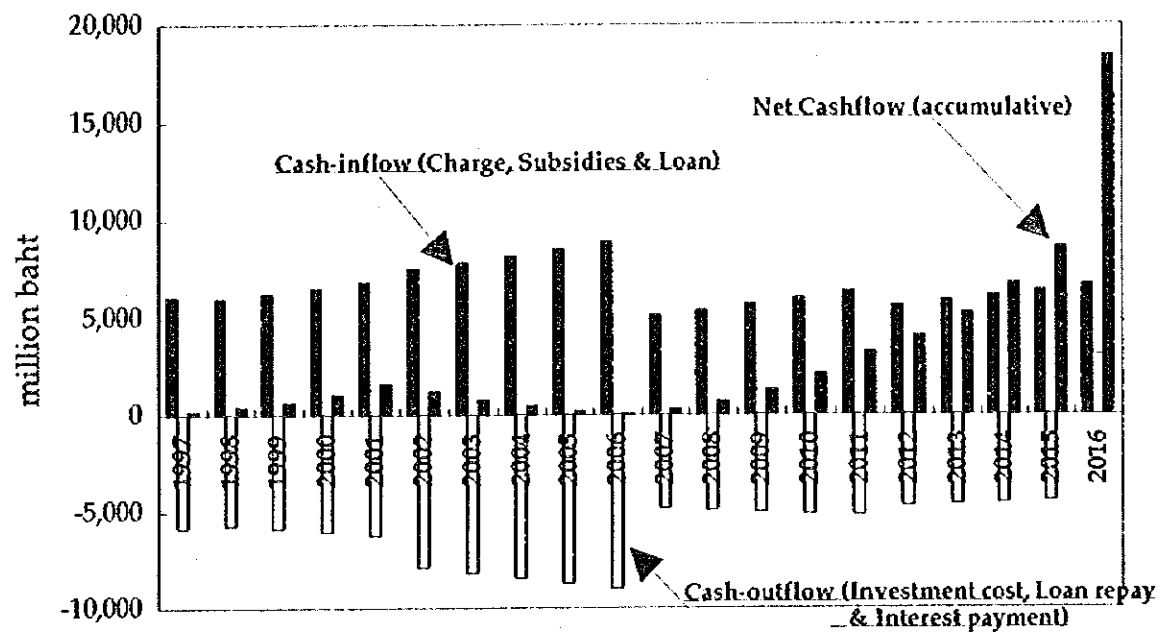


Fig. 15.11: Cash-flow with Subsidies and External Loan

