Appendix - 6

Estimate of Economic Benefit in the Espitito Santo Water and Coastal Pollution Management Project

(Source : Staff Appraisal Report , Brazil, Espirito Santo Water and Coastal Pollution Management Project, the World Bank, June 6, 1994)

1. Target population of the water supply component is composed of the following six groups.

Group 1 : those currently receiving rationed service and will receive a 24-hour supply

Group 2 : those currently receiving rationed service and will receive more hours of service

Group 3 : those currently not connected to service, but will be connected for a 24-hour service (low income group)

Group 4 : those currently not connected to service, but will receive rationed service

Group 5 : new connections as a result of population growth

Group 6 : regular visitors and seasonal tourists

2. The number of beneficiaries and estimated benefits are as follows.

Group	Number of Benefeciaries				Benefit	
	1999	(%)	Final Stage	(%)	US$/month /household	* US$/ cubic meter
1	182.6	28.9%	182.6	13.0%	6.66	0.28
2	55.4	8.8%	55.4	3.9%	3.64	0.16
3	19.7	3.1%	19.7	1.4%	8.94	0.38
4	1.5	0.2%	1.5	0.1%	5.91	0.25
5	373.7	59.0%	1,147.7	81.6%	39.61	1.69
sub-total	632.9	100.0%	1,406.9	100.0%		
6	6.0		6.0		8.82	0.47
Total	638.9		1,412.9			

Note : The following factors are assumed to convert monthly household-wise benefit to water volume basis benefit.

- consumption rate : 0.156 cubic meter/day/person
- number of household member : 5 members

3. Weighted averages of benefit are derived for 1999 and final stage for Group 1 to 5 as follows.

1999 : 1.11 US$/cubic meter

Final Stage : 1.43 US$/cubic meter

4. These are compared with the present tariff level.

Present average tariff level : 0.50 US$/cubic meter

1999: 222%

Final stage : 286%

4. These are compared with the future tariff level based on marginal cost pricing.

Future tariff based on marginal cost 1.15 US$/cubic meter

1999: 96%

Final stage : 124%

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Economic Evaluation for Curitiba Metropolitan Area Water Supply Project

Assumptions ;

a) Investment cost : 760 million US$

b) OM cost 68.4 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply volume : 7.234 cubic meter per second

total	100.0%	228.125	million cubic meter per year
domestic	56.9%	129.8	million cubic meter per year
industrial	43.1%	98.3	million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus 50.0% of unit benefit

f) Water loss domestic 25.0%

industrial 10.0%

EIRR =	10.29%
B/C =	1.02
B-C =	14.9 million US$
(Discount rate of 10% applied)	

Cost and Benefit Flow-1

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	161.5	0.0	161.5	0.0	0.0	0.0	-161.5
2	161.5	0.0	161.5	0.0	0.0	0.0	-161.5
3	161.5	0.0	161.5	0.0	0.0	0.0	-161.5
4	161.5	0.0	161.5	0.0	0.0	0.0	-161.5
5	0.0	58.1	58.1	90.2	49.7	140.0	81.8
6	0.0	58.1	58.1	90.2	49.7	140.0	81.8
7	0.0	58.1	58.1	90.2	49.7	140.0	81.8
8	0.0	58.1	58.1	90.2	49.7	140.0	81.8
9	0.0	58.1	58.1	90.2	49.7	140.0	81.8
10	0.0	58.1	58.1	90.2	49.7	140.0	81.8
11	0.0	58.1	58.1	90.2	49.7	140.0	81.8
12	0.0	58.1	58.1	90.2	49.7	140.0	81.8
13	0.0	58.1	58.1	90.2	49.7	140.0	81.8
14	0.0	58.1	58.1	90.2	49.7	140.0	81.8
15	0.0	58.1	58.1	90.2	49.7	140.0	81.8
16	0.0	58.1	58.1	90.2	49.7	140.0	81.8
17	0.0	58.1	58.1	90.2	49.7	140.0	81.8
18	0.0	58.1	58.1	90.2	49.7	140.0	81.8
19	0.0	58.1	58.1	90.2	49.7	140.0	81.8
20	0.0	58.1	58.1	90.2	49.7	140.0	81.8
21	0.0	58.1	58.1	90.2	49.7	140.0	81.8
22	0.0	58.1	58.1	90.2	49.7	140.0	81.8
23	0.0	58.1	58.1	90.2	49.7	140.0	81.8
24	0.0	58.1	58.1	90.2	49.7	140.0	81.8
25	0.0	58.1	58.1	90.2	49.7	140.0	81.8
26	0.0	58.1	58.1	90.2	49.7	140.0	81.8
27	0.0	58.1	58.1	90.2	49.7	140.0	81.8
28	0.0	58.1	58.1	90.2	49.7	140.0	81.8
29	0.0	58.1	58.1	90.2	49.7	140.0	81.8
30	0.0	58.1	58.1	90.2	49.7	140.0	81.8
31	0.0	58.1	58.1	90.2	49.7	140.0	81.8
32	0.0	58.1	58.1	90.2	49.7	140.0	81.8
33	0.0	58.1	58.1	90.2	49.7	140.0	81.8
34	0.0	58.1	58.1	90.2	49.7	140.0	81.8
Total	646.0	1,744.2	2,390.2	2,707.3	1,491.4	4,198.7	1,808.5

Economic Evaluation for Cascavel Water Supply Project

Assumptions;

a) Investment cost : 38.9 million US$
b) OM cost 3.5 million US$ 9.0% of investment cost
c) Conversion factor : 85 %
d) Water supply volume : 0.602 cubic meter per second
total 100.0% 19.0 million cubic meter per year
domestic 87.6% 16.6 million cubic meter per year
industrial 12.4% 2.4 million cubic meter per year
e) Unit benefit : domestic 0.62 US$ per cubic meter
industrial 0.56 US$ per cubic meter
Rate of consumer surplus : 50.0% of domestic benefit
f) Water loss domestic 25.0% EIRR = 21.49%
industrial 10.0% B/C = 1.81
B-C = 36.7

Cost and Benefit Flow (Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	8.3	0.0	8.3	0.0	0.0	0.0	-8.3
2	8.3	0.0	8.3	0.0	0.0	0.0	-8.3
3	8.3	0.0	8.3	0.0	0.0	0.0	-8.3
4	8.3	0.0	8.3	0.0	0.0	0.0	-8.3
5	0.0	3.0	3.0	11.6	1.2	12.7	9.8
6	0.0	3.0	3.0	11.6	1.2	12.7	9.8
7	0.0	3.0	3.0	11.6	1.2	12.7	9.8
8	0.0	3.0	3.0	11.6	1.2	12.7	9.8
9	0.0	3.0	3.0	11.6	1.2	12.7	9.8
10	0.0	3.0	3.0	11.6	1.2	12.7	9.8
11	0.0	3.0	3.0	11.6	1.2	12.7	9.8
12	0.0	3.0	3.0	11.6	1.2	12.7	9.8
13	0.0	3.0	3.0	11.6	1.2	12.7	9.8
14	0.0	3.0	3.0	11.6	1.2	12.7	9.8
15	0.0	3.0	3.0	11.6	1.2	12.7	9.8
16	0.0	3.0	3.0	11.6	1.2	12.7	9.8
17	0.0	3.0	3.0	11.6	1.2	12.7	9.8
18	0.0	3.0	3.0	11.6	1.2	12.7	9.8
19	0.0	3.0	3.0	11.6	1.2	12.7	9.8
20	0.0	3.0	3.0	11.6	1.2	12.7	9.8
21	0.0	3.0	3.0	11.6	1.2	12.7	9.8
22	0.0	3.0	3.0	11.6	1.2	12.7	9.8
23	0.0	3.0	3.0	11.6	1.2	12.7	9.8
24	0.0	3.0	3.0	11.6	1.2	12.7	9.8
25	0.0	3.0	3.0	11.6	1.2	12.7	9.8
26	0.0	3.0	3.0	11.6	1.2	12.7	9.8
27	0.0	3.0	3.0	11.6	1.2	12.7	9.8
28	0.0	3.0	3.0	11.6	1.2	12.7	9.8
29	0.0	3.0	3.0	11.6	1.2	12.7	9.8
30	0.0	3.0	3.0	11.6	1.2	12.7	9.8
31	0.0	3.0	3.0	11.6	1.2	12.7	9.8
32	0.0	3.0	3.0	11.6	1.2	12.7	9.8
33	0.0	3.0	3.0	11.6	1.2	12.7	9.8
34	0.0	3.0	3.0	11.6	1.2	12.7	9.8
Total	33.1	89.3	122.3	346.8	35.7	382.5	260.1

Note : Discount rate of 10 % is applied to derive B/C and B-C.

Economic Evaluation for Foz do Iguacu Water Supply Project

Assumptions ;

a) Investment cost : 11.1 million US$

b) OM cost 1.0 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply volume : 1.042 cubic meter per second

total	100.0%	32.9	million cubic meter per year
domestic	87.6%	28.8	million cubic meter per year
industrial	12.4%	4.1	million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 77.81%

industrial 10.0% B/C = 10.98

B-C = 129.1 million US$

Cost and Benefit Flow (Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	2.4	0.0	2.4	0.0	0.0	0.0	-2.4
2	2.4	0.0	2.4	0.0	0.0	0.0	-2.4
3	2.4	0.0	2.4	0.0	0.0	0.0	-2.4
4	2.4	0.0	2.4	0.0	0.0	0.0	-2.4
5	0.0	0.8	0.8	20.0	2.1	22.1	21.2
6	0.0	0.8	0.8	20.0	2.1	22.1	21.2
7	0.0	0.8	0.8	20.0	2.1	22.1	21.2
8	0.0	0.8	0.8	20.0	2.1	22.1	21.2
9	0.0	0.8	0.8	20.0	2.1	22.1	21.2
10	0.0	0.8	0.8	20.0	2.1	22.1	21.2
11	0.0	0.8	0.8	20.0	2.1	22.1	21.2
12	0.0	0.8	0.8	20.0	2.1	22.1	21.2
13	0.0	0.8	0.8	20.0	2.1	22.1	21.2
14	0.0	0.8	0.8	20.0	2.1	22.1	21.2
15	0.0	0.8	0.8	20.0	2.1	22.1	21.2
16	0.0	0.8	0.8	20.0	2.1	22.1	21.2
17	0.0	0.8	0.8	20.0	2.1	22.1	21.2
18	0.0	0.8	0.8	20.0	2.1	22.1	21.2
19	0.0	0.8	0.8	20.0	2.1	22.1	21.2
20	0.0	0.8	0.8	20.0	2.1	22.1	21.2
21	0.0	0.8	0.8	20.0	2.1	22.1	21.2
22	0.0	0.8	0.8	20.0	2.1	22.1	21.2
23	0.0	0.8	0.8	20.0	2.1	22.1	21.2
24	0.0	0.8	0.8	20.0	2.1	22.1	21.2
25	0.0	0.8	0.8	20.0	2.1	22.1	21.2
26	0.0	0.8	0.8	20.0	2.1	22.1	21.2
27	0.0	0.8	0.8	20.0	2.1	22.1	21.2
28	0.0	0.8	0.8	20.0	2.1	22.1	21.2
29	0.0	0.8	0.8	20.0	2.1	22.1	21.2
30	0.0	0.8	0.8	20.0	2.1	22.1	21.2
31	0.0	0.8	0.8	20.0	2.1	22.1	21.2
32	0.0	0.8	0.8	20.0	2.1	22.1	21.2
33	0.0	0.8	0.8	20.0	2.1	22.1	21.2
34	0.0	0.8	0.8	20.0	2.1	22.1	21.2
Total	9.4	25.5	34.9	600.2	61.8	662.0	627.1

Note : Discount rate of 10 % is applied to derive B/C and B-C.

Appendix 7 (4/25)
Economic Evaluation for Guarapuava Water Supply Project

Assumptions ;

a) Investment cost : 9.1 million US$

b) OM cost 0.8 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply volume : 0.289 cubic meter per second

total	100.0%	9.1	million cubic meter per year
domestic	69.0%	6.3	million cubic meter per year
industrial	31.0%	2.8	million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 38.16%

industrial 10.0% B/C = 3.52

B-C = 26.8 million US$

Cost and Benefit Flow (Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
2	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
3	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
4	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
5	0.0	0.7	0.7	4.4	1.4	5.8	5.1
6	0.0	0.7	0.7	4.4	1.4	5.8	5.1
7	0.0	0.7	0.7	4.4	1.4	5.8	5.1
8	0.0	0.7	0.7	4.4	1.4	5.8	5.1
9	0.0	0.7	0.7	4.4	1.4	5.8	5.1
10	0.0	0.7	0.7	4.4	1.4	5.8	5.1
11	0.0	0.7	0.7	4.4	1.4	5.8	5.1
12	0.0	0.7	0.7	4.4	1.4	5.8	5.1
13	0.0	0.7	0.7	4.4	1.4	5.8	5.1
14	0.0	0.7	0.7	4.4	1.4	5.8	5.1
15	0.0	0.7	0.7	4.4	1.4	5.8	5.1
16	0.0	0.7	0.7	4.4	1.4	5.8	5.1
17	0.0	0.7	0.7	4.4	1.4	5.8	5.1
18	0.0	0.7	0.7	4.4	1.4	5.8	5.1
19	0.0	0.7	0.7	4.4	1.4	5.8	5.1
20	0.0	0.7	0.7	4.4	1.4	5.8	5.1
21	0.0	0.7	0.7	4.4	1.4	5.8	5.1
22	0.0	0.7	0.7	4.4	1.4	5.8	5.1
23	0.0	0.7	0.7	4.4	1.4	5.8	5.1
24	0.0	0.7	0.7	4.4	1.4	5.8	5.1
25	0.0	0.7	0.7	4.4	1.4	5.8	5.1
26	0.0	0.7	0.7	4.4	1.4	5.8	5.1
27	0.0	0.7	0.7	4.4	1.4	5.8	5.1
28	0.0	0.7	0.7	4.4	1.4	5.8	5.1
29	0.0	0.7	0.7	4.4	1.4	5.8	5.1
30	0.0	0.7	0.7	4.4	1.4	5.8	5.1
31	0.0	0.7	0.7	4.4	1.4	5.8	5.1
32	0.0	0.7	0.7	4.4	1.4	5.8	5.1
33	0.0	0.7	0.7	4.4	1.4	5.8	5.1
34	0.0	0.7	0.7	4.4	1.4	5.8	5.1
Total	7.7	20.9	28.6	131.3	42.9	174.2	145.6

Note : Discount rate of 10 % is applied to derive B/C and B-C.

Economic Evaluation for Medianeira Water Supply Project

Assumptions ;

a) Investment cost : 4.3 million US$

b) OM cost 0.4 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply volume : 0.127 cubic meter per second

total	100.0%	4.0 million cubic meter per year
domestic	86.1%	3.5 million cubic meter per year
industrial	13.9%	0.6 million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 37.54%

industrial 10.0% B/C = 3.45

B-C = 12.3 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	0.9	0.0	0.9	0.0	0.0	0.0	-0.9
2	0.9	0.0	0.9	0.0	0.0	0.0	-0.9
3	0.9	0.0	0.9	0.0	0.0	0.0	-0.9
4	0.9	0.0	0.9	0.0	0.0	0.0	-0.9
5	0.0	0.3	0.3	2.4	0.3	2.7	2.4
6	0.0	0.3	0.3	2.4	0.3	2.7	2.4
7	0.0	0.3	0.3	2.4	0.3	2.7	2.4
8	0.0	0.3	0.3	2.4	0.3	2.7	2.4
9	0.0	0.3	0.3	2.4	0.3	2.7	2.4
10	0.0	0.3	0.3	2.4	0.3	2.7	2.4
11	0.0	0.3	0.3	2.4	0.3	2.7	2.4
12	0.0	0.3	0.3	2.4	0.3	2.7	2.4
13	0.0	0.3	0.3	2.4	0.3	2.7	2.4
14	0.0	0.3	0.3	2.4	0.3	2.7	2.4
15	0.0	0.3	0.3	2.4	0.3	2.7	2.4
16	0.0	0.3	0.3	2.4	0.3	2.7	2.4
17	0.0	0.3	0.3	2.4	0.3	2.7	2.4
18	0.0	0.3	0.3	2.4	0.3	2.7	2.4
19	0.0	0.3	0.3	2.4	0.3	2.7	2.4
20	0.0	0.3	0.3	2.4	0.3	2.7	2.4
21	0.0	0.3	0.3	2.4	0.3	2.7	2.4
22	0.0	0.3	0.3	2.4	0.3	2.7	2.4
23	0.0	0.3	0.3	2.4	0.3	2.7	2.4
24	0.0	0.3	0.3	2.4	0.3	2.7	2.4
25	0.0	0.3	0.3	2.4	0.3	2.7	2.4
26	0.0	0.3	0.3	2.4	0.3	2.7	2.4
27	0.0	0.3	0.3	2.4	0.3	2.7	2.4
28	0.0	0.3	0.3	2.4	0.3	2.7	2.4
29	0.0	0.3	0.3	2.4	0.3	2.7	2.4
30	0.0	0.3	0.3	2.4	0.3	2.7	2.4
31	0.0	0.3	0.3	2.4	0.3	2.7	2.4
32	0.0	0.3	0.3	2.4	0.3	2.7	2.4
33	0.0	0.3	0.3	2.4	0.3	2.7	2.4
34	0.0	0.3	0.3	2.4	0.3	2.7	2.4
Total	3.7	9.9	13.5	72.1	8.5	80.6	67.0

Note : Discount rate of 10 % is applied to derive B/C and B-C.

Appendix - 7 (6/25)

Economic Evaluation for Dois Vizinhos Water Supply Project

Assumptions ;

a) Investment cost : 9.1 million US$

b) OM cost 0.8 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply volume : 0.139 cubic meter per second

total	100.0%	4.4 million cubic meter per year
domestic	43.7%	1.9 million cubic meter per year
industrial	56.3%	2.5 million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 18.42%

industrial 10.0% B/C = 1.56

B-C = 6.0 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
2	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
3	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
4	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
5	0.0	0.7	0.7	1.3	1.2	2.6	1.9
6	0.0	0.7	0.7	1.3	1.2	2.6	1.9
7	0.0	0.7	0.7	1.3	1.2	2.6	1.9
8	0.0	0.7	0.7	1.3	1.2	2.6	1.9
9	0.0	0.7	0.7	1.3	1.2	2.6	1.9
10	0.0	0.7	0.7	1.3	1.2	2.6	1.9
11	0.0	0.7	0.7	1.3	1.2	2.6	1.9
12	0.0	0.7	0.7	1.3	1.2	2.6	1.9
13	0.0	0.7	0.7	1.3	1.2	2.6	1.9
14	0.0	0.7	0.7	1.3	1.2	2.6	1.9
15	0.0	0.7	0.7	1.3	1.2	2.6	1.9
16	0.0	0.7	0.7	1.3	1.2	2.6	1.9
17	0.0	0.7	0.7	1.3	1.2	2.6	1.9
18	0.0	0.7	0.7	1.3	1.2	2.6	1.9
19	0.0	0.7	0.7	1.3	1.2	2.6	1.9
20	0.0	0.7	0.7	1.3	1.2	2.6	1.9
21	0.0	0.7	0.7	1.3	1.2	2.6	1.9
22	0.0	0.7	0.7	1.3	1.2	2.6	1.9
23	0.0	0.7	0.7	1.3	1.2	2.6	1.9
24	0.0	0.7	0.7	1.3	1.2	2.6	1.9
25	0.0	0.7	0.7	1.3	1.2	2.6	1.9
26	0.0	0.7	0.7	1.3	1.2	2.6	1.9
27	0.0	0.7	0.7	1.3	1.2	2.6	1.9
28	0.0	0.7	0.7	1.3	1.2	2.6	1.9
29	0.0	0.7	0.7	1.3	1.2	2.6	1.9
30	0.0	0.7	0.7	1.3	1.2	2.6	1.9
31	0.0	0.7	0.7	1.3	1.2	2.6	1.9
32	0.0	0.7	0.7	1.3	1.2	2.6	1.9
33	0.0	0.7	0.7	1.3	1.2	2.6	1.9
34	0.0	0.7	0.7	1.3	1.2	2.6	1.9
Total	7.7	20.9	28.6	39.9	37.4	77.3	48.7

Note : Discount rate of 10 % is applied to derive B/C and B-C.

Economic Evaluation for Francisco Beltrao Water Supply Project

Assumptions ;

a) Investment cost : 4.7 million US$

b) OM cost 0.4 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply volume : 0.231 cubic meter per second

total	100.0%	7.3	million cubic meter per year
domestic	64.2%	4.7	million cubic meter per year
industrial	35.8%	2.6	million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0%

industrial 10.0%

EIRR = 51.19%

B/C = 5.38

B-C = 24.0 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.0	0.0	1.0	0.0	0.0	0.0	-1.0
2	1.0	0.0	1.0	0.0	0.0	0.0	-1.0
3	1.0	0.0	1.0	0.0	0.0	0.0	-1.0
4	1.0	0.0	1.0	0.0	0.0	0.0	-1.0
5	0.0	0.4	0.4	3.3	1.3	4.6	4.2
6	0.0	0.4	0.4	3.3	1.3	4.6	4.2
7	0.0	0.4	0.4	3.3	1.3	4.6	4.2
8	0.0	0.4	0.4	3.3	1.3	4.6	4.2
9	0.0	0.4	0.4	3.3	1.3	4.6	4.2
10	0.0	0.4	0.4	3.3	1.3	4.6	4.2
11	0.0	0.4	0.4	3.3	1.3	4.6	4.2
12	0.0	0.4	0.4	3.3	1.3	4.6	4.2
13	0.0	0.4	0.4	3.3	1.3	4.6	4.2
14	0.0	0.4	0.4	3.3	1.3	4.6	4.2
15	0.0	0.4	0.4	3.3	1.3	4.6	4.2
16	0.0	0.4	0.4	3.3	1.3	4.6	4.2
17	0.0	0.4	0.4	3.3	1.3	4.6	4.2
18	0.0	0.4	0.4	3.3	1.3	4.6	4.2
19	0.0	0.4	0.4	3.3	1.3	4.6	4.2
20	0.0	0.4	0.4	3.3	1.3	4.6	4.2
21	0.0	0.4	0.4	3.3	1.3	4.6	4.2
22	0.0	0.4	0.4	3.3	1.3	4.6	4.2
23	0.0	0.4	0.4	3.3	1.3	4.6	4.2
24	0.0	0.4	0.4	3.3	1.3	4.6	4.2
25	0.0	0.4	0.4	3.3	1.3	4.6	4.2
26	0.0	0.4	0.4	3.3	1.3	4.6	4.2
27	0.0	0.4	0.4	3.3	1.3	4.6	4.2
28	0.0	0.4	0.4	3.3	1.3	4.6	4.2
29	0.0	0.4	0.4	3.3	1.3	4.6	4.2
30	0.0	0.4	0.4	3.3	1.3	4.6	4.2
31	0.0	0.4	0.4	3.3	1.3	4.6	4.2
32	0.0	0.4	0.4	3.3	1.3	4.6	4.2
33	0.0	0.4	0.4	3.3	1.3	4.6	4.2
34	0.0	0.4	0.4	3.3	1.3	4.6	4.2
Total	4.0	10.8	14.8	97.7	39.6	137.4	122.6

Note : Discount rate of 10 % is applied to derive B/C and B-C.

Economic Evaluation for Pato Branco Water Supply Project

Assumptions ;

a) Investment cost : 9.1 million US$
b) OM cost 0.8 million US$ 9.0% of investment cost
c) Conversion factor : 85 %
d) Water supply volume : 0.116 cubic meter per second
total 100.0% 3.7 million cubic meter per year
domestic 80.6% 2.9 million cubic meter per year
industrial 19.4% 0.7 million cubic meter per year
e) Unit benefit : domestic 0.62 US$ per cubic meter
industrial 0.56 US$ per cubic meter
Rate of consumer surplus : 50.0% of domestic benefit
f) Water loss domestic 25.0% EIRR = 17.02%
industrial 10.0% B/C = 1.46
B - C = 4.9 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
2	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
3	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
4	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
5	0.0	0.7	0.7	2.0	0.4	2.4	1.7
6	0.0	0.7	0.7	2.0	0.4	2.4	1.7
7	0.0	0.7	0.7	2.0	0.4	2.4	1.7
8	0.0	0.7	0.7	2.0	0.4	2.4	1.7
9	0.0	0.7	0.7	2.0	0.4	2.4	1.7
10	0.0	0.7	0.7	2.0	0.4	2.4	1.7
11	0.0	0.7	0.7	2.0	0.4	2.4	1.7
12	0.0	0.7	0.7	2.0	0.4	2.4	1.7
13	0.0	0.7	0.7	2.0	0.4	2.4	1.7
14	0.0	0.7	0.7	2.0	0.4	2.4	1.7
15	0.0	0.7	0.7	2.0	0.4	2.4	1.7
16	0.0	0.7	0.7	2.0	0.4	2.4	1.7
17	0.0	0.7	0.7	2.0	0.4	2.4	1.7
18	0.0	0.7	0.7	2.0	0.4	2.4	1.7
19	0.0	0.7	0.7	2.0	0.4	2.4	1.7
20	0.0	0.7	0.7	2.0	0.4	2.4	1.7
21	0.0	0.7	0.7	2.0	0.4	2.4	1.7
22	0.0	0.7	0.7	2.0	0.4	2.4	1.7
23	0.0	0.7	0.7	2.0	0.4	2.4	1.7
24	0.0	0.7	0.7	2.0	0.4	2.4	1.7
25	0.0	0.7	0.7	2.0	0.4	2.4	1.7
26	0.0	0.7	0.7	2.0	0.4	2.4	1.7
27	0.0	0.7	0.7	2.0	0.4	2.4	1.7
28	0.0	0.7	0.7	2.0	0.4	2.4	1.7
29	0.0	0.7	0.7	2.0	0.4	2.4	1.7
30	0.0	0.7	0.7	2.0	0.4	2.4	1.7
31	0.0	0.7	0.7	2.0	0.4	2.4	1.7
32	0.0	0.7	0.7	2.0	0.4	2.4	1.7
33	0.0	0.7	0.7	2.0	0.4	2.4	1.7
34	0.0	0.7	0.7	2.0	0.4	2.4	1.7
Total	7.7	20.9	28.6	61.4	10.7	72.1	43.5

Note : Discount rate of 10 % is applied to derive B/C and B-C.

Economic Evaluation for Palmas Water Supply Project

Assumptions ;

a) Investment cost : 4.9 million US$

b) OM cost 0.4 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply volume : 0.069 cubic meter per second

total	100.0%	2.2 million cubic meter per year
domestic	73.1%	1.6 million cubic meter per year
industrial	26.9%	0.6 million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0%

industrial 10.0%

EIRR = 18.76%

B/C = 1.59

B-C = 3.4 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.0	0.0	1.0	0.0	0.0	0.0	-1.0
2	1.0	0.0	1.0	0.0	0.0	0.0	-1.0
3	1.0	0.0	1.0	0.0	0.0	0.0	-1.0
4	1.0	0.0	1.0	0.0	0.0	0.0	-1.0
5	0.0	0.4	0.4	1.1	0.3	1.4	1.0
6	0.0	0.4	0.4	1.1	0.3	1.4	1.0
7	0.0	0.4	0.4	1.1	0.3	1.4	1.0
8	0.0	0.4	0.4	1.1	0.3	1.4	1.0
9	0.0	0.4	0.4	1.1	0.3	1.4	1.0
10	0.0	0.4	0.4	1.1	0.3	1.4	1.0
11	0.0	0.4	0.4	1.1	0.3	1.4	1.0
12	0.0	0.4	0.4	1.1	0.3	1.4	1.0
13	0.0	0.4	0.4	1.1	0.3	1.4	1.0
14	0.0	0.4	0.4	1.1	0.3	1.4	1.0
15	0.0	0.4	0.4	1.1	0.3	1.4	1.0
16	0.0	0.4	0.4	1.1	0.3	1.4	1.0
17	0.0	0.4	0.4	1.1	0.3	1.4	1.0
18	0.0	0.4	0.4	1.1	0.3	1.4	1.0
19	0.0	0.4	0.4	1.1	0.3	1.4	1.0
20	0.0	0.4	0.4	1.1	0.3	1.4	1.0
21	0.0	0.4	0.4	1.1	0.3	1.4	1.0
22	0.0	0.4	0.4	1.1	0.3	1.4	1.0
23	0.0	0.4	0.4	1.1	0.3	1.4	1.0
24	0.0	0.4	0.4	1.1	0.3	1.4	1.0
25	0.0	0.4	0.4	1.1	0.3	1.4	1.0
26	0.0	0.4	0.4	1.1	0.3	1.4	1.0
27	0.0	0.4	0.4	1.1	0.3	1.4	1.0
28	0.0	0.4	0.4	1.1	0.3	1.4	1.0
29	0.0	0.4	0.4	1.1	0.3	1.4	1.0
30	0.0	0.4	0.4	1.1	0.3	1.4	1.0
31	0.0	0.4	0.4	1.1	0.3	1.4	1.0
32	0.0	0.4	0.4	1.1	0.3	1.4	1.0
33	0.0	0.4	0.4	1.1	0.3	1.4	1.0
34	0.0	0.4	0.4	1.1	0.3	1.4	1.0
Total	4.2	11.2	15.4	33.4	8.9	42.3	26.9

Note : Discount rate of 10 % is applied to derive B/C and B-C.

Economic Evaluation for Union da Vitoria Water Supply Project

Assumptions ;

a) Investment cost : 3.7 million US$

b) OM cost 0.3 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply volume : 0.035 cubic meter per second

total	100.0%	1.1 million cubic meter per year
domestic	61.0%	0.7 million cubic meter per year
industrial	39.0%	0.4 million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 10.27%

industrial 10.0% B/C = 1.02

Cost and Benefit Flow B-C = 0.07 million US$

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	0.79	0.00	0.79	0.00	0.00	0.00	-0.79
2	0.79	0.00	0.79	0.00	0.00	0.00	-0.79
3	0.79	0.00	0.79	0.00	0.00	0.00	-0.79
4	0.79	0.00	0.79	0.00	0.00	0.00	-0.79
5	0.00	0.28	0.28	0.46	0.22	0.68	0.40
6	0.00	0.28	0.28	0.46	0.22	0.68	0.40
7	0.00	0.28	0.28	0.46	0.22	0.68	0.40
8	0.00	0.28	0.28	0.46	0.22	0.68	0.40
9	0.00	0.28	0.28	0.46	0.22	0.68	0.40
10	0.00	0.28	0.28	0.46	0.22	0.68	0.40
11	0.00	0.28	0.28	0.46	0.22	0.68	0.40
12	0.00	0.28	0.28	0.46	0.22	0.68	0.40
13	0.00	0.28	0.28	0.46	0.22	0.68	0.40
14	0.00	0.28	0.28	0.46	0.22	0.68	0.40
15	0.00	0.28	0.28	0.46	0.22	0.68	0.40
16	0.00	0.28	0.28	0.46	0.22	0.68	0.40
17	0.00	0.28	0.28	0.46	0.22	0.68	0.40
18	0.00	0.28	0.28	0.46	0.22	0.68	0.40
19	0.00	0.28	0.28	0.46	0.22	0.68	0.40
20	0.00	0.28	0.28	0.46	0.22	0.68	0.40
21	0.00	0.28	0.28	0.46	0.22	0.68	0.40
22	0.00	0.28	0.28	0.46	0.22	0.68	0.40
23	0.00	0.28	0.28	0.46	0.22	0.68	0.40
24	0.00	0.28	0.28	0.46	0.22	0.68	0.40
25	0.00	0.28	0.28	0.46	0.22	0.68	0.40
26	0.00	0.28	0.28	0.46	0.22	0.68	0.40
27	0.00	0.28	0.28	0.46	0.22	0.68	0.40
28	0.00	0.28	0.28	0.46	0.22	0.68	0.40
29	0.00	0.28	0.28	0.46	0.22	0.68	0.40
30	0.00	0.28	0.28	0.46	0.22	0.68	0.40
31	0.00	0.28	0.28	0.46	0.22	0.68	0.40
32	0.00	0.28	0.28	0.46	0.22	0.68	0.40
33	0.00	0.28	0.28	0.46	0.22	0.68	0.40
34	0.00	0.28	0.28	0.46	0.22	0.68	0.40
Total	3.15	8.49	11.64	13.93	6.48	20.41	8.77

Note : Discount rate of 10 % is applied to derive B/C and B-C.

Appendix - 7 (11/25)

Economic Evaluation for All the Water Supply Projects for Type A Cities excluding Curitiba MA (Cascavel, Foz do Iguacu and Guarapuava)

Assumptions ;

a) Investment cost : 59.1 million US$

b) OM cost 5.3 million US$ 9.0% of invetment cost

c) Conversion factor : 85 %

d) Water supply volume : 1.933 cubic meter per second

total	100.0%	61.0 million cubic meter per year
domestic	90.8%	55.3 million cubic meter per year
industrial	9.2%	5.6 million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 40.79%

industrial 10.0% B/C = 3.86

Cost and Benefit Flow B - C = 197.1 million US$

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	12.6	0.0	12.6	0.0	0.0	0.0	-12.6
2	12.6	0.0	12.6	0.0	0.0	0.0	-12.6
3	12.6	0.0	12.6	0.0	0.0	0.0	-12.6
4	12.6	0.0	12.6	0.0	0.0	0.0	-12.6
5	0.0	4.5	4.5	38.5	2.8	41.3	36.8
6	0.0	4.5	4.5	38.5	2.8	41.3	36.8
7	0.0	4.5	4.5	38.5	2.8	41.3	36.8
8	0.0	4.5	4.5	38.5	2.8	41.3	36.8
9	0.0	4.5	4.5	38.5	2.8	41.3	36.8
10	0.0	4.5	4.5	38.5	2.8	41.3	36.8
11	0.0	4.5	4.5	38.5	2.8	41.3	36.8
12	0.0	4.5	4.5	38.5	2.8	41.3	36.8
13	0.0	4.5	4.5	38.5	2.8	41.3	36.8
14	0.0	4.5	4.5	38.5	2.8	41.3	36.8
15	0.0	4.5	4.5	38.5	2.8	41.3	36.8
16	0.0	4.5	4.5	38.5	2.8	41.3	36.8
17	0.0	4.5	4.5	38.5	2.8	41.3	36.8
18	0.0	4.5	4.5	38.5	2.8	41.3	36.8
19	0.0	4.5	4.5	38.5	2.8	41.3	36.8
20	0.0	4.5	4.5	38.5	2.8	41.3	36.8
21	0.0	4.5	4.5	38.5	2.8	41.3	36.8
22	0.0	4.5	4.5	38.5	2.8	41.3	36.8
23	0.0	4.5	4.5	38.5	2.8	41.3	36.8
24	0.0	4.5	4.5	38.5	2.8	41.3	36.8
25	0.0	4.5	4.5	38.5	2.8	41.3	36.8
26	0.0	4.5	4.5	38.5	2.8	41.3	36.8
27	0.0	4.5	4.5	38.5	2.8	41.3	36.8
28	0.0	4.5	4.5	38.5	2.8	41.3	36.8
29	0.0	4.5	4.5	38.5	2.8	41.3	36.8
30	0.0	4.5	4.5	38.5	2.8	41.3	36.8
31	0.0	4.5	4.5	38.5	2.8	41.3	36.8
32	0.0	4.5	4.5	38.5	2.8	41.3	36.8
33	0.0	4.5	4.5	38.5	2.8	41.3	36.8
34	0.0	4.5	4.5	38.5	2.8	41.3	36.8
Total	50.2	135.6	185.9	1,154.4	85.1	1,239.4	1,053.6

Note : Discount rate of 10% is applied to derive B/C and B-C.

Appendix - 7 (12/25)

Economic Evaluation for All the Water Supply Projects for Type B Cities (Medianeira, Dois Vizinhos, Francisco Beltrao, Pato Branco, Palmas, Unio da Vitoria)

Assumptions;

a) Investment cost: 35.8 million US$

b) OM cost 3.2 million US$ 9.0% of investment cost

c) Conversion factor: 85 %

d) Water supply volume: 0.718 cubic meter per second

total	100.0%	22.6 million cubic meter per year
domestic	65.8%	14.9 million cubic meter per year
industrial	34.2%	7.7 million cubic meter per year

e) Unit benefit: domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus: 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 25.92%

industrial 10.0% B/C = 2.20

Cost and Benefit Flow B - C = 50.1 million US$

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	7.6	0.0	7.6	0.0	0.0	0.0	-7.6
2	7.6	0.0	7.6	0.0	0.0	0.0	-7.6
3	7.6	0.0	7.6	0.0	0.0	0.0	-7.6
4	7.6	0.0	7.6	0.0	0.0	0.0	-7.6
5	0.0	2.7	2.7	10.4	3.9	14.3	11.5
6	0.0	2.7	2.7	10.4	3.9	14.3	11.5
7	0.0	2.7	2.7	10.4	3.9	14.3	11.5
8	0.0	2.7	2.7	10.4	3.9	14.3	11.5
9	0.0	2.7	2.7	10.4	3.9	14.3	11.5
10	0.0	2.7	2.7	10.4	3.9	14.3	11.5
11	0.0	2.7	2.7	10.4	3.9	14.3	11.5
12	0.0	2.7	2.7	10.4	3.9	14.3	11.5
13	0.0	2.7	2.7	10.4	3.9	14.3	11.5
14	0.0	2.7	2.7	10.4	3.9	14.3	11.5
15	0.0	2.7	2.7	10.4	3.9	14.3	11.5
16	0.0	2.7	2.7	10.4	3.9	14.3	11.5
17	0.0	2.7	2.7	10.4	3.9	14.3	11.5
18	0.0	2.7	2.7	10.4	3.9	14.3	11.5
19	0.0	2.7	2.7	10.4	3.9	14.3	11.5
20	0.0	2.7	2.7	10.4	3.9	14.3	11.5
21	0.0	2.7	2.7	10.4	3.9	14.3	11.5
22	0.0	2.7	2.7	10.4	3.9	14.3	11.5
23	0.0	2.7	2.7	10.4	3.9	14.3	11.5
24	0.0	2.7	2.7	10.4	3.9	14.3	11.5
25	0.0	2.7	2.7	10.4	3.9	14.3	11.5
26	0.0	2.7	2.7	10.4	3.9	14.3	11.5
27	0.0	2.7	2.7	10.4	3.9	14.3	11.5
28	0.0	2.7	2.7	10.4	3.9	14.3	11.5
29	0.0	2.7	2.7	10.4	3.9	14.3	11.5
30	0.0	2.7	2.7	10.4	3.9	14.3	11.5
31	0.0	2.7	2.7	10.4	3.9	14.3	11.5
32	0.0	2.7	2.7	10.4	3.9	14.3	11.5
33	0.0	2.7	2.7	10.4	3.9	14.3	11.5
34	0.0	2.7	2.7	10.4	3.9	14.3	11.5
Total	30.4	82.2	112.6	310.6	117.4	428.0	315.4

Note : Discount rate of 10% is applied to derive B/C and B-C.

Appendix - 7 (13/25)

Economic Evaluation for Water Supply Projects for Type C Cities in the Iguacu River basin

Assumptions ;

a) Investment cost : 102.9 million US$

b) OM cost 9.3 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply volume : 0.833 cubic meter per second

total	100.0%	26.3 million cubic meter per year
domestic	70.8%	18.6 million cubic meter per year
industrial	29.2%	7.7 million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 8.20%

industrial 10.0% B/C = 0.90

B - C = -11.7 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	21.9	0.0	21.9	0.0	0.0	0.0	-21.9
2	21.9	0.0	21.9	0.0	0.0	0.0	-21.9
3	21.9	0.0	21.9	0.0	0.0	0.0	-21.9
4	21.9	0.0	21.9	0.0	0.0	0.0	-21.9
5	0.0	7.9	7.9	12.9	3.9	16.8	8.9
6	0.0	7.9	7.9	12.9	3.9	16.8	8.9
7	0.0	7.9	7.9	12.9	3.9	16.8	8.9
8	0.0	7.9	7.9	12.9	3.9	16.8	8.9
9	0.0	7.9	7.9	12.9	3.9	16.8	8.9
10	0.0	7.9	7.9	12.9	3.9	16.8	8.9
11	0.0	7.9	7.9	12.9	3.9	16.8	8.9
12	0.0	7.9	7.9	12.9	3.9	16.8	8.9
13	0.0	7.9	7.9	12.9	3.9	16.8	8.9
14	0.0	7.9	7.9	12.9	3.9	16.8	8.9
15	0.0	7.9	7.9	12.9	3.9	16.8	8.9
16	0.0	7.9	7.9	12.9	3.9	16.8	8.9
17	0.0	7.9	7.9	12.9	3.9	16.8	8.9
18	0.0	7.9	7.9	12.9	3.9	16.8	8.9
19	0.0	7.9	7.9	12.9	3.9	16.8	8.9
20	0.0	7.9	7.9	12.9	3.9	16.8	8.9
21	0.0	7.9	7.9	12.9	3.9	16.8	8.9
22	0.0	7.9	7.9	12.9	3.9	16.8	8.9
23	0.0	7.9	7.9	12.9	3.9	16.8	8.9
24	0.0	7.9	7.9	12.9	3.9	16.8	8.9
25	0.0	7.9	7.9	12.9	3.9	16.8	8.9
26	0.0	7.9	7.9	12.9	3.9	16.8	8.9
27	0.0	7.9	7.9	12.9	3.9	16.8	8.9
28	0.0	7.9	7.9	12.9	3.9	16.8	8.9
29	0.0	7.9	7.9	12.9	3.9	16.8	8.9
30	0.0	7.9	7.9	12.9	3.9	16.8	8.9
31	0.0	7.9	7.9	12.9	3.9	16.8	8.9
32	0.0	7.9	7.9	12.9	3.9	16.8	8.9
33	0.0	7.9	7.9	12.9	3.9	16.8	8.9
34	0.0	7.9	7.9	12.9	3.9	16.8	8.9
Total	87.5	236.2	323.6	388.3	116.2	504.5	180.9

Note : Discount rate of 10% is applied to derive B/C and B-C.

Economic Evaluation for Ponta Grossa Water Supply Project

Assumptions ;

a) Investment cost : 13.5 million US$
b) OM cost 1.2 million US$ 9.0% of investment cost
c) Conversion factor : 85 %
d) Water supply volume : 0.428 cubic meter per second
total 100.0% 13.5 million cubic meter per year
domestic 63.0% 8.5 million cubic meter per year
industrial 37.0% 5.0 million cubic meter per year
e) Unit benefit : domestic 0.62 US$ per cubic meter
industrial 0.56 US$ per cubic meter
Rate of consumer surplus : 50.0% of domestic benefit
f) Water loss domestic 25.0% EIRR = 37.58%
industrial 10.0% B/C = 3.45
B-C = 38.6 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	2.9	0.0	2.9	0.0	0.0	0.0	-2.9
2	2.9	0.0	2.9	0.0	0.0	0.0	-2.9
3	2.9	0.0	2.9	0.0	0.0	0.0	-2.9
4	2.9	0.0	2.9	0.0	0.0	0.0	-2.9
5	0.0	1.0	1.0	5.9	2.5	8.4	7.4
6	0.0	1.0	1.0	5.9	2.5	8.4	7.4
7	0.0	1.0	1.0	5.9	2.5	8.4	7.4
8	0.0	1.0	1.0	5.9	2.5	8.4	7.4
9	0.0	1.0	1.0	5.9	2.5	8.4	7.4
10	0.0	1.0	1.0	5.9	2.5	8.4	7.4
11	0.0	1.0	1.0	5.9	2.5	8.4	7.4
12	0.0	1.0	1.0	5.9	2.5	8.4	7.4
13	0.0	1.0	1.0	5.9	2.5	8.4	7.4
14	0.0	1.0	1.0	5.9	2.5	8.4	7.4
15	0.0	1.0	1.0	5.9	2.5	8.4	7.4
16	0.0	1.0	1.0	5.9	2.5	8.4	7.4
17	0.0	1.0	1.0	5.9	2.5	8.4	7.4
18	0.0	1.0	1.0	5.9	2.5	8.4	7.4
19	0.0	1.0	1.0	5.9	2.5	8.4	7.4
20	0.0	1.0	1.0	5.9	2.5	8.4	7.4
21	0.0	1.0	1.0	5.9	2.5	8.4	7.4
22	0.0	1.0	1.0	5.9	2.5	8.4	7.4
23	0.0	1.0	1.0	5.9	2.5	8.4	7.4
24	0.0	1.0	1.0	5.9	2.5	8.4	7.4
25	0.0	1.0	1.0	5.9	2.5	8.4	7.4
26	0.0	1.0	1.0	5.9	2.5	8.4	7.4
27	0.0	1.0	1.0	5.9	2.5	8.4	7.4
28	0.0	1.0	1.0	5.9	2.5	8.4	7.4
29	0.0	1.0	1.0	5.9	2.5	8.4	7.4
30	0.0	1.0	1.0	5.9	2.5	8.4	7.4
31	0.0	1.0	1.0	5.9	2.5	8.4	7.4
32	0.0	1.0	1.0	5.9	2.5	8.4	7.4
33	0.0	1.0	1.0	5.9	2.5	8.4	7.4
34	0.0	1.0	1.0	5.9	2.5	8.4	7.4
Total	11.5	31.0	42.5	177.5	75.8	253.2	210.8

Note : Discount rate of 10 % is applied to derive B/C an B-C.

Appendix - 7 (15/25)
Economic Evaluation for Londrina Water Supply Project

Assumptions ;

a) Investment cost : 46.5 million US$

b) OM cost 4.2 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply bolume : 1.227 cubic meter per second

total	100.0%	38.7	million cubic meter per year
domestic	83.0%	32.1	million cubic meter per year
industrial	17.0%	6.6	million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 34.12%

EIRR = industrial 10.0% B/C = 3.05

B - C = 110.9 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	9.9	0.0	9.9	0.0	0.0	0.0	-9.9
2	9.9	0.0	9.9	0.0	0.0	0.0	-9.9
3	9.9	0.0	9.9	0.0	0.0	0.0	-9.9
4	9.9	0.0	9.9	0.0	0.0	0.0	-9.9
5	0.0	3.6	3.6	22.3	3.3	25.7	22.1
6	0.0	3.6	3.6	22.3	3.3	25.7	22.1
7	0.0	3.6	3.6	22.3	3.3	25.7	22.1
8	0.0	3.6	3.6	22.3	3.3	25.7	22.1
9	0.0	3.6	3.6	22.3	3.3	25.7	22.1
10	0.0	3.6	3.6	22.3	3.3	25.7	22.1
11	0.0	3.6	3.6	22.3	3.3	25.7	22.1
12	0.0	3.6	3.6	22.3	3.3	25.7	22.1
13	0.0	3.6	3.6	22.3	3.3	25.7	22.1
14	0.0	3.6	3.6	22.3	3.3	25.7	22.1
15	0.0	3.6	3.6	22.3	3.3	25.7	22.1
16	0.0	3.6	3.6	22.3	3.3	25.7	22.1
17	0.0	3.6	3.6	22.3	3.3	25.7	22.1
18	0.0	3.6	3.6	22.3	3.3	25.7	22.1
19	0.0	3.6	3.6	22.3	3.3	25.7	22.1
20	0.0	3.6	3.6	22.3	3.3	25.7	22.1
21	0.0	3.6	3.6	22.3	3.3	25.7	22.1
22	0.0	3.6	3.6	22.3	3.3	25.7	22.1
23	0.0	3.6	3.6	22.3	3.3	25.7	22.1
24	0.0	3.6	3.6	22.3	3.3	25.7	22.1
25	0.0	3.6	3.6	22.3	3.3	25.7	22.1
26	0.0	3.6	3.6	22.3	3.3	25.7	22.1
27	0.0	3.6	3.6	22.3	3.3	25.7	22.1
28	0.0	3.6	3.6	22.3	3.3	25.7	22.1
29	0.0	3.6	3.6	22.3	3.3	25.7	22.1
30	0.0	3.6	3.6	22.3	3.3	25.7	22.1
31	0.0	3.6	3.6	22.3	3.3	25.7	22.1
32	0.0	3.6	3.6	22.3	3.3	25.7	22.1
33	0.0	3.6	3.6	22.3	3.3	25.7	22.1
34	0.0	3.6	3.6	22.3	3.3	25.7	22.1
Total	39.5	106.7	146.2	669.8	99.8	769.5	623.3

Note : Discounte rate of 10% is applied to derive B/C and B-C.

Economic Evaluation for Apucarana Water Supply Project

Assumptions;

a) Investment cost : 14.9 million US$

b) OM cost 1.3 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply bolume :

total	100.0%	16.4 million cubic meter per year
domestic	68.8%	11.3 million cubic meter per year
industrial	31.2%	5.1 million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0%

industrial 10.0%

EIRR = 40.88%

B/C = 3.87

B - C = 49.9 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	3.2	0.0	3.2	0.0	0.0	0.0	-3.2
2	3.2	0.0	3.2	0.0	0.0	0.0	-3.2
3	3.2	0.0	3.2	0.0	0.0	0.0	-3.2
4	3.2	0.0	3.2	0.0	0.0	0.0	-3.2
5	0.0	1.1	1.1	7.9	2.6	10.4	9.3
6	0.0	1.1	1.1	7.9	2.6	10.4	9.3
7	0.0	1.1	1.1	7.9	2.6	10.4	9.3
8	0.0	1.1	1.1	7.9	2.6	10.4	9.3
9	0.0	1.1	1.1	7.9	2.6	10.4	9.3
10	0.0	1.1	1.1	7.9	2.6	10.4	9.3
11	0.0	1.1	1.1	7.9	2.6	10.4	9.3
12	0.0	1.1	1.1	7.9	2.6	10.4	9.3
13	0.0	1.1	1.1	7.9	2.6	10.4	9.3
14	0.0	1.1	1.1	7.9	2.6	10.4	9.3
15	0.0	1.1	1.1	7.9	2.6	10.4	9.3
16	0.0	1.1	1.1	7.9	2.6	10.4	9,3
17	0.0	1.1	1.1	7.9	2.6	10.4	9.3
18	0.0	1.1	1.1	7.9	2.6	10.4	9.3
19	0.0	1.1	1.1	7.9	2.6	10.4	9.3
20	0.0	1.1	1.1	7.9	2.6	10.4	9.3
21	0.0	1.1	1.1	7.9	2.6	10.4	9.3
22	0.0	1.1	1.1	7.9	2.6	10.4	9.3
23	0.0	1.1	1.1	7.9	2.6	10.4	9.3
24	0.0	1.1	1.1	7.9	2.6	10.4	9,3
25	0.0	1.1	1.1	7.9	2.6	10.4	9.3
26	0.0	1.1	1.1	7.9	2.6	10.4	9.3
27	0.0	1.1	1.1	7.9	2.6	10.4	9.3
28	0.0	1.1	1.1	7.9	2.6	10.4	9,3
29	0.0	1.1	1.1	7.9	2.6	10.4	9.3
30	0.0	1.1	1.1	7.9	2.6	10.4	9.3
31	0.0	1.1	1.1	7.9	2.6	10.4	9.3
32	0.0	1.1	1.1	7.9	2.6	10.4	9.3
33	0.0	1.1	1.1	7.9	2.6	10.4	9.3
34	0.0	1.1	1.1	7.9	2.6	10.4	9,3
Total	12.7	34.2	46.9	235.7	77.7	313.4	266.6

Note : Discounte rate of 10% is applied to derive B/C and B-C.

Appendix - 7 (17/25)
Economic Evaluation for Castro Water Supply Project

Assumptions ;

a) Investment cost : 5.5 million US$

b) OM cost 0.5 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply volume : 0.255 cubic meter per second

total	100.0%	8.0 million cubic meter per year
domestic	39.6%	3.2 million cubic meter per year
industrial	60.4%	4.9 million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 46.69%

industrial 10.0% B/C = 4.68

B - C = 23.6 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
2	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
3	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
4	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
5	0.0	0.4	0.4	2.2	2.5	4.7	4.2
6	0.0	0.4	0.4	2.2	2.5	4.7	4.2
7	0.0	0.4	0.4	2.2	2.5	4.7	4.2
8	0.0	0.4	0.4	2.2	2.5	4.7	4.2
9	0.0	0.4	0.4	2.2	2.5	4.7	4.2
10	0.0	0.4	0.4	2.2	2.5	4.7	4.2
11	0.0	0.4	0.4	2.2	2.5	4.7	4.2
12	0.0	0.4	0.4	2.2	2.5	4.7	4.2
13	0.0	0.4	0.4	2.2	2.5	4.7	4.2
14	0.0	0.4	0.4	2.2	2.5	4.7	4.2
15	0.0	0.4	0.4	2.2	2.5	4.7	4.2
16	0.0	0.4	0.4	2.2	2.5	4.7	4.2
17	0.0	0.4	0.4	2.2	2.5	4.7	4.2
18	0.0	0.4	0.4	2.2	2.5	4.7	4.2
19	0.0	0.4	0.4	2.2	2.5	4.7	4.2
20	0.0	0.4	0.4	2.2	2.5	4.7	4.2
21	0.0	0.4	0.4	2.2	2.5	4.7	4.2
22	0.0	0.4	0.4	2.2	2.5	4.7	4.2
23	0.0	0.4	0.4	2.2	2.5	4.7	4.2
24	0.0	0.4	0.4	2.2	2.5	4.7	4.2
25	0.0	0.4	0.4	2.2	2.5	4.7	4.2
26	0.0	0.4	0.4	2.2	2.5	4.7	4.2
27	0.0	0.4	0.4	2.2	2.5	4.7	4.2
28	0.0	0.4	0.4	2.2	2.5	4.7	4.2
29	0.0	0.4	0.4	2.2	2.5	4.7	4.2
30	0.0	0.4	0.4	2.2	2.5	4.7	4.2
31	0.0	0.4	0.4	2.2	2.5	4.7	4.2
32	0.0	0.4	0.4	2.2	2.5	4.7	4.2
33	0.0	0.4	0.4	2.2	2.5	4.7	4.2
34	0.0	0.4	0.4	2.2	2.5	4.7	4.2
Total	4.7	12.6	17.3	66.3	73.6	139.9	122.6

Note : Discounte rate of 10% is applied to derive B/C and B-C.

Appendix - 7 (18/25)

Economic Evaluation for Telemaco Borba Water Supply Project

Assumptions;

a) Investment cost: 6.8 million US$

b) OM cost 0.6 million US$ 9.0% of investment cost

c) Conversion factor: 85 %

d) Water supply bolume: 0.208 cubic meter per second

total	100.0%	6.6 million cubic meter per year
domestic	51.0%	3.4 million cubic meter per year
industrial	49.0%	3.2 million cubic meter per year

e) Unit benefit: domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus: 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 35.57%

industrial 10.0% B/C = 3.21

B - C = 17.5 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.4	0.0	1.4	0.0	0.0	0.0	-1.4
2	1.4	0.0	1.4	0.0	0.0	0.0	-1.4
3	1.4	0.0	1.4	0.0	0.0	0.0	-1.4
4	1.4	0.0	1.4	0.0	0.0	0.0	-1.4
5	0.0	0.5	0.5	2.3	1.6	4.0	3.4
6	0.0	0.5	0.5	2.3	1.6	4.0	3.4
7	0.0	0.5	0.5	2.3	1.6	4.0	3.4
8	0.0	0.5	0.5	2.3	1.6	4.0	3.4
9	0.0	0.5	0.5	2.3	1.6	4.0	3.4
10	0.0	0.5	0.5	2.3	1.6	4.0	3.4
11	0.0	0.5	0.5	2.3	1.6	4.0	3.4
12	0.0	0.5	0.5	2.3	1.6	4.0	3.4
13	0.0	0.5	0.5	2.3	1.6	4.0	3.4
14	0.0	0.5	0.5	2.3	1.6	4.0	3.4
15	0.0	0.5	0.5	2.3	1.6	4.0	3.4
16	0.0	0.5	0.5	2.3	1.6	4.0	3.4
17	0.0	0.5	0.5	2.3	1.6	4.0	3.4
18	0.0	0.5	0.5	2.3	1.6	4.0	3.4
19	0.0	0.5	0.5	2.3	1.6	4.0	3.4
20	0.0	0.5	0.5	2.3	1.6	4.0	3.4
21	0.0	0.5	0.5	2.3	1.6	4.0	3.4
22	0.0	0.5	0.5	2.3	1.6	4.0	3.4
23	0.0	0.5	0.5	2.3	1.6	4.0	3.4
24	0.0	0.5	0.5	2.3	1.6	4.0	3.4
25	0.0	0.5	0.5	2.3	1.6	4.0	3.4
26	0.0	0.5	0.5	2.3	1.6	4.0	3.4
27	0.0	0.5	0.5	2.3	1.6	4.0	3.4
28	0.0	0.5	0.5	2.3	1.6	4.0	3.4
29	0.0	0.5	0.5	2.3	1.6	4.0	3.4
30	0.0	0.5	0.5	2.3	1.6	4.0	3.4
31	0.0	0.5	0.5	2.3	1.6	4.0	3.4
32	0.0	0.5	0.5	2.3	1.6	4.0	3.4
33	0.0	0.5	0.5	2.3	1.6	4.0	3.4
34	0.0	0.5	0.5	2.3	1.6	4.0	3.4
Total	5.8	15.6	21.4	69.9	48.8	118.7	97.3

Note : Discounte rate of 10% is applied to derive B/C and B-C.

Economic Evaluation for Irati Water Supply Project

Assumptions ;

a) Investment cost : 9.0 million US$

b) OM cost 0.8 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply bolume : 0.069 cubic meter per second

total	100.0%	2.2	million cubic meter per year
domestic	65.6%	1.4	million cubic meter per year
industrial	34.4%	0.8	million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 7.09%

industrial 10.0% B/C = 0.85

B - C = -1.6 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
2	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
3	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
4	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
5	0.0	0.7	0.7	1.0	0.4	1.4	0.7
6	0.0	0.7	0.7	1.0	0.4	1.4	0.7
7	0.0	0.7	0.7	1.0	0.4	1.4	0.7
8	0.0	0.7	0.7	1.0	0.4	1.4	0.7
9	0.0	0.7	0.7	1.0	0.4	1.4	0.7
10	0.0	0.7	0.7	1.0	0.4	1.4	0.7
11	0.0	0.7	0.7	1.0	0.4	1.4	0.7
12	0.0	0.7	0.7	1.0	0.4	1.4	0.7
13	0.0	0.7	0.7	1.0	0.4	1.4	0.7
14	0.0	0.7	0.7	1.0	0.4	1.4	0.7
15	0.0	0.7	0.7	1.0	0.4	1.4	0.7
16	0.0	0.7	0.7	1.0	0.4	1.4	0.7
17	0.0	0.7	0.7	1.0	0.4	1.4	0.7
18	0.0	0.7	0.7	1.0	0.4	1.4	0.7
19	0.0	0.7	0.7	1.0	0.4	1.4	0.7
20	0.0	0.7	0.7	1.0	0.4	1.4	0.7
21	0.0	0.7	0.7	1.0	0.4	1.4	0.7
22	0.0	0.7	0.7	1.0	0.4	1.4	0.7
23	0.0	0.7	0.7	1.0	0.4	1.4	0.7
24	0.0	0.7	0.7	1.0	0.4	1.4	0.7
25	0.0	0.7	0.7	1.0	0.4	1.4	0.7
26	0.0	0.7	0.7	1.0	0.4	1.4	0.7
27	0.0	0.7	0.7	1.0	0.4	1.4	0.7
28	0.0	0.7	0.7	1.0	0.4	1.4	0.7
29	0.0	0.7	0.7	1.0	0.4	1.4	0.7
30	0.0	0.7	0.7	1.0	0.4	1.4	0.7
31	0.0	0.7	0.7	1.0	0.4	1.4	0.7
32	0.0	0.7	0.7	1.0	0.4	1.4	0.7
33	0.0	0.7	0.7	1.0	0.4	1.4	0.7
34	0.0	0.7	0.7	1.0	0.4	1.4	0.7
Total	7.7	20.7	28.3	30.0	11.4	41.4	13.1

Note : Discounte rate of 10% is applied to derive B/C and B-C.

Economic Evaluation for Corneiro Procopio Water Supply Project

Assumptions;

a) Investment cost : 7.4 million US$

b) OM cost 0.7 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply bolume : 0.069 cubic meter per second

total	100.0%	2.2	million cubic meter per year
domestic	70.8%	1.6	million cubic meter per year
industrial	29.2%	0.6	million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 10.79%

industrial 10.0% B/C = 1.05

B - C = 0.4 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.6	0.0	1.6	0.0	0.0	0.0	-1.6
2	1.6	0.0	1.6	0.0	0.0	0.0	-1.6
3	1.6	0.0	1.6	0.0	0.0	0.0	-1.6
4	1.6	0.0	1.6	0.0	0.0	0.0	-1.6
5	0.0	0.6	0.6	1.1	0.3	1.4	0.8
6	0.0	0.6	0.6	1.1	0.3	1.4	0.8
7	0.0	0.6	0.6	1.1	0.3	1.4	0.8
8	0.0	0.6	0.6	1.1	0.3	1.4	0.8
9	0.0	0.6	0.6	1.1	0.3	1.4	0.8
10	0.0	0.6	0.6	1.1	0.3	1.4	0.8
11	0.0	0.6	0.6	1.1	0.3	1.4	0.8
12	0.0	0.6	0.6	1.1	0.3	1.4	0.8
13	0.0	0.6	0.6	1.1	0.3	1.4	0.8
14	0.0	0.6	0.6	1.1	0.3	1.4	0.8
15	0.0	0.6	0.6	1.1	0.3	1.4	0.8
16	0.0	0.6	0.6	1.1	0.3	1.4	0.8
17	0.0	0.6	0.6	1.1	0.3	1.4	0.8
18	0.0	0.6	0.6	1.1	0.3	1.4	0.8
19	0.0	0.6	0.6	1.1	0.3	1.4	0.8
20	0.0	0.6	0.6	1.1	0.3	1.4	0.8
21	0.0	0.6	0.6	1.1	0.3	1.4	0.8
22	0.0	0.6	0.6	1.1	0.3	1.4	0.8
23	0.0	0.6	0.6	1.1	0.3	1.4	0.8
24	0.0	0.6	0.6	1.1	0.3	1.4	0.8
25	0.0	0.6	0.6	1.1	0.3	1.4	0.8
26	0.0	0.6	0.6	1.1	0.3	1.4	0.8
27	0.0	0.6	0.6	1.1	0.3	1.4	0.8
28	0.0	0.6	0.6	1.1	0.3	1.4	0.8
29	0.0	0.6	0.6	1.1	0.3	1.4	0.8
30	0.0	0.6	0.6	1.1	0.3	1.4	0.8
31	0.0	0.6	0.6	1.1	0.3	1.4	0.8
32	0.0	0.6	0.6	1.1	0.3	1.4	0.8
33	0.0	0.6	0.6	1.1	0.3	1.4	0.8
34	0.0	0.6	0.6	1.1	0.3	1.4	0.8
Total	6.3	17.0	23.3	32.3	9.7	42.0	18.8

Note : Discounte rate of 10% is applied to derive B/C and B-C.

Economic Evaluation for Arapongas Water Supply Project

Assumptions;

a) Investment cost: 15.9 million US$

b) OM cost 1.4 million US$ 9.0% of investment cost

c) Conversion factor: 90 %

d) Water supply bolume: 0.231 cubic meter per second

total	100.0%	7.3	million cubic meter per year
domestic	63.3%	4.6	million cubic meter per year
industrial	36.7%	2.7	million cubic meter per year

e) Unit benefit: domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus: 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 17.55%

industrial 10.0% B/C = 1.50

B - C = 9.8 million US$

Cost and Benefit Flow

(Unit: million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	3.6	0.0	3.6	0.0	0.0	0.0	-3.6
2	3.6	0.0	3.6	0.0	0.0	0.0	-3.6
3	3.6	0.0	3.6	0.0	0.0	0.0	-3.6
4	3.6	0.0	3.6	0.0	0.0	0.0	-3.6
5	0.0	1.3	1.3	3.2	1.4	4.6	3.3
6	0.0	1.3	1.3	3.2	1.4	4.6	3.3
7	0.0	1.3	1.3	3.2	1.4	4.6	3.3
8	0.0	1.3	1.3	3.2	1.4	4.6	3.3
9	0.0	1.3	1.3	3.2	1.4	4.6	3.3
10	0.0	1.3	1.3	3.2	1.4	4.6	3.3
11	0.0	1.3	1.3	3.2	1.4	4.6	3.3
12	0.0	1.3	1.3	3.2	1.4	4.6	3.3
13	0.0	1.3	1.3	3.2	1.4	4.6	3.3
14	0.0	1.3	1.3	3.2	1.4	4.6	3.3
15	0.0	1.3	1.3	3.2	1.4	4.6	3.3
16	0.0	1.3	1.3	3.2	1.4	4.6	3.3
17	0.0	1.3	1.3	3.2	1.4	4.6	3.3
18	0.0	1.3	1.3	3.2	1.4	4.6	3.3
19	0.0	1.3	1.3	3.2	1.4	4.6	3.3
20	0.0	1.3	1.3	3.2	1.4	4.6	3.3
21	0.0	1.3	1.3	3.2	1.4	4.6	3.3
22	0.0	1.3	1.3	3.2	1.4	4.6	3.3
23	0.0	1.3	1.3	3.2	1.4	4.6	3.3
24	0.0	1.3	1.3	3.2	1.4	4.6	3.3
25	0.0	1.3	1.3	3.2	1.4	4.6	3.3
26	0.0	1.3	1.3	3.2	1.4	4.6	3.3
27	0.0	1.3	1.3	3.2	1.4	4.6	3.3
28	0.0	1.3	1.3	3.2	1.4	4.6	3.3
29	0.0	1.3	1.3	3.2	1.4	4.6	3.3
30	0.0	1.3	1.3	3.2	1.4	4.6	3.3
31	0.0	1.3	1.3	3.2	1.4	4.6	3.3
32	0.0	1.3	1.3	3.2	1.4	4.6	3.3
33	0.0	1.3	1.3	3.2	1.4	4.6	3.3
34	0.0	1.3	1.3	3.2	1.4	4.6	3.3
Total	14.3	38.6	52.9	96.4	40.6	137.0	84.1

Note: Discounte rate of 10% is applied to derive B/C and B-C.

Economic Evaluation for Ibipora Water Supply Project

Assumptions;

a) Investment cost: 7.4 million US$

b) OM cost 0.7 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply bolume : 0.104 cubic meter per second

total	100.0%	3.3	million cubic meter per year
domestic	80.7%	2.7	million cubic meter per year
industrial	19.3%	0.6	million cubic meter per year

e) Unit benefit: domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus: 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 19.08%

industrial 10.0% B/C = 1.61

B - C = 5.3 million US$

- Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.6	0.0	1.6	0.0	0.0	0.0	-1.6
2	1.6	0.0	1.6	0.0	0.0	0.0	-1.6
3	1.6	0.0	1.6	0.0	0.0	0.0	-1.6
4	1.6	0.0	1.6	0.0	0.0	0.0	-1.6
5	0.0	0.6	0.6	1.8	0.3	2.2	1.6
6	0.0	0.6	0.6	1.8	0.3	2.2	1.6
7	0.0	0.6	0.6	1.8	0.3	2.2	1.6
8	0.0	0.6	0.6	1.8	0.3	2.2	1.6
9	0.0	0.6	0.6	1.8	0.3	2.2	1.6
10	0.0	0.6	0.6	1.8	0.3	2.2	1.6
11	0.0	0.6	0.6	1.8	0.3	2.2	1.6
12	0.0	0.6	0.6	1.8	0.3	2.2	1.6
13	0.0	0.6	0.6	1.8	0.3	2.2	1.6
14	0.0	0.6	0.6	1.8	0.3	2.2	1.6
15	0.0	0.6	0.6	1.8	0.3	2.2	1.6
16	0.0	0.6	0.6	1.8	0.3	2.2	1.6
17	0.0	0.6	0.6	1.8	0.3	2.2	1.6
18	0.0	0.6	0.6	1.8	0.3	2.2	1.6
19	0.0	0.6	0.6	1.8	0.3	2.2	1.6
20	0.0	0.6	0.6	1.8	0.3	2.2	1.6
21	0.0	0.6	0.6	1.8	0.3	2.2	1.6
22	0.0	0.6	0.6	1.8	0.3	2.2	1.6
23	0.0	0.6	0.6	1.8	0.3	2.2	1.6
24	0.0	0.6	0.6	1.8	0.3	2.2	1.6
25	0.0	0.6	0.6	1.8	0.3	2.2	1.6
26	0.0	0.6	0.6	1.8	0.3	2.2	1.6
27	0.0	0.6	0.6	1.8	0.3	2.2	1.6
28	0.0	0.6	0.6	1.8	0.3	2.2	1.6
29	0.0	0.6	0.6	1.8	0.3	2.2	1.6
30	0.0	0.6	0.6	1.8	0.3	2.2	1.6
31	0.0	0.6	0.6	1.8	0.3	2.2	1.6
32	0.0	0.6	0.6	1.8	0.3	2.2	1.6
33	0.0	0.6	0.6	1.8	0.3	2.2	1.6
34	0.0	0.6	0.6	1.8	0.3	2.2	1.6
Total	6.3	17.0	23.3	55.3	9.6	64.9	41.6

Note : Discounte rate of 10% is applied to derive B/C and B-C.

Appendix - 7 (23/25)

Economic Evaluation for All the Water Supply Projects in Type A Cities in the Tibagi River Basin (Ponta Grossa, Londrina-Cambe, Apucarana)

Assumptions ;

a) Investment cost : 74.9 million US$

b) OM cost 6.7 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply bolume : 2.176 cubic meter per second

total	100.0%	68.6 million cubic meter per year
domestic	73.3%	50.3 million cubic meter per year
industrial	26.7%	18.3 million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 35.98%

industrial 10.0% B/C = 3.26

B - C = 197.5 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	15.9	0.0	15.9	0.0	0.0	0.0	-15.9
2	15.9	0.0	15.9	0.0	0.0	0.0	-15.9
3	15.9	0.0	15.9	0.0	0.0	0.0	-15.9
4	15.9	0.0	15.9	0.0	0.0	0.0	-15.9
5	0.0	5.7	5.7	35.0	9.3	44.2	38.5
6	0.0	5.7	5.7	35.0	9.3	44.2	38.5
7	0.0	5.7	5.7	35.0	9.3	44.2	38.5
8	0.0	5.7	5.7	35.0	9.3	44.2	38.5
9	0.0	5.7	5.7	35.0	9.3	44.2	38.5
10	0.0	5.7	5.7	35.0	9.3	44.2	38.5
11	0.0	5.7	5.7	35.0	9.3	44.2	38.5
12	0.0	5.7	5.7	35.0	9.3	44.2	38.5
13	0.0	5.7	5.7	35.0	9.3	44.2	38.5
14	0.0	5.7	5.7	35.0	9.3	44.2	38.5
15	0.0	5.7	5.7	35.0	9.3	44.2	38.5
16	0.0	5.7	5.7	35.0	9.3	44.2	38.5
17	0.0	5.7	5.7	35.0	9.3	44.2	38.5
18	0.0	5.7	5.7	35.0	9.3	44.2	38.5
19	0.0	5.7	5.7	35.0	9.3	44.2	38.5
20	0.0	5.7	5.7	35.0	9.3	44.2	38.5
21	0.0	5.7	5.7	35.0	9.3	44.2	38.5
22	0.0	5.7	5.7	35.0	9.3	44.2	38.5
23	0.0	5.7	5.7	35.0	9.3	44.2	38.5
24	0.0	5.7	5.7	35.0	9.3	44.2	38.5
25	0.0	5.7	5.7	35.0	9.3	44.2	38.5
26	0.0	5.7	5.7	35.0	9.3	44.2	38.5
27	0.0	5.7	5.7	35.0	9.3	44.2	38.5
28	0.0	5.7	5.7	35.0	9.3	44.2	38.5
29	0.0	5.7	5.7	35.0	9.3	44.2	38.5
30	0.0	5.7	5.7	35.0	9.3	44.2	38.5
31	0.0	5.7	5.7	35.0	9.3	44.2	38.5
32	0.0	5.7	5.7	35.0	9.3	44.2	38.5
33	0.0	5.7	5.7	35.0	9.3	44.2	38.5
34	0.0	5.7	5.7	35.0	9.3	44.2	38.5
Total	63.7	171.9	235.6	1,049.1	277.9	1,327.0	1,091.4

Note : Discounte rate of 10% is applied to derive B/C and B-C.

Appendix - 7 (24/25)

Economic Evaluation for All the Water Supply Projects in Type B Cities in the Tibagi River Basin (Castro, Telemaco Borba, Corneiro Procopio, Irati, Arapongas, Ibipora)

Assumptions ;

a) Investment cost : 52.0 million US$

b) OM cost 4.7 million US$ 9.0% of investment cost

c) Conversion factor : 85 %

d) Water supply bolume : 0.938 cubic meter per second

total	100.0%	29.6 million cubic meter per year
domestic	56.3%	16.6 million cubic meter per year
industrial	43.7%	12.9 million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 0.56 US$ per cubic meter

Rate of consumer surplus : 50.0% of domestic benefit

f) Water loss domestic 25.0% EIRR = 22.82%

industrial 10.0% B/C = 1.92

B - C = 55.9 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	11.1	0.0	11.1	0.0	0.0	0.0	-11.1
2	11.1	0.0	11.1	0.0	0.0	0.0	-11.1
3	11.1	0.0	11.1	0.0	0.0	0.0	-11.1
4	11.1	0.0	11.1	0.0	0.0	0.0	-11.1
5	0.0	4.0	4.0	11.6	6.5	18.1	14.1
6	0.0	4.0	4.0	11.6	6.5	18.1	14.1
7	0.0	4.0	4.0	11.6	6.5	18.1	14.1
8	0.0	4.0	4.0	11.6	6.5	18.1	14.1
9	0.0	4.0	4.0	11.6	6.5	18.1	14.1
10	0.0	4.0	4.0	11.6	6.5	18.1	14.1
11	0.0	4.0	4.0	11.6	6.5	18.1	14.1
12	0.0	4.0	4.0	11.6	6.5	18.1	14.1
13	0.0	4.0	4.0	11.6	6.5	18.1	14.1
14	0.0	4.0	4.0	11.6	6.5	18.1	14.1
15	0.0	4.0	4.0	11.6	6.5	18.1	14.1
16	0.0	4.0	4.0	11.6	6.5	18.1	14.1
17	0.0	4.0	4.0	11.6	6.5	18.1	14.1
18	0.0	4.0	4.0	11.6	6.5	18.1	14.1
19	0.0	4.0	4.0	11.6	6.5	18.1	14.1
20	0.0	4.0	4.0	11.6	6.5	18.1	14.1
21	0.0	4.0	4.0	11.6	6.5	18.1	14.1
22	0.0	4.0	4.0	11.6	6.5	18.1	14.1
23	0.0	4.0	4.0	11.6	6.5	18.1	14.1
24	0.0	4.0	4.0	11.6	6.5	18.1	14.1
25	0.0	4.0	4.0	11.6	6.5	18.1	14.1
26	0.0	4.0	4.0	11.6	6.5	18.1	14.1
27	0.0	4.0	4.0	11.6	6.5	18.1	14.1
28	0.0	4.0	4.0	11.6	6.5	18.1	14.1
29	0.0	4.0	4.0	11.6	6.5	18.1	14.1
30	0.0	4.0	4.0	11.6	6.5	18.1	14.1
31	0.0	4.0	4.0	11.6	6.5	18.1	14.1
32	0.0	4.0	4.0	11.6	6.5	18.1	14.1
33	0.0	4.0	4.0	11.6	6.5	18.1	14.1
34	0.0	4.0	4.0	11.6	6.5	18.1	14.1
Total	44.2	119.3	163.5	347.2	196.0	543.1	379.6

Note : Discounte rate of 10% is applied to derive B/C and B-C.

Appendix - 7 (25/25)
Economic Evaluation for Water Supply Projects for Type C Cities in the Tibagi River basin

Assumptions ;

a) Investment cost : 32.9 million US$
b) OM cost 3.0 million US$ 9.0% of investment cost
c) Conversion factor : 85 %
d) Water supply volume : 0.347 cubic meter per second
total 100.0% 11.0 million cubic meter per year
domestic 70.6% 7.7 million cubic meter per year
industrial 29.4% 3.2 million cubic meter per year
e) Unit benefit : domestic 0.62 US$ per cubic meter
industrial 0.56 US$ per cubic meter
Rate of consumer surplus : 50.0% of domestic benefit
f) Water loss domestic 25.0% EIRR = 12.90%
industrial 10.0% B/C = 1.18
B-C = 6.7 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	7.0	0.0	7.0	0.0	0.0	0.0	-7.0
2	7.0	0.0	7.0	0.0	0.0	0.0	-7.0
3	7.0	0.0	7.0	0.0	0.0	0.0	-7.0
4	7.0	0.0	7.0	0.0	0.0	0.0	-7.0
5	0.0	2.5	2.5	5.4	1.6	7.0	4.5
6	0.0	2.5	2.5	5.4	1.6	7.0	4.5
7	0.0	2.5	2.5	5.4	1.6	7.0	4.5
8	0.0	2.5	2.5	5.4	1.6	7.0	4.5
9	0.0	2.5	2.5	5.4	1.6	7.0	4.5
10	0.0	2.5	2.5	5.4	1.6	7.0	4.5
11	0.0	2.5	2.5	5.4	1.6	7.0	4.5
12	0.0	2.5	2.5	5.4	1.6	7.0	4.5
13	0.0	2.5	2.5	5.4	1.6	7.0	4.5
14	0.0	2.5	2.5	5.4	1.6	7.0	4.5
15	0.0	2.5	2.5	5.4	1.6	7.0	4.5
16	0.0	2.5	2.5	5.4	1.6	7.0	4.5
17	0.0	2.5	2.5	5.4	1.6	7.0	4.5
18	0.0	2.5	2.5	5.4	1.6	7.0	4.5
19	0.0	2.5	2.5	5.4	1.6	7.0	4.5
20	0.0	2.5	2.5	5.4	1.6	7.0	4.5
21	0.0	2.5	2.5	5.4	1.6	7.0	4.5
22	0.0	2.5	2.5	5.4	1.6	7.0	4.5
23	0.0	2.5	2.5	5.4	1.6	7.0	4.5
24	0.0	2.5	2.5	5.4	1.6	7.0	4.5
25	0.0	2.5	2.5	5.4	1.6	7.0	4.5
26	0.0	2.5	2.5	5.4	1.6	7.0	4.5
27	0.0	2.5	2.5	5.4	1.6	7.0	4.5
28	0.0	2.5	2.5	5.4	1.6	7.0	4.5
29	0.0	2.5	2.5	5.4	1.6	7.0	4.5
30	0.0	2.5	2.5	5.4	1.6	7.0	4.5
31	0.0	2.5	2.5	5.4	1.6	7.0	4.5
32	0.0	2.5	2.5	5.4	1.6	7.0	4.5
33	0.0	2.5	2.5	5.4	1.6	7.0	4.5
34	0.0	2.5	2.5	5.4	1.6	7.0	4.5
Total	28.0	75.5	103.5	161.3	48.8	210.1	106.6

Note : Discounte rate of 10% is applied to derive B/C and B-C.

Appendix - 8 (1/4)

Economic Evaluation for Curitiba Sewerage Project

Assumptions ;

a) Investment cost : 293.6 million US$

b) OM cost 3.6 million US$

c) Conversion factor : 85 %

d) Treatment volume : 420,000 cubic meter per day
153.3 million cubic meter per year

e) Unit benefit : domestic 0.58 US$ per cubic meter

EIRR = 24.27%

B/C = 2.65

B - C = 359.2 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit	Balance
	Investment Cost	OM Cost	Total		
1	62.4	0.0	62.4	0.0	-62.4
2	62.4	0.0	62.4	0.0	-62.4
3	62.4	0.0	62.4	0.0	-62.4
4	62.4	0.0	62.4	0.0	-62.4
5	0.0	3.1	3.1	89.6	86.5
6	0.0	3.1	3.1	89.6	86.5
7	0.0	3.1	3.1	89.6	86.5
8	0.0	3.1	3.1	89.6	86.5
9	0.0	3.1	3.1	89.6	86.5
10	0.0	3.1	3.1	89.6	86.5
11	0.0	3.1	3.1	89.6	86.5
12	0.0	3.1	3.1	89.6	86.5
13	0.0	3.1	3.1	89.6	86.5
14	0.0	3.1	3.1	89.6	86.5
15	0.0	3.1	3.1	89.6	86.5
16	0.0	3.1	3.1	89.6	86.5
17	0.0	3.1	3.1	89.6	86.5
18	0.0	3.1	3.1	89.6	86.5
19	0.0	3.1	3.1	89.6	86.5
20	0.0	3.1	3.1	89.6	86.5
21	0.0	3.1	3.1	89.6	86.5
22	0.0	3.1	3.1	89.6	86.5
23	0.0	3.1	3.1	89.6	86.5
24	0.0	3.1	3.1	89.6	86.5
25	0.0	3.1	3.1	89.6	86.5
26	0.0	3.1	3.1	89.6	86.5
27	0.0	3.1	3.1	89.6	86.5
28	0.0	3.1	3.1	89.6	86.5
29	0.0	3.1	3.1	89.6	86.5
30	0.0	3.1	3.1	89.6	86.5
31	0.0	3.1	3.1	89.6	86.5
32	0.0	3.1	3.1	89.6	86.5
33	0.0	3.1	3.1	89.6	86.5
34	0.0	3.1	3.1	89.6	86.5
Total	249.6	91.8	341.4	2,687.1	2,345.7

Note : Discount rate of 10% is applied to derive B/C and B-C.

Appendix - 8 (2/4)

Economic Evaluation for Cascavel Sewerage Project

Assumptions ;

a) Investment cost : 49.5 million US$

b) OM cost 0.71 million US$

c) Conversion factor : 85 %

d) Treatment volume : 45,000 cubic meter per day
16.4 million cubic meter per year

e) Unit benefit : domestic 0.58 US$ per cubic meter

EIRR = 16.57%

B/C = 1.66

B - C = 24.6 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit	Balance
	Investment Cost	OM Cost	Total		
1	10.5	0.0	10.5	0.0	-10.5
2	10.5	0.0	10.5	0.0	-10.5
3	10.5	0.0	10.5	0.0	-10.5
4	10.5	0.0	10.5	0.0	-10.5
5	0.0	0.6	0.6	9.6	9.0
6	0.0	0.6	0.6	9.6	9.0
7	0.0	0.6	0.6	9.6	9.0
8	0.0	0.6	0.6	9.6	9.0
9	0.0	0.6	0.6	9.6	9.0
10	0.0	0.6	0.6	9.6	9.0
11	0.0	0.6	0.6	9.6	9.0
12	0.0	0.6	0.6	9.6	9.0
13	0.0	0.6	0.6	9.6	9.0
14	0.0	0.6	0.6	9.6	9.0
15	0.0	0.6	0.6	9.6	9.0
16	0.0	0.6	0.6	9.6	9.0
17	0.0	0.6	0.6	9.6	9.0
18	0.0	0.6	0.6	9.6	9.0
19	0.0	0.6	0.6	9.6	9.0
20	0.0	0.6	0.6	9.6	9.0
21	0.0	0.6	0.6	9.6	9.0
22	0.0	0.6	0.6	9.6	9.0
23	0.0	0.6	0.6	9.6	9.0
24	0.0	0.6	0.6	9.6	9.0
25	0.0	0.6	0.6	9.6	9.0
26	0.0	0.6	0.6	9.6	9.0
27	0.0	0.6	0.6	9.6	9.0
28	0.0	0.6	0.6	9.6	9.0
29	0.0	0.6	0.6	9.6	9.0
30	0.0	0.6	0.6	9.6	9.0
31	0.0	0.6	0.6	9.6	9.0
32	0.0	0.6	0.6	9.6	9.0
33	0.0	0.6	0.6	9.6	9.0
34	0.0	0.6	0.6	9.6	9.0
Total	42.1	18.1	60.2	287.9	227.7

Note : Discount rate of 10% is applied to derive B/C and B-C.

Appendix - 8 (3/4)

Economic Evaluation for Ponta Grossa Sewerage Project

Assumptions ;

a) Investment cost : 29.2 million US$

b) OM cost 0.36 million US$

c) Conversion factor : 85 %

d) Treatment volume : 30,000 cubic meter per day

11.0 million cubic meter per year

e) Unit benefit : domestic 0.58 US$ per cubic meter

EIRR = 18.56%

B/C = 1.90

B - C = 19.6 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit	Balance
	Investment Cost	OM Cost	Total		
1	6.2	0.0	6.2	0.0	-6.2
2	6.2	0.0	6.2	0.0	-6.2
3	6.2	0.0	6.2	0.0	-6.2
4	6.2	0.0	6.2	0.0	-6.2
5	0.0	0.3	0.3	6.4	6.1
6	0.0	0.3	0.3	6.4	6.1
7	0.0	0.3	0.3	6.4	6.1
8	0.0	0.3	0.3	6.4	6.1
9	0.0	0.3	0.3	6.4	6.1
10	0.0	0.3	0.3	6.4	6.1
11	0.0	0.3	0.3	6.4	6.1
12	0.0	0.3	0.3	6.4	6.1
13	0.0	0.3	0.3	6.4	6.1
14	0.0	0.3	0.3	6.4	6.1
15	0.0	0.3	0.3	6.4	6.1
16	0.0	0.3	0.3	6.4	6.1
17	0.0	0.3	0.3	6.4	6.1
18	0.0	0.3	0.3	6.4	6.1
19	0.0	0.3	0.3	6.4	6.1
20	0.0	0.3	0.3	6.4	6.1
21	0.0	0.3	0.3	6.4	6.1
22	0.0	0.3	0.3	6.4	6.1
23	0.0	0.3	0.3	6.4	6.1
24	0.0	0.3	0.3	6.4	6.1
25	0.0	0.3	0.3	6.4	6.1
26	0.0	0.3	0.3	6.4	6.1
27	0.0	0.3	0.3	6.4	6.1
28	0.0	0.3	0.3	6.4	6.1
29	0.0	0.3	0.3	6.4	6.1
30	0.0	0.3	0.3	6.4	6.1
31	0.0	0.3	0.3	6.4	6.1
32	0.0	0.3	0.3	6.4	6.1
33	0.0	0.3	0.3	6.4	6.1
34	0.0	0.3	0.3	6.4	6.1
Total	24.8	9.2	34.0	191.9	157.9

Note : Discount rate of 10% is applied to derive B/C and B-C.

Appendix - 8 (4/4)

Economic Evaluation for Londrina Sewerage Project

Assumptions ;

a) Investment cost : 59.4 million US$

b) OM cost 0.98 million US$

c) Conversion factor : 85 %

d) Treatment volume : 70,000 cubic meter per day

25.6 million cubic meter per year

e) Unit benefit : domestic 0.58 US$ per cubic meter

EIRR = 20.56%

B/C = 2.12

B - C = 50.7 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost			Benefit	Balance
	Investment Cost	OM Cost	Total		
1	12.6	0.0	12.6	0.0	-12.6
2	12.6	0.0	12.6	0.0	-12.6
3	12.6	0.0	12.6	0.0	-12.6
4	12.6	0.0	12.6	0.0	-12.6
5	0.0	0.8	0.8	14.9	14.1
6	0.0	0.8	0.8	14.9	14.1
7	0.0	0.8	0.8	14.9	14.1
8	0.0	0.8	0.8	14.9	14.1
9	0.0	0.8	0.8	14.9	14.1
10	0.0	0.8	0.8	14.9	14.1
11	0.0	0.8	0.8	14.9	14.1
12	0.0	0.8	0.8	14.9	14.1
13	0.0	0.8	0.8	14.9	14.1
14	0.0	0.8	0.8	14.9	14.1
15	0.0	0.8	0.8	14.9	14.1
16	0.0	0.8	0.8	14.9	14.1
17	0.0	0.8	0.8	14.9	14.1
18	0.0	0.8	0.8	14.9	14.1
19	0.0	0.8	0.8	14.9	14.1
20	0.0	0.8	0.8	14.9	14.1
21	0.0	0.8	0.8	14.9	14.1
22	0.0	0.8	0.8	14.9	14.1
23	0.0	0.8	0.8	14.9	14.1
24	0.0	0.8	0.8	14.9	14.1
25	0.0	0.8	0.8	14.9	14.1
26	0.0	0.8	0.8	14.9	14.1
27	0.0	0.8	0.8	14.9	14.1
28	0.0	0.8	0.8	14.9	14.1
29	0.0	0.8	0.8	14.9	14.1
30	0.0	0.8	0.8	14.9	14.1
31	0.0	0.8	0.8	14.9	14.1
32	0.0	0.8	0.8	14.9	14.1
33	0.0	0.8	0.8	14.9	14.1
34	0.0	0.8	0.8	14.9	14.1
Total	50.5	25.0	75.5	447.8	372.4

Note : Discount rate of 10% is applied to derive B/C and B-C.

Appendix - 9

Economic Evaluation for the Serra da Baitaca Ecological Preservation Area Project

Assumptions :

1. Cost

Invstment cost :		1,170,000	US$
OM cost	(5% of investment cost)	58,500	US$/year

2. Benefit

Population in Curitiba		1,315,000	
Number of visitors	10%	131,500	persons
frequency of visits		1	/year
Travel cost	US$10/round trip/person	1,315,000	US$/year

3. Opportunity cost of preservation

ecological ICMS in1996

Total for 30 areas (15 for green area and 15 for water source area)	30,000,000	US$
amount per area	1,000,000	US$

EIRR = 12.4%

(Unit : 000 US$)

Year	Cost				Benefit	Balance
	Invest-ment	OM	Opportunity cost	Total		
1996	390.0	19.5	1,000.0	1,409.5	438.3	-971.2
1997	390.0	39.0	1,000.0	1,429.0	876.7	-552.3
1998	390.0	58.5	1,000.0	1,448.5	1,315.0	-133.5
1999	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2000	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2001	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2002	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2003	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2004	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2005	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2006	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2007	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2008	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2009	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2010	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2011	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2012	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2013	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2014	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2015	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2016	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2017	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2018	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2019	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2020	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2021	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2022	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2023	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2024	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
2025	0.0	58.5	1,000.0	1,058.5	1,315.0	256.5
Total	1,170.0	1,696.5	30,000.0	32,866.5	38,135.0	5,268.5

Economic Evaluation for Unio da Vitoria Flood Control Project

Assumptions ;

a)	Investment cost :	85.9 million US$	
b)	OM cost	0.4 million US$	(0.5% annually of Investment cost)
c)	Conversion Factor	85 %	
d)	Benefit	9.8 million US$/year	
	Rate of annual increase	5.0 %/year	
	EIRR	14.65%	
	B/C =	1.91	
	B -C =	52.2 million US$	

Appendix - 10 (2/2)

Cost and Benefit Flow of the Unio da Vitoria Flood Control Project

(Unit : million US$)

No.	Cost			Benefit	Balance
	Investment Cost	OM Cost	Total		
1	14.6	0.0	14.6	0.0	-14.6
2	14.6	0.0	14.6	0.0	-14.6
3	14.6	0.0	14.6	0.0	-14.6
4	14.6	0.0	14.6	0.0	-14.6
5	14.6	0.0	14.6	0.0	-14.6
6	0.0	0.4	0.4	9.8	9.4
7	0.0	0.4	0.4	10.3	9.9
8	0.0	0.4	0.4	10.8	10.4
9	0.0	0.4	0.4	11.3	11.0
10	0.0	0.4	0.4	11.9	11.5
11	0.0	0.4	0.4	12.5	12.1
12	0.0	0.4	0.4	13.1	12.8
13	0.0	0.4	0.4	13.8	13.4
14	0.0	0.4	0.4	14.5	14.1
15	0.0	0.4	0.4	15.2	14.8
16	0.0	0.4	0.4	16.0	15.6
17	0.0	0.4	0.4	16.8	16.4
18	0.0	0.4	0.4	17.6	17.2
19	0.0	0.4	0.4	18.5	18.1
20	0.0	0.4	0.4	19.4	19.0
21	0.0	0.4	0.4	20.4	20.0
22	0.0	0.4	0.4	21.4	21.0
23	0.0	0.4	0.4	22.5	22.1
24	0.0	0.4	0.4	23.6	23.2
25	0.0	0.4	0.4	24.8	24.4
26	0.0	0.4	0.4	26.0	25.6
27	0.0	0.4	0.4	27.3	26.9
28	0.0	0.4	0.4	28.7	28.3
29	0.0	0.4	0.4	30.1	29.7
30	0.0	0.4	0.4	31.6	31.2
31	0.0	0.4	0.4	33.2	32.8
32	0.0	0.4	0.4	34.8	34.5
33	0.0	0.4	0.4	36.6	36.2
34	0.0	0.4	0.4	38.4	38.1
35	0.0	0.4	0.4	40.3	40.0
36	0.0	0.4	0.4	42.4	42.0
37	0.0	0.4	0.4	44.5	44.1
38	0.0	0.4	0.4	46.7	46.3
39	0.0	0.4	0.4	49.0	48.7
40	0.0	0.4	0.4	51.5	51.1
41	0.0	0.4	0.4	54.1	53.7
42	0.0	0.4	0.4	56.8	56.4
43	0.0	0.4	0.4	59.6	59.2
44	0.0	0.4	0.4	62.6	62.2
45	0.0	0.4	0.4	65.7	65.3
46	0.0	0.4	0.4	69.0	68.6
47	0.0	0.4	0.4	72.4	72.1
48	0.0	0.4	0.4	76.1	75.7
49	0.0	0.4	0.4	79.9	79.5
50	0.0	0.4	0.4	83.9	83.5
51	0.0	0.4	0.4	88.1	87.7
52	0.0	0.4	0.4	92.5	92.1
53	0.0	0.4	0.4	97.1	96.7
54	0.0	0.4	0.4	101.9	101.6
55	0.0	0.4	0.4	107.0	106.7
Total	73.0	18.3	91.3	2,051.6	1,960.3

Note : A discount rate of 10 % is applied to derive B/C and B-C.

Appendix - 11 (1/2)
Economic Evaluation for Soil Erosion Prevention Project
(Iguacu River Basin)

Assumed conversion factor : 85.0%
EIRR : 8.63%
B/C = 0.93
B-C = -7.7 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost				Benefit	Balance
	Investment Cost	OM Cost	Machinery purchase and replacement	Total		
1	76.01	0.00	11.90	87.91	10.28	-77.63
2	0.00	1.92	0.00	1.92	10.28	8.36
3	0.00	1.92	0.00	1.92	10.28	8.36
4	0.00	1.92	0.00	1.92	10.28	8.36
5	0.00	1.92	0.00	1.92	10.28	8.36
6	0.00	1.92	0.00	1.92	10.28	8.36
7	0.00	1.92	0.00	1.92	10.28	8.36
8	0.00	1.92	0.00	1.92	10.28	8.36
9	0.00	1.92	0.00	1.92	10.28	8.36
10	0.00	1.92	0.00	1.92	10.28	8.36
11	0.00	1.92	18.28	20.20	10.28	9.92
12	0.00	1.92	0.00	1.92	10.28	8.36
13	0.00	1.92	0.00	1.92	10.28	8.36
14	0.00	1.92	0.00	1.92	10.28	8.36
15	0.00	1.92	0.00	1.92	10.28	8.36
16	0.00	1.92	0.00	1.92	10.28	8.36
17	0.00	1.92	0.00	1.92	10.28	8.36
18	0.00	1.92	0.00	1.92	10.28	8.36
19	0.00	1.92	0.00	1.92	10.28	8.36
20	0.00	1.92	18.28	20.20	10.28	-9.92
21	0.00	1.92	0.00	1.92	10.28	8.36
22	0.00	1.92	0.00	1.92	10.28	8.36
23	0.00	1.92	0.00	1.92	10.28	8.36
24	0.00	1.92	0.00	1.92	10.28	8.36
25	0.00	1.92	0.00	1.92	10.28	8.36
26	0.00	1.92	0.00	1.92	10.28	8.36
27	0.00	1.92	0.00	1.92	10.28	8.36
28	0.00	1.92	0.00	1.92	10.28	8.36
29	0.00	1.92	0.00	1.92	10.28	8.36
30	0.00	1.92	0.00	1.92	10.28	8.36
31	0.00	1.92	0.00	1.92	10.28	8.36
32	0.00	1.92		1.92	10.28	8.36
Total	76.01	59.55	48.45	135.56	328.96	144.95

Note : A discount rate of 10% is applied to derive B/C and B-C.

Appendix - 11 (2/2)

Economic Evaluation for Soil Erosion Prevention Project

(Tibagi River Basin)

Assumed conversion factor : 85.0%

EIRR : 8.36%

B/C 0.92

B-C = -2.0 million US$

Cost and Benefit Flow

(Unit : million US$)

No.	Cost				Benefit	Balance
	Investment Cost	OM Cost	Machinery purchase and replacement	Total		
1	11.37	0.00	6.89	18.26	0.00	-18.26
2	0.00	0.60	0.00	0.60	2.78	2.19
3	0.00	0.60	0.00	0.60	2.78	2.19
4	0.00	0.60	0.00	0.60	2.78	2.19
5	0.00	0.60	0.00	0.60	2.78	2.19
6	0.00	0.60	0.00	0.60	2.78	2.19
7	0.00	0.60	0.00	0.60	2.78	2.19
8	0.00	0.60	0.00	0.60	2.78	2.19
9	0.00	0.60	0.00	0.60	2.78	2.19
10	0.00	0.60	0.00	0.60	2.78	2.19
11	0.00	0.60	9.01	9.61	2.78	-6.83
12	0.00	0.60	0.00	0.60	2.78	2.19
13	0.00	0.60	0.00	0.60	2.78	2.19
14	0.00	0.60	0.00	0.60	2.78	2.19
15	0.00	0.60	0.00	0.60	2.78	2.19
16	0.00	0.60	0.00	0.60	2.78	2.19
17	0.00	0.60	0.00	0.60	2.78	2.19
18	0.00	0.60	0.00	0.60	2.78	2.19
19	0.00	0.60	0.00	0.60	2.78	2.19
20	0.00	0.60	0.00	0.60	2.78	2.19
21	0.00	0.60	0.00	0.60	2.78	2.19
22	0.00	0.60	9.01	9.61	2.78	-6.83
23	0.00	0.60	0.00	0.60	2.78	2.19
24	0.00	0.60	0.00	0.60	2.78	2.19
25	0.00	0.60	0.00	0.60	2.78	2.19
26	0.00	0.60	0.00	0.60	2.78	2.19
27	0.00	0.60	0.00	0.60	2.78	2.19
28	0.00	0.60	0.00	0.60	2.78	2.19
29	0.00	0.60	0.00	0.60	2.78	2.19
30	0.00	0.60	0.00	0.60	2.78	2.19
31	0.00	0.60	0.00	0.60	2.78	2.19
32	0.00	0.60	0.00	0.60	2.78	2.19
Total	11.37	18.45	24.91	54.72	86.18	31.46

Note : A discount rate of 10% is applied to derive B/C and B-C.

Appendix - 12 (1/7)

Cost Benefit Flow for Cebolao Hydropower Project

(Unit : million US$)

Assumptions :	
Investment (Million US$)	175
OM (% to investment cost	0.5%
demand (GWh)	757
benefit (US$/MWh)	72
Investment cost disbursement in %	
1st year	20%
2	20%
3	20%
4	20%
5	20%
Conversion factor :	85%
IRR=	25.6%
B/C =	3.35
B - C =	275.4 (million US$)

Year	Investment	OM	Benefit			Balance
			Consumption	Other	Total	
1	29.7	0.0	0.0	0.0	0.0	-29.7
2	29.7	0.0	0.0	0.0	0.0	-29.7
3	29.7	0.0	0.0	0.0	0.0	-29.7
4	29.7	0.0	0.0	0.0	0.0	-29.7
5	29.7	0.0	0.0	0.0	0.0	-29.7
6	0.0	0.7	54.5	9.3	63.8	63.0
7	0.0	0.7	54.5	9.3	63.8	63.0
8	0.0	0.7	54.5	9.3	63.8	63.0
9	0.0	0.7	54.5	9.3	63.8	63.0
10	0.0	0.7	54.5	9.3	63.8	63.0
11	0.0	0.7	54.5	9.3	63.8	63.0
12	0.0	0.7	54.5	9.3	63.8	63.0
13	0.0	0.7	54.5	9.3	63.8	63.0
14	0.0	0.7	54.5	9.3	63.8	63.0
15	0.0	0.7	54.5	9.3	63.8	63.0
16	0.0	0.7	54.5	9.3	63.8	63.0
17	0.0	0.7	54.5	9.3	63.8	63.0
18	0.0	0.7	54.5	9.3	63.8	63.0
19	0.0	0.7	54.5	9.3	63.8	63.0
20	0.0	0.7	54.5	9.3	63.8	63.0
21	0.0	0.7	54.5	9.3	63.8	63.0
22	0.0	0.7	54.5	9.3	63.8	63.0
23	0.0	0.7	54.5	9.3	63.8	63.0
24	0.0	0.7	54.5	9.3	63.8	63.0
25	0.0	0.7	54.5	9.3	63.8	63.0
26	0.0	0.7	54.5	9.3	63.8	63.0
27	0.0	0.7	54.5	9.3	63.8	63.0
28	0.0	0.7	54.5	9.3	63.8	63.0
29	0.0	0.7	54.5	9.3	63.8	63.0
30	0.0	0.7	54.5	9.3	63.8	63.0
31	0.0	0.7	54.5	9.3	63.8	63.0
32	0.0	0.7	54.5	9.3	63.8	63.0
33	0.0	0.7	54.5	9.3	63.8	63.0
34	0.0	0.7	54.5	9.3	63.8	63.0
35	0.0	0.7	54.5	9.3	63.8	63.0
36	0.0	0.7	54.5	9.3	63.8	63.0
37	0.0	0.7	54.5	9.3	63.8	63.0
38	0.0	0.7	54.5	9.3	63.8	63.0
39	0.0	0.7	54.5	9.3	63.8	63.0
40	0.0	0.7	54.5	9.3	63.8	63.0
41	0.0	0.7	54.5	9.3	63.8	63.0
42	0.0	0.7	54.5	9.3	63.8	63.0
43	0.0	0.7	54.5	9.3	63.8	63.0
44	0.0	0.7	54.5	9.3	63.8	63.0
45	0.0	0.7	54.5	9.3	63.8	63.0
46	0.0	0.7	54.5	9.3	63.8	63.0
47	0.0	0.7	54.5	9.3	63.8	63.0
48	0.0	0.7	54.5	9.3	63.8	63.0
49	0.0	0.7	54.5	9.3	63.8	63.0
50	0.0	0.7	54.5	9.3	63.8	63.0
51	0.0	0.7	54.5	9.3	63.8	63.0
52	0.0	0.7	54.5	9.3	63.8	63.0
53	0.0	0.7	54.5	9.3	63.8	63.0
54	0.0	0.7	54.5	9.3	63.8	63.0
55	0.0	0.7	54.5	9.3	63.8	63.0
Total	148.6	37.1	2,725.2	463.3	3,188.5	3,002.8

Note : A discount rate of 10 % is applied to derive B/C and B-C.

Appendix - 12 (2/7)

Cost Benefit Flow for Jataizinho Hydropower Project

(Unit : million US$)

Assumptions :		Year	Investment	OM	Benefit			Balance
					Consumption	Other	Total	
Investment (Million US$)	177							
OM (% to investment cost	0.5%							
demand (GWh)	758	1	30.2	0.0	0.0	0.0	0.0	-30.2
benefit (US$/MWh)	72	2	30.2	0.0	0.0	0.0	0.0	-30.2
Investment cost disbursement in %		3	30.2	0.0	0.0	0.0	0.0	-30.2
1st year	20%	4	30.2	0.0	0.0	0.0	0.0	-30.2
2	20%	5	30.2	0.0	0.0	0.0	0.0	-30.2
3	20%	6	0.0	0.8	54.6	9.3	63.9	63.1
4	20%	7	0.0	0.8	54.6	9.3	63.9	63.1
5	20%	8	0.0	0.8	54.6	9.3	63.9	63.1
Conversion factor :	85%	9	0.0	0.8	54.6	9.3	63.9	63.1
		10	0.0	0.8	54.6	9.3	63.9	63.1
IRR=	25.3%	11	0.0	0.8	54.6	9.3	63.9	63.1
B/C =	3.30	12	0.0	0.8	54.6	9.3	63.9	63.1
B - C =	274.1	13	0.0	0.8	54.6	9.3	63.9	63.1
	(million US$)	14	0.0	0.8	54.6	9.3	63.9	63.1
		15	0.0	0.8	54.6	9.3	63.9	63.1
		16	0.0	0.8	54.6	9.3	63.9	63.1
		17	0.0	0.8	54.6	9.3	63.9	63.1
		18	0.0	0.8	54.6	9.3	63.9	63.1
		19	0.0	0.8	54.6	9.3	63.9	63.1
		20	0.0	0.8	54.6	9.3	63.9	63.1
		21	0.0	0.8	54.6	9.3	63.9	63.1
		22	0.0	0.8	54.6	9.3	63.9	63.1
		23	0.0	0.8	54.6	9.3	63.9	63.1
		24	0.0	0.8	54.6	9.3	63.9	63.1
		25	0.0	0.8	54.6	9.3	63.9	63.1
		26	0.0	0.8	54.6	9.3	63.9	63.1
		27	0.0	0.8	54.6	9.3	63.9	63.1
		28	0.0	0.8	54.6	9.3	63.9	63.1
		29	0.0	0.8	54.6	9.3	63.9	63.1
		30	0.0	0.8	54.6	9.3	63.9	63.1
		31	0.0	0.8	54.6	9.3	63.9	63.1
		32	0.0	0.8	54.6	9.3	63.9	63.1
		33	0.0	0.8	54.6	9.3	63.9	63.1
		34	0.0	0.8	54.6	9.3	63.9	63.1
		35	0.0	0.8	54.6	9.3	63.9	63.1
		36	0.0	0.8	54.6	9.3	63.9	63.1
		37	0.0	0.8	54.6	9.3	63.9	63.1
		38	0.0	0.8	54.6	9.3	63.9	63.1
		39	0.0	0.8	54.6	9.3	63.9	63.1
		40	0.0	0.8	54.6	9.3	63.9	63.1
		41	0.0	0.8	54.6	9.3	63.9	63.1
		42	0.0	0.8	54.6	9.3	63.9	63.1
		43	0.0	0.8	54.6	9.3	63.9	63.1
		44	0.0	0.8	54.6	9.3	63.9	63.1
		45	0.0	0.8	54.6	9.3	63.9	63.1
		46	0.0	0.8	54.6	9.3	63.9	63.1
		47	0.0	0.8	54.6	9.3	63.9	63.1
		48	0.0	0.8	54.6	9.3	63.9	63.1
		49	0.0	0.8	54.6	9.3	63.9	63.1
		50	0.0	0.8	54.6	9.3	63.9	63.1
		51	0.0	0.8	54.6	9.3	63.9	63.1
		52	0.0	0.8	54.6	9.3	63.9	63.1
		53	0.0	0.8	54.6	9.3	63.9	63.1
		54	0.0	0.8	54.6	9.3	63.9	63.1
		55	0.0	0.8	54.6	9.3	63.9	63.1
		Total	150.8	37.7	2,728.8	463.9	3,192.7	3,004.2

Note : A discount rate of 10 % is applied to derive B/C and B-C.

Appendix - 12 (3/7)

Cost Benefit Flow for Sao Jeronimo Hydropower Project

(Unit : million US$)

Assumptions :	
Investment (Million US$)	282
OM (% to investment cost	0.5%
demand (GWh)	1,386
benefit (US$/MWh)	72
Investment cost disbursement in %	
1st year	20%
2	20%
3	20%
4	20%
5	20%
Conversion factor :	85%
IRR=	27.8%
B/C =	3.81
B - C =	530.0 (Million US$)

Year	Investment	OM	Benefit			Balance
			Consumption	Other	Total	
1	47.9	0.0	0.0	0.0	0.0	-47.9
2	47.9	0.0	0.0	0.0	0.0	-47.9
3	47.9	0.0	0.0	0.0	0.0	-47.9
4	47.9	0.0	0.0	0.0	0.0	-47.9
5	47.9	0.0	0.0	0.0	0.0	-47.9
6	0.0	1.2	99.8	17.0	116.8	115.6
7	0.0	1.2	99.8	17.0	116.8	115.6
8	0.0	1.2	99.8	17.0	116.8	115.6
9	0.0	1.2	99.8	17.0	116.8	115.6
10	0.0	1.2	99.8	17.0	116.8	115.6
11	0.0	1.2	99.8	17.0	116.8	115.6
12	0.0	1.2	99.8	17.0	116.8	115.6
13	0.0	1.2	99.8	17.0	116.8	115.6
14	0.0	1.2	99.8	17.0	116.8	115.6
15	0.0	1.2	99.8	17.0	116.8	115.6
16	0.0	1.2	99.8	17.0	116.8	115.6
17	0.0	1.2	99.8	17.0	116.8	115.6
18	0.0	1.2	99.8	17.0	116.8	115.6
19	0.0	1.2	99.8	17.0	116.8	115.6
20	0.0	1.2	99.8	17.0	116.8	115.6
21	0.0	1.2	99.8	17.0	116.8	115.6
22	0.0	1.2	99.8	17.0	116.8	115.6
23	0.0	1.2	99.8	17.0	116.8	115.6
24	0.0	1.2	99.8	17.0	116.8	115.6
25	0.0	1.2	99.8	17.0	116.8	115.6
26	0.0	1.2	99.8	17.0	116.8	115.6
27	0.0	1.2	99.8	17.0	116.8	115.6
28	0.0	1.2	99.8	17.0	116.8	115.6
29	0.0	1.2	99.8	17.0	116.8	115.6
30	0.0	1.2	99.8	17.0	116.8	115.6
31	0.0	1.2	99.8	17.0	116.8	115.6
32	0.0	1.2	99.8	17.0	116.8	115.6
33	0.0	1.2	99.8	17.0	116.8	115.6
34	0.0	1.2	99.8	17.0	116.8	115.6
35	0.0	1.2	99.8	17.0	116.8	115.6
36	0.0	1.2	99.8	17.0	116.8	115.6
37	0.0	1.2	99.8	17.0	116.8	115.6
38	0.0	1.2	99.8	17.0	116.8	115.6
39	0.0	1.2	99.8	17.0	116.8	115.6
40	0.0	1.2	99.8	17.0	116.8	115.6
41	0.0	1.2	99.8	17.0	116.8	115.6
42	0.0	1.2	99.8	17.0	116.8	115.6
43	0.0	1.2	99.8	17.0	116.8	115.6
44	0.0	1.2	99.8	17.0	116.8	115.6
45	0.0	1.2	99.8	17.0	116.8	115.6
46	0.0	1.2	99.8	17.0	116.8	115.6
47	0.0	1.2	99.8	17.0	116.8	115.6
48	0.0	1.2	99.8	17.0	116.8	115.6
49	0.0	1.2	99.8	17.0	116.8	115.6
50	0.0	1.2	99.8	17.0	116.8	115.6
51	0.0	1.2	99.8	17.0	116.8	115.6
52	0.0	1.2	99.8	17.0	116.8	115.6
53	0.0	1.2	99.8	17.0	116.8	115.6
54	0.0	1.2	99.8	17.0	116.8	115.6
55	0.0	1.2	99.8	17.0	116.8	115.6
Total	239.4	59.8	4,989.6	848.2	5,837.8	5,538.6

Note : A discount rate of 10 % is applied to derive B/C and B-C.

Appendix - 12 (4/7)

Cost Benefit Flow for Maua Hydropower Project

(Unit : million US$)

Assumptions :	
Investment (Million US$)	386
OM (% to investment cost	0.5%
demand (GWh)	1,617
benefit (US$/MWh)	72
Investment cost disbursement in %	
1st year	20%
2	20%
3	20%
4	20%
5	20%
Conversion factor :	85%
IRR=	25.0%
B/C =	3.24
B - C =	580.0 (million US$)

Year	Investment	OM	Benefit			Balance
			Consumption	Other	Total	
1	65.6	0.0	0.0	0.0	0.0	-65.6
2	65.6	0.0	0.0	0.0	0.0	-65.6
3	65.6	0.0	0.0	0.0	0.0	-65.6
4	65.6	0.0	0.0	0.0	0.0	-65.6
5	65.6	0.0	0.0	0.0	0.0	-65.6
6	0.0	1.6	116.4	19.8	136.2	134.6
7	0.0	1.6	116.4	19.8	136.2	134.6
8	0.0	1.6	116.4	19.8	136.2	134.6
9	0.0	1.6	116.4	19.8	136.2	134.6
10	0.0	1.6	116.4	19.8	136.2	134.6
11	0.0	1.6	116.4	19.8	136.2	134.6
12	0.0	1.6	116.4	19.8	136.2	134.6
13	0.0	1.6	116.4	19.8	136.2	134.6
14	0.0	1.6	116.4	19.8	136.2	134.6
15	0.0	1.6	116.4	19.8	136.2	134.6
16	0.0	1.6	116.4	19.8	136.2	134.6
17	0.0	1.6	116.4	19.8	136.2	134.6
18	0.0	1.6	116.4	19.8	136.2	134.6
19	0.0	1.6	116.4	19.8	136.2	134.6
20	0.0	1.6	116.4	19.8	136.2	134.6
21	0.0	1.6	116.4	19.8	136.2	134.6
22	0.0	1.6	116.4	19.8	136.2	134.6
23	0.0	1.6	116.4	19.8	136.2	134.6
24	0.0	1.6	116.4	19.8	136.2	134.6
25	0.0	1.6	116.4	19.8	136.2	134.6
26	0.0	1.6	116.4	19.8	136.2	134.6
27	0.0	1.6	116.4	19.8	136.2	134.6
28	0.0	1.6	116.4	19.8	136.2	134.6
29	0.0	1.6	116.4	19.8	136.2	134.6
30	0.0	1.6	116.4	19.8	136.2	134.6
31	0.0	1.6	116.4	19.8	136.2	134.6
32	0.0	1.6	116.4	19.8	136.2	134.6
33	0.0	1.6	116.4	19.8	136.2	134.6
34	0.0	1.6	116.4	19.8	136.2	134.6
35	0.0	1.6	116.4	19.8	136.2	134.6
36	0.0	1.6	116.4	19.8	136.2	134.6
37	0.0	1.6	116.4	19.8	136.2	134.6
38	0.0	1.6	116.4	19.8	136.2	134.6
39	0.0	1.6	116.4	19.8	136.2	134.6
40	0.0	1.6	116.4	19.8	136.2	134.6
41	0.0	1.6	116.4	19.8	136.2	134.6
42	0.0	1.6	116.4	19.8	136.2	134.6
43	0.0	1.6	116.4	19.8	136.2	134.6
44	0.0	1.6	116.4	19.8	136.2	134.6
45	0.0	1.6	116.4	19.8	136.2	134.6
46	0.0	1.6	116.4	19.8	136.2	134.6
47	0.0	1.6	116.4	19.8	136.2	134.6
48	0.0	1.6	116.4	19.8	136.2	134.6
49	0.0	1.6	116.4	19.8	136.2	134.6
50	0.0	1.6	116.4	19.8	136.2	134.6
51	0.0	1.6	116.4	19.8	136.2	134.6
52	0.0	1.6	116.4	19.8	136.2	134.6
53	0.0	1.6	116.4	19.8	136.2	134.6
54	0.0	1.6	116.4	19.8	136.2	134.6
55	0.0	1.6	116.4	19.8	136.2	134.6
Total	327.8	81.9	5,821.2	989.6	6,810.8	6,401.1

Note : A discount rate of 10 % is applied to derive B/C and B-C.

Appendix - 12 (5/7)

Cost Benefit Flow for Telemaco Borba Hydropower Project

(Unit : million US$)

Assumptions :	
Investment (Million US$)	128
OM (% to investment cost	0.5%
demand (GWh)	541
benefit (US$/MWh)	72
Investment cost disbursement in %	
1st year	20%
2	20%
3	20%
4	20%
5	20%
Conversion factor :	85%
IRR=	25.2%
B/C =	3.27
B - C =	194.8 (million US$)

Year	Investment	OM	Benefit			Balance
			Consumption	Other	Total	
1	21.7	0.0	0.0	0.0	0.0	-21.7
2	21.7	0.0	0.0	0.0	0.0	-21.7
3	21.7	0.0	0.0	0.0	0.0	-21.7
4	21.7	0.0	0.0	0.0	0.0	-21.7
5	21.7	0.0	0.0	0.0	0.0	-21.7
6	0.0	0.5	39.0	6.6	45.6	45.0
7	0.0	0.5	39.0	6.6	45.6	45.0
8	0.0	0.5	39.0	6.6	45.6	45.0
9	0.0	0.5	39.0	6.6	45.6	45.0
10	0.0	0.5	39.0	6.6	45.6	45.0
11	0.0	0.5	39.0	6.6	45.6	45.0
12	0.0	0.5	39.0	6.6	45.6	45.0
13	0.0	0.5	39.0	6.6	45.6	45.0
14	0.0	0.5	39.0	6.6	45.6	45.0
15	0.0	0.5	39.0	6.6	45.6	45.0
16	0.0	0.5	39.0	6.6	45.6	45.0
17	0.0	0.5	39.0	6.6	45.6	45.0
18	0.0	0.5	39.0	6.6	45.6	45.0
19	0.0	0.5	39.0	6.6	45.6	45.0
20	0.0	0.5	39.0	6.6	45.6	45.0
21	0.0	0.5	39.0	6.6	45.6	45.0
22	0.0	0.5	39.0	6.6	45.6	45.0
23	0.0	0.5	39.0	6.6	45.6	45.0
24	0.0	0.5	39.0	6.6	45.6	45.0
25	0.0	0.5	39.0	6.6	45.6	45.0
26	0.0	0.5	39.0	6.6	45.6	45.0
27	0.0	0.5	39.0	6.6	45.6	45.0
28	0.0	0.5	39.0	6.6	45.6	45.0
29	0.0	0.5	39.0	6.6	45.6	45.0
30	0.0	0.5	39.0	6.6	45.6	45.0
31	0.0	0.5	39.0	6.6	45.6	45.0
32	0.0	0.5	39.0	6.6	45.6	45.0
33	0.0	0.5	39.0	6.6	45.6	45.0
34	0.0	0.5	39.0	6.6	45.6	45.0
35	0.0	0.5	39.0	6.6	45.6	45.0
36	0.0	0.5	39.0	6.6	45.6	45.0
37	0.0	0.5	39.0	6.6	45.6	45.0
38	0.0	0.5	39.0	6.6	45.6	45.0
39	0.0	0.5	39.0	6.6	45.6	45.0
40	0.0	0.5	39.0	6.6	45.6	45.0
41	0.0	0.5	39.0	6.6	45.6	45.0
42	0.0	0.5	39.0	6.6	45.6	45.0
43	0.0	0.5	39.0	6.6	45.6	45.0
44	0.0	0.5	39.0	6.6	45.6	45.0
45	0.0	0.5	39.0	6.6	45.6	45.0
46	0.0	0.5	39.0	6.6	45.6	45.0
47	0.0	0.5	39.0	6.6	45.6	45.0
48	0.0	0.5	39.0	6.6	45.6	45.0
49	0.0	0.5	39.0	6.6	45.6	45.0
50	0.0	0.5	39.0	6.6	45.6	45.0
51	0.0	0.5	39.0	6.6	45.6	45.0
52	0.0	0.5	39.0	6.6	45.6	45.0
53	0.0	0.5	39.0	6.6	45.6	45.0
54	0.0	0.5	39.0	6.6	45.6	45.0
55	0.0	0.5	39.0	6.6	45.6	45.0
Total	108.7	27.2	1,947.6	331.1	2,278.7	2,142.8

Note : A discount rate of 10 % is applied to derive B/C and B-C.

Appendix - 12 (6/7)

Cost Benefit Flow for Fundao Hydropower Project

(Unit : million US$)

Assumptions :	
Investment (Million US$)	214
OM (% to investment cost	0.5%
demand (GWh)	640
benefit (US$/MWh)	72
Investment cost disbursement in %	
1st year	20%
2	20%
3	20%
4	20%
5	20%
Conversion factor :	85%
IRR=	19.7%
B/C =	2.31
B - C =	188.4 (million US$)

Year	Investment	OM	Benefit			Balance
			Consumption	Other	Total	
1	36.4	0.0	0.0	0.0	0.0	-36.4
2	36.4	0.0	0.0	0.0	0.0	-36.4
3	36.4	0.0	0.0	0.0	0.0	-36.4
4	36.4	0.0	0.0	0.0	0.0	-36.4
5	36.4	0.0	0.0	0.0	0.0	-36.4
6	0.0	0.9	46.1	7.8	53.9	53.0
7	0.0	0.9	46.1	7.8	53.9	53.0
8	0.0	0.9	46.1	7.8	53.9	53.0
9	0.0	0.9	46.1	7.8	53.9	53.0
10	0.0	0.9	46.1	7.8	53.9	53.0
11	0.0	0.9	46.1	7.8	53.9	53.0
12	0.0	0.9	46.1	7.8	53.9	53.0
13	0.0	0.9	46.1	7.8	53.9	53.0
14	0.0	0.9	46.1	7.8	53.9	53.0
15	0.0	0.9	46.1	7.8	53.9	53.0
16	0.0	0.9	46.1	7.8	53.9	53.0
17	0.0	0.9	46.1	7.8	53.9	53.0
18	0.0	0.9	46.1	7.8	53.9	53.0
19	0.0	0.9	46.1	7.8	53.9	53.0
20	0.0	0.9	46.1	7.8	53.9	53.0
21	0.0	0.9	46.1	7.8	53.9	53.0
22	0.0	0.9	46.1	7.8	53.9	53.0
23	0.0	0.9	46.1	7.8	53.9	53.0
24	0.0	0.9	46.1	7.8	53.9	53.0
25	0.0	0.9	46.1	7.8	53.9	53.0
26	0.0	0.9	46.1	7.8	53.9	53.0
27	0.0	0.9	46.1	7.8	53.9	53.0
28	0.0	0.9	46.1	7.8	53.9	53.0
29	0.0	0.9	46.1	7.8	53.9	53.0
30	0.0	0.9	46.1	7.8	53.9	53.0
31	0.0	0.9	46.1	7.8	53.9	53.0
32	0.0	0.9	46.1	7.8	53.9	53.0
33	0.0	0.9	46.1	7.8	53.9	53.0
34	0.0	0.9	46.1	7.8	53.9	53.0
35	0.0	0.9	46.1	7.8	53.9	53.0
36	0.0	0.9	46.1	7.8	53.9	53.0
37	0.0	0.9	46.1	7.8	53.9	53.0
38	0.0	0.9	46.1	7.8	53.9	53.0
39	0.0	0.9	46.1	7.8	53.9	53.0
40	0.0	0.9	46.1	7.8	53.9	53.0
41	0.0	0.9	46.1	7.8	53.9	53.0
42	0.0	0.9	46.1	7.8	53.9	53.0
43	0.0	0.9	46.1	7.8	53.9	53.0
44	0.0	0.9	46.1	7.8	53.9	53.0
45	0.0	0.9	46.1	7.8	53.9	53.0
46	0.0	0.9	46.1	7.8	53.9	53.0
47	0.0	0.9	46.1	7.8	53.9	53.0
48	0.0	0.9	46.1	7.8	53.9	53.0
49	0.0	0.9	46.1	7.8	53.9	53.0
50	0.0	0.9	46.1	7.8	53.9	53.0
51	0.0	0.9	46.1	7.8	53.9	53.0
52	0.0	0.9	46.1	7.8	53.9	53.0
53	0.0	0.9	46.1	7.8	53.9	53.0
54	0.0	0.9	46.1	7.8	53.9	53.0
55	0.0	0.9	46.1	7.8	53.9	53.0
Total	181.9	45.5	2,304.0	391.7	2,695.7	2,468.3

Note : A discount rate of 10 % is applied to derive B/C and B-C.

Appendix - 12 (7/7)

Cost Benefit Flow for All the Hydropower Projects in the Tibagi River Basin

(Unit : million US$)

Assumptions :	
Investment (Million US$)	1,148
OM (% to investment cost	0.5%
demand (GWh)	5,059
benefit (US$/MWh)	72
Investment cost disbursement in %	
1st year	20%
2	20%
3	20%
4	20%
5	20%
Conversion factor :	85%
IRR=	25.9%
B/C =	3.41
B - C =	1,853.8 (million US$)

Year	Investment	OM	Benefit			Balance
			Consumption	Other	Total	
1	195.2	0.0	0.0	0.0	0.0	-195.2
2	195.2	0.0	0.0	0.0	0.0	-195.2
3	195.2	0.0	0.0	0.0	0.0	-195.2
4	195.2	0.0	0.0	0.0	0.0	-195.2
5	195.2	0.0	0.0	0.0	0.0	-195.2
6	0.0	4.9	364.2	61.9	426.2	421.3
7	0.0	4.9	364.2	61.9	426.2	421.3
8	0.0	4.9	364.2	61.9	426.2	421.3
9	0.0	4.9	364.2	61.9	426.2	421.3
10	0.0	4.9	364.2	61.9	426.2	421.3
11	0.0	4.9	364.2	61.9	426.2	421.3
12	0.0	4.9	364.2	61.9	426.2	421.3
13	0.0	4.9	364.2	61.9	426.2	421.3
14	0.0	4.9	364.2	61.9	426.2	421.3
15	0.0	4.9	364.2	61.9	426.2	421.3
16	0.0	4.9	364.2	61.9	426.2	421.3
17	0.0	4.9	364.2	61.9	426.2	421.3
18	0.0	4.9	364.2	61.9	426.2	421.3
19	0.0	4.9	364.2	61.9	426.2	421.3
20	0.0	4.9	364.2	61.9	426.2	421.3
21	0.0	4.9	364.2	61.9	426.2	421.3
22	0.0	4.9	364.2	61.9	426.2	421.3
23	0.0	4.9	364.2	61.9	426.2	421.3
24	0.0	4.9	364.2	61.9	426.2	421.3
25	0.0	4.9	364.2	61.9	426.2	421.3
26	0.0	4.9	364.2	61.9	426.2	421.3
27	0.0	4.9	364.2	61.9	426.2	421.3
28	0.0	4.9	364.2	61.9	426.2	421.3
29	0.0	4.9	364.2	61.9	426.2	421.3
30	0.0	4.9	364.2	61.9	426.2	421.3
31	0.0	4.9	364.2	61.9	426.2	421.3
32	0.0	4.9	364.2	61.9	426.2	421.3
33	0.0	4.9	364.2	61.9	426.2	421.3
34	0.0	4.9	364.2	61.9	426.2	421.3
35	0.0	4.9	364.2	61.9	426.2	421.3
36	0.0	4.9	364.2	61.9	426.2	421.3
37	0.0	4.9	364.2	61.9	426.2	421.3
38	0.0	4.9	364.2	61.9	426.2	421.3
39	0.0	4.9	364.2	61.9	426.2	421.3
40	0.0	4.9	364.2	61.9	426.2	421.3
41	0.0	4.9	364.2	61.9	426.2	421.3
42	0.0	4.9	364.2	61.9	426.2	421.3
43	0.0	4.9	364.2	61.9	426.2	421.3
44	0.0	4.9	364.2	61.9	426.2	421.3
45	0.0	4.9	364.2	61.9	426.2	421.3
46	0.0	4.9	364.2	61.9	426.2	421.3
47	0.0	4.9	364.2	61.9	426.2	421.3
48	0.0	4.9	364.2	61.9	426.2	421.3
49	0.0	4.9	364.2	61.9	426.2	421.3
50	0.0	4.9	364.2	61.9	426.2	421.3
51	0.0	4.9	364.2	61.9	426.2	421.3
52	0.0	4.9	364.2	61.9	426.2	421.3
53	0.0	4.9	364.2	61.9	426.2	421.3
54	0.0	4.9	364.2	61.9	426.2	421.3
55	0.0	4.9	364.2	61.9	426.2	421.3
Total	975.8	243.9	18,212.4	3,096.1	21,308.5	20,088.8

Note : A discount rate of 10 % is applied to derive B/C and B-C.

Appendix - 13 (1/25)
Financial Evaluation for Curitiba Metropolitan Area Water Supply Project

Assumptions ;

a) Investment cost : 760 million US$

b) OM cost 68.4 million US$ 9.0% of investment cost

c) Water supply volume : 7.234 cubic meter per second

total	100.0%	228.125 million cubic meter per year
domestic	56.9%	129.8 million cubic meter per year
industrial	43.1%	98.3 million cubic meter per year

d) Unit revenue : domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR 9.51%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	190.0	0.0	190.0	0.0	0.0	0.0	-190.0
2	190.0	0.0	190.0	0.0	0.0	0.0	-190.0
3	190.0	0.0	190.0	0.0	0.0	0.0	-190.0
4	190.0	0.0	190.0	0.0	0.0	0.0	-190.0
5	0.0	68.4	68.4	60.2	97.3	157.5	89.1
6	0.0	68.4	68.4	60.2	97.3	157.5	89.1
7	0.0	68.4	68.4	60.2	97.3	157.5	89.1
8	0.0	68.4	68.4	60.2	97.3	157.5	89.1
9	0.0	68.4	68.4	60.2	97.3	157.5	89.1
10	0.0	68.4	68.4	60.2	97.3	157.5	89.1
11	0.0	68.4	68.4	60.2	97.3	157.5	89.1
12	0.0	68.4	68.4	60.2	97.3	157.5	89.1
13	0.0	68.4	68.4	60.2	97.3	157.5	89.1
14	0.0	68.4	68.4	60.2	97.3	157.5	89.1
15	0.0	68.4	68.4	60.2	97.3	157.5	89.1
16	0.0	68.4	68.4	60.2	97.3	157.5	89.1
17	0.0	68.4	68.4	60.2	97.3	157.5	89.1
18	0.0	68.4	68.4	60.2	97.3	157.5	89.1
19	0.0	68.4	68.4	60.2	97.3	157.5	89.1
20	0.0	68.4	68.4	60.2	97.3	157.5	89.1
21	0.0	68.4	68.4	60.2	97.3	157.5	89.1
22	0.0	68.4	68.4	60.2	97.3	157.5	89.1
23	0.0	68.4	68.4	60.2	97.3	157.5	89.1
24	0.0	68.4	68.4	60.2	97.3	157.5	89.1
25	0.0	68.4	68.4	60.2	97.3	157.5	89.1
26	0.0	68.4	68.4	60.2	97.3	157.5	89.1
27	0.0	68.4	68.4	60.2	97.3	157.5	89.1
28	0.0	68.4	68.4	60.2	97.3	157.5	89.1
29	0.0	68.4	68.4	60.2	97.3	157.5	89.1
30	0.0	68.4	68.4	60.2	97.3	157.5	89.1
31	0.0	68.4	68.4	60.2	97.3	157.5	89.1
32	0.0	68.4	68.4	60.2	97.3	157.5	89.1
33	0.0	68.4	68.4	60.2	97.3	157.5	89.1
34	0.0	68.4	68.4	60.2	97.3	157.5	89.1
Total	760.0	2,052.0	2,812.0	1,804.8	2,920.2	4,725.0	1,913.0

Financial Evaluation for Cascavel Water Supply Project

Assumptions ;

a) Investment cost : 38.9 million US$

b) OM cost 3.5 million US$ 9.0% of investment cost

c) Water supply volume : 0.602 cubic meter per second

total	100.0%	19.0 million cubic meter per year
domestic	87.6%	16.6 million cubic meter per year
industrial	12.4%	2.4 million cubic meter per year

d) Unit revenue : domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 13.50%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	9.7	0.0	9.7	0.0	0.0	0.0	-9.7
2	9.7	0.0	9.7	0.0	0.0	0.0	-9.7
3	9.7	0.0	9.7	0.0	0.0	0.0	-9.7
4	9.7	0.0	9.7	0.0	0.0	0.0	-9.7
5	0.0	3.5	3.5	7.7	2.3	10.1	6.6
6	0.0	3.5	3.5	7.7	2.3	10.1	6.6
7	0.0	3.5	3.5	7.7	2.3	10.1	6.6
8	0.0	3.5	3.5	7.7	2.3	10.1	6.6
9	0.0	3.5	3.5	7.7	2.3	10.1	6.6
10	0.0	3.5	3.5	7.7	2.3	10.1	6.6
11	0.0	3.5	3.5	7.7	2.3	10.1	6.6
12	0.0	3.5	3.5	7.7	2.3	10.1	6.6
13	0.0	3.5	3.5	7.7	2.3	10.1	6.6
14	0.0	3.5	3.5	7.7	2.3	10.1	6.6
15	0.0	3.5	3.5	7.7	2.3	10.1	6.6
16	0.0	3.5	3.5	7.7	2.3	10.1	6.6
17	0.0	3.5	3.5	7.7	2.3	10.1	6.6
18	0.0	3.5	3.5	7.7	2.3	10.1	6.6
19	0.0	3.5	3.5	7.7	2.3	10.1	6.6
20	0.0	3.5	3.5	7.7	2.3	10.1	6.6
21	0.0	3.5	3.5	7.7	2.3	10.1	6.6
22	0.0	3.5	3.5	7.7	2.3	10.1	6.6
23	0.0	3.5	3.5	7.7	2.3	10.1	6.6
24	0.0	3.5	3.5	7.7	2.3	10.1	6.6
25	0.0	3.5	3.5	7.7	2.3	10.1	6.6
26	0.0	3.5	3.5	7.7	2.3	10.1	6.6
27	0.0	3.5	3.5	7.7	2.3	10.1	6.6
28	0.0	3.5	3.5	7.7	2.3	10.1	6.6
29	0.0	3.5	3.5	7.7	2.3	10.1	6.6
30	0.0	3.5	3.5	7.7	2.3	10.1	6.6
31	0.0	3.5	3.5	7.7	2.3	10.1	6.6
32	0.0	3.5	3.5	7.7	2.3	10.1	6.6
33	0.0	3.5	3.5	7.7	2.3	10.1	6.6
34	0.0	3.5	3.5	7.7	2.3	10.1	6.6
Total	38.9	105.0	143.9	231.9	69.9	301.8	157.9

Financial Evaluation for Foz do Iguacu Water Supply Project

Assumptions ;

a) Investment cost : 11.1 million US$

b) OM cost 1.0 million US$ 9.0% of investment cost

d) Water supply volume : 1.042 cubic meter per second

total	100.0%	32.9	million cubic meter per year
domestic	87.6%	28.8	million cubic meter per year
industrial	12.4%	4.1	million cubic meter per year

e) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

f) Water loss domestic 25.0%

industrial 10.0%

EIRR = 62.16%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	2.8	0.0	2.8	0.0	0.0	0.0	-2.8
2	2.8	0.0	2.8	0.0	0.0	0.0	-2.8
3	2.8	0.0	2.8	0.0	0.0	0.0	-2.8
4	2.8	0.0	2.8	0.0	0.0	0.0	-2.8
5	0.0	1.0	1.0	13.4	4.0	17.4	16.4
6	0.0	1.0	1.0	13.4	4.0	17.4	16.4
7	0.0	1.0	1.0	13.4	4.0	17.4	16.4
8	0.0	1.0	1.0	13.4	4.0	17.4	16.4
9	0.0	1.0	1.0	13.4	4.0	17.4	16.4
10	0.0	1.0	1.0	13.4	4.0	17.4	16.4
11	0.0	1.0	1.0	13.4	4.0	17.4	16.4
12	0.0	1.0	1.0	13.4	4.0	17.4	16.4
13	0.0	1.0	1.0	13.4	4.0	17.4	16.4
14	0.0	1.0	1.0	13.4	4.0	17.4	16.4
15	0.0	1.0	1.0	13.4	4.0	17.4	16.4
16	0.0	1.0	1.0	13.4	4.0	17.4	16.4
17	0.0	1.0	1.0	13.4	4.0	17.4	16.4
18	0.0	1.0	1.0	13.4	4.0	17.4	16.4
19	0.0	1.0	1.0	13.4	4.0	17.4	16.4
20	0.0	1.0	1.0	13.4	4.0	17.4	16.4
21	0.0	1.0	1.0	13.4	4.0	17.4	16.4
22	0.0	1.0	1.0	13.4	4.0	17.4	16.4
23	0.0	1.0	1.0	13.4	4.0	17.4	16.4
24	0.0	1.0	1.0	13.4	4.0	17.4	16.4
25	0.0	1.0	1.0	13.4	4.0	17.4	16.4
26	0.0	1.0	1.0	13.4	4.0	17.4	16.4
27	0.0	1.0	1.0	13.4	4.0	17.4	16.4
28	0.0	1.0	1.0	13.4	4.0	17.4	16.4
29	0.0	1.0	1.0	13.4	4.0	17.4	16.4
30	0.0	1.0	1.0	13.4	4.0	17.4	16.4
31	0.0	1.0	1.0	13.4	4.0	17.4	16.4
32	0.0	1.0	1.0	13.4	4.0	17.4	16.4
33	0.0	1.0	1.0	13.4	4.0	17.4	16.4
34	0.0	1.0	1.0	13.4	4.0	17.4	16.4
Total	11.1	30.0	41.1	401.4	121.0	522.4	481.3

Financial Evaluation for Guarapuava Water Supply Project

Assumptions ;

a) Investment cost : 9.1 million US$

b) OM cost 0.8 million US$ 9.0% of investment cost

d) Water supply volume : 0.289 cubic meter per second

total	100.0%	9.1 million cubic meter per year
domestic	69.0%	6.3 million cubic meter per year
industrial	31.0%	2.8 million cubic meter per year

e) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

f) Water loss domestic 25.0%

industrial 10.0% FIRR = 33.30%

Cas Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
2	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
3	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
4	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
5	0.0	0.8	0.8	2.9	2.8	5.7	4.9
6	0.0	0.8	0.8	2.9	2.8	5.7	4.9
7	0.0	0.8	0.8	2.9	2.8	5.7	4.9
8	0.0	0.8	0.8	2.9	2.8	5.7	4.9
9	0.0	0.8	0.8	2.9	2.8	5.7	4.9
10	0.0	0.8	0.8	2.9	2.8	5.7	4.9
11	0.0	0.8	0.8	2.9	2.8	5.7	4.9
12	0.0	0.8	0.8	2.9	2.8	5.7	4.9
13	0.0	0.8	0.8	2.9	2.8	5.7	4.9
14	0.0	0.8	0.8	2.9	2.8	5.7	4.9
15	0.0	0.8	0.8	2.9	2.8	5.7	4.9
16	0.0	0.8	0.8	2.9	2.8	5.7	4.9
17	0.0	0.8	0.8	2.9	2.8	5.7	4.9
18	0.0	0.8	0.8	2.9	2.8	5.7	4.9
19	0.0	0.8	0.8	2.9	2.8	5.7	4.9
20	0.0	0.8	0.8	2.9	2.8	5.7	4.9
21	0.0	0.8	0.8	2.9	2.8	5.7	4.9
22	0.0	0.8	0.8	2.9	2.8	5.7	4.9
23	0.0	0.8	0.8	2.9	2.8	5.7	4.9
24	0.0	0.8	0.8	2.9	2.8	5.7	4.9
25	0.0	0.8	0.8	2.9	2.8	5.7	4.9
26	0.0	0.8	0.8	2.9	2.8	5.7	4.9
27	0.0	0.8	0.8	2.9	2.8	5.7	4.9
28	0.0	0.8	0.8	2.9	2.8	5.7	4.9
29	0.0	0.8	0.8	2.9	2.8	5.7	4.9
30	0.0	0.8	0.8	2.9	2.8	5.7	4.9
31	0.0	0.8	0.8	2.9	2.8	5.7	4.9
32	0.0	0.8	0.8	2.9	2.8	5.7	4.9
33	0.0	0.8	0.8	2.9	2.8	5.7	4.9
34	0.0	0.8	0.8	2.9	2.8	5.7	4.9
Total	9.1	24.6	33.7	87.8	84.0	171.8	138.2

Financial Evaluation for Mediancira Water Supply Project

Assumptions ;

a) Investment cost : 4.3 million US$

b) OM cost 0.4 million US$ 9.0% investment cost

d) Water supply volume : 0.127 cubic meter per second

total	100.0%	4.0	million cubic meter per year
domestic	86.1%	3.5	million cubic meter per year
industrial	13.9%	0.6	million cubic meter per year

e) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

f) Water loss domestic 25.0%

industrial 10.0% FIRR = 27.57%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.1	0.0	1.1	0.0	0.0	0.0	-1.1
2	1.1	0.0	1.1	0.0	0.0	0.0	-1.1
3	1.1	0.0	1.1	0.0	0.0	0.0	-1.1
4	1.1	0.0	1.1	0.0	0.0	0.0	-1.1
5	0.0	0.4	0.4	1.6	0.6	2.2	1.8
6	0.0	0.4	0.4	1.6	0.6	2.2	1.8
7	0.0	0.4	0.4	1.6	0.6	2.2	1.8
8	0.0	0.4	0.4	1.6	0.6	2.2	1.8
9	0.0	0.4	0.4	1.6	0.6	2.2	1.8
10	0.0	0.4	0.4	1.6	0.6	2.2	1.8
11	0.0	0.4	0.4	1.6	0.6	2.2	1.8
12	0.0	0.4	0.4	1.6	0.6	2.2	1.8
13	0.0	0.4	0.4	1.6	0.6	2.2	1.8
14	0.0	0.4	0.4	1.6	0.6	2.2	1.8
15	0.0	0.4	0.4	1.6	0.6	2.2	1.8
16	0.0	0.4	0.4	1.6	0.6	2.2	1.8
17	0.0	0.4	0.4	1.6	0.6	2.2	1.8
18	0.0	0.4	0.4	1.6	0.6	2.2	1.8
19	0.0	0.4	0.4	1.6	0.6	2.2	1.8
20	0.0	0.4	0.4	1.6	0.6	2.2	1.8
21	0.0	0.4	0.4	1.6	0.6	2.2	1.8
22	0.0	0.4	0.4	1.6	0.6	2.2	1.8
23	0.0	0.4	0.4	1.6	0.6	2.2	1.8
24	0.0	0.4	0.4	1.6	0.6	2.2	1.8
25	0.0	0.4	0.4	1.6	0.6	2.2	1.8
26	0.0	0.4	0.4	1.6	0.6	2.2	1.8
27	0.0	0.4	0.4	1.6	0.6	2.2	1.8
28	0.0	0.4	0.4	1.6	0.6	2.2	1.8
29	0.0	0.4	0.4	1.6	0.6	2.2	1.8
30	0.0	0.4	0.4	1.6	0.6	2.2	1.8
31	0.0	0.4	0.4	1.6	0.6	2.2	1.8
32	0.0	0.4	0.4	1.6	0.6	2.2	1.8
33	0.0	0.4	0.4	1.6	0.6	2.2	1.8
34	0.0	0.4	0.4	1.6	0.6	2.2	1.8
Total	4.3	11.6	15.9	48.2	16.6	64.8	48.9

Financial Evaluation for Dois Vizinhos Water Supply Project

Assumptions ;

a) Investment cost : 9.1 million US$

b) OM cost 0.8 million US$ 9.0% of investment cost

d) Water supply volume : 0.139 cubic meter per second

total	100.0%	4.4	million cubic meter per year
domestic	43.7%	1.9	million cubic meter per year
industrial	56.3%	2.5	million cubic meter per year

e) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

f) Water loss domestic 25.0%

industrial 10.0% FIRR = 20.38%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
2	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
3	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
4	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
5	0.0	0.8	0.8	0.9	2.4	3.3	2.5
6	0.0	0.8	0.8	0.9	2.4	3.3	2.5
7	0.0	0.8	0.8	0.9	2.4	3.3	2.5
8	0.0	0.8	0.8	0.9	2.4	3.3	2.5
9	0.0	0.8	0.8	0.9	2.4	3.3	2.5
10	0.0	0.8	0.8	0.9	2.4	3.3	2.5
11	0.0	0.8	0.8	0.9	2.4	3.3	2.5
12	0.0	0.8	0.8	0.9	2.4	3.3	2.5
13	0.0	0.8	0.8	0.9	2.4	3.3	2.5
14	0.0	0.8	0.8	0.9	2.4	3.3	2.5
15	0.0	0.8	0.8	0.9	2.4	3.3	2.5
16	0.0	0.8	0.8	0.9	2.4	3.3	2.5
17	0.0	0.8	0.8	0.9	2.4	3.3	2.5
18	0.0	0.8	0.8	0.9	2.4	3.3	2.5
19	0.0	0.8	0.8	0.9	2.4	3.3	2.5
20	0.0	0.8	0.8	0.9	2.4	3.3	2.5
21	0.0	0.8	0.8	0.9	2.4	3.3	2.5
22	0.0	0.8	0.8	0.9	2.4	3.3	2.5
23	0.0	0.8	0.8	0.9	2.4	3.3	2.5
24	0.0	0.8	0.8	0.9	2.4	3.3	2.5
25	0.0	0.8	0.8	0.9	2.4	3.3	2.5
26	0.0	0.8	0.8	0.9	2.4	3.3	2.5
27	0.0	0.8	0.8	0.9	2.4	3.3	2.5
28	0.0	0.8	0.8	0.9	2.4	3.3	2.5
29	0.0	0.8	0.8	0.9	2.4	3.3	2.5
30	0.0	0.8	0.8	0.9	2.4	3.3	2.5
31	0.0	0.8	0.8	0.9	2.4	3.3	2.5
32	0.0	0.8	0.8	0.9	2.4	3.3	2.5
33	0.0	0.8	0.8	0.9	2.4	3.3	2.5
34	0.0	0.8	0.8	0.9	2.4	3.3	2.5
Total	9.1	24.6	33.7	26.7	73.2	99.9	66.3

Financial Evaluation for the Francisco Beltrao Water Supply Project

Assumptions ;

a) Investment cost : 4.7 million US$

b) OM cost 0.4 million US$ 9.0% of investment cost

d) Water supply volume : 0.231 cubic meter per second

total	100.0%	7.3	million cubic meter per year
domestic	64.2%	4.7	million cubic meter per year
industrial	35.8%	2.6	million cubic meter per year

e) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

f) Water loss domestic 25.0%

industrial 10.0% FIRR = 47.21%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
2	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
3	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
4	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
5	0.0	0.4	0.4	2.2	2.6	4.8	4.3
6	0.0	0.4	0.4	2.2	2.6	4.8	4.3
7	0.0	0.4	0.4	2.2	2.6	4.8	4.3
8	0.0	0.4	0.4	2.2	2.6	4.8	4.3
9	0.0	0.4	0.4	2.2	2.6	4.8	4.3
10	0.0	0.4	0.4	2.2	2.6	4.8	4.3
11	0.0	0.4	0.4	2.2	2.6	4.8	4.3
12	0.0	0.4	0.4	2.2	2.6	4.8	4.3
13	0.0	0.4	0.4	2.2	2.6	4.8	4.3
14	0.0	0.4	0.4	2.2	2.6	4.8	4.3
15	0.0	0.4	0.4	2.2	2.6	4.8	4.3
16	0.0	0.4	0.4	2.2	2.6	4.8	4.3
17	0.0	0.4	0.4	2.2	2.6	4.8	4.3
18	0.0	0.4	0.4	2.2	2.6	4.8	4.3
19	0.0	0.4	0.4	2.2	2.6	4.8	4.3
20	0.0	0.4	0.4	2.2	2.6	4.8	4.3
21	0.0	0.4	0.4	2.2	2.6	4.8	4.3
22	0.0	0.4	0.4	2.2	2.6	4.8	4.3
23	0.0	0.4	0.4	2.2	2.6	4.8	4.3
24	0.0	0.4	0.4	2.2	2.6	4.8	4.3
25	0.0	0.4	0.4	2.2	2.6	4.8	4.3
26	0.0	0.4	0.4	2.2	2.6	4.8	4.3
27	0.0	0.4	0.4	2.2	2.6	4.8	4.3
28	0.0	0.4	0.4	2.2	2.6	4.8	4.3
29	0.0	0.4	0.4	2.2	2.6	4.8	4.3
30	0.0	0.4	0.4	2.2	2.6	4.8	4.3
31	0.0	0.4	0.4	2.2	2.6	4.8	4.3
32	0.0	0.4	0.4	2.2	2.6	4.8	4.3
33	0.0	0.4	0.4	2.2	2.6	4.8	4.3
34	0.0	0.4	0.4	2.2	2.6	4.8	4.3
Total	4.7	12.7	17.4	65.4	77.6	143.0	125.6

Financial Evaluation for Pato Branco Water Supply Project

Assumptions ;

a) Investment cost : 9.1 million US$

b) OM cost 0.8 million US$ 9.0% of investment cost

c) Water supply volume : 0.116 cubic meter per second

total	100.0%	3.7 million cubic meter per year
domestic	80.6%	2.9 million cubic meter per year
industrial	19.4%	0.7 million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 11.15%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
2	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
3	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
4	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
5	0.0	0.8	0.8	1.4	0.7	2.1	1.3
6	0.0	0.8	0.8	1.4	0.7	2.1	1.3
7	0.0	0.8	0.8	1.4	0.7	2.1	1.3
8	0.0	0.8	0.8	1.4	0.7	2.1	1.3
9	0.0	0.8	0.8	1.4	0.7	2.1	1.3
10	0.0	0.8	0.8	1.4	0.7	2.1	1.3
11	0.0	0.8	0.8	1.4	0.7	2.1	1.3
12	0.0	0.8	0.8	1.4	0.7	2.1	1.3
13	0.0	0.8	0.8	1.4	0.7	2.1	1.3
14	0.0	0.8	0.8	1.4	0.7	2.1	1.3
15	0.0	0.8	0.8	1.4	0.7	2.1	1.3
16	0.0	0.8	0.8	1.4	0.7	2.1	1.3
17	0.0	0.8	0.8	1.4	0.7	2.1	1.3
18	0.0	0.8	0.8	1.4	0.7	2.1	1.3
19	0.0	0.8	0.8	1.4	0.7	2.1	1.3
20	0.0	0.8	0.8	1.4	0.7	2.1	1.3
21	0.0	0.8	0.8	1.4	0.7	2.1	1.3
22	0.0	0.8	0.8	1.4	0.7	2.1	1.3
23	0.0	0.8	0.8	1.4	0.7	2.1	1.3
24	0.0	0.8	0.8	1.4	0.7	2.1	1.3
25	0.0	0.8	0.8	1.4	0.7	2.1	1.3
26	0.0	0.8	0.8	1.4	0.7	2.1	1.3
27	0.0	0.8	0.8	1.4	0.7	2.1	1.3
28	0.0	0.8	0.8	1.4	0.7	2.1	1.3
29	0.0	0.8	0.8	1.4	0.7	2.1	1.3
30	0.0	0.8	0.8	1.4	0.7	2.1	1.3
31	0.0	0.8	0.8	1.4	0.7	2.1	1.3
32	0.0	0.8	0.8	1.4	0.7	2.1	1.3
33	0.0	0.8	0.8	1.4	0.7	2.1	1.3
34	0.0	0.8	0.8	1.4	0.7	2.1	1.3
Total	9.1	24.6	33.7	41.0	21.0	62.1	28.4

Financial Evaluation for Palmas Water Supply Project

Assumptions ;

a) Investment cost : 4.9 million US$

b) OM cost 0.4 million US$ 9.0% of investment cost

c) Water supply volume : 0.069 cubic meter per second

total	100.0%	2.2 million cubic meter per year
domestic	73.1%	1.6 million cubic meter per year
industrial	26.9%	0.6 million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 14.37%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
2	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
3	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
4	1.2	0.0	1.2	0.0	0.0	0.0	-1.2
5	0.0	0.4	0.4	0.7	0.6	1.3	0.9
6	0.0	0.4	0.4	0.7	0.6	1.3	0.9
7	0.0	0.4	0.4	0.7	0.6	1.3	0.9
8	0.0	0.4	0.4	0.7	0.6	1.3	0.9
9	0.0	0.4	0.4	0.7	0.6	1.3	0.9
10	0.0	0.4	0.4	0.7	0.6	1.3	0.9
11	0.0	0.4	0.4	0.7	0.6	1.3	0.9
12	0.0	0.4	0.4	0.7	0.6	1.3	0.9
13	0.0	0.4	0.4	0.7	0.6	1.3	0.9
14	0.0	0.4	0.4	0.7	0.6	1.3	0.9
15	0.0	0.4	0.4	0.7	0.6	1.3	0.9
16	0.0	0.4	0.4	0.7	0.6	1.3	0.9
17	0.0	0.4	0.4	0.7	0.6	1.3	0.9
18	0.0	0.4	0.4	0.7	0.6	1.3	0.9
19	0.0	0.4	0.4	0.7	0.6	1.3	0.9
20	0.0	0.4	0.4	0.7	0.6	1.3	0.9
21	0.0	0.4	0.4	0.7	0.6	1.3	0.9
22	0.0	0.4	0.4	0.7	0.6	1.3	0.9
23	0.0	0.4	0.4	0.7	0.6	1.3	0.9
24	0.0	0.4	0.4	0.7	0.6	1.3	0.9
25	0.0	0.4	0.4	0.7	0.6	1.3	0.9
26	0.0	0.4	0.4	0.7	0.6	1.3	0.9
27	0.0	0.4	0.4	0.7	0.6	1.3	0.9
28	0.0	0.4	0.4	0.7	0.6	1.3	0.9
29	0.0	0.4	0.4	0.7	0.6	1.3	0.9
30	0.0	0.4	0.4	0.7	0.6	1.3	0.9
31	0.0	0.4	0.4	0.7	0.6	1.3	0.9
32	0.0	0.4	0.4	0.7	0.6	1.3	0.9
33	0.0	0.4	0.4	0.7	0.6	1.3	0.9
34	0.0	0.4	0.4	0.7	0.6	1.3	0.9
Total	4.9	13.2	18.1	22.3	17.5	39.8	21.7

Financial Evaluation for Union da Vitoria Water Supply Project

Assumptions ;

a) Investment cost : 3.7 million US$

b) OM cost 0.3 million US$ 9.0% of investment cost

c) Water supply volume : 0.035 cubic meter per second

total	100.0%	1.1 million cubic meter per year
domestic	61.0%	0.7 million cubic meter per year
industrial	39.0%	0.4 million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

f) Water loss domestic 25.0%

industrial 10.0% FIRR = 8.73%

Cash Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	0.93	0.00	0.93	0.00	0.00	0.00	-0.93
2	0.93	0.00	0.93	0.00	0.00	0.00	-0.93
3	0.93	0.00	0.93	0.00	0.00	0.00	-0.93
4	0.93	0.00	0.93	0.00	0.00	0.00	-0.93
5	0.00	0.33	0.33	0.31	0.42	0.73	0.40
6	0.00	0.33	0.33	0.31	0.42	0.73	0.40
7	0.00	0.33	0.33	0.31	0.42	0.73	0.40
8	0.00	0.33	0.33	0.31	0.42	0.73	0.40
9	0.00	0.33	0.33	0.31	0.42	0.73	0.40
10	0.00	0.33	0.33	0.31	0.42	0.73	0.40
11	0.00	0.33	0.33	0.31	0.42	0.73	0.40
12	0.00	0.33	0.33	0.31	0.42	0.73	0.40
13	0.00	0.33	0.33	0.31	0.42	0.73	0.40
14	0.00	0.33	0.33	0.31	0.42	0.73	0.40
15	0.00	0.33	0.33	0.31	0.42	0.73	0.40
16	0.00	0.33	0.33	0.31	0.42	0.73	0.40
17	0.00	0.33	0.33	0.31	0.42	0.73	0.40
18	0.00	0.33	0.33	0.31	0.42	0.73	0.40
19	0.00	0.33	0.33	0.31	0.42	0.73	0.40
20	0.00	0.33	0.33	0.31	0.42	0.73	0.40
21	0.00	0.33	0.33	0.31	0.42	0.73	0.40
22	0.00	0.33	0.33	0.31	0.42	0.73	0.40
23	0.00	0.33	0.33	0.31	0.42	0.73	0.40
24	0.00	0.33	0.33	0.31	0.42	0.73	0.40
25	0.00	0.33	0.33	0.31	0.42	0.73	0.40
26	0.00	0.33	0.33	0.31	0.42	0.73	0.40
27	0.00	0.33	0.33	0.31	0.42	0.73	0.40
28	0.00	0.33	0.33	0.31	0.42	0.73	0.40
29	0.00	0.33	0.33	0.31	0.42	0.73	0.40
30	0.00	0.33	0.33	0.31	0.42	0.73	0.40
31	0.00	0.33	0.33	0.31	0.42	0.73	0.40
32	0.00	0.33	0.33	0.31	0.42	0.73	0.40
33	0.00	0.33	0.33	0.31	0.42	0.73	0.40
34	0.00	0.33	0.33	0.31	0.42	0.73	0.40
Total	3.70	9.99	13.69	9.32	12.68	22.00	8.31

Appendix - 13 (11/25)
Financial Evaluation for All the Water Supply Projects for Type A Cities in the Iguacu River Basin (excluding Curitiba MA)

Assumptions ;

a) Investment cost : 59.1 million US$

b) OM cost 5.3 million US$ 9.0% of investment cost

c) Water supply volume : 1.933 cubic meter per second

total	100.0%	61.0 million cubic meter per year
domestic	90.8%	55.3 million cubic meter per year
industrial	9.2%	5.6 million cubic meter per year

d) Unit revenue : domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0%

EIRR = 28.85%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment	OM Cost	Total	Domestric	Industrial	Total	
1	14.8	0.0	14.8	0.0	0.0	0.0	-14.8
2	14.8	0.0	14.8	0.0	0.0	0.0	-14.8
3	14.8	0.0	14.8	0.0	0.0	0.0	-14.8
4	14.8	0.0	14.8	0.0	0.0	0.0	-14.8
5	0.0	5.3	5.3	25.7	5.6	31.3	26.0
6	0.0	5.3	5.3	25.7	5.6	31.3	26.0
7	0.0	5.3	5.3	25.7	5.6	31.3	26.0
8	0.0	5.3	5.3	25.7	5.6	31.3	26.0
9	0.0	5.3	5.3	25.7	5.6	31.3	26.0
10	0.0	5.3	5.3	25.7	5.6	31.3	26.0
11	0.0	5.3	5.3	25.7	5.6	31.3	26.0
12	0.0	5.3	5.3	25.7	5.6	31.3	26.0
13	0.0	5.3	5.3	25.7	5.6	31.3	26.0
14	0.0	5.3	5.3	25.7	5.6	31.3	26.0
15	0.0	5.3	5.3	25.7	5.6	31.3	26.0
16	0.0	5.3	5.3	25.7	5.6	31.3	26.0
17	0.0	5.3	5.3	25.7	5.6	31.3	26.0
18	0.0	5.3	5.3	25.7	5.6	31.3	26.0
19	0.0	5.3	5.3	25.7	5.6	31.3	26.0
20	0.0	5.3	5.3	25.7	5.6	31.3	26.0
21	0.0	5.3	5.3	25.7	5.6	31.3	26.0
22	0.0	5.3	5.3	25.7	5.6	31.3	26.0
23	0.0	5.3	5.3	25.7	5.6	31.3	26.0
24	0.0	5.3	5.3	25.7	5.6	31.3	26.0
25	0.0	5.3	5.3	25.7	5.6	31.3	26.0
26	0.0	5.3	5.3	25.7	5.6	31.3	26.0
27	0.0	5.3	5.3	25.7	5.6	31.3	26.0
28	0.0	5.3	5.3	25.7	5.6	31.3	26.0
29	0.0	5.3	5.3	25.7	5.6	31.3	26.0
30	0.0	5.3	5.3	25.7	5.6	31.3	26.0
31	0.0	5.3	5.3	25.7	5.6	31.3	26.0
32	0.0	5.3	5.3	25.7	5.6	31.3	26.0
33	0.0	5.3	5.3	25.7	5.6	31.3	26.0
34	0.0	5.3	5.3	25.7	5.6	31.3	26.0
Total	59.1	159.6	218.7	772.1	166.6	938.6	720.0

Appendix - 13 (12/25)

Financial Evaluation for All the Water Supply Projects for Type B Cities in the Iguacu River Basin

Assumptions ;

a) Investment cost : 35.8 million US$

b) OM cost 3.2 million US$ 9.0% of investment cost

c) Water supply volume : 0.718 cubic meter per second

total	100.0%	22.6 million cubic meter per year
domestic	65.8%	14.9 million cubic meter per year
industrial	34.2%	7.7 million cubic meter per year

d) Unit revenue : domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0%

FIRR = 22.71%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment	OM Cost	Total	Domestric	Industrial	Total	
1	9.0	0.0	9.0	0.0	0.0	0.0	-9.0
2	9.0	0.0	9.0	0.0	0.0	0.0	-9.0
3	9.0	0.0	9.0	0.0	0.0	0.0	-9.0
4	9.0	0.0	9.0	0.0	0.0	0.0	-9.0
5	0.0	3.2	3.2	6.9	7.7	14.6	11.4
6	0.0	3.2	3.2	6.9	7.7	14.6	11.4
7	0.0	3.2	3.2	6.9	7.7	14.6	11.4
8	0.0	3.2	3.2	6.9	7.7	14.6	11.4
9	0.0	3.2	3.2	6.9	7.7	14.6	11.4
10	0.0	3.2	3.2	6.9	7.7	14.6	11.4
11	0.0	3.2	3.2	6.9	7.7	14.6	11.4
12	0.0	3.2	3.2	6.9	7.7	14.6	11.4
13	0.0	3.2	3.2	6.9	7.7	14.6	11.4
14	0.0	3.2	3.2	6.9	7.7	14.6	11.4
15	0.0	3.2	3.2	6.9	7.7	14.6	11.4
16	0.0	3.2	3.2	6.9	7.7	14.6	11.4
17	0.0	3.2	3.2	6.9	7.7	14.6	11.4
18	0.0	3.2	3.2	6.9	7.7	14.6	11.4
19	0.0	3.2	3.2	6.9	7.7	14.6	11.4
20	0.0	3.2	3.2	6.9	7.7	14.6	11.4
21	0.0	3.2	3.2	6.9	7.7	14.6	11.4
22	0.0	3.2	3.2	6.9	7.7	14.6	11.4
23	0.0	3.2	3.2	6.9	7.7	14.6	11.4
24	0.0	3.2	3.2	6.9	7.7	14.6	11.4
25	0.0	3.2	3.2	6.9	7.7	14.6	11.4
26	0.0	3.2	3.2	6.9	7.7	14.6	11.4
27	0.0	3.2	3.2	6.9	7.7	14.6	11.4
28	0.0	3.2	3.2	6.9	7.7	14.6	11.4
29	0.0	3.2	3.2	6.9	7.7	14.6	11.4
30	0.0	3.2	3.2	6.9	7.7	14.6	11.4
31	0.0	3.2	3.2	6.9	7.7	14.6	11.4
32	0.0	3.2	3.2	6.9	7.7	14.6	11.4
33	0.0	3.2	3.2	6.9	7.7	14.6	11.4
34	0.0	3.2	3.2	6.9	7.7	14.6	11.4
Total	35.8	96.7	132.5	207.7	229.9	437.6	305.1

Appendix - 13 (13/25)

Financial Evaluation for Water Supply Projects for Type C Cities in the Iguacu River basin

Assumptions ;

a) Investment cost : 102.9 million US$

b) OM cost 9.3 million US$ 9.0% of investment cost

c) Water supply volume : 0.833 cubic meter per second

total	100.0%	26.3 million cubic meter per year
domestic	70.8%	18.6 million cubic meter per year
industrial	29.2%	7.7 million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

f) Water loss domestic 25.0%

industrial 10.0% FIRR = 4.75%

Cash Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	25.7	0.0	25.7	0.0	0.0	0.0	-25.7
2	25.7	0.0	25.7	0.0	0.0	0.0	-25.7
3	25.7	0.0	25.7	0.0	0.0	0.0	-25.7
4	25.7	0.0	25.7	0.0	0.0	0.0	-25.7
5	0.0	9.3	9.3	8.7	7.6	16.2	7.0
6	0.0	9.3	9.3	8.7	7.6	16.2	7.0
7	0.0	9.3	9.3	8.7	7.6	16.2	7.0
8	0.0	9.3	9.3	8.7	7.6	16.2	7.0
9	0.0	9.3	9.3	8.7	7.6	16.2	7.0
10	0.0	9.3	9.3	8.7	7.6	16.2	7.0
11	0.0	9.3	9.3	8.7	7.6	16.2	7.0
12	0.0	9.3	9.3	8.7	7.6	16.2	7.0
13	0.0	9.3	9.3	8.7	7.6	16.2	7.0
14	0.0	9.3	9.3	8.7	7.6	16.2	7.0
15	0.0	9.3	9.3	8.7	7.6	16.2	7.0
16	0.0	9.3	9.3	8.7	7.6	16.2	7.0
17	0.0	9.3	9.3	8.7	7.6	16.2	7.0
18	0.0	9.3	9.3	8.7	7.6	16.2	7.0
19	0.0	9.3	9.3	8.7	7.6	16.2	7.0
20	0.0	9.3	9.3	8.7	7.6	16.2	7.0
21	0.0	9.3	9.3	8.7	7.6	16.2	7.0
22	0.0	9.3	9.3	8.7	7.6	16.2	7.0
23	0.0	9.3	9.3	8.7	7.6	16.2	7.0
24	0.0	9.3	9.3	8.7	7.6	16.2	7.0
25	0.0	9.3	9.3	8.7	7.6	16.2	7.0
26	0.0	9.3	9.3	8.7	7.6	16.2	7.0
27	0.0	9.3	9.3	8.7	7.6	16.2	7.0
28	0.0	9.3	9.3	8.7	7.6	16.2	7.0
29	0.0	9.3	9.3	8.7	7.6	16.2	7.0
30	0.0	9.3	9.3	8.7	7.6	16.2	7.0
31	0.0	9.3	9.3	8.7	7.6	16.2	7.0
32	0.0	9.3	9.3	8.7	7.6	16.2	7.0
33	0.0	9.3	9.3	8.7	7.6	16.2	7.0
34	0.0	9.3	9.3	8.7	7.6	16.2	7.0
Total	102.9	277.8	380.7	259.7	227.6	487.3	106.6

Financial Evaluation for Ponta Grossa Water Supply Project

Assumptions ;

a) Investment cost : 13.5 million US$

b) OM cost 1.2 million US$ 9.0% of investment cost

c) Water supply volume : 0.428 cubic meter per second

total	100.0%	13.5	million cubic meter per year
domestic	63.0%	8.5	million cubic meter per year
industrial	37.0%	5.0	million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 34.55%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	3.4	0.0	3.4	0.0	0.0	0.0	-3.4
2	3.4	0.0	3.4	0.0	0.0	0.0	-3.4
3	3.4	0.0	3.4	0.0	0.0	0.0	-3.4
4	3.4	0.0	3.4	0.0	0.0	0.0	-3.4
5	0.0	1.2	1.2	4.0	4.9	8.9	7.7
6	0.0	1.2	1.2	4.0	4.9	8.9	7.7
7	0.0	1.2	1.2	4.0	4.9	8.9	7.7
8	0.0	1.2	1.2	4.0	4.9	8.9	7.7
9	0.0	1.2	1.2	4.0	4.9	8.9	7.7
10	0.0	1.2	1.2	4.0	4.9	8.9	7.7
11	0.0	1.2	1.2	4.0	4.9	8.9	7.7
12	0.0	1.2	1.2	4.0	4.9	8.9	7.7
13	0.0	1.2	1.2	4.0	4.9	8.9	7.7
14	0.0	1.2	1.2	4.0	4.9	8.9	7.7
15	0.0	1.2	1.2	4.0	4.9	8.9	7.7
16	0.0	1.2	1.2	4.0	4.9	8.9	7.7
17	0.0	1.2	1.2	4.0	4.9	8.9	7.7
18	0.0	1.2	1.2	4.0	4.9	8.9	7.7
19	0.0	1.2	1.2	4.0	4.9	8.9	7.7
20	0.0	1.2	1.2	4.0	4.9	8.9	7.7
21	0.0	1.2	1.2	4.0	4.9	8.9	7.7
22	0.0	1.2	1.2	4.0	4.9	8.9	7.7
23	0.0	1.2	1.2	4.0	4.9	8.9	7.7
24	0.0	1.2	1.2	4.0	4.9	8.9	7.7
25	0.0	1.2	1.2	4.0	4.9	8.9	7.7
26	0.0	1.2	1.2	4.0	4.9	8.9	7.7
27	0.0	1.2	1.2	4.0	4.9	8.9	7.7
28	0.0	1.2	1.2	4.0	4.9	8.9	7.7
29	0.0	1.2	1.2	4.0	4.9	8.9	7.7
30	0.0	1.2	1.2	4.0	4.9	8.9	7.7
31	0.0	1.2	1.2	4.0	4.9	8.9	7.7
32	0.0	1.2	1.2	4.0	4.9	8.9	7.7
33	0.0	1.2	1.2	4.0	4.9	8.9	7.7
34	0.0	1.2	1.2	4.0	4.9	8.9	7.7
Total	13.5	36.5	50.0	118.7	148.4	267.1	217.1

Financial Evaluation for Londrina Water Supply Project

Assumptions ;

a) Investment cost : 46.5 million US$

b) OM cost 4.2 million US$ 9.0% of onvestment cost

c) Water supply bolume : 1.227 cubic meter per second

total	100.0%	38.7	million cubic meter per year
domestic	83.0%	32.1	million cubic meter per year
industrial	17.0%	6.6	million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 25.53%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	11.6	0.0	11.6	0.0	0.0	0.0	-11.6
2	11.6	0.0	11.6	0.0	0.0	0.0	-11.6
3	11.6	0.0	11.6	0.0	0.0	0.0	-11.6
4	11.6	0.0	11.6	0.0	0.0	0.0	-11.6
5	0.0	4.2	4.2	14.9	6.5	21.4	17.3
6	0.0	4.2	4.2	14.9	6.5	21.4	17.3
7	0.0	4.2	4.2	14.9	6.5	21.4	17.3
8	0.0	4.2	4.2	14.9	6.5	21.4	17.3
9	0.0	4.2	4.2	14.9	6.5	21.4	17.3
10	0.0	4.2	4.2	14.9	6.5	21.4	17.3
11	0.0	4.2	4.2	14.9	6.5	21.4	17.3
12	0.0	4.2	4.2	14.9	6.5	21.4	17.3
13	0.0	4.2	4.2	14.9	6.5	21.4	17.3
14	0.0	4.2	4.2	14.9	6.5	21.4	17.3
15	0.0	4.2	4.2	14.9	6.5	21.4	17.3
16	0.0	4.2	4.2	14.9	6.5	21.4	17.3
17	0.0	4.2	4.2	14.9	6.5	21.4	17.3
18	0.0	4.2	4.2	14.9	6.5	21.4	17.3
19	0.0	4.2	4.2	14.9	6.5	21.4	17.3
20	0.0	4.2	4.2	14.9	6.5	21.4	17.3
21	0.0	4.2	4.2	14.9	6.5	21.4	17.3
22	0.0	4.2	4.2	14.9	6.5	21.4	17.3
23	0.0	4.2	4.2	14.9	6.5	21.4	17.3
24	0.0	4.2	4.2	14.9	6.5	21.4	17.3
25	0.0	4.2	4.2	14.9	6.5	21.4	17.3
26	0.0	4.2	4.2	14.9	6.5	21.4	17.3
27	0.0	4.2	4.2	14.9	6.5	21.4	17.3
28	0.0	4.2	4.2	14.9	6.5	21.4	17.3
29	0.0	4.2	4.2	14.9	6.5	21.4	17.3
30	0.0	4.2	4.2	14.9	6.5	21.4	17.3
31	0.0	4.2	4.2	14.9	6.5	21.4	17.3
32	0.0	4.2	4.2	14.9	6.5	21.4	17.3
33	0.0	4.2	4.2	14.9	6.5	21.4	17.3
34	0.0	4.2	4.2	14.9	6.5	21.4	17.3
Total	46.5	125.6	172.1	448.0	195.3	643.3	471.3

Financial Evaluation for Apucarana Water Supply Project

Assumptions ;

a) Investment cost : 14.9 million US$

b) OM cost 1.3 million US$ 9.0% of investment cost

c) Water supply bolume : 0.521 cubic meter per second

total	100.0%	16.4 million cubic meter per year
domestic	68.8%	11.3 million cubic meter per year
industrial	31.2%	5.1 million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 35.91%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	3.7	0.0	3.7	0.0	0.0	0.0	-3.7
2	3.7	0.0	3.7	0.0	0.0	0.0	-3.7
3	3.7	0.0	3.7	0.0	0.0	0.0	-3.7
4	3.7	0.0	3.7	0.0	0.0	0.0	-3.7
5	0.0	1.3	1.3	5.3	5.1	10.3	9.0
6	0.0	1.3	1.3	5.3	5.1	10.3	9.0
7	0.0	1.3	1.3	5.3	5.1	10.3	9.0
8	0.0	1.3	1.3	5.3	5.1	10.3	9.0
9	0.0	1.3	1.3	5.3	5.1	10.3	9.0
10	0.0	1.3	1.3	5.3	5.1	10.3	9.0
11	0.0	1.3	1.3	5.3	5.1	10.3	9.0
12	0.0	1.3	1.3	5.3	5.1	10.3	9.0
13	0.0	1.3	1.3	5.3	5.1	10.3	9.0
14	0.0	1.3	1.3	5.3	5.1	10.3	9.0
15	0.0	1.3	1.3	5.3	5.1	10.3	9.0
16	0.0	1.3	1.3	5.3	5.1	10.3	9.0
17	0.0	1.3	1.3	5.3	5.1	10.3	9.0
18	0.0	1.3	1.3	5.3	5.1	10.3	9.0
19	0.0	1.3	1.3	5.3	5.1	10.3	9.0
20	0.0	1.3	1.3	5.3	5.1	10.3	9.0
21	0.0	1.3	1.3	5.3	5.1	10.3	9.0
22	0.0	1.3	1.3	5.3	5.1	10.3	9.0
23	0.0	1.3	1.3	5.3	5.1	10.3	9.0
24	0.0	1.3	1.3	5.3	5.1	10.3	9.0
25	0.0	1.3	1.3	5.3	5.1	10.3	9.0
26	0.0	1.3	1.3	5.3	5.1	10.3	9.0
27	0.0	1.3	1.3	5.3	5.1	10.3	9.0
28	0.0	1.3	1.3	5.3	5.1	10.3	9.0
29	0.0	1.3	1.3	5.3	5.1	10.3	9.0
30	0.0	1.3	1.3	5.3	5.1	10.3	9.0
31	0.0	1.3	1.3	5.3	5.1	10.3	9.0
32	0.0	1.3	1.3	5.3	5.1	10.3	9.0
33	0.0	1.3	1.3	5.3	5.1	10.3	9.0
34	0.0	1.3	1.3	5.3	5.1	10.3	9.0
Total	14.9	40.2	55.1	157.6	152.2	309.8	254.7

Financial Evaluation for Castro Water Supply Project

Assumptions ;

a) Investment cost : 5.5 million US$

b) OM cost 0.5 million US$ 9.0% of investment cost

c) Water supply volume : 0.255 cubic meter per second

total	100.0%	8.0	million cubic meter per year
domestic	39.6%	3.2	million cubic meter per year
industrial	60.4%	4.9	million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 51.06%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.4	0.0	1.4	0.0	0.0	0.0	-1.4
2	1.4	0.0	1.4	0.0	0.0	0.0	-1.4
3	1.4	0.0	1.4	0.0	0.0	0.0	-1.4
4	1.4	0.0	1.4	0.0	0.0	0.0	-1.4
5	0.0	0.5	0.5	1.5	4.8	6.3	5.8
6	0.0	0.5	0.5	1.5	4.8	6.3	5.8
7	0.0	0.5	0.5	1.5	4.8	6.3	5.8
8	0.0	0.5	0.5	1.5	4.8	6.3	5.8
9	0.0	0.5	0.5	1.5	4.8	6.3	5.8
10	0.0	0.5	0.5	1.5	4.8	6.3	5.8
11	0.0	0.5	0.5	1.5	4.8	6.3	5.8
12	0.0	0.5	0.5	1.5	4.8	6.3	5.8
13	0.0	0.5	0.5	1.5	4.8	6.3	5.8
14	0.0	0.5	0.5	1.5	4.8	6.3	5.8
15	0.0	0.5	0.5	1.5	4.8	6.3	5.8
16	0.0	0.5	0.5	1.5	4.8	6.3	5.8
17	0.0	0.5	0.5	1.5	4.8	6.3	5.8
18	0.0	0.5	0.5	1.5	4.8	6.3	5.8
19	0.0	0.5	0.5	1.5	4.8	6.3	5.8
20	0.0	0.5	0.5	1.5	4.8	6.3	5.8
21	0.0	0.5	0.5	1.5	4.8	6.3	5.8
22	0.0	0.5	0.5	1.5	4.8	6.3	5.8
23	0.0	0.5	0.5	1.5	4.8	6.3	5.8
24	0.0	0.5	0.5	1.5	4.8	6.3	5.8
25	0.0	0.5	0.5	1.5	4.8	6.3	5.8
26	0.0	0.5	0.5	1.5	4.8	6.3	5.8
27	0.0	0.5	0.5	1.5	4.8	6.3	5.8
28	0.0	0.5	0.5	1.5	4.8	6.3	5.8
29	0.0	0.5	0.5	1.5	4.8	6.3	5.8
30	0.0	0.5	0.5	1.5	4.8	6.3	5.8
31	0.0	0.5	0.5	1.5	4.8	6.3	5.8
32	0.0	0.5	0.5	1.5	4.8	6.3	5.8
33	0.0	0.5	0.5	1.5	4.8	6.3	5.8
34	0.0	0.5	0.5	1.5	4.8	6.3	5.8
Total	5.5	14.8	20.4	44.4	144.0	188.4	168.1

Financial Evaluation for Telemaco Borba Water Supply Project

Assumptions ;

a) Investment cost : 6.8 million US$

b) OM cost 0.6 million US$ 9.0% of investment cost

c) Water supply bolume : 0.208 cubic meter per second

total	100.0%	6.6	million cubic meter per year
domestic	51.0%	3.4	million cubic meter per year
industrial	49.0%	3.2	million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 36.10%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.7	0.0	1.7	0.0	0.0	0.0	-1.7
2	1.7	0.0	1.7	0.0	0.0	0.0	-1.7
3	1.7	0.0	1.7	0.0	0.0	0.0	-1.7
4	1.7	0.0	1.7	0.0	0.0	0.0	-1.7
5	0.0	0.6	0.6	1.6	3.2	4.7	4.1
6	0.0	0.6	0.6	1.6	3.2	4.7	4.1
7	0.0	0.6	0.6	1.6	3.2	4.7	4.1
8	0.0	0.6	0.6	1.6	3.2	4.7	4.1
9	0.0	0.6	0.6	1.6	3.2	4.7	4.1
10	0.0	0.6	0.6	1.6	3.2	4.7	4.1
11	0.0	0.6	0.6	1.6	3.2	4.7	4.1
12	0.0	0.6	0.6	1.6	3.2	4.7	4.1
13	0.0	0.6	0.6	1.6	3.2	4.7	4.1
14	0.0	0.6	0.6	1.6	3.2	4.7	4.1
15	0.0	0.6	0.6	1.6	3.2	4.7	4.1
16	0.0	0.6	0.6	1.6	3.2	4.7	4.1
17	0.0	0.6	0.6	1.6	3.2	4.7	4.1
18	0.0	0.6	0.6	1.6	3.2	4.7	4.1
19	0.0	0.6	0.6	1.6	3.2	4.7	4.1
20	0.0	0.6	0.6	1.6	3.2	4.7	4.1
21	0.0	0.6	0.6	1.6	3.2	4.7	4.1
22	0.0	0.6	0.6	1.6	3.2	4.7	4.1
23	0.0	0.6	0.6	1.6	3.2	4.7	4.1
24	0.0	0.6	0.6	1.6	3.2	4.7	4.1
25	0.0	0.6	0.6	1.6	3.2	4.7	4.1
26	0.0	0.6	0.6	1.6	3.2	4.7	4.1
27	0.0	0.6	0.6	1.6	3.2	4.7	4.1
28	0.0	0.6	0.6	1.6	3.2	4.7	4.1
29	0.0	0.6	0.6	1.6	3.2	4.7	4.1
30	0.0	0.6	0.6	1.6	3.2	4.7	4.1
31	0.0	0.6	0.6	1.6	3.2	4.7	4.1
32	0.0	0.6	0.6	1.6	3.2	4.7	4.1
33	0.0	0.6	0.6	1.6	3.2	4.7	4.1
34	0.0	0.6	0.6	1.6	3.2	4.7	4.1
Total	6.8	18.4	25.2	46.7	95.6	142.4	117.2

Financial Evaluation for Irati Water Supply Project

Assumptions ;

a) Investment cost : 9 million US$

b) OM cost 0.8 million US$ 9.0% of investment cost

c) Water supply bolume : 0.069 cubic meter per second

total	100.0%	2.2 million cubic meter per year
domestic	65.6%	1.4 million cubic meter per year
industrial	34.4%	0.8 million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0%

FIRR = 4.66%

Cash Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
2	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
3	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
4	2.3	0.0	2.3	0.0	0.0	0.0	-2.3
5	0.0	0.8	0.8	0.7	0.7	1.4	0.6
6	0.0	0.8	0.8	0.7	0.7	1.4	0.6
7	0.0	0.8	0.8	0.7	0.7	1.4	0.6
8	0.0	0.8	0.8	0.7	0.7	1.4	0.6
9	0.0	0.8	0.8	0.7	0.7	1.4	0.6
10	0.0	0.8	0.8	0.7	0.7	1.4	0.6
11	0.0	0.8	0.8	0.7	0.7	1.4	0.6
12	0.0	0.8	0.8	0.7	0.7	1.4	0.6
13	0.0	0.8	0.8	0.7	0.7	1.4	0.6
14	0.0	0.8	0.8	0.7	0.7	1.4	0.6
15	0.0	0.8	0.8	0.7	0.7	1.4	0.6
16	0.0	0.8	0.8	0.7	0.7	1.4	0.6
17	0.0	0.8	0.8	0.7	0.7	1.4	0.6
18	0.0	0.8	0.8	0.7	0.7	1.4	0.6
19	0.0	0.8	0.8	0.7	0.7	1.4	0.6
20	0.0	0.8	0.8	0.7	0.7	1.4	0.6
21	0.0	0.8	0.8	0.7	0.7	1.4	0.6
22	0.0	0.8	0.8	0.7	0.7	1.4	0.6
23	0.0	0.8	0.8	0.7	0.7	1.4	0.6
24	0.0	0.8	0.8	0.7	0.7	1.4	0.6
25	0.0	0.8	0.8	0.7	0.7	1.4	0.6
26	0.0	0.8	0.8	0.7	0.7	1.4	0.6
27	0.0	0.8	0.8	0.7	0.7	1.4	0.6
28	0.0	0.8	0.8	0.7	0.7	1.4	0.6
29	0.0	0.8	0.8	0.7	0.7	1.4	0.6
30	0.0	0.8	0.8	0.7	0.7	1.4	0.6
31	0.0	0.8	0.8	0.7	0.7	1.4	0.6
32	0.0	0.8	0.8	0.7	0.7	1.4	0.6
33	0.0	0.8	0.8	0.7	0.7	1.4	0.6
34	0.0	0.8	0.8	0.7	0.7	1.4	0.6
Total	9.0	24.3	33.3	20.0	22.4	42.4	9.1

Financial Evaluation for Corneiro Procopio Water Supply Project

Assumptions ;

a) Investment cost : 7.4 million US$

b) OM cost 0.7 million US$ 0.09 of investment cost

c) Water supply bolume : 0.069 cubic meter per second

total	100.0%	2.2 million cubic meter per year
domestic	70.8%	1.6 million cubic meter per year
industrial	29.2%	0.6 million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 7.34%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
2	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
3	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
4	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
5	0.0	0.7	0.7	0.7	0.6	1.4	0.7
6	0.0	0.7	0.7	0.7	0.6	1.4	0.7
7	0.0	0.7	0.7	0.7	0.6	1.4	0.7
8	0.0	0.7	0.7	0.7	0.6	1.4	0.7
9	0.0	0.7	0.7	0.7	0.6	1.4	0.7
10	0.0	0.7	0.7	0.7	0.6	1.4	0.7
11	0.0	0.7	0.7	0.7	0.6	1.4	0.7
12	0.0	0.7	0.7	0.7	0.6	1.4	0.7
13	0.0	0.7	0.7	0.7	0.6	1.4	0.7
14	0.0	0.7	0.7	0.7	0.6	1.4	0.7
15	0.0	0.7	0.7	0.7	0.6	1.4	0.7
16	0.0	0.7	0.7	0.7	0.6	1.4	0.7
17	0.0	0.7	0.7	0.7	0.6	1.4	0.7
18	0.0	0.7	0.7	0.7	0.6	1.4	0.7
19	0.0	0.7	0.7	0.7	0.6	1.4	0.7
20	0.0	0.7	0.7	0.7	0.6	1.4	0.7
21	0.0	0.7	0.7	0.7	0.6	1.4	0.7
22	0.0	0.7	0.7	0.7	0.6	1.4	0.7
23	0.0	0.7	0.7	0.7	0.6	1.4	0.7
24	0.0	0.7	0.7	0.7	0.6	1.4	0.7
25	0.0	0.7	0.7	0.7	0.6	1.4	0.7
26	0.0	0.7	0.7	0.7	0.6	1.4	0.7
27	0.0	0.7	0.7	0.7	0.6	1.4	0.7
28	0.0	0.7	0.7	0.7	0.6	1.4	0.7
29	0.0	0.7	0.7	0.7	0.6	1.4	0.7
30	0.0	0.7	0.7	0.7	0.6	1.4	0.7
31	0.0	0.7	0.7	0.7	0.6	1.4	0.7
32	0.0	0.7	0.7	0.7	0.6	1.4	0.7
33	0.0	0.7	0.7	0.7	0.6	1.4	0.7
34	0.0	0.7	0.7	0.7	0.6	1.4	0.7
Total	7.4	20.0	27.4	21.6	19.0	40.6	13.2

Financial Evaluation for Arapongas Water Supply Project

Assumptions ;

a) Investment cost : 15.9 million US$

b) OM cost 1.4 million US$ 9.0% of investment cost

c) Water supply bolume : 0.231 cubic meter per second

total	100.0%	7.3 million cubic meter per year
domestic	63.3%	4.6 million cubic meter per year
industrial	36.7%	2.7 million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 16.45%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	4.0	0.0	4.0	0.0	0.0	0.0	-4.0
2	4.0	0.0	4.0	0.0	0.0	0.0	-4.0
3	4.0	0.0	4.0	0.0	0.0	0.0	-4.0
4	4.0	0.0	4.0	0.0	0.0	0.0	-4.0
5	0.0	1.4	1.4	2.1	2.7	4.8	3.4
6	0.0	1.4	1.4	2.1	2.7	4.8	3.4
7	0.0	1.4	1.4	2.1	2.7	4.8	3.4
8	0.0	1.4	1.4	2.1	2.7	4.8	3.4
9	0.0	1.4	1.4	2.1	2.7	4.8	3.4
10	0.0	1.4	1.4	2.1	2.7	4.8	3.4
11	0.0	1.4	1.4	2.1	2.7	4.8	3.4
12	0.0	1.4	1.4	2.1	2.7	4.8	3.4
13	0.0	1.4	1.4	2.1	2.7	4.8	3.4
14	0.0	1.4	1.4	2.1	2.7	4.8	3.4
15	0.0	1.4	1.4	2.1	2.7	4.8	3.4
16	0.0	1.4	1.4	2.1	2.7	4.8	3.4
17	0.0	1.4	1.4	2.1	2.7	4.8	3.4
18	0.0	1.4	1.4	2.1	2.7	4.8	3.4
19	0.0	1.4	1.4	2.1	2.7	4.8	3.4
20	0.0	1.4	1.4	2.1	2.7	4.8	3.4
21	0.0	1.4	1.4	2.1	2.7	4.8	3.4
22	0.0	1.4	1.4	2.1	2.7	4.8	3.4
23	0.0	1.4	1.4	2.1	2.7	4.8	3.4
24	0.0	1.4	1.4	2.1	2.7	4.8	3.4
25	0.0	1.4	1.4	2.1	2.7	4.8	3.4
26	0.0	1.4	1.4	2.1	2.7	4.8	3.4
27	0.0	1.4	1.4	2.1	2.7	4.8	3.4
28	0.0	1.4	1.4	2.1	2.7	4.8	3.4
29	0.0	1.4	1.4	2.1	2.7	4.8	3.4
30	0.0	1.4	1.4	2.1	2.7	4.8	3.4
31	0.0	1.4	1.4	2.1	2.7	4.8	3.4
32	0.0	1.4	1.4	2.1	2.7	4.8	3.4
33	0.0	1.4	1.4	2.1	2.7	4.8	3.4
34	0.0	1.4	1.4	2.1	2.7	4.8	3.4
Total	15.9	42.9	58.8	64.5	79.6	144.0	85.2

Financial Evaluation for Ibipora Water Supply Project

Assumptions ;

a) Investment cost : 7.4 million US$

b) OM cost 0.7 million US$ 9.0% of investment cost

c) Water supply bolume : 0.104 cubic meter per second

total	100.0%	3.3 million cubic meter per year
domestic	80.7%	2.7 million cubic meter per year
industrial	19.3%	0.6 million cubic meter per year

d) Water tariff domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0%

FIRR = 12.97%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
2	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
3	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
4	1.9	0.0	1.9	0.0	0.0	0.0	-1.9
5	0.0	0.7	0.7	1.2	0.6	1.9	1.2
6	0.0	0.7	0.7	1.2	0.6	1.9	1.2
7	0.0	0.7	0.7	1.2	0.6	1.9	1.2
8	0.0	0.7	0.7	1.2	0.6	1.9	1.2
9	0.0	0.7	0.7	1.2	0.6	1.9	1.2
10	0.0	0.7	0.7	1.2	0.6	1.9	1.2
11	0.0	0.7	0.7	1.2	0.6	1.9	1.2
12	0.0	0.7	0.7	1.2	0.6	1.9	1.2
13	0.0	0.7	0.7	1.2	0.6	1.9	1.2
14	0.0	0.7	0.7	1.2	0.6	1.9	1.2
15	0.0	0.7	0.7	1.2	0.6	1.9	1.2
16	0.0	0.7	0.7	1.2	0.6	1.9	1.2
17	0.0	0.7	0.7	1.2	0.6	1.9	1.2
18	0.0	0.7	0.7	1.2	0.6	1.9	1.2
19	0.0	0.7	0.7	1.2	0.6	1.9	1.2
20	0.0	0.7	0.7	1.2	0.6	1.9	1.2
21	0.0	0.7	0.7	1.2	0.6	1.9	1.2
22	0.0	0.7	0.7	1.2	0.6	1.9	1.2
23	0.0	0.7	0.7	1.2	0.6	1.9	1.2
24	0.0	0.7	0.7	1.2	0.6	1.9	1.2
25	0.0	0.7	0.7	1.2	0.6	1.9	1.2
26	0.0	0.7	0.7	1.2	0.6	1.9	1.2
27	0.0	0.7	0.7	1.2	0.6	1.9	1.2
28	0.0	0.7	0.7	1.2	0.6	1.9	1.2
29	0.0	0.7	0.7	1.2	0.6	1.9	1.2
30	0.0	0.7	0.7	1.2	0.6	1.9	1.2
31	0.0	0.7	0.7	1.2	0.6	1.9	1.2
32	0.0	0.7	0.7	1.2	0.6	1.9	1.2
33	0.0	0.7	0.7	1.2	0.6	1.9	1.2
34	0.0	0.7	0.7	1.2	0.6	1.9	1.2
Total	7.4	20.0	27.4	37.0	18.8	55.8	28.4

Appendix - 13 (23/25)
Financial Evaluation for Water Supply Projects for Type A Cities in the Tibagi River basin

Assumptions ;

a) Investment cost : 74.9 million US$

b) OM cost 6.7 million US$ 9.0% of investment cost

c) Water supply volume : 2.176 cubic meter per second

total	100.0%	68.6	million cubic meter per year
domestic	75.6%	51.9	million cubic meter per year
industrial	24.4%	16.7	million cubic meter per year

d) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 29.50%

Cash Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	18.7	0.0	18.7	0.0	0.0	0.0	-18.7
2	18.7	0.0	18.7	0.0	0.0	0.0	-18.7
3	18.7	0.0	18.7	0.0	0.0	0.0	-18.7
4	18.7	0.0	18.7	0.0	0.0	0.0	-18.7
5	0.0	6.7	6.7	24.1	16.6	40.7	34.0
6	0.0	6.7	6.7	24.1	16.6	40.7	34.0
7	0.0	6.7	6.7	24.1	16.6	40.7	34.0
8	0.0	6.7	6.7	24.1	16.6	40.7	34.0
9	0.0	6.7	6.7	24.1	16.6	40.7	34.0
10	0.0	6.7	6.7	24.1	16.6	40.7	34.0
11	0.0	6.7	6.7	24.1	16.6	40.7	34.0
12	0.0	6.7	6.7	24.1	16.6	40.7	34.0
13	0.0	6.7	6.7	24.1	16.6	40.7	34.0
14	0.0	6.7	6.7	24.1	16.6	40.7	34.0
15	0.0	6.7	6.7	24.1	16.6	40.7	34.0
16	0.0	6.7	6.7	24.1	16.6	40.7	34.0
17	0.0	6.7	6.7	24.1	16.6	40.7	34.0
18	0.0	6.7	6.7	24.1	16.6	40.7	34.0
19	0.0	6.7	6.7	24.1	16.6	40.7	34.0
20	0.0	6.7	6.7	24.1	16.6	40.7	34.0
21	0.0	6.7	6.7	24.1	16.6	40.7	34.0
22	0.0	6.7	6.7	24.1	16.6	40.7	34.0
23	0.0	6.7	6.7	24.1	16.6	40.7	34.0
24	0.0	6.7	6.7	24.1	16.6	40.7	34.0
25	0.0	6.7	6.7	24.1	16.6	40.7	34.0
26	0.0	6.7	6.7	24.1	16.6	40.7	34.0
27	0.0	6.7	6.7	24.1	16.6	40.7	34.0
28	0.0	6.7	6.7	24.1	16.6	40.7	34.0
29	0.0	6.7	6.7	24.1	16.6	40.7	34.0
30	0.0	6.7	6.7	24.1	16.6	40.7	34.0
31	0.0	6.7	6.7	24.1	16.6	40.7	34.0
32	0.0	6.7	6.7	24.1	16.6	40.7	34.0
33	0.0	6.7	6.7	24.1	16.6	40.7	34.0
34	0.0	6.7	6.7	24.1	16.6	40.7	34.0
Total	74.9	202.2	277.1	723.7	497.3	1,221.0	943.8

Appendix - 13 (24/25)

Financial Evaluation for Water Supply Projects for Type B Cities in the Tibagi River basin

Assumptions ;

a) Investment cost : 52 million US$

b) OM cost 4.7 million US$ 9.0% of investment cost

c) Water supply volume : 0.938 cubic meter per second

total	100.0%	29.6 million cubic meter per year
domestic	56.3%	16.6 million cubic meter per year
industrial	43.7%	12.9 million cubic meter per year

d) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0%

FIRR = 22.01%

Cash Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	13.0	0.0	13.0	0.0	0.0	0.0	-13.0
2	13.0	0.0	13.0	0.0	0.0	0.0	-13.0
3	13.0	0.0	13.0	0.0	0.0	0.0	-13.0
4	13.0	0.0	13.0	0.0	0.0	0.0	-13.0
5	0.0	4.7	4.7	7.7	12.8	20.5	15.9
6	0.0	4.7	4.7	7.7	12.8	20.5	15.9
7	0.0	4.7	4.7	7.7	12.8	20.5	15.9
8	0.0	4.7	4.7	7.7	12.8	20.5	15.9
9	0.0	4.7	4.7	7.7	12.8	20.5	15.9
10	0.0	4.7	4.7	7.7	12.8	20.5	15.9
11	0.0	4.7	4.7	7.7	12.8	20.5	15.9
12	0.0	4.7	4.7	7.7	12.8	20.5	15.9
13	0.0	4.7	4.7	7.7	12.8	20.5	15.9
14	0.0	4.7	4.7	7.7	12.8	20.5	15.9
15	0.0	4.7	4.7	7.7	12.8	20.5	15.9
16	0.0	4.7	4.7	7.7	12.8	20.5	15.9
17	0.0	4.7	4.7	7.7	12.8	20.5	15.9
18	0.0	4.7	4.7	7.7	12.8	20.5	15.9
19	0.0	4.7	4.7	7.7	12.8	20.5	15.9
20	0.0	4.7	4.7	7.7	12.8	20.5	15.9
21	0.0	4.7	4.7	7.7	12.8	20.5	15.9
22	0.0	4.7	4.7	7.7	12.8	20.5	15.9
23	0.0	4.7	4.7	7.7	12.8	20.5	15.9
24	0.0	4.7	4.7	7.7	12.8	20.5	15.9
25	0.0	4.7	4.7	7.7	12.8	20.5	15.9
26	0.0	4.7	4.7	7.7	12.8	20.5	15.9
27	0.0	4.7	4.7	7.7	12.8	20.5	15.9
28	0.0	4.7	4.7	7.7	12.8	20.5	15.9
29	0.0	4.7	4.7	7.7	12.8	20.5	15.9
30	0.0	4.7	4.7	7.7	12.8	20.5	15.9
31	0.0	4.7	4.7	7.7	12.8	20.5	15.9
32	0.0	4.7	4.7	7.7	12.8	20.5	15.9
33	0.0	4.7	4.7	7.7	12.8	20.5	15.9
34	0.0	4.7	4.7	7.7	12.8	20.5	15.9
Total	52.0	140.4	192.4	232.2	383.7	615.9	423.5

Appendix - 13 (25/25)

Financial Evaluation for Water Supply Projects for Type C Cities in the Tibagi River basin

Assumptions ;

a) Investment cost : 32.9 million US$

b) OM cost 3.0 million US$ 9.0% of investment cost

c) Water supply volume : 0.347 cubic meter per second

total	100.0%	11.0 million cubic meter per year
domestic	70.6%	7.7 million cubic meter per year
industrial	29.4%	3.2 million cubic meter per year

d) Unit benefit : domestic 0.62 US$ per cubic meter

industrial 1.10 US$ per cubic meter

e) Water loss domestic 25.0%

industrial 10.0% FIRR = 9.41%

Cash Flow

(Unit : million US$)

No.	Cost			Benefit			Balance
	Investment Cost	OM Cost	Total	Domestric	Industrial	Total	
1	8.2	0.0	8.2	0.0	0.0	0.0	-8.2
2	8.2	0.0	8.2	0.0	0.0	0.0	-8.2
3	8.2	0.0	8.2	0.0	0.0	0.0	-8.2
4	8.2	0.0	8.2	0.0	0.0	0.0	-8.2
5	0.0	3.0	3.0	3.6	3.2	6.8	3.8
6	0.0	3.0	3.0	3.6	3.2	6.8	3.8
7	0.0	3.0	3.0	3.6	3.2	6.8	3.8
8	0.0	3.0	3.0	3.6	3.2	6.8	3.8
9	0.0	3.0	3.0	3.6	3.2	6.8	3.8
10	0.0	3.0	3.0	3.6	3.2	6.8	3.8
11	0.0	3.0	3.0	3.6	3.2	6.8	3.8
12	0.0	3.0	3.0	3.6	3.2	6.8	3.8
13	0.0	3.0	3.0	3.6	3.2	6.8	3.8
14	0.0	3.0	3.0	3.6	3.2	6.8	3.8
15	0.0	3.0	3.0	3.6	3.2	6.8	3.8
16	0.0	3.0	3.0	3.6	3.2	6.8	3.8
17	0.0	3.0	3.0	3.6	3.2	6.8	3.8
18	0.0	3.0	3.0	3.6	3.2	6.8	3.8
19	0.0	3.0	3.0	3.6	3.2	6.8	3.8
20	0.0	3.0	3.0	3.6	3.2	6.8	3.8
21	0.0	3.0	3.0	3.6	3.2	6.8	3.8
22	0.0	3.0	3.0	3.6	3.2	6.8	3.8
23	0.0	3.0	3.0	3.6	3.2	6.8	3.8
24	0.0	3.0	3.0	3.6	3.2	6.8	3.8
25	0.0	3.0	3.0	3.6	3.2	6.8	3.8
26	0.0	3.0	3.0	3.6	3.2	6.8	3.8
27	0.0	3.0	3.0	3.6	3.2	6.8	3.8
28	0.0	3.0	3.0	3.6	3.2	6.8	3.8
29	0.0	3.0	3.0	3.6	3.2	6.8	3.8
30	0.0	3.0	3.0	3.6	3.2	6.8	3.8
31	0.0	3.0	3.0	3.6	3.2	6.8	3.8
32	0.0	3.0	3.0	3.6	3.2	6.8	3.8
33	0.0	3.0	3.0	3.6	3.2	6.8	3.8
34	0.0	3.0	3.0	3.6	3.2	6.8	3.8
Total	32.9	88.8	121.7	107.9	95.5	203.4	81.7

Appendix - 14 (1/4)
Financial Evaluation for Curitiba Sewerage Project

Assumptions ;

a)	Investment cost :	293.6	million US$
b)	OM cost	3.6	million US$
c)	Treatment volume :	420,000	cubic meter per day
		153.3	million cubic meter per year
d)	Sewage tariff (domestic+industry)	0.58	US$ per cubic meter

FIRR = 21.34%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue	Balance
	Investment Cost	OM Cost	Total		
1	73.4	0.0	73.4	0.0	-73.4
2	73.4	0.0	73.4	0.0	-73.4
3	73.4	0.0	73.4	0.0	-73.4
4	73.4	0.0	73.4	0.0	-73.4
5	0.0	3.6	3.6	89.6	86.0
6	0.0	3.6	3.6	89.6	86.0
7	0.0	3.6	3.6	89.6	86.0
8	0.0	3.6	3.6	89.6	86.0
9	0.0	3.6	3.6	89.6	86.0
10	0.0	3.6	3.6	89.6	86.0
11	0.0	3.6	3.6	89.6	86.0
12	0.0	3.6	3.6	89.6	86.0
13	0.0	3.6	3.6	89.6	86.0
14	0.0	3.6	3.6	89.6	86.0
15	0.0	3.6	3.6	89.6	86.0
16	0.0	3.6	3.6	89.6	86.0
17	0.0	3.6	3.6	89.6	86.0
18	0.0	3.6	3.6	89.6	86.0
19	0.0	3.6	3.6	89.6	86.0
20	0.0	3.6	3.6	89.6	86.0
21	0.0	3.6	3.6	89.6	86.0
22	0.0	3.6	3.6	89.6	86.0
23	0.0	3.6	3.6	89.6	86.0
24	0.0	3.6	3.6	89.6	86.0
25	0.0	3.6	3.6	89.6	86.0
26	0.0	3.6	3.6	89.6	86.0
27	0.0	3.6	3.6	89.6	86.0
28	0.0	3.6	3.6	89.6	86.0
29	0.0	3.6	3.6	89.6	86.0
30	0.0	3.6	3.6	89.6	86.0
31	0.0	3.6	3.6	89.6	86.0
32	0.0	3.6	3.6	89.6	86.0
33	0.0	3.6	3.6	89.6	86.0
34	0.0	3.6	3.6	89.6	86.0
Total	293.6	108.0	401.6	2,687.1	2,285.5

Appendix - 14 (2/4)
Financial Evaluation for Cascavel Sewerage Project

Assumptions ;

a)	Investment cost :	49.5 million US$
b)	OM cost	0.71 million US$
c)	Treatment volume :	45,000 cubic meter per day
		16.4 million cubic meter per year
d)	Sewage tariff (domestic+industry)	0.58 US$ per cubic meter

FIRR = 14.27%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue	Balance
	Investment Cost	OM Cost	Total		
1	12.4	0.0	12.4	0.0	-12.4
2	12.4	0.0	12.4	0.0	-12.4
3	12.4	0.0	12.4	0.0	-12.4
4	12.4	0.0	12.4	0.0	-12.4
5	0.0	0.7	0.7	9.6	8.9
6	0.0	0.7	0.7	9.6	8.9
7	0.0	0.7	0.7	9.6	8.9
8	0.0	0.7	0.7	9.6	8.9
9	0.0	0.7	0.7	9.6	8.9
10	0.0	0.7	0.7	9.6	8.9
11	0.0	0.7	0.7	9.6	8.9
12	0.0	0.7	0.7	9.6	8.9
13	0.0	0.7	0.7	9.6	8.9
14	0.0	0.7	0.7	9.6	8.9
15	0.0	0.7	0.7	9.6	8.9
16	0.0	0.7	0.7	9.6	8.9
17	0.0	0.7	0.7	9.6	8.9
18	0.0	0.7	0.7	9.6	8.9
19	0.0	0.7	0.7	9.6	8.9
20	0.0	0.7	0.7	9.6	8.9
21	0.0	0.7	0.7	9.6	8.9
22	0.0	0.7	0.7	9.6	8.9
23	0.0	0.7	0.7	9.6	8.9
24	0.0	0.7	0.7	9.6	8.9
25	0.0	0.7	0.7	9.6	8.9
26	0.0	0.7	0.7	9.6	8.9
27	0.0	0.7	0.7	9.6	8.9
28	0.0	0.7	0.7	9.6	8.9
29	0.0	0.7	0.7	9.6	8.9
30	0.0	0.7	0.7	9.6	8.9
31	0.0	0.7	0.7	9.6	8.9
32	0.0	0.7	0.7	9.6	8.9
33	0.0	0.7	0.7	9.6	8.9
34	0.0	0.7	0.7	9.6	8.9
Total	49.5	21.3	70.8	287.9	217.1

Financial Evaluation for Ponta Grossa Sewerage Project

Assumptions ;

a) Investment cost : 29.2 million US$

b) OM cost 0.36 million US$

c) Treatment volume : 30,000 cubic meter per day
11.0 million cubic meter per year

d) Sewage tariff (domestic+industrial) 0.58 US$ per cubic meter

FIRR = 15.95%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue	Balance
	Investment Cost	OM Cost	Total		
1	7.3	0.0	7.3	0.0	-7.3
2	7.3	0.0	7.3	0.0	-7.3
3	7.3	0.0	7.3	0.0	-7.3
4	7.3	0.0	7.3	0.0	-7.3
5	0.0	0.4	0.4	6.3	6.0
6	0.0	0.4	0.4	6.3	6.0
7	0.0	0.4	0.4	6.3	6.0
8	0.0	0.4	0.4	6.3	6.0
9	0.0	0.4	0.4	6.3	6.0
10	0.0	0.4	0.4	6.3	6.0
11	0.0	0.4	0.4	6.3	6.0
12	0.0	0.4	0.4	6.3	6.0
13	0.0	0.4	0.4	6.3	6.0
14	0.0	0.4	0.4	6.3	6.0
15	0.0	0.4	0.4	6.3	6.0
16	0.0	0.4	0.4	6.3	6.0
17	0.0	0.4	0.4	6.3	6.0
18	0.0	0.4	0.4	6.3	6.0
19	0.0	0.4	0.4	6.3	6.0
20	0.0	0.4	0.4	6.3	6.0
21	0.0	0.4	0.4	6.3	6.0
22	0.0	0.4	0.4	6.3	6.0
23	0.0	0.4	0.4	6.3	6.0
24	0.0	0.4	0.4	6.3	6.0
25	0.0	0.4	0.4	6.3	6.0
26	0.0	0.4	0.4	6.3	6.0
27	0.0	0.4	0.4	6.3	6.0
28	0.0	0.4	0.4	6.3	6.0
29	0.0	0.4	0.4	6.3	6.0
30	0.0	0.4	0.4	6.3	6.0
31	0.0	0.4	0.4	6.3	6.0
32	0.0	0.4	0.4	6.3	6.0
33	0.0	0.4	0.4	6.3	6.0
34	0.0	0.4	0.4	6.3	6.0
Total	29.2	10.8	40.0	189.8	149.8

Appendix - 14 (4/4)
Financial Evaluation for Londrina Sewerage Project

Assumptions ;

a)	Investment cost :	59.4 million US$
b)	OM cost	0.98 million US$
c)	Treatment volume :	70,000 cubic meter per day
		25.6 million cubic meter per year
d)	Sewage tariff (domestic + industrial)	0.58 US$ per cubic meter

FIRR = 17.73%

Cash Flow

(Unit : million US$)

No.	Cost			Revenue	Balance
	Investment Cost	OM Cost	Total		
1	14.9	0.0	14.9	0.0	-14.9
2	14.9	0.0	14.9	0.0	-14.9
3	14.9	0.0	14.9	0.0	-14.9
4	14.9	0.0	14.9	0.0	-14.9
5	0.0	1.0	1.0	14.8	13.8
6	0.0	1.0	1.0	14.8	13.8
7	0.0	1.0	1.0	14.8	13.8
8	0.0	1.0	1.0	14.8	13.8
9	0.0	1.0	1.0	14.8	13.8
10	0.0	1.0	1.0	14.8	13.8
11	0.0	1.0	1.0	14.8	13.8
12	0.0	1.0	1.0	14.8	13.8
13	0.0	1.0	1.0	14.8	13.8
14	0.0	1.0	1.0	14.8	13.8
15	0.0	1.0	1.0	14.8	13.8
16	0.0	1.0	1.0	14.8	13.8
17	0.0	1.0	1.0	14.8	13.8
18	0.0	1.0	1.0	14.8	13.8
19	0.0	1.0	1.0	14.8	13.8
20	0.0	1.0	1.0	14.8	13.8
21	0.0	1.0	1.0	14.8	13.8
22	0.0	1.0	1.0	14.8	13.8
23	0.0	1.0	1.0	14.8	13.8
24	0.0	1.0	1.0	14.8	13.8
25	0.0	1.0	1.0	14.8	13.8
26	0.0	1.0	1.0	14.8	13.8
27	0.0	1.0	1.0	14.8	13.8
28	0.0	1.0	1.0	14.8	13.8
29	0.0	1.0	1.0	14.8	13.8
30	0.0	1.0	1.0	14.8	13.8
31	0.0	1.0	1.0	14.8	13.8
32	0.0	1.0	1.0	14.8	13.8
33	0.0	1.0	1.0	14.8	13.8
34	0.0	1.0	1.0	14.8	13.8
Total	59.4	29.4	88.8	442.9	354.1