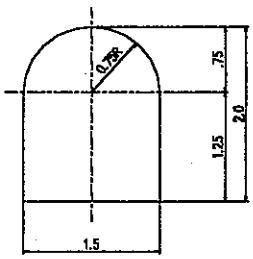
Type of Works	Calculation	Quantity
<Structural Concrete>		
(1) Concrete around barrel		
Total volume (EL145.00−EL135.00=10.00m)		
$V = \pi/4 \times 12.0^2 \times 10.0$	$= 1,131.0\ m^3$	
Subtraction volume		
Hollownes $= \pi/4 \{ 10.0^2 \times 7.0 + 8.0^2 \times 1.0 + 5.0^2 \times 1.0 + 1/2 (5.0^2 + 6.0^2) \times 1.0 \}$		
$= \pi/4 (700.0 + 64.0 + 25.0 + 30.5)$		
$= \pi/4 \times 819.5$	$= 643.6\ m^3$	
Gallery		
Section area $= \pi/4 \times 1.5^2 \times 1/2 + 1.5 \times 1.25$	$= 2.76\ m^3$	
Volume $= (2.76 \times 3.0) \times 1/2 \times$ 2ヶ所	$= 8.3\ m^3$	
Total of subtraction volume		
$Va = 643.6 + 8.3$	$= 651.9\ m^3$	
Concrete around barrel		
$Vc = 1,131.0 - 651.9\ m^3$	$=$	$479.1\ m^3$
		
(2) Concrete around casing		
Total volume (EL135.00−EL127.00=8.00m)		
$V = 15.0 \times 16.5 \times 8.0$	$= 1,980.0\ m^3$	
Hollowness		
1) Notch part		
$V_① = 2.0 \times 2.0 / 2 \times 8.0 \times$ 2spots	$= 32.0\ m^3$	
$V_② = 4.0 \times 9.0 / 2 \times 8.0$	$= 144.0\ m^3$	

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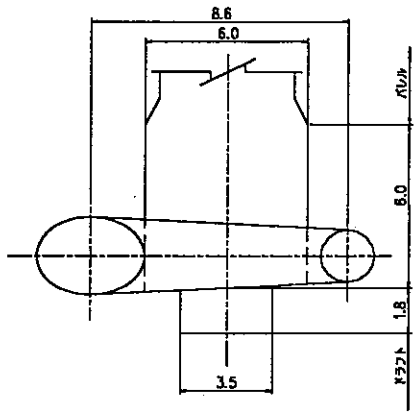
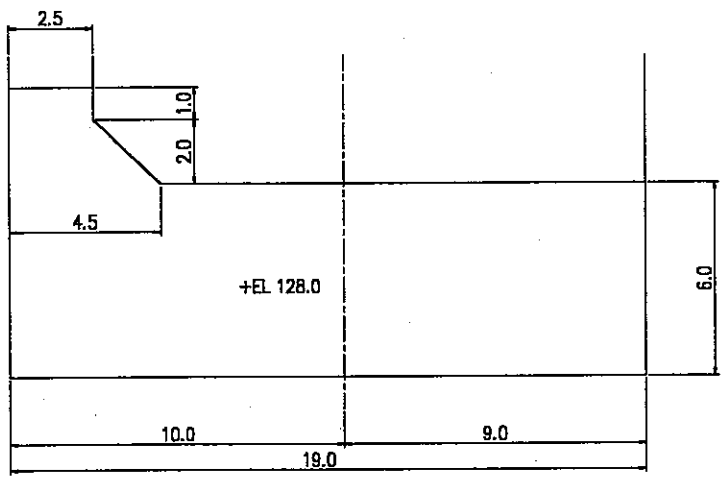
Type of Works	Calculation	Quantity
	2) Casing	
	$V_{③} = \pi/4 \times 6.0^2 \times 6.0 = 169.6\ m^3$	
	$V_{④} = \pi/4 \times 2.6^2 \times \pi \times 8.6 = 143.4\ m^3$	
	※ϕ 2.6≒(3.5+3.0+2.3+1.5)/4	
	$V_{⑤} = \pi/4 \times 3.5^2 \times 1.8 = 17.3\ m^3$	
	$V_{⑥} = \pi/4 \times 4.5^2 \times 2.5 = 39.8\ m^3$	
		
	3) Gallery	
	Barrel	
	$V_{⑦}$ = See "Barrel" = 8.3 m^3	
	Casing	
	$V_{⑧} = 2.0 \times 1.5 \times 2.0 = 6.0\ m^3$	
	Draft	
	$V_{⑨} = 2.0 \times 1.5 \times 6.0 / 2 = 9.0\ m^3$	
	Total of subtraction volume	
	$\Sigma V_{①} \sim V_{⑨} = 569.4\ m^3$	
	Concrete around casing	
	$V_c = 1,980.0 - 569.4 = 1,410.6\ m^3$	

Type of Works	Calculation		Quantity
(3)	Other Concrete		
	Total		
	1) Concrete around draft	2,192.3 m^3	
	2) Side wall concrete	6,672.8 m^3	
	3) Concrete of slab	738.3 m^3	
	4) Retaining wall concrete to stop crumbling the bankin	175.0 m^3	
	Total	9,778.4 m^3	9,778.4 m^3

1)Concrete around draft　　EL127.0(128.0)以下

① EL128.00～EL127.00　　t = 1.00 m

$V_{①}$ = (2.5 × 1.0 + (2.50 + 4.50 / 2 × 2.0 + 19.0 × 6.0) × 1.0 = 123.5 m^3



② EL127.00～EL125.00　　t = 2.00 m

$V_{②}$ = 21.0 × 16.5 × 2.0 = 693.0 m^3

Type of Works	Calculation	Quantity

③ EL125.00～EL117.50

Area of EL125.0

$A = 20.25 \times 16.5 = 334.1\ m^2$

Area of EL118.3

$A = 18.24 \times 12.48 = 227.6\ m^2$

Area of EL117.5

$A = 8.5 \times 12.0 = 102.0\ m^2$

Volume

$V_③ = (334.1 + 227.6) \times 1/2 \times 6.70 + (227.6 + 102.0) \times 1/2 \times 0.80$

$= 1,881.7 + 131.8 = 2,013.5\ m^3$

④ Subtraction volume

④-1 Draft tube

$V_{④-1} = \{(4.5 \times 10.5) + (3.5 \times 10.5)\} \times 1/2 \times 10.0 + \{(3.5 \times 10.5) + \pi/4 \times 3.5^2\} \times 1/2 \times 9.0$

$= 420.0 + 208.7 = 628.7\ m^3$

④-2 Draft gallery

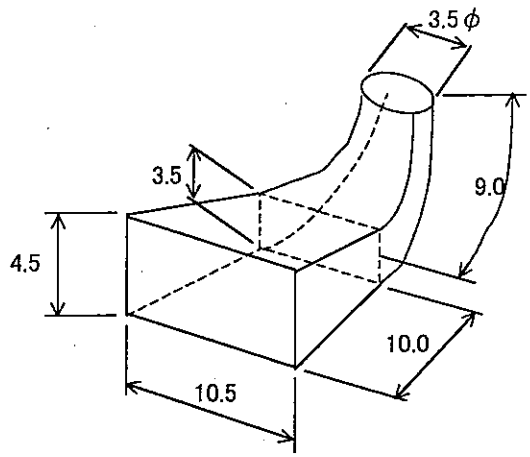
$V_{④-2} = 2.0 \times 1.5 \times 6.0 / 2 = 9.0\ m^3$

Total of subtraction volume

$V④ = 628.7 + 9.0 = 637.7\ m^3$

Total of concrete around draft

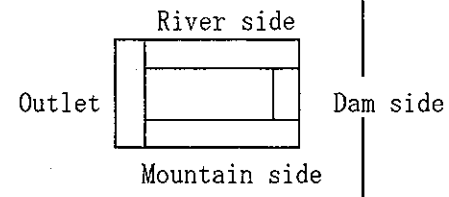
$V_{(1)} = 123.5 + 693.0 + 2,013.5 - 637.7 = 2,192.3\ m^3$



Type of Works	Calculation	Quantity

2)Sidewall concrete

(River side)



$V_{①} = 10.0 \times 2.25 \times (29.75 + 5.0 \times 1/2) = 725.6\ m^3$

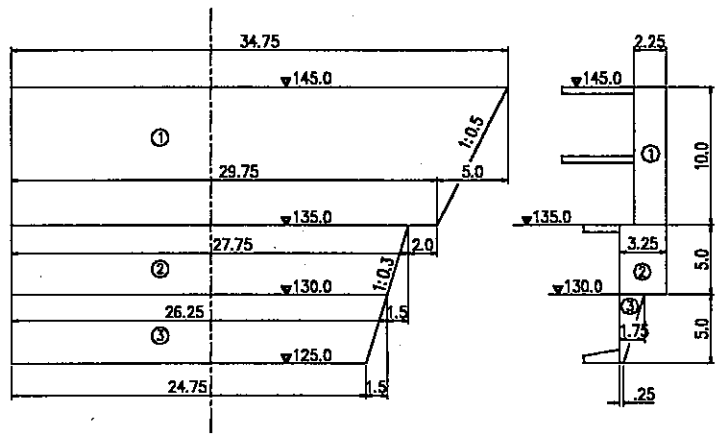
$V_{②} = 5.0 \times 3.25 \times (26.25 + 1.50 \times 1/2) = 438.8\ m^3$

$V_{③} = (1.75 + 0.25) \times 1/2 \times 5.0 \times (24.75 + 1.5/2)$

$= 127.5\ m^3$

Total of river side

$\Sigma V = V_{①} + V_{②} + V_{③} = 1,291.9\ m^3$



(Mountain side)

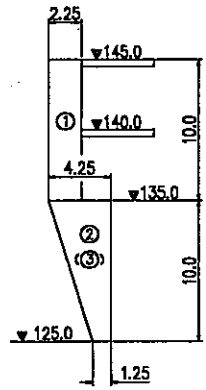
$V_{①} = 10.0 \times 2.25 \times (29.75 + 5.0 \times 1/2) = 725.6\ m^3$

$V_{②} = (4.25 + 1.25) \times 1/2 \times 10.0 \times (24.75 + 3.0/2)$

$= 721.9\ m^3$

Total of mountain side

$\Sigma V = V_{①} + V_{②} = 1,447.5\ m^3$



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Type of Works	Calculation	Quantity

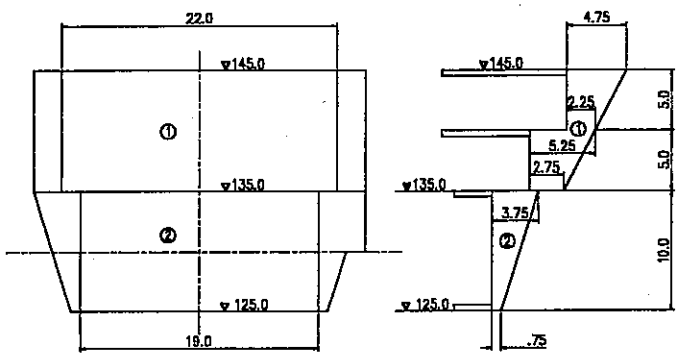
(Dam side)

$V_{①} = \{(4.75 + 2.25) \times 1/2 \times 5.0 + (5.25 + 2.75) \times 1/2 \times 5.0\} \times 22.5 = 825.0\ m^3$

$V_{②} = (3.75 + 0.75) \times 1/2 \times 10.0 \times 19.0 = 427.5\ m^3$

Total of dam side

$\Sigma V = V_{①} + V_{②} = 1,252.5\ m^3$



(Outlet side)

$V_{①} = 2.0 \times 10.0 \times 26.5 = 530.0\ m^3$

$V_{②} = 2.5 \times 5.0 \times (25.0 + 1.5 \times 1/2) = 321.9\ m^3$

$V_{③} = 2.5 \times 5.0 \times (20.5 + 23.5) \times 1/2 = 275.0\ m^3$

$V_{④} = (16.5 + 12.48) \times 1/2 \times 6.7 \times 2.5 = 242.7\ m^3$

$\Sigma V = 1,369.6\ m^3$

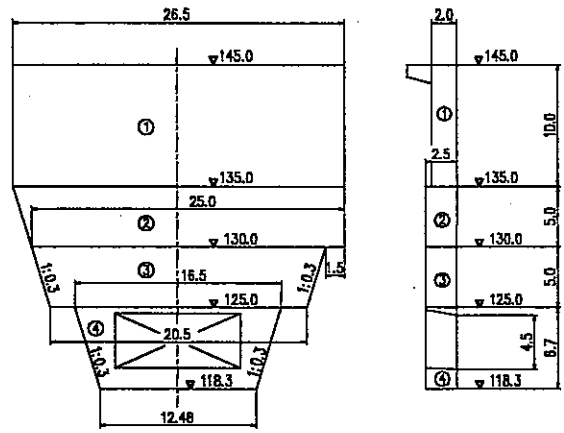
Part of discharge

$V_{⑤} = 10.5 \times 4.5 \times 2.5 = 118.1\ m^2$

Total of outlet side

$\Sigma V = 1,369.6 - 118.1 = 1,251.5\ m^3$

Type of Works	Calculation	Quantity



(Outlet)

Total volume

$V_{①} = 4.0 \times 10.0 \times 26.5 = 1,060.0\ m^3$

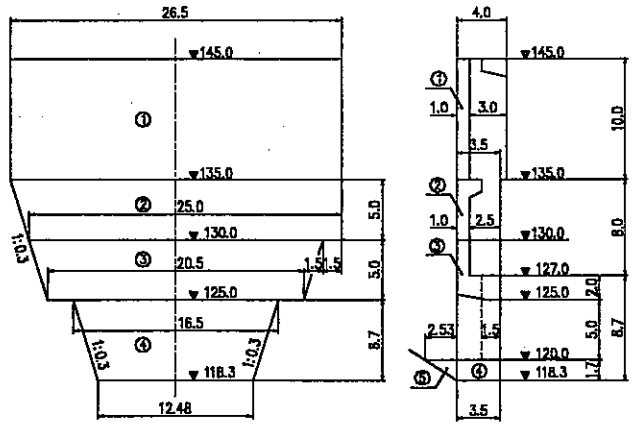
$V_{②} = 3.5 \times 5.0 \times (25.0 + 1.5/2) = 450.6\ m^3$

$V_{③} = 3.5 \times 5.0 \times (23.5 + 20.5) \times 1/2 = 385.0\ m^3$

$V_{④} = 3.5 \times 6.7 \times (16.5 + 12.48) \times 1/2 = 339.8\ m^3$

$V_{⑤} = 2.53 \times 1.7 \times 1/2 \times 12.48 = 26.8\ m^3$

$\Sigma V_{①} \sim V_{⑤} = 2,262.2\ m^3$



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Type of Works	Calculation	Quantity

Subtraction volume

Part of gate slot

$V = 14.5 \times 1.0 \times 1.0 + (14.5 \times 1.0 + 14.5 \times 3.0) \times 1/2 \times 0.5 + 14.5 \times 3.0 \times 8.5 + 11.5 \times 1.5 \times 1.0 + (11.5 \times 1.5 + 11.5 \times 2.5) \times 1/2 \times 0.5 + 11.5 \times 2.5 \times 6.5 + 11.5 \times 1.5 \times 2.0$

$= 14.5 + 14.5 + 369.8 + 17.3 + 11.5 + 186.9 + 34.5 = 649.0\ m^3$

Part of draft

$V = 10.5 \times 5.0 \times 3.50 = 183.8\ m^3$

Total of outlet

$\Sigma V = 2,262.2 - 649.0 - 183.8 = 1,429.4\ m^3$

Total of Sidewall concrete

$\Sigma Vc =$

1,291.9	(River side)
1,447.5	(Mountain side)
1,252.5	(Dam side)
1,251.5	(Outlet side)
1,429.4	(Outlet)
Total 6,672.8	m^3

3) Slab concrete

① Level of EL125.5m $t = 0.5$ m

$V_① = 15.0 \times 2.5 \times 0.5 = 18.8\ m^3$

$V_② = (5.0 + 3.0) \times 1/2 \times 2.0 \times 0.5 = 4.0\ m^3$

$V_③ = 5.5 \times 3.0 \times 0.5 = 8.3\ m^3$

$V_④ = (3.0 + 4.0) \times 1/2 \times 2.5 \times 0.5 = 4.4\ m^3$

$V_⑤ = 4.0 \times 1.5 \times 1/2 \times 0.5 = 1.5\ m^3$

$V_⑥ = 5.0 \times 6.8 \times 0.5 = 17.0\ m^3$

$\Sigma V = 54.0\ m^3$

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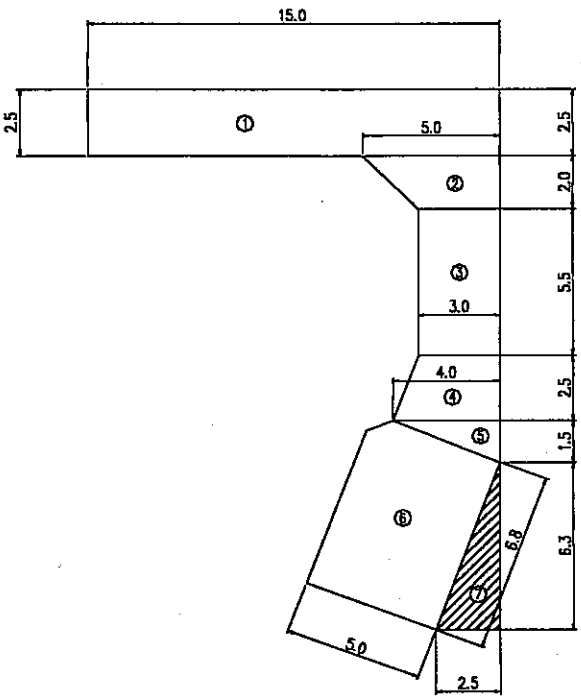
Type of Works	Calculation	Quantity

② EL125.0～EL135.0

$V_{⑦} = 6.3 \times 2.5 \times 1/2 \times 10.00 = 78.8\ m^3$



③ Level of EL135.0m $t = 0.5\ m$

$A_{③} = 19.0 \times 6.0 + (2.5 + 4.5)/2 \times 2.0$
$+ 16.0 \times 2.5 + (5.0 + 3.0)/2 \times 2.0$
$+ 3.0 \times 5.5 + (3.0 + 4.0)/2 \times 2.5$
$+ 4.0 \times 1.5 \times 1/2 + 5.00 \times 6.8$
$= 114.0 + 7.0 + 40.0 + 8.0 + 16.5$
$+ 8.8 + 3.0 + 34.0 = 231.3\ m^2$

Part of subtraction

Stairs

$A = 1.5 \times (2.0 + 3.5) = 8.3\ m^2$

Hatch for carrying in

$A = 4.0 \times 5.2 = 20.8\ m^2$

$\Sigma A = 231.3 - 8.3 - 20.80 = 202.2\ m^2$

$V_{③} = 202.2 \times 0.5 = 101.1\ m^3$

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Type of Works	Calculation	Quantity

④ Level of EL135.0～EL135.3 t = 0.3 m

A = 9.0 × 4.0 + (9.0 + 6.0)/2 × 3.0
+ 15.0 × 2.0 = 88.5 m^2

$V_④$ = 88.5 × 0.3 = 26.6 m^3

⑤ Level of EL140.0m t = 0.5 m

A = 27.0 × 22.0 = 594.0 m^2

Part of subtraction

Barrel

A = $\pi/4 \times 12.0^2$ = 113.1 m^2

Hatch for carrying in

A = 4.0 × 5.2 = 20.8 m^2

Stairs

A = 3.4 × 4.5 = 15.3 m^2

ΣA = 594.0 − 113.1 − 20.8 − 15.3 = 444.8 m^2

$V_⑤$ = 444.8 × 0.5 = 222.4 m^3

⑥ Level of EL145.0m

A = 30.0 × 22.0 = 660.0 m^2

Part of subtraction

Barrel

A = $\pi/4 \times 12.0^2$ = 113.1 m^2

Hatch for carrying in

A = 4.0 × 5.2 = 20.8 m^2

Stairs

A = 3.4 × 4.5 = 15.3 m^2

ΣA = 660.0 − 113.1 − 20.8 − 15.3 = 510.8 m^2

$V_⑥$ = 510.8 × 0.5 = 255.4 m^3

Type of Works	Calculation	Quantity

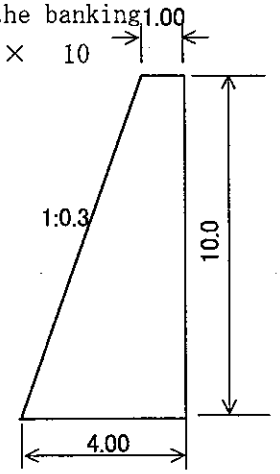
⑦ Total of slab concrete

① Level of EL125.5	54.0	m^3
② Level of EL125.0～EL135.0	78.8	m^3
③ Level of EL135.0	101.1	m^3
④ Level of EL135.0～EL135.3	26.6	m^3
⑤ Level of EL140.0	222.4	m^3
⑥ Level of EL145.0	255.4	m^3
Total	738.3	m^3

4) Retaining wall concrete to stop crumbling the banking

$A = (1.0 + 4.0) / 2 \times 10$

$= 25.0 \ m^2$



Mountain side

$Vc = 25.0 \times 2.0 + 25.0 / 2 \times 5.0$

$= 50.0 + 62.5 = 112.5 \ m^3$

River side

$Vc = 25.0 \times 1.5 + 2.0 / 2 \times 25.0$

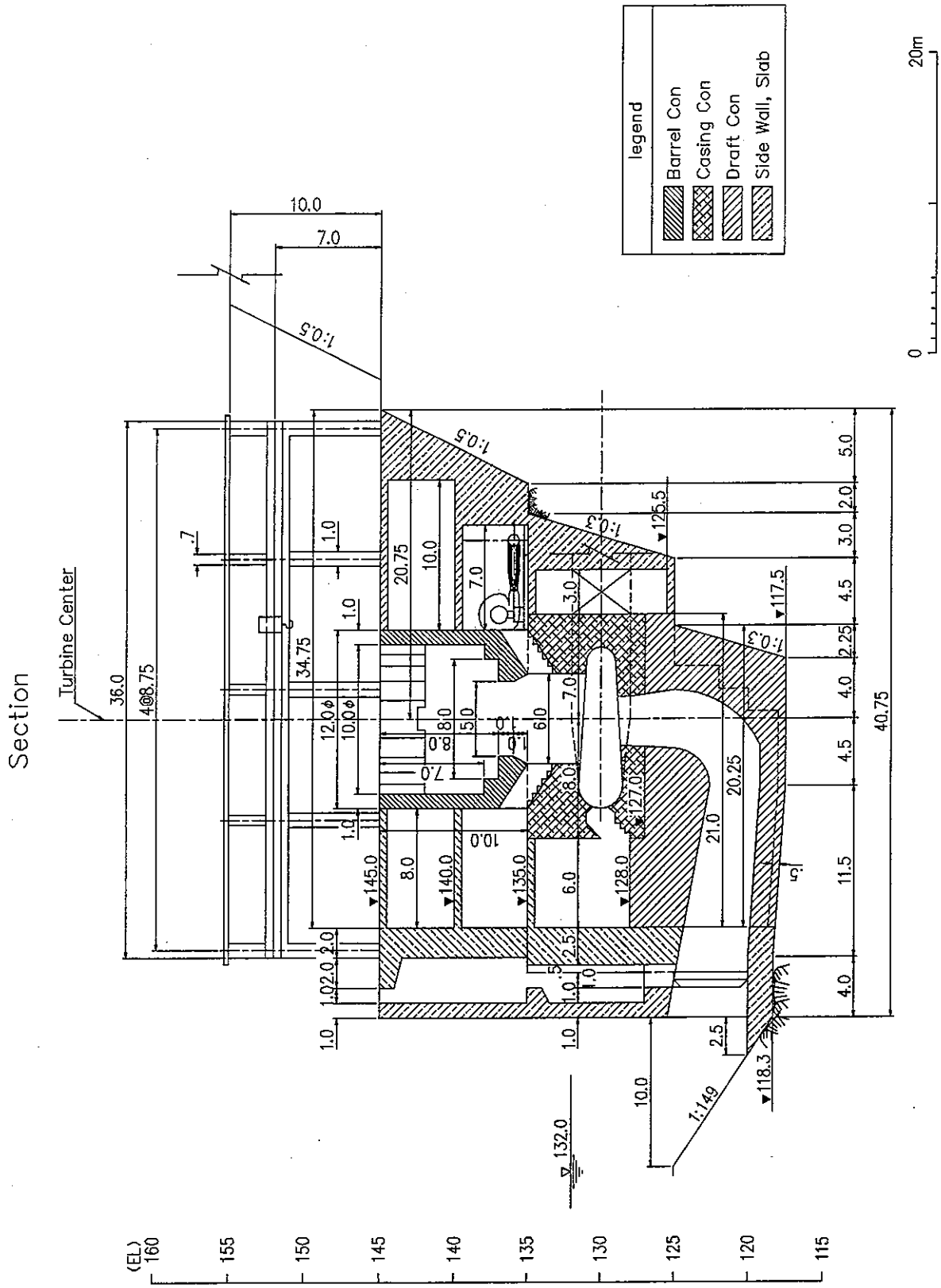
$= 37.5 + 25.0 = 62.5 \ m^3$

$\Sigma V = 112.5 + 62.5 = 175.0 \ m^3$

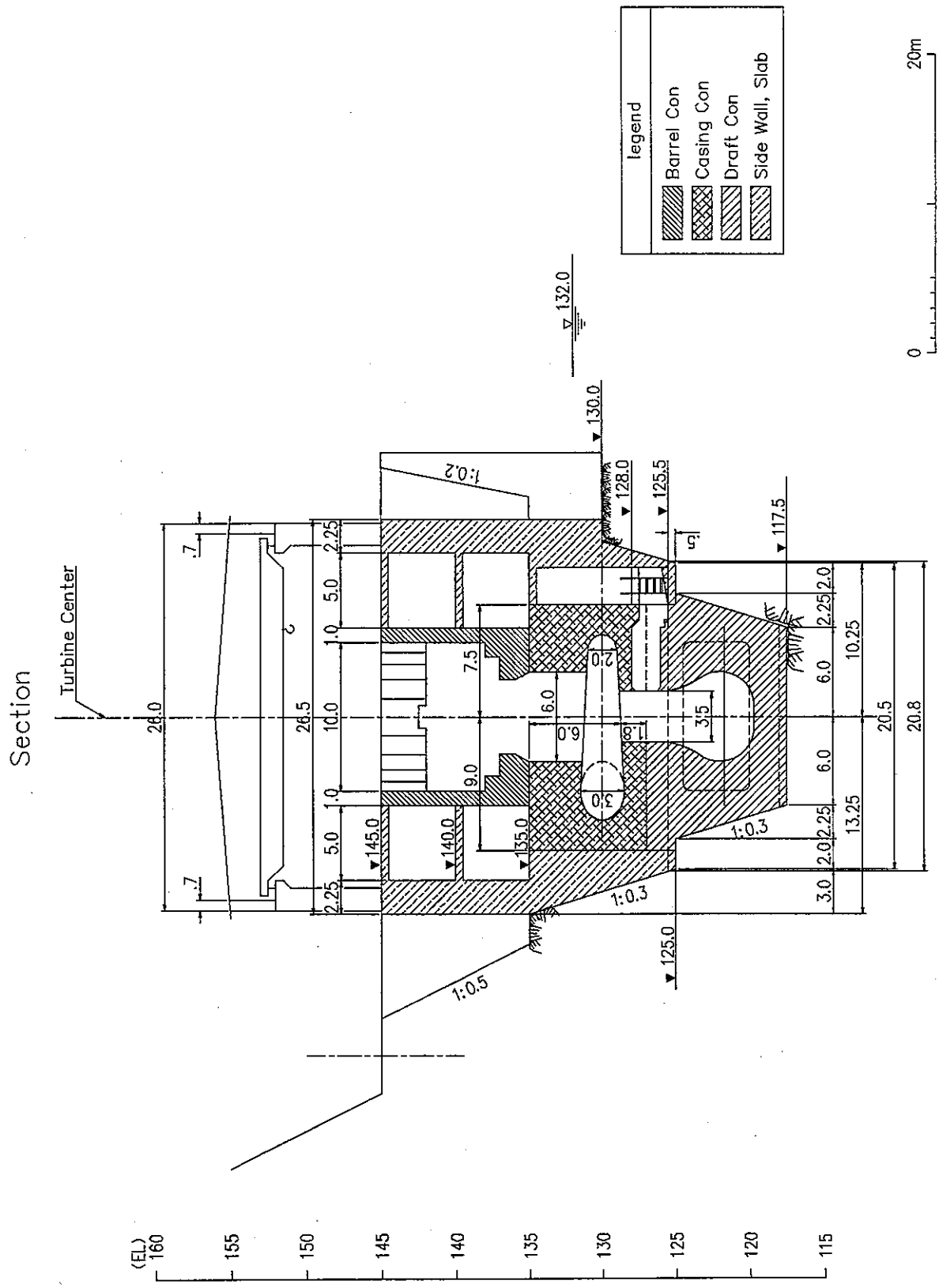
(4) Total of structural concrete

$V = 479.1 + 1,410.6 + 9,778.4 = 11,668.1 \ m^3$

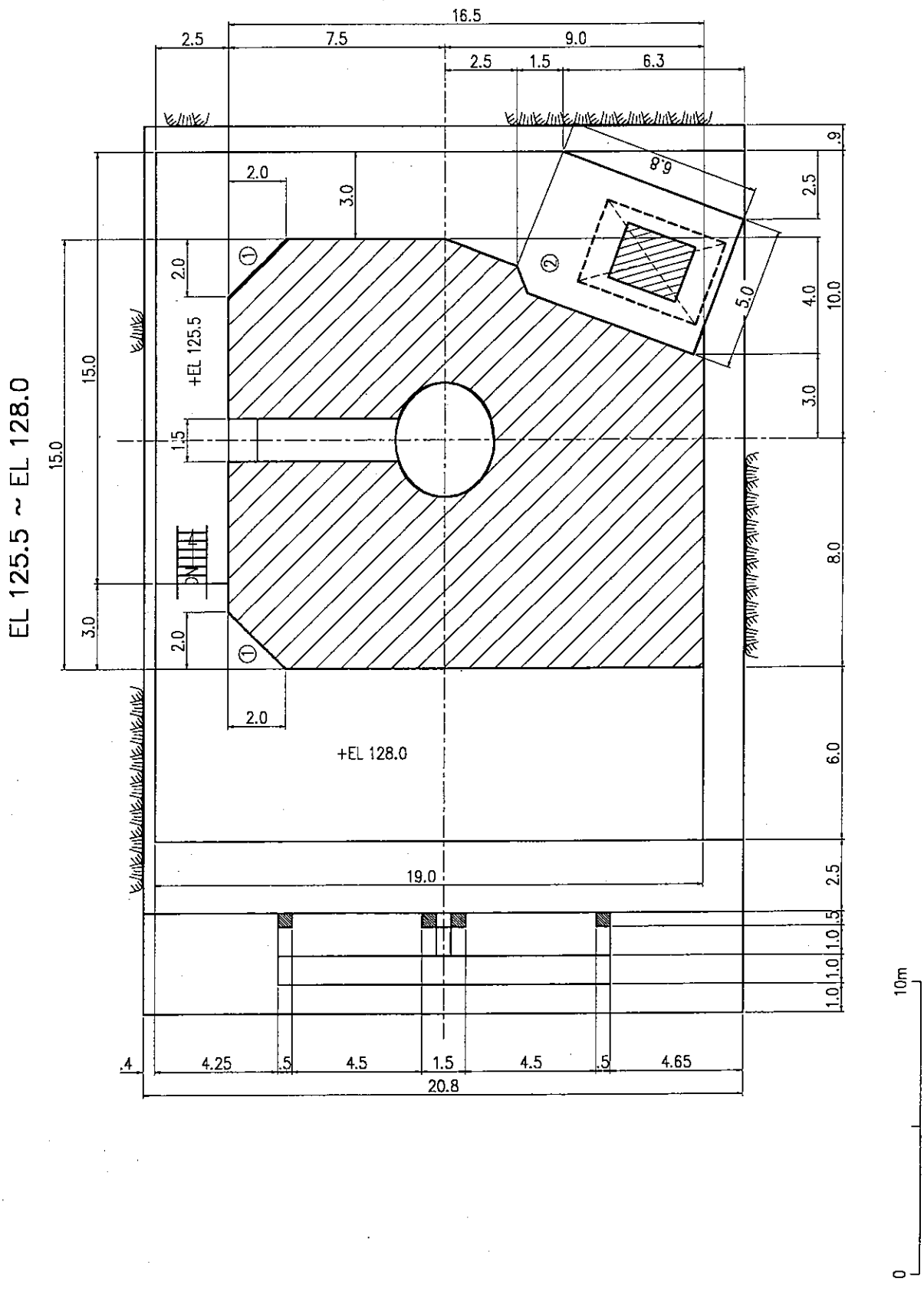
Powerhouse Section



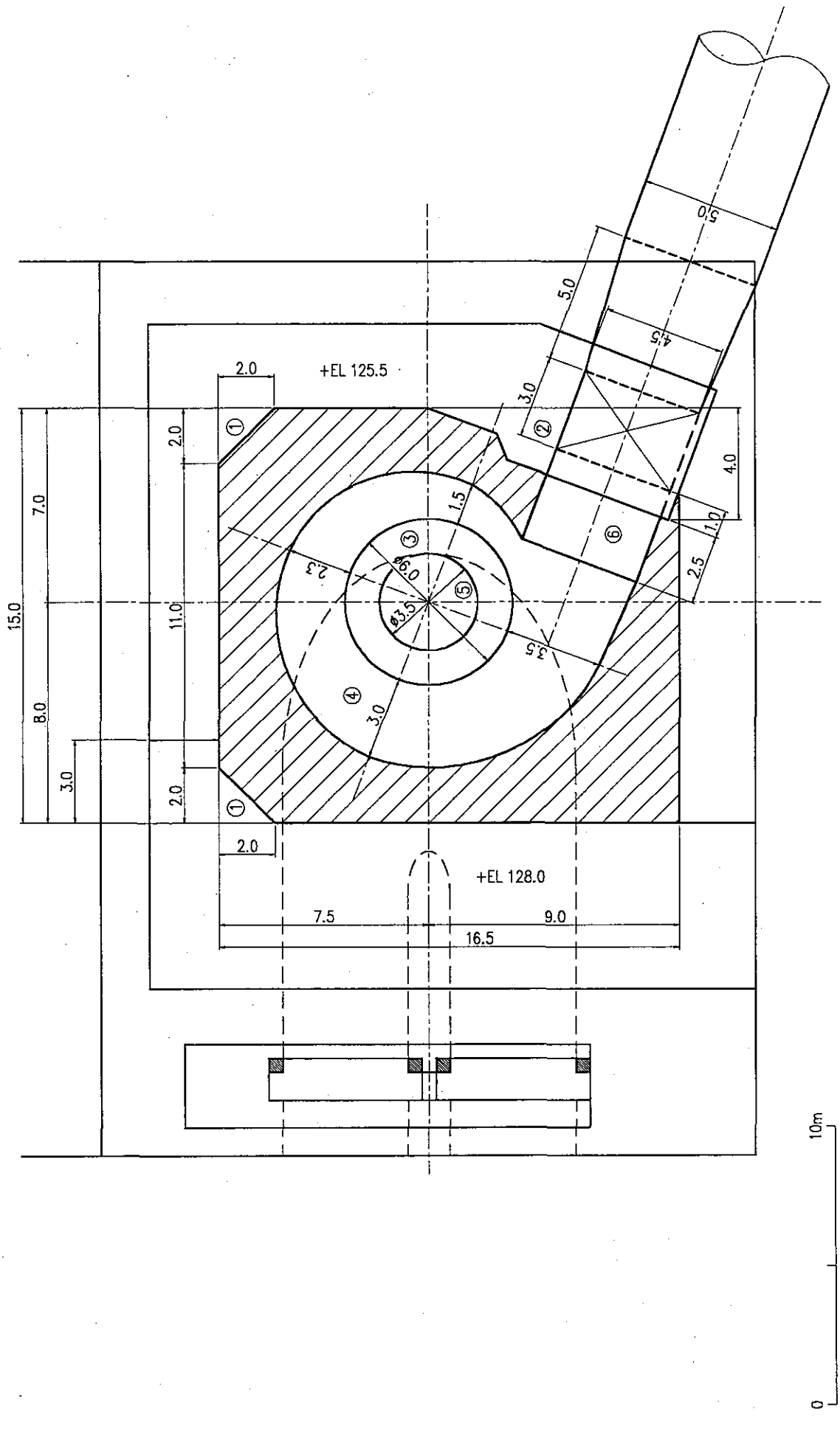
Powerhouse Section



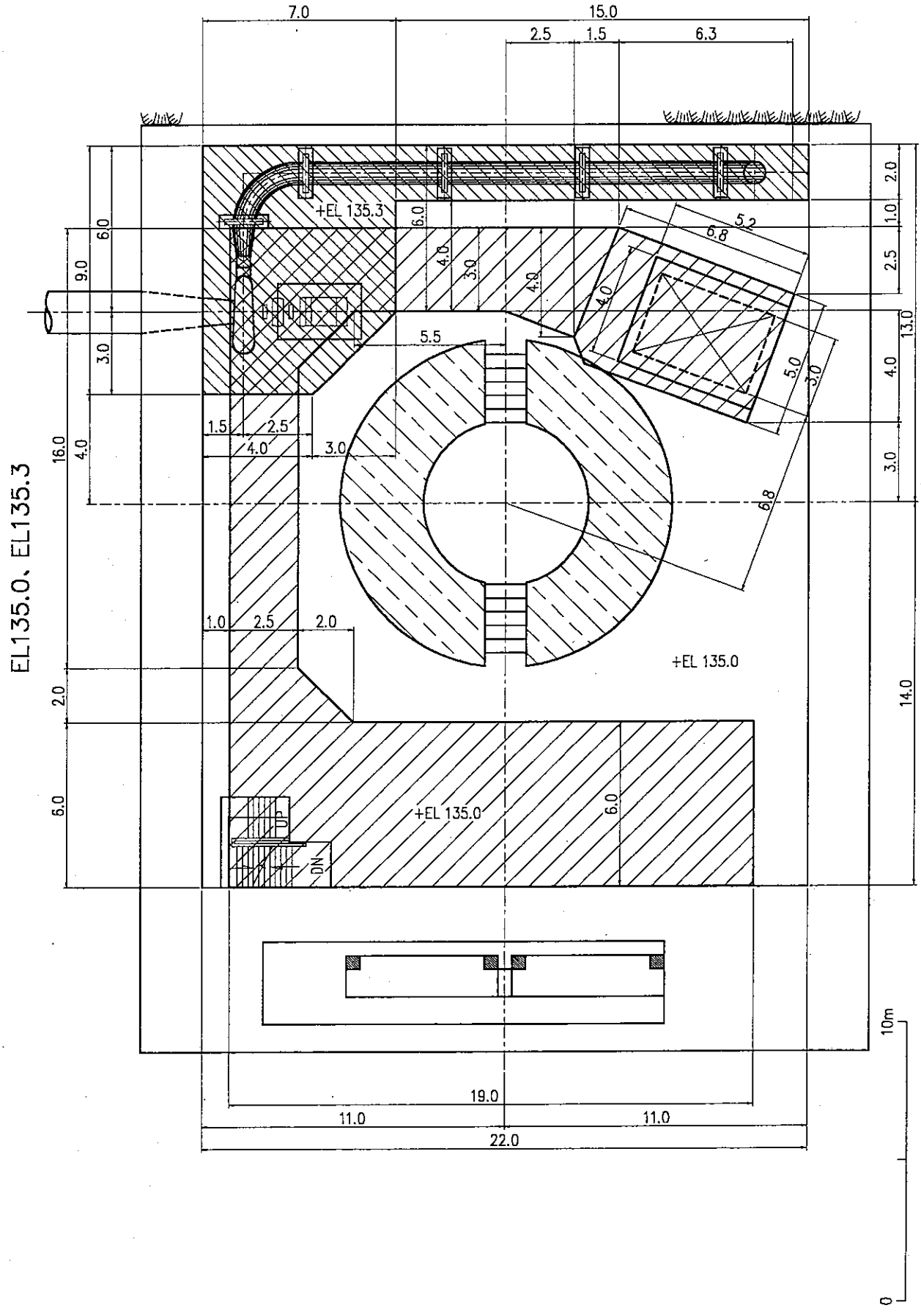
Powerhouse (Casing Concrete)



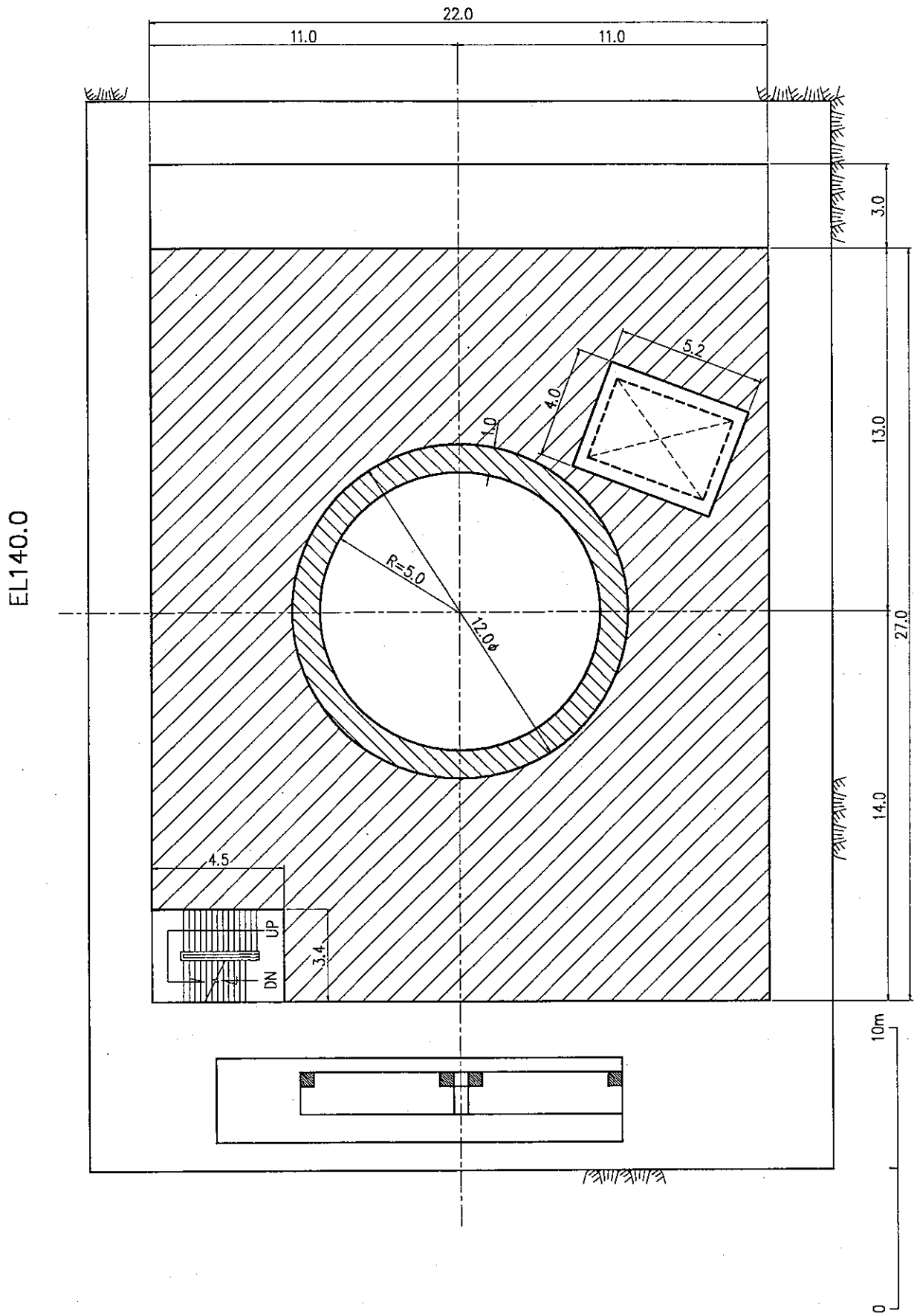
Powerhouse (Casing Concrete)



Powerhouse (Slab Concrete)



Powerhouse (Slab Concrete)



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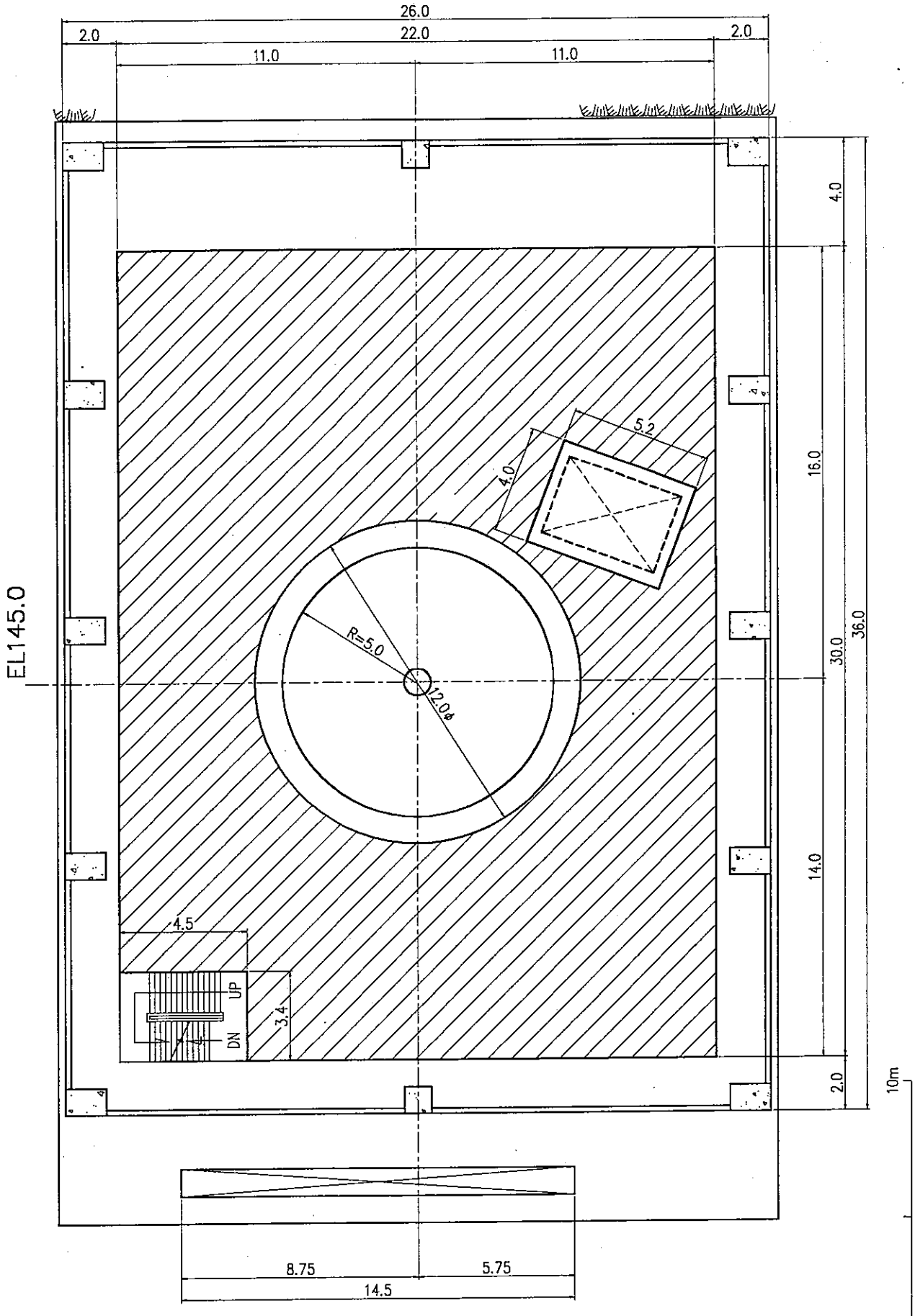
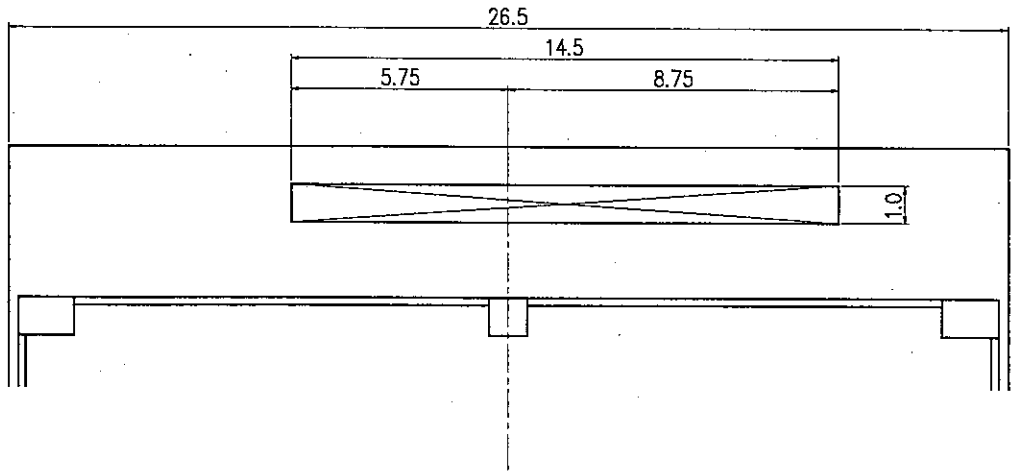
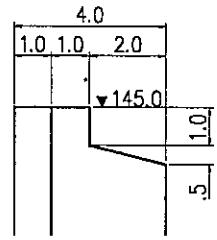
Powerhouse (Slab Concrete)

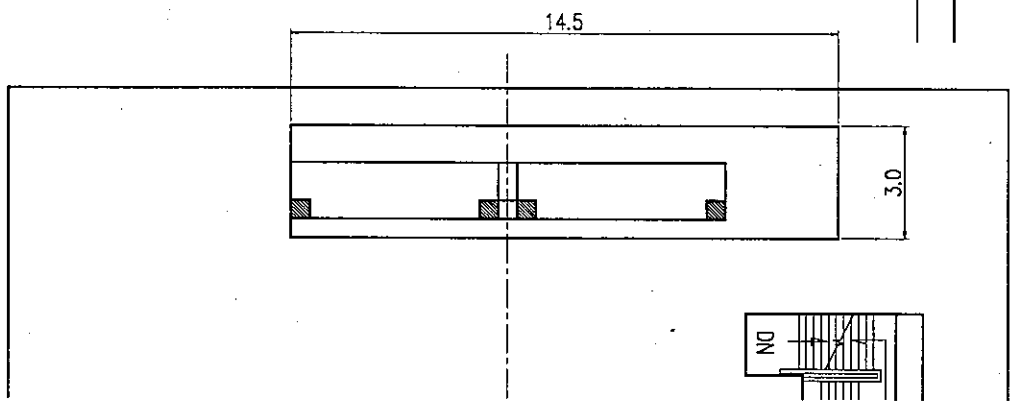


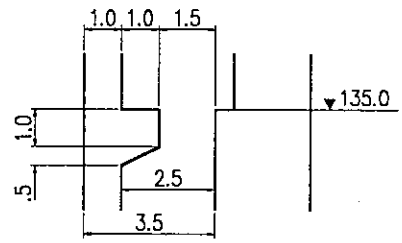
EL145.0



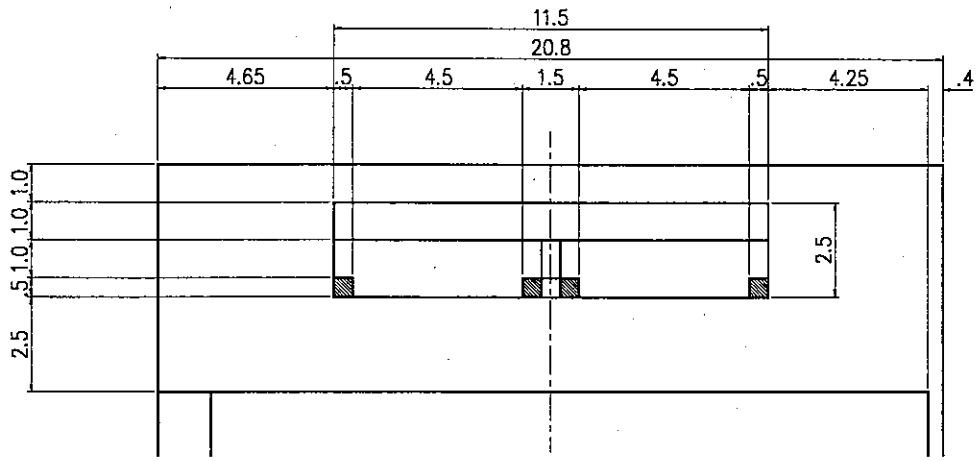


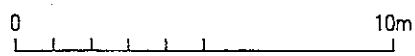
EL143.5~EL135.0



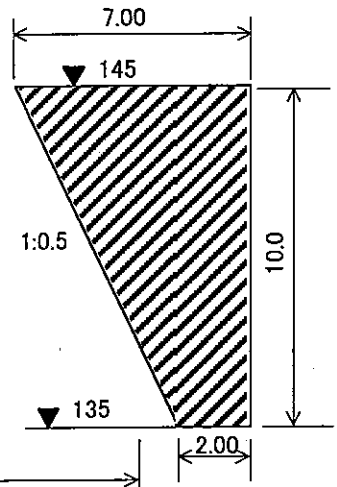


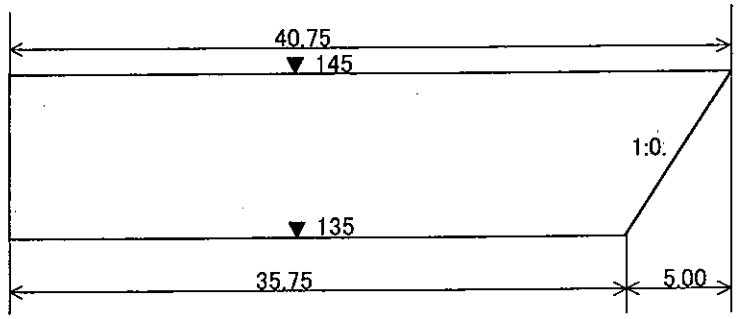
EL133.5~EL127.0



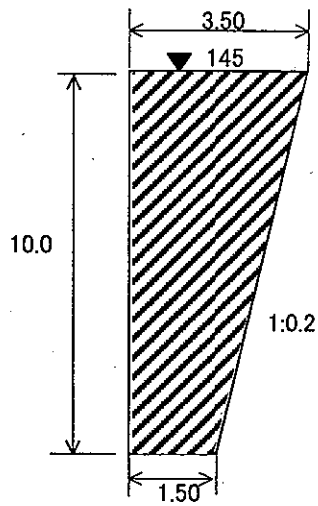


Type of Works	Calculation		Quantity
<Reinforced Bar>			
1)Reinforced bar of the concrete around barrel			
$W_{①}$ = 479.10 × 80 kg/m^3	= 38.3 t		
2)Reinforced bar of the concrete around casing			
$W_{②}$ = 1410.6 × 100 kg/m^3	= 141.1 t		
3)Reinforced bar of the concrete around draft			
$W_{③}$ = 2192.3 × 50 kg/m^3	= 109.6 t		
4)Reinforced bar of the sidewall concrete			
$W_{④}$ = 6672.8 × 60 kg/m^3	= 400.4 t		
5)Reinforced bar of the sidewall slab concrete			
$W_{⑤}$ = 738.3 × 60 kg/m^3	= 44.3 t		
Total W =	733.7 t		733.7 t
<Reference data : Back-filling>			
1)Mountain side			
A = (7.0 + 2.0) / 2 × 10.0 = 45.0 m^2			
V = 45.0 × (35.75 + 5.0 / 2) = 1,721.3 m^3			





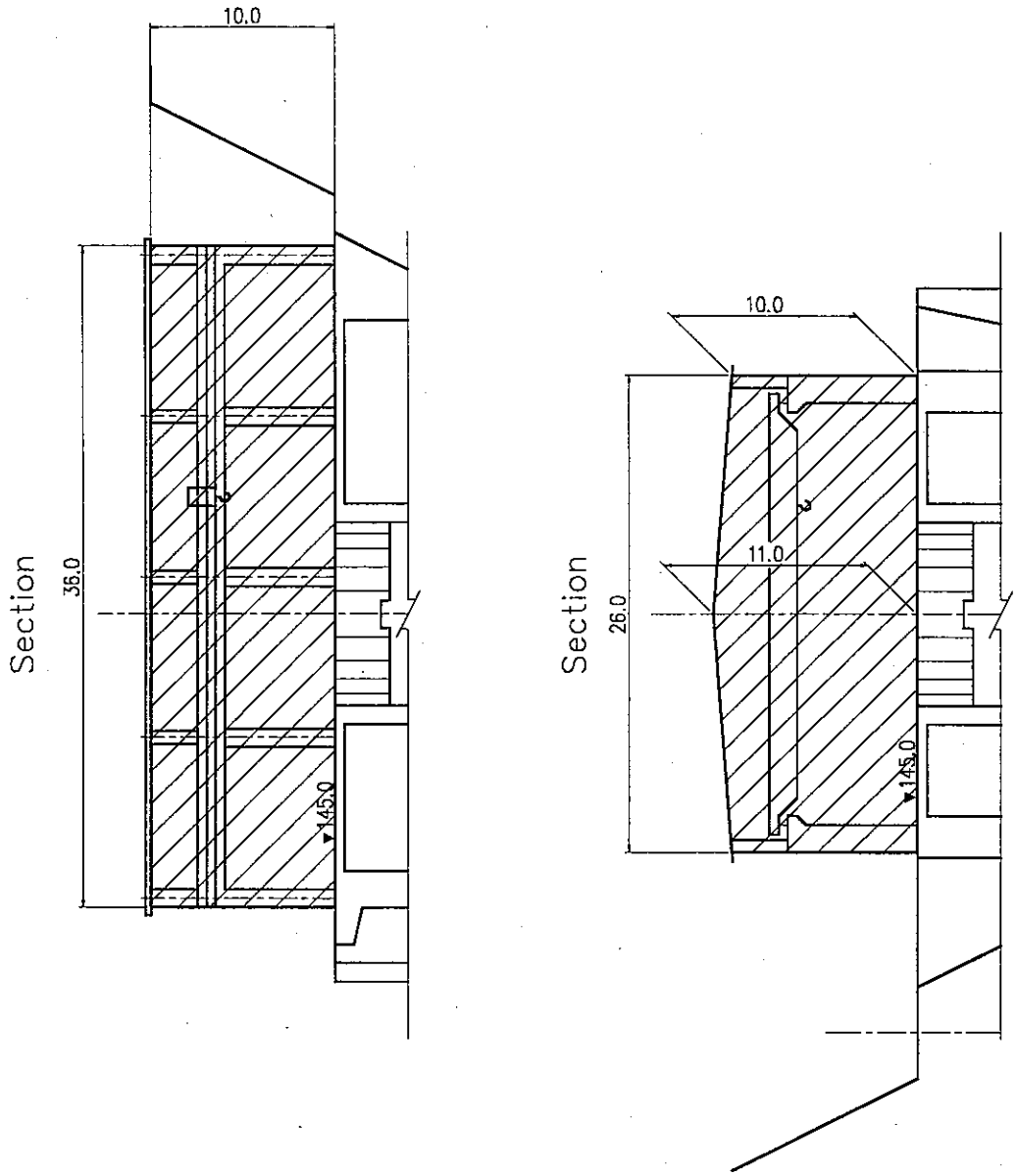
Type of Works	Calculation	Quantity
	(2)River side A = (3.5 + 1.5) / 2 × 10.0 = 25.0 m^2 V = 25.0 × (35.75 + 5.0 / 2) = 956.3 m^3 ΣV = 1,721.3 + 956.3 =	2,677.6 m^3



b) Control Building

Type of Works	Calculation	Quantity
<Control Building>		
	The total volume of control building : V m^3	
	V= (10.0 × 26.0 + 1/2 × 1.00 × 26.0) × 36.00 =	9,828 m^3

Powerhouse Control Building



(c) Outlet

Type of Works	Calculation	Quantity

<Common Excavation and Rock Excavation>

Common Excavation and Rock Excavation

Elevation	Head (m)	Sectional Area (m^2)	Mean Area (m^2)	Volume (m^3)	Total Volume (m^3)	Notes
EL125.0		103.3				
EL130.0	5.0	1,404.6	754.0	3,769.8	3,769.8	
EL135.0	5.0	657.3	1,031.0	5,154.8	8,924.5	
EL135.0	0.0	748.2	702.8	0.0	8,924.5	
EL145.0	10.0	686.6	717.4	7,174.0	16,098.5	

Estimated Ratio‥(Common Excavation) : (Rock Excavation) = 3 : 7

(1) Common Excavation

$V = 16,098.5 \times 0.3$ = 4,829.6 m^3

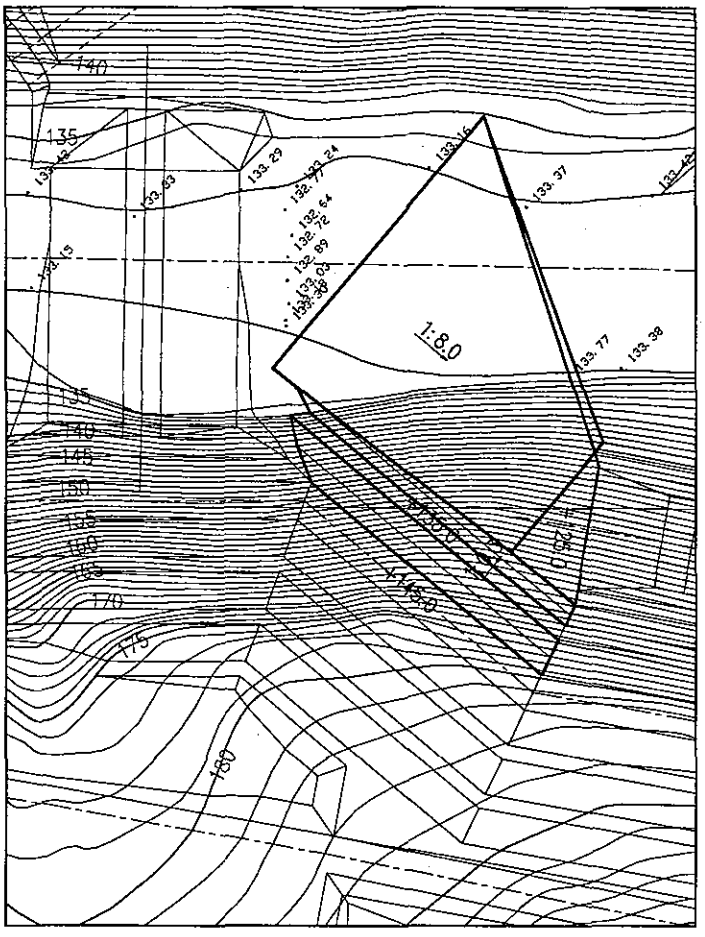
(2) Rock Excavation

$V = 16,098.5 \times 0.7$ = 11,269.0 m^3

829

Outlet–Excavation

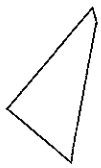
Plan



830

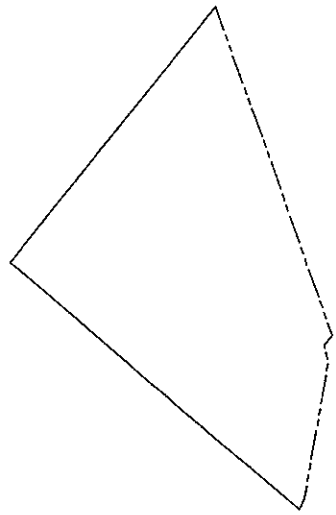
Outlet—Excavation

EL 125.0



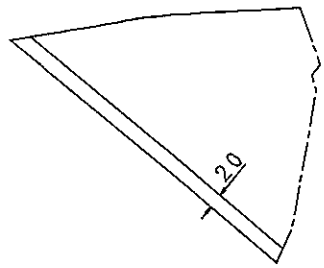
EL 125.0 A= 103.3m²

EL 130.0



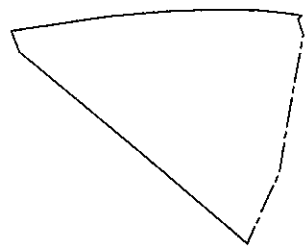
EL 130 0 A= 1,404.6m²

EL 135.0



EL 135.0 A= 748.2m²
EL 135.0 A= 657.3m²

EL 145.0



EL 145.0 A= 686.6m²

0 40m

(d) Switchyard

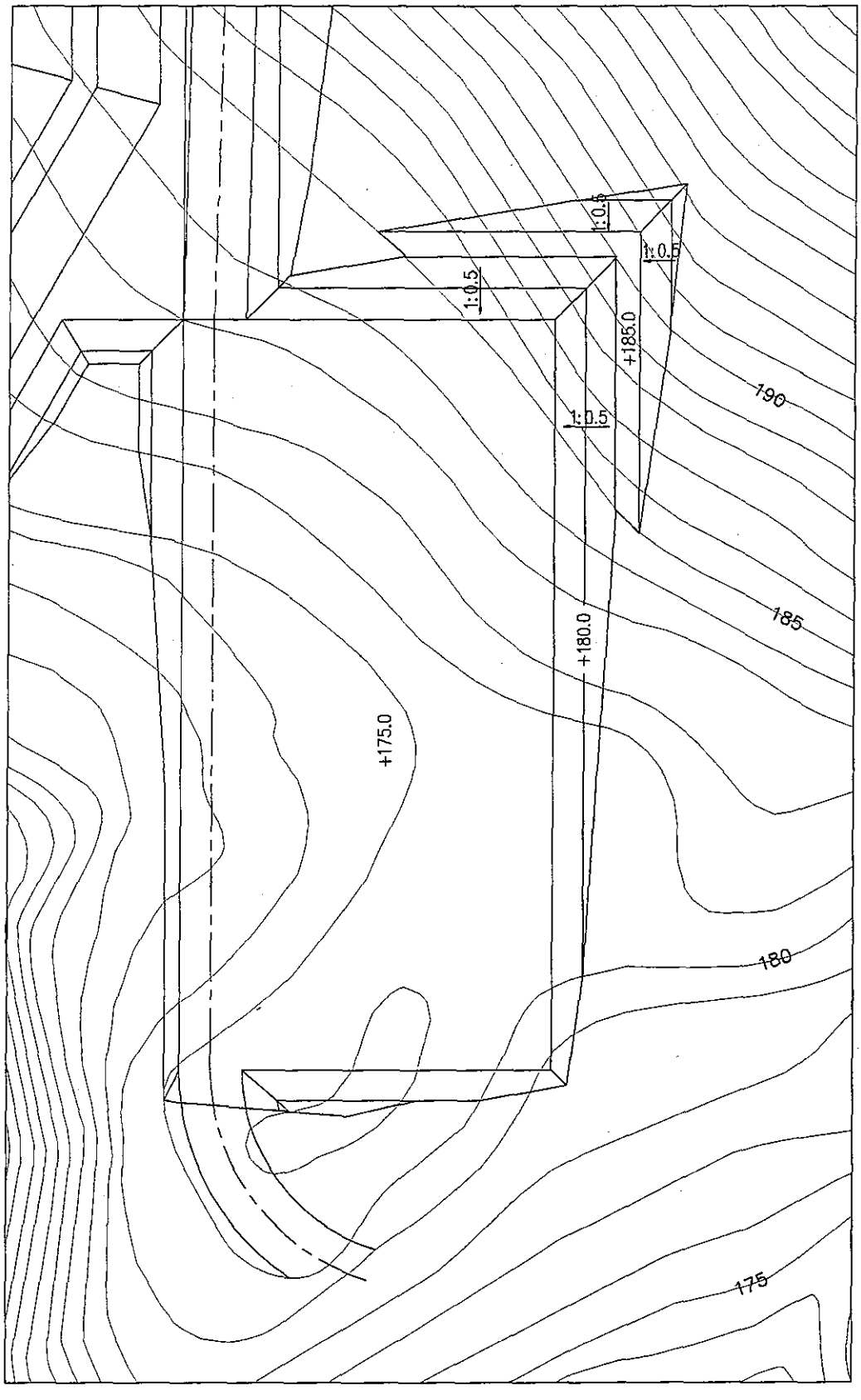
Type of Works	Calculation	Quantity
< Common Excavation >		

Elevation (m)	Head (m)	Section Area (m^2)	Mean Area (m^2)	Volume (m^3)	Total Volume (m^3)	Notes
EL175.0		1,814.3				
EL180.0	5.0	1,584.3	1,699.3	8,496.5	8,496.5	
EL185.0	5.0	163.9	874.1	4,370.5	12,867.0	
EL185.0	0.0	247.2	205.6	0.0	12,867.0	
EL193.0	8.0	0.0	123 6	988.8	13,855.8	

$\Sigma V =$ 13,855.8 m^3

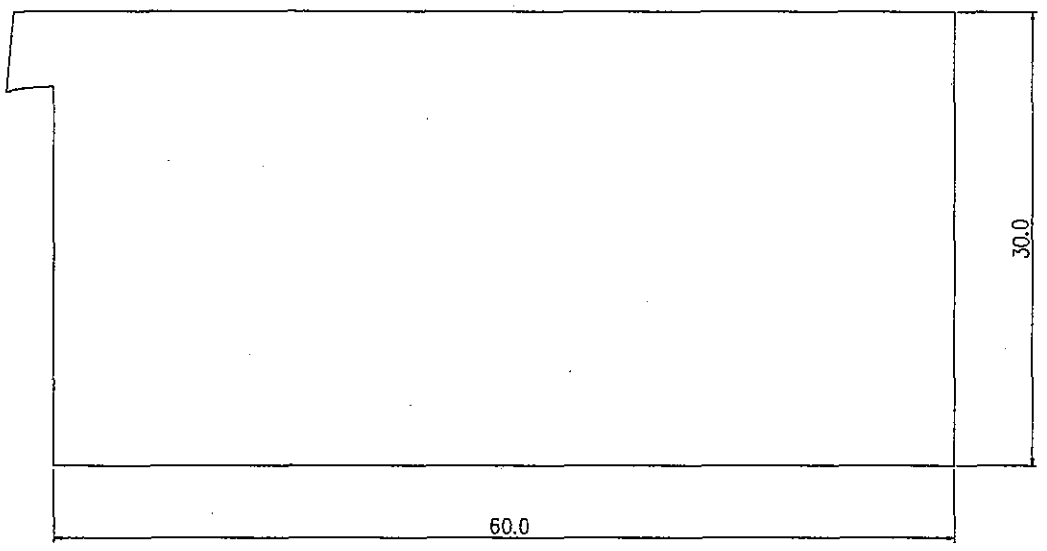
Switchyard—Excavation

Plan



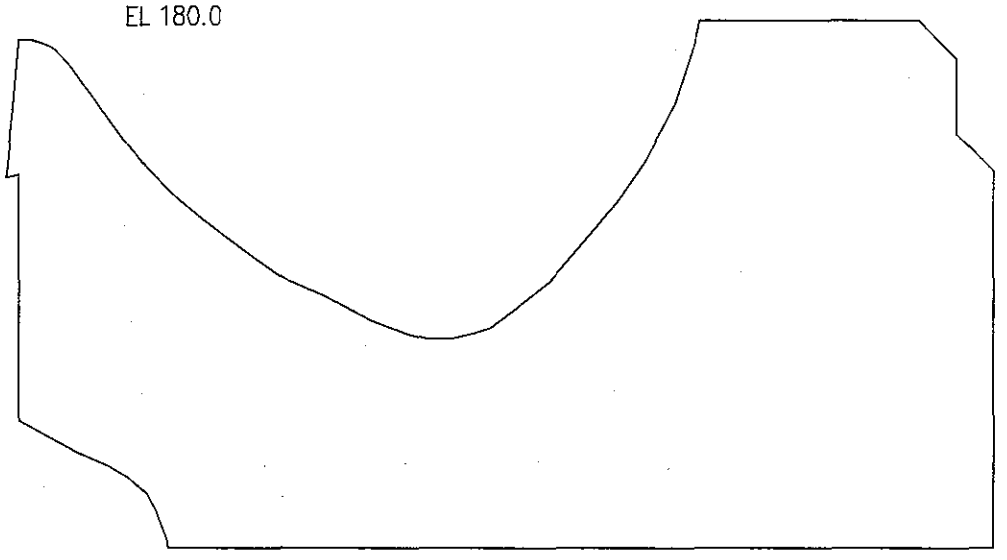
Switchyard—Excavation

EL 175.0



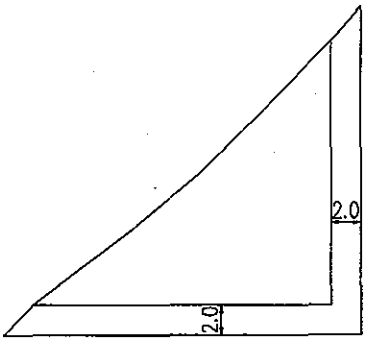
EL 175.0 A= 1,814.3m²

EL 180.0

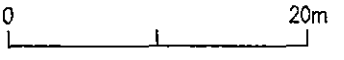


EL 180.0 A= 1,584.3m²

EL 185.0



EL 185.0 A= 247.2m²
EL 185.0 A= 163.9m²



Appendix 12.3.3

Hydromechanical Equipment

835
(836)

Spillway Gate

[Table] The Executive Results of Spilway Gate (Gate of Crest Radial Type)

Gate Type	Span B (m)	Height H (m)	Design Water Depth h(m)	Outlet Discharge (m^3/s/Gate)	Weight/Gate (ton)	$B^2 \times H \times h$	Hoist (ton)
Crest Radial	7.00	9.30	9.13	255.50	34.924	4,161	28.178
〃	7.00	10.80	11.64	387.50	50.000	6,160	34.2
〃	9.50	11.00	12.10	667.00	61.400	12,012	31.7
〃	8.60	12.37	13.77	875.00	77.300	12,593	29.8
〃	8.00	9.93	12.43	262.10	54.600	7,898	23.2
〃	12.00	7.94	8.64	450.00	45.150	9,876	18.036
〃	9.50	11.15	11.65	653.00	67.920	11,723	27.301
〃	10.50	8.00	8.20	375.00	37.600	7,232	22.1
〃	9.50	11.50	12.60	550.00	59.400	13,077	
〃	12.00	12.05	12.25	500.00	82.970	21,256	29.517
〃	8.20	9.93	11.32	60.00	50.500	7,558	27.1
〃	11.50	7.39	9.56	565.00	56.540	9,343	28.123
〃	10.00	12.83	13.00	800.00	69.000	16,679	19.9
〃	7.35	7.31	7.91	243.00	24.500	3,124	20.958
〃	7.40	11.96	11.99	544.00	55.080	7,853	22.028
〃	10.70	18.75	18.99	2,067.00	186.300	40,766	88.6
〃	9.00	7.79	7.79	323.00	30.100	4,915	12.3
〃	7.00	7.30	7.30	203.00	26.700	2,611	11.214
〃	9.00	6.60	6.60	336.00	30.000	3,528	12.5
〃	7.00	7.45	8.35	243.00	24.680	3,048	10.468
〃	8.00	8.06	9.37	350.00	34.000	4,833	22.784
〃	9.30	8.72	10.72	500.00	42.630	8,085	23.1
Chaparral	13.20	15.20	13.50		158.200	35,754	67.2
La Honda	12.50	15.20	13.50		143.500	32,063	61.3

Notes; 1. The span is the space of the pier.
2. The height is calculated by the next formura. : 13.5m(High water-level)＋1.7m＝15.2m

Chaparral

Form of gate $Y = 0.004 \times 35,754 + 15.208 \fallingdotseq 158.2$ ton／Gate
Hoist $Y = 0.0016 \times 35,754 + 9.9847 \fallingdotseq 67.19$ ton／Gate

Spillway Gate : 5 Gates	158.2／Gate × 5 Gates＝	791.0	ton
Hoist	67.2／Unit × 5 Units＝	336.0	ton
Total		1127.0	ton

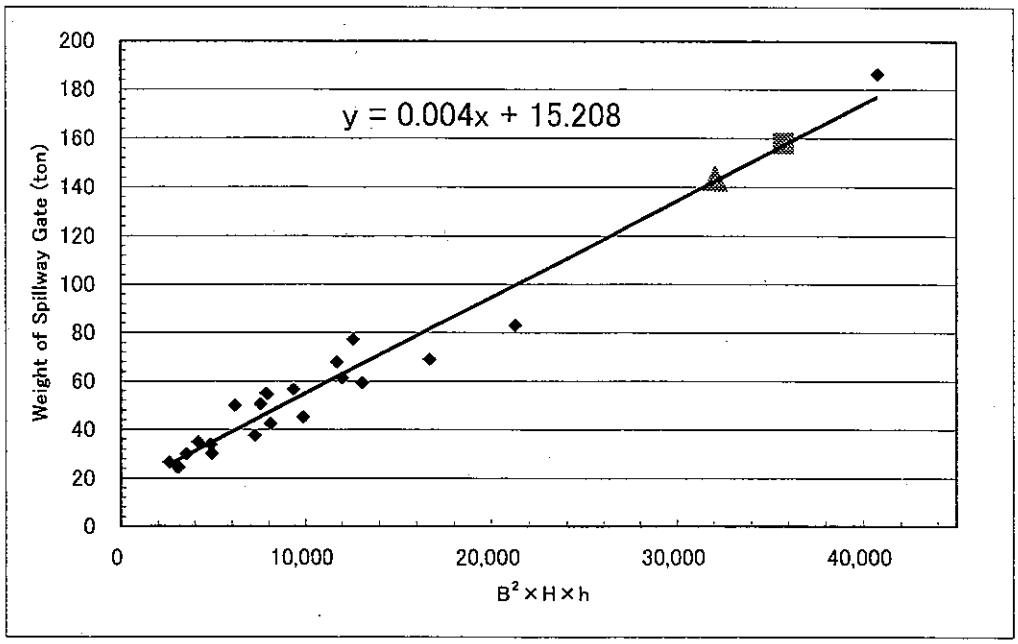
1,127 ton

La Honda

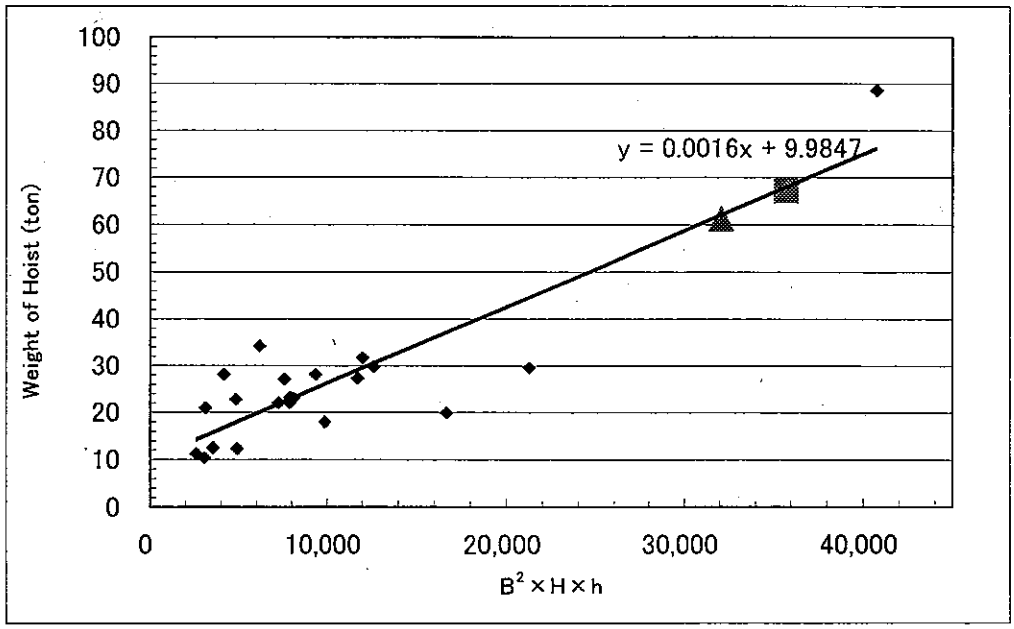
Form of gate $Y = 0.004 \times 32,063 + 15.208 \fallingdotseq 143.5$ ton／Gate
Hoist $Y = 0.0016 \times 32,063 + 9.9847 \fallingdotseq 61.3$ ton／Gate

Spillway Gate : 5 Gates	143.5／Gate × 5 Gates＝	717.5	ton
Hoist	61.3／Unit × 5 Units＝	306.5	ton
Total		1,024.0	ton

Weight of Spillway Gate



Weight of Hoist



Intake Gate

[Table] The Executive Results of Intake Gate and Outlet Gate
(High-pressure Fixed Roller Gate)

	Span B (m)	Height H (m)	Design Water Depth h(m)	Quantity of Water Intake Q(m^3/s)	Weight/Gate (ton)	$B^2 \times H \times h$	Hoist (ton)
Roller Gate	1.50	1.50	30.85		2.10	104	3.2
〃	2.00	2.60	47.42		15.04	493	5.98
〃	2.40	2.60	71.39		12.96	1,069	11.429
〃	2.45	2.45	11.40		14.10	168	9.6
〃	8.00	13.00	12.57		56.80	10,458	23.5
〃	7.30	7.30	45.91		109.30	17,860	53.9
〃	8.00	8.00	48.33		121.40	24,745	60.235
〃	2.50	2.50	13.10		6.00	205	5
〃	3.00	4.60	18.83		10.83	780	13.479
〃	4.85	5.00	10.13		18.48	1,191	12.495
〃	2.30	2.30	16.34		9.00	199	
〃	6.00	4.15	5.70		11.10	852	6.096
〃	4.30	6.00	50.80		58.84	5,636	47.555
〃	2.50	2.50	18.00		5.24	281	6.57
〃	2.90	3.22	30.40		12.60	823	17
Slide Gate	2.30	2.38	13.74	19.00	4.40	173	
〃	5.00	5.00	31.00	0.36	30.81	3,874	
〃	5.50	5.50	83.10		60.25	13,826	
J-Power Project	6.30	6.30	9.10		18.00	2,275	9.878

Chaparral							
Intake Gate	7.00	7.00	26.00		54.05	8,918	29.81
Outlet Gate	5.75	5.15	12.00		19.68	2,043	14

La Honda							
Intake Gate	7.00	7.00	42.50		82.35	14,578	42.83
Outlet Gate	5.75	5.15	12.00		19.68	2,043	14

Notes; The length of span or height is the dimension of the intake or outlet plus 0.5m.

Chaparral

[By the use of approximate formula of roller gate]

Intake Gate $Y = 0.005 \times 8,918 + 9.4606 \fallingdotseq 54.05$ (ton)
Outlet Gate $Y = 0.005 \times 2,043 + 9.4606 \fallingdotseq 19.68$ (tor (Per 1 Gate)
Hoist of intake gate $Y = 0.0023 \times 8,918 + 9.2986 \fallingdotseq 29.81$ (ton)
Hoist of outlet gate $Y = 0.0023 \times 2,043 + 9.2986 \fallingdotseq 14.00$ (ton)

Intake Gate(Incrude Hoist)	83.86 ton/gate×1 gate =	83.86	ton
Outlet Gate(Incrude Hoist)	33.68 ton/gate×2 gates=	67.36	ton
		151.22	ton

Intake Gate 84 ton

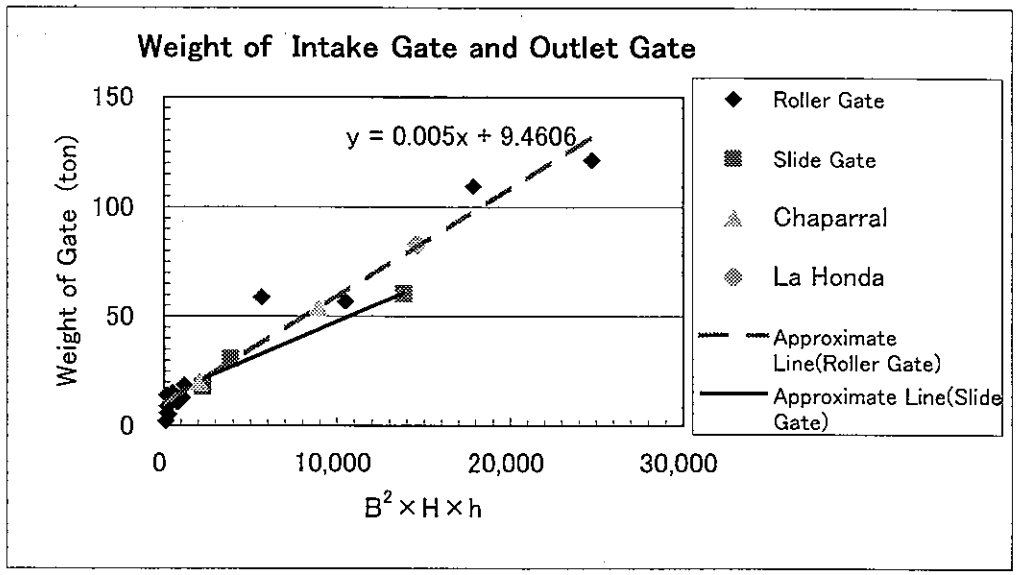
La Honda

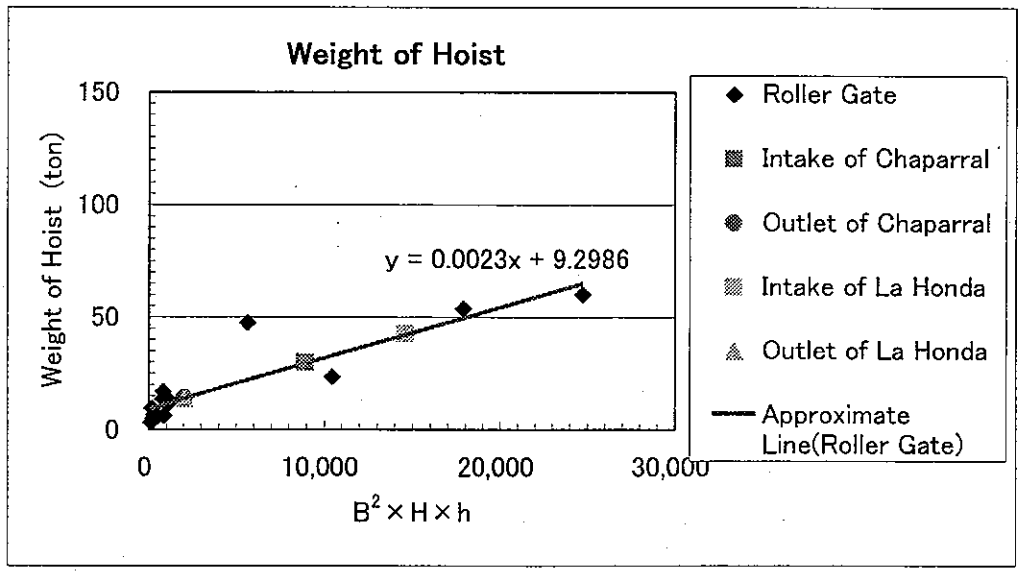
[By the use of approximate formula of roller gate]

Intake Gate $Y = 0.005 \times 14,578 + 9.4606 \fallingdotseq 82.35$ (ton)
Outlet Gate $Y = 0.005 \times 2,043 + 9.4606 \fallingdotseq 19.68$ (tc (Per 1 Gate)
Hoist of intake gate $Y = 0.0023 \times 14,578 + 9.2986 \fallingdotseq 42.83$ (ton)
Hoist of outlet gate $Y = 0.0023 \times 2,043 + 9.2986 \fallingdotseq 14.00$ (ton)

Intake Gate(Incrude Hoist)	125.18 ton/gate×1 gate =	125.18	ton
Outlet Gate(Incrude Hoist)	33.68 ton/gate×2 gates=	67.36	ton
		192.54	ton

839


Weight of Intake Gate and Outlet Gate
Weight of Gate (ton)
150
100
50
0
y = 0.005x + 9.4606
0
10,000
20,000
30,000
B² × H × h
Roller Gate
Slide Gate
Chaparral
La Honda
Approximate Line(Roller Gate)
Approximate Line(Slide Gate)


Weight of Hoist
Weight of Hoist (ton)
150
100
50
0
y = 0.0023x + 9.2986
0
10,000
20,000
30,000
B² × H × h
Roller Gate
Intake of Chaparral
Outlet of Chaparral
Intake of La Honda
Outlet of La Honda
Approximate Line(Roller Gate)

840

Intake Screen

	Span B (m)	Height H (m)	Design Water Depth h(m)	Quantity of Water Intake Q(m^3/s)	Weight/Screen (ton)	$B^2 \times H \times h$
Chaparral	10.00	10.00	26.00	100.00	2.10	26,000
La Honda	10.00	10.00	42.50	100.00	2.10	42,500

The weight of the intake screen is estimated by the actual results of J-Power Project.

Chaparral $W = 10\ m \times 10\ m \times 200\ kg/m^2 = 20,000\ (kg) = 20\ (ton)$

Intake Screen 20 (ton)

La Honda $W = 10\ m \times 10\ m \times 200\ kg/m^2 = 20,000\ (kg) = 20\ (ton)$

841

Outlet Gate

[Table] The Executive Results of Intake Gate and Outlet Gate
(High-pressure Fixed Roller Gate)

	Span B (m)	Height H (m)	Design Water Depth h(m)	Quantity of Water Intake Q(m^3/s)	Weight/Gate (ton)	$B^2 \times H \times h$	Hoist (ton)
Roller Gate	1.50	1.50	30.85		2.10	104	3.2
〃	2.00	2.60	47.42		15.04	493	5.98
〃	2.40	2.60	71.39		12.96	1,069	11.429
〃	2.45	2.45	11.40		14.10	168	9.6
〃	8.00	13.00	12.57		56.80	10,458	23.5
〃	7.30	7.30	45.91		109.30	17,860	53.9
〃	8.00	8.00	48.33		121.40	24,745	60.235
〃	2.50	2.50	13.10		6.00	205	5
〃	3.00	4.60	18.83		10.83	780	13.479
〃	4.85	5.00	10.13		18.48	1,191	12.495
〃	2.30	2.30	16.34		9.00	199	
〃	6.00	4.15	5.70		11.10	852	6.096
〃	4.30	6.00	50.80		58.84	5,636	47.555
〃	2.50	2.50	18.00		5.24	281	6.57
〃	2.90	3.22	30.40		12.60	823	17
Slide Gate	2.30	2.38	13.74	19.00	4.40	173	
〃	5.00	5.00	31.00	0.36	30.81	3,874	
〃	5.50	5.50	83.10		60.25	13,826	
J-Power Project	6.30	6.30	9.10		18.00	2,275	9.878
Chaparral							
Intake Gate	7.00	7.00	26.00		54.05	8,918	29.81
Outlet Gate	5.75	5.15	12.00		19.68	2,043	14
La Honda							
Intake Gate	7.00	7.00	42.50		82.35	14,578	42.83
Outlet Gate	5.75	5.15	12.00		19.68	2,043	14

Notes; The length of span or height is the dimension of the intake or outlet plus 0.5m.

Chaparral

[By the use of approximate formula of roller gate]

Intake Gate $Y = 0.005 \times 8,918 + 9.4606 \fallingdotseq 54.05$ (ton)
Outlet Gate $Y = 0.005 \times 2,043 + 9.4606 \fallingdotseq 19.68$ (tor (Per 1 Gate)
Hoist of intake gate $Y = 0.0023 \times 8,918 + 9.2986 \fallingdotseq 29.81$ (ton)
Hoist of outlet gate $Y = 0.0023 \times 2,043 + 9.2986 \fallingdotseq 14.00$ (ton)

Intake Gate(Incrude Hoist)	83.86 ton/gate×1 gate =	83.86	ton
Outlet Gate(Incrude Hoist)	33.68 ton/gate×2 gates=	67.36	ton
		151.22	ton

Outlet Gate 68 ton

La Honda

[By the use of approximate formula of roller gate]

Intake Gate $Y = 0.005 \times 14,578 + 9.4606 \fallingdotseq 82.35$ (ton)
Outlet Gate $Y = 0.005 \times 2,043 + 9.4606 \fallingdotseq 19.68$ (tc (Per 1 Gate)
Hoist of intake gate $Y = 0.0023 \times 14,578 + 9.2986 \fallingdotseq 42.83$ (ton)
Hoist of outlet gate $Y = 0.0023 \times 2,043 + 9.2986 \fallingdotseq 14.00$ (ton)

Intake Gate(Incrude Hoist)	125.18 ton/gate×1 gate =	125.18	ton
Outlet Gate(Incrude Hoist)	33.68 ton/gate×2 gates=	67.36	ton
		192.54	ton

Chapater 14 : Economic and Financial Evaluation

Appendix 14.1: Economic / Financial Evaluation

Appendix 14.2: Cash Flow Analysis – Case A

Appendix 14.3: Cash Flow Analysis – Case B

Appendix 14.4: Cash Flow Analysis – Case C

Appendix 14.1: Economic/Financial Evaluation

Tabla 14.3 Evaluación Económica

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh		
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 10%

Planta térmica alternativa

Capacidad instalada	46.0 MW		
Costo de invesión	46,000 1000US$	100%	44,200
Precio de combustib	0.63 US$/galo	100%	0.63

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	10,680
T.I.R.E.	11.3%
B / C	1.10

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO								(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CREDITO CO_2				PLANTA ALTERNATIVA					
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Costo Construcc.	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0				0	0	-28,561
2		2008	28,429	1,061		29,489				0	0			0	0	-29,489
3		2009	49,524	1,212		50,737				0	27,600			27,600	27,600	-23,137
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	0	18,400	1,017	3,797	23,213	23,213	2,863
5	2	2011			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
6	3	2012			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
7	4	2013			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
8	5	2014			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
9	6	2015			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
10	7	2016			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
11	8	2017			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
12	9	2018			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
13	10	2019			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
14	11	2020			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
15	12	2021			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
16	13	2022			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
17	14	2023			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
18	15	2024			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
19	16	2025			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
20	17	2026			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
21	18	2027			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
22	19	2028			931	931	115,199	-5,760	0.000	0	0	2,440	9,112	11,552	11,552	10,621
23	20	2029			931	931	115,199	-5,760	0.000	0	27,600	2,440	9,112	39,152	39,152	38,221
24	21	2030			931	931	115,199	-5,760	0.000	0	18,400	2,440	9,112	29,952	29,952	29,021
25	22	2031			931	931	67,199	-960	0.000	0		2,440	9,112	11,552	11,552	10,621
26	23	2032			931	931				0		2,440	9,112	11,552	11,552	10,621
27	24	2033			931	931				0		2,440	9,112	11,552	11,552	10,621
28	25	2034			931	931				0		2,440	9,112	11,552	11,552	10,621
29	26	2035			931	931				0		2,440	9,112	11,552	11,552	10,621
30	27	2036			931	931				0		2,440	9,112	11,552	11,552	10,621
31	28	2037		455	931	1,385				0		2,440	9,112	11,552	11,552	10,167
32	29	2038		1,061	931	1,991				0		2,440	9,112	11,552	11,552	9,561
33	30	2039		1,212	931	2,143				0		2,440	9,112	11,552	11,552	9,409
34	31	2040		303	931	1,234				0		2,440	9,112	11,552	11,552	10,318
35	32	2041			931	931				0		2,440	9,112	11,552	11,552	10,621
36	33	2042	4,183		931	5,113				0		2,440	9,112	11,552	11,552	6,439
37	34	2043	8,075		931	9,005				0		2,440	9,112	11,552	11,552	2,547
38	35	2044	14,412		931	15,343				0		2,440	9,112	11,552	11,552	-3,791
39	36	2045	8,213		931	9,144				0		2,440	9,112	11,552	11,552	2,408
40	37	2046			931	931				0		2,440	9,112	11,552	11,552	10,621
41	38	2047			931	931				0		2,440	9,112	11,552	11,552	10,621
42	39	2048			931	931				0	0	2,440	9,112	11,552	11,552	10,621
43	40	2049			931	931				0	27,600	2,440	9,112	39,152	39,152	38,221
44	41	2050			931	931				0	18,400	2,440	9,112	29,952	29,952	29,021
45	42	2051			931	931				0		2,440	9,112	11,552	11,552	10,621
46	43	2052			931	931				0		2,440	9,112	11,552	11,552	10,621
47	44	2053			931	931				0		2,440	9,112	11,552	11,552	10,621
48	45	2054			931	931				0		2,440	9,112	11,552	11,552	10,621
49	46	2055			931	931				0		2,440	9,112	11,552	11,552	10,621
50	47	2056			931	931				0		2,440	9,112	11,552	11,552	10,621
51	48	2057			931	931				0		2,440	9,112	11,552	11,552	10,621
52	49	2058			931	931				0		2,440	9,112	11,552	11,552	10,621
53	50	2059	-19,933	-1,010	931	-20,012				0	-23,000	2,440	9,112	-11,448	-11,448	8,564
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	0	115,000	120,589	450,283	685,872	685,872	494,157
Valor Presente i = 10%					VP (Costo):	109,614							VP (Beneficio):		120,294	10,680
															V.P.N.	10,680
															T.I.R.E.	11.3%
															B / C	1.10

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.3 Evaluación Económica

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh		
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 8%

Planta térmica alternativa

Capacidad instalada	46.0 MW			
Costo de invesión	46,000 1000US$	100%	44,200	
Precio de combustib	0.63 US$/galon	100%	0.63	

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	**34,388**
T.I.R.E.	**11.3%**
B / C	**1.29**

(unidad: US$1000)

No.		AÑO	COSTO				BENEFICIO										(B) - (C)
			PROYECTO EL CHAPARRAL			(C)	CREDITO CO_2				PLANTA ALTERNATIVA				(B)		
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Costo Construcc.	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO		
1		2007	28,106	455		28,561				0				0	0		-28,561
2		2008	28,429	1,061		29,489				0	0			0	0		-29,489
3		2009	49,524	1,212		50,737				0	27,600			27,600	27,600		-23,137
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	0	18,400	1,017	3,797	23,213	23,213		2,863
5	2	2011			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
6	3	2012			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
7	4	2013			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
8	5	2014			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
9	6	2015			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
10	7	2016			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
11	8	2017			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
12	9	2018			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
13	10	2019			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
14	11	2020			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
15	12	2021			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
16	13	2022			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
17	14	2023			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
18	15	2024			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
19	16	2025			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
20	17	2026			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
21	18	2027			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552		10,621
22	19	2028			931	931	115,199	-5,760	0.000	0	0	2,440	9,112	11,552	11,552		10,621
23	20	2029			931	931	115,199	-5,760	0.000	0	27,600	2,440	9,112	39,152	39,152		38,221
24	21	2030			931	931	115,199	-5,760	0.000	0	18,400	2,440	9,112	29,952	29,952		29,021
25	22	2031			931	931	67,199	-960	0.000	0		2,440	9,112	11,552	11,552		10,621
26	23	2032			931	931				0		2,440	9,112	11,552	11,552		10,621
27	24	2033			931	931				0		2,440	9,112	11,552	11,552		10,621
28	25	2034			931	931				0		2,440	9,112	11,552	11,552		10,621
29	26	2035			931	931				0		2,440	9,112	11,552	11,552		10,621
30	27	2036			931	931				0		2,440	9,112	11,552	11,552		10,621
31	28	2037		455	931	1,385				0		2,440	9,112	11,552	11,552		10,167
32	29	2038		1,061	931	1,991				0		2,440	9,112	11,552	11,552		9,561
33	30	2039		1,212	931	2,143				0		2,440	9,112	11,552	11,552		9,409
34	31	2040		303	931	1,234				0		2,440	9,112	11,552	11,552		10,318
35	32	2041			931	931				0		2,440	9,112	11,552	11,552		10,621
36	33	2042	4,183		931	5,113				0		2,440	9,112	11,552	11,552		6,439
37	34	2043	8,075		931	9,005				0		2,440	9,112	11,552	11,552		2,547
38	35	2044	14,412		931	15,343				0		2,440	9,112	11,552	11,552		-3,791
39	36	2045	8,213		931	9,144				0		2,440	9,112	11,552	11,552		2,408
40	37	2046			931	931				0		2,440	9,112	11,552	11,552		10,621
41	38	2047			931	931				0		2,440	9,112	11,552	11,552		10,621
42	39	2048			931	931				0	0	2,440	9,112	11,552	11,552		10,621
43	40	2049			931	931				0	27,600	2,440	9,112	39,152	39,152		38,221
44	41	2050			931	931				0	18,400	2,440	9,112	29,952	29,952		29,021
45	42	2051			931	931				0		2,440	9,112	11,552	11,552		10,621
46	43	2052			931	931				0		2,440	9,112	11,552	11,552		10,621
47	44	2053			931	931				0		2,440	9,112	11,552	11,552		10,621
48	45	2054			931	931				0		2,440	9,112	11,552	11,552		10,621
49	46	2055			931	931				0		2,440	9,112	11,552	11,552		10,621
50	47	2056			931	931				0		2,440	9,112	11,552	11,552		10,621
51	48	2057			931	931				0		2,440	9,112	11,552	11,552		10,621
52	49	2058			931	931				0		2,440	9,112	11,552	11,552		10,621
53	50	2059	-19,933	-1,010	931	-20,012				0	-23,000	2,440	9,112	-11,448	-11,448		8,564
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	0	115,000	120,589	450,283	685,872	685,872		494,157
Valor Presente i = 8%					VP (Costo):	117,125							VP (Beneficio):		151,513		34,388
															V.P.N.		34,388
															T.I.R.E.		11.3%
															B / C		1.29

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.3 Evaluación Económica

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh		
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 6%

Planta térmica alternativa

Capacidad instalada	46.0 MW			
Costo de invesión	46,000 1000US$	100%	44,200	
Precio de combustib	0.63 US$/galo	100%	0.63	

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	72,822
T.I.R.E.	11.3%
B / C	1.57

(unidad: US$1000)

No.		AÑO	COSTO				BENEFICIO									(B) - (C)
			PROYECTO EL CHAPARRAL			(C)	CREDITO CO_2				PLANTA ALTERNATIVA				(B)	
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Costo Construcc.	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0				0	0	-28,561
2		2008	28,429	1,061		29,489				0	0			0	0	-29,489
3		2009	49,524	1,212		50,737				0	27,600			27,600	27,600	-23,137
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	0	18,400	1,017	3,797	23,213	23,213	2,863
5	2	2011			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
6	3	2012			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
7	4	2013			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
8	5	2014			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
9	6	2015			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
10	7	2016			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
11	8	2017			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
12	9	2018			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
13	10	2019			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
14	11	2020			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
15	12	2021			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
16	13	2022			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
17	14	2023			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
18	15	2024			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
19	16	2025			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
20	17	2026			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
21	18	2027			931	931	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,621
22	19	2028			931	931	115,199	-5,760	0.000	0	0	2,440	9,112	11,552	11,552	10,621
23	20	2029			931	931	115,199	-5,760	0.000	0	27,600	2,440	9,112	39,152	39,152	38,221
24	21	2030			931	931	115,199	-5,760	0.000	0	18,400	2,440	9,112	29,952	29,952	29,021
25	22	2031			931	931	67,199	-960	0.000	0		2,440	9,112	11,552	11,552	10,621
26	23	2032			931	931				0		2,440	9,112	11,552	11,552	10,621
27	24	2033			931	931				0		2,440	9,112	11,552	11,552	10,621
28	25	2034			931	931				0		2,440	9,112	11,552	11,552	10,621
29	26	2035			931	931				0		2,440	9,112	11,552	11,552	10,621
30	27	2036			931	931				0		2,440	9,112	11,552	11,552	10,621
31	28	2037		455	931	1,385				0		2,440	9,112	11,552	11,552	10,167
32	29	2038		1,061	931	1,991				0		2,440	9,112	11,552	11,552	9,561
33	30	2039		1,212	931	2,143				0		2,440	9,112	11,552	11,552	9,409
34	31	2040		303	931	1,234				0		2,440	9,112	11,552	11,552	10,318
35	32	2041			931	931				0		2,440	9,112	11,552	11,552	10,621
36	33	2042	4,183		931	5,113				0		2,440	9,112	11,552	11,552	6,439
37	34	2043	8,075		931	9,005				0		2,440	9,112	11,552	11,552	2,547
38	35	2044	14,412		931	15,343				0		2,440	9,112	11,552	11,552	-3,791
39	36	2045	8,213		931	9,144				0		2,440	9,112	11,552	11,552	2,408
40	37	2046			931	931				0		2,440	9,112	11,552	11,552	10,621
41	38	2047			931	931				0		2,440	9,112	11,552	11,552	10,621
42	39	2048			931	931				0	0	2,440	9,112	11,552	11,552	10,621
43	40	2049			931	931				0	27,600	2,440	9,112	39,152	39,152	38,221
44	41	2050			931	931				0	18,400	2,440	9,112	29,952	29,952	29,021
45	42	2051			931	931				0		2,440	9,112	11,552	11,552	10,621
46	43	2052			931	931				0		2,440	9,112	11,552	11,552	10,621
47	44	2053			931	931				0		2,440	9,112	11,552	11,552	10,621
48	45	2054			931	931				0		2,440	9,112	11,552	11,552	10,621
49	46	2055			931	931				0		2,440	9,112	11,552	11,552	10,621
50	47	2056			931	931				0		2,440	9,112	11,552	11,552	10,621
51	48	2057			931	931				0		2,440	9,112	11,552	11,552	10,621
52	49	2058			931	931				0		2,440	9,112	11,552	11,552	10,621
53	50	2059	-19,933	-1,010	931	-20,012				0	-23,000	2,440	9,112	-11,448	-11,448	8,564
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	0	115,000	120,589	450,283	685,872	685,872	494,157
Valor Presente i = 6%					VP (Costo):	126,861							VP (Beneficio):		199,683	72,822
															V.P.N.	72,822
															T.I.R.E.	11.3%
															B / C	1.57

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.3 Evaluación Económica

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh		
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 10%

Planta térmica alternativa

Capacidad instalada	46.0 MW			
Costo de invesión	46,000 1000US$	100%	44,200	
Precio de combustib	0.63 US$/galoı	100%	0.63	

Crédito CO_2 (precio CER): 3 US$/$CO_2$ton

V.P.N.	12,713
T.I.R.E.	11.6%
B / C	1.12

(unidad: US$1000)

No.		AÑO	COSTO				BENEFICIO									(B) - (C)
			PROYECTO EL CHAPARRAL			(C)	CREDITO CO_2				PLANTA ALTERNATIVA				(B)	
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Costo Construcc.	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0				0	0	-28,561
2		2008	28,429	1,061		29,489				0	0			0	0	-29,489
3		2009	49,524	1,212		50,737				0	27,600			27,600	27,600	-23,137
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.003	137	18,400	1,017	3,797	23,213	23,350	3,000
5	2	2011			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
6	3	2012			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
7	4	2013			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
8	5	2014			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
9	6	2015			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
10	7	2016			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
11	8	2017			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
12	9	2018			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
13	10	2019			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
14	11	2020			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
15	12	2021			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
16	13	2022			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
17	14	2023			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
18	15	2024			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
19	16	2025			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
20	17	2026			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
21	18	2027			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,950
22	19	2028			931	931	115,199	-5,760	0.003	328	0	2,440	9,112	11,552	11,881	10,950
23	20	2029			931	931	115,199	-5,760	0.003	328	27,600	2,440	9,112	39,152	39,481	38,550
24	21	2030			931	931	115,199	-5,760	0.003	328	18,400	2,440	9,112	29,952	30,281	29,350
25	22	2031			931	931	67,199	-960	0.003	328		2,440	9,112	11,552	11,881	10,950
26	23	2032			931	931				0		2,440	9,112	11,552	11,552	10,621
27	24	2033			931	931				0		2,440	9,112	11,552	11,552	10,621
28	25	2034			931	931				0		2,440	9,112	11,552	11,552	10,621
29	26	2035			931	931				0		2,440	9,112	11,552	11,552	10,621
30	27	2036			931	931				0		2,440	9,112	11,552	11,552	10,621
31	28	2037		455	931	1,385				0		2,440	9,112	11,552	11,552	10,167
32	29	2038		1,061	931	1,991				0		2,440	9,112	11,552	11,552	9,561
33	30	2039		1,212	931	2,143				0		2,440	9,112	11,552	11,552	9,409
34	31	2040		303	931	1,234				0		2,440	9,112	11,552	11,552	10,318
35	32	2041			931	931				0		2,440	9,112	11,552	11,552	10,621
36	33	2042	4,183		931	5,113				0		2,440	9,112	11,552	11,552	6,439
37	34	2043	8,075		931	9,005				0		2,440	9,112	11,552	11,552	2,547
38	35	2044	14,412		931	15,343				0		2,440	9,112	11,552	11,552	-3,791
39	36	2045	8,213		931	9,144				0		2,440	9,112	11,552	11,552	2,408
40	37	2046			931	931				0		2,440	9,112	11,552	11,552	10,621
41	38	2047			931	931				0		2,440	9,112	11,552	11,552	10,621
42	39	2048			931	931				0	0	2,440	9,112	11,552	11,552	10,621
43	40	2049			931	931				0	27,600	2,440	9,112	39,152	39,152	38,221
44	41	2050			931	931				0	18,400	2,440	9,112	29,952	29,952	29,021
45	42	2051			931	931				0		2,440	9,112	11,552	11,552	10,621
46	43	2052			931	931				0		2,440	9,112	11,552	11,552	10,621
47	44	2053			931	931				0		2,440	9,112	11,552	11,552	10,621
48	45	2054			931	931				0		2,440	9,112	11,552	11,552	10,621
49	46	2055			931	931				0		2,440	9,112	11,552	11,552	10,621
50	47	2056			931	931				0		2,440	9,112	11,552	11,552	10,621
51	48	2057			931	931				0		2,440	9,112	11,552	11,552	10,621
52	49	2058			931	931				0		2,440	9,112	11,552	11,552	10,621
53	50	2059	-19,933	-1,010	931	-20,012				0	-23,000	2,440	9,112	-11,448	-11,448	8,564
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	7,031	115,000	120,589	450,283	685,872	692,903	501,188
Valor Presente i = 10%					VP (Costo):	109,614							VP (Beneficio):		122,327	12,713
															V.P.N.	12,713
															T.I.R.E.	11.6%
															B / C	1.12

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.3 Evaluación Económica

Proyecto El Chaparral

Capacidad instalada	65.7 MW			
Capacidad dependable	38.4 MW			
Generacion de energía	*233,210 MWh*			
Costo de construcción	128,749	1000US$	100%	128,749

Tasa de descuento: 10%

Planta térmica alternativa

Capacidad instalada	46.0 MW			
Costo de invesión	46,000	1000US$	100%	44,200
Precio de combustib	*0.63*	*US$/galo*	*100%*	*0.63*

Crédito CO_2 (precio CER): 5 US$/$CO_2$ton

V.P.N.	**14,069**
T.I.R.E.	**11.7%**
B / C	***1.13***

(unidad: US$1000)

No.		AÑO	COSTO				BENEFICIO									(B) - (C)
			PROYECTO EL CHAPARRAL			(C)	CREDITO CO_2				PLANTA ALTERNATIVA				(B)	
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Costo Construcc.	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0				0	0	-28,561
2		2008	28,429	1,061		29,489				0	0			0	0	-29,489
3		2009	49,524	1,212		50,737				0	27,600			27,600	27,600	-23,137
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.005	228	18,400	1,017	3,797	23,213	23,441	3,091
5	2	2011			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
6	3	2012			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
7	4	2013			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
8	5	2014			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
9	6	2015			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
10	7	2016			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
11	8	2017			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
12	9	2018			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
13	10	2019			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
14	11	2020			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
15	12	2021			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
16	13	2022			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
17	14	2023			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
18	15	2024			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
19	16	2025			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
20	17	2026			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
21	18	2027			931	931	115,199	-5,760	0.005	547		2,440	9,112	11,552	12,099	11,169
22	19	2028			931	931	115,199	-5,760	0.005	547	0	2,440	9,112	11,552	12,099	11,169
23	20	2029			931	931	115,199	-5,760	0.005	547	27,600	2,440	9,112	39,152	39,699	38,769
24	21	2030			931	931	115,199	-5,760	0.005	547	18,400	2,440	9,112	29,952	30,499	29,569
25	22	2031			931	931	67,199	-960	0.005	547		2,440	9,112	11,552	12,099	11,169
26	23	2032			931	931				0		2,440	9,112	11,552	11,552	10,621
27	24	2033			931	931				0		2,440	9,112	11,552	11,552	10,621
28	25	2034			931	931				0		2,440	9,112	11,552	11,552	10,621
29	26	2035			931	931				0		2,440	9,112	11,552	11,552	10,621
30	27	2036			931	931				0		2,440	9,112	11,552	11,552	10,621
31	28	2037		455	931	1,385				0		2,440	9,112	11,552	11,552	10,167
32	29	2038		1,061	931	1,991				0		2,440	9,112	11,552	11,552	9,561
33	30	2039		1,212	931	2,143				0		2,440	9,112	11,552	11,552	9,409
34	31	2040		303	931	1,234				0		2,440	9,112	11,552	11,552	10,318
35	32	2041			931	931				0		2,440	9,112	11,552	11,552	10,621
36	33	2042	4,183		931	5,113				0		2,440	9,112	11,552	11,552	6,439
37	34	2043	8,075		931	9,005				0		2,440	9,112	11,552	11,552	2,547
38	35	2044	14,412		931	15,343				0		2,440	9,112	11,552	11,552	-3,791
39	36	2045	8,213		931	9,144				0		2,440	9,112	11,552	11,552	2,408
40	37	2046			931	931				0		2,440	9,112	11,552	11,552	10,621
41	38	2047			931	931				0		2,440	9,112	11,552	11,552	10,621
42	39	2048			931	931				0	0	2,440	9,112	11,552	11,552	10,621
43	40	2049			931	931				0	27,600	2,440	9,112	39,152	39,152	38,221
44	41	2050			931	931				0	18,400	2,440	9,112	29,952	29,952	29,021
45	42	2051			931	931				0		2,440	9,112	11,552	11,552	10,621
46	43	2052			931	931				0		2,440	9,112	11,552	11,552	10,621
47	44	2053			931	931				0		2,440	9,112	11,552	11,552	10,621
48	45	2054			931	931				0		2,440	9,112	11,552	11,552	10,621
49	46	2055			931	931				0		2,440	9,112	11,552	11,552	10,621
50	47	2056			931	931				0		2,440	9,112	11,552	11,552	10,621
51	48	2057			931	931				0		2,440	9,112	11,552	11,552	10,621
52	49	2058			931	931				0		2,440	9,112	11,552	11,552	10,621
53	50	2059	-19,933	-1,010	931	-20,012				0	-23,000	2,440	9,112	-11,448	-11,448	8,564
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	11,719	115,000	120,589	450,283	685,872	697,591	505,876
Valor Presente i = 10%					VP (Costo):	109,614								VP (Beneficio):	123,682	14,069
															V.P.N.	14,069
															T.I.R.E.	11.7%
															B / C	1.13

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.3 Evaluación Económica

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh		
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 10%

Planta térmica alternativa

Capacidad instalada	46.0 MW			
Costo de invesión	46,000 1000US$	100%	44,200	
Precio de combustib	0.63 US$/galon	100%	0.63	

Crédito CO_2 (precio CER): 10 US$/$CO_2$ton

V.P.N.	17,457
T.I.R.E.	12.1%
B / C	1.16

(unidad: US$1000)

No.		AÑO	COSTO				BENEFICIO									(B) - (C)
			PROYECTO EL CHAPARRAL			(C)	CREDITO CO_2				PLANTA ALTERNATIVA				(B)	
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Costo Construcc.	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0				0	0	-28,561
2		2008	28,429	1,061		29,489				0	0			0	0	-29,489
3		2009	49,524	1,212		50,737				0	27,600			27,600	27,600	-23,137
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.010	456	18,400	1,017	3,797	23,213	23,669	3,319
5	2	2011			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
6	3	2012			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
7	4	2013			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
8	5	2014			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
9	6	2015			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
10	7	2016			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
11	8	2017			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
12	9	2018			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
13	10	2019			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
14	11	2020			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
15	12	2021			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
16	13	2022			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
17	14	2023			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
18	15	2024			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
19	16	2025			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
20	17	2026			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
21	18	2027			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,716
22	19	2028			931	931	115,199	-5,760	0.010	1,094	0	2,440	9,112	11,552	12,647	11,716
23	20	2029			931	931	115,199	-5,760	0.010	1,094	27,600	2,440	9,112	39,152	40,247	39,316
24	21	2030			931	931	115,199	-5,760	0.010	1,094	18,400	2,440	9,112	29,952	31,047	30,116
25	22	2031			931	931	67,199	-960	0.010	1,094		2,440	9,112	11,552	12,647	11,716
26	23	2032			931	931				0		2,440	9,112	11,552	11,552	10,621
27	24	2033			931	931				0		2,440	9,112	11,552	11,552	10,621
28	25	2034			931	931				0		2,440	9,112	11,552	11,552	10,621
29	26	2035			931	931				0		2,440	9,112	11,552	11,552	10,621
30	27	2036			931	931				0		2,440	9,112	11,552	11,552	10,621
31	28	2037		455	931	1,385				0		2,440	9,112	11,552	11,552	10,167
32	29	2038		1,061	931	1,991				0		2,440	9,112	11,552	11,552	9,561
33	30	2039		1,212	931	2,143				0		2,440	9,112	11,552	11,552	9,409
34	31	2040		303	931	1,234				0		2,440	9,112	11,552	11,552	10,318
35	32	2041			931	931				0		2,440	9,112	11,552	11,552	10,621
36	33	2042	4,183		931	5,113				0		2,440	9,112	11,552	11,552	6,439
37	34	2043	8,075		931	9,005				0		2,440	9,112	11,552	11,552	2,547
38	35	2044	14,412		931	15,343				0		2,440	9,112	11,552	11,552	-3,791
39	36	2045	8,213		931	9,144				0		2,440	9,112	11,552	11,552	2,408
40	37	2046			931	931				0		2,440	9,112	11,552	11,552	10,621
41	38	2047			931	931				0		2,440	9,112	11,552	11,552	10,621
42	39	2048			931	931				0	0	2,440	9,112	11,552	11,552	10,621
43	40	2049			931	931				0	27,600	2,440	9,112	39,152	39,152	38,221
44	41	2050			931	931				0	18,400	2,440	9,112	29,952	29,952	29,021
45	42	2051			931	931				0		2,440	9,112	11,552	11,552	10,621
46	43	2052			931	931				0		2,440	9,112	11,552	11,552	10,621
47	44	2053			931	931				0		2,440	9,112	11,552	11,552	10,621
48	45	2054			931	931				0		2,440	9,112	11,552	11,552	10,621
49	46	2055			931	931				0		2,440	9,112	11,552	11,552	10,621
50	47	2056			931	931				0		2,440	9,112	11,552	11,552	10,621
51	48	2057			931	931				0		2,440	9,112	11,552	11,552	10,621
52	49	2058			931	931				0		2,440	9,112	11,552	11,552	10,621
53	50	2059	-19,933	-1,010	931	-20,012				0	-23,000	2,440	9,112	-11,448	-11,448	8,564
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	23,438	115,000	120,589	450,283	685,872	709,310	517,595
Valor Presente i = 10%					VP (Costo):	109,614							VP (Beneficio):		127,070	17,457
															V.P.N.	17,457
															T.I.R.E.	12.1%
															B / C	1.16

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.3 Evaluación Económica

Proyecto El Chaparral

Capacidad instalada	*65.7*	*MW*		
Capacidad dependable	38.4	MW		
Generacion de energía	233,210	MWh		
Costo de construcción	128,749	1000US$	100%	128,749

Tasa de descuento: 10%

Planta térmica alternativa

Capacidad instalada	46.0	MW		
Costo de invesión	41,400	1000US$	90%	44,200
Precio de combustib	0.567	US$/galoı	90%	0.63

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	-1,349
T.I.R.E.	9.8%
B / C	0.99

(unidad: US$1000)

No.		AÑO	COSTO				BENEFICIO									
			PROYECTO EL CHAPARRAL			(C)	CREDITO CO_2				PLANTA ALTERNATIVA				(B)	(B) - (C)
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Costo Construcc.	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0				0	0	-28,561
2		2008	28,429	1,061		29,489				0	0			0	0	-29,489
3		2009	49,524	1,212		50,737				0	24,840			24,840	24,840	-25,897
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	0	16,560	915	3,417	20,892	20,892	542
5	2	2011			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
6	3	2012			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
7	4	2013			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
8	5	2014			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
9	6	2015			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
10	7	2016			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
11	8	2017			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
12	9	2018			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
13	10	2019			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
14	11	2020			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
15	12	2021			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
16	13	2022			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
17	14	2023			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
18	15	2024			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
19	16	2025			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
20	17	2026			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
21	18	2027			931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
22	19	2028			931	931	115,199	-5,760	0.000	0	0	2,196	8,201	10,397	10,397	9,466
23	20	2029			931	931	115,199	-5,760	0.000	0	24,840	2,196	8,201	35,237	35,237	34,306
24	21	2030			931	931	115,199	-5,760	0.000	0	16,560	2,196	8,201	26,957	26,957	26,026
25	22	2031			931	931	67,199	-960	0.000	0		2,196	8,201	10,397	10,397	9,466
26	23	2032			931	931				0		2,196	8,201	10,397	10,397	9,466
27	24	2033			931	931				0		2,196	8,201	10,397	10,397	9,466
28	25	2034			931	931				0		2,196	8,201	10,397	10,397	9,466
29	26	2035			931	931				0		2,196	8,201	10,397	10,397	9,466
30	27	2036			931	931				0		2,196	8,201	10,397	10,397	9,466
31	28	2037		455	931	1,385				0		2,196	8,201	10,397	10,397	9,012
32	29	2038		1,061	931	1,991				0		2,196	8,201	10,397	10,397	8,406
33	30	2039		1,212	931	2,143				0		2,196	8,201	10,397	10,397	8,254
34	31	2040		303	931	1,234				0		2,196	8,201	10,397	10,397	9,163
35	32	2041			931	931				0		2,196	8,201	10,397	10,397	9,466
36	33	2042	4,183		931	5,113				0		2,196	8,201	10,397	10,397	5,284
37	34	2043	8,075		931	9,005				0		2,196	8,201	10,397	10,397	1,392
38	35	2044	14,412		931	15,343				0		2,196	8,201	10,397	10,397	-4,946
39	36	2045	8,213		931	9,144				0		2,196	8,201	10,397	10,397	1,253
40	37	2046			931	931				0		2,196	8,201	10,397	10,397	9,466
41	38	2047			931	931				0		2,196	8,201	10,397	10,397	9,466
42	39	2048			931	931				0	0	2,196	8,201	10,397	10,397	9,466
43	40	2049			931	931				0	24,840	2,196	8,201	35,237	35,237	34,306
44	41	2050			931	931				0	16,560	2,196	8,201	26,957	26,957	26,026
45	42	2051			931	931				0		2,196	8,201	10,397	10,397	9,466
46	43	2052			931	931				0		2,196	8,201	10,397	10,397	9,466
47	44	2053			931	931				0		2,196	8,201	10,397	10,397	9,466
48	45	2054			931	931				0		2,196	8,201	10,397	10,397	9,466
49	46	2055			931	931				0		2,196	8,201	10,397	10,397	9,466
50	47	2056			931	931				0		2,196	8,201	10,397	10,397	9,466
51	48	2057			931	931				0		2,196	8,201	10,397	10,397	9,466
52	49	2058			931	931				0		2,196	8,201	10,397	10,397	9,466
53	50	2059	-19,933	-1,010	931	-20,012				0	-20,700	2,196	8,201	-10,303	-10,303	9,709
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	0	103,500	108,530	405,255	617,285	617,285	425,569
Valor Presente i = 10%					VP (Costo):	109,614							VP (Beneficio):		108,265	-1,349
															V.P.N.	-1,349
															T.I.R.E.	9.8%
															B / C	0.99

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.3 Evaluación Económica

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh		
Costo de construcción	141,624 1000US$	110%	128,749

Tasa de descuento: 10%

Planta térmica alternativa

Capacidad instalada	46.0 MW		
Costo de invesión	46,000 1000US$	100%	44,200
Precio de combustib	0.63 US$/galo	100%	0.63

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	-281
T.I.R.E.	10.0%
B / C	1.00

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO								(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CREDITO CO_2				PLANTA ALTERNATIVA					
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Costo Construcc.	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO	
1		2007	30,917	500		31,417				0				0	0	-31,417
2		2008	31,272	1,167		32,438				0	0			0	0	-32,438
3		2009	54,477	1,333		55,810				0	27,600			27,600	27,600	-28,210
4	1	2010	21,625	333	427	22,385	48,000	-2,400	0.000	0	18,400	1,017	3,797	23,213	23,213	828
5	2	2011			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
6	3	2012			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
7	4	2013			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
8	5	2014			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
9	6	2015			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
10	7	2016			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
11	8	2017			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
12	9	2018			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
13	10	2019			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
14	11	2020			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
15	12	2021			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
16	13	2022			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
17	14	2023			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
18	15	2024			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
19	16	2025			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
20	17	2026			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
21	18	2027			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,528
22	19	2028			1,024	1,024	115,199	-5,760	0.000	0	0	2,440	9,112	11,552	11,552	10,528
23	20	2029			1,024	1,024	115,199	-5,760	0.000	0	27,600	2,440	9,112	39,152	39,152	38,128
24	21	2030			1,024	1,024	115,199	-5,760	0.000	0	18,400	2,440	9,112	29,952	29,952	28,928
25	22	2031			1,024	1,024	67,199	-960	0.000	0		2,440	9,112	11,552	11,552	10,528
26	23	2032			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
27	24	2033			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
28	25	2034			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
29	26	2035			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
30	27	2036			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
31	28	2037		500	1,024	1,524				0		2,440	9,112	11,552	11,552	10,028
32	29	2038		1,167	1,024	2,191				0		2,440	9,112	11,552	11,552	9,362
33	30	2039		1,333	1,024	2,357				0		2,440	9,112	11,552	11,552	9,195
34	31	2040		333	1,024	1,357				0		2,440	9,112	11,552	11,552	10,195
35	32	2041			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
36	33	2042	4,601		1,024	5,625				0		2,440	9,112	11,552	11,552	5,928
37	34	2043	8,882		1,024	9,906				0		2,440	9,112	11,552	11,552	1,646
38	35	2044	15,854		1,024	16,877				0		2,440	9,112	11,552	11,552	-5,325
39	36	2045	9,034		1,024	10,058				0		2,440	9,112	11,552	11,552	1,494
40	37	2046			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
41	38	2047			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
42	39	2048			1,024	1,024				0	0	2,440	9,112	11,552	11,552	10,528
43	40	2049			1,024	1,024				0	27,600	2,440	9,112	39,152	39,152	38,128
44	41	2050			1,024	1,024				0	18,400	2,440	9,112	29,952	29,952	28,928
45	42	2051			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
46	43	2052			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
47	44	2053			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
48	45	2054			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
49	46	2055			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
50	47	2056			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
51	48	2057			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
52	49	2058			1,024	1,024				0		2,440	9,112	11,552	11,552	10,528
53	50	2059	-21,926	-1,111	1,024	-22,013				0	-23,000	2,440	9,112	-11,448	-11,448	10,566
TOTAL			154,735	5,556	50,596	210,887	2,419,179	-118,559	0	0	115,000	120,589	450,283	685,872	685,872	474,985
Valor Presente i = 10%					VP (Costo):	120,575							VP (Beneficio):		120,294	-281
															V.P.N.	-281
															T.I.R.E.	10.0%
															B / C	1.00

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.3 Evaluación Económica

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh		
Costo de construcción	141,624 1000US$	110%	128,749

Tasa de descuento: 10%

Planta térmica alternativa

Capacidad instalada	46.0 MW			
Costo de invesión	41,400 1000US$	90%	44,200	
Precio de combustib	0.567 US$/galon	90%	0.63	

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	**-12,310**
T.I.R.E.	**8.7%**
B / C	**0.90**

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO								(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CREDITO CO_2				PLANTA ALTERNATIVA					
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Costo Construcc.	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO	
1		2007	30,917	500		31,417				0				0	0	-31,417
2		2008	31,272	1,167		32,438				0	0			0	0	-32,438
3		2009	54,477	1,333		55,810				0	24,840			24,840	24,840	-30,970
4	1	2010	21,625	333	427	22,385	48,000	-2,400	0.000	0	16,560	915	3,417	20,892	20,892	-1,493
5	2	2011			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
6	3	2012			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
7	4	2013			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
8	5	2014			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
9	6	2015			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
10	7	2016			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
11	8	2017			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
12	9	2018			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
13	10	2019			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
14	11	2020			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
15	12	2021			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
16	13	2022			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
17	14	2023			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
18	15	2024			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
19	16	2025			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
20	17	2026			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
21	18	2027			1,024	1,024	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,373
22	19	2028			1,024	1,024	115,199	-5,760	0.000	0	0	2,196	8,201	10,397	10,397	9,373
23	20	2029			1,024	1,024	115,199	-5,760	0.000	0	24,840	2,196	8,201	35,237	35,237	34,213
24	21	2030			1,024	1,024	115,199	-5,760	0.000	0	16,560	2,196	8,201	26,957	26,957	25,933
25	22	2031			1,024	1,024	67,199	-960	0.000	0		2,196	8,201	10,397	10,397	9,373
26	23	2032			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
27	24	2033			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
28	25	2034			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
29	26	2035			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
30	27	2036			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
31	28	2037		500	1,024	1,524				0		2,196	8,201	10,397	10,397	8,873
32	29	2038		1,167	1,024	2,191				0		2,196	8,201	10,397	10,397	8,206
33	30	2039		1,333	1,024	2,357				0		2,196	8,201	10,397	10,397	8,040
34	31	2040		333	1,024	1,357				0		2,196	8,201	10,397	10,397	9,040
35	32	2041			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
36	33	2042	4,601		1,024	5,625				0		2,196	8,201	10,397	10,397	4,772
37	34	2043	8,882		1,024	9,906				0		2,196	8,201	10,397	10,397	491
38	35	2044	15,854		1,024	16,877				0		2,196	8,201	10,397	10,397	-6,480
39	36	2045	9,034		1,024	10,058				0		2,196	8,201	10,397	10,397	339
40	37	2046			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
41	38	2047			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
42	39	2048			1,024	1,024				0	0	2,196	8,201	10,397	10,397	9,373
43	40	2049			1,024	1,024				0	24,840	2,196	8,201	35,237	35,237	34,213
44	41	2050			1,024	1,024				0	16,560	2,196	8,201	26,957	26,957	25,933
45	42	2051			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
46	43	2052			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
47	44	2053			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
48	45	2054			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
49	46	2055			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
50	47	2056			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
51	48	2057			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
52	49	2058			1,024	1,024				0		2,196	8,201	10,397	10,397	9,373
53	50	2059	-21,926	-1,111	1,024	-22,013				0	-20,700	2,196	8,201	-10,303	-10,303	11,710
TOTAL			154,735	5,556	50,596	210,887	2,419,179	-118,559	0	0	103,500	108,530	405,255	617,285	617,285	406,398
Valor Presente i = 10%					VP (Costo):	120,575							VP (Beneficio):		108,265	-12,310
															V.P.N.	-12,310
															T.I.R.E.	8.7%
															B / C	0.90

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.3 Evaluación Económica

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh		
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 10%

Planta térmica alternativa

Capacidad instalada	46.0 MW			
Costo de invesión	50,600 1000US$	110%	44,200	
Precio de combustib	0.693 US$/galon	110%	0.63	

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	22,710
T.I.R.E.	12.8%
B / C	1.21

(unidad: US$1000)

No.		AÑO	COSTO				BENEFICIO									(B) - (C)
			PROYECTO EL CHAPARRAL			(C)	CREDITO CO_2				PLANTA ALTERNATIVA				(B)	
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Costo Construcc.	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0				0	0	-28,561
2		2008	28,429	1,061		29,489				0	0			0	0	-29,489
3		2009	49,524	1,212		50,737				0	30,360			30,360	30,360	-20,377
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	0	20,240	1,118	4,176	25,535	25,535	5,185
5	2	2011			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
6	3	2012			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
7	4	2013			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
8	5	2014			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
9	6	2015			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
10	7	2016			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
11	8	2017			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
12	9	2018			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
13	10	2019			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
14	11	2020			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
15	12	2021			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
16	13	2022			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
17	14	2023			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
18	15	2024			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
19	16	2025			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
20	17	2026			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
21	18	2027			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,777
22	19	2028			931	931	115,199	-5,760	0.000	0	0	2,684	10,023	12,707	12,707	11,777
23	20	2029			931	931	115,199	-5,760	0.000	0	30,360	2,684	10,023	43,067	43,067	42,137
24	21	2030			931	931	115,199	-5,760	0.000	0	20,240	2,684	10,023	32,947	32,947	32,017
25	22	2031			931	931	67,199	-960	0.000	0		2,684	10,023	12,707	12,707	11,777
26	23	2032			931	931				0		2,684	10,023	12,707	12,707	11,777
27	24	2033			931	931				0		2,684	10,023	12,707	12,707	11,777
28	25	2034			931	931				0		2,684	10,023	12,707	12,707	11,777
29	26	2035			931	931				0		2,684	10,023	12,707	12,707	11,777
30	27	2036			931	931				0		2,684	10,023	12,707	12,707	11,777
31	28	2037		455	931	1,385				0		2,684	10,023	12,707	12,707	11,322
32	29	2038		1,061	931	1,991				0		2,684	10,023	12,707	12,707	10,716
33	30	2039		1,212	931	2,143				0		2,684	10,023	12,707	12,707	10,565
34	31	2040		303	931	1,234				0		2,684	10,023	12,707	12,707	11,474
35	32	2041			931	931				0		2,684	10,023	12,707	12,707	11,777
36	33	2042	4,183		931	5,113				0		2,684	10,023	12,707	12,707	7,594
37	34	2043	8,075		931	9,005				0		2,684	10,023	12,707	12,707	3,702
38	35	2044	14,412		931	15,343				0		2,684	10,023	12,707	12,707	-2,636
39	36	2045	8,213		931	9,144				0		2,684	10,023	12,707	12,707	3,564
40	37	2046			931	931				0		2,684	10,023	12,707	12,707	11,777
41	38	2047			931	931				0		2,684	10,023	12,707	12,707	11,777
42	39	2048			931	931				0	0	2,684	10,023	12,707	12,707	11,777
43	40	2049			931	931				0	30,360	2,684	10,023	43,067	43,067	42,137
44	41	2050			931	931				0	20,240	2,684	10,023	32,947	32,947	32,017
45	42	2051			931	931				0		2,684	10,023	12,707	12,707	11,777
46	43	2052			931	931				0		2,684	10,023	12,707	12,707	11,777
47	44	2053			931	931				0		2,684	10,023	12,707	12,707	11,777
48	45	2054			931	931				0		2,684	10,023	12,707	12,707	11,777
49	46	2055			931	931				0		2,684	10,023	12,707	12,707	11,777
50	47	2056			931	931				0		2,684	10,023	12,707	12,707	11,777
51	48	2057			931	931				0		2,684	10,023	12,707	12,707	11,777
52	49	2058			931	931				0		2,684	10,023	12,707	12,707	11,777
53	50	2059	-19,933	-1,010	931	-20,012				0	-25,300	2,684	10,023	-12,593	-12,593	7,420
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	0	126,500	132,647	495,311	754,459	754,459	562,744
Valor Presente i = 10%					VP (Costo):	109,614							VP (Beneficio):		132,324	22,710
															V.P.N.	22,710
															T.I.R.E.	12.8%
															B / C	1.21

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.3 Evaluación Económica

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh		
Costo de construcción	115,874 1000US$	90%	128,749

Tasa de descuento: 10%

Planta térmica alternativa

Capacidad instalada	46.0 MW			
Costo de invesión	46,000 1000US$	100%	44,200	
Precio de combustib	0.63 US$/galon	100%	0.63	

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	**21,642**
T.I.R.E.	**13.0%**
B / C	**1.22**

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO								(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CREDITO CO_2				PLANTA ALTERNATIVA					
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Costo Construcc.	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO	
1		2007	25,296	409		25,705				0				0	0	-25,705
2		2008	25,586	955		26,540				0	0			0	0	-26,540
3		2009	44,572	1,091		45,663				0	27,600			27,600	27,600	-18,063
4	1	2010	17,693	273	349	18,315	48,000	-2,400	0.000	0	18,400	1,017	3,797	23,213	23,213	4,898
5	2	2011			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
6	3	2012			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
7	4	2013			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
8	5	2014			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
9	6	2015			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
10	7	2016			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
11	8	2017			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
12	9	2018			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
13	10	2019			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
14	11	2020			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
15	12	2021			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
16	13	2022			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
17	14	2023			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
18	15	2024			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
19	16	2025			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
20	17	2026			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
21	18	2027			838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
22	19	2028			838	838	115,199	-5,760	0.000	0	0	2,440	9,112	11,552	11,552	10,715
23	20	2029			838	838	115,199	-5,760	0.000	0	27,600	2,440	9,112	39,152	39,152	38,315
24	21	2030			838	838	115,199	-5,760	0.000	0	18,400	2,440	9,112	29,952	29,952	29,115
25	22	2031			838	838	67,199	-960	0.000	0		2,440	9,112	11,552	11,552	10,715
26	23	2032			838	838				0		2,440	9,112	11,552	11,552	10,715
27	24	2033			838	838				0		2,440	9,112	11,552	11,552	10,715
28	25	2034			838	838				0		2,440	9,112	11,552	11,552	10,715
29	26	2035			838	838				0		2,440	9,112	11,552	11,552	10,715
30	27	2036			838	838				0		2,440	9,112	11,552	11,552	10,715
31	28	2037		409	838	1,247				0		2,440	9,112	11,552	11,552	10,305
32	29	2038		955	838	1,792				0		2,440	9,112	11,552	11,552	9,760
33	30	2039		1,091	838	1,929				0		2,440	9,112	11,552	11,552	9,624
34	31	2040		273	838	1,110				0		2,440	9,112	11,552	11,552	10,442
35	32	2041			838	838				0		2,440	9,112	11,552	11,552	10,715
36	33	2042	3,764		838	4,602				0		2,440	9,112	11,552	11,552	6,950
37	34	2043	7,267		838	8,105				0		2,440	9,112	11,552	11,552	3,447
38	35	2044	12,971		838	13,809				0		2,440	9,112	11,552	11,552	-2,257
39	36	2045	7,392		838	8,229				0		2,440	9,112	11,552	11,552	3,323
40	37	2046			838	838				0		2,440	9,112	11,552	11,552	10,715
41	38	2047			838	838				0		2,440	9,112	11,552	11,552	10,715
42	39	2048			838	838				0	0	2,440	9,112	11,552	11,552	10,715
43	40	2049			838	838				0	27,600	2,440	9,112	39,152	39,152	38,315
44	41	2050			838	838				0	18,400	2,440	9,112	29,952	29,952	29,115
45	42	2051			838	838				0		2,440	9,112	11,552	11,552	10,715
46	43	2052			838	838				0		2,440	9,112	11,552	11,552	10,715
47	44	2053			838	838				0		2,440	9,112	11,552	11,552	10,715
48	45	2054			838	838				0		2,440	9,112	11,552	11,552	10,715
49	46	2055			838	838				0		2,440	9,112	11,552	11,552	10,715
50	47	2056			838	838				0		2,440	9,112	11,552	11,552	10,715
51	48	2057			838	838				0		2,440	9,112	11,552	11,552	10,715
52	49	2058			838	838				0		2,440	9,112	11,552	11,552	10,715
53	50	2059	-17,940	-909	838	-18,011				0	-23,000	2,440	9,112	-11,448	-11,448	6,563
TOTAL			126,601	4,546	41,397	172,544	2,419,179	-118,559	0	0	115,000	120,589	450,283	685,872	685,872	513,328
Valor Presente i = 10%					VP (Costo):	98,652							VP (Beneficio):		120,294	21,642
															V.P.N.	21,642
															T.I.R.E.	13.0%
															B / C	1.22

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.4 Evaluación Económica (2)

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh	100%	233,210
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible: 233.2 MWh
Costo de energía: 67.65 US$/MWh

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	1,623
T.I.R.E.	10.2%
B / C	1.01

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO							(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CO_2 CREDITO				VENTA DE ENERGIA				
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COST	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0			0	0	-28,561
2		2008	28,429	1,061		29,489				0			0	0	-29,489
3		2009	49,524	1,212		50,737				0			0	0	-50,737
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	0	97,171	0.06765	6,574	6,574	-13,777
5	2	2011			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
6	3	2012			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
7	4	2013			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
8	5	2014			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
9	6	2015			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
10	7	2016			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
11	8	2017			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
12	9	2018			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
13	10	2019			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
14	11	2020			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
15	12	2021			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
16	13	2022			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
17	14	2023			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
18	15	2024			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
19	16	2025			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
20	17	2026			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
21	18	2027			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
22	19	2028			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
23	20	2029			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
24	21	2030			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
25	22	2031			931	931	67,199	-960	0.000	0	233,210	0.06765	15,777	15,777	14,846
26	23	2032			931	931				0	233,210	0.06765	15,777	15,777	14,846
27	24	2033			931	931				0	233,210	0.06765	15,777	15,777	14,846
28	25	2034			931	931				0	233,210	0.06765	15,777	15,777	14,846
29	26	2035			931	931				0	233,210	0.06765	15,777	15,777	14,846
30	27	2036			931	931				0	233,210	0.06765	15,777	15,777	14,846
31	28	2037		455	931	1,385				0	233,210	0.06765	15,777	15,777	14,391
32	29	2038		1,061	931	1,991				0	233,210	0.06765	15,777	15,777	13,785
33	30	2039		1,212	931	2,143				0	233,210	0.06765	15,777	15,777	13,634
34	31	2040		303	931	1,234				0	233,210	0.06765	15,777	15,777	14,543
35	32	2041			931	931				0	233,210	0.06765	15,777	15,777	14,846
36	33	2042	4,183		931	5,113				0	233,210	0.06765	15,777	15,777	10,663
37	34	2043	8,075		931	9,005				0	233,210	0.06765	15,777	15,777	6,771
38	35	2044	14,412		931	15,343				0	233,210	0.06765	15,777	15,777	434
39	36	2045	8,213		931	9,144				0	233,210	0.06765	15,777	15,777	6,633
40	37	2046			931	931				0	233,210	0.06765	15,777	15,777	14,846
41	38	2047			931	931				0	233,210	0.06765	15,777	15,777	14,846
42	39	2048			931	931				0	233,210	0.06765	15,777	15,777	14,846
43	40	2049			931	931				0	233,210	0.06765	15,777	15,777	14,846
44	41	2050			931	931				0	233,210	0.06765	15,777	15,777	14,846
45	42	2051			931	931				0	233,210	0.06765	15,777	15,777	14,846
46	43	2052			931	931				0	233,210	0.06765	15,777	15,777	14,846
47	44	2053			931	931				0	233,210	0.06765	15,777	15,777	14,846
48	45	2054			931	931				0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931				0	233,210	0.06765	15,777	15,777	14,846
50	47	2056			931	931				0	233,210	0.06765	15,777	15,777	14,846
51	48	2057			931	931				0	233,210	0.06765	15,777	15,777	14,846
52	49	2058			931	931				0	233,210	0.06765	15,777	15,777	14,846
53	50	2059	-19,933	-1,010	931	-20,012				0	233,210	0.06765	15,777	15,777	35,789
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	0			779,630	779,630	587,915
Valor Presente i = 10%					VP (Costo):	109,614						VP (Beneficio):		111,237	1,623
														V.P.N.	1,623
														T.I.R.E.	10.2%
														B / C	1.01

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.4 Evaluación Económica (2)

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh	100%	233,210
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 8%

Tarifa Promedia

Energía vendible: 233.2 MWh
Costo de energía: 67.65 US$/MWh

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	29,323
T.I.R.E.	10.2%
B / C	1.25

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO							(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CO_2 CREDITO				VENTA DE ENERGIA				
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COST	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0			0	0	-28,561
2		2008	28,429	1,061		29,489				0			0	0	-29,489
3		2009	49,524	1,212		50,737				0			0	0	-50,737
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	0	97,171	0.06765	6,574	6,574	-13,777
5	2	2011			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
6	3	2012			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
7	4	2013			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
8	5	2014			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
9	6	2015			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
10	7	2016			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
11	8	2017			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
12	9	2018			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
13	10	2019			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
14	11	2020			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
15	12	2021			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
16	13	2022			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
17	14	2023			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
18	15	2024			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
19	16	2025			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
20	17	2026			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
21	18	2027			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
22	19	2028			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
23	20	2029			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
24	21	2030			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
25	22	2031			931	931	67,199	-960	0.000	0	233,210	0.06765	15,777	15,777	14,846
26	23	2032			931	931				0	233,210	0.06765	15,777	15,777	14,846
27	24	2033			931	931				0	233,210	0.06765	15,777	15,777	14,846
28	25	2034			931	931				0	233,210	0.06765	15,777	15,777	14,846
29	26	2035			931	931				0	233,210	0.06765	15,777	15,777	14,846
30	27	2036			931	931				0	233,210	0.06765	15,777	15,777	14,846
31	28	2037		455	931	1,385				0	233,210	0.06765	15,777	15,777	14,391
32	29	2038		1,061	931	1,991				0	233,210	0.06765	15,777	15,777	13,785
33	30	2039		1,212	931	2,143				0	233,210	0.06765	15,777	15,777	13,634
34	31	2040		303	931	1,234				0	233,210	0.06765	15,777	15,777	14,543
35	32	2041			931	931				0	233,210	0.06765	15,777	15,777	14,846
36	33	2042	4,183		931	5,113				0	233,210	0.06765	15,777	15,777	10,663
37	34	2043	8,075		931	9,005				0	233,210	0.06765	15,777	15,777	6,771
38	35	2044	14,412		931	15,343				0	233,210	0.06765	15,777	15,777	434
39	36	2045	8,213		931	9,144				0	233,210	0.06765	15,777	15,777	6,633
40	37	2046			931	931				0	233,210	0.06765	15,777	15,777	14,846
41	38	2047			931	931				0	233,210	0.06765	15,777	15,777	14,846
42	39	2048			931	931				0	233,210	0.06765	15,777	15,777	14,846
43	40	2049			931	931				0	233,210	0.06765	15,777	15,777	14,846
44	41	2050			931	931				0	233,210	0.06765	15,777	15,777	14,846
45	42	2051			931	931				0	233,210	0.06765	15,777	15,777	14,846
46	43	2052			931	931				0	233,210	0.06765	15,777	15,777	14,846
47	44	2053			931	931				0	233,210	0.06765	15,777	15,777	14,846
48	45	2054			931	931				0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931				0	233,210	0.06765	15,777	15,777	14,846
50	47	2056			931	931				0	233,210	0.06765	15,777	15,777	14,846
51	48	2057			931	931				0	233,210	0.06765	15,777	15,777	14,846
52	49	2058			931	931				0	233,210	0.06765	15,777	15,777	14,846
53	50	2059	-19,933	-1,010	931	-20,012				0	233,210	0.06765	15,777	15,777	35,789
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	0			779,630	779,630	587,915
Valor Presente i = 8%					VP (Costo):	117,125						VP (Beneficio):		146,448	29,323
													V.P.N.	29,323	
													T.I.R.E.	10.2%	
													B / C	1.25	

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.4 Evaluación Económica (2)

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh	100%	233,210
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 6%

Tarifa Promedia

Energía vendible: 233.2 MWh

Costo de energía: 67.65 US$/MWh

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	74,637
T.I.R.E.	10.2%
B / C	1.59

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO								(B) - (C)
			PROYECTO EL CHAPARRAL				CO_2 CREDITO				VENTA DE ENERGIA			(B)	
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COST	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0			0	0	-28,561
2		2008	28,429	1,061		29,489				0			0	0	-29,489
3		2009	49,524	1,212		50,737				0			0	0	-50,737
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	0	97,171	0.06765	6,574	6,574	-13,777
5	2	2011			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
6	3	2012			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
7	4	2013			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
8	5	2014			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
9	6	2015			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
10	7	2016			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
11	8	2017			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
12	9	2018			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
13	10	2019			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
14	11	2020			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
15	12	2021			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
16	13	2022			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
17	14	2023			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
18	15	2024			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
19	16	2025			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
20	17	2026			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
21	18	2027			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
22	19	2028			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
23	20	2029			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
24	21	2030			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
25	22	2031			931	931	67,199	-960	0.000	0	233,210	0.06765	15,777	15,777	14,846
26	23	2032			931	931				0	233,210	0.06765	15,777	15,777	14,846
27	24	2033			931	931				0	233,210	0.06765	15,777	15,777	14,846
28	25	2034			931	931				0	233,210	0.06765	15,777	15,777	14,846
29	26	2035			931	931				0	233,210	0.06765	15,777	15,777	14,846
30	27	2036			931	931				0	233,210	0.06765	15,777	15,777	14,846
31	28	2037		455	931	1,385				0	233,210	0.06765	15,777	15,777	14,391
32	29	2038		1,061	931	1,991				0	233,210	0.06765	15,777	15,777	13,785
33	30	2039		1,212	931	2,143				0	233,210	0.06765	15,777	15,777	13,634
34	31	2040		303	931	1,234				0	233,210	0.06765	15,777	15,777	14,543
35	32	2041			931	931				0	233,210	0.06765	15,777	15,777	14,846
36	33	2042	4,183		931	5,113				0	233,210	0.06765	15,777	15,777	10,663
37	34	2043	8,075		931	9,005				0	233,210	0.06765	15,777	15,777	6,771
38	35	2044	14,412		931	15,343				0	233,210	0.06765	15,777	15,777	434
39	36	2045	8,213		931	9,144				0	233,210	0.06765	15,777	15,777	6,633
40	37	2046			931	931				0	233,210	0.06765	15,777	15,777	14,846
41	38	2047			931	931				0	233,210	0.06765	15,777	15,777	14,846
42	39	2048			931	931				0	233,210	0.06765	15,777	15,777	14,846
43	40	2049			931	931				0	233,210	0.06765	15,777	15,777	14,846
44	41	2050			931	931				0	233,210	0.06765	15,777	15,777	14,846
45	42	2051			931	931				0	233,210	0.06765	15,777	15,777	14,846
46	43	2052			931	931				0	233,210	0.06765	15,777	15,777	14,846
47	44	2053			931	931				0	233,210	0.06765	15,777	15,777	14,846
48	45	2054			931	931				0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931				0	233,210	0.06765	15,777	15,777	14,846
50	47	2056			931	931				0	233,210	0.06765	15,777	15,777	14,846
51	48	2057			931	931				0	233,210	0.06765	15,777	15,777	14,846
52	49	2058			931	931				0	233,210	0.06765	15,777	15,777	14,846
53	50	2059	-19,933	-1,010	931	-20,012				0	233,210	0.06765	15,777	15,777	35,789
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	0			779,630	779,630	587,915
Valor Presente i = 6%					VP (Costo):	126,861						VP (Beneficio):		201,498	74,637
														V.P.N.	74,637
														T.I.R.E.	10.2%
														B / C	1.59

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.4 Evaluación Económica (2)

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh	100%	233,210
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible:	233.2 MWh
Costo de energía:	67.65 US$/MWh

Crédito CO_2 (precio CER): 3 US$/$CO_2$ton

V.P.N.	3,656
T.I.R.E.	10.3%
B / C	1.03

(unidad: US$1000)

No.		AÑO	COSTO				BENEFICIO								(B) - (C)
			PROYECTO EL CHAPARRAL			(C)	CO_2 CREDITO				VENTA DE ENERGIA			(B)	
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COST	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0			0	0	-28,561
2		2008	28,429	1,061		29,489				0			0	0	-29,489
3		2009	49,524	1,212		50,737				0			0	0	-50,737
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.003	137	97,171	0.06765	6,574	6,710	-13,640
5	2	2011			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
6	3	2012			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
7	4	2013			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
8	5	2014			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
9	6	2015			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
10	7	2016			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
11	8	2017			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
12	9	2018			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
13	10	2019			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
14	11	2020			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
15	12	2021			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
16	13	2022			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
17	14	2023			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
18	15	2024			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
19	16	2025			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
20	17	2026			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
21	18	2027			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
22	19	2028			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
23	20	2029			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
24	21	2030			931	931	115,199	-5,760	0.003	328	233,210	0.06765	15,777	16,105	15,174
25	22	2031			931	931	67,199	-960	0.003	328	233,210	0.06765	15,777	16,105	15,174
26	23	2032			931	931				0	233,210	0.06765	15,777	15,777	14,846
27	24	2033			931	931				0	233,210	0.06765	15,777	15,777	14,846
28	25	2034			931	931				0	233,210	0.06765	15,777	15,777	14,846
29	26	2035			931	931				0	233,210	0.06765	15,777	15,777	14,846
30	27	2036			931	931				0	233,210	0.06765	15,777	15,777	14,846
31	28	2037		455	931	1,385				0	233,210	0.06765	15,777	15,777	14,391
32	29	2038		1,061	931	1,991				0	233,210	0.06765	15,777	15,777	13,785
33	30	2039		1,212	931	2,143				0	233,210	0.06765	15,777	15,777	13,634
34	31	2040		303	931	1,234				0	233,210	0.06765	15,777	15,777	14,543
35	32	2041			931	931				0	233,210	0.06765	15,777	15,777	14,846
36	33	2042	4,183		931	5,113				0	233,210	0.06765	15,777	15,777	10,663
37	34	2043	8,075		931	9,005				0	233,210	0.06765	15,777	15,777	6,771
38	35	2044	14,412		931	15,343				0	233,210	0.06765	15,777	15,777	434
39	36	2045	8,213		931	9,144				0	233,210	0.06765	15,777	15,777	6,633
40	37	2046			931	931				0	233,210	0.06765	15,777	15,777	14,846
41	38	2047			931	931				0	233,210	0.06765	15,777	15,777	14,846
42	39	2048			931	931				0	233,210	0.06765	15,777	15,777	14,846
43	40	2049			931	931				0	233,210	0.06765	15,777	15,777	14,846
44	41	2050			931	931				0	233,210	0.06765	15,777	15,777	14,846
45	42	2051			931	931				0	233,210	0.06765	15,777	15,777	14,846
46	43	2052			931	931				0	233,210	0.06765	15,777	15,777	14,846
47	44	2053			931	931				0	233,210	0.06765	15,777	15,777	14,846
48	45	2054			931	931				0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931				0	233,210	0.06765	15,777	15,777	14,846
50	47	2056			931	931				0	233,210	0.06765	15,777	15,777	14,846
51	48	2057			931	931				0	233,210	0.06765	15,777	15,777	14,846
52	49	2058			931	931				0	233,210	0.06765	15,777	15,777	14,846
53	50	2059	-19,933	-1,010	931	-20,012				0	233,210	0.06765	15,777	15,777	35,789
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	7,031			779,630	786,661	594,946
Valor Presente i = 10%					VP (Costo):	109,614						VP (Beneficio):		113,270	3,656
														V.P.N.	3,656
														T.I.R.E.	10.3%
														B / C	1.03

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.4 Evaluación Económica (2)

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh	100%	233,210
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible: 233.2 MWh

Costo de energía: 67.65 US$/MWh

Crédito CO_2 (precio CER): 5 US$/$CO_2$ton

V.P.N.	**5,011**
T.I.R.E.	**10.5%**
B / C	**1.05**

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO								(B) - (C)
			PROYECTO EL CHAPARRAL				CO_2 CREDITO				VENTA DE ENERGIA			(B)	
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COST	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0			0	0	-28,561
2		2008	28,429	1,061		29,489				0			0	0	-29,489
3		2009	49,524	1,212		50,737				0			0	0	-50,737
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.005	228	97,171	0.06765	6,574	6,802	-13,549
5	2	2011			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
6	3	2012			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
7	4	2013			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
8	5	2014			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
9	6	2015			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
10	7	2016			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
11	8	2017			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
12	9	2018			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
13	10	2019			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
14	11	2020			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
15	12	2021			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
16	13	2022			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
17	14	2023			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
18	15	2024			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
19	16	2025			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
20	17	2026			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
21	18	2027			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
22	19	2028			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
23	20	2029			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
24	21	2030			931	931	115,199	-5,760	0.005	547	233,210	0.06765	15,777	16,324	15,393
25	22	2031			931	931	67,199	-960	0.005	547	233,210	0.06765	15,777	16,324	15,393
26	23	2032			931	931				0	233,210	0.06765	15,777	15,777	14,846
27	24	2033			931	931				0	233,210	0.06765	15,777	15,777	14,846
28	25	2034			931	931				0	233,210	0.06765	15,777	15,777	14,846
29	26	2035			931	931				0	233,210	0.06765	15,777	15,777	14,846
30	27	2036			931	931				0	233,210	0.06765	15,777	15,777	14,846
31	28	2037		455	931	1,385				0	233,210	0.06765	15,777	15,777	14,391
32	29	2038		1,061	931	1,991				0	233,210	0.06765	15,777	15,777	13,785
33	30	2039		1,212	931	2,143				0	233,210	0.06765	15,777	15,777	13,634
34	31	2040		303	931	1,234				0	233,210	0.06765	15,777	15,777	14,543
35	32	2041			931	931				0	233,210	0.06765	15,777	15,777	14,846
36	33	2042	4,183		931	5,113				0	233,210	0.06765	15,777	15,777	10,663
37	34	2043	8,075		931	9,005				0	233,210	0.06765	15,777	15,777	6,771
38	35	2044	14,412		931	15,343				0	233,210	0.06765	15,777	15,777	434
39	36	2045	8,213		931	9,144				0	233,210	0.06765	15,777	15,777	6,633
40	37	2046			931	931				0	233,210	0.06765	15,777	15,777	14,846
41	38	2047			931	931				0	233,210	0.06765	15,777	15,777	14,846
42	39	2048			931	931				0	233,210	0.06765	15,777	15,777	14,846
43	40	2049			931	931				0	233,210	0.06765	15,777	15,777	14,846
44	41	2050			931	931				0	233,210	0.06765	15,777	15,777	14,846
45	42	2051			931	931				0	233,210	0.06765	15,777	15,777	14,846
46	43	2052			931	931				0	233,210	0.06765	15,777	15,777	14,846
47	44	2053			931	931				0	233,210	0.06765	15,777	15,777	14,846
48	45	2054			931	931				0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931				0	233,210	0.06765	15,777	15,777	14,846
50	47	2056			931	931				0	233,210	0.06765	15,777	15,777	14,846
51	48	2057			931	931				0	233,210	0.06765	15,777	15,777	14,846
52	49	2058			931	931				0	233,210	0.06765	15,777	15,777	14,846
53	50	2059	-19,933	-1,010	931	-20,012				0	233,210	0.06765	15,777	15,777	35,789
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	11,719			779,630	791,349	599,634
Valor Presente i = 10%					VP (Costo):	109,614						VP (Beneficio):		114,625	5,011
														V.P.N.	5,011
														T.I.R.E.	10.5%
														B / C	1.05

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.4 Evaluación Económica (2)

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh	100%	233,210
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible:	233.2 MWh
Costo de energía:	67.65 US$/MWh

Crédito CO_2 (precio CER): 10 US$/$CO_2$ton

V.P.N.	8,399
T.I.R.E.	10.8%
B / C	1.08

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO							(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CO_2 CREDITO				VENTA DE ENERGIA				
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COST	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0			0	0	-28,561
2		2008	28,429	1,061		29,489				0			0	0	-29,489
3		2009	49,524	1,212		50,737				0			0	0	-50,737
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.010	456	97,171	0.06765	6,574	7,030	-13,321
5	2	2011			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
6	3	2012			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
7	4	2013			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
8	5	2014			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
9	6	2015			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
10	7	2016			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
11	8	2017			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
12	9	2018			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
13	10	2019			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
14	11	2020			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
15	12	2021			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
16	13	2022			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
17	14	2023			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
18	15	2024			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
19	16	2025			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
20	17	2026			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
21	18	2027			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
22	19	2028			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
23	20	2029			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
24	21	2030			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
25	22	2031			931	931	67,199	-960	0.010	1,094	233,210	0.06765	15,777	16,871	15,940
26	23	2032			931	931				0	233,210	0.06765	15,777	15,777	14,846
27	24	2033			931	931				0	233,210	0.06765	15,777	15,777	14,846
28	25	2034			931	931				0	233,210	0.06765	15,777	15,777	14,846
29	26	2035			931	931				0	233,210	0.06765	15,777	15,777	14,846
30	27	2036			931	931				0	233,210	0.06765	15,777	15,777	14,846
31	28	2037		455	931	1,385				0	233,210	0.06765	15,777	15,777	14,391
32	29	2038		1,061	931	1,991				0	233,210	0.06765	15,777	15,777	13,785
33	30	2039		1,212	931	2,143				0	233,210	0.06765	15,777	15,777	13,634
34	31	2040		303	931	1,234				0	233,210	0.06765	15,777	15,777	14,543
35	32	2041			931	931				0	233,210	0.06765	15,777	15,777	14,846
36	33	2042	4,183		931	5,113				0	233,210	0.06765	15,777	15,777	10,663
37	34	2043	8,075		931	9,005				0	233,210	0.06765	15,777	15,777	6,771
38	35	2044	14,412		931	15,343				0	233,210	0.06765	15,777	15,777	434
39	36	2045	8,213		931	9,144				0	233,210	0.06765	15,777	15,777	6,633
40	37	2046			931	931				0	233,210	0.06765	15,777	15,777	14,846
41	38	2047			931	931				0	233,210	0.06765	15,777	15,777	14,846
42	39	2048			931	931				0	233,210	0.06765	15,777	15,777	14,846
43	40	2049			931	931				0	233,210	0.06765	15,777	15,777	14,846
44	41	2050			931	931				0	233,210	0.06765	15,777	15,777	14,846
45	42	2051			931	931				0	233,210	0.06765	15,777	15,777	14,846
46	43	2052			931	931				0	233,210	0.06765	15,777	15,777	14,846
47	44	2053			931	931				0	233,210	0.06765	15,777	15,777	14,846
48	45	2054			931	931				0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931				0	233,210	0.06765	15,777	15,777	14,846
50	47	2056			931	931				0	233,210	0.06765	15,777	15,777	14,846
51	48	2057			931	931				0	233,210	0.06765	15,777	15,777	14,846
52	49	2058			931	931				0	233,210	0.06765	15,777	15,777	14,846
53	50	2059	-19,933	-1,010	931	-20,012				0	233,210	0.06765	15,777	15,777	35,789
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	23,438			779,630	803,068	611,353
Valor Presente i = 10%					VP (Costo):	109,614							VP (Beneficio):	118,013	8,399
														V.P.N.	8,399
														T.I.R.E.	10.8%
														B / C	1.08

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.4 Evaluación Económica (2)

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	209,889 MWh	90%	233,210
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible: 233.2 MWh

Costo de energía: 67.65 US$/MWh

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	-9,501
T.I.R.E.	9.1%
B / C	0.91

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO							(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CO_2 CREDITO				VENTA DE ENERGIA				
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COST	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal	TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0			0	0	-28,561
2		2008	28,429	1,061		29,489				0			0	0	-29,489
3		2009	49,524	1,212		50,737				0			0	0	-50,737
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	0	87,454	0.06765	5,916	5,916	-14,434
5	2	2011			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
6	3	2012			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
7	4	2013			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
8	5	2014			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
9	6	2015			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
10	7	2016			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
11	8	2017			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
12	9	2018			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
13	10	2019			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
14	11	2020			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
15	12	2021			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
16	13	2022			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
17	14	2023			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
18	15	2024			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
19	16	2025			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
20	17	2026			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
21	18	2027			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
22	19	2028			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
23	20	2029			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
24	21	2030			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
25	22	2031			931	931	67,199	-960	0.000	0	209,889	0.06765	14,199	14,199	13,268
26	23	2032			931	931				0	209,889	0.06765	14,199	14,199	13,268
27	24	2033			931	931				0	209,889	0.06765	14,199	14,199	13,268
28	25	2034			931	931				0	209,889	0.06765	14,199	14,199	13,268
29	26	2035			931	931				0	209,889	0.06765	14,199	14,199	13,268
30	27	2036			931	931				0	209,889	0.06765	14,199	14,199	13,268
31	28	2037		455	931	1,385				0	209,889	0.06765	14,199	14,199	12,814
32	29	2038		1,061	931	1,991				0	209,889	0.06765	14,199	14,199	12,208
33	30	2039		1,212	931	2,143				0	209,889	0.06765	14,199	14,199	12,056
34	31	2040		303	931	1,234				0	209,889	0.06765	14,199	14,199	12,965
35	32	2041			931	931				0	209,889	0.06765	14,199	14,199	13,268
36	33	2042	4,183		931	5,113				0	209,889	0.06765	14,199	14,199	9,086
37	34	2043	8,075		931	9,005				0	209,889	0.06765	14,199	14,199	5,194
38	35	2044	14,412		931	15,343				0	209,889	0.06765	14,199	14,199	-1,144
39	36	2045	8,213		931	9,144				0	209,889	0.06765	14,199	14,199	5,055
40	37	2046			931	931				0	209,889	0.06765	14,199	14,199	13,268
41	38	2047			931	931				0	209,889	0.06765	14,199	14,199	13,268
42	39	2048			931	931				0	209,889	0.06765	14,199	14,199	13,268
43	40	2049			931	931				0	209,889	0.06765	14,199	14,199	13,268
44	41	2050			931	931				0	209,889	0.06765	14,199	14,199	13,268
45	42	2051			931	931				0	209,889	0.06765	14,199	14,199	13,268
46	43	2052			931	931				0	209,889	0.06765	14,199	14,199	13,268
47	44	2053			931	931				0	209,889	0.06765	14,199	14,199	13,268
48	45	2054			931	931				0	209,889	0.06765	14,199	14,199	13,268
49	46	2055			931	931				0	209,889	0.06765	14,199	14,199	13,268
50	47	2056			931	931				0	209,889	0.06765	14,199	14,199	13,268
51	48	2057			931	931				0	209,889	0.06765	14,199	14,199	13,268
52	49	2058			931	931				0	209,889	0.06765	14,199	14,199	13,268
53	50	2059	-19,933	-1,010	931	-20,012				0	209,889	0.06765	14,199	14,199	34,211
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	0			701,667	701,667	509,952
Valor Presente i = 10%					VP (Costo):	109,614						VP (Beneficio):		100,113	-9,501
														V.P.N.	-9,501
														T.I.R.E.	9.1%
														B / C	0.91

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.4 Evaluación Económica (2)

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh	100%	233,210
Costo de construcción	141,624 1000US$	110%	128,749

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible: 233.2 MWh
Costo de energía: 67.65 US$/MWh

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	-8,682
T.I.R.E.	9.3%
B / C	0.93

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO							(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CO_2 CREDITO				VENTA DE ENERGIA				
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COST	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal	TOTAL BENEFICIO	
1		2007	30,917	500		31,417				0			0	0	-31,417
2		2008	31,272	1,167		32,438				0			0	0	-32,438
3		2009	54,477	1,333		55,810				0			0	0	-55,810
4	1	2010	21,625	333	388	22,346	48,000	-2,400	0.000	0	97,171	0.06765	6,574	6,574	-15,773
5	2	2011			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
6	3	2012			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
7	4	2013			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
8	5	2014			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
9	6	2015			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
10	7	2016			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
11	8	2017			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
12	9	2018			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
13	10	2019			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
14	11	2020			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
15	12	2021			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
16	13	2022			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
17	14	2023			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
18	15	2024			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
19	16	2025			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
20	17	2026			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
21	18	2027			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
22	19	2028			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
23	20	2029			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
24	21	2030			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
25	22	2031			931	931	67,199	-960	0.000	0	233,210	0.06765	15,777	15,777	14,846
26	23	2032			931	931				0	233,210	0.06765	15,777	15,777	14,846
27	24	2033			931	931				0	233,210	0.06765	15,777	15,777	14,846
28	25	2034			931	931				0	233,210	0.06765	15,777	15,777	14,846
29	26	2035			931	931				0	233,210	0.06765	15,777	15,777	14,846
30	27	2036			931	931				0	233,210	0.06765	15,777	15,777	14,846
31	28	2037		500	931	1,431				0	233,210	0.06765	15,777	15,777	14,346
32	29	2038		1,167	931	2,098				0	233,210	0.06765	15,777	15,777	13,679
33	30	2039		1,333	931	2,264				0	233,210	0.06765	15,777	15,777	13,513
34	31	2040		333	931	1,264				0	233,210	0.06765	15,777	15,777	14,513
35	32	2041			931	931				0	233,210	0.06765	15,777	15,777	14,846
36	33	2042	4,601		931	5,532				0	233,210	0.06765	15,777	15,777	10,245
37	34	2043	8,882		931	9,813				0	233,210	0.06765	15,777	15,777	5,964
38	35	2044	15,854		931	16,784				0	233,210	0.06765	15,777	15,777	-1,008
39	36	2045	9,034		931	9,965				0	233,210	0.06765	15,777	15,777	5,812
40	37	2046			931	931				0	233,210	0.06765	15,777	15,777	14,846
41	38	2047			931	931				0	233,210	0.06765	15,777	15,777	14,846
42	39	2048			931	931				0	233,210	0.06765	15,777	15,777	14,846
43	40	2049			931	931				0	233,210	0.06765	15,777	15,777	14,846
44	41	2050			931	931				0	233,210	0.06765	15,777	15,777	14,846
45	42	2051			931	931				0	233,210	0.06765	15,777	15,777	14,846
46	43	2052			931	931				0	233,210	0.06765	15,777	15,777	14,846
47	44	2053			931	931				0	233,210	0.06765	15,777	15,777	14,846
48	45	2054			931	931				0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931				0	233,210	0.06765	15,777	15,777	14,846
50	47	2056			931	931				0	233,210	0.06765	15,777	15,777	14,846
51	48	2057			931	931				0	233,210	0.06765	15,777	15,777	14,846
52	49	2058			931	931				0	233,210	0.06765	15,777	15,777	14,846
53	50	2059	-21,926	-1,111	931	-22,107				0	233,210	0.06765	15,777	15,777	37,883
TOTAL			154,735	5,556	45,996	206,287	2,419,179	-118,559	0	0			779,630	779,630	573,343
Valor Presente i = 10%					VP (Costo):	119,919						VP (Beneficio):		111,237	-8,682
														V.P.N.	-8,682
														T.I.R.E.	9.3%
														B / C	0.93

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.4 Evaluación Económica (2)

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	209,889 MWh	90%	233,210
Costo de construcción	141,624 1000US$	110%	128,749

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible: 233.2 MWh

Costo de energía: 67.65 US$/MWh

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	**-19,806**
T.I.R.E.	**8.3%**
B / C	**0.83**

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO							(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CO_2 CREDITO				VENTA DE ENERGIA				
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COST	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal	TOTAL BENEFICIO	
1		2007	30,917	500		31,417				0			0	0	-31,417
2		2008	31,272	1,167		32,438				0			0	0	-32,438
3		2009	54,477	1,333		55,810				0			0	0	-55,810
4	1	2010	21,625	333	388	22,346	48,000	-2,400	0.000	0	87,454	0.06765	5,916	5,916	-16,430
5	2	2011			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
6	3	2012			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
7	4	2013			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
8	5	2014			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
9	6	2015			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
10	7	2016			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
11	8	2017			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
12	9	2018			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
13	10	2019			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
14	11	2020			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
15	12	2021			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
16	13	2022			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
17	14	2023			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
18	15	2024			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
19	16	2025			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
20	17	2026			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
21	18	2027			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
22	19	2028			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
23	20	2029			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
24	21	2030			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,268
25	22	2031			931	931	67,199	-960	0.000	0	209,889	0.06765	14,199	14,199	13,268
26	23	2032			931	931				0	209,889	0.06765	14,199	14,199	13,268
27	24	2033			931	931				0	209,889	0.06765	14,199	14,199	13,268
28	25	2034			931	931				0	209,889	0.06765	14,199	14,199	13,268
29	26	2035			931	931				0	209,889	0.06765	14,199	14,199	13,268
30	27	2036			931	931				0	209,889	0.06765	14,199	14,199	13,268
31	28	2037		500	931	1,431				0	209,889	0.06765	14,199	14,199	12,768
32	29	2038		1,167	931	2,098				0	209,889	0.06765	14,199	14,199	12,101
33	30	2039		1,333	931	2,264				0	209,889	0.06765	14,199	14,199	11,935
34	31	2040		333	931	1,264				0	209,889	0.06765	14,199	14,199	12,935
35	32	2041			931	931				0	209,889	0.06765	14,199	14,199	13,268
36	33	2042	4,601		931	5,532				0	209,889	0.06765	14,199	14,199	8,667
37	34	2043	8,882		931	9,813				0	209,889	0.06765	14,199	14,199	4,386
38	35	2044	15,854		931	16,784				0	209,889	0.06765	14,199	14,199	-2,585
39	36	2045	9,034		931	9,965				0	209,889	0.06765	14,199	14,199	4,234
40	37	2046			931	931				0	209,889	0.06765	14,199	14,199	13,268
41	38	2047			931	931				0	209,889	0.06765	14,199	14,199	13,268
42	39	2048			931	931				0	209,889	0.06765	14,199	14,199	13,268
43	40	2049			931	931				0	209,889	0.06765	14,199	14,199	13,268
44	41	2050			931	931				0	209,889	0.06765	14,199	14,199	13,268
45	42	2051			931	931				0	209,889	0.06765	14,199	14,199	13,268
46	43	2052			931	931				0	209,889	0.06765	14,199	14,199	13,268
47	44	2053			931	931				0	209,889	0.06765	14,199	14,199	13,268
48	45	2054			931	931				0	209,889	0.06765	14,199	14,199	13,268
49	46	2055			931	931				0	209,889	0.06765	14,199	14,199	13,268
50	47	2056			931	931				0	209,889	0.06765	14,199	14,199	13,268
51	48	2057			931	931				0	209,889	0.06765	14,199	14,199	13,268
52	49	2058			931	931				0	209,889	0.06765	14,199	14,199	13,268
53	50	2059	-21,926	-1,111	931	-22,107				0	209,889	0.06765	14,199	14,199	36,306
TOTAL			154,735	5,556	45,996	206,287	2,419,179	-118,559	0	0			701,667	701,667	495,380
Valor Presente i = 10%					**VP (Costo):**	**119,919**							**VP (Beneficio):**	**100,113**	**-19,806**
														V.P.N.	**-19,806**
														T.I.R.E.	**8.3%**
														B / C	**0.83**

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.4 Evaluación Económica (2)

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	256,531 MWh	110%	233,210
Costo de construcción	128,749 1000US$	100%	128,749

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible: 233.2 MWh

Costo de energía: 67.65 US$/MWh

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	12,747
T.I.R.E.	11.2%
B / C	1.12

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO								(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CO_2 CREDITO				VENTA DE ENERGIA					
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COST	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal		TOTAL BENEFICIO	
1		2007	28,106	455		28,561				0			0		0	-28,561
2		2008	28,429	1,061		29,489				0			0		0	-29,489
3		2009	49,524	1,212		50,737				0			0		0	-50,737
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	0	106,888	0.06765	7,231		7,231	-13,119
5	2	2011			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
6	3	2012			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
7	4	2013			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
8	5	2014			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
9	6	2015			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
10	7	2016			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
11	8	2017			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
12	9	2018			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
13	10	2019			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
14	11	2020			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
15	12	2021			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
16	13	2022			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
17	14	2023			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
18	15	2024			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
19	16	2025			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
20	17	2026			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
21	18	2027			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
22	19	2028			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
23	20	2029			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
24	21	2030			931	931	115,199	-5,760	0.000	0	256,531	0.06765	17,354		17,354	16,424
25	22	2031			931	931	67,199	-960	0.000	0	256,531	0.06765	17,354		17,354	16,424
26	23	2032			931	931				0	256,531	0.06765	17,354		17,354	16,424
27	24	2033			931	931				0	256,531	0.06765	17,354		17,354	16,424
28	25	2034			931	931				0	256,531	0.06765	17,354		17,354	16,424
29	26	2035			931	931				0	256,531	0.06765	17,354		17,354	16,424
30	27	2036			931	931				0	256,531	0.06765	17,354		17,354	16,424
31	28	2037		455	931	1,385				0	256,531	0.06765	17,354		17,354	15,969
32	29	2038		1,061	931	1,991				0	256,531	0.06765	17,354		17,354	15,363
33	30	2039		1,212	931	2,143				0	256,531	0.06765	17,354		17,354	15,211
34	31	2040		303	931	1,234				0	256,531	0.06765	17,354		17,354	16,121
35	32	2041			931	931				0	256,531	0.06765	17,354		17,354	16,424
36	33	2042	4,183		931	5,113				0	256,531	0.06765	17,354		17,354	12,241
37	34	2043	8,075		931	9,005				0	256,531	0.06765	17,354		17,354	8,349
38	35	2044	14,412		931	15,343				0	256,531	0.06765	17,354		17,354	2,011
39	36	2045	8,213		931	9,144				0	256,531	0.06765	17,354		17,354	8,211
40	37	2046			931	931				0	256,531	0.06765	17,354		17,354	16,424
41	38	2047			931	931				0	256,531	0.06765	17,354		17,354	16,424
42	39	2048			931	931				0	256,531	0.06765	17,354		17,354	16,424
43	40	2049			931	931				0	256,531	0.06765	17,354		17,354	16,424
44	41	2050			931	931				0	256,531	0.06765	17,354		17,354	16,424
45	42	2051			931	931				0	256,531	0.06765	17,354		17,354	16,424
46	43	2052			931	931				0	256,531	0.06765	17,354		17,354	16,424
47	44	2053			931	931				0	256,531	0.06765	17,354		17,354	16,424
48	45	2054			931	931				0	256,531	0.06765	17,354		17,354	16,424
49	46	2055			931	931				0	256,531	0.06765	17,354		17,354	16,424
50	47	2056			931	931				0	256,531	0.06765	17,354		17,354	16,424
51	48	2057			931	931				0	256,531	0.06765	17,354		17,354	16,424
52	49	2058			931	931				0	256,531	0.06765	17,354		17,354	16,424
53	50	2059	-19,933	-1,010	931	-20,012				0	256,531	0.06765	17,354		17,354	37,367
TOTAL			140,668	5,051	45,996	191,715	2,419,179	-118,559	0	0			857,593		857,593	665,878
Valor Presente i = 10%					VP (Costo):	109,614						VP (Beneficio):			122,361	12,747
															V.P.N.	12,747
															T.I.R.E.	11.2%
															B / C	1.12

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.4 Evaluación Económica (2)

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	233,210 MWh	100%	233,210
Costo de construcción	115,874 1000US$	90%	128,749

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible: 233.2 MWh

Costo de energía: 67.65 US$/MWh

Crédito CO_2 (precio CER): 0 US$/$CO_2$ton

V.P.N.	**11,928**
T.I.R.E.	**11.2%**
B / C	**1.12**

(unidad: US$1000)

No.		AÑO	COSTO			(C)	BENEFICIO							(B)	(B) - (C)
			PROYECTO EL CHAPARRAL				CO_2 CREDITO				VENTA DE ENERGIA				
			Costo de Construcc.	Línea de Transmisión	Costo O&M	TOTAL COST	Beneficio Volumen	Costo	Precio CER US$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal	TOTAL BENEFICIO	
1		2007	25,296	409		25,705				0			0	0	-25,705
2		2008	25,586	955		26,540				0			0	0	-26,540
3		2009	44,572	1,091		45,663				0			0	0	-45,663
4	1	2010	17,693	273	388	18,354	48,000	-2,400	0.000	0	97,171	0.06765	6,574	6,574	-11,780
5	2	2011			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
6	3	2012			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
7	4	2013			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
8	5	2014			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
9	6	2015			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
10	7	2016			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
11	8	2017			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
12	9	2018			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
13	10	2019			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
14	11	2020			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
15	12	2021			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
16	13	2022			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
17	14	2023			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
18	15	2024			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
19	16	2025			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
20	17	2026			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
21	18	2027			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
22	19	2028			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
23	20	2029			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
24	21	2030			931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
25	22	2031			931	931	67,199	-960	0.000	0	233,210	0.06765	15,777	15,777	14,846
26	23	2032			931	931				0	233,210	0.06765	15,777	15,777	14,846
27	24	2033			931	931				0	233,210	0.06765	15,777	15,777	14,846
28	25	2034			931	931				0	233,210	0.06765	15,777	15,777	14,846
29	26	2035			931	931				0	233,210	0.06765	15,777	15,777	14,846
30	27	2036			931	931				0	233,210	0.06765	15,777	15,777	14,846
31	28	2037		409	931	1,340				0	233,210	0.06765	15,777	15,777	14,437
32	29	2038		955	931	1,885				0	233,210	0.06765	15,777	15,777	13,891
33	30	2039		1,091	931	2,022				0	233,210	0.06765	15,777	15,777	13,755
34	31	2040		273	931	1,204				0	233,210	0.06765	15,777	15,777	14,573
35	32	2041			931	931				0	233,210	0.06765	15,777	15,777	14,846
36	33	2042	3,764		931	4,695				0	233,210	0.06765	15,777	15,777	11,082
37	34	2043	7,267		931	8,198				0	233,210	0.06765	15,777	15,777	7,579
38	35	2044	12,971		931	13,902				0	233,210	0.06765	15,777	15,777	1,875
39	36	2045	7,392		931	8,323				0	233,210	0.06765	15,777	15,777	7,454
40	37	2046			931	931				0	233,210	0.06765	15,777	15,777	14,846
41	38	2047			931	931				0	233,210	0.06765	15,777	15,777	14,846
42	39	2048			931	931				0	233,210	0.06765	15,777	15,777	14,846
43	40	2049			931	931				0	233,210	0.06765	15,777	15,777	14,846
44	41	2050			931	931				0	233,210	0.06765	15,777	15,777	14,846
45	42	2051			931	931				0	233,210	0.06765	15,777	15,777	14,846
46	43	2052			931	931				0	233,210	0.06765	15,777	15,777	14,846
47	44	2053			931	931				0	233,210	0.06765	15,777	15,777	14,846
48	45	2054			931	931				0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931				0	233,210	0.06765	15,777	15,777	14,846
50	47	2056			931	931				0	233,210	0.06765	15,777	15,777	14,846
51	48	2057			931	931				0	233,210	0.06765	15,777	15,777	14,846
52	49	2058			931	931				0	233,210	0.06765	15,777	15,777	14,846
53	50	2059	-17,940	-909	931	-17,918				0	233,210	0.06765	15,777	15,777	33,695
TOTAL			126,601	4,546	45,996	177,143	2,419,179	-118,559	0	0			779,630	779,630	602,486
Valor Presente i = 10%					VP (Costo):	99,309						VP (Beneficio):		111,237	11,928
														V.P.N.	11,928
														T.I.R.E.	11.2%
														B / C	1.12

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	180,200 MWh	100%	180,200
Costo de construcción	135,336 1000US$	100%	135,336

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible:	*180,200 MWh*
Costo de energía:	58.08 US$/MWh

Crédito CO_2 (precio de CER):

0 US$/$CO_2$ton

T.I.R.F. 6.4%

(Unidad: US$1000)

No.		AÑO	PROYECTO EL CHAPARRAL				BENEFICIO					(B) - (C)
			Costo de Construcc.	Línea de Transmisión	Costo O&M	(C) TOTAL COSTO	Energía Vendible MWh	Ingreso Venta Energía	Emisión de CO_2 evitada	CER transacción	(B) TOTAL BENEFICIO	
1		2007	30,106	468	0	30,574						-30,574
2		2008	29,801	1,091	0	30,892						-30,892
3		2009	51,855	1,247	0	53,102						-53,102
4	1	2010	20,457	312	401	21,170	75,083	4,361	45,600	0	4,361	-16,809
5	2	2011			963	963	180,200	10,466	109,439	0	10,466	9,503
6	3	2012			963	963	180,200	10,466	109,439	0	10,466	9,503
7	4	2013			963	963	180,200	10,466	109,439	0	10,466	9,503
8	5	2014			963	963	180,200	10,466	109,439	0	10,466	9,503
9	6	2015			963	963	180,200	10,466	109,439	0	10,466	9,503
10	7	2016			963	963	180,200	10,466	109,439	0	10,466	9,503
11	8	2017			963	963	180,200	10,466	109,439	0	10,466	9,503
12	9	2018			963	963	180,200	10,466	109,439	0	10,466	9,503
13	10	2019			963	963	180,200	10,466	109,439	0	10,466	9,503
14	11	2020			963	963	180,200	10,466	109,439	0	10,466	9,503
15	12	2021			963	963	180,200	10,466	109,439	0	10,466	9,503
16	13	2022			963	963	180,200	10,466	109,439	0	10,466	9,503
17	14	2023			963	963	180,200	10,466	109,439	0	10,466	9,503
18	15	2024			963	963	180,200	10,466	109,439	0	10,466	9,503
19	16	2025			963	963	180,200	10,466	109,439	0	10,466	9,503
20	17	2026			963	963	180,200	10,466	109,439	0	10,466	9,503
21	18	2027			963	963	180,200	10,466	109,439	0	10,466	9,503
22	19	2028			963	963	180,200	10,466	109,439	0	10,466	9,503
23	20	2029			963	963	180,200	10,466	109,439	0	10,466	9,503
24	21	2030			963	963	180,200	10,466	109,439	0	10,466	9,503
25	22	2031			963	963	180,200	10,466	66,239	0	10,466	9,503
26	23	2032			963	963	180,200	10,466			10,466	9,503
27	24	2033			963	963	180,200	10,466			10,466	9,503
28	25	2034			963	963	180,200	10,466			10,466	9,503
29	26	2035			963	963	180,200	10,466			10,466	9,503
30	27	2036			963	963	180,200	10,466			10,466	9,503
31	28	2037		468	963	1,430	180,200	10,466			10,466	9,036
32	29	2038		1,091	963	2,054	180,200	10,466			10,466	8,412
33	30	2039		1,247	963	2,209	180,200	10,466			10,466	8,257
34	31	2040		312	963	1,274	180,200	10,466			10,466	9,192
35	32	2041			963	963	180,200	10,466			10,466	9,503
36	33	2042	4,244		963	5,207	180,200	10,466			10,466	5,259
37	34	2043	8,205		963	9,168	180,200	10,466			10,466	1,298
38	35	2044	14,632		963	15,595	180,200	10,466			10,466	-5,129
39	36	2045	8,326		963	9,289	180,200	10,466			10,466	1,177
40	37	2046			963	963	180,200	10,466			10,466	9,503
41	38	2047			963	963	180,200	10,466			10,466	9,503
42	39	2048			963	963	180,200	10,466			10,466	9,503
43	40	2049			963	963	180,200	10,466			10,466	9,503
44	41	2050			963	963	180,200	10,466			10,466	9,503
45	42	2051			963	963	180,200	10,466			10,466	9,503
46	43	2052			963	963	180,200	10,466			10,466	9,503
47	44	2053			963	963	180,200	10,466			10,466	9,503
48	45	2054			963	963	180,200	10,466			10,466	9,503
49	46	2055			963	963	180,200	10,466			10,466	9,503
50	47	2056			963	963	180,200	10,466			10,466	9,503
51	48	2057			963	963	180,200	10,466			10,466	9,503
52	49	2058			963	963	180,200	10,466			10,466	9,503
53	50	2059	-20,233	-1,039	963	-20,309	180,200	10,466			190,666	200,509
TOTAL			147,394	5,194	47,577	200,165	8,904,883	517,196	2,300,620	0	697,396	8,704,718
											T.I.R.F.	6.4%

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada	65.7 MW			
Capacidad dependable	38.4 MW			
Generacion de energía	162,180 MWh	90%	180,200	
Costo de construcción	135,336 1000US$	100%	135,336	

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible: 162,180 MWh

Costo de energía: 58.08 US$/MWh

Crédito CO_2 (precio de CER):

0 US$/$CO_2$ton

T.I.R.F. 5.7%

(Unidad: US$1000)

No.		AÑO	PROYECTO EL CHAPARRAL				BENEFICIO					(B) - (C)
			Costo de Construcc.	Línea de Transmisión	Costo O&M	(C) TOTAL COSTO	Energía Vendible MWh	Ingreso Venta Energía	Emisión de CO_2 evitada	CER transacción	(B) TOTAL BENEFICIO	
1		2007	30,106	468	0	30,574						-30,574
2		2008	29,801	1,091	0	30,892						-30,892
3		2009	51,855	1,247	0	53,102						-53,102
4	1	2010	20,457	312	401	21,170	67,575	3,925	45,600	0	3,925	-17,245
5	2	2011			963	963	162,180	9,419	109,439	0	9,419	8,457
6	3	2012			963	963	162,180	9,419	109,439	0	9,419	8,457
7	4	2013			963	963	162,180	9,419	109,439	0	9,419	8,457
8	5	2014			963	963	162,180	9,419	109,439	0	9,419	8,457
9	6	2015			963	963	162,180	9,419	109,439	0	9,419	8,457
10	7	2016			963	963	162,180	9,419	109,439	0	9,419	8,457
11	8	2017			963	963	162,180	9,419	109,439	0	9,419	8,457
12	9	2018			963	963	162,180	9,419	109,439	0	9,419	8,457
13	10	2019			963	963	162,180	9,419	109,439	0	9,419	8,457
14	11	2020			963	963	162,180	9,419	109,439	0	9,419	8,457
15	12	2021			963	963	162,180	9,419	109,439	0	9,419	8,457
16	13	2022			963	963	162,180	9,419	109,439	0	9,419	8,457
17	14	2023			963	963	162,180	9,419	109,439	0	9,419	8,457
18	15	2024			963	963	162,180	9,419	109,439	0	9,419	8,457
19	16	2025			963	963	162,180	9,419	109,439	0	9,419	8,457
20	17	2026			963	963	162,180	9,419	109,439	0	9,419	8,457
21	18	2027			963	963	162,180	9,419	109,439	0	9,419	8,457
22	19	2028			963	963	162,180	9,419	109,439	0	9,419	8,457
23	20	2029			963	963	162,180	9,419	109,439	0	9,419	8,457
24	21	2030			963	963	162,180	9,419	109,439	0	9,419	8,457
25	22	2031			963	963	162,180	9,419	66,239	0	9,419	8,457
26	23	2032			963	963	162,180	9,419			9,419	8,457
27	24	2033			963	963	162,180	9,419			9,419	8,457
28	25	2034			963	963	162,180	9,419			9,419	8,457
29	26	2035			963	963	162,180	9,419			9,419	8,457
30	27	2036			963	963	162,180	9,419			9,419	8,457
31	28	2037		468	963	1,430	162,180	9,419			9,419	7,989
32	29	2038		1,091	963	2,054	162,180	9,419			9,419	7,366
33	30	2039		1,247	963	2,209	162,180	9,419			9,419	7,210
34	31	2040		312	963	1,274	162,180	9,419			9,419	8,145
35	32	2041			963	963	162,180	9,419			9,419	8,457
36	33	2042	4,244		963	5,207	162,180	9,419			9,419	4,213
37	34	2043	8,205		963	9,168	162,180	9,419			9,419	252
38	35	2044	14,632		963	15,595	162,180	9,419			9,419	-6,175
39	36	2045	8,326		963	9,289	162,180	9,419			9,419	130
40	37	2046			963	963	162,180	9,419			9,419	8,457
41	38	2047			963	963	162,180	9,419			9,419	8,457
42	39	2048			963	963	162,180	9,419			9,419	8,457
43	40	2049			963	963	162,180	9,419			9,419	8,457
44	41	2050			963	963	162,180	9,419			9,419	8,457
45	42	2051			963	963	162,180	9,419			9,419	8,457
46	43	2052			963	963	162,180	9,419			9,419	8,457
47	44	2053			963	963	162,180	9,419			9,419	8,457
48	45	2054			963	963	162,180	9,419			9,419	8,457
49	46	2055			963	963	162,180	9,419			9,419	8,457
50	47	2056			963	963	162,180	9,419			9,419	8,457
51	48	2057			963	963	162,180	9,419			9,419	8,457
52	49	2058			963	963	162,180	9,419			9,419	8,457
53	50	2059	-20,233	-1,039	963	-20,309	162,180	9,419			171,599	182,489
TOTAL			147,394	5,194	47,577	200,165	8,014,395	465,476	2,300,620	0	627,656	7,814,230
											T.I.R.F.	5.7%

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	180,200 MWh	100%	180,200
Costo de construcción	148,870 1000US$	110%	135,336

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible: 180,200 MWh

Costo de energía: 58.08 US$/MWh

Crédito CO_2 (precio de CER): 0 US$/$CO_2$ton

T.I.R.F. 5.8%

(Unidad: US$1000)

No.		AÑO	PROYECTO EL CHAPARRAL				BENEFICIO					(B) - (C)
			Costo de Construcc.	Línea de Transmisión	Costo O&M	(C) TOTAL COSTO	Energía Vendible MWh	Ingreso Venta Energía	Emisión de CO_2 evitada	CER transacción	(B) TOTAL BENEFICIO	
1		2007	33,117	514	0	33,631						-33,631
2		2008	32,782	1,200	0	33,981						-33,981
3		2009	57,041	1,371	0	58,412						-58,412
4	1	2010	22,503	343	441	23,287	75,083	4,361	45,600	0	4,361	-18,926
5	2	2011			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
6	3	2012			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
7	4	2013			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
8	5	2014			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
9	6	2015			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
10	7	2016			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
11	8	2017			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
12	9	2018			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
13	10	2019			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
14	11	2020			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
15	12	2021			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
16	13	2022			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
17	14	2023			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
18	15	2024			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
19	16	2025			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
20	17	2026			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
21	18	2027			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
22	19	2028			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
23	20	2029			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
24	21	2030			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
25	22	2031			1,059	1,059	180,200	10,466	66,239	0	10,466	9,407
26	23	2032			1,059	1,059	180,200	10,466			10,466	9,407
27	24	2033			1,059	1,059	180,200	10,466			10,466	9,407
28	25	2034			1,059	1,059	180,200	10,466			10,466	9,407
29	26	2035			1,059	1,059	180,200	10,466			10,466	9,407
30	27	2036			1,059	1,059	180,200	10,466			10,466	9,407
31	28	2037		468	1,059	1,527	180,200	10,466			10,466	8,939
32	29	2038		1,091	1,059	2,150	180,200	10,466			10,466	8,316
33	30	2039		1,247	1,059	2,306	180,200	10,466			10,466	8,160
34	31	2040		312	1,059	1,371	180,200	10,466			10,466	9,095
35	32	2041			1,059	1,059	180,200	10,466			10,466	9,407
36	33	2042	4,244		1,059	5,303	180,200	10,466			10,466	5,163
37	34	2043	8,205		1,059	9,264	180,200	10,466			10,466	1,202
38	35	2044	14,632		1,059	15,691	180,200	10,466			10,466	-5,225
39	36	2045	8,326		1,059	9,385	180,200	10,466			10,466	1,081
40	37	2046			1,059	1,059	180,200	10,466			10,466	9,407
41	38	2047			1,059	1,059	180,200	10,466			10,466	9,407
42	39	2048			1,059	1,059	180,200	10,466			10,466	9,407
43	40	2049			1,059	1,059	180,200	10,466			10,466	9,407
44	41	2050			1,059	1,059	180,200	10,466			10,466	9,407
45	42	2051			1,059	1,059	180,200	10,466			10,466	9,407
46	43	2052			1,059	1,059	180,200	10,466			10,466	9,407
47	44	2053			1,059	1,059	180,200	10,466			10,466	9,407
48	45	2054			1,059	1,059	180,200	10,466			10,466	9,407
49	46	2055			1,059	1,059	180,200	10,466			10,466	9,407
50	47	2056			1,059	1,059	180,200	10,466			10,466	9,407
51	48	2057			1,059	1,059	180,200	10,466			10,466	9,407
52	49	2058			1,059	1,059	180,200	10,466			10,466	9,407
53	50	2059	-20,233	-1,039	1,059	-20,212	180,200	10,466			190,666	200,412
TOTAL			160,616	5,506	52,334	218,457	8,904,883	517,196	2,300,620	0	697,396	8,686,427
											T.I.R.F.	5.8%

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	162,180 MWh	90%	180,200
Costo de construcción	148,870 1000US$	110%	135,336

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible:	162,180 MWh
Costo de energía:	58.08 US$/MWh

Crédito CO_2 (precio de CER):

0 US$/$CO_2$ton

T.I.R.F. 5.1%

(Unidad: US$1000)

No.		AÑO	PROYECTO EL CHAPARRAL				BENEFICIO					(B) - (C)
			Costo de Construcc.	Línea de Transmisión	Costo O&M	(C) TOTAL COSTO	Energía Vendible MWh	Ingreso Venta Energía	Emisión de CO_2 evitada	CER transacción	(B) TOTAL BENEFICIO	
1		2007	33,117	514	0	33,631						-33,631
2		2008	32,782	1,200	0	33,981						-33,981
3		2009	57,041	1,371	0	58,412						-58,412
4	1	2010	22,503	343	441	23,287	67,575	3,925	45,600	0	3,925	-19,362
5	2	2011			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
6	3	2012			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
7	4	2013			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
8	5	2014			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
9	6	2015			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
10	7	2016			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
11	8	2017			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
12	9	2018			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
13	10	2019			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
14	11	2020			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
15	12	2021			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
16	13	2022			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
17	14	2023			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
18	15	2024			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
19	16	2025			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
20	17	2026			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
21	18	2027			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
22	19	2028			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
23	20	2029			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
24	21	2030			1,059	1,059	162,180	9,419	109,439	0	9,419	8,360
25	22	2031			1,059	1,059	162,180	9,419	66,239	0	9,419	8,360
26	23	2032			1,059	1,059	162,180	9,419			9,419	8,360
27	24	2033			1,059	1,059	162,180	9,419			9,419	8,360
28	25	2034			1,059	1,059	162,180	9,419			9,419	8,360
29	26	2035			1,059	1,059	162,180	9,419			9,419	8,360
30	27	2036			1,059	1,059	162,180	9,419			9,419	8,360
31	28	2037		468	1,059	1,527	162,180	9,419			9,419	7,893
32	29	2038		1,091	1,059	2,150	162,180	9,419			9,419	7,270
33	30	2039		1,247	1,059	2,306	162,180	9,419			9,419	7,114
34	31	2040		312	1,059	1,371	162,180	9,419			9,419	8,049
35	32	2041			1,059	1,059	162,180	9,419			9,419	8,360
36	33	2042	4,244		1,059	5,303	162,180	9,419			9,419	4,116
37	34	2043	8,205		1,059	9,264	162,180	9,419			9,419	155
38	35	2044	14,632		1,059	15,691	162,180	9,419			9,419	-6,271
39	36	2045	8,326		1,059	9,385	162,180	9,419			9,419	34
40	37	2046			1,059	1,059	162,180	9,419			9,419	8,360
41	38	2047			1,059	1,059	162,180	9,419			9,419	8,360
42	39	2048			1,059	1,059	162,180	9,419			9,419	8,360
43	40	2049			1,059	1,059	162,180	9,419			9,419	8,360
44	41	2050			1,059	1,059	162,180	9,419			9,419	8,360
45	42	2051			1,059	1,059	162,180	9,419			9,419	8,360
46	43	2052			1,059	1,059	162,180	9,419			9,419	8,360
47	44	2053			1,059	1,059	162,180	9,419			9,419	8,360
48	45	2054			1,059	1,059	162,180	9,419			9,419	8,360
49	46	2055			1,059	1,059	162,180	9,419			9,419	8,360
50	47	2056			1,059	1,059	162,180	9,419			9,419	8,360
51	48	2057			1,059	1,059	162,180	9,419			9,419	8,360
52	49	2058			1,059	1,059	162,180	9,419			9,419	8,360
53	50	2059	-20,233	-1,039	1,059	-20,212	162,180	9,419			171,599	182,392
TOTAL			160,616	5,506	52,334	218,457	8,014,395	465,476	2,300,620	0	627,656	7,795,938
											T.I.R.F.	**5.1%**

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	*198,220* MWh	*110%*	*180,200*
Costo de construcción	135,336 1000US$	100%	135,336

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible:	198,220 MWh
Costo de energía:	58.08 US$/MWh

Crédito CO_2 (precio de CER):

0 US$/$CO_2$ton

T.I.R.F.	7.1%

(Unidad: US$1000)

No.		AÑO	PROYECTO EL CHAPARRAL				BENEFICIO					(B) - (C)
			Costo de Construcc.	*Línea de* Transmisión	*Costo* O&M	(C) TOTAL COSTO	Energía *Vendible* MWh	Ingreso *Venta* Energía	Emisión de CO_2 *evitada*	CER *transacción*	(B) TOTAL BENEFICIO	
1		2007	30,106	468	0	30,574						-30,574
2		2008	29,801	1,091	0	30,892						-30,892
3		2009	51,855	1,247	0	53,102						-53,102
4	1	2010	20,457	312	401	21,170	82,592	4,797	45,600	0	4,797	-16,373
5	2	2011			963	963	198,220	11,513	109,439	0	11,513	10,550
6	3	2012			963	963	198,220	11,513	109,439	0	11,513	10,550
7	4	2013			963	963	198,220	11,513	109,439	0	11,513	10,550
8	5	2014			963	963	198,220	11,513	109,439	0	11,513	10,550
9	6	2015			963	963	198,220	11,513	109,439	0	11,513	10,550
10	7	2016			963	963	198,220	11,513	109,439	0	11,513	10,550
11	8	2017			963	963	198,220	11,513	109,439	0	11,513	10,550
12	9	2018			963	963	198,220	11,513	109,439	0	11,513	10,550
13	10	2019			963	963	198,220	11,513	109,439	0	11,513	10,550
14	11	2020			963	963	198,220	11,513	109,439	0	11,513	10,550
15	12	2021			963	963	198,220	11,513	109,439	0	11,513	10,550
16	13	2022			963	963	198,220	11,513	109,439	0	11,513	10,550
17	14	2023			963	963	198,220	11,513	109,439	0	11,513	10,550
18	15	2024			963	963	198,220	11,513	109,439	0	11,513	10,550
19	16	2025			963	963	198,220	11,513	109,439	0	11,513	10,550
20	17	2026			963	963	198,220	11,513	109,439	0	11,513	10,550
21	18	2027			963	963	198,220	11,513	109,439	0	11,513	10,550
22	19	2028			963	963	198,220	11,513	109,439	0	11,513	10,550
23	20	2029			963	963	198,220	11,513	109,439	0	11,513	10,550
24	21	2030			963	963	198,220	11,513	109,439	0	11,513	10,550
25	22	2031			963	963	198,220	11,513	66,239	0	11,513	10,550
26	23	2032			963	963	198,220	11,513			11,513	10,550
27	24	2033			963	963	198,220	11,513			11,513	10,550
28	25	2034			963	963	198,220	11,513			11,513	10,550
29	26	2035			963	963	198,220	11,513			11,513	10,550
30	27	2036			963	963	198,220	11,513			11,513	10,550
31	28	2037		468	963	1,430	198,220	11,513			11,513	10,082
32	29	2038		1,091	963	2,054	198,220	11,513			11,513	9,459
33	30	2039		1,247	963	2,209	198,220	11,513			11,513	9,303
34	31	2040		312	963	1,274	198,220	11,513			11,513	10,238
35	32	2041			963	963	198,220	11,513			11,513	10,550
36	33	2042	4,244		963	5,207	198,220	11,513			11,513	6,306
37	34	2043	8,205		963	9,168	198,220	11,513			11,513	2,345
38	35	2044	14,632		963	15,595	198,220	11,513			11,513	-4,082
39	36	2045	8,326		963	9,289	198,220	11,513			11,513	2,224
40	37	2046			963	963	198,220	11,513			11,513	10,550
41	38	2047			963	963	198,220	11,513			11,513	10,550
42	39	2048			963	963	198,220	11,513			11,513	10,550
43	40	2049			963	963	198,220	11,513			11,513	10,550
44	41	2050			963	963	198,220	11,513			11,513	10,550
45	42	2051			963	963	198,220	11,513			11,513	10,550
46	43	2052			963	963	198,220	11,513			11,513	10,550
47	44	2053			963	963	198,220	11,513			11,513	10,550
48	45	2054			963	963	198,220	11,513			11,513	10,550
49	46	2055			963	963	198,220	11,513			11,513	10,550
50	47	2056			963	963	198,220	11,513			11,513	10,550
51	48	2057			963	963	198,220	11,513			11,513	10,550
52	49	2058			963	963	198,220	11,513			11,513	10,550
53	50	2059	-20,233	-1,039	963	-20,309	198,220	11,513			209,733	218,529
TOTAL			147,394	5,194	47,577	200,165	9,795,372	568,915	2,300,620	0	767,135	9,595,206
											T.I.R.F.	**7.1%**

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	198,220 MWh	110%	180,200
Costo de construcción	148,870 1000US$	110%	135,336

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible:	198,220 MWh
Costo de energía:	58.08 US$/MWh

Crédito CO_2 (precio de CER):

0 US$/$CO_2$ton

T.I.R.F.	**6.4%**

(Unidad: US$1000)

No.		AÑO	PROYECTO EL CHAPARRAL				BENEFICIO					(B) - (C)
			Costo de Construcc.	Línea de Transmisión	Costo O&M	(C) TOTAL COSTO	Energía Vendible MWh	Ingreso Venta Energía	Emisión de CO_2 evitada	CER transacción	(B) TOTAL BENEFICIO	
1		2007	33,117	514	0	33,631						-33,631
2		2008	32,782	1,200	0	33,981						-33,981
3		2009	57,041	1,371	0	58,412						-58,412
4	1	2010	22,503	343	441	23,287	82,592	4,797	45,600	0	4,797	-18,490
5	2	2011			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
6	3	2012			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
7	4	2013			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
8	5	2014			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
9	6	2015			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
10	7	2016			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
11	8	2017			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
12	9	2018			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
13	10	2019			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
14	11	2020			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
15	12	2021			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
16	13	2022			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
17	14	2023			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
18	15	2024			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
19	16	2025			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
20	17	2026			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
21	18	2027			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
22	19	2028			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
23	20	2029			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
24	21	2030			1,059	1,059	198,220	11,513	109,439	0	11,513	10,454
25	22	2031			1,059	1,059	198,220	11,513	66,239	0	11,513	10,454
26	23	2032			1,059	1,059	198,220	11,513			11,513	10,454
27	24	2033			1,059	1,059	198,220	11,513			11,513	10,454
28	25	2034			1,059	1,059	198,220	11,513			11,513	10,454
29	26	2035			1,059	1,059	198,220	11,513			11,513	10,454
30	27	2036			1,059	1,059	198,220	11,513			11,513	10,454
31	28	2037		468	1,059	1,527	198,220	11,513			11,513	9,986
32	29	2038		1,091	1,059	2,150	198,220	11,513			11,513	9,363
33	30	2039		1,247	1,059	2,306	198,220	11,513			11,513	9,207
34	31	2040		312	1,059	1,371	198,220	11,513			11,513	10,142
35	32	2041			1,059	1,059	198,220	11,513			11,513	10,454
36	33	2042	4,244		1,059	5,303	198,220	11,513			11,513	6,210
37	34	2043	8,205		1,059	9,264	198,220	11,513			11,513	2,248
38	35	2044	14,632		1,059	15,691	198,220	11,513			11,513	-4,178
39	36	2045	8,326		1,059	9,385	198,220	11,513			11,513	2,127
40	37	2046			1,059	1,059	198,220	11,513			11,513	10,454
41	38	2047			1,059	1,059	198,220	11,513			11,513	10,454
42	39	2048			1,059	1,059	198,220	11,513			11,513	10,454
43	40	2049			1,059	1,059	198,220	11,513			11,513	10,454
44	41	2050			1,059	1,059	198,220	11,513			11,513	10,454
45	42	2051			1,059	1,059	198,220	11,513			11,513	10,454
46	43	2052			1,059	1,059	198,220	11,513			11,513	10,454
47	44	2053			1,059	1,059	198,220	11,513			11,513	10,454
48	45	2054			1,059	1,059	198,220	11,513			11,513	10,454
49	46	2055			1,059	1,059	198,220	11,513			11,513	10,454
50	47	2056			1,059	1,059	198,220	11,513			11,513	10,454
51	48	2057			1,059	1,059	198,220	11,513			11,513	10,454
52	49	2058			1,059	1,059	198,220	11,513			11,513	10,454
53	50	2059	-20,233	-1,039	1,059	-20,212	198,220	11,513			209,733	218,432
TOTAL			160,616	5,506	52,334	218,457	9,795,372	568,915	2,300,620	0	767,135	9,576,915
											T.I.R.F.	**6.4%**

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	180,200 MWh	100%	180,200
Costo de construcción	135,336 1000US$	100%	135,336

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible:	*180,200 MWh*
Costo de energía:	58.08 US$/MWh

Crédito CO_2 (precio de CER):

3 US$/$CO_2$ton

T.I.R.F. 6.6%

(Unidad: US$1000)

No.		AÑO	PROYECTO EL CHAPARRAL				BENEFICIO					(B) - (C)
			Costo de Construcc.	Línea de Transmisión	Costo O&M	(C) TOTAL COSTO	Energía Vendible MWh	Ingreso Venta Energía	Emisión de CO_2 evitada	CER transacción	(B) TOTAL BENEFICIO	
1		2007	30,106	468	0	30,574						-30,574
2		2008	29,801	1,091	0	30,892						-30,892
3		2009	51,855	1,247	0	53,102						-53,102
4	1	2010	20,457	312	401	21,170	75,083	4,361	45,600	137	4,498	-16,672
5	2	2011			963	963	180,200	10,466	109,439	328	10,794	9,832
6	3	2012			963	963	180,200	10,466	109,439	328	10,794	9,832
7	4	2013			963	963	180,200	10,466	109,439	328	10,794	9,832
8	5	2014			963	963	180,200	10,466	109,439	328	10,794	9,832
9	6	2015			963	963	180,200	10,466	109,439	328	10,794	9,832
10	7	2016			963	963	180,200	10,466	109,439	328	10,794	9,832
11	8	2017			963	963	180,200	10,466	109,439	328	10,794	9,832
12	9	2018			963	963	180,200	10,466	109,439	328	10,794	9,832
13	10	2019			963	963	180,200	10,466	109,439	328	10,794	9,832
14	11	2020			963	963	180,200	10,466	109,439	328	10,794	9,832
15	12	2021			963	963	180,200	10,466	109,439	328	10,794	9,832
16	13	2022			963	963	180,200	10,466	109,439	328	10,794	9,832
17	14	2023			963	963	180,200	10,466	109,439	328	10,794	9,832
18	15	2024			963	963	180,200	10,466	109,439	328	10,794	9,832
19	16	2025			963	963	180,200	10,466	109,439	328	10,794	9,832
20	17	2026			963	963	180,200	10,466	109,439	328	10,794	9,832
21	18	2027			963	963	180,200	10,466	109,439	328	10,794	9,832
22	19	2028			963	963	180,200	10,466	109,439	328	10,794	9,832
23	20	2029			963	963	180,200	10,466	109,439	328	10,794	9,832
24	21	2030			963	963	180,200	10,466	109,439	328	10,794	9,832
25	22	2031			963	963	180,200	10,466	66,239	0	10,466	9,503
26	23	2032			963	963	180,200	10,466			10,466	9,503
27	24	2033			963	963	180,200	10,466			10,466	9,503
28	25	2034			963	963	180,200	10,466			10,466	9,503
29	26	2035			963	963	180,200	10,466			10,466	9,503
30	27	2036			963	963	180,200	10,466			10,466	9,503
31	28	2037		468	963	1,430	180,200	10,466			10,466	9,036
32	29	2038		1,091	963	2,054	180,200	10,466			10,466	8,412
33	30	2039		1,247	963	2,209	180,200	10,466			10,466	8,257
34	31	2040		312	963	1,274	180,200	10,466			10,466	9,192
35	32	2041			963	963	180,200	10,466			10,466	9,503
36	33	2042	4,244		963	5,207	180,200	10,466			10,466	5,259
37	34	2043	8,205		963	9,168	180,200	10,466			10,466	1,298
38	35	2044	14,632		963	15,595	180,200	10,466			10,466	-5,129
39	36	2045	8,326		963	9,289	180,200	10,466			10,466	1,177
40	37	2046			963	963	180,200	10,466			10,466	9,503
41	38	2047			963	963	180,200	10,466			10,466	9,503
42	39	2048			963	963	180,200	10,466			10,466	9,503
43	40	2049			963	963	180,200	10,466			10,466	9,503
44	41	2050			963	963	180,200	10,466			10,466	9,503
45	42	2051			963	963	180,200	10,466			10,466	9,503
46	43	2052			963	963	180,200	10,466			10,466	9,503
47	44	2053			963	963	180,200	10,466			10,466	9,503
48	45	2054			963	963	180,200	10,466			10,466	9,503
49	46	2055			963	963	180,200	10,466			10,466	9,503
50	47	2056			963	963	180,200	10,466			10,466	9,503
51	48	2057			963	963	180,200	10,466			10,466	9,503
52	49	2058			963	963	180,200	10,466			10,466	9,503
53	50	2059	-20,233	-1,039	963	-20,309	180,200	10,466			190,666	200,509
TOTAL			147,394	5,194	47,577	200,165	8,904,883	517,196	2,300,620	6,703	704,099	8,704,718
											T.I.R.F.	**6.6%**

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada	65.7 MW			
Capacidad dependable	38.4 MW			
Generacion de energía	180,200 MWh	100%	180,200	
Costo de construcción	135,336 1000US$	100%	135,336	

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible:	180,200 MWh
Costo de energía:	58.08 US$/MWh

Crédito CO_2 (precio de CER): 5 US$/$CO_2$ton

T.I.R.F.	**6.7%**

(Unidad: US$1000)

No.		AÑO	PROYECTO EL CHAPARRAL				BENEFICIO					(B) - (C)
			Costo de Construcc.	Línea de Transmisión	Costo O&M	(C) TOTAL COSTO	Energía Vendible MWh	Ingreso Venta Energía	Emisión de CO_2 evitada	CER transacción	(B) TOTAL BENEFICIO	
1		2007	30,106	468	0	30,574						-30,574
2		2008	29,801	1,091	0	30,892						-30,892
3		2009	51,855	1,247	0	53,102						-53,102
4	1	2010	20,457	312	401	21,170	75,083	4,361	45,600	228	4,589	-16,581
5	2	2011			963	963	180,200	10,466	109,439	547	11,013	10,050
6	3	2012			963	963	180,200	10,466	109,439	547	11,013	10,050
7	4	2013			963	963	180,200	10,466	109,439	547	11,013	10,050
8	5	2014			963	963	180,200	10,466	109,439	547	11,013	10,050
9	6	2015			963	963	180,200	10,466	109,439	547	11,013	10,050
10	7	2016			963	963	180,200	10,466	109,439	547	11,013	10,050
11	8	2017			963	963	180,200	10,466	109,439	547	11,013	10,050
12	9	2018			963	963	180,200	10,466	109,439	547	11,013	10,050
13	10	2019			963	963	180,200	10,466	109,439	547	11,013	10,050
14	11	2020			963	963	180,200	10,466	109,439	547	11,013	10,050
15	12	2021			963	963	180,200	10,466	109,439	547	11,013	10,050
16	13	2022			963	963	180,200	10,466	109,439	547	11,013	10,050
17	14	2023			963	963	180,200	10,466	109,439	547	11,013	10,050
18	15	2024			963	963	180,200	10,466	109,439	547	11,013	10,050
19	16	2025			963	963	180,200	10,466	109,439	547	11,013	10,050
20	17	2026			963	963	180,200	10,466	109,439	547	11,013	10,050
21	18	2027			963	963	180,200	10,466	109,439	547	11,013	10,050
22	19	2028			963	963	180,200	10,466	109,439	547	11,013	10,050
23	20	2029			963	963	180,200	10,466	109,439	547	11,013	10,050
24	21	2030			963	963	180,200	10,466	109,439	547	11,013	10,050
25	22	2031			963	963	180,200	10,466	66,239	0	10,466	9,503
26	23	2032			963	963	180,200	10,466			10,466	9,503
27	24	2033			963	963	180,200	10,466			10,466	9,503
28	25	2034			963	963	180,200	10,466			10,466	9,503
29	26	2035			963	963	180,200	10,466			10,466	9,503
30	27	2036			963	963	180,200	10,466			10,466	9,503
31	28	2037		468	963	1,430	180,200	10,466			10,466	9,036
32	29	2038		1,091	963	2,054	180,200	10,466			10,466	8,412
33	30	2039		1,247	963	2,209	180,200	10,466			10,466	8,257
34	31	2040		312	963	1,274	180,200	10,466			10,466	9,192
35	32	2041			963	963	180,200	10,466			10,466	9,503
36	33	2042	4,244		963	5,207	180,200	10,466			10,466	5,259
37	34	2043	8,205		963	9,168	180,200	10,466			10,466	1,298
38	35	2044	14,632		963	15,595	180,200	10,466			10,466	-5,129
39	36	2045	8,326		963	9,289	180,200	10,466			10,466	1,177
40	37	2046			963	963	180,200	10,466			10,466	9,503
41	38	2047			963	963	180,200	10,466			10,466	9,503
42	39	2048			963	963	180,200	10,466			10,466	9,503
43	40	2049			963	963	180,200	10,466			10,466	9,503
44	41	2050			963	963	180,200	10,466			10,466	9,503
45	42	2051			963	963	180,200	10,466			10,466	9,503
46	43	2052			963	963	180,200	10,466			10,466	9,503
47	44	2053			963	963	180,200	10,466			10,466	9,503
48	45	2054			963	963	180,200	10,466			10,466	9,503
49	46	2055			963	963	180,200	10,466			10,466	9,503
50	47	2056			963	963	180,200	10,466			10,466	9,503
51	48	2057			963	963	180,200	10,466			10,466	9,503
52	49	2058			963	963	180,200	10,466			10,466	9,503
53	50	2059	-20,233	-1,039	963	-20,309	180,200	10,466			190,666	200,509
TOTAL			147,394	5,194	47,577	200,165	8,904,883	517,196	2,300,620	11,172	708,568	8,704,718
											T.I.R.F.	**6.7%**

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada	65.7 MW		
Capacidad dependable	38.4 MW		
Generacion de energía	180,200 MWh	100%	180,200
Costo de construcción	135,336 1000US$	100%	135,336

Tasa de descuento: 10%

Tarifa Promedia

Energía vendible:	180,200 MWh
Costo de energía:	58.08 US$/MWh

Crédito CO_2 (precio de CER):

10 US$/$CO_2$ton

T.I.R.F. 7.0%

(Unidad: US$1000)

No.		AÑO	PROYECTO EL CHAPARRAL				BENEFICIO					(B) - (C)
			Costo de Construcc.	*Línea de* Transmisión	*Costo* O&M	(C) TOTAL COSTO	Energía Vendible MWh	Ingreso Venta Energía	Emisión de CO_2 evitada	CER transacción	(B) TOTAL BENEFICIO	
1		2007	30,106	468	0	30,574						-30,574
2		2008	29,801	1,091	0	30,892						-30,892
3		2009	51,855	1,247	0	53,102						-53,102
4	1	2010	20,457	312	401	21,170	75,083	4,361	45,600	456	4,817	-16,353
5	2	2011			963	963	180,200	10,466	109,439	1,094	11,560	10,598
6	3	2012			963	963	180,200	10,466	109,439	1,094	11,560	10,598
7	4	2013			963	963	180,200	10,466	109,439	1,094	11,560	10,598
8	5	2014			963	963	180,200	10,466	109,439	1,094	11,560	10,598
9	6	2015			963	963	180,200	10,466	109,439	1,094	11,560	10,598
10	7	2016			963	963	180,200	10,466	109,439	1,094	11,560	10,598
11	8	2017			963	963	180,200	10,466	109,439	1,094	11,560	10,598
12	9	2018			963	963	180,200	10,466	109,439	1,094	11,560	10,598
13	10	2019			963	963	180,200	10,466	109,439	1,094	11,560	10,598
14	11	2020			963	963	180,200	10,466	109,439	1,094	11,560	10,598
15	12	2021			963	963	180,200	10,466	109,439	1,094	11,560	10,598
16	13	2022			963	963	180,200	10,466	109,439	1,094	11,560	10,598
17	14	2023			963	963	180,200	10,466	109,439	1,094	11,560	10,598
18	15	2024			963	963	180,200	10,466	109,439	1,094	11,560	10,598
19	16	2025			963	963	180,200	10,466	109,439	1,094	11,560	10,598
20	17	2026			963	963	180,200	10,466	109,439	1,094	11,560	10,598
21	18	2027			963	963	180,200	10,466	109,439	1,094	11,560	10,598
22	19	2028			963	963	180,200	10,466	109,439	1,094	11,560	10,598
23	20	2029			963	963	180,200	10,466	109,439	1,094	11,560	10,598
24	21	2030			963	963	180,200	10,466	109,439	1,094	11,560	10,598
25	22	2031			963	963	180,200	10,466	66,239	0	10,466	9,503
26	23	2032			963	963	180,200	10,466			10,466	9,503
27	24	2033			963	963	180,200	10,466			10,466	9,503
28	25	2034			963	963	180,200	10,466			10,466	9,503
29	26	2035			963	963	180,200	10,466			10,466	9,503
30	27	2036			963	963	180,200	10,466			10,466	9,503
31	28	2037		468	963	1,430	180,200	10,466			10,466	9,036
32	29	2038		1,091	963	2,054	180,200	10,466			10,466	8,412
33	30	2039		1,247	963	2,209	180,200	10,466			10,466	8,257
34	31	2040		312	963	1,274	180,200	10,466			10,466	9,192
35	32	2041			963	963	180,200	10,466			10,466	9,503
36	33	2042	4,244		963	5,207	180,200	10,466			10,466	5,259
37	34	2043	8,205		963	9,168	180,200	10,466			10,466	1,298
38	35	2044	14,632		963	15,595	180,200	10,466			10,466	-5,129
39	36	2045	8,326		963	9,289	180,200	10,466			10,466	1,177
40	37	2046			963	963	180,200	10,466			10,466	9,503
41	38	2047			963	963	180,200	10,466			10,466	9,503
42	39	2048			963	963	180,200	10,466			10,466	9,503
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45	42	2051			963	963	180,200	10,466			10,466	9,503
46	43	2052			963	963	180,200	10,466			10,466	9,503
47	44	2053			963	963	180,200	10,466			10,466	9,503
48	45	2054			963	963	180,200	10,466			10,466	9,503
49	46	2055			963	963	180,200	10,466			10,466	9,503
50	47	2056			963	963	180,200	10,466			10,466	9,503
51	48	2057			963	963	180,200	10,466			10,466	9,503
52	49	2058			963	963	180,200	10,466			10,466	9,503
53	50	2059	-20,233	-1,039	963	-20,309	180,200	10,466			190,666	200,509
TOTAL			147,394	5,194	47,577	200,165	8,904,883	517,196	2,300,620	22,344	719,739	8,704,718
											T.I.R.F.	**7.0%**

Nota: Año 53 corresponde al precio residual de las obras y los equipos.

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