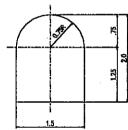
=10.00m)					15	
=10.00m)						
=10.00m)						
10. 00m)						
× 10.0			=	1, 131.0 m	3	
× 7.0	$+ 8.0^{2}$	× 1.0	+	$5.0^2$		
$(5.0^2)$	$+6.0^{2}$	) × 1.	0 }			
+ 64.0	+ 25.0	÷ 30.5	)			
			=	643.6 m	3	
						•
× 1/2	+ 1.5	× 1.25	=	2.76 m	3	
,						
			=	651.9 m	3	
9 m <sup>3</sup>				=	479. 1	. m
1					1.	
3.5	\ FE					
	$\times$ 7.0 ( 5.0 <sup>2</sup> + 64.0 $\times$ 1/2	× 7.0 + $8.0^2$ ( $5.0^2$ + $6.0^2$ + $64.0$ + $25.0$ × $1/2$ + $1.5$ × $1/2$ × $2$ ヶ所	$\times$ 7.0 + 8.0 <sup>2</sup> × 1.0 ( 5.0 <sup>2</sup> + 6.0 <sup>2</sup> ) × 1. + 64.0 + 25.0 + 30.5 $\times$ 1/2 + 1.5 × 1.25 × 1/2 × 2ヶ所	$\times$ 7.0 + 8.0 <sup>2</sup> × 1.0 + ( 5.0 <sup>2</sup> + 6.0 <sup>2</sup> ) × 1.0 } + 64.0 + 25.0 + 30.5 ) = $\times 1/2 + 1.5 \times 1.25 = \times 1/2 \times 2 \gamma$	$\times$ 7.0 + 8.0 <sup>2</sup> × 1.0 + 5.0 <sup>2</sup> ( 5.0 <sup>2</sup> + 6.0 <sup>2</sup> ) × 1.0 ) + 64.0 + 25.0 + 30.5 ) = 643.6 m <sup>2</sup> × 1/2 + 1.5 × 1.25 = 2.76 m <sup>2</sup> × 1/2 × 2ヶ所 = 8.3 m <sup>2</sup> = 651.9 m <sup>2</sup>	$\times$ 7.0 + 8.0 <sup>2</sup> × 1.0 + 5.0 <sup>2</sup> ( 5.0 <sup>2</sup> + 6.0 <sup>2</sup> ) × 1.0 ) + 64.0 + 25.0 + 30.5 ) = 643.6 m <sup>3</sup> × 1/2 + 1.5 × 1.25 = 2.76 m <sup>3</sup> × 1/2 × 2ヶ所 = 8.3 m <sup>3</sup> = 651.9 m <sup>3</sup>



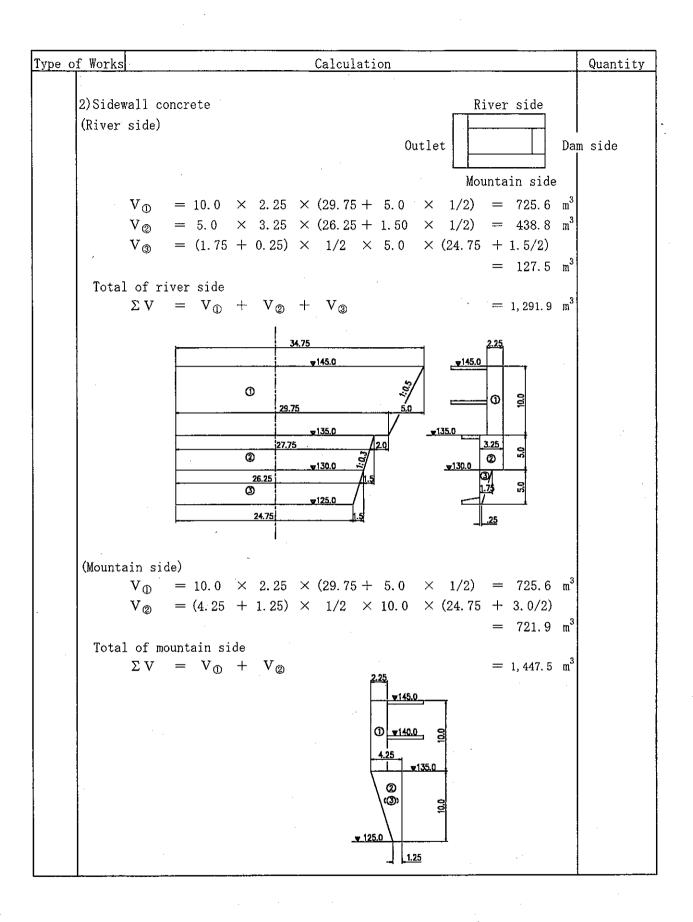
(2) Concrete around casing Total volume (EL135.00—EL127.00=8.00<sup>m</sup>)  $V = 15.0 \times 16.5 \times 8.0$  $= 1,980.0 \text{ m}^3$ Hollowness

1) Notch part  $V_{\odot} = 2.0 \times 2.0 / 2 \times 8.0 \times 2 \text{spots} = 32.0 \text{ m}^3$  $V_{\odot} = 4.0 \times 9.0 / 2 \times 8.0$  $= 144.0 \text{ m}^3$ 

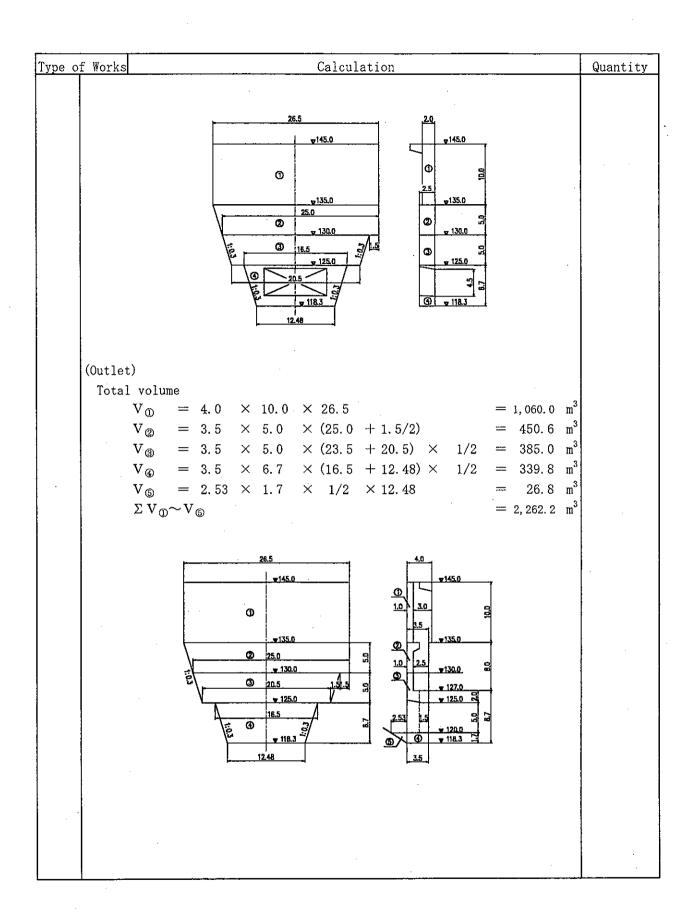
Type of Works	Calculation				Quantity
	04100141211				quantity
2) Casing					
$V_{\mathfrak{J}} = \pi/4 \times$			169.6	_	
	$2.6^2 \times \pi \times 8.6$	=	143. 4	m <sup>3</sup>	
	$\% \phi 2.6 \Rightarrow (3.5+3.0+2.3+1.5)/4$			9	
$V_{\circ} = \pi/4 \times V_{\circ}$			17. 3		
$V_{\hat{\otimes}} = \pi/4 \times$	4. 5° × 2. 5		39. 8	m	
	8.6 6.0 9.1 4.65 3.5				
3) Gallery	•				
Barrel					
$V_{\mathfrak{D}} = See$ "Barr	el"	=	8. 3	m <sup>3</sup>	
Casing	1 5 > 9 0	=	6. 0	3	
$V_{\textcircled{\$}} = 2.0  imes Draft$	1.5 × 2.0	_	0. 0	111	
1 · · · · · · · · · · · · · · · · · · ·	1.5 × 6.0 / 2		9. 0	$m^3$	
Total of subtracti	on volume				
$\Sigma V_{\mathbb{O}} \sim V_{\mathbb{G}}$	•	=	569. 4	m³	
Concrete around casing $V_{\rm c}=1,980.0-$	569. 4			=	1, 410.6 m <sup>3</sup>
					1
			٠		

Type o	f Works Calculation	Quantity
	Other Concrete	
	Total	
	1) Concrete around draft 2,192.3 m	
	2) Side wall concrete 6,672.8 m	
	3) Concrete of slab 738.3 m	1
	4) Retaining wall concrete to stop crumbling the bankin 175.0 m	n"
	Total 9,778.4 m	n <sup>3</sup> 9, 778. 4 m <sup>3</sup>
	1) Concrete around draft EL127.0(128.0)以下 ① EL128.00~EL127.00	
	2.5	
	+EL 128.0 co	
	10.0 9.0	
	② EL127. 00~EL125. 00 $t = 2.00 t$ $V_{\text{②}} = 21.0 \times 16.5 \times 2.0 = 693.0 t$	

Type of Work	S Calculation				Quantity
3	EL125.00~EL117.50				
	Area of EL125.0			ŀ	
	$A = 20.25 \times 16.5$	=	334. 1	$m^2$	
	Area of EL118.3				
1	$A = 18.24 \times 12.48$	$_{\text{\tiny -}}$	227. 6	$m^2$	
	Area of EL117.5				
	$A = 8.5 \times 12.0$	=	102.0	$m^2$	
	Volume				
	$V_{\circledcirc} = (334.1 + 227.6) \times 1/2 \times 6.70 + (227.6)$	+	102.0	)	
	$\times$ 1/2 $\times$ 0.80				
	= 1,881.7 + 131.8	=	2,013.5	$m^3$	
4	Subtraction volume				
	<b>④−1</b> Draft tube				
	$V_{\oplus -1} = \{(4.5 \times 10.5) + (3.5 \times 10.5)\} \times 1/2$				
	+ $\{(3.5 \times 10.5) + \pi/4 \times 3.5^2\} \times 1/2$	×	9. 0		
	= 420.0 + 208.7	=	628. 7	m <sup>3</sup>	
	♠-2 Draft gallery	-		3	
	$V_{\mathfrak{G}^{-2}} = 2.0 \times 1.5 \times 6.0 / 2$	=	9. 0	m	
	Total of subtraction volume				
	V = 628.7 + 9.0	=	637. 7	<sub>m</sub> 3	
	V (4) 020. 7 · + · 9. 0		031.1	"	
Total	of concrete around draft				
	$V_{(1)} = 123.5 + 693.0 + 2,013.5 - 637.7$	=	2, 192. 3	m.³	
	$\sim$ 3.5 $\phi$				
	3.5			1	
	9.0				
	4.5				
	¥   / 100 /				
	10.0				
,	10.5				
•					



## Type of Works Quantity Calculation (Dam side) $V_{\odot} = \{ (4.75 + 2.25) \times 1/2 \times 5.0 + (5.25 + 2.75) \}$ $\times$ 1/2 $\times$ 5.0 $\times$ 22.5 $= 825.0 \text{ m}^3$ $V_{\odot} = (3.75 + 0.75) \times 1/2 \times 10.0 \times 19.0 = 427.5 \text{ m}^3$ Total of dam side $= 1,252.5 \text{ m}^3$ $\Sigma V = V_{0} + V_{2}$ ♥145.0 (Outlet side) $V_{\mathbb{O}} = 2.0 \times 10.0 \times 26.5$ $= 530.0 \text{ m}^3$ $V_{\odot} = 2.5 \times 5.0 \times (25.0 + 1.5 \times 1/2) = 321.9 \text{ m}^3$ $V_{\odot} = 2.5 \times 5.0 \times (20.5 + 23.5) \times 1/2 = 275.0 \text{ m}^3$ $V_{\textcircled{4}} = (16.5 + 12.48) \times 1/2 \times 6.7 \times 2.5$ $= 242.7 \text{ m}^3$ $\Sigma V$ $= 1,369.6 \text{ m}^3$ Part of discharge $V_{\odot} = 10.5 \times 4.5 \times 2.5$ $= 118.1 \text{ m}^2$ Total of outlet side $= 1,251.5 \text{ m}^3$ $\Sigma V = 1,369.6 - 118.1$

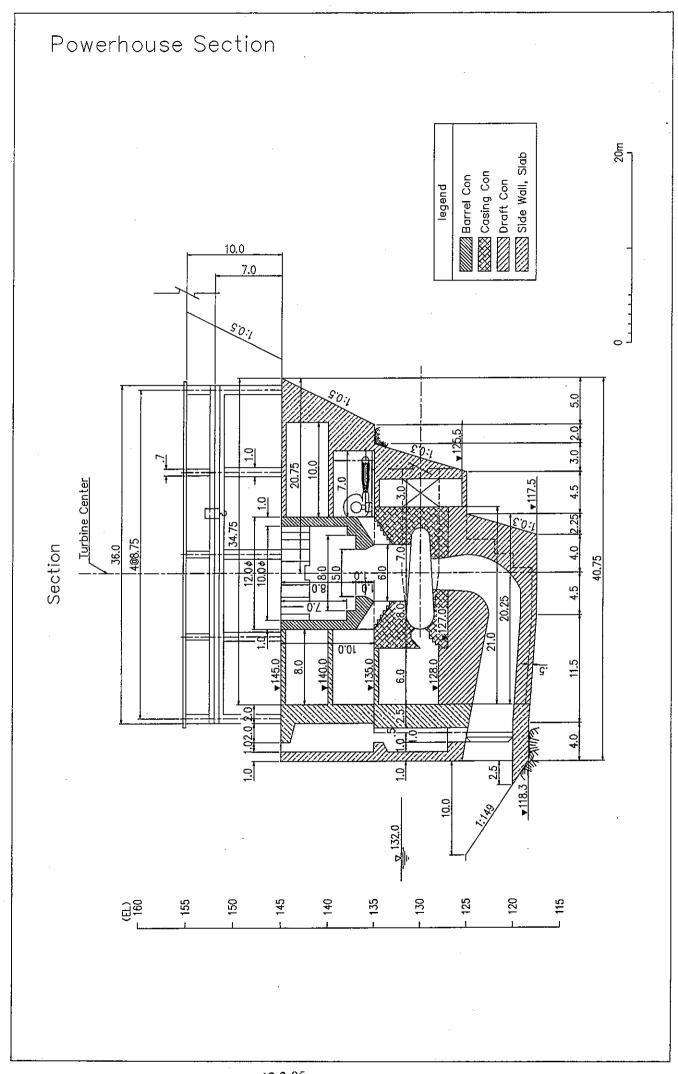


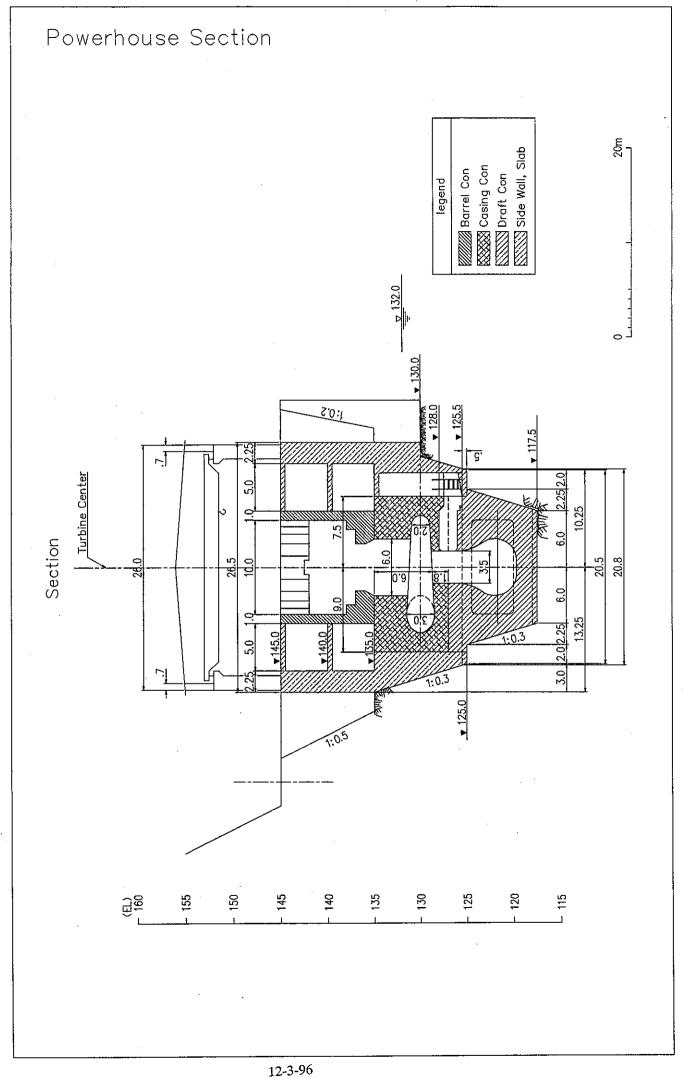
уре	of Works Calculation	Quantit
	Subtraction volume	
	Part of gate slot	
	$V = 14.5 \times 1.0 \times 1.0 + (14.5 \times 1.0 + 14.5)$	
	$\times$ 3.0) $\times$ 1/2 $\times$ 0.5 + 14.5 $\times$ 3.0 $\times$ 8.5	
	$+ 11.5 \times 1.5 \times 1.0 + (11.5 \times 1.5 + 11.5)$	
	$\times$ 2.5) $\times$ 1/2 $\times$ 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	
	$+ 186.9 + 34.5 = 649.0 \text{ m}^3$	
	Part of draft	
	$V = 10.5 \times 5.0 \times 3.50 = 183.8 \text{ m}^3$	
	Total of outlet	
	$\Sigma V = 2,262.2 - 649.0 - 183.8 = 1,429.4 \text{ m}^3$	
	Total of Sidewall concrete	
	$\Sigma \text{ Vc} = 1,291.9 \text{ (River side)}$	
	1,447.5 (Mountain side)	
	1, 252.5 (Dam side)	
	1,251.5 (Outlet side)	
	1, 429.4 (Outlet)	
	Total 6,672.8 m <sup>3</sup>	
	3)Slab concrete	
	① Level of EL125.5m $t = 0.5 \text{ m}$	
	$V_{\odot} = 15.0 \times 2.5 \times 0.5$ = 18.8 m <sup>3</sup>	
	$V_{\odot} = (5.0 + 3.0) \times 1/2 \times 2.0 \times 0.5 = 4.0 \text{ m}^3$	
	$V_{\odot} = 5.5 \times 3.0 \times 0.5 = 8.3 \text{ m}^3$	
	$V_{\oplus} = (3.0 + 4.0) \times 1/2 \times 2.5 \times 0.5 = 4.4 \text{ m}^3$	
	$V_{\odot} = 4.0 \times 1.5 \times 1/2 \times 0.5 = 1.5 \text{ m}^3$	
	$V_{\odot} = 5.0 \times 6.8 \times 0.5 = 17.0 \mathrm{m}^3$	
	$\Sigma V = 54.0 \text{ m}^3$	
	•	

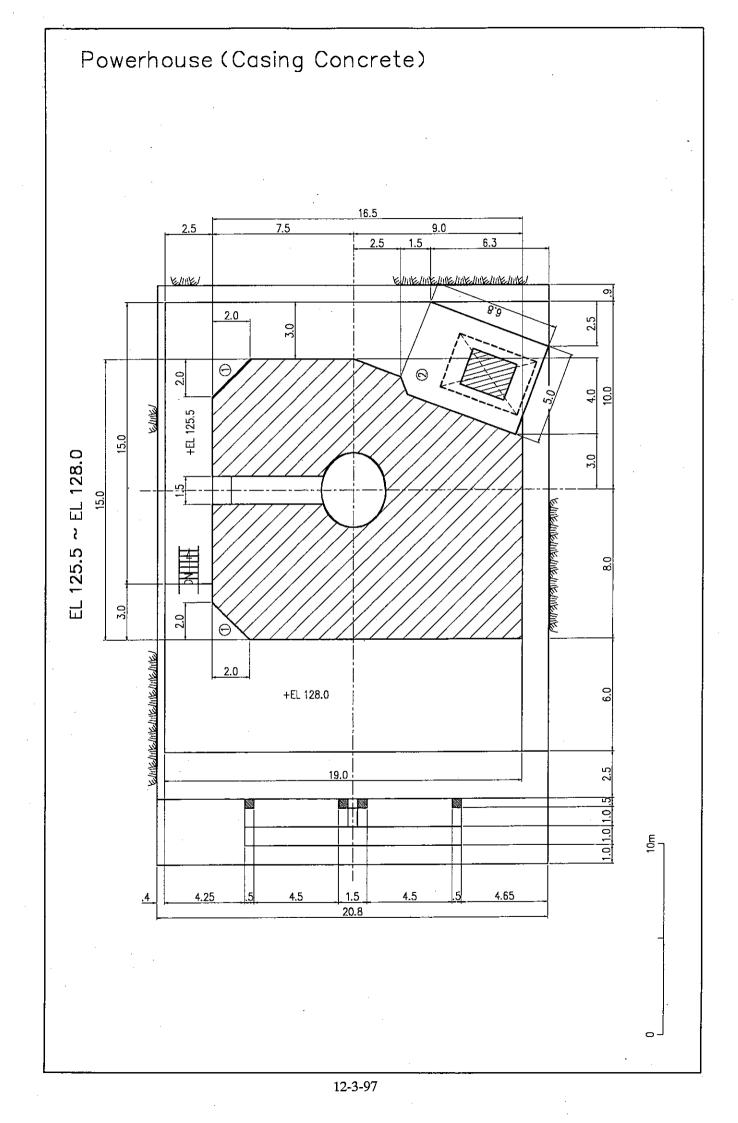
ype of	Works		Calcu	lation	<del>-</del>		Quantity
	_						
	② EL125. 0~EL135.						
	$V_{\odot} = 6.3$	× 2.5	× 1/2	$\times$ 10.00	<del></del>	78.8 n	13
			45.4				
			15.0	· · · · · · · · · · · · · · · · · · ·	7		
	<b>*</b>			_ <del></del> .			
			Φ	5.0	2.5		
	<u> </u>			0	20		
				3.0	R S		:
					1		
				4.0	- 5		
			4	(a)			
				/ ~			
				6 4	97		
					2 P		
			·		<b>/</b>		ļ
				25	·		
					→		
		•		•			
	3 Level of EL135.			>	t =	0.5 n	n
	$A_{3} = 19.0$						
				$+ 3.0)/2 \times$			
				+ 4.0)/2 ×			
				+ 5.00 ×			
				+ 8.0 +		001 0 -	_2
		+ 8.8	+ 3.0	+ 34.0		231.3 r	ß
İ	Part of subtrac	tion					
	Stairs	C T O ! I					
	A = 1.5	× (2.0	+ 3.5)		=	8.3	n <sup>2</sup>
	Hatch for car					2.0	
ļ	A = 4.0				<del></del>	20.8 r	n <sup>2</sup>
	$\Sigma A = 231.3$		<b>—</b> 20. 80		=	202. 2	
	$V_{3} = 202.2$				==	101.1 r	
I							

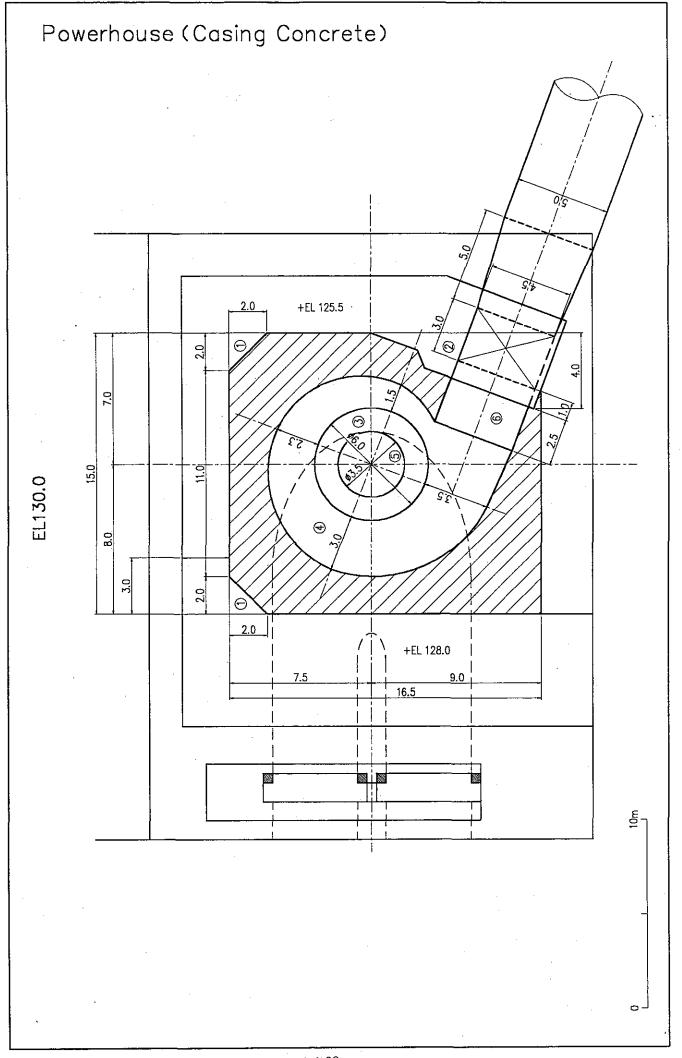
T of Warden	C-11-+	<del></del>	Ougntity
Type of Works	Calculation		Quantity
	Level of EL135.0~EL135.3 t =	0.3 m	
	$A = 9.0 \times 4.0 + (9.0 + 6.0)/2 \times 3.0$	0.0 11	
		88.5 m <sup>2</sup>	
		26.6 m <sup>3</sup>	.
	Level of EL140.0m t =	0.5 m	
		594.0 m <sup>2</sup>	
	Part of subtraction		
	Barrel		
	$A = \pi/4 \times 12.0^2 =$	113.1 m <sup>2</sup>	
	Hatch for carrying in		
	$A = 4.0 \times 5.2$	20.8 m <sup>2</sup>	
	Stairs		
		15.3 m <sup>2</sup>	1
		444.8 m <sup>2</sup>	
	$V_{\$} = 444.8 \times 0.5$	222.4 m <sup>3</sup>	
	Level of EL145.0m		
	$A = 30.0 \times 22.0$	660.0 m <sup>2</sup>	
	Part of subtraction		
	Barrel $A = \pi/4 \times 12.0^2 =$	113.1 m <sup>2</sup>	
	Hatch for carrying in	113.1 111	
		20.8 m <sup>2</sup>	,
	Stairs	20.0 111	
		15.3 m <sup>2</sup>	
	$\Sigma A = 660.0 - 113.1 - 20.8 - 15.3$	510.8 m <sup>2</sup>	
		255.4 m <sup>3</sup>	
	<u> </u>		

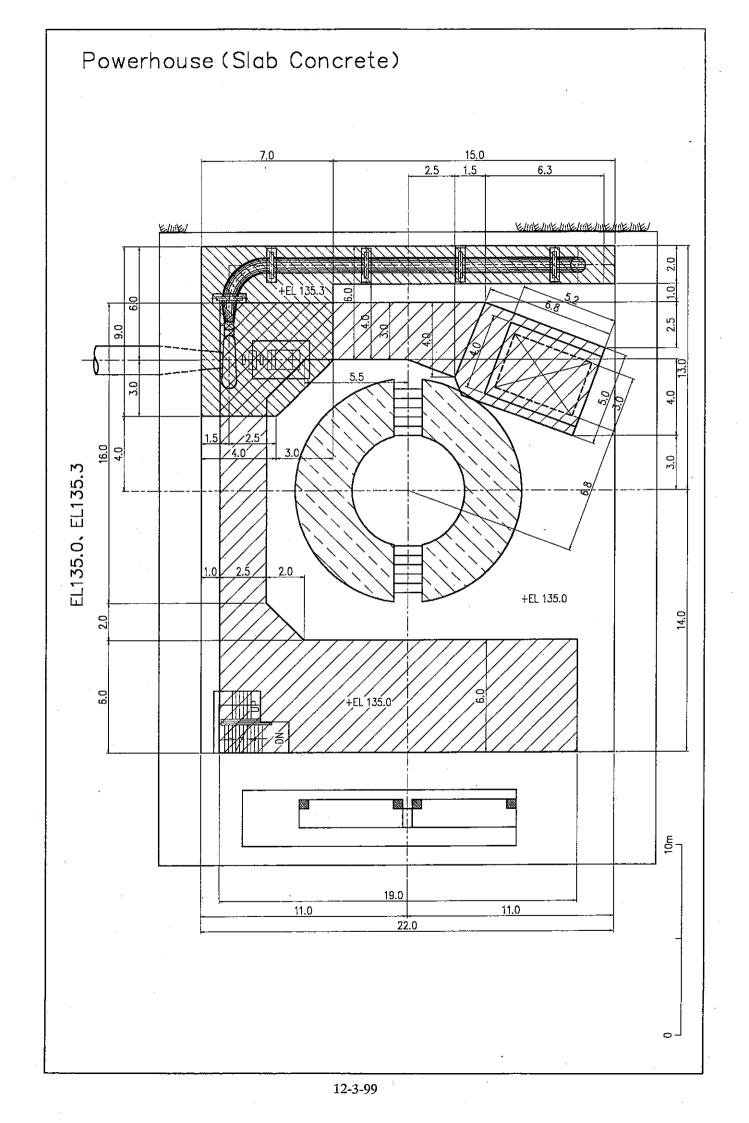
e of Work	Calculation	Quantity
	Total of slab concrete	
	① Level of EL125. 5 54.0 m <sup>3</sup>	
	② Level of EL125.0~EL135.0 78.8 m <sup>3</sup>	
	③ Level of EL135.0 101.1 m <sup>3</sup>	
	④ Level of EL135.0∼EL135.3 26.6 m³	
	⑤ Level of EL140.0 222.4 m <sup>3</sup>	
	⑥ Level of EL145.0 255.4 m <sup>3</sup>	
	Total 738.3 m <sup>3</sup>	
		•
4) Ret	aining wall concrete to stop crumbling the banking 1.00	
T) NO U	$A = \begin{pmatrix} 1.0 + 4.0 \end{pmatrix} / 2 \times 10$	
-	$= 25.0 \text{ m}^2$	
	1:0.3/	
	1:0.3	
	/	
	<u>/</u>	
	<4.00 →	
	•	
	Mountain side	
	$V_c = 25.0 \times 2.0 + 25.0 / 2 \times 5.0$	
	= 50.0 + 62.5 = 112.5 m3	
	River side	
	$V_c = 25.0 \times 1.5 + 2.0 / 2 \times 25.0$	
	$= 37.5 + 25.0 = 62.5 \text{ m}^3$	
	$\Sigma V = 112.5 + 62.5 = 175.0 \text{ m}^3$	
ı	of structural concrete	
(A) T-41	of structural concrete	
1	<b>.</b>	11 662 1
1		11, 668. 1

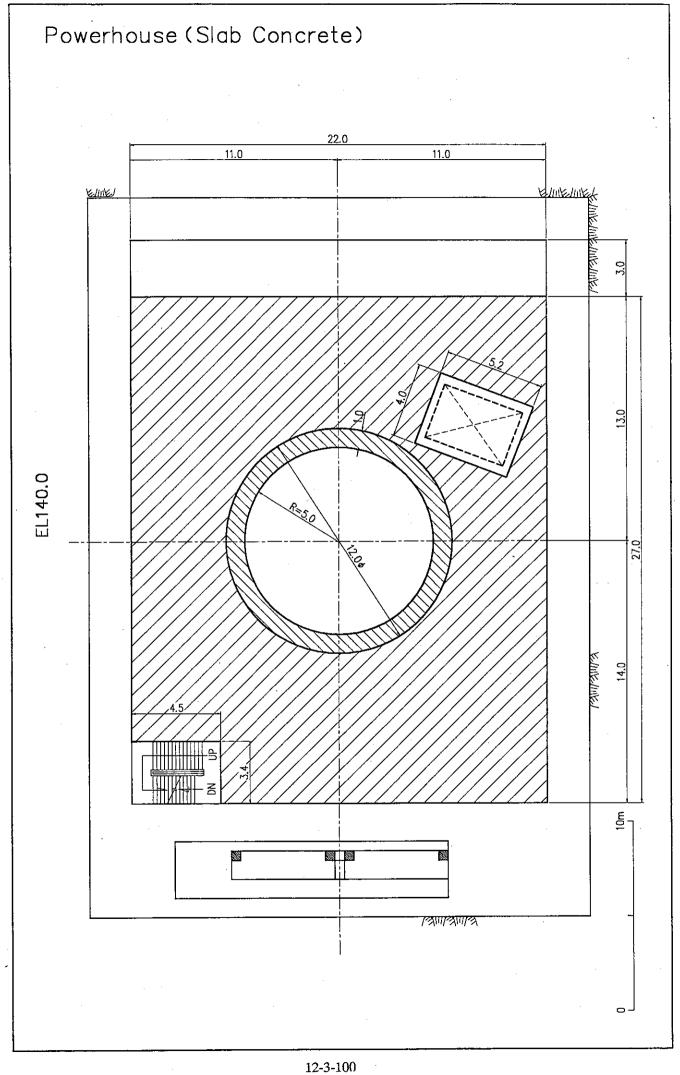


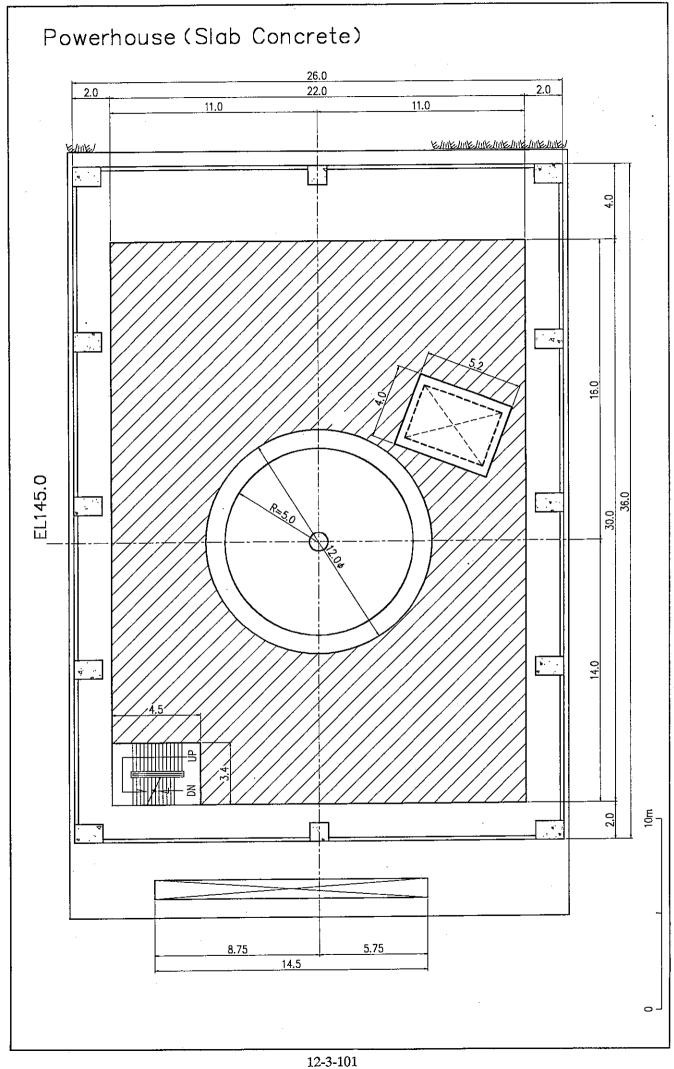


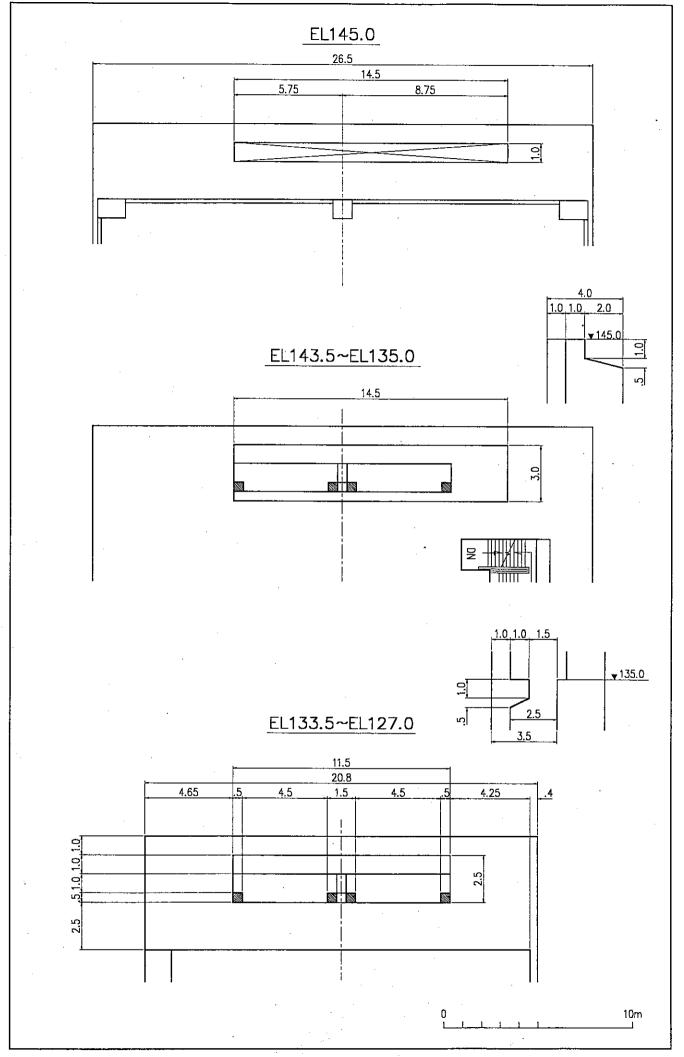










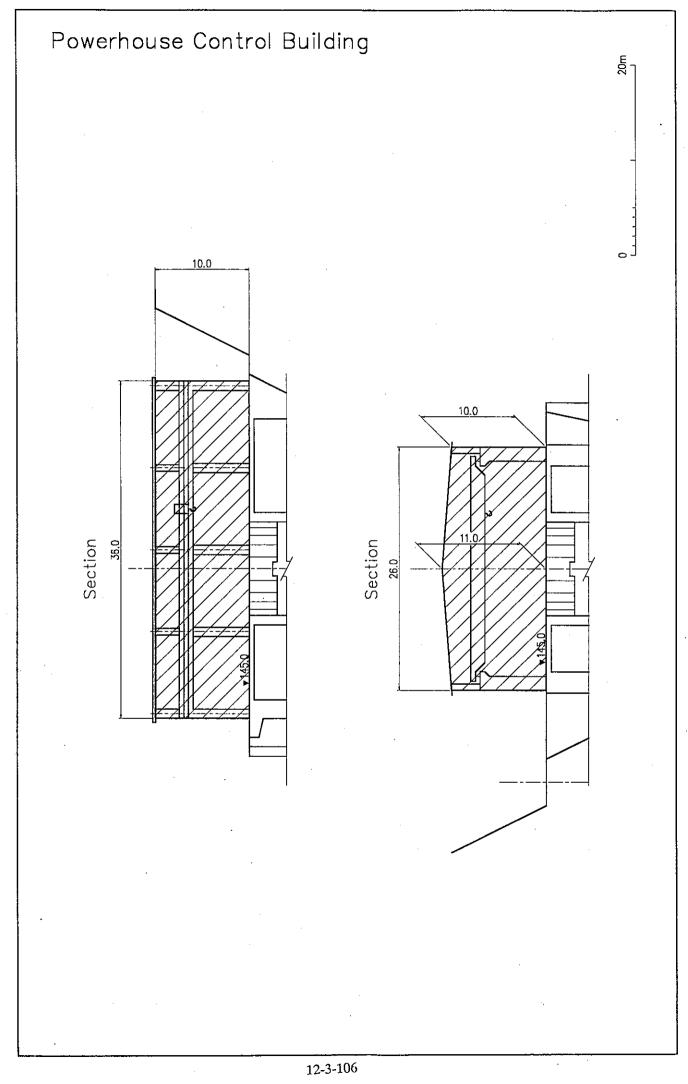


Type of Works	Calculation			Quantity
<reinforced bar=""></reinforced>				
1)Reinforced bar of the concrete				
$W_{\oplus} = 479.10 \times 80 \text{ kg}$		=	38.3 t	
2) Reinforced bar of the concrete		_	141 1 +	
$W_{\odot} = 1410.6 \times 100 \text{ kg}$		=	141.1 t	
3) Reinforced bar of the concrete $W_{\textcircled{3}} = 2192.3 \times 50 \text{ kg}$		==	109.6 t	
4) Reinforced bar of the sidewall			100.0	
$W_{\text{$\mathbb{Q}$}} = 6672.8 \times 60 \text{ kg}$	· · · · · · · · · · · · · · · · · · ·		400.4 t	
5)Reinforced bar of the sidewall				
$W_{\$} = 738.3 \times 60 \text{ kg}$	g/m³	==	44.3 t	
·				
Total W =	:		733.7 t	733.7 t
		•		
   <reference data:back-filling=""></reference>				
Note: Choc data: Baok 1111111gs				
		7.00		
1) Mountain side		<b>¥</b> 145		
A = (7.0 + 2.0)	/ 2			
× 10.0				
$= 45.0 \text{ m}^2$		<i>``\\\\\\</i>		
	•	1:0.5	// ≗	
V = 45.0		\////	// -	
× ( 35.75 + 5.0 /	2 )		/// I	
$= 1,721.3 \text{ m}^3$		<b>W</b>	<b>//</b> /	
		▼ 135		
40.75			2.00	
▼ 145		<del></del>		
·		1.0		
		1:0.		
135				
35.75		5.00		
k		****		
•				
		<u></u>		

Type of Wo				. <u>-</u> .			Calcu	latio	on					Quantity
(2) F	River side A=		3. 5	. +-	1. 5	)	/	2	×	10.0	=	25. 0	m <sup>2</sup>	
	V = ×						2	)			==	956. 3	m <sup>3</sup>	
	Σ V	=	1, 72	1.3	+ 95	6. 3				<u> </u> 3.	50	l	==	2, 677. 6 m <sup>3</sup>
									<b></b>	<b>7</b>		7	;	
								,	,			1		
								. 10	0.0			0.2		
						•						0.2		
							÷			1.50				
												•		

ntrol Works					Calculati	on				Quantity
l Bu	ilding	>								
Th≏	total	volu	me of o	control buil	ding · V	m <sup>3</sup>				
THE	totai	VOLU	inc or c	Ontion bair	G1116 . *	111				
	v =	(	10.0	× 26.0 +	1/2 ×	1.00	× 26.0			
								×	36.00 =	9, 828
			•							
			•			-				
					-		í			
					*					
				•						

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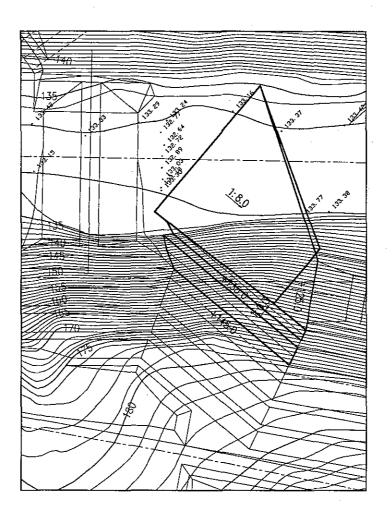


### (c) Outlet

Type of	f Works	<del>_</del>		Calculati	on	<u> </u>			Quanti	itv
	on Excavation a	and Rock Exc	avation>					$\exists$		•
	Common	Excavation	and Rock	Excavation	1					
	Elevatio	on Head	Sectional	Mean Area	Volume	Total	Notes			
		(m)	Area(m²)	(m <sup>2</sup> )	(m <sup>3</sup> )	Volume(m³)				
[	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				
1	EL135.	0.0	748. 2	702. 8	0.0	8, 924, 5		ł		
]	EL145.	0 10.0	686.6	717.4	7, 174. 0	16, 098. 5		Ì		
	Estimated Ra	atio··(Comm	on Excavat	tion):(Ro	ck Excava	tion) = 3	: 7			
(1)	Common Excava	tion								
	·V :	= 16,098.5	× 0.3					=	4, 829. 6	m <sup>3</sup>
(-)										
(2) 	-		. 0. 5							3
	V =	= 16, 098. 5	× 0.7		•			=	11, 269. 0	m^
		•	•							
						,				
								Ì		
	-								•	
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# Outlet-Excavation

Plan



0 . 40n

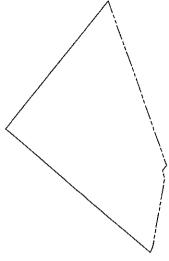
### Outlet-Excavation





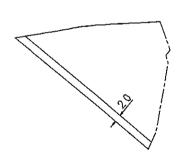
EL 125.0 A= 103.3 m<sup>2</sup>





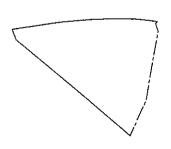
EL 130 0 A= 1,404.6 m<sup>2</sup>

EL 135.0



EL 135.0  $A=748.2m^2$ EL 135.0  $A=657.3m^2$ 

EL 145.0



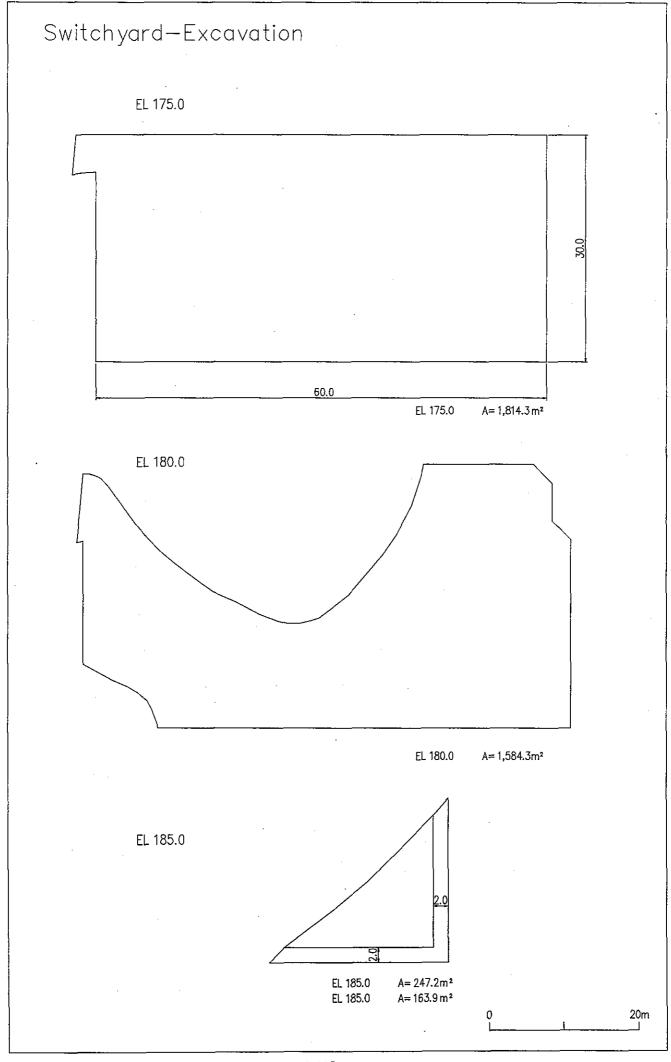
EL 145.0 A= 686.6m<sup>2</sup>

0 40m

### (d) Switchyard

Type of	f Works	Calculation							
	Common Excavation >								
		Elevation	Head	Section	Mean Area	Volume	Total	Notes	
		(m)	(m)	Area(m²)	(m <sup>2</sup> )	(m <sup>3</sup> )	Volume(m³)		
		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 <sup>3</sup>
		·							

Switchyard—Excavation Plan +180.0



Appendix 12.3.3

Hydromechanical Equipment

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#### Spillway Gate

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

Gate Type	Span	Height	Design Water	Outlet Discharge	Weight/Gate	$B^2 \times H \times h$	Hoist
date 17pc	B (m)	H (m)	Depth h(m)	(m³/s/Gate)	(ton)	2	(ton)
Crest Radial	7.00	9.30	9. 13	255. 50	34. 924	4, 161	28. 178
II	7. 00	10.80	11. 64	387. 50	50.000	6, 160	34. 2
11	9. 50	11.00	12. 10	667.00	61. 400	12, 012	31. 7
ŋ	8. 60	12. 37	13. 77	875.00	77, 300	12, 593	29.8
IJ	8, 00	9. 93	12, 43	262, 10	54. 600	7, 898	23. 2
n	12.00	7. 94	8. 64	450.00	45. 150	9, 876	18.036
11	9. 50	11. 15	11.65	653, 00	67. 920	11, 723	27. 301
η	10.50	8. 00	8. 20	375. 00	37. 600	7, 232	22. 1
H <sub>c</sub>	9.50	11. 50	12. 60	550.00	59, 400	13, 077	
η	12.00	12, 05	12. 25	500.00	82, 970	21, 256	29. 51 <u>7</u>
II	8. 20	9. 93	11. 32	60.00	50. 500	7, 558	27. 1
11	11. 50	7. 39	9. 56	565.00	56. 540	9, 343	28. 123
ıı	10.00	12.83	13.00	800.00	69.000	16, 679	19. 9
IJ	7. 35	7, 31	7.91	243.00	24. 500	3, 124	20. 958
Ŋ	7.40	11. 96	11.99	544.00	55. 080	7, 853	22. 028
η	10, 70	18. 75	18. 99	2, 067. 00	186. 300	40, 766	88. 6
<u> </u>	9.00	7. 79	7. 79	323.00	30. 100	4, 915	12. 3
ıı ıı	7, 00	7. 30	7. 30	203.00	26, 700	2, 611	11. 214
1)	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
II .	8, 00	8. 06	9.37	350, 00	34.000	4, 833	22, 784
11:	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.

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

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

<u>1,127 ton</u>

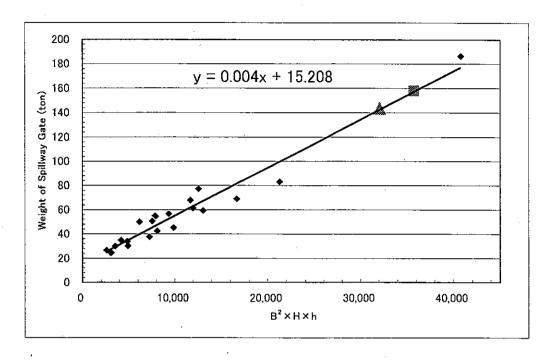
#### La Honda

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

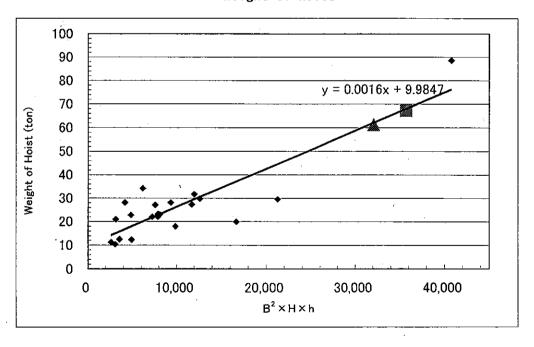
Spillway Gate : 5 Gates Hoist	143.5/Gate $\times$ 5Gates= $61.3/Unit \times 5Units=$	717.5 ton 306.5 ton
Total		1.024.0 ton

<sup>2.</sup> The height is calculated by the next formura. : 13.5m(High water-level) +1.7m=15.2m Chaparral

Weight of Spillway Gate



Weight of Hoist



#### Intake Gate

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

						. 2	
]	Span	Height	Design Water	Quantity of Water	Weight/Gate	$B^2 \times H \times h$	Hoist_
	B ( <u>m)</u>	H (m)	Depth h(m)	Intake Q(m³/s)	(ton)		(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
11	2. 40	2, 60	71. 39		12. 96	1, 069	11. 429
11	2.45	2. 45	11. 40		14. 10	168	9.6
"	8. 00	13.00	12. 57		56, 80	10, 458	23. 5
II .	7. 30	7. 30	45. 91		109.30	17, 860	53. 9
1/	8.00	8. 00	48. 33		_121.40	24, 745	60, 235
1)	2. 50	2. 50	13. 10		6.00	205	5
11	3. 00	4.60	18.83		10.83	780	13. 479
11	4. 85	5. 00	10. 13		18. 48	1, 191	12, 495
"	2. 30	2. 30	16. 34	<u> </u>	9.00	199	
IJ	6.00	4. 15	5.70		11. 10	852	6, 096
,n	4. 30	6.00	50.80		58. 84	5, 636	47. 555
11	2. 50	2. 50	18.00		5. 24	281	6. 57
11	2. 90	3. 22	30.40		12.60	823	17
Slide Gate	2, 30	2. 38	13.74	19.00	4. 40	_ 173	
11	5.00	5. 00	31.00	0. 36	30. 81	3, 874	
11	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	<u>82. 35</u>	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.

[By the use of approximate formula of roller gate]

Intake Gate  $Y = 0.005 \times 8$ ; 918 + 9.4606 = 54.05(ton)

Outlet Gate  $Y = 0.005 \times 2,043 + 9.4606 = 19.68$ (Per 1 Gate) (tor

Hoist of intake gate  $Y = 0.0023 \times 8,918 + 9.2986 = 29.81$ Hoist of outlet gate  $Y = 0.0023 \times 2,043 + 9.2986 = 14.00$ (ton)

Intake Gate (Incrude Hoist) 83.86 ton/gate $\times$ 1 gate = 83.86 ton Outlet Gate (Incrude Hoist) 33.68 ton/gate×2 gates= 67.3<u>6</u> ton 151. 22 ton

Intake Gate 84 ton

#### La Honda

[By the use of approximate formula of roller gate]

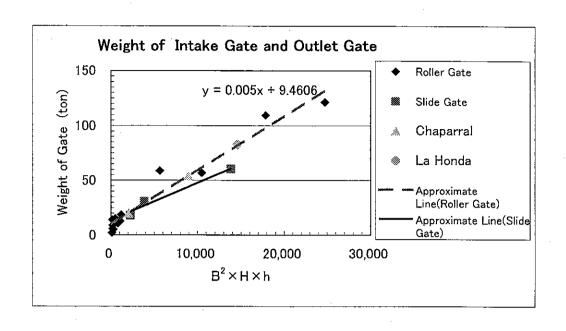
Intake Gate  $Y = 0.005 \times 14,578 + 9.4606 = 82.35$ (ton)

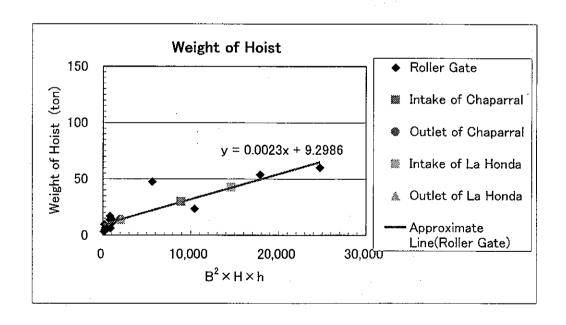
(Per 1 Gate) Outlet Gate  $Y = 0.005 \times 2,043 + 9.4606 = 19.68$ 

Hoist of intake gate  $Y = 0.0023 \times 14,578 + 9.2986 = 42.83$ Hoist of outlet gate  $Y = 0.0023 \times 2,043 + 9.2986 = 14.00$ (ton) (ton) '

Intake Gate(Incrude Hoist) 125.18 ton/gate $\times$ 1 gate = 125.18 ton Outlet Gate(Incrude Hoist) 33.68 ton/gate×2 gates= 67.36 ton 192, 54 ton

12-3-116





### Intake Screen

	Span	Height	Design Water	Quantity of Water	Weight/Screen	$B^2 \times H \times h$
	B (m)	H (m)	Depth h(m)	Intake Q(m³/s)	(ton)	Ī
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  $$\operatorname{\mathtt{J-Power}}$  Project.

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

Intake Screen 20 (ton)

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

#### Outlet Gate

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

	Span	Height	Design Water	Quantity of Water	Weight/Gate	R <sup>4</sup> ×H×h	Hoist
	B (m)	H (m)	Depth h(m)	Intake Q(m³/s)	(ton)	P VIIVII	(ton)
Roller Gate	1.50	1.50	30. 85	2,000	2, 10	104	3. 2
IJ	2.00	2.60	47. 42	"' "	15. 04	493	5. 98
ı,	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
11	7. 30	7. 30	45. 91		109.30	17, 860	53. 9
. 11	8. 00	8.00	48. 33		121. 40	24, 745	60. 235
	2. 50	2.50	13. 10		6. 00	205	5
11	3.00	4.60	18. 83		10. 83	780	13. 479
11	4. 85	5.00	10. 13		18. 48	1, 191	12. 495
1)	2. 30	2. 30	16. 34		9. 00	199	
11	6.00	4. 15	5. 70		11. 10	852	6. 096
11	4. 30	6.00	50. 80		58. 84	5, 636	47. 555
11	2, 50	2. 50	18, 00		5. 24	281	6. 57
11	2. 90	3, 22	30. 40		12.60	823	17
Slide Gate	2. 30	2. 38	13. 74	19.00	4. 40	173	
11	5. 00	5. 00	31.00	0. 36	30. 81	3, 874	
1)	5. 50	5. 50	83. 10		60. 25	13, 826	<del>-</del>
J-Power							
Project	6.30	6. 30	9, 10		18.00	2, 275	9.878

Ì					Chaparral			
ı	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.

[By the use of approximate formula of roller gate]

Intake Gate  $Y = 0.005 \times 8,918 + 9.4606 = 54.05$ 

Outlet Gate  $Y = 0.005 \times 2,043 + 9.4606 = 19.68$ (tor

Hoist of intake gate  $Y = 0.0023 \times 8,918 + 9,2986 = 29.81$ (ton)

Hoist of outlet gate  $Y = 0.0023 \times 2,043 + 9.2986 = 14.00$ (ton)

Intake Gate(Incrude Hoist) 83.86 ton/gate $\times$ 1 gate = 83.86 ton Outlet Gate(Incrude Hoist) 33.68  $ton/gate \times 2$  gates= 67.36 ton 151. 22 ton

Outlet Gate 68 ton

(Per 1 Gate)

(Per 1 Gate)

#### La Honda

[By the use of approximate formula of roller gate]

Intake Gate  $Y = 0.005 \times 14,578 + 9.4606 = 82.35$ (ton)

 $Y = 0.005 \times 2,043 + 9.4606 = 19.68$ (tc Hoist of intake gate  $Y = 0.0023 \times 14,578 + 9.2986 = 42.83$ 

(ton) Hoist of outlet gate  $Y = 0.0023 \times 2.043 + 9.2986 = 14.00$ 

Intake Gate(Incrude Hoist) 125.18 ton/gate $\times$ 1 gate = 125.18£on Outlet Gate(Incrude Hoist) 67.36 33.68 ton/gate $\times$ 2 gates= 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

[Ec	conomic Evaluation (Benefit = alternative thermal)]	
	Basic case (i = 10 %)	14-1-1
	Basic case (i = 8 %)	14-1-2
	Basic case (i = 6 %)	14-1-3
	CDM = US\$ 3	14-1-4
	CDM = US\$ 5	14-1-5
	CDM = US\$ 10	14-1-6
	Alternative thermal cost = 90 %	14-1-7
	Construction cost = 110%	14-1-8
	Alternative thermal cost = 90 %, Construction cost = 110%	14-1-9
	Alternative thermal cost = 110 %	14-1-10
	Construction cost = 90 %	14-1-11
[Ec	onomic Evaluation (Benefit = power sale revenue)]	
	Basic case (i = 10 %)	14-1-12
	Basic case (i = 8 %)	14-1-13
	Basic case (i = 6 %)	14-1-14
	CDM = US\$ 3	14-1-15
	CDM = US\$ 5	14-1-16
	CDM = US\$ 10	14-1-17
	Annual energy = 90 %	14-1-18
	Construction cost = 110 %	14-1-19
	Annual energy = 90 %, Construction cost = 110 %	14-1 <b>-</b> 20
	Annual energy = 110 %	14-1-21
	Construction cost = 90 %	14-1-22
[Fin	ancial Evaluation]	
	Base Case	14-1-23
	Annual energy = 90 %	14-1-24
	Construction cost = 110 %	14-1-25
	Annual energy = 90 %, Construction cost = 110 %	14-1 <b>-</b> 26
	Annual energy = 110 %	14-1-27
	Annual energy = 110 %, Construction cost = 110 %	14-1-28
	CDM = US\$ 3	14-1-29
	CDM = US\$ 5	14-1-30
	CDM = US\$ 10	14-1 <b>-</b> 31



Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía Costo de construcción

65.7 MW 38.4 MW 233,210 MWh 128,749 1000US\$ 100%

128,749

Planta térmica alternativa :
Capacidad instalada 46.0 MW
Costo de invesión 46,000 1000US\$

Precio de combustib -0.63 US\$/galor

100% 100%

44,200 0.63

Tasa de descuento:

10%

Crédito CO2 (precio CER):

0 US\$/CO2ton

10,680 T.I.R.E. 11.3%

			<del></del> -	COS	т.О					BENE	FICIO				(unidad	l: US\$1000)
N	,	AÑO	PPOVECT	O EL CHAI		(C)	<del> </del>	CREDI	тосо			ANTA AI	TERNAT	TVΔ	(B)	(B) - (C)
	٠.	1410	Costo de	Linea de	Costo	TOTAL	Beneficio		Precio CER		Costo	Costo	Costo	Subtotal	4 ' '	) (D)-(C)
j			ı	Transmisión		COSTO	Volumen		US\$/ton	Suptotat	Construce		Combustibl		BENEFICIO	
	<del>-</del> i						1	<del>                                     </del>	,		T	Ţ	Ţ	Ţ	1	
1	- 1	2007	28,106	455		28,561			l i	0	i			0	0	-28,561
2	1	2008	28,429	1,061		29,489				0				0		-29,489
3		2009	49,524	1,212		50,737			]	0				27,600		-23,137
4 5	1	2010	19,659	303	388	20,350			0.000	0						2,863
6	2	2011 2012			931 931	931 931				0		2,440 2,440			11,552 11,552	10,621 10,621
7	4	2013			931	931			0.000	0		2,440			11,552	10,621
8	5	2014			931	931	115,199		0.000	ő		2,440			11,552	10,621
9	6	2015			931	931			0.000	0		2,440			11,552	10,621
10	7	2016		·	931	931	115,199		0.000	0		2,440	9,112	11,552	11,552	10,621
11	8	2017			931	931	115,199		0.000	0		2,440			11,552	10,621
12	9	2018			931	931			0.000	0		2,440			11,552	10,621
13	10	2019		Ì	931	931			0.000	0		2,440			11,552	10,621
14 15	11 12	2020 2021			931 931	931 931	115,199 115,199	-5,760 -5,760	000.0 000.0	0		2,440 2,440			11,552 11,552	10,621 10,621
16	13	2022			931	931	115,199		0.000	0		2,440			11,552	10,621
17	14	2023	ĺ	1	931	931	115,199	-5,760	0.000	o	,	2,440			11,552	10,621
18	15	2024			931	931	115,199	-5,760	0.000	0		2,440			11,552	10,621
19	16	2025			931	931	115,199	-5,760	0.000	0		2,440			11,552	10,621
20	17	2026		· [	931	931	115,199	-5,760	0.000	0		2,440			11,552	10,621
21	18	2027			931	931	115,199	-5,760	0.000	0	_	2,440		11,552	11,552	10,621
22 23	19 20	2028 2029	ļ	]	931 931	931 931	115,199	-5,760	0.000	0 0	27 600	2,440 2,440		11,552 39,152	11,552 39,152	10,621 38,221
24	21	2030			931	931	115,199 115,199	-5,760 -5,760	0.000	0	27,600 18,400			29,952	29,952	29,021
25	22	2031			931	931	67,199	-960	0.000	0	10,400	2,440		11,552	11,552	10,621
26	23	2032	1	,	931	931	,	[ [	3.555	0		2,440		11,552	11,552	10,621
27	24	2033	ŀ		931	931				0		2,440	9,112	11,552	11,552	10,621
28	25	2034			931	931		1		0		2,440		11,552	11,552	10,621
29	26	2035	ł	1	931	931			1	0		2,440		11,552	11,552	10,621
30 31	27 28	2036 2037		455	931 931	931 1,385		İ		0		2,440 2,440		11,552 11,552	11,5\$2 11,5\$2	10,621 10,167
32	29	2038	į	1,061	931	1,991		.		0		2,440		11,552	11,552	9,561
33	30	2039	1	1,212	931	2,143				o.		2,440		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		l		0		2,440	9,112	11,552	11,552	10,621
36	33	2042	4,183	i	931	5,113	l	-	- 1	0		2,440		11,552	11,552	6,439
37	34	2043	8,075	1	931	9,005	Ì			0	ļ	2,440	9,112	11,552	11,552	2,547
38 39	35 36	2044 2045	14,412 8,213		931 931	15,343 9,144		1		0	i	2,440 2,440	9,112 9,112	11,552 11,552	11,552 11,552	-3,791 2,408
40	37	2046	0,213	1	931	931	ĺ	ĺ		ol	ĺ	2,440	9,112	11,552	11,552	10,621
41	38	2047			931	931				0	ł	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	ĺ	ĺ	. [	of	27,600	2,440	9,112	39,152	39,152	38,221
44	41	2050		İ	931	931				0	18,400	2,440	9,112	29,952	29,952	29,021
45	42	2051	j	]	931	931	]	ļ	J	0		2,440	9,112	11,552	11,552	10,621
46 47	43 44	2052 2053	1		931 931	931 931	†	1	[:	0	[	2,440	9,112 9,112	11,552 11,552	11,552 11,552	10,621 10,621
48	45	2054			931	931	.		1	0		2,440 2,440	9,112	11,552	11,552	10,621
49	46	2055	1		931	931	ļ	J		ŏ	J	2,440	9,112	11,552	11,552	10,621
50	47	2056	1		931	931	İ	ļ	ł	ŏ		2,440	9,112	11,552	11,552	10,621
51	48	2057		}	931	931		i	İ	0	i	2,440	9,112	11,552	11,552	10,621
52	49	2058			931	931	}	- 1	- 1	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
т.	ОТА	,	140,668	5 051	45 006	101 7167	410 170	110 550	o	,	115 000	120,589	450,283	685,872	695 920	494 152
	r Pres		140,008)	5,051	45,996	191,/15[2	,419,179	-110,539	U	<u> </u>	115,000	120,389	430,283	000,8/2	685,872	494,157
i = 1				VP :	(Costo):	109,614							VP (Be	neficio):	120,294	10,680
*		-				,,-							, ,		V.P.N.	10,680
		- 1				1								-	r.i.r.e.	11.3%
														]	B/C	1.10

Proyecto El Chaparral Capacidad instalada

65,7 MW 38.4 MW

Capacidad dependable Generacion de energía Costo de construcción

233,210 MWh 128,749 1000US\$ 100%

128,749

Planta térmica alternativa
Capacidad instalada
Costo de invesión
Precio de combustib
Costo de combustib

100% 100% 44,200 0.63

34,388 V.P.N. T.I,R.E. B/C 11.3% 1,29

Tasa de descuento:

Crédito CO<sub>2</sub> (precio CER):

0	US\$/CO2ton
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														,		
	-			COS	ΤO					BENE	FICIO				(unidad	3: US\$1000
N	o.	AÑO	PROYECT	O EL CHA	PARRAL	(C)		CREDI	TOCO		,	ANTA AL	TERNAT	IVA	(B)	(B) - (C)
	- }		Costo de	Línea de	Costo	TOTAL	Beneficio			Subtotal	Costo	Costo	Costo	Subtotal		` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` `
. I			Construce.	Transmisión	O&M	COSTO	Volumen		US\$/ton		Construct	O&M	Combustibl	c	BENEFICIO	
1		2007	28,106	455		28,561			·	O	ļ			١ ,	١.	20.50
2		2008	28,429	1,061		29,489				0			·	0		, , .
3	']	2009	49,524	1,212		50,737			1	0				27,600		-29,489 -23,137
4	1	2010	19,659	303	388	20,350			0.000	a			3,797			2,863
5	2	2011			931	931				0		2,440	9,112	11,552		10,621
6 7	4	2012 2013		}	931	931				0		2,440				10,621
8	5	2013	'		931 931	931 931				0		2,440				10,621
9	6	2015			931	931				0		2,440 2,440				10,621 10,621
10	7	2016			931	931		-5,760	0.000	0		2,440		11,552		10,621
11	8	2017			931	931				0		2,440				10,621
12	9	2018			931	931	115,199			0		2,440		11,552	11,552	10,621
13 14	10 11	2019 2020			931	931	115,199	-5,760	0.000	0		2,440		11,552		10,621
15	12	2021			931 931	931 931		-5,760 -5,760	0.000	0		2,440		11,552		10,621
16	13	2022			931	931	115,199	-5,760	0.000	0		2,440 2,440		11,552 11,552	11,552 11,552	10,621 10,621
17	14	2023			931	931	115,199	-5,760	0.000	ő		2,440		11,552		10,621
18	15	2024	]		931	931	115,199	-5,760	0.000	0		2,440		11,552		10,621
19	16	2025	Ì	i	931	931	115,199	-5,760	0.000	0		2,440		11,552	11,552	10,621
20 21	17 18	2026 2027		Į.	931	931	115,199	-5,760	0.000	0		2,440		11,552	11,552	10,621
22	19	2027			931 931	931 931	115,199 115,199	-5,760 -5,760	0.000	0		2,440 2,440		11,552	11,552	10,621
23	20	2029	ľ	ĺ	931	931	115,199	-5,760	0.000	0.				11,552 39,152	11,552 39,152	10,621 38,221
24	21	2030		1	931	931	115,199	-5,760	0.000	Ŏ		2,440		29,952	29,952	29,021
25	22	2031		İ	931	931	67,199	-960	0.000	0		2,440		11,552	11,552	10,621
26	23	2032			931	931				. 0		2,440	9,112	11,552		10,621
27 28	24 25	2033 2034	ŀ	1	931	931				0		2,440	9,112	11,552	11,552	10,621
29	26	2034		ŀ	931 931	931 931				0		2,440	9,112	11,552	11,552	10,621
30	27	2036			931	931			1	o		2,440 2,440	9,112 9,112	11,552 11,552	11,552 11,552	10,621 10,621
31	28	2037		455	931	1,385	i			ŏ		2,440		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	!		I	0	•	2,440	9,112	11,552	11,552	9,409
34	31 32	2040 2041		303	931 931	1,234 931				0		2,440	9,112	11,552	11,552	10,318
36	33	2042	4,183		931	5,113				0 0		2,440 2,440	9,112 9,112	11,552 11,552	11,552 11,552	10,621
37	34	2043	8,075		931	9,005				0	İ	2,440	9,112	11,552	11,552	6,439 2,547
38	35	2044	14,412		931	15,343		1		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 41	37 38	2046 2047			931 931	931 931	,			0		2,440	9,112	11,552	11,552	10,621
42	39	2048			931	931			i	0	0	2,440 2,440	9,112 9,112	11,552 11,552	11,552	10,621
43	40	2049			931	931				0	27,600	2,440	9,112	39,152	11,552 39,152	10,621 38,221
44	41	2050			931	931		i		ō	18,400	2,440	9,112	29,952	29,952	29,021
45	42	2051	-		931	931	ŀ	l		0		2,440	9,112	11,552	11,552	10,621
46 47	43	2052			931	931		l	ļ	, 0		2,440	9,112	11,552	11,552	10,621
48	44 45	2053 2054			931 931	931 931	1	.	1	0	.	2,440	9,112	11,552	11,552	10,621
49	46	2055		1	931	931	.		. 1	o O		2,440 2,440	9,112	11,552	11,552	10,621
50	47	2056			931	931			.	0		2,440 2,440	9,112 9,112	11,552 11,552	11,552 11,552	10,621 10,621
51	48	2057		·	931	931				ŏ		2,440	9,112	11,552	11,552	10,621
52	49	2058			931	931	Į	1	- 1	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
т.	ንተ ላ	т	140,668	£ 051	45 006	101 715	3 410 170	110 550		ام	115 000	100 500	450.000	405 0 <b>50</b>		
	OTA r Pres		140,008	5,051	45,996	191,/10	2,419,179	-118,559	0	U	115,000	120,589	450,283	085,872	685,872	494,157
i =				. VP	(Costo):	117,125							VP (B)	eneficio):	151,513	34,388
					,*	,							. 2 (2)		V.P.N.	34,388
														ľ	T.I.R.E.	11.3%
															B/C	1.29

Proyecto El Chaparral Capacidad instalada

Tasa de descuento:

6%

Capacidad dependable Generacion de energía Costo de construcción

65.7 MW 38.4 MW 233,210 MWh 128,749 1000US\$ 100%

128,749

Planta térmica alternativa Capacidad instalada 46

46.0 MW 46,000 1000US\$ 0.63 US\$/galor Costo de invesión Precio de combustib

100% 100%

44,200 0.63

Crédito CO<sub>2</sub> (precio CER):

0 US\$/CO2ton

V.P.N. 72,822 T.I.R.E. 11,3% B/C 1.57

				COS	T 0		<del></del>			DENE	FICIO		·		(unidad	: US\$1000
No	ا م	AÑO	ppovem	O EL CHAP	-	(C)	<del></del>	CREDI	TOCO			ANTA AT	TERNAT	TVΔ	(B)	(B) - (C)
144	٠.	טינת	Costo de	Línea de	Costo	TOTAL	Beneficio		Precio CER	<u> </u>	Costo	Costo	Costo	Subtotal	4 ' '	(D) - (C)
				Transmisión		COSTO	Volumen		US\$/ton	Subiblai	Construcc	1	Combustibl		BENEFICIO	
-		<del>                                     </del>	Construct.	Transmisson	COLIFI	00010	TOIDING	<u> </u>	033/1011	<del></del>	Соланисо	T OCCIVI	Combustion	1	BENEFICIO	<del></del>
1		2007	28,106	455		28,561				a	Í		[	0	l o	-28,56
2		2008	28,429	1,061	Ì	29,489				ď				0	_	-29,48
3		2009	49,524	1,212		50,737		İ		o		E		27,600		-23,13
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	o		1	3,797			2,86
5	2	2011	22,055	300	931	931	115,199		0.000	o		2,440				10,62
6	3	2012		1	931	931	115,199		0.000	o		2,440			11,552	10,62
7	4	2013			931	931	115,199		0.000	Ŏ		2,440				10,62
8	5	2014			931	931	115,199		0.000	0		2,440	1 -		11,552	10,62
9	6	2015		.	931	931	115,199		0.000	0		2,440				10,62
10	7	2016		1	931	931	115,199		0.000	. 0	1	2,440			11,552	10,62
11	s 8	2017	' !		931	931	115,199		0.000	0		2,440			11,552	10,621
12	9	2018	•		931	931	115,199		0.000	ő		2,440			11,552	10,621
13	10	2019		1	931	931	115,199		0.000	ō		2,440			11,552	10,621
14	11	2020			931	931	115,199		0.000	ŏ		2,440			11,552	10,621
15	12	2021	ļ		931	931	115,199		0.000	ő		2,440			11,552	10,621
16	13	2022	İ		931	931	115,199	5,760	0.000	ő		2,440	9,112		11,552	10,621
17	14	2023			931	931	115,199	-5,760	0.000	ő		2,440	9,112		11,552	10,621
18	15	2024		1	931	931	115,199	-5,760	0.000	ō		2,440	9,112		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	ō	t I	2,440			11,552	10,621
21	18	2027	. 1	1	931	931	115,199	-5,760	0.000	ō		2,440	9,112		11,552	10,621
22	19	2028	ļ		931	931	115,199	-5,760	0.000	ō		2,440	9,112	11,552	11,552	10,621
23	20	2029	1	1	931	931	115,199	-5,760	0.000	ō		2,440		39,152	39,152	38,221
24	21	2030	<u> </u>	1	931	931	115,199	-5,760	0.000	. 0		2,440		29,952	29,952	29,021
25	22	2031		į	931	931	67,199	-960	0.000	ō		2,440	9,112	11,552	11,552	10,621
26	23	2032	J	1	931	931	,			0		2,440		11,552	11,552	10,621
27	24	2033			931	931				ō		2,440	9,112	11,552	11,552	10,621
28	25	2034		-	931	931	· ·			ō		2,440	9,112	11,552	11,552	10,621
29	26	2035		!	931	931				ō		2,440	9,112	11,552	11,552	10,621
30	27	2036		i	931	931				Ô		2,440	9,112	11,552	11,552	10,621
31	28	2037	[	455	931	1,385				Ó		2,440	9,112	11,552	11,552	10,167
32	29	2038	Í	1,061	931	1,991		ĺ	ĺ	o	ĺ	2,440	9,112	11,552	11,552	9,561
33	30	2039	i	1,212	931	2,143				Ö		2,440	9,112	11,552	11,552	9,409
34	31	2040	i	303	931	1,234				0		2,440	9,112	11,552	11,552	10,318
35	32	2041	i		. 931	931				o		2,440	9,112	11,552	11,552	10,621
36	33	2042	4,183	1	931	5,113				o		2,440	9,112	11,552	11,552	6,439
37	34	2043	8,075	1	931	9,005		ľ	1	ol	i i	2,440	9,112	11,552	11,552	2,547
38	35	2044	14,412		931	15,343		1		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		1	931	931		}	ŀ	0		2,440	9,112	11,552	11,552	10,621
41	38	2047			931	931	1	]		o		2,440	9,112	11,552	11,552	10,621
42	39	2048	1	1	931	931	1	1	1	o	0	2,440	9,112	11,552	11,552	10,621
43	40	2049	1		931	931		1		0	27,600	2,440	9,112	39,152	39,152	38,221
44	41	2050	1		931	931				0	18,400	2,440	9,112	29,952	29,952	29,021
45	42	2051			931	931			ł	0		2,440	9,112	11,552	11,552	10,621
46	43	2052	ļ	1	931	931			ļ	0		2,440	9,112	11,552	11,552	10,621
47	44	2053	}	1	931	931	1	ł		0}	}	2,440	9,112	11,552	11,552	10,621
48	45	2054		1	931	931				0		2,440	9,112	11,552	11,552	10,621
49	46	2055			931	931		1	.	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	- 1	1	931	931	- 1	- 1	ļ	o)		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
									- T							
	TA		140,668	5,051	45,996	191,715	,419,179	-118,559	0	0	115,000	120,589	450,283	685,872	685,872	494,157
Valor		ente									-					
i = -	6%	-		VP (	(Costo):	126,861							VP (Be		199,683	72,822
		}				ŀ									V.P.N.	72,822
		- 1													LI.R.E.	11.3%
		- 1												13	B/C	1.57

128,749

Tasa de descuento:

Proyecto El Chaparral Capacidad instalada Capacidad dependable

65.7 MW

10%

38.4 MW 233,210 MWh 128,749 1000US\$ 100% Generacion de energía Costo de construcción

Planta térmica alternativa Capacidad instalada 46.0 MW

Capacidad instalada Costo de invesión 100% 46,000 1000US\$ 44,200 Precio de combustib 0.63 US\$/galor 100% 0.63

Crédito CO2 (precio CER):

3 US\$/CO2ton

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

			·					-							(unidad	: US\$1000
				COS						BENE						
No	١,	AÑO	PROYECT	O EL CHAF	ARRAL.	(C)		CREDI	тосо	2	PL	ANTA AL	TERNATI	VA	(B)	(B) - (C
			Costo de	Linea de	Costo	TOTAL	Beneficio		Precio CER	Subtotal	Costo	Costo	Costo	Subtotal	TOTAL	
			Construce.	Transmisión	O&M	COSTO	Volumen		US\$/ton		Construcc.	O&M	Combustible		BENEFICIO	
	- 1						]									
1	]	2007	28,106	455		28,561				0				0	0	
2	- }	2008	28,429	1,061		29,489			i	0				0		
3		2009	49,524	1,212		50,737				0				27,600	27,600	
4	1	2010	19,659	303	388	20,350				137		1,017	-		23,350	3,00
5	2	2011			931	931		-5,760		328		2,440	,		11,881	10,95
6	4	2012 2013			931	931 931		-5,760		328		2,440			11,881	
8	5	2013			931 931	931	115,199 115,199	-5,760		328 328		2,440 2,440			11,881	10,95 10,95
9	6	2015			931	931		-5,760 -5,760		328 328	ŀ	2,440	9,112 9,112		11,881 11,881	10,9
10	7	2015			931	931		-5,760 -5,760		328		2,440	9,112	11,552	11,881	10,9
11	8	2017			931	931	115,199	-5,760		328		2,440		11,552	11,881	10,9
12	9	2018			931	931	115,199	-5,760 -5,760		328		2,440	9,112	11,552	11,881	10,95
13	10	2019	'		931	931		-5,760		328		2,440	9,112	11,552	11,881	10,95
14	11	2020		i	931	931	115,199	-5,760		328		2,440		11,552	11,881	10,95
15	12	2021			931	931		-5,760		328	<b>.</b>	2,440	9,112	11,552	11,881	10,95
16	13	2022			931	931		-5,760	0.003	328		2,440		11,552	11,881	10,95
17	14	2023			931	931	115,199	-5,760	0.003	328		2,440		11,552	11,881	10,95
18	15	2024			931	931	115,199	-5,760	0.003	328		2,440		11,552	11,881	10,95
19	16	2025			931	931	115,199	-5,760	0.003	328		2,440		11,552	11,881	10,95
20	17	2026			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	
21	18	2027			931	931	115,199	-5,760	0.003	328		2,440	9,112	11,552	11,881	10,95
22	19	2028			931	931	115,199	-5,760	0.003	328	0	2,440	9,112	11,552	11,881	10,95
23	20	2029			931	931	115,199	-5,760	0.003	328	27,600	2,440	9,112	39,152	39,481	38,55
24	21	2030		+	931	931	115,199	-5,760	0.003	328	18,400	2,440	9,112	29,952	30,281	29,35
25	22	2031			931	931	67,199	-960	0.003	` 328		2,440	9,112	11,552	11,881	10,95
26	23	2032	1		931	931			l i	0		2,440	9,112	11,552	11,552	10,62
27	24	2033			931	931				0		2,440	9,112	11,552	11,552	10,62
28	25	2034			931	931			'	0		2,440	9,112	11,552	11,552	10,62
29	26	2035			931	931				0		2,440	9,112	11,552	11,552	
30	27	2036			931	931				0		2,440	9,112	11,552	11,552	10,62
31	28	2037		455	931	1,385				0		2,440	9,112	11,552	11,552	10,16
32	29	2038		1,061	931	1,991				0		2,440	9,112	11,552	11,552	9,56
33	30	2039		1,212	931	2,143				0		2,440	9,112	11,552	11,552	9,40
34	31	2040		303	931	1,234				0		2,440	9,112	11,552	11,552	10,31
35	32 33	2041	4 100		931	931				0		2,440	9,112	11,552	11,552	10,62
36 37	34	2042 2043	4,183 8,075		931	5,113 9,005				0 0		2,440 2,440	9,112	11,552	11,552	6,43
38	35	2043	14,412		931 931	15,343				0		2,440 2,440	9,112 9,112	11,552 11,552	11,552 11,552	2,54 -3,79
39	36	2045	8,213		931	9,144				0		2,440	9,112	11,552	11,552	2,40
40	37	2046	0,213		931	931				0		2,440	9,112	11,552	11,552	10,62
41	38	2047	j	1	931	931			.	ol		2,440	9,112	11,552	11,552	10,62
42	39	2048			931	931		:		0	0	2,440	9,112	11,552	11,552	10,62
43	40	2049	j		931	931				ŏ	27,600	2,440	9,112	39,152	39,152	38,22
44	41	2050			931	931				ő	18,400	2,440	9,112	29,952	29,952	29,02
45	42	2051			931	931				ŏ	,	2,440	9,112	11,552	11,552	10,62
46	43	2052			931	931				ŏ		2,440	9,112	11,552	11,552	10,62
47	44	2053			931	931				ŏ		2,440	9,112	11,552	11,552	10,62
48	45	2054			931	931				ō	[	2,440	9,112	11,552	11,552	10,62
49	46	2055			931	931				ō		2,440	9,112		11,552	10,62
50	47	2056			931	931			•	0		2,440	9,112	11,552	11,552	10,62
51	48	2057			931	931				0		2,440	9,112		11.552	10,62
52	49	2058			931	931			.	0		2,440	9,112		11,552	10,62
53	50	2059	-19,933	-1,010	931	-20,012				0	-23,000	2,440	9,112	-11,448	-11,448	8,56
TO	DT/	AL_	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	501,18
		sente														
i = 1	10%			VP	(Costo):	109,614							VP (B	eneficio):	122,327	
								•							V.P.N.	12,71
															T.I.R.E. B / C	11,69 1.1

128,749

Proyecto El Chaparral

Capacidad instalada Capacidad dependable Generacion de energía Costo de construcción

Tasa de descuento:

65.7 MW 38.4 MW 233,210 MWh 128,749 1000US\$ 100%

10%

Planta térmica alternativa

Precio de combustib

Capacidad instalada Costo de invesión 46.0 MW

46,000 1000US\$ 0.63 US\$/galor

100% 100%

5 US\$/CO2ton

44,200 0.63

Crédito CO2 (precio CER):

V.P.N. 14,069 T,I,R,E. 11.7%

			· · · · · · · · · · · · · · · · · · ·	cos	T 0					DENE	FICIO				(unidad	3: US\$1000
N	,	AÑO	DROVECT	O EL CHAP		(C)	<del> </del>	CREDI	тосо			ΔΝΥΔ ΔΙ	TERNAT	Τ./.Δ	(B)	(B) - (C)
	"	Zuio	Costo de	Línea de	Costo	TOTAL	Beneficio		Precio CER	<u>*</u> -	Costo	Costo	Costo	Subtotal	TOTAL	(5)-(6)
				Transmisión	O&M	COSTO	Volumen	Costo	US\$/ton	Subtotat	Construce	,	Combustibl	L.	BENEFICIO	1
_			Constitues.	TIANSMISION		00510	Volumen		OSSITOR		Constituce	Octal	Combustion	<u> </u>	BENEFICIO	<del> </del>
1	.	2007	28,106	455		28,561	{	[	[ [	0	,i	ĺ	1	/ o	0	-28,56
2	Ì	2008	28,429	1,061		29,489		ļ		0				٥		-29,489
3		2009	49,524	1,212		50,737				0				27,600		-23,13
4	1	2010	19,659	303	388	20,350		-2,400	0.005	228		1,017	3,797			3,091
5		2011	15,055	, 305	931	931		-5,760	0.005	547		2,440			12,099	11,169
6	2 3	2012			931	931		-5,760	0.005	547		2,440			12,099	11,169
7	4	2013			931	931		-5,760	0.005	547	1	2,440				11,169
8	5	2014			931	931		-5,760	0.005	547		2,440				11,169
9	6	2015	}	· ;	931	931	115,199	-5,760	0.005	547		2,440		11,552	12,099	11,169
10	7	2016			931	931	115,199	-5,760	0.005	547		2,440		11,552		11,169
11	8	2017	1		931	931	115,199	-5,760	0.005	547		2,440			12,099	11,169
12	9	2018	i		931	931	115,199	-5,760	0.005	547		2,440			12,099	11,169
13	10	2019	j	1	931	931	115,199	-5,760	0.005	547		2,440			12,099	11,169
14	11	2020	j		931	931	115,199	-5,760	0.005	547	ĺ	2,440			12,099	11,169
15	12	2021	1		931	931	115,199	-5,760	0.005	547		2,440		11,552	12,099	11,169
16	13	2022			931	931	115,199	-5,760	0.005	547		2,440		11,552	12,099	11,169
17	14	2023			931	931	115,199	-5,760	0.005	547		2,440		11,552	12,099	11,169
18	15	2024	ľ	ľ	931	931	115,199	-5,760	0.005	547	1	2,440		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		-5,760	0.005	547		2,440		11,552	12,099	11,169
21	18	2027			931	931	115,199	-5,760	0.005	547		2,440	1	11,552	12,099	11,169
22	19	2028	1	1	931	931	115,199	-5,760	0.005	547	o	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		1	931	931		-5,760	0.005	547	18,400	2,440		29,952	30,499	29,569
25	22	2031		+	931	931	67,199	-960	0.005	547	20,.00	2,440	9,112	11,552	12,099	11,169
26	23	2032	J	j	931	931	0.,2,,	700	5.552	0		2,440		11,552	11,552	10,621
27	24	2033		-	931	931	. [	[	[	ŏ		2,440	9,112	11,552	11,552	10,621
28	25	2034			931	931		1		ŏ		2,440	9,112	11,552	11,552	10,621
29	26	2035			931	931				ŏ		2,440	9,112	11,552	11,552	10,621
30	27	2036	ŀ	ĺ	931	931				Ŏ		2,440	9,112	11,552	11,552	10,621
31	28	2037	(	455	931	1,385	í	- 1	- 1	01	' '	2,440	9,112	11,552	11,552	10,167
32	29	2038	l	1,061	931	1,991			1	0		2,440	9,112	11,552	11,552	9,561
33	30	2039		1,212	931	2,143	ŀ			0		2,440	9,112	11,552	11.552	9,409
34	31	2040		303	931	1,234	į	ŀ		0		2,440	9,112	11,552	11,552	10,318
35	32	2041	{		931	931	i	[	1	0	,	2,440	9,112	11,552	11,552	10,621
36	33	2042	4,183		931	5,113		-	ļ	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			ĺ	0		2,440	9,112	11,552	11,552	-3,791
39	36	2045	8,213	J	931	9,144	ļ	]	- }	0		2,440	9,112	11,552	11,552	2,408
40	37	2046			931	931		i		0	ł	2,440	9,112	11,552	11,552	10,621
41	38	2047	ŀ		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	1			0	27,600	2,440	9,112	39,152	39,152	38,221
44	41	2050		1	931	931	1	ĺ	- 1	0	18,400	2,440	9,112	29,952	29,952	29,021
45	42	2051			931	931	1			0		2,440	9,112	11,552	11,552	10,621
46	43	2052		1	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	}	1	931	931	1	1	1	0	1	2,440	9,112	11,552	11,552	10,621
49	46	2055		]	931	931	-	.	1	0		2,440	9,112	11,552	11,552	10,621
50	47	2056			931	931		1	1	0		2,440	9,112	11,552	11,552	10,621
51	48	2057		1	931	931		1	1	0		2,440	9,112	11,552	11,552	10,621
52	49	2058			931	931	J	J	J	0	J	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
Τ.	TA	L_	140,668	5,051	45,996	191 <u>,71</u> 5	419,179	-118,559	_0	11,719	115,000	120,589	450,283	685,872	697,591	505,876
Valor																
i = 10	0%	ſ		VP (	Costo):	109,614							VP (Be	neficio):_	123,682	14,069
														[T	V.P.N.	14,069
															LI.R.E.	11.7%
														_  1	B/C	1.13

128,749

Proyecto El Chaparral

Capacidad instalada

Tasa de descuento:

65.7 MW

10%

Capacidad dependable Generacion de energía

38.4 MW 233,210 MWh 128,749 1000US\$ 100% Costo de construcción

Planta térmica alternativa
Capacidad instalada
Costo de invesión 46,0
Precio de combustib 0. 46.0 MW 46,000 1000US\$ 0.63 US\$/galor 100% 100%

Crédito CO2 (precio CER): 10 US\$/CO2ton V.P.N. T.I.R.E. B/C 17,457 12.1%

44,200 0.63

				606	Υ O		1			DENE	E1010				(unidad	: US\$1000
N	<u> </u>	AÑO	DDOSTC	COS		<u>(C)</u>	<del> </del>	רסברי	тосо	BENE		A NOT 4 47	THE DAY 4 CT		(F)	(D) (C
140	υ.	ANG		O EL CHAP		(C)	B C.	·				<del>, · · · · · · · · · · · · · · · · · · ·</del>	TERNAT		(B)	(B) - (C)
			Costo de	Línea de Transmisión	Costo O&M	TOTAL COSTO	Beneficio Volumen	Costo	Precio CER US\$/ton	Subtotal	Costo Construcc.	Costo	Combustible	Subtotal	TOTAL BENEFICIO	
	j		Construce.	r ansumaton	Oam	COSTO	VOIDING	<del> </del>	033/1011		Construct.	Octivi	Comoustion	1	BENEFICIO	
1		2007	28,106	455		28,561				0				0	o	-28,563
2	- 1	2008	28,429	1,061		29,489				0	0			0	l ő	-29,489
3		2009	49,524	1,212		50,737		İ		Ö	27,600			27,600		-23,13
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.010	456	18,400	1,017	3,797		23,669	3,319
5		2011	17,055	505	931	931		-5,760		1,094	10,400	2,440			12,647	11,710
6	. 2	2012			931	931	115,199		0.010	1,094		2,440	,		12,647	11,710
7	4	2013			931	931	115,199	-5,760	0.010	1,094		2,440				11,71
8	5	2014			931	931			0.010	1,094		2,440				11,71
9	6	2015			931	931			0.010	1,094		2,440			12,647	11,71
10	7	2016		[	931	931	115,199		0.010	1,094		2,440			12,647	11,71
11	8	2017			931	931	115,199		0.010	1,094		2,440			12,647	11,71
12	9	2018			931	931	115,199		0,010	1,094		2,440	9,112		12,647	11,710
13	10	2019			931	931	115,199		0,010	1,094	i	2,440			12,647	11,716
14	11	2020			931	931	115,199	-5,760	0.010	1,094		2,440	9,112		12,647	11,716
15	12	2021			931	931	115,199	-5,760	0.010	1,094		2,440		11,552	12,647	11,716
16	13	2022			931	931	115,199	-5,760	0.010	1,094		2,440		11,552	12,647	11,716
17	14	2023			931	931	115,199	-5,760	0.010	1,094		2,440	9,112		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	11,710
19	16	2025			931	931	115,199	-5,760	0.010	1,094		2,440	9,112		12,647	11,710
20	17	2026			931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,71
21	18	2027	ļ		931	931	115,199	-5,760	0.010	1,094		2,440	9,112	11,552	12,647	11,71
22	19	2028		ŀ	931	931	115,199	-5,760	0.010	1,094	0	2,440		11,552	12,647	11,710
23	20	2029			931	931	115,199	-5,760	0.010	1,094	27,600	2,440	9,112		40,247	39,310
24	21	2030	i		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				ō		2,440	9,112	11,552	11,552	10,621
28	25	2034			931	931				ŏ		2,440	9,112	11,552	11,552	10,621
29	26	2035		.	931	931				o.		2,440	9,112	11,552	11,552	10,621
30	27	2036		•	931	931				o.		2,440	9,112	11,552	11,552	10,621
31	28	2037		455	931	1,385	i		[	ōĺ		2,440	9,112	11,552	11,552	10,167
32	29	2038		1,061	931	1,991				ō	.	2,440	9,112	11,552	11,552	9,561
33	30	2039		1,212	931	2,143				Ō		2,440	9,112	11,552	11,552	9,409
34	31	2040		303	931	1,234				ō	1	2,440	9,112	11,552	11,552	10,318
35	32	2041	i		931	931			1	ŏ		2,440	9,112	11,552	11,552	10,621
36	33	2042	4,183		931	5,113	-		-	ŏ		2,440	9,112	11,552	11,552	6,439
37	34	2043	8,075		931	9,005				ŏ		2,440	9,112	11,552	11,552	2,547
38	35	2044	14,412		931	15,343				o		2,440	9,112	11,552	11,552	-3,791
39	36	2045	8,213		931	9,144				ol		2,440	9,112	11,552	11,552	2,408
40	37	2046	•	-	931	931				ol		2,440	9,112	11,552	11,552	10,621
41	38	2047		-	931	931			}	o		2,440	9,112	11,552	11,552	10,621
42	39	2048			931	931				ŏ	0	2,440	9,112	11,552	11,552	10,621
43	40	2049			931	931				ŏ	27,600	2,440	9,112	39,152	39,152	38,221
44	41	2050	i		931	931				ŏ	18,400	2,440	9,112	29,952	29,952	29,021
45	42	2051			931	931			1	ō	,	2,440	9,112	11,552	11,552	10,621
46	43	2052			931	931	}		Ì	ō		2,440	9,112	11,552	11,552	10,621
47	44	2053			931	931			.	ō	i	2,440	9,112	11,552	11,552	10,621
48	45	2054			931	931	-		l	0		2,440	9,112	11,552	11,552	10,621
49	46	2055	ļ		931	931	1		l	0		2,440	9,112	11,552	11,552	10,621
50	47	2056			931	931	Ì		l	o		2,440	9,112	11,552	11,552	10,621
51	48	2057	!		931	931				ō.	Į	2,440		11,552	11,552	10,621
52	49	2058	. 1		931	931			j	0		2,440	9,112	11,552	11,552	10,621
53	50	2059	-19,933	-1,010	931	-20,012				ō.	-23,000	2,440	9,112	-11,448	-11,448	8,564
			7, 10	1			i		<del></del> i		- 7			,		
T	OTA	AL	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
	r Pre		2 10,000		.5,7291		-, • • • • • • • • • • • • • • • • • • •	,000		,0]	222,000			000,012	, 0,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	22,,27.
i = 3				VP	(Costo):	109,614							VP (B	eneficio):	127,070	17,457
				· · -	,	.,									V.P.N.	17,457
		ļ				]									T.I.R.E.	12.1%
						1									B/C	1.16

Tabla 14.3 Evaluación Económica

128,749

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía Costo de construcción

Tasa de descuento:

10%

65.7 MW 38.4 MW 233,210 MWh 128,749 1000US\$ 100%

Planta térmica alternativa Capacidad instalada 46

Costo de invesión Precio de combustib

46.0 MW 41,400 1000US\$ 0.567 US\$/galor

44,200 0.63 90% 90%

Crédito CO<sub>2</sub> (precio CER):

0 US\$/CO2ton

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

															(unida	i: US\$1000
1.			ļ	COS			ļ				FICIO					
N	٥,	AÑO		O EL CHAI	ARRAL	(C)		CREDI	TO CO	2	PL	ANTA AL	TERNAT		(B)	(B) - (C)
			Costo de	Linea de	Costo	TOTAL	Beneficio		Precio CER	Subtotal	Costo	Costo	Costo	Subtotal	TOTAL	
		<u></u>	Construcc.	Transmisión	O&M	COSTO	Volumer	<u>                                     </u>	US\$/ton		Construcc	0&M	Combustib	le _	BENEFICIO	
$\Gamma$		7	[	1							1	·	1	T	Ţ. <u> </u>	J
1		2007	28,106	455		28,561				0	)			0	0	-28,56
2		2008	28,429	1,061		29,489				0				1 0	l o	-29,48
3		2009	49,524	1,212		50,737				0				24,840	24,840	
4	1	1	19,659	303	388	20,350	48,000	-2,400	0.000	ō		915	3,417		20,892	.54
5	2		25,025		931	931	115,199		0.000	ă		2,196				9,46
6	3	2012			931	931	115,199		0.000	ő		2,196				9,46
7	4				931	931	115,199		0.000	0		2,196				9,46
8	5			·	931	931	115,199		0.000	0		2,196				9,46
9	6				931	931		-5,760	0.000	0					1 .	
10	7			İ	931	931	115,199 115,199			0		2,196				9,46
11	8			,	931	931		-5,760	0.000			2,196				9,46
	9			1			115,199		0.000	0		2,196				9,46
12		2018			931	931	115,199		0.000	0		2,196			10,397	9,460
13	10				931	931	115,199	-5,760	0.000	0		2,196	8,201		10,397	9,460
14	11	2020		·	931	931	115,199	-5,760	0.000	0		2,196			10,397	9,460
15	12	2021		l f	931	931	115,199	-5,760	0.000	0		2,196			10,397	9,460
. 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		ŀ	931	931	115,199	-5,760	0,000	0		2,196			10,397	9,466
18	15	2024	j		931	931	115,199	-5,760	0.000	0		2,196	8,201		10,397	9,466
19	16	2025		ĺ	931	931	115,199	-5,760	0.000	0		2,196	8,201	10,397	10,397	9,466
20	17	2026		ŀ	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	ļ	ļ	931	931	115,199	-5,760	0.000	0	, ,	2,196	8,201	10,397	10,397	9,466
23	20	2029			931	931	115,199	-5,760	0.000	0		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	1	2,196	8,201	10,397	10,397	9,466
26	23	2032		1	931	931	١ .			0	]	2,196	8,201	10,397	10,397	9,466
27	24	2033	ŀ		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	1		931	931			- 1	0		2,196	8,201	10,397	10,397	9,466
30	27	2036	}	1	931	931		1	- 1	0	}	2,196	8,201	10,397	10,397	9,466
31	28	2037	1	455	931	1,385		į		0		2,196	8,201	10,397	10,397	9,012
32	29	2038	ł	1,061	931	1,991		1		ò		2,196	8,201	10,397	10,397	8,406
33	30	2039		1,212	931	2,143				ò	İ	2,196	8,201	10,397	10,397	8,254
34	31	2040	ľ	303	931	1,234		- 1	- 1	Õ	ŀ	2,196	8,201	10,397	10,397	9,163
35	32	2041			931	931				ŏ		2,196	8,201	10,397	10,397	9,466
36	33	2042	4,183		931	5,113			]	Ö		2,196	8,201	10,397	10,397	5,284
37	34	2043	8,075		931	9,005			1	ŏ		2,196	8,201	10,397	10,397	1,392
38	35	2044	14,412		931	15,343	ĺ	1	ľ	ől		2,196	8,201	10,397	10,397	-4,946
39	36	2045	8,213	1	931	9,144				o		2,196	8,201	10,397	10,397	1,253
40	37	2046	3,213		931	931		İ		ő		2,196	8,201	10,397	10,397	9,466
41	38	2047	}		931	931				Ď		2,196	8,201	10,397	10,397	9,466
42	39	2048			931	931	ſ	ſ	ĺ	o	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	1			0	16,560	2,196	8,201	26,957	26,957	26,026
45	42	2051		]	931	931	}	- }	J	G	10,500	2,196	8,201	10,397	10,397	9,466
46	43	2052		,	931	931		1		0	ĺ	2,196	8,201	10,397	10,397	9,466
47	44	2052		1				- 1		0		2,196				
48		2054			931	931		1		0	ĺ		8,201	10,397	10,397	9,466 0.466
	45		1	- }	931	931	ļ	ļ	1		- 1	2,196	8,201	10,397	10,397	9,466
49	46	2055			931	931			1	0		2,196	8,201	10,397	10,397	9,466
50	47	2056			931	931		1		0	1	2,196	8,201	10,397	10,397	9,466
51	48	2057	i		931	931				. 0	1	2,196	8,201	10,397	10,397	9,466
52	49	2058			931	931	- 1	i	- 1	0	00 -00	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
		ļ						.	İ							
	<u> T A</u>		140,668	5,051	45,996	191,715	,419,179	-118,559	0	0	103,500	108,530	405,255	617,285	617,285	425,569
Valor		sente		`												أنيت م
j = 1	0%			VP (	(Costo):	109,614							VP (Be	eneficio):	108,265	-1,349
															V.P.N.	-1,349
		- 1				1									LIRE.	9.8%
														13	B/C	0.99

128,749

Proyecto El Chaparral Capacidad instalada Capacidad dependable

Tasa de descuento:

10%

65.7 MW 38.4 MW 233,210 MWh 141,624 1000US\$ 110%

Generacion de energía Costo de construcción

Planta térmica alternativa
Capacidad instalada
Costo de invesión 46,0
Precio de combustib 0. 46,0 MW 46,000 1000US\$ 0.63 US\$/galor

100% 100% 44,200 0.63

Crédito CO<sub>2</sub> (precio CER):

0 US\$/CO2ton

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

		1		COS	70					BENE	FICIO				(unidad	: US\$1000
N	n.	AÑO	PROVECT	O EL CHAF		(C)		CREDI	TOCO		,	ANTA AT	TERNATI	VΔ	(B)	(B) - (C)
	٠.		Costo de	Linea de	Costo	TOTAL	Beneficio		Precio CER		Costo	Costo	Costo	Subtotal	TOTAL	(D) - (C)
				Transmisión		COSTO	Volumen		US\$/ton	Odolotai	Construcc.		Combustible		BENEFICIO	
													<u> </u>			
1		2007	30,917	500		31,417				0				0		-31,41
2		2008	31;272	1,167		32,438				0				0		-32,43
3		2009	54,477	1,333		55,810				0				27,600		-28,21
4	1	2010	21,625	333	427	22,385	48,000	-2,400		0	18,400	1,017	3,797	23,213	23,213	82
5	2				1,024	1,024		-5,760	0.000	0		2,440		11,552		10,52
6	3				1,024	1,024		-5,760	0.000	0	1	2,440		11,552	11,552	10,52
7 8	4				1,024	1,024		-5,760	0.000	0		2,440		11,552	11,552	10,52
9	5 6				1,024	1,024 1,024	115,199 115,199	-5,760	0.000	0		2,440		11,552	11,552	10,5
10	7				1,024 1,024	1,024	115,199	-5,760 -5,760	0.000	0	1	2,440		11,552 11,552	11,552	10,5
11	8	2017			1,024	1,024	115,199	-5,760	0.000	0		2,440 2,440	9,112	11,552	11,552 11,552	10,53 10,53
12	9	2018			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552		10,5
13	10	2019			1,024	1,024	115,199	-5,760	0.000	ő		2,440		11,552	11,552	10,5
14	11	2020	'		1,024	1,024	115,199	-5,760	0.000	ŏ		2,440	9,112	11,552	11,552	10,5
15	12	2021			1,024	1,024	115,199	-5,760	0.000	ő		2,440	9,112	11,552	11,552	10,5
16	13	2022		Ī	1,024	1,024	115,199	-5,760	0.000	ŏ	1	2,440	9,112	11,552	11,552	10,5
17	14	2023	1		1,024	1,024		-5,760	0.000	ō		2,440	9,112	11,552	11,552	10,5
18	15	2024			1,024	1,024		-5,760	0.000	Ó		2,440	9,112	11,552	11,552	10,5
19	16	2025			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,5
20	17	2026			1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,5
21	18	2027	[	]	1,024	1,024	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,5
22	19	2028		i	1,024	1,024	115,199	-5,760	0.000	0	0	2,440	9,112	11,552	11,552	10,5
23	20	2029			1,024	1,024	115,199	-5,760	0.000	0	27,600	2,440	9,112	39,152	39,152	38,1
24	21	2030			1,024	1,024	115,199	-5,760	0.000	0	18,400	2,440	9,112	29,952	29,952	28,9
25	22	2031	\ \ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	- 1	1,024	1,024	67,199	-960	0.000	0		2,440	9,112	11,552	11,552	10,5
26	23	2032		ļ	1,024	1,024				0		2,440	9,112	11,552	11,552	10,5
27	24	2033		į	1,024	1,024				0		2,440	9,112	11,552		10,53
28	25	2034			1,024	1,024				0		2,440	9,112	11,552	11,552	10,5
29	26	2035			1,024	1,024			·	0		2,440	9,112	11,552	11,552	10,52
30	27	2036			1,024	1,024				0	٠.	2,440	9,112	11,552	11,552	10,5
31	28	2037	İ	500	1,024	1,524			ļ	0		2,440	9,112	11,552	11,552	10,0
32 33	29	2038		1,167	1,024	2,191			İ	0	i i	2,440	9,112	11,552	11,552	9,3
34	30 31	2039 2040		1,333 333	1,024	2,357				0		2,440	9,112	11,552	11,552	9,1
35	32	2040		333	1,024 1,024	1,357 1,024				0		2,440 2,440	9,112 9,112	11,552 11,552	11,552 11,552	10,1
36	33	2042	4,601	*	1,024	5,625				ő		2,440	9,112	11,552	11,552	10,5 5,9
37	34	2043	8,882	ı	1,024	9,906				ŏ		2,440	9,112	11,552	11,552	1,6
38	35	2044	15,854		1,024	16,877	ì			ő		2,440	9,112	11,552	11,552	-5,3
39	36	2045	9,034	-	1,024	10,058				Ŏ.		2,440	9,112	11,552	11,552	1,4
40	37	2046	. ,		1,024	1,024				oi		2,440	9,112	11,552	11,552	10,5
41	38	2047	.	ļ	1,024	1,024				ō	i	2,440	9,112	11,552	11,552	10,5
42	39	2048	+	l	1,024	1,024	ł			0	0	2,440	9,112	11,552	11,552	10,5
43	40	2049			1,024	1,024			į	0	27,600	2,440	9,112	39,152	39,152	38,1
44	41	2050	İ		1,024	1,024	1		ľ	0	18,400	2,440	9,112	29,952	29,952	28,92
15	42	2051		ŀ	1,024	1,024		į		0	Í	2,440	9,112	11,552	11,552	10,53
46	43	2052		ŀ	1,024	1,024				0		2,440	9,112	11,552	11,552	10,5
47	44	2053			1,024	1,024				0		2,440	9,112	11,552	11,552	10,5
18	45	2054	ļ	.	1,024	1,024			ł	0		2,440	9,112	11,552	11,552	10,5%
19	46	2055	.		1,024	1,024	j		į	0		2,440	9,112			10,52
50	47	2056			1,024	1,024				0	- 1	2,440	9,112	11,552	11,552	10,53
51	48	2057	\	}	1,024	1,024		-	.	0	1	2,440	9,112	11,552	11,552	10,53
52 53	49 50	2058 2059	21.026		1,024	1,024 -22,013				0	-23,000	2,440 2,440	9,112 9,112	11,552 -11,448	11,552 -11,448	10,52
101	اںد	2039	-21,926	-1,111	1,024	-22,013				U	-23,000	2,440	9,112	-11,440	-11,440	10,5
т	отл	Α Т	154 725	5 556	50,596	210 997	2 410 170	-119 550	o	ام	115,000	120 580	450,283	685,872	685,872	474,9
		esente	154,735	5,556	20,390	210,007	2,419,179	-110,557	UĮ	U	110,000	140,009	<del>-30,203</del>	000,072	003,072	4/4,30
	or Fre 10%	acute.		VP	(Costo):	120,575							VP (B	eneficio):	120,294	-28
. –	-0/0			*1	(Coato).	1-0j010							. 2 (15		V.P.N.	-28
							•								T.I.R.E.	10.0
															B/C	1.

128,749

Proyecto El Chaparral

Capacidad instalada Capacidad dependable Generacion de energía

Tasa de descuento:

65.7 MW 38.4 MW 233,210 MWh

10%

141,624 1000US\$ 110% Costo de construcción

Planta térmica alternativa

Capacidad instalada

46.0 MW 41,400 1000US\$ 0.567 US\$/galor Costo de invesión Precio de combustib

44,200 0.63 90% 90%

Crédito CO2 (precio CER):

0 US\$/CO2ton

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

			COS	ΤÓ					BENE						: US\$1000)
No	ANO	PROVECT			(C)		CREDI	TOCO	2	PLA	NTA AL	TERNATI	VA	(B)	(B) - (C)
2.0.	12.0	Costo de	Linea de	Costo	TOTAL	Beneficio Volumen	Costo	Precio CER	Subtotal	Costo Construcca	Costo O&M	Costo Combustible	Subtotal	TOTAL BENEFICIO	
No. 1 1 2 3 4 1 1 5 2 6 3 7 4 8 5 6 10 7 11 18 12 16 13 17 14 18 15 12 16 13 17 14 18 15 19 16 20 17 21 18 22 19 23 20 24 21 25 22 26 23 27 24 28 25 29 26 23 33 30 37 34 31 35 32 36 33 37 34 31 35 32 36 33 37 34 41 41 41 41 42 42 44 44 41 44 44 44 44 44 44 44 44 44 44	2026 2027 2028 2029 2030 2031 2032 2033 2034 2036 2037 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2048 2049 2049 2040 2040 2040 2040 2040 2040	Costo de	COS OEL CHAP Linea de Transmisión 500 1,167 1,333 333 333 333	ARRAL	(C) TOTAL COSTO  31,417 32,438 55,810 22,385 1,024	8eneficio Volumen 48,000 115,199 115,199 115,199 115,199 115,199 115,199 115,199 115,199 115,199 115,199 115,199 115,199 115,199 115,199 115,199 115,199 115,199	-2,400 -5,760 -5,760 -5,760 -5,760 -5,760 -5,760 -5,760 -5,760 -5,760 -5,760 -5,760 -5,760	Precio CER US\$/(on	2	PL/Costo Construcc. 0 24,840 16,560 16,560	Costo O&M  915 2,196	Costo Combustible  3,417 8,201	Subtotal  0 0 24,840 20,892 10,397	TOTAL BENEFICIO  0 0 0 24,840 20,892 10,397	-31,417 -32,438 -30,970 -1,493 9,373
48 45 49 46 50 47 51 48 52 49	2054 2055 2056 2057 2058			1,024 1,024 1,024 1,024 1,024	1,024 1,024 1,024 1,024 1,024				0 0	) ) )	2,196 2,196 2,196 2,196 2,196 2,196 2,196	8,201 8,201 8,201 8,201	10,397 10,397	10,397 10,397 10,397 10,397	9,37
53 50				1,024	-22,013	<u> </u>	110.5-0		<del></del>	103,500		<u> </u>			
TOT.		15 <u>4,735</u>	5,556	50,596	210,887	2,419,179	-118,559	<u>) 0</u>	10	103,500	108,530				
i = 10%			VF	(Costo):	120,575							VP (E	Beneficio)	V.P.N.	-12,31
						ŀ								T.I.R.E. B / C	8.7% 0.9

128,749

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generación de energía

Tasa de descuento:

65.7 MW 38.4 MW 233,210 MWh 128,749 1000US\$ 100%

10%

Costo de construcción

Planta térmica alternativa Capacidad instalada 46 Costo de invesión 50,6 Precio de combustib 0,6 46.0 MW 50,600 1000US\$ 0.693 US\$/galor

110% 110% 44,200 0.63

Crédito CO2 (precio CER):

0 US\$/CO2ton

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

	Т			COS	то					BENE	FICIO				(unidad	: US\$1000
No.		AÑO	PROVECT	O EL CHAP		(C)		CREDI	TO CO		Y	ANTA AT	TERNATI	VA	(B)	(B) - (C)
1.0.	- [		Costo de	Linea de	Costo	TOTAL	Beneficio		Precio CER		Costo	Costo	Costo	Subtotal	TOTAL	(B) - (C)
				Transmisión		COSTO	Volumen	Costo	US\$/ton	Guototui	Construce.		Combustible		BENEFICIO	
	Т															
1		2007	28,106	455		28,561			l i	0				0		-28,56
2		2008 2009	28,429	1,061		29,489				0				0	0	-29,48
- 1	,	2010	49,524 19,659	1,212 303	388	50,737 20,350		2.400	0.000	0		1 110	4 176	30,360	30,360	-20,37
	2	2010	19,039	303	931	20,330 931		-2,400 -5,760	0.000	0		1,118 2,684	4,176 10,023	25,535 12,707	25,535 12,707	<i>5</i> ,18 11,77
6	3	2012		i	931	931		-5,760	0.000	o		2,684		12,707	12,707	11,77
	4	2013			931	931	115,199	-5,760	0.000	ő		2,684	10,023	12,707	12,707	11,77
	5	2014			931	931	115,199	-5,760	0.000	ŏ		2,684	10,023	12,707	12,707	11,77
	6	2015			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,77
10	7	2016			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,77
	8	2017		.	931	931	115,199	-5,760	0.000	0	]	2,684	10,023	12,707	12,707	11,77
	9	2018			931	931	115,199	-5,760	0.000	0		2,684		12,707	12,707	11,77
	10	2019			931	931		-5,760	0.000	0		2,684	10,023	12,707	12,707	11,77
	11	2020			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,77
	12	2021			931	931	115,199	-5,760	0.000	0		2,684		12,707	12,707	11,77
	13	2022 2023			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,77
	l4 l5	2024			931 931	931 931	115,199 115,199	-5,760	0.000	0	1	2,684 2,684	10,023 10,023	12,707	12,707	11,77
	16	2025			931	931	115,199	-5,760 -5,760	0.000	0	1 !	2,684	10,023	12,707 12,707	12,707 12,707	11,77 11,77
	17	2026			931	931	115,199	-5,760	0.000	0		2,684	10,023	12,707	12,707	11,77
	18	2027		]	931	931	115,199	-5,760	0.000	Ö		2,684	10,023	12,707	12,707	11,77
	9	2028		į	931	931	115,199	-5,760	0.000	ō		2,684	10,023	12,707	12,707	11,77
	20	2029			931	931	115,199	-5,760	0.000	0		2,684	10,023	43,067	43,067	42,13
24 2	21	2030			931	931	115,199	-5,760	0.000	0		2,684	10,023	32,947	32,947	32,01
	22	2031	l	. \	931	931	67,199	-960	0.000	0		2,684	10,023	12,707	12,707	11,77
	23	2032		.	931	931			i	0		2,684	10,023	12,707	12,707	11,77
	24	2033		,	931	931			·	0		2,684	10,023	12,707	12,707	11,77
	25	2034		1	931	931			-	0		2,684	10,023	12,707	12,707	11,77
	26	2035		·	931	931		i	. [	0		2,684	10,023	12,707	12,707	11,77
	27	2036 2037		455	931 931	931 1,385				0		2,684	10,023 10,023	12,707	12,707	11,77
	9	2038		1,061	931	1,991				0		2,684 2,684	10,023	12,707 12,707	12,707 12,707	11,32 10,71
	10	2039		1,212	931	2,143				0		2,684	10,023	12,707	12,707	10,71
	1	2040		303	931	1,234			İ	o		2,684	10,023	12,707	12,707	11,47
	2	2041			931	931				ō		2,684	10,023	12,707	12,707	11,77
36 3	13	2042	4,183		931	5,113			.	0		2,684	10,023	12,707	12,707	7,59
	14	2043	8,075		931	9,005			i	0		2,684	10,023	12,707	12,707	3,70
	5	2044	14,412	}	931	15,343	ı	ľ	}	0		2,684	10,023	12,707	12,707	-2,63
	36	2045	8,213	.	931	9,144				0		2,684	10,023	12,707	12,707	3,56
	17	2046			931	931				0	i	2,684	10,023	12,707	12,707	11,77
	18	2047		İ	931	931			1	0		2,684	10,023	12,707	12,707	11,77
	19	2048 2049			931	931			1	0	20.200	2,684	10,023	12,707	12,707	11,77
	1	2049			931 931	931 931		Ì		0	30,360 20,240	2,684 2,684	10,023	43,067	43,067	42,13
	2	2051	l		931	931				0	20,240	2,684	10,023 10,023	32,947 12,707	32,947 12,707	32,01° 11,77°
	3	2052		. '	931	931			ŀ	o		2,684	10,023	12,707	12,707	11,77
	4	2053			931	931				ő		2,684	10,023	12,707	12,707	11,77
	5	2054			931	931				ő		2,684	10,023	12,707	12,707	11,77
	6	2055	l	.	931	931				ō		2,684	10,023	12,707	12,707	11,77
	7	2056			931	931	j		l	o		2,684		12,707	12,707	11,77
51 4	8	2057	-	-	931	931	· ·		{	o		2,684	10,023	12,707	12,707	11,77
		2058		ļ	931	931			i	0		2,684	10,023	12,707	12,707	11,77
53 5	0	2059	-19,933	-1,010	931	-20,012				Ö	-25,300	2,684	10,023	· -12,593	-12,593	7,42
TOT	ТΑ	Ľ	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	562,74
Valor P	res		0,000		***		_,,	,				,				
i = 109	70			VP	(Costo):	109,614							yr (B		132,324 V.P.N.	22,71 22,71
		J										•			T.I.R.E.	12.8%
		1													B/C	1.2

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía Costo de construcción

Tasa de descuento:

65.7 MW 38.4 MW 233,210 MWh

10%

115,874 1000US\$ 90%

128,749

Planta térmica alternativa

Precio de combustib

46.0 MW 46,000 1000US\$ Capacidad instalada Costo de invesión

0.63 US\$/galor

100% 44,200 100% 0.63

Crédito CO<sub>2</sub> (precio CER):

0 US\$/CO2ton

V.P.N. T.I.R.E, B/C 13.0%

															(unidad	US\$1000)
	1			COS	ΤO					BENE						
No	o.	AÑO	PROYECT	O EL CHAP	ARRAL	(C)		CREDI	TO CO	2	PL/		TERNATI		(B)	(B) - (C)
				Linea de	Costo	TOTAL	Beneficio	Costo	Precio CER	Subtotal	Costo	Costo		Subtotal	TOTAL	
			Construcc,	Transmisión	O&M	COSTO	Volumen		US\$/ton		Construce.	O&M	Combustible		BENEFICIO	
Ī									ì						· _	
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		-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
6	3	2012			838	838		-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		-5,760	0.000	0		2,440	9,112	11,552 11,552	11,552 11,552	10,715 10,715
10	7	2016			838	838	115,199	-5,760	0.000	0 0		2,440 2,440	9,112 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	,	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
14	11	2020			838	838	115,199	-5,760 5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
15	12	2021			838	838 838	115,199 115,199	-5,760 -5,760		0		2,440	9,112	11,552	11,552	10,715
16	13	2022			838	838 838	115,199	-5,760 -5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
17	14	2023			838 838	838		-5,760 -5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
18 19	15	2024 2025			838	838		-5,760 -5,760	! !	Õ		2,440	9,112	11,552	11,552	10,715
20	16 17	2025			838	838	115,199	-5,760	0.000	0		2,440		11,552	11,552	10,715
	18	2027	i		838	838	115,199	-5,760	0.000	0		2,440	9,112	11,552	11,552	10,715
21 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		i	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	1			0		2,440	9,112	11,552	11,552	10,715
29	26	2035		l i	838	838	1			0		2,440	9,112	11,552	11,552	10,715
30	27	2036			838	838	1			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		11,552	11,552	9,624 10,442
34	31	2040		273	838	1,110				0		2,440		11,552	11,552 11,552	10,715
35	32	2041			838	838				0		2,440	9,112	11,552 11,552	11,552	6,950
36	33	2042	3,764		838	4,602				0		2,440 2,440	9,112 9,112	11,552	11,552	3,447
37	34	2043	7,267		. 838	8,105				· 0		2,440	9,112	11,552	11,552	-2,257
38	35	2044	12,971	]	838	13,809				0		2,440		11,552	11,552	3,323
39	36	2045	7,392		838	8,229				0		2,440	9,112	11,552	11,552	10,715
40	37	2046			838	838 838				0		2,440	9,112	11,552	11,552	10,715
41	38	2047			. 838	838 838				0	0	2,440	9,112	11,552	11,552	10,715
42 43	39 40	2048 2049			838 838	838				0		2,440	9,112	39,152	39,152	38,315
44		2049			838	838				0	18,400	2,440	9,112	29,952	29,952	29,115
45	41 42	2050			838	838				. 0		2,440	9,112	11,552	11,552	10,715
46	43	2051			838	838				. 0		2,440		11,552	11,552	10,715
47	44	2052			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					0		2,440				10,715
51	48	2057			838					0		2,440				10,715
52	49	2058			838					0		2,440		11,552		10,715
53	50		-17,940	-909	838	-18,011	<u> </u>		<u> </u>	0	-23,000	2,44 <u>0</u>	9,112	11,448	-11,448	6,563
					11000											545.000
T	οт.	ΑL	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
		esente											5700 AT		120 204	21 642
	10%			VF	(Costo):	98,652	1						VP (B	eneficio):		21,642 21,642
															V.P.N. T.I.R.E.	13.0%
															B/C	1.22
							Щ.,								210	

Proyecto El Chaparral Capacidad instalada Capacidad dependable

Generacion de energía

Costo de construcción

65.7 MW 38.4 MW

233,210 MWh 128,749 1000US\$ 100%

233,210 128,749

Tarifa Promedia Energía vendible: Costo de energía: 233.2 MWh

67.65 US\$/MWh

Tasa de descuento:

10%

Crédito CO<sub>2</sub> (precio CER):

0 US\$/CO2ton

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

				COS	ΤO		ſ <u> </u>		ВЕ	NEFIC	10			(unidad	: US\$1000
N	o	AÑO	PROYECT	O EL CHAI		(C)		CO2CE	EDITO			A DE EN	ERGIA	(B)	(B) - (C)
		Ċ	Costo de	Línea de	Costo	TOTAL	Beneficio	Costo	Precio CER	Subtotal			Subtotal	4 '''	(-) (-)
•			Construcc.	Transmisión	O&M	COST	Volumen		US\$/ton		Vendible	Unitario	<u> </u>	BENEFICIO	
-									1			1	<u> </u>	Ī	
1		2007	28,106	455		28,561				0			0	0	-28,56
2		2008	28,429	1,061		29,489				0			0	0	-29,489
3		2009	49,524	1,212		50,737			!	0			0		-50,731
4	1	2010	19,659	303	388	20,350		-2,400				0.06765	6,574	6,574	-13,77
5	2	2011			931	931		-5,760		. 0		0.06765	15,777	15,777	14,846
6	3	2012			931	931		-5,760		0		0.06765	15,777		14,846
7	4	2013	i		931	931	115,199	-5,760		0	-,	0.06765	15,777		14,846
8	5	2014			931	931		-5,760	0,000	0			15,777		14,846
9	6	2015			931	931		-5,760		0	,		15,777		14,846
10	7	2016	i		931	931	115,199	-5,760	0.000	0		0.06765	15,777	15,777	14,846
11	8	2017			931	931		-5,760	0.000	0			15,777	15,777	14,846
12 13	10	2018 2019			931	931		-5,760	0.000	0	,		15,777	15,777	14,840
14	11	2019	- 1		931 931	931		-5,760	0.000	0		0.06765	15,777	15,777	14,846
15	12	2021	· · · · · · · · · · · · · · · · · · ·		931	931	115,199	-5,760	0.000	0	,	0.06765	15,777	15,777	14,846
16	13	2021			931	931 931		-5,760 -5,760	0.000	0	, ,	0.06765	15,777	15,777	14,846
17	14	2022			931	931	115,199 115,199	-5,760 -5,760	0.000	0			15,777		14,846
18	15	2024		j	931	931	115,199	-5,760 -5,760	0.000	0		0.06765 0.06765	15,777	15,777	14,846
19	16	2025			931	931	115,199	-5,760 -5,760	0.000	0	233,210	0.06765	15,777 15,777	15,777	14,846
20	17	2026			931	931	115,199	-5,760 -5,760	0.000	0	233,210		15,777	15,777 15,777	14,846 14,846
21	18	2027		1	931	931	115,199	-5,760	0.000	ŏ	233,210	0.06765	15,777	15,777	14,846
22	19	2028			931	931	115,199	-5,760	0.000	ő	233,210	0.06765	15,777	15,777	14,846
23	20	2029	i		931	931	115,199	-5,760	0.000	ő	233,210	0.06765	15,777	15,777	14,846
24	21	2030			931	931	115,199	-5,760	0.000	ő	233,210	0.06765	15,777	15,777	14,846
25	22	2031			931	931	67,199	-960	0.000	ő	233,210	0.06765	15,777	15,777	14,846
26	23	2032	I		931	931	01,222	200	0,000	ŏ	233,210	0.06765	15,777	15,777	14,846
27	24	2033			931	931				Õ	233,210	0.06765	15,777	15,777	14,846
28	25	2034			931	931				ŏ	233,210	0.06765	15,777	15,777	14,846
29	26	2035		i	931	931				ō	233,210	0.06765	15,777	15,777	14,846
30	27	2036	- 1		931	931				ō	233,210	0.06765	15,777	15,777	14,846
31	28	2037	ĺ	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	ŀ	303	931	1,234				0	233,210	0.06765	15,777	15,777	14,543
35	32	2041	İ		931	931			İ	0	233,210	0.06765	15,777	15,777	14,846
36	33	2042	4,183	ł	931	5,113				,o	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	ŀ	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	Į		931	931				0	233,210	0.06765	15,777	15,777	14,846
42	39	2048	1		931	931			ļ	0	233,210	0.06765	15,777	15,777	14,846
43	40	2049	.		931	931	ľ			. 0	233,210	0.06765	15,777	15,777	14,846
44 45	42	2050 2051			931	931			1	0	233,210	0.06765	15,777	15,777	14,846
46	42	2051			931	931				0	233,210	0.06765	15,777	15,777	14,846
47	44	2052			931	931			ŀ	0	233,210	0.06765	15,777	15,777	14,846
48	45	2053			931 931	931			ļ	0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931 931			ļ	0	233,210	0.06765	15,777	15,777	14,846
50	47	2056			931	931			ļ	Ü	233,210	0.06765	15,777	15,777	14,846
51	48	2057			931	931		İ	-	. 0	233,210 233,210		15,777	15,777 15,777	14,846 14,846
52	49	2058			931	931		-		. 0	233,210		15,777		
53	50	2059	-19,933	-1,010	931	-20,012				0	233,210		15,777 15,777	15,777 15,777	14,846 35,789
221	20(	1	-17,733	-1,010					Ť		الكلشوف	100,00,0	<i>۱۱۱۱</i> وسد	1,7,7,7	ره, دد
т	ОТА		140,668	5,051	45,996	101 715	2,419,179	119 550	o	0			779,630	770 670	507 015
		sente	140,008	3,031	42,990	191,/15	٤,417,1/۶	-110,339	U		l.		119,030	779,630	587,915
i = 1		Some		VP	(Costo):	109,614						VP (R.	eneficia).	111,237	1,623
	-5 70	- 1		41	( Costo) i	10,7,014						1 (D)		V.P.N.	1,623
		- 1						•						T.I.R.E.	10.2%
		- 1												B/C	1.01

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía Costo de construcción

Tasa de descuento:

8%

65.7 MW 38.4 MW 233,210 MWh 100% 128,749 1000US\$ 100%

233,210 128,749

Crédito CO2 (precio CER):

Tarifa Promedia Energía vendible: Costo de energía:

0 US\$/CO2ton

233.2 MWh 67.65 US\$/MWh

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

(....: 4. 4. TEC1000)

		,		COS	TO				D r	NEFIC	110			(unidad	J: US\$1000)
N	o.	AÑO	PROYECT	O EL CHAI		(C)	<del> </del>	CO, CI	REDITO			A DE EN	ERGIA	(B)	(B) - (C)
			Costo de	Línea de	Costo	TOTAL	Beneficio		Precio CER		Energía	Precio	Subtotal	TOTAL	(-) (-)
<u> </u>		<u> </u>	Construce.	Transmisión	O&M	COST	Volumen	<u> </u>	US\$/ton		Vendible	Unitario	<u> </u>	BENEFICIO	
1		2007	28,106	455		28,561				0			0	0	-28,561
2		2008	28,429	1,061		29,489				- Ŏ			ő		-29,489
3		2009	49,524	1,212		50,737				0			0	-	-50,737
4	1 2	2010 2011	19,659	303	388 931	20,350		-2,400		0		0.06765	,		-13,777
5 6	3	2012			931	931 931		-5,760 -5,760		0		0.06765 0.06765		15,777 1 <b>5,77</b> 7	14,846 14,846
7	4	2013			931	931		-5,760		0	233,210	0.06765	15,777		14,846
8	5	2014			931	931		-5,760		0				, ,	14,846
9 10	6 7	2015 2016			931 931	931 931		-5,760 -5,760		0		0.06765 0.06765	15,777 15,777		14,846 14,846
11	8	2017			931	931		-5,760		0	/		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		-5,760		0	233,210		15,777	15,777	14,846
14 15	11 12	2020 2021			931 931	931 931		-5,760 -5,760		0	233,210 233,210	0.06765	15,777 15,777	15,777 15,777	14,846 14,846
16	13	2022			931	931		-5,760		ō	233,210		15,777	15,777	14,846
17	14	2023	İ		931	931	115,199	-5,760		0	233,210	0.06765	15,777	15,777	14,846
18 19	15 16	2024 2025			931 931	931 931	115,199	-5,760 -5,760		0	233,210 233,210	0.06765 0.06765	15,777 15,777	15,777 15,777	14,846 14,846
20	17	2026			931	931	115,199 115,199	-5,760		0		0.06765	15,777	15,777	14,846
21	18	2027	- 1	l	931	931	115,199	-5,760	0.000	o	233,210	0.06765	15,777	15, <b>77</b> 7	14,846
22	19	2028		1	931	931	115,199	-5,760		0	233,210	0.06765	15,777	15,777	14,846
23 24	20 21	2029	ļ		931 931	931 931	115,199 115,199	-5,760 -5,760		0	233,210 233,210	0.06765 0.06765	15,777 15,777	15,777 15,777	14,846 14,846
25	22	2031		i	931	931	67,199	-5,760 -960		0	233,210	0.06765	15,777	15,777	14,846
26	23	2032	ĺ	• [	931	931	'			0	233,210	0.06765	15,777	15,777	14,846
27	24 25	2033			931	931				0	233,210	0.06765	15,777	15,777	14,846
28 29	26	2034			931 931	931 931				0	233,210 233,210	0.06765 0.06765	15,777 15,777	15,777 15,777	14,846 14,846
30	27	2036		1	931	931				ō	233,210	0.06765	15,777	15,777	14,846
31	28	2037		455	931	1,385	1			0	233,210	0.06765	15,777	15,777	14,391
32 33	29 30	2038		1,061 1,212	931 931	1,991 2,143				0	233,210 233,210	0.06765	15,777 15,777	15,777 15,777	13,785 13,634
34	31	2040	}	303	931	1,234	. ]			ő	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			-	아	233,210	0.06765	15,777	15,777	10,663
37 38	34 35	2043	8,075 14,412		931 931	9,005 15,343		1		0). 0	233,210 233,210	0.06765	15,777 15,777	15,777 15,777	6,771 434
39	36	2045	8,213	}	931	9,144	1	i	1	ő	233,210	0.06765	15,777	15,777	6,633
40	37	2046			931	931		1		0	233,210	0.06765	15,777	15,777	14,846
41 42	38 39	2047 2048	-		931 931	931 931				0	233,210 233,210	0.06765	15,777 15,777	15,777 15,777	14,846 14,846
43	40	2049		1	931	931	-	,	- 1	o	233,210	0.06765	15,777	15,777	14,846
44	41	2050	}		931	931			İ	o	233,210	0.06765	15,777	15,777	14,846
45	42	2051			931	931			ŀ	0	233,210	0.06765	15,777	15,777	14,846
46 47	43 44	2052 2053		į	931 931	931 931				0	233,210 233,210	0.06765	15,777 15,777	15,777 15,777	14,846 14,846
48	45	2054	- 1	1	931	931	ĺ	ĺ	ĺ	o	233,210	0.06765	15,777	15,777	14,846
49	46	2055		j	931	931		į	i	0	233,210	0.06765	15,777	15,777	14,846
50 51	47 48	2056 2057			931	931	ļ			0		0.06765	15,777	15,777	14,846 14,846
52	48	2058	}	-	931 931	931 931	1	- 1	- 1	0	233,210 233,210		15,777 15,777	15,777 15,777	14,846
53	50	2059	-19,933	-1,010	931	-20,012					233,210	0.06765	15,777	15,777	35,789
	^ ·	. 1	140.555		45.00	105 -		110					270 cas	770 555	600.000
	OTA r Pres		140,668	5,051	45,996	191,715	2,419,179	-118 <u>,559</u>	0	0			779,630	779,630	587,915
i =				VP	(Costo):	117,125	-					VP (Be		146,448	29,323
														V.P.N.	29,323
														F,I,R.E. B / C	10,2% 1,25
													- }-	.,.	1.43

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

65.7 MW 38.4 MW 233,210 MWh 100% 128,749 1000US\$ 100%

233,210 128,749

233.2 MWh 67.65 US\$/MWh

Tarifa Promedia Energía vendible: Costo de energía:

Tasa de descuento:

6%

Crédito CO2 (precio CER):

0 US\$/CO2ton

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

				cos	ΤO				BE	NEFIC	10			(unidad	: US\$1000
N	o.	AÑO	PROVECT	O EL CHAI		(C)		COCCR	EDITO			A DE EN	FRGIA	(B)	(B) (C)
• • •	٠.	12.0	Costo de		Costo	TOTAL	Beneficio					,			(B) - (C)
		l - i		, ,			Volumen	Costo		Subtotal		Precio	Subtotal		
			Construce.	Transmisión	O&M	COST	volumen		US\$/ton	<u> </u>	Vendible	Unitario		BENEFICIO	
										ĺ					
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			l 0	l o	-50,737
4	1	2010	19,659	303	388	20,350	48,000	-2,400	0.000	. 0	97,171	0.06765	6,574	-	-13,777
5	2	2011	,		931	931	115,199	-5,760		ŏ			15,777		14,846
6	3	2012			931	931		-5,760		ő					
7	4	2013			931	931							15,777		14,846
8	5			1				-5,760		0					14,846
		2014			931	931		-5,760		0			15,777		14,846
9	6	2015	i		931	931		-5,760	0.000	0			15,777		14,846
10	7	2016			931	931	115,199	-5,760	0.000	0			15,777	15,777	14,846
11	8	2017			931	931	115,199	-5,760	0,000	0			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			15,777		14,846
14	11	2020			931	931	115,199	-5,760	0.000	0			15,777		14,846
15	12	2021	i		931	931	115,199	-5,760	0.000	. 0			15,777		14,846
16	13	2022			931	931	115,199	-5,760	0.000	0			15,777		
17	14	2023			931	931	115,199	-5,760	0.000	0			15,777		14,846
18	15	2024								_					14,846
					931	931	115,199	-5,760		0			15,777		14,846
19	16	2025	l	١.	931	931	115,199	-5,760	0.000	0	233,210		15,777		14,846
20	17	2026			931	931	115,199	-5,760	0.000	0	233,210		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	1	ŀ	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		15,777	15,777	14,846
25	22	2031			931	931	67,199	-960	0.000	0	233,210		15,777	15,777	14,846
26	23	2032			931	931	01,222	-500	0.000	0	233,210		15,777		14,846
27	24	2033		i	931	931			1	0,	233,210				
28	25	2034			931	931							15,777		14,846
29	26									0	233,210		15,777	15,777	14,846
		2035	- !		931	931				0	233,210		15,777	15,777	14,846
30	27	2036	!		931	931				0	233,210		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	1	303	931	1,234				0	233,210	0.06765	15,777	15,777	14,543
35	32	2041	i		931	931				0	233,210	0.06765	15,777	15,777	14,846
36	33	2042	4,183	i	931	5,113				Ó	233,210	0.06765	15,777	15,777	10,663
37	34	2043	8,075		931	9,005				Õ	233,210	0.06765	15,777	15,777	6,771
38	35	2044	14,412		931	15,343			i	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	
40	37	2046	0,213		931	931			ì	0					6,633
41	38	2046	!	j							233,210	0.06765	15,777	15,777	14,846
			[	-	931	931	J			0	233,210	0.06765	15,777	15,777	14,846
42	39	2048			931	931	}			. 0	233,210		15,777	15,777	14,846
43	40	2049			931	931			1	. 0	233,210	0.06765	15,777	15,777	14,846
44	41	2050	į	1	931	931			†	0	233,210	0.06765	15,777	15,777	14,846
45	42	2051	- 1	j	931	931				0	233,210	0.06765	15,777	15,777	14,846
46	43	2052	I		931	931				0	233,210	0.06765	15,777	15,777	14,846
47	44	2053	I	•	931	931				0	233,210	0.06765	15,777	15,777	14,846
48	45	2054	I		931	931	1			0	233,210	0.06765	15,777	15,777	14,846
49	46	2055	I		931	931	İ			ő	233,210	0.06765	15,777	15,777	14,846
50	47	2056	I		931	931			- 1	أم					
51			1						1	0	233,210		15,777	15,777	14,846
	48	2057	I		931	931			]	0			15,777		14,846
52	49	2058			931	931			1	0			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
Т	OTA	AL	140,668	5,051	45,996	191.715	2,419,179	-118.559	0	0			779,630	779,630	587,915
		sente	-,		.,	,	, . <u>, . , . , . , . , . , . , . , . , .</u>	- / /					,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	6%			VP	(Costo):	126,861						VP (R	eneficio).	201,498	74,637
	J 70	ı		**	, 2020071							(1)		V.P.N.	74,637
		l													
		- 1												T.I.R.E.	10.2%
														B/C	1.59

Proyecto El Chaparral

Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

65.7 MW

38.4 MW 233,210 MWh 100%

233,210 128,749 1000US\$ 100%

128,749

Crédito CO2 (precio CER):

Tarifa Promedia

Energía vendible:

Costo de energía:

3 US\$/COston

233.2 MWh

67.65 US\$/MWh

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

Tasa de descuento:

10%

(unidad: US\$1000) COSTO BENEFIC 10 No. AÑO PROYECTO EL CHAPARRAL CO2CREDITO VENTA DE ENERGIA (C) (B) (B) - (C)Beneficio Precio CER Subtotal TOTAL Costo de Línea de TOTAL Costo Energía Precio Subtotal Costo Unitario Vendible Construcc, Transmisión O&M COST Volumen US\$/ton BENEFICIO 455 28,106 28,561 -28,561 2008 28,429 1,061 29,489 0 -29,489 3 2009 2010 49,524 1,212 50,737 -50,737 19,659 303 388 20,350 48,000 -2,4000.003 137 97,171 0.06765 6.574 6,710 -13,640 5 115,199 2011 931 931 -5,760 233,210 0.06765 15,777 16,105 0.003 328 15,174 -5,760 233,210 2012 931 931 115,199 0.003 328 0.06765 16,105 15,174 15,777 115,199 -5,760 2013 931 931 0.003 328 233,210 0.06765 15,777 16,105 15,174 8 2014 931 931 115,199 -5,760 0.003 328 233,210 0.06765 15,777 16,105 15,174 2015 931 931 115,199 -5,760 0.003 328 233,210 0.06765 15,777 16,105 15,17 10 2016 931 931 115.199 -5,7600.003 328 233,210 0.06765 15,773 16,105 15,174 2017 931 931 115,199 -5,760 0.003 328 233,210 0.06765 15,77 16,105 15,17 233,210 12 2018 931 93: 115,199 -5,760 0.003 0.06765 15,777 16,105 15,17 13 10 2019 931 931 115,199 -5,760 0.003 328 233,210 0.06765 15,77 16,105 15,174 14 11 2020 931 931 115,199 -5,760 0.003 328 233,210 0.06765 15,777 15,777 16,105 15,17 115,199 15 -5,760 2021 931 931 0.003 233,210 0.06765 12 328 16,105 15.17 931 931 16 931 115,199 -5,760 0.003 328 233,210 15,777 16,105 15,174 13 2022 0.06765 2023 931 115,199 -5,760 0.003 328 233,210 0.06765 15,777 16,105 15,174 2024 18 15 931 931 115,199 -5,760 0.003 328 233,210 0.06765 15,77 16,105 15,174 233,210 233,210 19 16 2025 931 931 115,199 -5,760 0.003 328 0.06765 15,777 16,103 15,174 115,199 20 17 2026 931 931 -5,760 0.003 328 0.06765 15,777 16,105 15,174 -5,760 233,210 15,174 21 18 2027 931 931 115,199 0.003 328 0.06765 15,777 16,105 22 2028 931 93: 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 931 933 115,199 -5,760 0.003 378 233,210 0.06765 15,777 16,105 15,174 25 22 233,210 16,105 931 933 67,199 0.06765 15,777 15.174 2031 -960 0.003 328 23 15,777 26 2032 931 931 233,210 0.06765 15,777 14,84 27 24 233,210 0.06765 15,777 14,846 2033 931 931 15,777 28 25 2034 931 931 233,210 0.06765 15,777 15,777 14,846 29 26 2035 931 931 233,210 0.06765 15,777 15,777 14,84 30 27 931 233,210 15,777 15,777 14.84 2036 931 0.06765 28 15,777 31 2037 455 931 1,385 233,210 0.06765 15,777 14,39 32 29 2038 1,061 931 1,991 233,210 0.06765 15,777 15,777 13,78 33 30 2039 1,212 931 233,210 0.06765 15,77 15,77 13,63 2,143 34 35 36 31 2040 303 931 1,234 233,210 0.06765 15,777 15,777 14,543 15,777 15,777 32 33 2041 931 931 233,210 0.06765 15,777 15,777 14.846 233,210 2042 4.183 933 0.06765 10.663 5.11 37 2043 8,075 931 9,005 233,210 0.06765 15,777 15,77 6,77 38 35 2044 14,412 931 15,343 233,210 0.06765 15,777 15,777 434 15,777 15,777 39 36 37 2045 8,213 931 9,144 233,210 0.06765 15,777 6.633 40 2046 0.06765 15,77 14,846 931 931 233,210 41 38 2047 0.06765 15,777 15,777 14,846 931 931 233,210 42 39 15,777 15,77 14,840 2048 931 931 233,210 0.06765 43 40 2049 931 931 233,210 0.06765 15,777 15,777 14,840 44 45 41 2050 931 931 233,210 0.06765 15,777 15,777 14.840 42 14.846 0.06765 15,777 15.77 2051 931 931 233,210 46 43 0.06765 15,777 14,84 2052 931 931 233,210 15,777 14,846 2053 931 931 233,210 0.06765 15,777 15,777 48 45 2054 931 931 233,210 0.06765 15,777 15,777 14,846 49 46 2055 931 931 233,210 0.06765 15,777 15,777 .14,844 14.846 47 15,777 15,777 50 2056 931 931 233,210 0.06765 51 48 15,777 15,777 2057 931 233,210 14.84 931 0.06765 14,846 52 49 931 233,210 0.06765 15,777 15,777 2058 931 0 -1,010 35,789 2059 -19<u>,9</u>33 -20,012 233,210 0.06765 7,031 TOTAL 140,668 5,051 45,996 191,715 2,419,179 -118,559 779,630 786,663 594,946 Valor Presente 113,270 VP (Beneficio): 3.656 i = 10%VP (Costo): 109.614 V.P.N. 3,656 T.I.R.E. 10.3% 1.03

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

65.7 MW 38.4 MW 233,210 MWh

100% 128,749 1000US\$ 100% 233,210

128,749

Tarifa Promedia Energía vendible: Costo de energía:

233.2 MWh 67.65 US\$/MWh

Tasa de descuento:

10%

Crédito CO2 (precio CER):

5 US\$/CO2ton

V.P.N. 5,011 10.5% T.I.R.E. B / C 1,05

				COS	тΩ		<del>1</del>		RE	NEFIC	10			(unidad	: US\$1000)
No	,	AÑO	PROVECT	O EL CHAP		(C)	<del>                                     </del>	CO-CP	EDITO		<del>,</del>	A DE ENI	EDGI A	(B)	(B) (C)
144	<i>J</i> .	710	Costo de	Línea de	Costo	TOTAL	Beneficio	·			-			(B) TOTAL	(B) - (C)
				Transmisión		COST	Volumen	Costo	Precio CER US\$/ton	Subiotai	Energía Vandible	Precio Unitario	Subtotal	BENEFICIO	
			Construct,	1 I ansinision	ORM		Volumen	-	033/1011		vendible	Onitario	<u> </u>	BENEFICIO	
1		2007	20 100	455		20 561	1						_	ا ا	20.56
2		2007	28,106	455		28,561	1			0			0		-28,561
3		2008	28,429	1,061		29,489			i	0			0		-29,489
4	- 1	2009 2010	49,524	1,212	200	50,737	40 000	2 (00	0.005	0		0.0000	0		-50,731
5	1 2	2010	19,659	303	388	20,350		-2,400			97,171	0.06765			-13,549
6	3	2011			931	931	115,199	-5,760		547	233,210				15,393
7	4	1			931	931		-5,760		547					15,393
8	5	2013			931	931	115,199	-5,760		547			15,777		15,393
		2014			931	931	115,199	-5,760		547	233,210		15,777		15,393
9	6	2015			931	931	115,199	-5,760		547			15,777		15,393
10	7	2016			931	931	115,199	-5,760		547	233,210		15,777		15,393
11	8	2017			931	931	115,199	-5,760		547	233,210		15,777		15,393
12	9	2018			931	931	115,199	-5,760	0.005	547	233,210		15,777		15,393
13	10	2019			931	931	115,199	-5,760	0.005	547	233,210		15,777		15,393
14	11	2020			931	931	115,199	-5,760	0.005	547	233,210		15,777		15,393
15	12	2021			931	931	115,199	-5,760	0.005	547	233,210		15,777		15,393
16	13	2022			931	931	115,199	-5,760	0.005	547	233,210		15,777		15,393
17	14	2023			931	931	115,199	-5,760	0.005	547	233,210		15,777		15,393
18	15	2024		:	931	931	115,199	-5,760	0.005	547	233,210		15,777		15,393
19	16	2025			931	931	115,199	-5,760	0.005	547	233,210		15,777	16,324	15,393
20	17	2026			931	931	115,199	-5,760	0.005	547	233,210		15,777	16,324	15,393
21	18	2027			931	931	115,199	-5,760	0.005	547	233,210		15,777		15,393
22	19	2028			931	931	115,199	-5,760	0.005	547	233,210		15,777		15,393
23	20	2029			931	931	115,199	-5,760		547	233,210	0.06765	15,777	16,324	15,393
24	21	2030	.	Į.	931	931	115,199	-5,760		547	233,210		15,777		15,393
25	22	2031			931	931	67,199	-960	0.005	547	233,210		15,777	16,324	15,393
26	23	2032		İ	931	931				0	233,210		15,777	15,777	14,846
27	24	2033	į	į	931	931				0	233,210		15,777	15,777	14,846
28	25	2034			931	931				0	233,210		. 15,777		14,846
29	26	2035	f		931	931				. 0	233,210		15,777		14,846
30	27	2036	-	455	931	931				0	233,210		15,777		14,846
31	28	2037		455	931	1,385	1			0	233,210		15,777	15,777	14,391
32	29	2038		1,061	931	1,991				0	233,210		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	i	303	931	1,234				0	233,210	0.06765	15,777	15,777	14,543
35	32	2041	4 102		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	ļ	931	15,343				0	233,210	0.06765	15,777	15,777	434
39	36 37	2045	8,213	[	931	9,144				0	233,210	0.06765	15,777	15,777	6,633
40		2046		-	931	931				0	233,210	0.06765	15,777	15,777	14,846
41	38 39	2047	1		931	931				0	233,210		15,777	15,777	14,846
42		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		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		0.06765	15,777	15,777	14,846
51	48	2057			931	931		l		0	,		15,777	15,777	14,846
52	49	2058			931	931				0		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
_									_						
_	OT.	<del></del>	140,668	5,051	45,996	191,715	2,419,179	-118,559	0	11,719			779,630	791,349	599,634
		sente				***						-			
i = 1	10%			VP	(Costo):	109,614						VP (B		114,625	5,011
														V.P.N.	5,011
														T.I.R.E.	10.5%
		- 1												B/C	1.03

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

Tasa de descuento:

65.7 MW 38.4 MW 233,210 MWh 100%

233,210

128,749

128,749 1000US\$ 100%

233.2 MWh

Tarifa Promedia Energía vendible: Costo de energía:

67.65 US\$/MWh

Crédito CO<sub>2</sub> (precio CER):

10 US\$/CO2ton

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

_					= .					Transia			<u> </u>	(unidad	: US\$1000
<b>k</b> 1	ro.	AÑO	ppost	COS		<b>/</b> ^	<del> </del>	<u> </u>	EDITO	NEFIC		A DE EN	ED CY A	(B)	/B) /m
IN	lo.	ANO		O EL CHA		(C)								(B)	(B) - (C)
		'	Costo de	Linea de	Costo	TOTAL COST	Beneficio Volumen		Precio CER				Subtotal		
		<del> </del> -	Construce,	Transmisiór	O&M	C031	Volumen		US\$/ton	!	Vendible	Unitario	1	BENEFICIO	
٠,		2002	20 104	456		20.561				_					20.00
1		2007	28,106			28,561				0			0		-28,56
2		2008	28,429		}	29,489				0			0		-29,489
3 4		2009	49,524			50,737		- 400	0.010			0.0000	_		-50,73
5	1	2010 2011	19,659	303	388 931	20,350 931		-2,400		456 1,094		0.06765 0.06765			
	2 3	2011			931	931		-5,760		1,094					15,940 15,940
6 7	4	2012			931	931		-5,760 5,760	0.010	1,094					15,940
8	- T	2014			931	931		-5,760 -5,760							15,940
أو	5 6	2015		ľ	931	931		-5,760	0.010	1,094					15,940
10	7	2016			931	931		-5,760	0.010	1,094	233,210	0.06765		16,871	15,940
11	8	2017			931	931		-5,760	0.010	1,094		0.06765			15,940
12	9	2018		İ	931	931		-5,760	0.010	1,094	233,210			16,871	15,940
13	10	2019		,	931	931		-5,760	0.010	1,094	233,210			16,871	15,940
14	11	2020			931	931		-5,760	0.010	1,094	233,210				15,940
15	12	2021			931	931		-5,760	0.010	1,094	233,210			16,871	15,940
16	13	2022			931	931		-5,760	0.010	1,094	233,210				15,940
17	14	2023	ļ		931	931		-5,760	0.010	1,094					15,940
18	15	2024	ļ		931	931		-5,760	0.010	1,094	233,210	0.06765		16,871	15,940
19	16	2025			931	931		-5,760	0.010	1,094	233,210	0.06765		16,871	15,940
20	17	2026		+	931	931		-5,760	0.010	1,094	233,210	0.06765		16,871	15,940
21	18	2027			931	931	115,199	-5,760	0.010	1,094	233,210	0.06765		16,871	15,940
22	19	2028		ĺ	931	931		-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		16,871	15,940
26	23	2032	ľ	1	931	931	· .		ł	o	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		Ì	931	931			1	. 0	233,210	0.06765	15,777	15,777	14,846
29	26	2035			931	931			ŀ	0	233,210	0.06765	15,77 <b>7</b>	15,777	14,846
30	27	2036	1	1	931	931	1	- /	ĺ	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		1	ļ	0	233,210	0.06765	15,777	15,777	13,785
33	30	2039		1,212	931	2,143			Ì	0	233,210	0.06765	15,777	15,777	13,634
34	31	2040	1	303	931	1,234	ļ	1	Į	0	233,210	0.06765	15,777	15,777	14,543
35	32	2041		i	931	931		. 1		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	į			0]	233,210	0.06765	15,777	15,777	6,771
38	35	2044	14,412	.	931	15,343	.		1	0	233,210	0.06765	15,777	15,777	434
39	36	2045	8,213		931	9,144		[	ĺ	6	233,210	0.06765	15,777	15,777	6,633
40 41	37 38	2046	}		931	931	1			0 0	233,210	0.06765	15,777	15,777	14,846
42	39	2047 2048			931	931 931	1			0	233,210	0.06765	15,777	15,777	14,846
43	40	2048	ŀ		931 931	931				0	233,210 233,210	0.06765	15,777 15,777	15,777 15,777	14,846 14,846
44	41	2049	ļ	1	931	931	1	ľ	- 1	ol	233,210	0.06765		15,777	14,846
45	42	2051	ļ		931	931	]		- 1	0	233,210	0.06765	15,777 15,777	15,777	14,846
46	43	2052			931	931	1		1	0	233,210	0.06765	15,777	15,777	14,846
47	44	2053			931	931	1		-	o	233,210	0.06765	15,777	15,777	14,846
48	45	2054	ł	. }	931	931	1		1	0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931			1	o	233,210	0.06765	15,777	15,777	14,846
50	47	2056		1	931	931				o	233,210		15,777	15,777	14,846
51	48	2057			931	931	-		.	ŏ	233,210	0.06765	15,777	15,777	14,846
52	49	2058	1	.	931	931	ļ	J		ő	233,210	0.06765	15,777	15,777	14,846
53	50	2059	-19,933	-1,010	931	-20,012		!		ŏ	233,210	0.06765	15,777	15,777	35,789
<u> </u>		20031	12,,200	-1,010	- / / /	120,012	<del></del>			<del></del>	233,210	9,00705			33,733
	OTA		140,668	5,051	45,996	191,715	2,419,179	118,559	0	23,438			779,630	803,068	611,353
Valo i = 1	r Pres	sente		VP	(Costo):	109,614						VP (Be	neficio):	118,013	8,399
•						,								V.P.N.	8,399
														LIRE.	10.8%
		- 1				ŀ								B/C	1,08

Costo de construcción

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía

Tasa de descuento;

65.7 MW 38.4 MW 209,889 MWh

10%

90%

233,210 128,749

Tarifa Promedia Energía vendible:

Costo de energía:

233,2 MWh 67,65 US\$/MWh

128,749 1000US\$ 100%

Crédito CO2 (precio CER):

0 US\$/CO2ton

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

				COS	то				ВЕ	NEFIC	10			(unidad	l: US\$1000
N	o.	AŃO	PROYECT	O EL CHA	PARRAL	(C)		CO2CF	EDITO	)	VENT	A DE ENI	ERGIA	(B)	(B) - (C)
			Costo de	Línea de Transmisión	Costo O&M	TOTAL	Beneficio Volumen	Costo	Precio CER US\$/ton	Subtotal	Energía Vendible	Precio Unitario	Subtotal	TOTAL	
	<del></del> -	<del>1</del>	Construct.	Tansmision	OæM	- 031	Volumen	<u> </u>	USA/ton	! , - <u></u>	vendible	Unitario		BENEFICIO	
1		2007	28,106	455		28,561	1			0			0	o	-28,56
2		2008	28,429	1,061		29,489				0			0		-29,48
3		2009	49,524	1,212		50,737				0			0	0	-50,73
4	1	2010	19,659	303	388	20,350					87,454	0.06765	5,916		-14,43
5	2	2011			931	931		-5,760			209,889	0.06765	14,199	14,199	13,26
6 7	3 4	2012			931	931					209,889	0.06765	14,199	14,199	13,26
8	5	2013 2014			931 931	931 931		-5,760 -5,760			209,889 209,889	0.06765 0.06765	14,199 14,199	14,199 14,199	13,26
او	6	2015			931	931		-5,760		ŏ	209,889	0.06765	14,199	14,199	13,26 13,26
10	7	2016			931	931		-5,760		ŏ	209,889	0.06765	14,199	14,199	13,26
11	8	2017			931	931		-5,760			209,889	0.06765	14,199	14,199	13,26
12	9	2018			931	931		-5,760			209,889	0.06765	14,199	14,199	13,26
13	10	2019			931	. 931		-5,760		0	209,889	0.06765	14,199	14,199	13,26
14	11	2020			931	931		-5,760		0	209,889	0.06765	14,199	14,199	13,26
15	12	2021 2022			931	931		-5,760		0	209,889	0.06765	14,199	14,199	13,26
16 17	13 14	2022			931 931	931 931	115,199 115,199	-5,760		0	209,889 209,889	0.06765 0.06765	14,199	14,199	13,26
18	15	2024			931	931		-5,760 -5,760			209,889	0.06765	14,199 14,199	14,199 14,199	13,26 13,26
19	16	2025			931	931		-5,760		ő	209,889	0.06765	14,199	14,199	13,26
20	17	2026			931	931		-5,760			209,889	0.06765	14,199	14,199	13,26
21	18	2027			931	931	115,199	-5,760		0	209,889	0.06765	14,199	14,199	13,26
22	19	2028			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,26
23	20	2029			931	931	115,199	-5,760		. 0	209,889	0.06765	14,199	14,199	13,26
24	21	2030			931	931	115,199	-5,760		0	209,889	0.06765	14,199	14,199	13,26
25 26	22 23	2031			931 931	931 931	67,199	-960	0.000	0	209,889 209,889	0.06765 0.06765	14,199	14,199	13,26
27	24	2033			931	931				0	209,889	0.06765	14,199 14,199	14,199 14,199	13,26 13,26
28	25	2034			931	931			İ	o	209,889	0.06765	14,199	14,199	13,26
29	26	2035		j	931	931				0	209,889	0.06765	14,199	14,199	13,26
30	27	2036			931	931				. 0	209,889	0.06765	14,199	14,199	13,26
31	28	2037		455	931	1,385				0	209,889	0.06765	14,199	14,199	12,81
32	29	2038		1,061	931	1,991				0	209,889	0.06765	14,199	14,199	12,20
33 34	30 31	2039 2040		1,212. 303	931 931	2,143 1,234				0	209,889	0.06765	14,199	14,199	12,05
35	32	2041		202	931	931				ő	209,889 209,889	0.06765 0.06765	14,199 14,199	14,199 14,199	12,96 13,26
36	33	2042	4,183		931	5,113		1		ŏ	209,889	0.06765	14,199	14,199	9,08
37	34	2043	8,075		931	9,005				Ŏ	209,889	0.06765	14,199	14,199	5,19
38	35	2044	14,412		931	15,343				Ò	209,889	0.06765	14,199	14,199	-1,14
39	36	2045	8,213		931	9,144				. 0	209,889	0.06765	14,199	14,199	5,05
40	37	2046			931	931				0	209,889	0.06765	14,199	14,199	13,26
41 42	38 39	2047 2048	1		931 931	931 931		İ		0	209,889	0.06765	14,199	14,199	13,26
43	40	2049			931	931				0	209,889 209,889	0.06765	14,199 14,199	14,199 14,199	13,26 13,26
44	41	2050		i	931	931				o	209,889	0.06765	14,199	14,199	13,26
45	42	2051			931	931				ő	209,889	0.06765	14,199	14,199	13,26
46	43	2052			931	931				0	209,889	0.06765	14,199	14,199	13,26
47	44	2053		j	931	931				0	209,889	0.06765	14,199	14,199	13,26
48	45	2054			931	931				0	209,889	0.06765	14,199	14,199	13,26
49 50	46	2055			931	931				0	209,889	0.06765	14,199	14,199	13,26
51	47 48	2056			931 931	931 931				0	209,889	0.06765 0.06765	14,199 14,199	14,199 14,199	13,26 13,26
52	49	2058		1	931	931				ő	209,889	0.06765	14,199	14,199	13,26
53	50	2059	-19,933	-1,010	931	-20,012				ŏ	209,889	0.06765	14,199	14,199	34,21
т	ОТА	AT.	140,668	5,051	45,996	191 715	2,419,179	-118 559	0	0			701,667	701,667	509,95
Valo	r Pres		2.2,000				-, :+-,+-/   - 			<u> </u>					
i = 1	10%			VP	(Costo):	109,614						VP (B	eneficio):	100,113	-9,50
						.								V.P.N. T.I.R.E.	-9,501 9.1%

65.7 MW 38.4 MW

Tarifa Promedia Energía vendible: Costo de energía:

233.2 MWh 67.65 US\$/MWh

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía Costo de construcción

233,210 MWh 100% 141,624 1000US\$ 110% 233,210 128,749

Crédito CO2 (precio CER): 0 US\$/CO2ton V.P.N. T.I.R.E. B/C -8,682 9.3% 0.93

10% Tasa de descuento:

_				cos	т о		<del> </del>	·	n r	NEFIC	110			(unidad	i: US\$1000
N		AÑO	DROVECT	O EL CHAI		(C)	<del> </del>	CO. CE	EDITO			A DE EN	EDCIA	(B)	(B) (C)
	υ.	12.0	Costo de	Linea de	Costo	TOTAL	Beneficio		Precio CER			Precio	Subtotal	- ' '	(B) - (C)
				Transmisión		COST	Volumen		US\$/ton	Subtotal		Unitario		BENEFICIO	
		<del></del>	Constituce.	I Tansinision	OCM	C031	Volumen		U33/10II	<del>                                     </del>	Vendidie	TOIlliano	<del>   </del>	BENEFICIO	
٠,		2007	30.017	600		21.41	,		i					ا ا	71 446
1 2		2007	30,917	500 1,167	·	31,417			i	0			0		
			31,272			32,43				0			0		-32,438
3		2009	54,477	1,333	200	55,810		0.400	0.000	0		0.000	0		-55,810
5	1 2	2010 2011	21,625	333	388 931	22,346		-2,400							-15,773
6	3	2011			931	931		-5,760	0.000						14,846
7	4				931	931 931			0.000		,				14,846
8	5				931	931		-5,760	0.000		,				14,846
9	6	2015	·	i 1	931	931		-5,760		Ö					14,846
10	7	2016			931	931		-5,760 -5,760	0.000	0		0.06765		15,777	14,846 14,846
11	8	2017		i	931	931		-5,760		Ö				15,777 15,777	14,846
12	9	2018			931	931		-5,760	0.000	ő				15,777	14,846
13	10	2019	i	ľ	931	931		-5,760	0.000	0					14,846
14	11	2020			931	931		-5,760	0.000	ő				15,777	14,846
15	12	2021			931	931		-5,760	0.000	0				15,777	14,846
16	13	2022			931	931		-5,760	0.000	0					14,846
17	14	2023	}	,	931	931		-5,760	0.000	0	233,210				14,846
18	15	2024		ļ	931	931		-5,760 -5,760	0.000	0	233,210				14,846
19	16	2025			931	931		-5,760	0.000	0	233,210		,		14,846
20	17	2026	1		931	931		-5,760	0.000	ŏ	233,210			15,777	14,846
21	18	2027			931	. 931		-5,760	0.000	ŏ	233,210				14,846
22	19	2028	[	1	931	931		-5,760	0.000	ŏ	233,210			15,777	14,846
23	20	2029		j	931	931	115,199	-5,760	0.000	ŏ	233,210		15,777	15,777	14,846
24	21	2030		1	931	931		-5,760	0.000	ō	233,210		15,777	15,777	14,846
25	22	2031		1	931	931	67,199	-960	0.000	ō	233,210		15,777	15,777	14,846
26	23	2032		1	931	931	(,		2.400	Ō	233,210		15,777	15,777	14,846
27	24	2033		1	931	931				ō	233,210		15,777	15,777	14,846
28	25	2034			931	931				Ó	233,210		15,777	15,777	14,846
29	26	2035		,	931	931				ō	233,210		15,777	15,777	14,846
30	27	2036	}	j	931	931			1	0	233,210		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	J	333	931	1,264	J J			û	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	1	931	5,532			ŀ	0	233,210	0.06765	15,777	15,777	10,245
37	34	2043	8,882		931	9,813			ŀ	0	233,210	0.06765	15,777	15,777	5,964
38	35	2044	15,854		931	16,784		j		0	233,210	0.06765	15,777	15,777	-1,008
39	36	2045	9,034	1	931	9,965		- (	- 1	0	233,210	0.06765	15,777	15,777	5,812
40	37	2046	ŀ		931	931		1		0	233,210	0.06765	15,777	15,777	14,846
41	38	2047			931	931		- 1		o]	233,210	0.06765	15,777	15,777	14,846
42	39	2048	1		931	931		1	j	. 0	233,210	0.06765	15,777	15,777	14,846
43	40	2049	1		931	931	' }	• 1	ł	0	233,210	0.06765	15,777	15,777	14,846
44	41	2050	1		931	931		1	-	0	233,210	0.06765	15,777	15,777	14,846
45	42	2051	ŀ		931	931				0	233,210	0.06765	15,777	15,777	14,846
46	43	2052			931	931	1	1	1	0	233,210	0.06765	15,777	15,777	14,846
47	44	2053			931	931	- 1	ļ	ļ	0	233,210	0.06765	15,777	15,777	14,846
48	45	2054			931	931	- 1			0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931	1			0	233,210	0.06765	15,777	15,777	14,846
50	47	2056			931	931				0	233,210		15,777	15,777	14,846
51	48	2057	}		931	931		ļ		0	233,210		15,777	15,777	14,846
52 <b>[</b>	49	2058			931	931	1	- 1	- 1	O/	233,210		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
		T							1		$\Box$				
	TA		154,735	5,556	45,996	206,287	2,419,179	118,559	0	0			779,630	779,630	573,343
	Pres	ente													
i ≈ 1	0%	- 1		VP	(Costo):	119,919						VP (Be	eneficio):_		-8,682
		1												V.P.N.	-8,682
														rare.	9.3%
		1											])	B/C	0.93

Costo de construcción

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía

10%

65.7 MW 38.4 MW 209,889 MWh 141,624 1000US\$ 110%

233,210 128,749

Tasa de descuento:

Tarifa Promedia Energía vendible: Costo de energía:

233,2 MWh 67.65 US\$/MWh

Crédito CO2 (precio CER): 0 US\$/CO2ton

-19,806 8,3% V.P.N. T.I.R.E. B / C 0.83

	_		i	COS	т О					NEFIC	10			(unidad	: US\$1000
No	,	AÑO	PROVECT	O EL CHAP		(C)		CO. CR	EDITO			A DE EN	FDCIA	(B)	(B) (C)
	"	71.10	Costo de	Línea de	Costo	TOTAL	Beneficio		Precio CER		Energía	Precio	Subtotal	TOTAL	(B) - (C)
	Ì	i		Transmisión		COST	Volumen	Costo	US\$/ton	Subtotal	Vendible		Subtotat	BENEFICIO	
1.				1	_ ~~~		i voiamen		000/101		VOLGLOID	Cintano	!	DEIVERSCIO	
1		2007	30,917	500		31,417				0		İ	0	o	-31,417
2		2008	31,272	1,167		32,438				ő			0		-32,438
3		2009	54,477	1,333		55,810				ő		ŀ	0		-55,810
4	1	2010	21,625	333	388	22,346		-2,400	0,000	ŏ	87,454	0,06765			-16,430
5	2	2011	21,023		931	931		-5,760	0.000	ő	209,889				13,26
6	3	2012			931	931	115,199	-5,760		ŏ	209,889				13,26
7	4	2013			931	931	115,199	-5,760	0.000	ŏ	209,889		14,199		13,26
8	5	2014			931	931		-5,760		Ö	209,889				13,26
9	6	2015			931	931	115,199	-5,760		Ō	209,889		14,199		13,26
10	7	2016			931	931	115,199	-5,760		ő	209,889	0.06765	14,199		13,26
11	8	2017			931	931		-5,760	000.0	Ŏ	209,889	0.06765			13,26
12	9	2018		1	931	931	115,199	-5,760	0.000	ō	209,889	0.06765	14,199		13,26
13	10	2019			931	931		-5,760	0.000	0	209,889		14,199		13,26
14	11	2020			931	931		-5,760	0.000	0			14,199		13,26
15	12	2021			931	931	115,199	-5,760	0.000	0	,	0.06765	14,199		13,26
16	13	2022			931	931	115,199	-5,760	0.000	Ö		0.06765	14,199		13,26
17	14	2023			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199		13,26
18	15	2024			931	931	115,199	-5,760		0	209,889	0.06765	14,199		13,26
19	16	2025			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199		13,26
20	17	2026			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,26
21	18]	2027			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199	14,199	13,26
22	19	2028			931	931	115,199	-5,760	0,000	0	209,889	0.06765	14,199	14,199	13,26
23	20	2029			931	931	115,199	-5,760	0.000	0	209,889	0.06765	14,199		13,26
24	21	2030		•	931	931	115,199	-5,760	0.000	. 0	209,889	0.06765	14,199	14.199	13,26
25	22	2031		:	931	931	67,199	-960	0.000	0	209,889	0.06765	14,199	14,199	13,26
26	23	2032	•		931	931				0	209,889	0.06765	14,199	14,199	13,26
27	24	2033			931	931				0	209,889	0.06765	14,199	14,199	13,26
28	25	2034		i	931	931				0	209,889	0.06765	14,199	14,199	13,26
29	26	2035			931	931				0	209,889	0.06765	14,199	14,199	13,26
30	27	2036			931	931				0	209,889	0.06765	14,199	14,199	13,26
31	28	2037		500	931	1,431				0	209,889	0.06765	14,199		12,76
32	29	2038		1,167	931	2,098				.0	209,889	0.06765	14,199		12,10
33	30	2039		1,333	931	2,264			1	0	209,889	0.06765	14,199		11,93
34	31	2040		333	931	1,264				0	209,889	0.06765	14,199	14,199	12,93
35	32	2041			931	931				0	209,889	0.06765	. 14,199	14,199	13,26
36	33	2042	4,601		931	5,532				0	209,889	0.06765	14,199		8,66
37	34	2043	8,882		931	9,813				0	209,889	0.06765	14,199	14,199	4,38
38	35	2044	15,854		931	16,784				0	209,889	0.06765	14,199		-2,58
39	36	2045	9,034	1	931	9,965				0	209,889	0.06765	14,199		4,23
40	37	2046		j	931	931				0	209,889	0.06765	14,199		13,26
41	38 39	2047			931	931				0	209,889	0.06765	14,199	14,199	13,26
42	39 40	2048 2049		1	931	931				0	209,889	0.06765	14,199	14,199	13,26
43 44	41	2049			931 931	931				0	209,889	0.06765	14,199	14,199	13,26
45	42	2051		l	931	931 931				0	209,889	0.06765 0.06765	14,199	14,199	13,26
46	42	2051		į	931						209,889		14,199	14,199	13,26
47	44	2052		Į	931	931 931				0	209,889	0.06765 0.06765	14,199	14,199	13,26
48	45	2054			931	931				0	209,889 209,889	0.06765	14,199	14,199	13,26
48	46	2054		[	931	931				0			14,199	14,199	13,26
	- 1							i		0	209,889	0.06765	14,199	14,199	13,26
50 51	47 48	2056 2057		ŀ	931 931	931 931				0	209,889 209,889		14,199 14,199	14,199 14,199	13,26 13,26
52	49	2058		İ	931	931		į		0	209,889		14,199	14,199	13,26
53	50	2059	-21,926	-1,111	931	-22,107				0	209,889		14,199	14,199	36,30
ادد	201	الادات	-21,920	-1,111	931				1	٧	407,009	0.00703	<u> </u>	1 27,129	
Tr.	0 7 1	<sub>А.Т.</sub>	154 775	2 222	45,996	206 202	2 410 170	110 550	o	0	1		701,667	701 667	495,38
	OT/	sente	154,735	5,556	43,990	200,287	2,419,179	-110,539	01	<u>0</u>			/01,00/	701,667	493,38
i = 1		30116		VP	(Costo):	119,919						VP (R	eneficia)•	100,113	-19,80
, <del>-</del> J	0 70	1		٧ſ	(Costo):	117,717						7 I (D		V.P.N.	-19,80
														T.I.R.E.	8,3%
														B/C	0.8

Proyecto El Chaparral

Costo de construcción

Capacidad instalada Capacidad dependable Generacion de energía 65.7 MW

38.4 MW 256,531 MWh

110% 233,210 128,749 1000US\$ 100%

Tarifa Promedia Energía vendíble:

233.2 MWh

Costo de energía:

67.65 US\$/MWh

Tasa de descuento:

10%

128,749

Crédito CO2 (precio CER): 0 US\$/COston

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

B/C

(unidad: US\$1000) COSTO BENEFICIO CO2 CREDITO VENTA DE ENERGIA No. ΑÑΩ PROYECTO EL CHAPARRAL (C) (B) (B) - (C)Costo de Línea de TOTAL Beneficio Costo Precio CER Subtotal Energía Precio Subtotal TOTAL O&M US\$/ton Construcc Transmisión COST Volumer Vendible Unitario BENEFICIO 28,106 455 28,563 -28,563 2007 2 2008 28,429 1,061 29,489 0 -29,489 -50,737 2009 49,524 1,212 50,737 2010 19,659 303 388 20,350 48,000 -2,400 0.000 106,888 0.06765 7,231 7,231 -13,119 17,354 17,354 2011 931 931 115,199 -5,760 0.000 256,531 0.06765 17,354 16,424 17,354 2012 931 93. 115,199 -5,7600.000256,531 0.06765 16,424 17,354 17,354 2013 931 931 115,199 -5.7600.000 256,531 0.06765 16,424 17,354 2014 931 931 115,199 -5,760 256,531 0.06765 17,354 16,424 0.000 2015 931 931 115,199 -5,760 0.000 256,531 0.06765 17,354 17,354 16,424 10 2016 931 931 115,199 -5,760 0.000 256,531 0.06765 17,354 17,354 17,354 16,424 17.354 11 2017 931 931 115,199 -5,760 0.000 256,531 0.06765 16.424 256,531 17,354 17,354 16,424 931 115,199 0.06765 931 -5.7600.000 12 2018 17,354 17,354 13 10 2019 931 931 115,199 -5,760 0.000 256,531 0.06765 16,424 115,199 -5,760 0.000 256,531 0.06765 17,354 17,354 16,424 2020 931 17,354 17,354 17,354 17,354 15 12 2021 931 931 115,199 -5,760 0.000 256,531 0.06765 16,424 256,531 0.06765 16,42 16 13 2022 931 931 115,199 -5,760 0.000 256,531 0.06765 17,354 17,354 16,424 17 14 2023 931 931 115,199 -5,760 0.000 17,354 17,354 16,424 18 15 2024 931 931 115,199 -5,760 0.000 256,531 0.06765 16 2025 931 933 115,199 -5,760 0.000 256,531 0,06765 17,354 17,354 16,424 20 17 2026 931 931 115,199 -5,760 0.000 256,531 0.06765 17,354 17,354 16,42 17,354 17,354 17,354 16.424 21 18 2027 931 931 115,199 -5,760 0.000 n 256,531 0.06765 17,354 16,424 256,531 0.06765 931 115,199 -5,760 0.000 22 19 2028 931 23 931 -5,760 0.000 256,531 0,06765 17,354 17,35 16,42 20 2029 931 115,199 24 256,531 0,06765 17,354 17,354 16,424 21 2030 931 931 115,199 -5,760 0.000 17,354 17,354 25 22 2031 931 931 67,199 0.000 256,531 0,06765 17,354 16,424 23 24 17,354 16.424 26 27 2032 931 931 oſ 256,531 0.06765 17,354 17,354 16,424 256,531 0.06765 2033 931 931 28 25 17,354 17,354 2034 931 931 256,531 0.06765 16,424 29 26 2035 931 931 256,531 0.06765 17,354 17,354 16,424 30 27 2036 931 931 256,531 0.06765 17,354 17,354 16,424 17,354 17,354 15.969 31 28 2037 455 931 1.385 256,531 0.06765 256,531 17,354 17,354 32 33 29 0.06765 15,363 2038 1.061 931 1,991 30 17,35 256,531 0.06765 17,354 15,21 1,212 931 2039 2.143 256,531 34 31 0.06765 17,354 17,354 16,121 2040 931 1,234 35 32 931 931 256,531 0.06765 17,354 17,354 17,354 16,424 2041 36 37 38 33 34 2042 4,183 931 5.113 256,531 0.06765 17.354 12.24 17,354 17,354 8,349 256,531 0.06765 2043 8.075 931 9,005 35 2044 14,412 931 15,343 256,531 0.06765 17,354 17,354 2,01 39 36 17,354 17,354 8,21 2045 8,213 931 9,144 256,531 0.06765 40 37 2046 931 931 256,531 0.06765 17,354 17,354 16,424 17,354 17,354 41 38 39 2047 931 931 256.531 0.06765 17,354 16.424 256,531 17,354 16,424 0.06765 42 2048 931 931 43 17,354 17,354 40 256,531 0.06765 16,424 2049 931 931 44 45 256,531 0.06765 17,354 17,354 16,424 41 2050 931 931 17,354 17,354 42 2051 931 931 256,531 0.06765 17,354 16,424 46 47 43 44 2052 931 931 n 256,531 0.06765 17,354 16.424 17,354 256,531 17,354 16,424 2053 931 931 0.06765 48 45 256,531 0.06765 17,35 17,354 16,424 931 2054 931 49 256,531 17,354 17,354 16,424 46 2055 931 931 0.06765 50 47 2056 931 256,531 0.06765 17,354 17,354 16,424 51 48 2057 931 931 0 256,531 0.06765 17,354 17,354 16.424 17,354 17,354 16,424 52 49 2058 931 931 256,531 0.06765 17.354 17,354 50 2059 -19.933 -1.010 931 -20.013 256,531 0.06765 37,367 140,668 45,996 191,715 2,419,179 -118,559 857,593 857,593 665,878 TOTAL 5,051 Valor Presente VP (Beneficio): 12 747 i = 10%VP (Costo): 109,614 V.P.N. 12,747 T.I.R.E. 11.2%

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

65.7 MW 38.4 MW 233,210 MWh

100%

233,210 128,749

115,874 1000US\$ 90%

Tasa de descuento: 10% Tarifa Promedia

Energía vendible: Costo de energía:

233.2 MWh

67.65 US\$/MWh

Crédito CO<sub>2</sub> (precio CER):

0 US\$/CO2ton

11.928 11.2% V.P.N. T.I.R.E. 1,12

				000	T 0									(unidad	l: US\$1000)
. ът	.	AÑO	DD ON THE	COS		- (60	-	<u> </u>		NEFIC	<del>, </del>				
N	0.	AÑO		O EL CHAP		(C)			EDITO			A DE EN	,	(B)	(B) - (C)
			Costo de	Línea de	Costo	TOTAL	Beneficio	Costo		Subtotal		Precio	Subtotal	TOTAL	
			Construcc.	Transmisión	O&M	COST	Volumen		US\$/ton	[	Vendible	Unitario	ļ	BENEFICIO	
							1					·			
1		2007	25,296			25,705				0	1		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			i o	l o	-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		-5,760		. 0			15,777		14,846
6	3	2012			931	931		-5,760		0			15,777		14,846
7	4	2013			931	931		-5,760		0			15,777		14,846
8	5	2014			931	931	115,199	-5,760		ō			15,777	15,777	14,846
9	6	2015			931	931		-5,760		ō	,		15,777	15,777	14,846
10	7	2016			931	931	115,199	-5,760		ő			15,777	15,777	14,846
11	8	2017		!	931	931	115,199	-5,760		ŏ			15,777	15,777	14,846
12	او	2018		ŀ	931	931	115,199	-5,760	0.000	ŏ					
13	10	2019		. ]	931	931	115,199	-5,760		ő			15,777	15,777	14,846
14	11	2020		l	931	931				0			15,777		14,846
15	12	2021			931	931	115,199 115,199	-5,760 -5,760		. 0			15,777	15,777	14,846
16	13	2022	-		931	931					,		15,777	15,777	14,846
17	14	2022	.				115,199	-5,760		0			15,777	15,777	14,846
18	15	2023		Į.	931	931	115,199	-5,760	0.000	0	233,210		15,777	15,777	14,846
				f	931	931	115,199	-5,760	0.000	0	233,210		15,777	15,777	14,846
19	16	2025	į		931	931	115,199	-5,760	0.000	0	233,210		15,777	15,777	14,846
20	17	2026			931	931	115,199	-5,760	0.000	0	233,210		15,777	15,777	14,846
21	18	2027		- 1	931	931	115,199	-5,760	0.000	0	233,210		15,777	15,777	14,846
22	19	2028		i	931	931	115,199	-5,760	0.000	. 0	233,210		15,777	15,777	14,846
23	20	2029	1		931	931	115,199	-5,760	0.000	0	233,210	0.06765	15,777	15,777	14,846
24	21	2030	1	ļ	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	İ			0	233,210	0.06765	15,777	15,777	14,846
27	24	2033	i	1	931	931				0	233,210	0.06765	15,777	15,777	14,846
28	25	2034	1		931	931	ļ. J			0	233,210	0.06765	15,777	15,777	14,846
29	26	2035	İ	-	931	931				0	233,210		15,777	15,777	14,846
30	27	2036			931	931				0	233,210		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				ō	233,210		15,777	15,777	13,891
33	30	2039	İ	1,091	931	2,022			,	ŏ	233,210		15,777	15,777	13,755
34	31	2040		273	931	1,204	i			ŏ	233,210		15,777	15,777	14,573
35	32	2041		. 2.5	931	931				ő	233,210		15,777	15,777	14,846
36	33	2042	3,764		931	4,695				o	233,210		15,777		
37	34	2043	7,267	- 1	931	8,198				Ö	233,210	0.06765		15,777	11,082
38	35	2044	12,971		931	13,902				0	233,210	0.06765	15,777	15,777	7,579
39	36	2045	7,392		931	8,323		J		0	233,210	0.06765	15,777	15,777	1,875
40	37	2046	عودوه	. !	931	931			f	0			15,777	15,777	7,454
41	38	2047		.	931	931		ł			233,210	0.06765	15,777	15,777	14,846
42	39	2048		1	931				}	0	233,210	0.06765	15,777	15,777	14,846
43	40	2048		i		931	l			0	233,210	0.06765	15,777	15,777	14,846
			1		931	931		i		0	233,210	0.06765	15,777	15,777	14,846
44	41	2050			931	931				0	233,210		15,777	15,777	14,846
45	42	2051		Į	931	931			J	0	233,210	0.06765	15,777	15,777	14,846
46	43	2052		Į	931	931			ļ	0	233,210	0.06765	15,777	15,777	14,846
47	44	2053		ľ	931	931				0	233,210	0.06765	15,777	15,777	14,846
48	45	2054		-	931	931	1	ļ	. [	0	233,210	0.06765	15,777	15,777	14,846
49	46	2055			931	931		į		0	233,210	0.06765	15,777	15,777	14,846
50	47	2056			931	931	- 1	.		0	233,210		15,7 <b>7</b> 7	15,777	14,846
51	48	2057		i	931	931				0		0.06765	15,777	15,777	14,846
52	49	2058		j	931	931			1	0	233,210		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
			+		i			1		İ	I	i			
T	OTA	L	126,601	4,546	45,996	177.143	2,419,179	-118.559	0	o		ł	779,630	779,630	602,486
	r Pres		,				-,	-10,000	. 4				. , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	77,030	002,700
i = 1				VP	(Costo):	99,309						VP (R	eneficio):	111,237	11,928
		- 1		12	( <del>_ 0</del> 210)+	22,200						7 E (1)		V.P.N.	11,928
														T.I.R.E.	11,928
					•	- 1								B/C	1.12
	-												1	~, 0	1.12

#### Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

65.7 MW 38.4 MW

100% 180,200 MWh 135,336 1000US\$ 100%

180,200 135,336 Tarifa Promedia

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

Crédito CO<sub>2</sub> (precio de CER):

0 US\$/CO2ton

Tasa de descuento:

10%

T.I.R.F.

6.4%

					200.0				<del></del>		(Unida	d: US\$1000
No		AÑO	PROY	YECTO EL	CHAPAR		Canada	, <u> </u>	ENEFIC! Emisión de	CER	(D)	(B) (C)
NO	٠.	ANU	Costo de	Línea de	Costo	(C) TOTAL	Energía Vendible	Ingreso Venta	CO <sub>2</sub> evitada		(B)	(B) - (C)
				1		costo	MWh	Venta Energía	CO <sub>2</sub> evitada	transaccion	TOTAL BENEFICIO	
<del></del>			Construcc.	Transmisión	U&M	COSTO	MWII	Energia	<u> </u>	<u> </u>	BENEFICIO	<u> </u>
	l		·									
1	- 1	2007	30,106	468	0	30,574		'	Î		<b>[</b>	-30,574
1 2 3	- 1	2008	29,801	1,091	ō							-30,892
3	}	2009	51,855	1,247	0							-53,102
4	1	2010	20,457	312	401	21,170	75,083	4,361	45,600	0	4,361	-16,80
4 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		0		9,503
7	4	2013			963	963	180,200	10,466		0	10,466	9,503
8	5	2014			963	963	180,200	10,466		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		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 14	10 11	2019 2020			963	963 963	180,200	10,466 10,466	109,439 109,439	0	10,466	9,503 9,503
15	12	2020			963 963	963	180,200 180,200	10,466	109,439	. 0	10,466 10,466	9,503
16	13	2021		ł	963	963	180,200	10,466	109,439	0	10,466	9,503
17	14	2023	i		963	963	180,200	10,466	109,439	ŏ	10,466	9,503
18	15	2024			963	963	180,200	10,466	109,439	Ö	10,466	9,503
19	16	2025	J	ļ	963	963	180,200	10,466	109,439	Ŏ	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
	20	2029		ł	963	963	180,200	10,466	109,439	0	10,466	9,503
	21	2030			963	963	180,200	10,466	109,439	0	10,466	9,503
	22	2031			963	963	180,200	10,466	66,239	0	10,466	9,503
	23	2032	ļ		963	963	180,200	10,466			10,466	9,503
	24	2033	į		963	963	180,200	10,466	[	ſ	10,466	9,503
	25	2034		1	963	963	180,200	10,466			10,466	9,503
	26 27	2035 2036			963 963	963 963	180,200	10,466	Ì		10,466	9,503
	28	2030	}	468	963	1,430	180,200 180,200	10,466 10,466	1	ł	10,466 10,466	9,503 9,036
	29	2038		1,091	963	2,054	180,200	10,466		·	10,466	8,412
	30	2039		1,247	963	2,209	180,200	10,466		ļ	10,466	8,257
	31	2040		312	963	1,274	180,200	10,466		İ	10,466	9,192
	32	2041	[		963	963	180,200	10,466	[	í	10,466	9,503
	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		l	10,466	1,298
	35	2044	14,632	ł	963	15,595	180,200	10,466	ľ	ļ	10,466	-5,129
	36	2045	8,326		963	9,289	180,200	10,466		1	10,466	1,177
	37	2046	1		963	963	180,200	10,466			10,466	9,503
	38	2047	1		963	963	180,200	10,466			10,466	9,503
	39	2048		1	963	963	180,200	10,466	ľ	ì	10,466	9,503
	40	2049			963	963	180,200	10,466			10,466	9,503
	41	2050			963	963	180,200	10,466		'	10,466	9,503
	42	2051		1	963	963	180,200	10,466	}	J	10,466	9,503
	43 44	2052			963 963	963 963	180,200 180,200	10,466 10,466			10,466 10,466	9,503
	45	2054		1	963	963	180,200	10,466			10,466	9,503 9,503
	46	2055			963	963	180,200	10,466			10,466	9,503
	47	2056	- 1	1	963	963	180,200	10,466		1	10,466	9,503
	48	2057			963	963	180,200	10,466			10,466	9,503
	49	2058			963	963	180,200	10,466			10,466	9,503
	50	2059	-20,233	-1,039	963	-20,309	180,200	10,466			190,666	200,509
									<u> </u>	<del></del>		
<u>JATC</u>			147,394	5,194	47,577	200,165	8,904,883	<u>5</u> 17,1 <u>9</u> 6	2,300,620	0	697,396	8,704,718
											T.I.R.F.	6.4%

Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral Capacidad instalada Capacidad dependable

65.7 MW 38.4 MW

Tarifa Promedia . Energía vendible: Costo de energía:

162,180 MWh 58.08 US\$/MWh

Generacion de energía Costo de construcción

162,180 MWh 90% 135,336 1000US\$ 100% 180,200 135,336

Crédito CO2 (precio de CER):

0 US\$/CO2ton

Tasa de descuento:

10%

T.I.R.F.

5.7%

	I		PROY	ECTO EL	CHAPAR	RAL		В	ENEFIC	0		
No	).	ΑÑΟ	;			(C)	Energía	Ingreso	Emisión de	CER	(B)	(B) - (C
	- 1		Costo de	Linea de	Costo	TOTAL	Vendible	Venta	CO2 evitada	transacción	TOTAL	
			Construcc,	Transmisión	O&M	COSTO	MWh	Energía			BENEFICIO	
										•		
							]					
1		2007	30,106	468	0	30,574						-30,5
2		2008	29,801	1,091	0	30,892						-30,8
3	ا۔	2009	51,855	1,247	0	53,102				_		-53,1
4	1	2010	20,457	312	401	21,170	67,575	3,925	45,600	0	3,925	-17,2
5 6	2	2011 2012			963	963	162,180	9,419	109,439	0	9,419	8,4
7	4	2012			963 963	963 963	162,180	9,419	109,439 109,439	0° 0°	9,419	8,4
8	5	2013	-		963	963	162,180 162,180	9,419 9,419	109,439	0	9,419 9,419	8,4
9	6	2015			963	963	162,180	9,419	109,439	0	9,419	8, <sub>4</sub> 8, <sub>4</sub>
10	7	2015			963	963	162,180	9,419	109,439	. 0	9,419	8,4
1	8	2017			963	963	162,180	9,419	109,439	0	9,419	8,4
12	9	2018			963	963	162,180	9,419	109,439	ō	9,419	8,4
13	10	2019			963	963	162,180	9,419	109,439	Ō	9,419	8,4
4	11	2020			963	963	162,180	9,419	109,439	0	9,419	8,
5	12	2021			963	963	162,180	9,419	109,439	0	9,419	8,
6	13	2022			963	963	162,180	9,419	109,439	0	9,419	8,
7	14	2023			963	963	162,180	9,419	109,439	0	9,419	8,
8	15	2024			. 963	963	162,180	9,419	109,439	0	9,419	8,
9	16	2025			963	963	162,180	9,419	109,439	0	9,419	8,
0.	17	2026			963	963	162,180	9,419	109,439	0	9,419	8,
1	18	2027			963	963	162,180	9,419	109,439	0.	9,419	8,
2	19	2028			963	963	162,180	9,419	109,439	0	9,419	8,
3	20	2029		}	963	963	162,180	9,419	109,439	0	9,419	8,
4	21	2030			963	963	162,180	9,419	109,439	0	9,419	8,
5	22	2031			963	963	162,180	9,419	66,239	0	9,419	8,4
6	23	2032			963	963	162,180	9,419			9,419	8,
27	24 25	2033 2034			963 963	963 963	162,180	9,419			9,419	8,4
9	26	2035		·	963	963	162,180 162,180	9,419 9,419			9,419 9,419	8,4 8,4
0	27	2036			963	963	162,180	9,419			9,419	8,
1	28	2037		468	963	1,430	162,180	9,419			9,419	7,
2	29	2038		1,091	963	2,054	162,180	9,419			9,419	7,
3	30	2039		1,247	963	2,209	162,180	9,419			9,419	7,
4	31	2040		312	963	1,274	162,180	9,419			9,419	8,
5	32	2041	İ		963	963	162,180	9,419			9,419	8,4
6	33	2042	4,244		963	5,207	162,180	9,419			9,419	4,3
7	34	2043	8,205		963	9,168	162,180	9,419			9,419	:
8	35	2044	14,632		963	15,595	162,180	9,419			9,419	-6,
9	36	2045	8,326		963	9,289	162,180	9,419			9,419	
0	37	2046	•	j	963	963	162,180	9,419	*		9,419	8,4
1	38	2047		ļ	963	963	162,180	9,419			9,419	8,4
2	39	2048		İ	963	963	162,180	9,419			9,419	8,4
3 4	40 41	2049 2050		İ	963 963	963 963	162,180	9,419			9,419	8,4
5	41	2050			963 963	963	162,180 162,180	9,419 9,419			9,419 9,419	8,4 8,4
6	42	2051	.		963	963	162,180	9,419		.	9,419	8,4
7	44	2052			963	963	162,180	9,419			9,419	8,4
8	45	2054	-		963	963	162,180	9,419			9,419	8,4
9	46	2055	}		963	963	162,180	9,419			9,419	8,4
ó	47	2056			963	963	162,180	9,419			9,419	8,4
1	48	2057			963	963	162,180	9,419			9,419	8,4
2	49	2058			963	963	162,180	9,419			9,419	8,4
3	50	2059	-20,233	-1,039	963	-20,309	162,180	9,419		·	171,599	182,4
TΑ	T_		147,394	5,194	47,577	200,165	8,014,395	465,476	2,300,620	0	627,656	7,814,2
				•								
											T.I.R.F.	5.

Tabla 14.5 Evaluación Financiera

135,336

Proyecto El Chaparral

Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

65.7 MW

38.4 MW 180,200 MWh 100% 148,870 1000US\$ 110%

180,200

Tarifa Promedia Energía vendible: Costo de energía:

180,200 MWh

58.08 US\$/MWh

Crédito CO<sub>2</sub> (precio de CER):

0 US\$/CO2ton

Tasa de descuento:

10%

5.8% T.I.R.F.

(Unidad: US\$1000)

No.	AÑO		ECTO EL	<del>-</del>							
1					(C)	Energía	Ingreso	Emisión de	CER	(B)	(B) - (C)
1		Costo de	Línea de	Costo -	TOTAL	Vendible	Venta	CO2 evitada	transacción	TOTAL	
			Transmisión	O&M	COSTO	MWh	Energía	-		BENEFICIO	
		-			-						
1	2007	33,117	514	0	33,631						-33,631
	2008	32,782	1,200	ol	33,981						-33,981
2 3 4 1 5 2 6 3	2009	57,041	1,371	0	58,412			i			-58,412
4 1		22,503	343	441	23,287	75,083	4,361	45,600	0	4,361	-18,926
5 2		22,000		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				1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
8 5				1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
9 6				1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
10 7				1,059	1,059	180,200	10,466	109,439	. 0	10,466	9,407
11 8				1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
12 9			l ·	1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
			l :	1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
13 10 14 11	2019			1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
				1,059	1,059	180,200	10,466	109,439	0	10,466	9,407
				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			]	1,059	1,059	180,200	10,466	109,439	Ō	10,466	9,407
18 15	2024		]		1,059	180,200	10,466	109,439	0	10,466	9,40
19 16			1	1,059		180,200	10,466	109,439	ő	10,466	9,40
20 17	2026			1,059	1,059	180,200	10,466	109,439	Ŏ	10,466	9,407
21 18				1,059	1,059	180,200	10,466	109,439	0		9,407
22 19	2028			1,059	1,059	180,200	10,466	109,439	0	10,466	9,40
23 20				1,059	1,059		10,466	109,439	0		9,40
24 21	2030			1,059	1,059	180,200	10,466	66,239	ő	10,466	9,407
25 22	2031			1,059	1,059	180,200	10,466	00,239	•	10,466	9,407
26 23	2032			1,059	1,059	180,200				10,466	9,40
27 24				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			[	1,059	1,059	180,200	10,466			10,466	9,407
30 27	2036		ii	1,059	1,059	180,200	10,466			10,466	8,939
31 28	2037		468	1,059	1,527	180,200	10,466			10,466	8,316
32 29			1,091	1,059	2,150	180,200	10,466			10,466	8,160
33 30			1,247	1,059	2,306	180,200	10,466			10,466	9,095
34 31			312	1,059	1,371	180,200	10,466			10,466	9,407
35 32			<u> </u>	1,059	1,059	180,200	10,466			10,466	5,163
36 33		4,244	<b>]</b> .	1,059	5,303	180,200	10,466			10,466	1,202
37 34		8,205	j l	1,059	9,264	180,200	10,466	:		10,466	-5,225
38 35		14,632		1,059	15,691	180,200	10,466			10,466	1,081
39 36		8,326		1,059	9,385	180,200	10,466			10,466	9,401
40 37				1,059	1,059	180,200	10,466			10,466	9,40
41 38				1,059	1,059	180,200	10,466			10,466	9,40
42 39	2048			1,059	1,059	180,200	10,466			10,466	9,40
43 40				1,059	1,059	180,200	10,466			10,466	9,40
44 41				1,059	1,059	180,200	10,466				9,40
45 42			.	1,059	1,059	180,200	10,466			10,466	9,40°
46 43				1,059	1,059	180,200	10,466			10,466	
47 44				1,059	1,059	180,200	10,466	-		10,466	9,40
48 45	2054			1,059	1,059	180,200	10,466			10,466	9,40
49 46				1,059	1,059	180,200	10,466			10,466	9,40
50 47	2056		†	1,059	1,059	180,200	10,466			10,466	9,40
51 48		,		1,059	1,059	180,200	10,466			10,466	9,401
52 49		·		1,059	1,059	180,200	10,466			10,466	9,40
53 50			-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	8,686,42
			,		· ·					T.I.R.F.	5.8%

Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

65.7 MW 38.4 MW

162,180 MWh 90% 148,870 1000US\$ 110%

180,200 135,336

Tarifa Promedia

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

Crédito CO2 (precio de CER):

0 US\$/CO2ton

Tasa de descuento:

10%

T.I.R.F.

5.1%

(Unidad: US\$1000) PROYECTO EL CHAPARRAL BENEFICIO AÑO No. CER (C) Energía Ingreso Emisión de (B) (B) - (C) TOTAL Línea de Costo Vendible Venta CO2 evitada transacción TOTAL Costo de O&M COSTO MWh BENEFICIO Construcc. Transmisión Energía 2007 33,117 514 33,631 -33,631 2 2008 0 32,782 1,200 33,981 -33,981 3 2009 57,041 1,371 58,412 0 -58,412 2010 22,503 343 441 23,287 67.575 3.925 45,600 3,925 -19,362 5 2 2011 1,059 1,059 162,180 9,419 109,439 9,419 8,360 1,059 1,059 109,439 2012 162,180 9,419 9,419 8,360 7 4 2013 1,059 1,059 9,419 0 8,360 162.180 109,439 9,419 8 5 2014 1.059 1.059 162.180 9,419 109,439 0 9,419 8,360 Q 6 0 2015 1,059 1,059 162,180 9,419 109,439 9,419 8,360 10 2016 1,059 1,059 162,180 9,419 109,439 0 9,419 8,360 0 2017 1,059 1.059 162,180 9,419 109,439 9,419 8,360 1,059 0 9 8,360 12 2018 1,059 162,180 9,419 109,439 9,419 13 10 2019 1,059 1,059 162,180 9,419 109,439 0 9,419 8,360 14 2020 1,059 1,059 162,180 9,419 109,439 0 9,419 11 8,360 162,180 0 15 12 2021 1,059 1,059 9,419 109,439 9,419 8,360 1,059 0 16 13 2022 1.059 9.419 109,439 9,419 162,180 8,360 0 17 14 2023 1,059 1,059 162,180 9,419 109,439 9,419 8,360 18 15 2024 1,059 1,059 162,180 9,419 109,439 0 9,419 8,360 0 19 16 2025 1,059 1,059 162,180 9,419 109,439 9,419 8,360 0 1,059 109,439 8,360 20 17 2026 1.059 162,180 9,419 9.419 21 0 18 2027 1,059 1,059 162,180 9,419 109,439 9,419 8,360 0 22 19 2028 1,059 1,059 162,180 9,419 109,439 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 1,059 1,059 9,419 8,360 22 2031 162,180 66,239 9,419 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 2034 8,360 25 1,059 1.059 9,419 162,180 9,419 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 1,059 1,527 468 162,180 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 1,247 1,059 2,306 2039 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 4,116 33 2042 4,244 1,059 5,303 162,180 9,419 9,419 37 2043 8,205 1.059 9,264 34 162,180 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 1,059 1,059 41 38 2047 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 8,360 1.059 1,059 162,180 9.419 9,419 45 42 2051 8,360 46 43 2052 1,059 1,059 162,180 9,419 9,419 47 44 2053 1,059 1,059 162,180 9,419 9,419 8,360 48 1,059 1,059 162,180 9,419 9,419 8,360 45 2054 8.360 49 1,059 1,059 9,419 46 2055 162,180 9,419 50 47 2056 1,059 1,059 162,180 9,419 9,419 8,360 9,419 8,360 51 48 2057 1,059 1,059 162,180 9,419 1,059 9,419 8,360 49 1,059 162,180 9,419 52 2058 1,059 -20.212 9 4 1 9 171,599 182,392 53 50 -1,039 162.180 2059 -20,233 465,476 627,656 7,795,938 218,457 8,014,395 2,300,620 TOTAL 5,506 52.334 160,616 T.I.R.F. 5.1%

#### Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

65.7 MW 38.4 MW

198,220 MWh 110% 135,336 1000US\$ 100%

180,200 135,336 Tarifa Promedia

Energía vendible: Costo de energía:

198,220 MWh 58,08 US\$/MWh

Crédito CO2 (precio de CER):

0 US\$/CO2ton

Tasa de descuento:

10%

T.I.R.F.

7.1%

		<u> </u>	2003	YECTO EL	CHADAT	DAT			ENERIC		(Unida	d: US\$1000
N		AÑO	FRU	ECIUEL	CHAPAI	(C)	Energía	Ingreso	ENEFICI Emisión de	CER	(B)	(B) - (C)
4	0.	ALIO	Costo de	Linea de	Costo	TOTAL	Vendible	Venta	CO <sub>2</sub> evitada	l	TOTAL	(B) - (C)
						COSTO	1		CO <sub>2</sub> evitada	transaccion		
		<del></del>	Construcc.	Transmisión	U&M	1 COSTO	MWh	Energía			BENEFICIO	<u> </u>
											ļ	1
1	- 1	2007	30,106	468	o	20.574		' '			Î	20.57
	- 1					30,574						-30,574
2	- 1	2008 2009		1,091	0	30,892		į				-30,892
2 3 4	1	2019		1,247 312	0		00 500	4 707	45 (00)	0	4 707	-53,102
5		2010	. 20,437	312	401	21,170	82,592	4,797	45,600	0		-16,373
6	2 3	2011			963	963	198,220	11,513	109,439	0		10,550
7	4	2012			963 963	963 963	198,220	11,513	109,439	0		10,550
8	5	2013			963 963	963	198,220 198,220	11,513	109,439	0		10,550
9	6	2014			963 963	963		11,513	109,439	0	11,513	10,550
10	7	2016	)	. )	963	963	198,220 198,220	11,513 11,513	109,439	O O	11,513	10,550
11	8	2017			963	963	198,220	11,513	109,439 109,439	0	11,513	10,550 10,550
12	9	2018			963	963	198,220	11,513	109,439	0	11,513 11,513	10,550
13	10	2019	]	J	963	963	198,220	11,513		0		10,550
14	11	2020			963	963	198,220	11,513	109,439	ő	11,513	10,550
15	12	2020			963	963	198,220	11,513	109,439	. 0	11,513 11,513	10,550
16	13	2022			963	963	198,220	11,513	109,439	0	11,513	10,550
17	14	2023	ĺ	ĺ	963	963	198,220	11,513	109,439	0	11,513	10,550
18	15	2023	}	-	963	963	198,220	11,513	109,439	0	11,513	10,550
19	16	2025		1	963	963	198,220	11,513	109,439	0	11,513	10,550
20	17	2026	1	-	963	963	198,220	11,513	109,439	0	11,513	10,550
21	18	2027			963	963	198,220	11,513	109,439	ő	11,513	10,550
22	19	2028			963	963	198,220	11,513	109,439	ő	11,513	10,550
23	20	2029			963	963	198,220	11,513	109,439	o	11,513	10,550
24	. 21	2030			963	963	198,220	11,513	109,439	ő	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	00,235	ĭ	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	ĺ		11,513	10,550
29	26	2035			963	963	198,220	11,513			11,513	10,550
30	27	2036	-	Ì	963	963	198,220	11,513	ſ	ĺ	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		I	11,513	9,459
33	30	2039	ĺ	1,247	963	2,209	198,220	11,513	1	1	11,513	9,303
34	31	2040		312	963	1,274	198,220	11,513	1	- 1	11,513	10,238
35	32	2041		-	963	963	198,220	11,513		. 1	11,513	10,550
36	33	2042	4,244	1	963	5,207	198,220	11,513	1	1	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	1	963	9,289	198,220	11,513	1		11,513	2,224
40	37	2046	-		963	963	198,220	11,513	ŀ		11,513	10,550
41	38	2047	}		963	963	198,220	11,513	ļ		11,513	10,550
42	39	2048			963	963	198,220	11,513	1	]	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	ļ	J	963	963	198,220	11,513	ļ		11,513	10,550
46	43	2052			963	963	198,220	11,513	1		11,513	10,550
47	44	2053			963	963	198,220	11,513	+	- 1	11,513	10,550
48	45	2054			963	963	198,220	11,513			11,513	10,550
49	46	2055	. [	ſ	963	963	198,220	11,513	Ĭ	- 1	11,513	10,550
50	47	2056		1	963	963	198,220	11,513			11,513	10,550
51	48	2057			963	963	198,220	11,513		Į	11,513	10,550
52	49	2058	20.2		963	963	198,220	11,513	ľ	1	11,513	10,550
53	50	2059	-20,233	-1,039	963	-20,309	198,220	11,513			209,733	218,529
or ::						200 : 55	0.005.005		2 205 555	[ _	8,5.4.	
OTA	<u> </u>		147,394	5,194	47,577	200,165	9,795,372	568,915	2,300,620	0	767,135	9,595,206
											T.J.R.F.	7.1%
											I.J.R.F.	1.1%

#### Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral

Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

65.7 MW 38.4 MW

198,220 MWh 110% 148,870 1000US\$ 110%

180,200 135,336 Tarifa Promedia

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

Crédito CO2 (precio de CER):

0 US\$/CO2ton

Tasa de descuento:

10%

T.I.R.F. 6.4%

	PRO		PROYECTO EL	CHAPAR	RAL		В	ENEFICI	0	Comda	d: US\$100
1 2007 2 2008 3 2009 4 1 2010 5 2 2011 6 3 2012 7 4 2013 8 5 2014 9 6 2015 10 7 2016 11 8 2017 12 9 2018 13 10 2019 14 11 2020 15 12 2021 16 13 2022 17 14 2023 18 15 2024 19 16 2025 20 17 2026 21 18 2027 22 19 2028 23 20 2029 24 21 2030 25 22 2031 26 23 2032 27 24 2033 28 25 2034 29 26 23 20 2029 24 21 2030 25 22 2031 26 23 2032 27 24 2033 28 25 2034 29 2038 33 30 27 2036 31 2040 35 32 2041 36 33 2042 37 34 2043 38 35 34 2040 37 34 2043 38 35 34 2040 37 34 2043 38 35 32 2041 36 33 2042 37 34 2043 38 35 36 2045 40 37 2046 41 38 2047 42 39 2048 43 40 2049 44 41 2050 44 2051 46 43 2052 47 44 2053 48 45 2054 49 46 2055 50 47 2056 51 48 2057 52 49 2058	ÑΟ	.   4			(C)	Energía	Ingreso	Emisión de	CER	(B)	(B) - (C)
1 2007 2 2008 3 2009 4 1 2010 5 2 2011 6 3 2012 7 4 2013 8 5 2014 9 6 2015 10 7 2016 11 8 2017 12 9 2018 13 10 2019 14 11 2020 15 12 2021 16 13 2022 17 14 2023 18 15 2024 19 16 2025 20 17 2026 21 18 2027 22 19 2028 23 20 2029 24 21 2030 25 22 2031 26 23 2032 27 24 2033 28 25 2034 29 26 23 20 2029 24 21 2030 25 22 2031 26 23 2032 27 24 2033 28 25 2034 29 2038 33 30 27 2036 31 2040 35 32 2041 36 33 2042 37 34 2043 38 35 34 2040 37 34 2043 38 35 34 2040 37 34 2043 38 35 32 2041 36 33 2042 37 34 2043 38 35 36 2045 40 37 2046 41 38 2047 42 39 2048 43 40 2049 44 41 2050 44 2051 46 43 2052 47 44 2053 48 45 2054 49 46 2055 50 47 2056 51 48 2057 52 49 2058	Costo d		Costo de Línea de	Costo	TOTAL	Vendible	Venta	CO2 evitada	transacción	TOTAL	. ,
2   2008 3   2009 4   1   2010 5   2   2011 6   3   2012 7   4   2013 8   5   2014 9   6   2015 10   7   2016 11   8   2017 12   9   2018 13   10   2019 14   11   2020 15   12   2021 16   13   2022 17   14   2023 18   15   2024 19   16   2025 20   17   2026 21   18   2027 22   19   2028 23   20   2029 24   21   2030 25   22   2031 26   23   2032 27   24   2033 28   25   2034 29   26   2035 30   27   2036 31   28   2037 32   29   2038 33   30   2039 34   31   2040 35   32   2041 36   33   2042 37   34   2043 38   35   2044 36   33   2042 37   34   2043 38   35   2044 39   2048 40   37   2046 41   38   2047 42   39   2048 43   40   2049 44   41   2050 45   42   2051 46   43   2052 47   44   2053 48   46   2055 50   47   2056 51   48   2057 52   49   2058	l l		Construce. Transmisión	1	COSTO	MWh	Energía	*		BENEFICIO	
2   2008 3   2009 4   1   2010 5   2   2011 6   3   2012 7   4   2013 8   5   2014 9   6   2015 10   7   2016 11   8   2017 12   9   2018 13   10   2019 14   11   2020 15   12   2021 16   13   2022 17   14   2023 18   15   2024 19   16   2025 20   17   2026 21   18   2027 22   19   2028 23   20   2029 24   2033 26   23   2032 27   24   2033 28   25   2034 29   26   2035 30   27   2036 31   28   2037 32   29   2038 33   30   2039 34   31   2040 35   32   2041 36   33   2042 37   34   2043 38   35   2044 36   33   2042 37   34   2043 38   35   2044 38   36   2045 49   2058 40   2049 41   41   2050 42   2051 43   40   2049 44   41   2050 45   42   2051 46   43   2052 47   44   2053 48   46   2055 50   47   2056 51   48   2057 52   49   2058				<u> </u>	1						**
2   2008 3   2009 4   1   2010 5   2   2011 6   3   2012 7   4   2013 8   5   2014 9   6   2015 10   7   2016 11   8   2017 12   9   2018 13   10   2019 14   11   2020 15   12   2021 16   13   2022 17   14   2023 18   15   2024 19   16   2025 20   17   2026 21   18   2027 22   19   2028 23   20   2029 24   21   2030 25   22   2031 26   23   2032 27   24   2033 28   25   2034 29   26   2035 30   27   2036 31   20   2039 32   20   2039 33   30   2039 34   31   2040 35   32   2041 36   33   2042 37   34   2043 38   35   2044 38   35   2044 39   2058 31   2040 32   209 33   30   2039 34   31   2040 35   32   2041 36   33   2042 37   34   2043 38   35   2044 40   37   2046 41   38   2047 42   39   2048 43   40   2049 44   41   2050 45   46   2055 47   44   2053 48   46   2057 49   2058 50   47   2056 51   48   2057 52   49   2058											
4 1 2010 5 2 2011 6 3 2012 7 4 2013 8 5 2014 9 6 2015 10 7 2016 11 8 2017 12 9 2018 13 10 2019 14 11 2020 15 12 2021 16 13 2022 17 14 2023 18 15 2024 19 16 2025 20 17 2026 21 18 2027 22 19 2028 23 20 2029 24 21 2030 26 23 2022 27 24 2033 28 25 2034 29 26 2035 30 27 2036 31 28 2037 32 29 26 2035 33 30 2039 34 31 2040 35 32 2041 36 33 2042 37 34 2043 38 35 2044 39 36 36 2045 40 37 2046 41 38 2047 42 39 2048 43 2049 44 41 2050 45 2051 46 43 2052 47 44 2053 48 45 2054 49 2058	2007 33,11		33,117 514	0	33,631						-33,6
4 1 2010 5 2 2011 6 3 2012 7 4 2013 8 5 2014 9 6 2015 10 7 2016 11 8 2017 12 9 2018 13 10 2019 14 11 2020 15 12 2021 16 13 2022 17 14 2023 18 15 2024 19 16 2025 20 17 2026 21 18 2027 22 19 2028 23 20 2029 24 21 2030 26 23 2022 27 24 2033 28 25 2034 29 26 2035 30 27 2036 31 28 2037 32 29 26 2035 33 30 2039 34 31 2040 35 32 2041 36 33 2042 37 34 2043 38 35 2044 39 36 36 2045 40 37 2046 41 38 2047 42 39 2048 43 2049 44 41 2050 45 2051 46 43 2052 47 44 2053 48 45 2054 49 2058					33,981						-33,9
5         2         2011           6         3         2012           7         4         2013           8         5         2014           9         6         2015           10         7         2016           11         8         2017           12         9         2018           13         10         2019           14         11         2020           15         12         2021           13         2022         1           14         2023         2022           17         2026         2           21         18         2027           22         19         2028           23         20         2029           24         21         2030           25         22         2031           26         23         2032           27         24         2033           28         25         2034           29         23         20           29         203         2039           33         30         2039           33	2009 57,04		57,041 1,371	0	58,412						-58,4
8         5         2014           9         6         2015           10         7         2016           11         8         2017           12         9         2018           13         10         2019           14         11         2020           15         12         2021           16         13         2022           17         14         2023           18         15         2024           19         16         2025           21         18         2027           21         2030         2029           22         19         2028           23         2032         222           21         2030         229           22         2031         2032           22         2031         2032           27         24         2033           28         25         2034           29         2038         2037           204         29         2038           33         30         2039           34         31         2040				441	23,287	82,592	4,797	45,600	0	4,797	-18,4
8         5         2014           9         6         2015           10         7         2016           11         8         2017           12         9         2018           13         10         2019           14         11         2020           15         12         2021           16         13         2022           17         14         2023           18         15         2024           19         16         2025           10         17         2026           11         18         2027           12         2030         2029           14         21         2030           15         22         2031           16         23         2032           17         24         2033           18         25         2034           19         26         2035           20         20         29           23         2032           24         2033           33         2042           24         33           204 <td></td> <td>2</td> <td></td> <td>1,059</td> <td>1,059</td> <td>198,220</td> <td>11,513</td> <td>109,439</td> <td>0</td> <td>, ,</td> <td>10,</td>		2		1,059	1,059	198,220	11,513	109,439	0	, ,	10,
8         5         2014           9         6         2015           0         7         2016           1.1         8         2017           2         9         2018           3         10         2019           4         11         2020           5         12         2021           6         13         2022           7         14         2023           8         15         2024           9         16         2025           10         17         2026           11         18         2027           12         2030         2029           4         21         2030           15         22         2031           16         23         2032           17         24         2033           18         25         2034           19         26         2035           10         28         2037           20         29         2038           3         30         2039           4         31         2040           5		3		1,059	1,059	198,220	11,513	109,439	. 0		10,4
9 6 2015 0 7 2016 1 8 2017 2 9 2018 3 10 2019 4 11 2020 5 12 2021 6 13 2022 7 14 2023 8 15 2024 9 16 2025 0 17 2026 1 18 2027 2 19 2028 3 20 2029 4 21 2030 5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 2058 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 36 2045 9 36 2045 9 36 2045 9 36 2045 9 36 2045 9 36 2045 9 36 2045				1,059	1,059	198,220	11,513	109,439	0	11,513	10,
.0         7         2016           .1         8         2017           .2         9         2018           .3         10         2019           .4         11         2020           .5         12         2021           .6         13         2022           .7         14         2023           .8         15         2024           .9         16         2025           .0         17         2026           .1         18         2027           .2         19         2028           .3         20         2029           .4         21         2030           .5         22         2031           .6         23         2032           .7         24         2033           .8         25         2034           .9         26         2035           .0         27         2036           .1         28         2037           .2         29         2038           .3         30         2039           .4         31         2040           .				1,059	1,059	198,220	11,513	109,439	0	11,513	10,4
1 8 2017 2 9 2018 3 10 2019 4 11 2020 5 12 2021 6 13 2022 7 14 2023 8 15 2024 9 16 2025 0 17 2026 1 18 2027 1 20 2029 4 21 2030 5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 2052 7 44 2053 8 2052 7 24 2035 8 2037 9 2048 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 46 2055 0 47 2056 1 48 2057 2 49 2058		6		1,059	1,059	198,220	11,513	109,439	0	11,513	10,
2 9 2018 3 10 2019 4 11 2020 5 12 2021 6 13 2022 7 14 2023 8 15 2024 9 16 2025 10 17 2026 11 18 2027 2 19 2028 3 20 2029 4 21 2030 5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 9 46 2055 0 47 2056 1 48 2057 2 49 2058		7		1,059	1,059	198,220	11,513	109,439	0	11,513	10,4
3         10         2019           4         11         2020           5         12         2021           6         13         2022           7         14         2023           8         15         2024           9         16         2025           10         17         2026           11         18         2027           22         19         2028           3         20         2029           4         21         2030           5         22         2031           6         23         2032           7         24         2033           8         25         2034           9         26         2035           0         27         2036           1         28         2037           2         29         2038           3         30         2039           4         31         2040           5         32         2041           6         33         2042           7         34         2043           8         3				1,059	1,059	198,220	11,513	109,439	0	11,513	10,4
4         11         2020           5         12         2021           6         13         2022           7         14         2023           8         15         2024           9         16         2025           10         17         2026           11         18         2027           12         19         2028           13         2032         2031           15         22         2031           16         23         2032           17         24         2033           18         25         2034           19         26         2035           10         27         2036           11         28         2037           29         2038         30           20         2040           20         2040           31         2042           7         34         2043           8         35         2044           9         36         2045           0         37         2046           1         38         2047 <tr< td=""><td></td><td></td><td></td><td>1,059</td><td>1,059</td><td>198,220</td><td>11,513</td><td>(109,439</td><td>0</td><td>11,513</td><td>10,4</td></tr<>				1,059	1,059	198,220	11,513	(109,439	0	11,513	10,4
5         12         2021           6         13         2022           7         14         2023           8         15         2024           9         16         2025           0         17         2026           1         18         2027           2         19         2028           3         20         2029           4         21         2030           5         22         2031           6         23         2032           7         24         2033           8         25         2034           9         26         2035           1         28         2037           2         29         2038           3         30         2039           4         31         2040           5         32         2041           6         33         2042           7         34         2043           8         35         2044           9         36         2045           0         37         2046           1         38 </td <td></td> <td></td> <td></td> <td>1,059</td> <td>1,059</td> <td>198,220</td> <td>11,513</td> <td>109,439</td> <td>0</td> <td>11,513</td> <td>10,</td>				1,059	1,059	198,220	11,513	109,439	0	11,513	10,
6 13 2022 7 14 2023 8 15 2024 9 16 2025 0 17 2026 1 18 2027 1 2030 2 19 2028 3 20 2029 4 21 2030 5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 2047 2 39 2048 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	109,439	0	11,513	10,
7 14 2023 8 15 2024 9 16 2025 0 17 2026 11 18 2027 12 19 2028 3 20 2029 4 21 2030 5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 1 28 2037 1 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 1 28 2037 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2049 4 41 2050 6 43 2052 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2059 4 41 2050 6 43 2052 7 44 2053 8 40 2059 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 46 2055 9 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	109,439	0	11,513	10,
8     15     2024       9     16     2025       0     17     2026       1     18     2027       2     19     2028       3     20     2029       4     21     2030       5     22     2031       6     23     2032       7     24     2033       8     25     2034       9     26     2035       0     27     2036       1     28     2037       2     29     2038       3     30     2039       4     31     2040       5     32     2041       6     33     2042       7     34     2043       8     35     2044       9     36     2045       0     37     2046       1     38     2047       2     39     2048       3     40     2049       4     41     2050       5     42     2051       6     43     2052       7     44     2053       8     45     2054       9     46     2055 </td <td></td> <td></td> <td></td> <td>1,059</td> <td>1,059</td> <td>198,220</td> <td>11,513</td> <td>109,439</td> <td>0</td> <td>11,513</td> <td>10,4</td>				1,059	1,059	198,220	11,513	109,439	0	11,513	10,4
9 16 2025 0 17 2026 1 18 2027 2 19 2028 3 20 2029 4 21 2030 5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	109,439	0	11,513	10,4
0 17 2026 1 18 2027 2 19 2028 3 20 2029 4 21 2030 5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	109,439	0	11,513	10,
1 18 2027 2 19 2028 3 20 2029 4 21 2030 5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 29 2038 3 3 2029 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	109,439	0	11,513	10,4
2 19 2028 3 20 2029 4 21 2030 5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2055 6 43 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	109,439	0	11,513	10,4
3 20 2029 4 21 2030 5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 6 43 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	109,439	0	11,513	10,
4 21 2030 5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 6 43 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	109,439	0	11,513	10,4
5 22 2031 6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 9 36 2045 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	109,439	0	11,513	10,4
6 23 2032 7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	109,439	0	11,513	10,4
7 24 2033 8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	66,239	0	11,513	10,4
8 25 2034 9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513			11,513	10,4
9 26 2035 0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058	I			1,059	1,059	198,220	11,513			11,513	10,4
0 27 2036 1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 7 44 2053 8 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	-		11,513	10,4
1 28 2037 2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059 1,059	1,059 1,059	198,220	11,513			11,513	10,4 10,4
2 29 2038 3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058					1,527	198,220 198,220	11,513 11,513			11,513 11,513	9,9
3 30 2039 4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 40 2052 7 44 2053 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	2,150	198,220	11,513			11,513	9,3
4 31 2040 5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058					2,306	198,220	11,513			11,513	9,: 9,:
5 32 2041 6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058			312	1,059	1,371	198,220	11,513			11,513	10,1
6 33 2042 7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	· ·		11,513	10,
7 34 2043 8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058			4,244	1,059	5,303	198,220	11,513			11,513	6,2
8 35 2044 9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 6 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058			8,205	1,059	9,264	198,220	11,513	* p		11,513	2,2
9 36 2045 0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058			14,632	1,059	15,691	198,220	11,513			11,513	-4,
0 37 2046 1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058			8,326	1,059	9,385	198,220	11,513	Ţ		11,513	2,:
1 38 2047 2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513			11,513	10,4
2 39 2048 3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513			11,513	10,4
3 40 2049 4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058	1		1	1,059	1,059	198,220	11,513	j		11,513	10,4
4 41 2050 5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	ļ		11,513	10,4
5 42 2051 6 43 2052 7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513			11,513	10,4
7 44 2053 8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513			11,513	10,4
8 45 2054 9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	ļ		11,513	10,4
9 46 2055 0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513	ļ		11,513	10,4
0 47 2056 1 48 2057 2 49 2058				1,059	1,059	198,220	11,513			11,513	10,4
1 48 2057 2 49 2058				1,059	1,059	198,220	11,513			11,513	10,4
2 49 2058				1,059	1,059	198,220	11,513			11,513	10,4
				1,059	1,059	198,220	11,513			11,513	10,4
3 50 2059				1,059	1,059	198,220	11,513			11,513	10,4
	20,23	50	-20,233 -1,039		-20,212	198,220	11,513			209,733	218,4
1											-
TAL	160,61	L	160,616 5,506	52,334	218,457	9,795,372	568,915	2,300,620	0	767,135	9,576,9
										T.I.R.F.	6.4

Tabla 14.5 Evaluación Financiera

180,200

135,336

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

65.7 MW 38.4 MW

180,200 MWh 100% 135,336 1000US\$ 100%

Tarifa Promedia Energía vendible: Costo de energía:

180,200 MWh

58.08 US\$/MWh

Tasa de descuento:

10%

Crédito CO2 (precio de CER):

3 US\$/CO2ton

T.I.R.F.

6.6%

No.   AÑO   Costo de   Línea de   Costo   (C)   TOTAL   Vendible   Costo   COSTO   Wwh   Venta   COSTO   COS					m cono est			<del></del> -				(Unida	d: US\$1000)
Costo de   Construce.   Transmission   Costo   COSTO   MWh   Energía   Costo   COSTO   MWh   Energía   Costo   COSTO   MWh   Energía   Costo   COSTO   MWh   Energía   Costo   COSTO   COSTO   MWh   Energía   Costo   COSTO	N.	_	AÑO	PRO	YECTO EL	CHAPAI		Energía		ENEFIC. Emisión de	CER	(B)	(B) - (C)
1	``	<b>.</b>	1110	Costo de	Línea de	Costo		_	_	CO <sub>2</sub> evitada		TOTAL	(B) - (C)
1					I	-		ŀ			пшин	BENEFICIO	
2				<u> </u>	<u> </u>								
2						_							7
4													-30,574
4	2												-30,892
5         2         2011         963         963         180,200         10,466           6         3         2012         963         963         180,200         10,466           7         4         2013         963         963         180,200         10,466           8         5         2014         963         963         180,200         10,466           10         7         2016         963         963         180,200         10,466           11         8         2017         963         963         180,200         10,466           11         8         2017         963         963         180,200         10,466           12         9         2018         963         963         180,200         10,466           12         19         2021         963         963         180,200         10,466           14         11         2020         963         963         180,200         10,466           15         12         2021         963         963         180,200         10,466           15         12         2021         963         963         180,200         10,466		, ,						75 002	1 261	45,600	137	4,498	-53,102
6	5			20,437	312	1					328	10,794	-16,672 9,832
7		3									328		9,832
9   6   2015   963   963   180,200   10,466     10   7   2016   963   963   180,200   10,466     11   8   2017   963   963   180,200   10,466     12   9   2018   963   963   180,200   10,466     13   10   2019   963   963   180,200   10,466     14   11   2020   963   963   180,200   10,466     15   12   2021   963   963   180,200   10,466     16   13   2022   963   963   180,200   10,466     17   14   2023   963   963   180,200   10,466     19   16   2025   963   963   180,200   10,466     19   16   2025   963   963   180,200   10,466     19   16   2025   963   963   180,200   10,466     11   8   2077   963   963   180,200   10,466     22   19   2028   963   963   180,200   10,466     23   20   2029   963   963   180,200   10,466     24   21   2030   963   963   180,200   10,466     25   22   2031   963   963   180,200   10,466     26   23   2032   963   963   180,200   10,466     27   24   2033   963   180,200   10,466     28   25   2034   963   963   180,200   10,466     29   26   2035   963   963   180,200   10,466     29   20   2038   1,046   963   963   180,200   10,466     20   20   2039   1,046   963   963   180,200   10,466     20   20   20   20   30   30   30   30	7	4	2013				,				328	10,794	
10				<u> </u>	'	963	963		10,466		328	10,794	9,832
11							)·			109,439	328	10,794	9,832
12										109,439	328	10,794	9,832
13							, ,			109,439	328 328	10,794	9,832
14		- 1								109,439 109,439	328	10,794 10,794	9,832 9,832
15				-						109,439	328	10,794	9,832
16	15										328	10,794	9,832
17	16	13	2022		ſ		1 6	180,200	10,466	109,439	328	10,794	9,832
19								180,200		109,439	328	10,794	9,832
20										109,439	328	10,794	9,832
21   18   2027   963   963   180,200   10,466					ł					109,439	328	10,794	9,832
22         19         2028         963         963         180,200         10,466           23         20         2029         963         963         180,200         10,466           24         21         2030         963         963         180,200         10,466           25         22         2031         963         963         180,200         10,466           26         23         2032         963         963         180,200         10,466           27         24         2033         963         963         180,200         10,466           28         25         2034         963         963         180,200         10,466           29         26         2035         963         963         180,200         10,466           30         27         2036         963         963         180,200         10,466           31         28         2037         468         963         1,430         180,200         10,466           32         29         2038         1,991         963         2,209         180,200         10,466           32         29         2038         1,247 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>109,439</td><td>328 328</td><td>10,794 10,794</td><td>9,832 9,832</td></t<>										109,439	328 328	10,794 10,794	9,832 9,832
23         20         2029         963         963         180,200         10,466           24         21         2030         963         963         180,200         10,466           25         22         2031         963         963         180,200         10,466           26         23         2032         963         963         180,200         10,466           27         24         2033         963         963         180,200         10,466           28         25         2034         963         963         180,200         10,466           29         26         2035         963         963         180,200         10,466           30         27         2036         963         963         180,200         10,466           31         28         2037         468         963         1,430         180,200         10,466           31         28         2037         468         963         1,204         10,466           32         29         2038         1,091         963         2,209         180,200         10,466           34         31         2040         312         96										109,439 109,439	328	10,794	9,832 9,832
24         21         2030         963         963         180,200         10,466           25         22         2031         963         963         180,200         10,466           26         23         2032         963         963         180,200         10,466           27         24         2033         963         963         180,200         10,466           28         25         2034         963         963         180,200         10,466           29         26         2035         963         963         180,200         10,466           30         27         2036         963         963         180,200         10,466           31         28         2037         468         963         1,430         180,200         10,466           31         28         2037         468         963         1,254         180,200         10,466           32         29         2038         1,091         963         2,209         180,200         10,466           32         29         2038         1,247         963         1,274         180,200         10,466           35         32					}					109,439	328	10,794	9,832
25         22         2031         963         963         180,200         10,466           26         23         2032         963         963         180,200         10,466           27         24         2033         963         963         180,200         10,466           28         25         2034         963         963         180,200         10,466           30         27         2036         963         963         180,200         10,466           31         28         2037         468         963         1,430         180,200         10,466           32         29         2038         1,091         963         2,054         180,200         10,466           32         29         2038         1,091         963         2,054         180,200         10,466           32         29         2038         1,091         963         2,054         180,200         10,466           33         30         2039         1,247         963         2,209         180,200         10,466           34         31         2040         312         963         1,274         180,200         10,466 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>109,439</td><td>328</td><td>10,794</td><td>9,832</td></t<>										109,439	328	10,794	9,832
27         24         2033         963         963         180,200         10,466           28         25         2034         963         963         180,200         10,466           29         26         2035         963         963         180,200         10,466           30         27         2036         963         963         180,200         10,466           31         28         2037         468         963         1,430         180,200         10,466           32         29         2038         1,091         963         2,209         180,200         10,466           32         29         2038         1,247         963         2,209         180,200         10,466           34         31         2040         312         963         1,274         180,200         10,466           35         32         2041         312         963         963         180,200         10,466           36         33         2042         4,244         963         5,207         180,200         10,466           37         34         2043         8,205         963         9,168         180,200         10,466<		22	2031		j	963	963			66,239	0	10,466	9,503
28         25         2034         963         963         180,200         10,466           29         26         2035         963         963         180,200         10,466           30         27         2036         963         963         180,200         10,466           31         28         2037         468         963         1,430         180,200         10,466           32         29         2038         1,091         963         2,054         180,200         10,466           33         30         2039         1,247         963         2,209         180,200         10,466           34         31         2040         312         963         1,274         180,200         10,466           35         32         2041         963         963         180,200         10,466           36         33         2042         4,244         963         9,168         180,200         10,466           37         34         2043         8,205         963         9,168         180,200         10,466           39         36         2045         8,326         963         9,63         180,200         10,4				ĺ								10,466	9,503
29         26         2035         963         963         180,200         10,466           30         27         2036         963         963         180,200         10,466           31         28         2037         468         963         1,430         180,200         10,466           32         29         2038         1,091         963         2,054         180,200         10,466           33         30         2039         1,247         963         2,209         180,200         10,466           34         31         2040         312         963         1,274         180,200         10,466           35         32         2041         963         963         180,200         10,466           36         33         2042         4,244         963         5,207         180,200         10,466           37         34         2043         8,205         963         9,168         180,200         10,466           38         35         2044         14,632         963         15,595         180,200         10,466           39         36         2045         8,326         963         963         180				ſ	1					ĺ	ľ	10,466	9,503
30         27         2036         963         963         180,200         10,466           31         28         2037         468         963         1,430         180,200         10,466           32         29         2038         1,091         963         2,054         180,200         10,466           33         30         2039         1,247         963         2,209         180,200         10,466           34         31         2040         312         963         1,274         180,200         10,466           35         32         2041         963         5,207         180,200         10,466           36         33         2042         4,244         963         5,207         180,200         10,466           37         34         2043         8,205         963         9,168         180,200         10,466           39         36         2045         8,326         963         9,289         180,200         10,466           40         37         2046         963         963         180,200         10,466           41         38         2047         963         963         180,200         1						,					}	10,466	9,503
31         28         2037         468         963         1,430         180,200         10,466           32         29         2038         1,091         963         2,054         180,200         10,466           33         30         2039         1,247         963         2,209         180,200         10,466           34         31         2040         312         963         1,274         180,200         10,466           35         32         2041         963         963         180,200         10,466           36         33         2042         4,244         963         5,207         180,200         10,466           37         34         2043         8,205         963         9,188         180,200         10,466           38         35         2044         14,632         963         15,595         180,200         10,466           40         37         2046         963         963         180,200         10,466           41         38         2047         963         963         180,200         10,466           42         39         2048         963         963         180,200         1												10,466 10,466	9,503 9,503
32         29         2038         1,091         963         2,054         180,200         10,466           33         30         2039         1,247         963         2,209         180,200         10,466           34         31         2040         312         963         1,274         180,200         10,466           35         32         2041         963         963         180,200         10,466           36         33         2042         4,244         963         5,207         180,200         10,466           37         34         2043         8,205         963         9,168         180,200         10,466           38         35         2044         14,632         963         15,595         180,200         10,466           40         37         2046         963         963         180,200         10,466           41         38         2047         963         963         180,200         10,466           42         39         2048         963         963         180,200         10,466           43         40         2049         963         963         180,200         10,466				ľ	468						- 1	10,466	9,036
33         30         2039         1,247         963         2,209         180,200         10,466           34         31         2040         312         963         1,274         180,200         10,466           35         32         2041         963         963         180,200         10,466           36         33         2042         4,244         963         5,207         180,200         10,466           37         34         2043         8,205         963         9,168         180,200         10,466           38         35         2044         14,632         963         15,595         180,200         10,466           40         37         2046         963         963         180,200         10,466           41         38         2047         963         963         180,200         10,466           42         39         2048         963         963         180,200         10,466           43         40         2049         963         963         180,200         10,466           44         41         2050         963         963         180,200         10,466           45 <td></td> <td>29</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>10,466</td> <td>8,412</td>		29										10,466	8,412
35         32         2041         963         963         180,200         10,466           36         33         2042         4,244         963         5,207         180,200         10,466           37         34         2043         8,205         963         9,168         180,200         10,466           38         35         2044         14,632         963         15,595         180,200         10,466           39         36         2045         8,326         963         9,289         180,200         10,466           40         37         2046         963         963         963         180,200         10,466           41         38         2047         963         963         963         180,200         10,466           42         39         2048         963         963         180,200         10,466           43         40         2049         963         963         180,200         10,466           44         41         2050         963         963         180,200         10,466           45         42         2051         963         963         180,200         10,466	33		2039								I	10,466	8,257
36         33         2042         4,244         963         5,207         180,200         10,466           37         34         2043         8,205         963         9,168         180,200         10,466           38         35         2044         14,632         963         15,595         180,200         10,466           39         36         2045         8,326         963         9,289         180,200         10,466           40         37         2046         963         963         180,200         10,466           41         38         2047         963         963         180,200         10,466           42         39         2048         963         963         180,200         10,466           43         40         2049         963         963         180,200         10,466           44         41         2050         963         963         180,200         10,466           45         42         2051         963         963         180,200         10,466           47         44         2053         963         963         180,200         10,466           48         45					312	I					1	10,466	9,192
37         34         2043         8,205         963         9,168         180,200         10,466           38         35         2044         14,632         963         15,595         180,200         10,466           39         36         2045         8,326         963         9,289         180,200         10,466           40         37         2046         963         963         180,200         10,466           41         38         2047         963         963         180,200         10,466           42         39         2048         963         963         180,200         10,466           43         40         2049         963         963         180,200         10,466           44         41         2050         963         963         180,200         10,466           45         42         2051         963         963         180,200         10,466           45         42         2051         963         963         180,200         10,466           46         43         2052         963         963         180,200         10,466           47         44         2053						I						10,466	9,503
38         35         2044         14,632         963         15,595         180,200         10,466           39         36         2045         8,326         963         9,289         180,200         10,466           40         37         2046         963         963         180,200         10,466           41         38         2047         963         963         180,200         10,466           42         39         2048         963         963         180,200         10,466           43         40         2049         963         963         180,200         10,466           44         41         2050         963         963         180,200         10,466           45         42         2051         963         963         180,200         10,466           45         42         2051         963         963         180,200         10,466           46         43         2052         963         963         180,200         10,466           47         44         2053         963         963         180,200         10,466           48         45         2054         963	36					1						10,466	5,259
39         36         2045         8,326         963         9,289         180,200         10,466           40         37         2046         963         963         180,200         10,466           41         38         2047         963         963         180,200         10,466           42         39         2048         963         963         180,200         10,466           43         40         2049         963         963         180,200         10,466           44         41         2050         963         963         180,200         10,466           45         42         2051         963         963         180,200         10,466           46         43         2052         963         963         180,200         10,466           47         44         2053         963         963         180,200         10,466           48         45         2054         963         963         180,200         10,466           49         46         2055         963         963         180,200         10,466           50         47         2056         963         963         18						4						10,466 10,466	1,298 -5,129
40         37         2046         963         963         180,200         10,466           41         38         2047         963         963         180,200         10,466           42         39         2048         963         963         180,200         10,466           43         40         2049         963         963         180,200         10,466           44         41         2050         963         963         180,200         10,466           45         42         2051         963         963         180,200         10,466           46         43         2052         963         963         180,200         10,466           47         44         2053         963         963         180,200         10,466           48         45         2054         963         963         180,200         10,466           49         46         2055         963         963         180,200         10,466           50         47         2056         963         963         180,200         10,466           51         48         2057         963         963         180,200         10								, ,		ĺ	ĺ	10,466	1,177
41         38         2047         963         963         180,200         10,466           42         39         2048         963         963         180,200         10,466           43         40         2049         963         963         180,200         10,466           44         41         2050         963         963         180,200         10,466           45         42         2051         963         963         180,200         10,466           46         43         2052         963         963         180,200         10,466           47         44         2053         963         963         180,200         10,466           48         45         2054         963         963         180,200         10,466           49         46         2055         963         963         180,200         10,466           50         47         2056         963         963         180,200         10,466           51         48         2057         963         963         180,200         10,466           52         49         2058         963         963         180,200         10				_,								10,466	9,503
42         39         2048         963         963         180,200         10,466           43         40         2049         963         963         180,200         10,466           44         41         2050         963         963         180,200         10,466           45         42         2051         963         963         180,200         10,466           46         43         2052         963         963         180,200         10,466           47         44         2053         963         963         180,200         10,466           48         45         2054         963         963         180,200         10,466           49         46         2055         963         963         180,200         10,466           50         47         2056         963         963         180,200         10,466           51         48         2057         963         963         180,200         10,466           52         49         2058         963         963         180,200         10,466           53         50         2059         -20,233         -1,039         963 <td< td=""><td>41</td><td>38</td><td>2047</td><td>1</td><td></td><td>963</td><td>963</td><td>180,200</td><td>10,466</td><td></td><td></td><td>10,466</td><td>9,503</td></td<>	41	38	2047	1		963	963	180,200	10,466			10,466	9,503
44     41     2050     963     963     180,200     10,466       45     42     2051     963     963     180,200     10,466       46     43     2052     963     963     180,200     10,466       47     44     2053     963     963     180,200     10,466       48     45     2054     963     963     180,200     10,466       49     46     2055     963     963     180,200     10,466       50     47     2056     963     963     180,200     10,466       51     48     2057     963     963     180,200     10,466       52     49     2058     963     963     963     180,200     10,466       53     50     2059     -20,233     -1,039     963     -20,309     180,200     10,466				. 1	1	II.		180,200		}	}	10,466	9,503
45         42         2051         963         963         180,200         10,466           46         43         2052         963         963         180,200         10,466           47         44         2053         963         963         180,200         10,466           48         45         2054         963         963         180,200         10,466           49         46         2055         963         963         180,200         10,466           50         47         2056         963         963         180,200         10,466           51         48         2057         963         963         180,200         10,466           52         49         2058         963         963         963         180,200         10,466           53         50         2059         -20,233         -1,039         963         -20,309         180,200         10,466				1	1	II.						10,466	9,503
46         43         2052         963         963         180,200         10,466           47         44         2053         963         963         180,200         10,466           48         45         2054         963         963         180,200         10,466           49         46         2055         963         963         180,200         10,466           50         47         2056         963         963         180,200         10,466           51         48         2057         963         963         180,200         10,466           52         49         2058         963         963         180,200         10,466           53         50         2059         -20,233         -1,039         963         -20,309         180,200         10,466	44											10,466	9,503
47         44         2053         963         963         180,200         10,466           48         45         2054         963         963         180,200         10,466           49         46         2055         963         963         180,200         10,466           50         47         2056         963         963         180,200         10,466           51         48         2057         963         963         180,200         10,466           52         49         2058         963         963         180,200         10,466           53         50         2059         -20,233         -1,039         963         -20,309         180,200         10,466	45					II.				J		10,466 10,466	9,503
48     45     2054     963     963     180,200     10,466       49     46     2055     963     963     180,200     10,466       50     47     2056     963     963     180,200     10,466       51     48     2057     963     963     180,200     10,466       52     49     2058     963     963     180,200     10,466       53     50     2059     -20,233     -1,039     963     -20,309     180,200     10,466	40										-	10,466	9,503 9,503
49     46     2055     963     963     180,200     10,466       50     47     2056     963     963     180,200     10,466       51     48     2057     963     963     180,200     10,466       52     49     2058     963     963     180,200     10,466       53     50     2059     -20,233     -1,039     963     -20,309     180,200     10,466	48											10,466	9,503
50     47     2056     963     963     180,200     10,466       51     48     2057     963     963     180,200     10,466       52     49     2058     963     963     180,200     10,466       53     50     2059     -20,233     -1,039     963     -20,309     180,200     10,466	49					J.						10,466	9,503
52     49     2058     963     963     180,200     10,466       53     50     2059     -20,233     -1,039     963     -20,309     180,200     10,466	50	- 1		· [	ļ.	ſ				1	İ	10,466	9,503
53 50 2059 -20,233 -1,039 963 -20,309 180,200 10,466	51			İ								10,466	9,503
	52											10,466	9,503
TOTAL 147,394 5,194 47,577 200,165 8,904,883 517,196 2	53	50	2059	-20,233	-1,039	963	-20,309	180,200	10,466			190,666	200,509
	ATO	L		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%

#### Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral Capacidad instalada Capacidad dependable

65.7 MW

Tarifa Promedia

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

Generacion de energía Costo de construcción

38.4 MW 180,200 MWh

135,336 1000US\$ 100%

100%

180,200 135,336

Crédito CO2 (precio de CER):

5 US\$/CO2ton

Tasa de descuento:

10%

T.I.R.F.

6.7%

		r	F	TOTAL TO	OTT + 77 + 77		•		n		(Unida	d: US\$1000)
N	o.	AÑO	PROY	ECTO EL	CHAPAR		Energia		ENEFICI Emisión de	CER	(B)	(B) (C)
1	0.	ANO	Costo de	Línea de	Costo	(C) TOTAL	Energía Vendible	Ingreso Venta		l	(B)	(B) - (C)
l				Transmisión	O&M	COSTO	MWh		CO <sub>2</sub> evitada	transacción	TOTAL	
_			CONSTRUCC.	1 Tansmision	OWM	LCOSTO	NIWD	Energía		<u> </u>	BENEFICIO	
			1									
1		2007	30,106	468	0	30,574						-30,574
		2008	29,801	1,091	0	30,892						-30,892
2 3	}	2009	51,855	1,247	Ö			1				-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		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 2022			963	963	180,200	10,466	109,439	547	11,013	10,050
16 17	13 14	2022			963	963 963	180,200	10,466	109,439	547	11,013	10,050
18	. 15	2023			963 963	963	180,200	10,466	109,439	547 547	11,013	10,050
19	16	2024			963	963 963	180,200 180,200	10,466 10,466	109,439 109,439	547 547	11,013 11,013	10,050 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	j	,	963	963	180,200	10,466			10,466	9,503
29	26	2035			963	963	180,200	10,466	ļ		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 33	29 30	2038 2039		1,091	963	2,054	180,200	10,466			10,466	8,412
34	31	2039		1,247 312	963 963	2,209	180,200	10,466 10,466			10,466	8,257
35	32	2041		312	963	1,274 963	180,200 180,200	10,466			10,466 10,466	9,192 9,503
36	33	2042	4,244		963	5,207	180,200	10,466			10,466	5,259
37	34	2043	8,205	i	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		ŀ	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		1	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	İ		963	963	180,200	10,466			10,466	9,503
47 48	44 45	2053 2054			963	963 963	180,200 180,200	10,466 10,466			10,466 10,466	9,503
48	45 46	2054			963 963	963	180,200	10,466			10,466	9,503 9,503
50	46	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
			,	_,00,7	,,,,						0,000	,
TOT	AL		147,394	5,194	47,577	200,165	8,904,883	517,196	2,300,620	11,172	708,568	8,704,718
	•		<i>y</i> 1	,—- · i	, , , , , , , , , , , , , , , , , , ,	, ,1				• -		
											T.I.R.F.	6.7%

#### Tabla 14.5 Evaluación Financiera

Proyecto El Chaparral Capacidad instalada Capacidad dependable Generacion de energía

Costo de construcción

65.7 MW 38.4 MW

180,200 MWh 100% 135,336 1000US\$ 100% 180,200 135,336 Tarifa Promedia

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

Crédito CO2 (precio de CER):

10 US\$/CO2ton

Tasa de descuento:

10%

T.J.R.F.

(Unidad: US\$1000)

7.0%

r—	_		PRO	YECTŐ EL	CHAPAI	RRAL		F	ENEFIC	0	Omor	d: US\$1000)
N	lo.	AÑO	120	Leigh	[	(C)	Energía	Ingreso	Emisión de	CER	(B)	(B) - (C)
Į.			Costo de	Linea de	Costo	TOTAL	Vendible	Venta	CO2 evitada	transacción	TOTAL	\-/ \-/
		١,		Transmisión		COSTO	MWh	Energía			BENEFICIO	
-	1			1		1	171 1177	1	<del></del>			
	]		ļ	!		1		)	J			
1		2007	30,106	468	0	30,574					[	-30,574
2		2008	29,801	1,091	0							-30,892
3		2009	51,855	1,247	0						i .	-53,102
4	1	2010	20,457	312	401		75,083	4,361	45,600	456	4,817	-16,353
5		2011			963	963	180,200	10,466		1,094		10,598
6	3	2012			963	963	180,200	10,466		1,094		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	1 1	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	1 1	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		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	l I	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 22	18 19	2027 2028			963	963	180,200	10,466	109,439	1,094	11,560	10,598
23	20	2028			963 963	963 963	180,200	10,466 10,466	109,439 109,439	1,094 1,094	11,560	10,598 10,598
24	21	2030			963	963	180,200 180,200	10,466	109,439	1,094	11,560 11,560	10,598
25	22	2031			963	963	180,200	10,466	66,239	1,094	10,466	9,503
26	23	2032	J		963	963	180,200	10,466	00,233	ๆ	10,466	9,503
27	24	2033			963	963	180,200	10,466		ĺ	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		- 1	10,466	9,503
31	28	2037	1	468	963	1,430	180,200	10,466		ŀ	10,466	9,036
32	29	2038		1,091	963	2,054	180,200	10,466		l	10,466	8,412
33	30	2039		1,247	963	2,209	180,200	10,466	1	ì	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	- 1	1	10,466	5,259
37	34	2043	8,205		963	9,168	180,200	10,466	1		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	j		963	963	180,200	10,466			10,466	9,503
41	38	2047		j	963	963	180,200	10,466			10,466	9,503
42	39	2048	1	1	963	963	180,200	10,466			10,466	9,503
43	40	2049			963	963	180,200	10,466	Į		10,466	9,503
44	41	2050	1		963	963	180,200	10,466			10,466	9,503
45	42	2051	1	- 1	963	963	180,200	10,466		j	10,466	9,503
46	43	2052		1	963	963	180,200	10,466			10,466	9,503
47	44	2053			963	963	180,200	10,466	İ		10,466	9,503
48	45	2054	. }	J	963	963	180,200	10,466			10,466	9,503
49	46	2055		}	963	963	180,200	10,466	{	ľ	10,466	9,503
50	47	2056	ļ	į	963	963	180,200	10,466			10,466	9,503
51 52	48	2057			963	963	180,200	10,466			10,466	9,503
53	49 50	2058 2059	-20,233	-1,039	963 963	963 -20,309	180,200 180,200	10,466 10,466	. (	ļ	10,466 190,666	9,503 200,509
231	201	2039	-20,233	-1,039	9031	-20,309	100,200	10,400	·	<del></del>	150,000	200,309
ΓΟΤΑ	IL.		147,394	5,194	47,577	200,165	8,904,883	517,196	2,300,620	22,344	719,739	8,704,718
	<u></u> _		~~~~~~~	<u>~,474</u>	_ <del>-1</del> 5277}	-00,100	<u></u>	247,170	الاعتارين بيوم	22,277	12000	3,707,710
											T.I.R.F.	7.0%