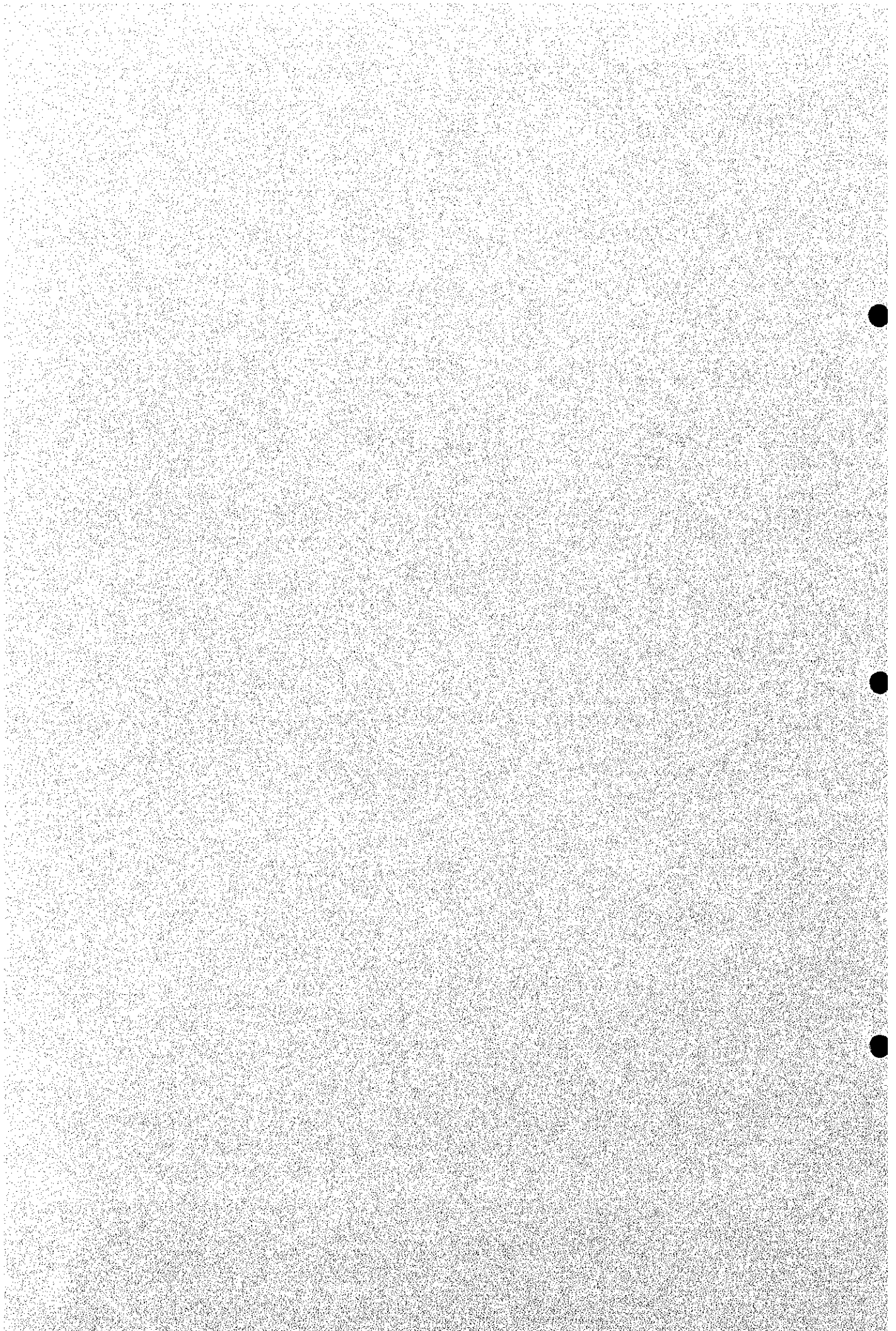


APPENDIX

for

CHAPTER 12



Appendix 12.4-1 Construction Cost for Financial Analysis

(1,000 US\$)

FY	Subtransmission Line			Distribution Substation			Telecommunication			Distribution System			Total Construction Cost for Analysis C+F+H+L
	Total Construction Cost	Value Added Tax	Construction Cost Analysis	Total Construction Cost	Value Added Tax	Construction Cost Analysis	Total Construction Cost	Value Added Tax	Construction Cost Analysis	Total Construction Cost	Value Added Tax	Construction Cost Analysis	
	A	B	C=A-B	D	E	F=D-E	G	H	I=G+H	J	K	L=J+K	
1996	0	0	0	57,248	3,259	53,990	0	0	0	38,345	2,183	36,162	90,152
1997	28,048	1,597	26,451	125,444	7,142	118,303	2,948	173	2,775	104,784	5,969	98,815	246,344
1998	23,690	1,347	22,343	90,468	5,152	85,316	2,433	143	2,290	78,092	4,448	73,644	183,593
1999	39,904	2,272	37,632	102,597	5,838	96,759	2,059	121	1,938	96,827	5,513	91,313	227,643
2000	116,044	6,616	109,428	152,766	8,692	144,073	3,088	181	2,907	182,118	10,375	171,743	428,151
2001	13,655	778	12,877	103,299	5,882	97,417	2,948	173	2,775	80,310	4,577	75,733	188,802
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	156,370	8,901	147,469	0	0	0	104,737	5,962	98,775	246,244
2006	330,478	18,839	311,639	234,556	13,352	221,204	6,784	398	6,386	383,004	21,828	361,176	900,406
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	107,226	6,103	101,122	0	0	0	71,820	4,088	67,732	168,854
2011	53,935	3,071	50,864	160,838	9,155	151,683	3,861	227	3,634	146,441	8,340	138,100	344,281
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	90,341	5,141	85,200	0	0	0	60,511	3,443	57,067	142,268
2016	82,344	4,695	77,649	135,512	7,710	127,801	3,064	180	2,884	147,972	8,429	139,543	347,878
Total	688,097	39,213	648,884	1,516,665	86,327	1,430,338	27,184	1,595	25,589	1,494,960	85,156	1,409,804	3,514,615

Appendix 12.4-2 Calculation of FIRR

(1,000 US\$)

Discount Rate	No.	FY	Cost				Benefit		NPV
			Construction	O & M	Energy Purchase	Total	PV	Energy Sales	
11.7922%	1	1996	90,152	0		90,152	80,642	0	-80,642
	2	1997	246,344	0		246,344	197,114	0	-197,114
	3	1998	183,593	10,110	149,811	343,514	245,873	182,224	-115,444
	4	1999	227,643	17,331	311,580	556,554	356,337	376,884	-115,035
	5	2000	428,151	24,078	480,371	932,600	534,120	580,228	-201,811
	6	2001	188,802	38,457	672,390	899,650	460,899	808,025	-46,940
	7	2002	0	49,544	838,744	888,287	407,075	1,006,645	54,240
	8	2003	0	49,544	1,000,908	1,050,452	430,611	1,200,263	61,412
	9	2004	0	49,544	1,170,404	1,219,947	447,341	1,402,634	66,989
	10	2005	246,244	49,544	1,343,158	1,638,945	537,589	1,608,895	-9,857
	11	2006	900,406	49,544	1,518,269	2,468,218	724,200	1,818,283	-190,697
	12	2007	0	89,824	1,695,955	1,785,779	488,696	2,030,450	64,216
	13	2008	0	89,824	1,875,911	1,965,735	481,506	2,245,326	65,641
	14	2009	0	89,824	2,058,136	2,147,960	451,094	2,462,911	66,143
	15	2010	168,854	89,824	2,242,571	2,501,249	469,879	2,683,136	34,169
	16	2011	344,281	89,824	2,426,937	2,864,042	481,280	2,906,140	7,074
	17	2012	0	108,755	2,585,826	2,694,581	405,040	3,092,255	59,777
	18	2013	0	108,755	2,741,774	2,850,529	383,284	3,278,439	57,537
	19	2014	0	108,755	2,897,664	3,006,419	361,604	3,464,554	55,103
	20	2015	142,268	108,755	3,053,554	3,304,576	355,540	3,650,689	37,236
	21	2016	347,878	108,755	3,211,154	3,667,786	352,992	3,836,853	16,271
	22	2017		126,555	3,211,154	3,337,710	287,342	3,836,853	42,971
	23	2018		126,555	3,211,154	3,337,710	257,032	3,836,853	38,438
	24	2019		126,555	3,211,154	3,337,710	229,919	3,836,853	34,384
	25	2020		126,555	3,211,154	3,337,710	205,667	3,836,853	30,757
	26	2021		126,555	3,211,154	3,337,710	183,972	3,836,853	27,512
	27	2022		126,555	3,211,154	3,337,710	164,567	3,836,853	24,610
	28	2023		126,555	3,211,154	3,337,710	147,208	3,836,853	22,014
	29	2024		126,555	3,211,154	3,337,710	131,680	3,836,853	19,692
	30	2025		126,555	3,211,154	3,337,710	117,790	3,836,853	17,615
	31	2026		126,555	3,211,154	3,337,710	105,365	3,836,853	15,757
	32	2027		126,555	3,211,154	3,337,710	94,251	3,836,853	14,095
	33	2028		126,555	3,211,154	3,337,710	84,309	3,836,853	12,608
	34	2029		126,555	3,211,154	3,337,710	75,416	3,836,853	11,278
		Total	3,514,615	2,975,806	74,023,123	80,513,543	10,697,232	88,513,900	0

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Appendix 12.5-11 Repayment Schedule of Debt (Loan Supplied 2010 - 2011)

(1,000 US\$)

No	FY	Financing for Construction			Repayment of Foreign Currency				Repayment of Local Currency			
		Foreign	Local	Total	Interest	Principal	Total	Balance	Interest	Principal	Total	Balance
	2010	146,908	135,869	282,777								
	2011	307,588	318,823	626,411				454,496				454,692
1	2012				31,815	11,086	42,901	443,409	59,110	35,642	94,752	419,050
2	2013				31,039	11,863	42,901	431,547	54,477	40,275	94,752	378,775
3	2014				30,208	12,693	42,901	418,854	49,241	45,511	94,752	333,264
4	2015				29,320	13,581	42,901	405,272	43,324	51,427	94,752	281,837
5	2016				28,369	14,532	42,901	390,740	36,639	58,113	94,752	223,723
6	2017				27,352	15,549	42,901	375,191	29,084	65,668	94,752	158,056
7	2018				26,263	16,638	42,901	358,553	20,547	74,205	94,752	83,851
8	2019				25,099	17,802	42,901	340,751	10,901	83,851	94,752	0
9	2020				23,853	19,049	42,901	321,702				
10	2021				22,519	20,382	42,901	301,320				
11	2022				21,092	21,809	42,901	279,511				
12	2023				19,566	23,335	42,901	256,176				
13	2024				17,932	24,969	42,901	231,207				
14	2025				16,184	26,717	42,901	204,490				
15	2026				14,314	28,587	42,901	175,903				
16	2027				12,313	30,588	42,901	145,315				
17	2028				10,172	32,729	42,901	112,586				
18	2029				7,881	35,020	42,901	77,566				
19	2030				5,430	37,472	42,901	40,095				
20	2031				2,807	40,095	42,901	0				
	Total	454,496	454,692	909,188	403,528	454,496	858,023		303,322	454,692	758,014	

Appendix 12.5-12 Repayment Schedule of Debt (Loan Supplied 2015 - 2016)

(1,000 US\$)

No	FY	Financing for Construction			Repayment of Foreign Currency				Repayment of Local Currency			
		Foreign	Local	Total	Interest	Principal	Total	Balance	Interest	Principal	Total	Balance
	2015	142,583	135,070	277,653								
	2016	372,090	347,114	719,203				514,672				482,184
1	2017				36,027	12,554	48,581	502,118	62,684	37,797	100,481	444,388
2	2018				35,148	13,433	48,581	488,685	57,770	42,710	100,481	401,677
3	2019				34,208	14,373	48,581	474,311	52,218	48,263	100,481	353,414
4	2020				33,202	15,380	48,581	458,932	45,944	54,537	100,481	298,877
5	2021				32,125	16,456	48,581	442,478	38,854	61,627	100,481	237,251
6	2022				30,973	17,608	48,581	424,867	30,843	69,638	100,481	167,612
7	2023				29,741	18,841	48,581	406,027	21,790	78,691	100,481	88,921
8	2024				28,422	20,160	48,581	385,867	11,560	88,921	100,481	0
9	2025				27,011	21,571	48,581	364,296				
10	2026				25,501	23,081	48,581	341,218				
11	2027				23,885	24,696	48,581	316,519				
12	2028				22,156	26,425	48,581	290,094				
13	2029				20,307	28,275	48,581	261,819				
14	2030				18,327	30,254	48,581	231,565				
15	2031				16,210	32,372	48,581	199,193				
16	2032				13,944	34,638	48,581	164,556				
17	2033				11,519	37,063	48,581	127,493				
18	2034				8,925	39,657	48,581	87,836				
19	2035				6,149	42,433	48,581	45,403				
20	2036				3,178	45,403	48,581	0				
	Total	514,672	482,184	996,857	456,956	514,672	971,629		321,662	482,184	803,847	

Appendix 12.5-13 Statement of Profit and Loss

(1,000 US\$)

FY	Revenue A	Business Expenses				Total E=B+C+D	Business Profit F=A-E	Financial Cost (Interest) G	Net Profit H=F-G
		O & M Cost B	Energy Purchase C	Depreciation D					
1998	210,947	10,648	173,424	14,143	198,215	12,732	29,866	-17,134	
1999	458,105	18,843	378,728	24,596	422,166	35,939	50,193	-14,255	
2000	740,534	27,012	613,089	34,839	674,940	65,594	68,313	-2,719	
2001	1,082,831	44,465	901,067	57,557	1,003,090	79,741	110,335	-30,593	
2002	1,416,451	59,085	1,180,197	74,830	1,314,111	102,339	138,749	-36,410	
2003	1,773,335	61,042	1,478,797	74,830	1,614,669	158,665	128,161	30,504	
2004	2,175,945	63,065	1,815,680	74,830	1,953,575	222,370	116,309	106,061	
2005	2,620,721	65,155	2,187,862	74,830	2,327,847	292,874	103,036	189,837	
2006	3,109,881	67,314	2,596,755	74,830	2,738,899	370,982	88,167	282,816	
2007	3,646,396	125,008	3,045,692	151,051	3,321,751	324,645	233,612	91,033	
2008	4,233,896	129,151	3,537,310	151,051	3,817,512	416,384	213,047	203,337	
2009	4,876,395	133,432	4,074,968	151,051	4,359,451	516,944	192,527	324,417	
2010	5,578,047	137,855	4,662,145	151,051	4,951,051	626,997	174,882	452,115	
2011	6,343,740	142,425	5,304,247	151,051	5,597,723	746,017	159,527	586,490	
2012	7,087,505	178,387	5,926,762	192,378	6,297,526	789,979	233,418	556,561	
2013	7,889,955	184,300	6,598,407	192,378	6,975,085	914,870	209,100	705,770	
2014	8,754,755	190,409	7,322,253	192,378	7,705,040	1,049,716	182,030	867,685	
2015	9,686,311	196,721	8,101,987	192,378	8,491,086	1,195,225	151,880	1,043,345	
2016	10,689,328	203,242	8,946,156	192,378	9,341,775	1,347,553	136,827	1,210,726	
2017	11,223,795	243,922	9,393,463	237,689	9,875,074	1,348,721	219,031	1,129,690	
2018	11,784,985	252,007	9,863,137	237,689	10,352,833	1,432,151	195,122	1,237,030	
2019	12,374,234	260,361	10,356,293	237,689	10,854,344	1,519,890	169,898	1,349,992	
2020	12,992,946	268,992	10,874,108	223,546	11,366,646	1,626,299	142,865	1,483,434	
2021	13,642,593	277,909	11,417,814	213,093	11,908,816	1,733,777	126,117	1,607,660	
2022	14,324,722	287,121	11,988,704	202,850	12,478,675	1,846,047	109,789	1,736,258	
2023	15,040,959	296,639	12,588,139	180,132	13,064,911	1,976,048	93,303	1,882,745	
2024	15,793,007	306,473	13,217,546	162,860	13,686,879	2,106,128	75,119	2,031,009	
2025	16,582,657	316,632	13,878,424	162,860	14,357,916	2,224,741	55,049	2,169,693	
2026	17,411,790	327,129	14,572,345	162,860	15,082,333	2,349,458	45,942	2,303,514	
2027	18,282,379	337,973	15,300,962	162,860	15,801,795	2,480,584	36,198	2,444,386	
2028	19,196,498	349,177	16,066,010	162,860	16,578,047	2,618,451	32,328	2,586,123	
2029	20,156,323	360,753	16,869,311	86,638	17,316,702	2,839,621	28,188	2,811,434	
Total	281,181,965	5,922,648	235,231,782	4,656,054	245,810,484	35,371,481	4,048,927	31,322,553	

Appendix 12.5-14 Cash Flow

(1,000 US\$)

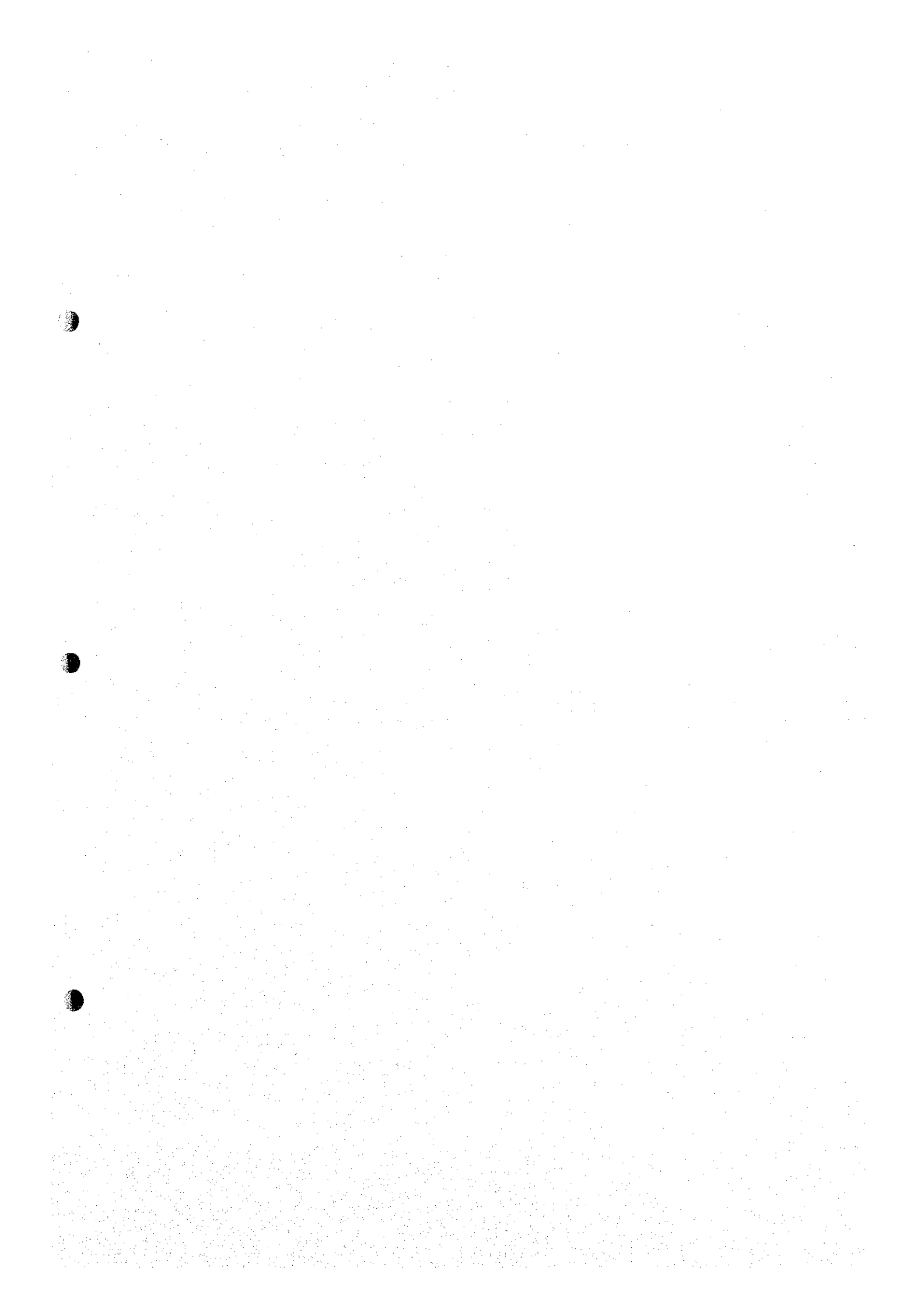
FY	Cash Inflow				Cash Outflow			Balance	
	Financing	Net Profit	Depreciation	Total	Investment*	Repayment of Principal	Total	Total	Accumulated
1996	92,918			92,918	97,299	0	97,299	-4,381	-4,381
1997	261,681			261,681	282,827		282,827	-21,147	-25,528
1998	201,078	-17,134	14,143	198,087	216,647	14,866	231,513	-33,427	-58,955
1999	256,672	-14,255	24,596	267,013	273,574	27,463	301,037	-34,024	-92,979
2000	495,393	-2,719	34,839	527,513	527,695	40,963	588,658	-41,144	-134,123
2001	225,715	-30,593	57,557	252,678	248,214	68,276	316,490	-63,811	-197,934
2002		-36,410	74,830	38,420		93,772	93,772	-55,352	-253,287
2003		30,504	74,830	105,334		104,360	104,360	974	-252,313
2004		106,061	74,830	180,891		116,212	116,212	64,678	-187,635
2005	330,030	189,837	74,830	594,697	345,472	129,485	474,957	119,740	-67,895
2006	1,242,115	282,816	74,830	1,599,760	1,331,393	116,272	1,447,665	152,095	84,200
2007		91,033	151,051	242,084		186,652	186,652	55,431	139,632
2008		203,337	151,051	354,388		188,302	188,302	166,086	305,718
2009		324,417	151,051	475,468		168,316	168,316	307,152	612,870
2010	269,517	452,115	151,051	872,682	282,777	152,980	435,756	436,926	1,049,796
2011	571,378	586,490	151,051	1,308,919	626,411	168,334	794,745	514,174	1,563,970
2012		556,561	192,378	748,939		232,096	232,096	516,842	2,080,812
2013		705,770	192,378	898,148		256,414	256,414	641,734	2,722,546
2014		867,685	192,378	1,060,063		283,484	283,484	776,579	3,499,125
2015	264,588	1,043,345	192,378	1,500,311	277,653	170,960	448,613	1,051,697	4,550,822
2016	660,637	1,210,726	192,378	2,063,741	719,203	186,013	905,216	1,158,525	5,709,347
2017		1,129,690	237,689	1,367,379		252,872	252,872	1,114,508	6,823,855
2018		1,237,030	237,689	1,474,719		260,132	260,132	1,214,587	8,038,442
2019		1,349,992	237,689	1,587,682		272,936	272,936	1,314,745	9,353,187
2020		1,483,434	223,546	1,706,980		192,513	192,513	1,514,467	10,867,655
2021		1,607,660	213,093	1,820,754		180,433	180,433	1,640,321	12,507,975
2022		1,736,258	202,850	1,939,108		175,831	175,831	1,763,276	14,271,252
2023		1,882,745	180,132	2,062,877		192,318	192,318	1,870,559	16,141,811
2024		2,031,009	162,860	2,193,868		210,502	210,502	1,983,367	18,125,178
2025		2,169,693	162,860	2,332,552		130,091	130,091	2,202,461	20,327,639
2026		2,303,514	162,860	2,466,374		139,197	139,197	2,327,176	22,654,815
2027		2,444,386	162,860	2,607,245		55,284	55,284	2,551,961	25,206,777
2028		2,586,123	162,860	2,748,982		59,154	59,154	2,689,828	27,896,605
2029		2,811,434	86,638	2,898,072		63,295	63,295	2,834,777	30,731,382
Total	4,871,721	31,322,553	4,656,054	40,850,328	5,229,186	4,889,780	10,118,946	30,731,382	

* Note: Investment including interest during construction

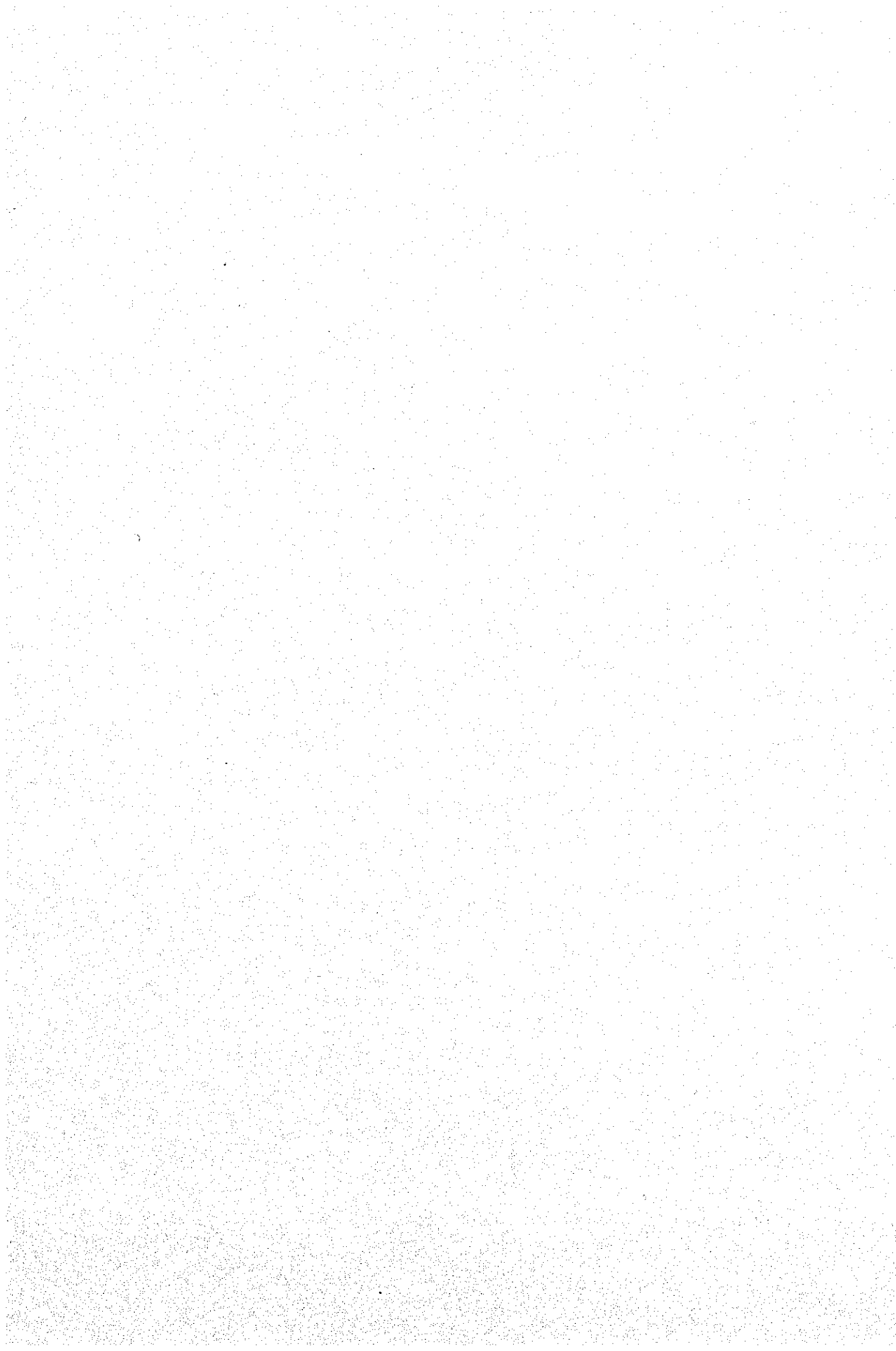
Appendix 12.5-15 Calculation of Debt Service Ratio

(1,000 US\$)

FY	Internal Fund Procured				Payment of Debt				Debt Service Ratio(A/B)
	Business Profit	Depreciation	Total	Accumulated (A)	Interest	Principal	Total	Accumulated (B)	
1996									
1997									
1998	12,732	14,143	26,875	26,875	29,866	14,866	44,732	44,732	0.60
1999	35,939	24,596	60,535	87,410	50,193	27,463	77,657	122,389	0.71
2000	65,594	34,839	100,433	187,843	68,313	40,963	109,276	231,665	0.81
2001	79,741	57,557	137,298	325,141	110,335	68,276	178,611	410,276	0.79
2002	102,339	74,830	177,169	502,310	138,749	93,772	232,522	642,797	0.78
2003	158,665	74,830	233,495	735,805	128,161	104,360	232,522	875,319	0.84
2004	222,370	74,830	297,200	1,033,005	116,309	116,212	232,522	1,107,840	0.93
2005	292,874	74,830	367,704	1,400,709	103,036	129,485	232,522	1,340,362	1.05
2006	370,982	74,830	445,812	1,846,521	88,167	116,272	204,438	1,544,800	1.20
2007	324,645	151,051	475,696	2,322,217	233,612	186,652	420,265	1,965,065	1.18
2008	416,384	151,051	567,435	2,889,651	213,047	188,302	401,349	2,366,413	1.22
2009	516,944	151,051	667,995	3,557,646	192,527	168,316	360,843	2,727,256	1.30
2010	626,997	151,051	778,048	4,335,694	174,882	152,980	327,861	3,055,118	1.42
2011	746,017	151,051	897,068	5,232,762	159,527	168,334	327,861	3,382,979	1.55
2012	789,979	192,378	982,357	6,215,119	233,418	232,096	465,514	3,848,493	1.61
2013	914,870	192,378	1,107,248	7,322,367	209,100	256,414	465,514	4,314,007	1.70
2014	1,049,716	192,378	1,242,093	8,564,460	182,030	283,484	465,514	4,779,522	1.79
2015	1,195,225	192,378	1,387,603	9,952,063	151,880	170,960	322,840	5,102,362	1.95
2016	1,347,553	192,378	1,539,931	11,491,994	136,827	186,013	322,840	5,425,201	2.12
2017	1,348,721	237,689	1,586,410	13,078,404	219,031	252,872	471,902	5,897,104	2.22
2018	1,432,151	237,689	1,669,841	14,748,244	195,122	260,132	455,253	6,352,357	2.32
2019	1,519,890	237,689	1,757,579	16,505,824	169,898	272,936	442,834	6,795,191	2.43
2020	1,626,299	223,546	1,849,846	18,355,669	142,865	192,513	335,379	7,130,569	2.57
2021	1,733,777	213,093	1,946,871	20,302,540	126,117	180,433	306,550	7,437,119	2.73
2022	1,846,047	202,850	2,048,897	22,351,437	109,789	175,831	285,620	7,722,740	2.89
2023	1,976,048	180,132	2,156,180	24,507,617	93,303	192,318	285,620	8,008,360	3.06
2024	2,106,128	162,860	2,268,987	26,776,604	75,119	210,502	285,620	8,293,981	3.23
2025	2,224,741	162,860	2,387,601	29,164,205	55,049	130,091	185,140	8,479,120	3.44
2026	2,349,456	162,860	2,512,316	31,676,521	45,942	139,197	185,140	8,664,260	3.66
2027	2,480,584	162,860	2,643,444	34,319,964	36,198	55,284	91,483	8,755,743	3.92
2028	2,618,451	162,860	2,781,311	37,101,275	32,328	59,154	91,483	8,847,225	4.19
2029	2,839,621	86,638	2,926,260	40,027,535	28,188	63,295	91,483	8,938,708	4.48
Total	35,371,481	4,656,054	40,027,535		4,048,927	4,889,780	8,938,708		







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