SCHEDULE C.1.1 CAPITAL EXPENDITURE FORECASTS: TOTAL PESO REAL

		2007	2008	2009	2010	2011
	A. DISTRIBUTION PLANT					
1	Land and Land Rights (Distribution Purpose)	2,250,000	-	2,250,000	-	-
2	Structures and Improvements (Distribution Purpose)	3,847,000	3,643,000	4,047,000	-	-
3	Station Equipment					
3a	Power transformers	22,621,237	2,019,237	202,000	-	-
3b	Switchgear	4,982,963	4,950,019	1,168,976	-	485,000
3a	Protective equipment	1,010,697	261,394	896,917	-	-
3b	Metering & control equipment					
3a	Communications equipment	2,434,000	5,693,517	4,125,517	3,725,517	-
3b	Other station equipment	5,785,000	1,943,000	988,000	33,000	-
4	Poles, Towers and Fixtures - Distribution	78,790,650	54,941,620	47,153,231	38,818,313	38,870,906
5	Poles, Towers and Fixtures - Customer					
6	Overhead Conductors and Devices - Distribution	38,961,180	38,877,525	32,416,174	30,140,195	28,352,721
7	Overhead Conductors and Devices - Customer					
8	Underground Conduits - Distribution					
9	Underground Conduits - Customer					
10	Underground Conductors and Devices - Distribution					
11	Underground Conductors and Devices - Customer					
12	Line Transformers - Distribution	11,922,393	16,770,917	16,770,917	16,770,917	16,770,917
13	Line Transformers - Customer					
14	Power Conditioning Equipment	132,000	17,523,335	14,510,784	5,737,132	-
15	Services	4,291,269	4,705,601	4,915,661	5,144,496	5,372,381
16	Meters, Instruments & Metering Transformers-distribution	23,363,050	43,613,700	28,447,100	28,672,700	29,280,200
17	Meters, Instruments & Metering Transformers - customer					
18	Information technology equipment (distribution)					
19	Regulated Entity Property on Consumers' Premises					
20	Street Lights and Signal Systems	119,928	239,856	239,856	239,856	239,856
21	Submarine Cables					

SCHEDULE C.1.1 CAPITAL EXPENDITURE FORECASTS: TOTAL PESO REAL

		2007	2008	2009	2010	2011
	B. GENERAL PLANT					
22	Land and Land Rights (non-network)					
23	Structures and Improvements (non-network)	3,847,000	1,587,250	50,362,000	150,560,000	80,390,350
24	Office Furniture and Equipment	17,374,740	14,798,300	13,840,950	5,571,105	18,352,775
25	Transportation Equipment	17,868,500	24,148,700	29,982,150	3,998,200	5,138,800
26	Stores Equipment					
27	Tools, Shop and Garage Equipment	6,254,635	4,202,411	2,041,166	1,221,025	683,095
28	Laboratory Equipment	-	1,205,000	-	275,000	-
29	Information systems equipment (non-network)	11,308,465	13,162,955	16,783,422	6,994,600	7,752,000
30	Power-operated Equipment					
31	Communication Plant and Equipment	3,439,000	2,042,500	411,000	109,000	686,000
32	Miscellaneous Equipment	1,351,086	5,895,833	408,400	278,125	5,400
33	**C. Materials and Supplies (including spares)**					
34	**D. Transferred subtransmission assets**					
35	**E. Allocated Overheads Capitalized**					
	TOTAL	**261,954,793**	**262,225,669**	**271,961,220**	**298,289,179**	**232,380,400**
EXCHANGE RATE ASSUMPTION (Details in Sch. B.3.1)		**52.715**	**52.416**	**52.416**	**52.915**	**52.915**

SCHEDULE C.1.1 CAPITAL EXPENDITURE FORECASTS: TOTAL DOLLAR REAL

		2007	2008	2009	2010	2011
	A. Distribution Plant					
1	Land and Land Rights (Distribution Purpose)					
2	Structures and Improvements (Distribution Purpose)					
3	Station Equipment					
3a	Power transformers	1,373,776	-	434,648	-	-
3b	Switchgear	330,763	294,864	172,694	-	-
3a	Protective equipment	128,488	177,726	94,930	-	-
3b	Metering & control equipment	16,870	28,248	16,870	-	-
3a	Communications equipment	487,317	933,116	82,872	-	-
3b	Other station equipment	12,734	12,734	12,734	-	-
4	Poles, Towers and Fixtures - Distribution					
5	Poles, Towers and Fixtures - Customer					
6	Overhead Conductors and Devices - Distribution	254,545	69,928	81,720	69,928	39,207
7	Overhead Conductors and Devices - Customer					
8	Underground Conduits - Distribution					
9	Underground Conduits - Customer					
10	Underground Conductors and Devices - Distribution					
11	Underground Conductors and Devices - Customer					
12	Line Transformers - Distribution					
13	Line Transformers - Customer					
14	Power Conditioning Equipment	46,961	151,888	92,849	18,652	-
15	Services					
16	Meters, Instruments & Metering Transformers-distribution					
17	Meters, Instruments & Metering Transformers - customer					
18	Information technology equipment (distribution)					
19	Regulated Entity Property on Consumers' Premises					
20	Street Lights and Signal Systems					
21	Submarine Cables					

SCHEDULE C.1.1 CAPITAL EXPENDITURE FORECASTS: TOTAL DOLLAR REAL

		2007	2008	2009	2010	2011
	B. General Plant					
22	Land and Land Rights (non-network)					
23	Structures and Improvements (non-network)					
24	Office Furniture and Equipment					
25	Transportation Equipment					
26	Stores Equipment					
27	Tools, Shop and Garage Equipment	75,000	16,327	78,840	-	-
28	Laboratory Equipment					
29	Information systems equipment (non-network)	-	27,202	17,840	12,200	10,500
30	Power-operated Equipment					
31	Communication Plant and Equipment					
32	Miscellaneous Equipment					
33	**C. Materials and Supplies (including spares)**					
34	**D. Transferred subtransmission assets**					
35	**E. Allocated Overheads Capitalized**					
	TOTAL	**2,726,453**	**1,712,033**	**1,085,997**	**100,781**	**49,707**

SCHEDULE C.1.2 CAPITAL EXPENDITURE FORECASTS: TOTAL PESO NOMINAL

		2007	2008	2009	2010	2011
	A. Distribution Plant					
1	Land and Land Rights (Distribution Purpose)	2,403,675	-	2,626,425	-	-
2	Structures and Improvements (Distribution Purpose)	4,109,750	4,079,067	4,724,063	-	-
3	Station Equipment	-	-	-	-	-
3a	Power transformers	24,166,267	2,260,940	235,795	-	-
3b	Switchgear	5,323,300	5,542,536	1,364,546	-	614,738
3a	Protective equipment	1,079,728	292,683	1,046,971	-	-
3b	Metering & control equipment	-	-	-	-	-
3a	Communications equipment	2,600,242	6,375,031	4,815,716	4,527,248	-
3b	Other station equipment	6,180,116	2,175,577	1,153,292	40,102	-
4	Poles, Towers and Fixtures - Distribution	84,172,052	61,518,132	55,041,967	47,172,013	49,268,873
5	Poles, Towers and Fixtures - Customer	-	-	-	-	-
6	Overhead Conductors and Devices - Distribution	41,622,228	43,531,165	37,839,400	36,626,364	35,937,074
7	Overhead Conductors and Devices - Customer	-	-	-	-	-
8	Underground Conduits - Distribution	-	-	-	-	-
9	Underground Conduits - Customer	-	-	-	-	-
10	Underground Conductors and Devices - Distribution	-	-	-	-	-
11	Underground Conductors and Devices - Customer	-	-	-	-	-
12	Line Transformers - Distribution	12,736,692	18,778,395	19,576,691	20,380,018	21,257,137
13	Line Transformers - Customer	-	-	-	-	-
14	Power Conditioning Equipment	141,016	19,620,878	16,938,439	6,971,763	-
15	Services	4,584,363	5,268,861	5,738,051	6,251,592	6,809,493
16	Meters, Instruments & Metering Transformers-distribution	24,958,746	48,834,260	33,206,300	34,843,065	37,112,654
17	Meters, Instruments & Metering Transformers - customer	-	-	-	-	-
18	Information technology equipment (distribution)	-	-	-	-	-
19	Regulated Entity Property on Consumers' Premises	-	-	-	-	-
20	Street Lights and Signal Systems	128,119	268,567	279,984	291,473	304,017
21	Submarine Cables	-	-	-	-	-

SCHEDULE C.1.2 CAPITAL EXPENDITURE FORECASTS: TOTAL PESO NOMINAL

		2007	2008	2009	2010	2011
	B. General Plant	-	-	-	-	-
22	Land and Land Rights (non-network)	-	-	-	-	-
23	Structures and Improvements (non-network)	4,109,750	1,777,244	58,787,563	182,960,512	101,894,769
24	Office Furniture and Equipment	18,561,435	16,569,657	16,156,541	6,770,007	23,262,142
25	Transportation Equipment	19,088,919	27,039,299	34,998,164	4,858,613	6,513,429
26	Stores Equipment	-	-	-	-	-
27	Tools, Shop and Garage Equipment	6,681,826	4,705,440	2,382,653	1,483,789	865,823
28	Laboratory Equipment	-	1,349,239	-	334,180	-
29	Information systems equipment (non-network)	12,080,833	14,738,561	19,591,289	8,499,838	9,825,660
30	Power-operated Equipment	-	-	-	-	-
31	Communication Plant and Equipment	3,673,884	2,286,987	479,760	132,457	869,505
32	Miscellaneous Equipment	1,443,365	6,601,564	476,725	337,978	6,845
33	**C. Materials and Supplies (including spares)**		3,351,600	4,684,400	6,025,600	7,490,000
34	**D. Transferred subtransmission assets**	-	-	-	-	-
35	**E. Allocated Overheads Capitalized**	-	-	-	-	-
	TOTAL (PESO NOMINAL)	**279,846,305**	**296,965,682**	**322,144,733**	**368,506,610**	**302,032,157**
Philippine Consumer Price Index change assumption (%pa over regulatory year). Please see details in Schedule B.1.1		**6.83%**	**4.81%**	**4.25%**	**4.10%**	**4.30%**
- Inflation factor to convert Real to Nominal		**1.0683**	**1.1197**	**1.1673**	**1.2152**	**1.2675**

SCHEDULE C.1.2 CAPITAL EXPENDITURE FORECASTS: TOTAL DOLLAR NOMINAL

		2007	2008	2009	2010	2011
	A. Distribution Plant					
1	Land and Land Rights (Distribution Purpose)	-	-	-	-	-
2	Structures and Improvements (Distribution Purpose)	-	-	-	-	-
3	Station Equipment	-	-	-	-	-
3a	Power transformers	1,422,957	-	473,375	-	-
3b	Switchgear	342,604	312,703	188,081	-	-
3a	Protective equipment	133,088	188,478	103,388	-	-
3b	Metering & control equipment	17,474	29,957	18,373	-	-
3a	Communications equipment	504,763	989,570	90,256	-	-
3b	Other station equipment	13,189	13,504	13,868	-	-
4	Poles, Towers and Fixtures - Distribution	-	-	-	-	-
5	Poles, Towers and Fixtures - Customer	-	-	-	-	-
6	Overhead Conductors and Devices - Distribution	263,658	74,159	89,002	78,215	45,037
7	Overhead Conductors and Devices - Customer	-	-	-	-	-
8	Underground Conduits - Distribution	-	-	-	-	-
9	Underground Conduits - Customer	-	-	-	-	-
10	Underground Conductors and Devices - Distribution	-	-	-	-	-
11	Underground Conductors and Devices - Customer	-	-	-	-	-
12	Line Transformers - Distribution	-	-	-	-	-
13	Line Transformers - Customer	-	-	-	-	-
14	Power Conditioning Equipment	48,642	161,077	101,122	20,863	-
15	Services	-	-	-	-	-
16	Meters, Instruments & Metering Transformers-distribution	-	-	-	-	-
17	Meters, Instruments & Metering Transformers - customer	-	-	-	-	-
18	Information technology equipment (distribution)	-	-	-	-	-
19	Regulated Entity Property on Consumers' Premises	-	-	-	-	-
20	Street Lights and Signal Systems	-	-	-	-	-
21	Submarine Cables	-	-	-	-	-

SCHEDULE C.1.2 CAPITAL EXPENDITURE FORECASTS: TOTAL DOLLAR NOMINAL

		2007	2008	2009	2010	2011
	B. General Plant	-	-	-	-	-
22	Land and Land Rights (non-network)	-	-	-	-	-
23	Structures and Improvements (non-network)	-	-	-	-	-
24	Office Furniture and Equipment	-	-	-	-	-
25	Transportation Equipment	-	-	-	-	-
26	Stores Equipment	-	-	-	-	-
27	Tools, Shop and Garage Equipment	77,685	17,315	85,865	-	-
28	Laboratory Equipment	-	-	-	-	-
29	Information systems equipment (non-network)	-	28,848	19,430	13,646	12,061
30	Power-operated Equipment	-	-	-	-	-
31	Communication Plant and Equipment	-	-	-	-	-
32	Miscellaneous Equipment	-	-	-	-	-
33	**C. Materials and Supplies (including spares)**	-	-	-	-	-
34	**D. Transferred subtransmission assets**	-	-	-	-	-
35	**E. Allocated Overheads Capitalized**	-	-	-	-	-
	TOTAL (DOLLAR NOMINAL)	**2,824,060**	**1,815,611**	**1,182,759**	**112,723**	**57,099**

EXCHANGE RATE ASSUMPTION (Details in Sch. B.3.1)	**52.715**	**52.416**	**52.416**	**52.915**	**52.915**
USA CONSUMER PRICE INDEX ASSUMPTION (Details in Sch. B.2.1)	**3.55%**	**2.39%**	**2.70%**	**2.70%**	**2.70%**
- US Inflation factor to convert Real to Nominal	**1.0355**	**1.0605**	**1.0891**	**1.1185**	**1.1487**

SCHEDULE C.1.3 CAPITAL EXPENDITURE FORECASTS: TOTAL NOMINAL - in PESO

		2007	2008	2009	2010	2011
	A. Distribution Plant					
1	Land and Land Rights (Distribution Purpose)	2,403,675	-	2,626,425	-	-
2	Structures and Improvements (Distribution Purpose)	4,109,750	4,079,067	4,724,063	-	-
3	Station Equipment	-	-	-	-	-
3a	Power transformers	105,936,737	2,415,023	26,755,080	-	-
3b	Switchgear	24,977,341	23,427,848	11,987,795	-	656,632
3a	Protective equipment	8,647,208	10,865,102	6,906,788	-	-
3b	Metering & control equipment	983,922	1,677,226	1,028,674	-	-
3a	Communications equipment	31,199,500	62,213,348	10,197,138	4,835,780	-
3b	Other station equipment	7,343,961	3,079,903	2,008,339	42,835	-
4	Poles, Towers and Fixtures - Distribution	89,908,377	65,710,592	58,793,077	50,386,786	52,626,546
5	Poles, Towers and Fixtures - Customer	-	-	-	-	-
6	Overhead Conductors and Devices - Distribution	59,304,758	50,649,814	45,401,161	43,543,235	40,931,734
7	Overhead Conductors and Devices - Customer	-	-	-	-	-
8	Underground Conduits - Distribution	-	-	-	-	-
9	Underground Conduits - Customer	-	-	-	-	-
10	Underground Conductors and Devices - Distribution	-	-	-	-	-
11	Underground Conductors and Devices - Customer	-	-	-	-	-
12	Line Transformers - Distribution	13,604,698	20,058,143	20,910,842	21,768,916	22,705,811
13	Line Transformers - Customer	-	-	-	-	-
14	Power Conditioning Equipment	2,889,554	29,976,392	23,754,401	8,626,067	-
15	Services	4,896,787	5,627,934	6,129,099	6,677,638	7,273,560
16	Meters, Instruments & Metering Transformers-distribution	26,659,685	52,162,315	35,469,309	37,217,620	39,641,881
17	Meters, Instruments & Metering Transformers - customer	-	-	-	-	-
18	Information technology equipment (distribution)	-	-	-	-	-
19	Regulated Entity Property on Consumers' Premises	-	-	-	-	-
20	Street Lights and Signal Systems	136,850	286,870	299,065	311,337	324,736
21	Submarine Cables	-	-	-	-	-

SCHEDULE C.1.3 CAPITAL EXPENDITURE FORECASTS: TOTAL NOMINAL - in PESO

		2007	2008	2009	2010	2011
	B. General Plant					
22	Land and Land Rights (non-network)	-	-	-	-	-
23	Structures and Improvements (non-network)	4,109,750	1,777,244	58,787,563	182,960,512	101,894,769
24	Office Furniture and Equipment	18,561,435	16,569,657	16,156,541	6,770,007	23,262,142
25	Transportation Equipment	19,088,919	27,039,299	34,998,164	4,858,613	6,513,429
26	Stores Equipment	-	-	-	-	-
27	Tools, Shop and Garage Equipment	10,777,008	5,613,006	6,883,308	1,483,789	865,823
28	Laboratory Equipment	-	1,349,239	-	334,180	-
29	Information systems equipment (non-network)	12,080,833	16,250,634	20,609,702	9,221,899	10,463,885
30	Power-operated Equipment	-	-	-	-	-
31	Communication Plant and Equipment	3,673,884	2,286,987	479,760	132,457	869,505
32	Miscellaneous Equipment	1,443,365	6,601,564	476,725	337,978	6,845
33	**C. Materials and Supplies (including spares)**	-	3,351,600	4,684,400	6,025,600	7,490,000
34	**D. Transferred subtransmission assets**	-	-	-	-	-
35	**E. Allocated Overheads Capitalized**	-	-	-	-	-
	TOTAL	**452,737,997**	**413,068,806**	**400,067,421**	**385,535,247**	**315,527,297**

Schedule C1.4
Justification of Capital Expenditure
(Major and Minor Projects)

A. TOTAL CAPITAL EXPENDITURE FORECAST

The total capital expenditures for the 2ND Regulatory Period covering the Regulatory Years 2008 to 2011 amount in nominal values at P1,432 million, or an average investment over four years of P358 million.

As shown in the table below, of the P1,432 total capital expenditures, P926 million or 65% shall be spent for Distribution Plant facilities necessary to serve load growth, renew/refurbish the existing system and facilities, to meet performance targets, and to comply with the Philippine Grid and Distribution Codes and other regulatory requirements.

The remaining P506 million or 35% of the total capital requirements shall be for General Plant facilities.

ASSET CATEGORY	2008	2009	2010	2011	TOTAL
Distribution Plant	332	257	173	164	926
General Plant	70	81	143	212	506
T O T A L	**402**	**338**	**316**	**376**	**1,432**

B. MAJOR PROJECTS

There are two major projects under the expenditure forecast for Distribution Plant assets, namely:

1. Development of 20MVA 69/34.5kv Substation at Kauswagan in 2009 projected to cost in real value at P 19,958,407 plus $ 861,708

excluding cost for freight and handling estimated at 6.815% or a total nominal peso value at P 77,433,285 (please refer to Annex A).

2. Development of 20MVA 69/34.5kV Substation at Baloy in 2007 projected to cost in real value at P 24,478,158 plus $ 1,051,466 excluding cost for freight and handling estimated at 6.815% or a total nominal peso value at P 89,262,962 (please refer to Annex Q).

The only major project under the General Plant assets is the construction of a Corporate/Administrative Building in 2009 – 2011 projected to cost in real value at P 283,610,000 or total nominal value at P 345,998,199.

Justification of the project is presented in Annex B.

C. MINOR PROJECTS

Some of the minor projects are the following:

(Note: Cost shown in the annexes is in real value.)

1. Upgrading of Carmen 10 MVA, 69-13.8kV Power Transformer at Carmen (Annex C)
2. Installation of 10 MVA Power Transformer from Carmen to Macasandig Substation (Annex C)
3. Upgrading of Pueblo Substation from 10 MVA to 20 MVA (Annex C)
4. Installation of the old 10 MVA, 69-34.5kV Power Transformer from Carmen to Tagoloan Substation (Annex C)

5. New lines construction, reconductoring and conversions (Annex C)
6. Installation of Circuit Breaker at Transco-Natumulan and Installation of SCADA ready Disconnect Switches in the T&D System (Annex C)
7. Asset Register Database Build-Up (Annex D)
8. Work Management System (Annex E)
9. Installation of Phase Markers (Annex F)
10. Compliance with the Philippine Grid and Distribution Code and other regulatory requirements (Annexes G, H, I, J, K, L, M, N, O,& P)

D. RESIDUAL AND OTHER CAPITAL EXPENDITURES

These are capital expenditures necessary to renew or refurbish the existing Distribution System that shall become non-functional due to its deteriorating and ageing condition or obsolescence.

These capital expenditures include normal T&D system renewal or refurbishment, line revision, minor and major line extensions.

These also include among others transportation equipment requirements, corporate ICT infrastructure and projects, capital requirements incidental to the hiring of additional personnel, and other capital items necessary to provide the basic support facilities, systems, and personnel in order to carry the company's obligations to provide better service and satisfy the requirements of existing and future customers.

Schedule C1.4 Annex A - 20 MVA, 69-34.5kV KAUSWAGAN SUBSTATION

CAGAYAN ELECTRIC POWER & LIGHT CO.,INC **2007-2011 Capital Expenditure Forecast** **Major Project Information Summary**	

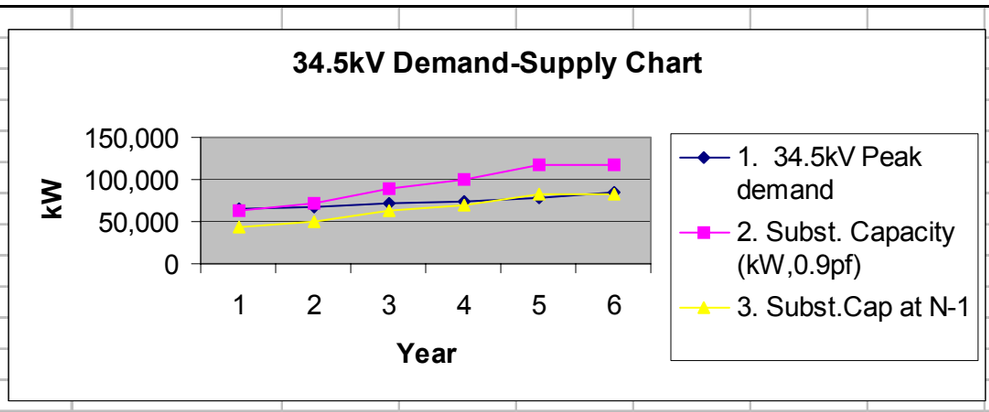
Project Details:	
Name	**20 MVA, 69-34.5kV KAUSWAGAN SUBSTATION**
Project code	
Description	The proposed Kauswagan substation is a new substation with 20 MVA capacity, self-cooled. Its primary voltage is 69kV, with 34.5kV secondary. The power transformer and other major equipment are all outdoor type and mounted on steel structures. The substation will be equipped with facilities for remote monitoring and control. RTUs, IEDs, and communication facilities will be installed in steel enclosures located inside the Control Building.
Commissioning date	2nd sem 2010

Project Classification:			
Rank	1st priority		
Project Driver Classification	**Load Growth**		
	a. Rank – 1st priority		
	b. Project Driver – Load Growth		
	c. Project Type – Growth		
Expenditure for the Period 2007-2011 (in Millions)	**Forex:** $861,708	**Local:** 19,958,407	**TOTAL:**

Project Purpose	The western part of the franchise area is seen as a high-growth area and demand for electricity in the coming years is anticipated to grow considerably. It is also estimated that the existing substations supplying the area will experience more than 100% of its rated capacity during peak periods. The addition of one substation in the western part will provide adequate capacity to the area and prevent overloading of these substations.
Impact if Project Not Implemented	If the project is not implemented there will be shortage of supply for the 34.5kV system in the eastern part. A worse case scenario would happen if any of the existing transformer would be out of service for whatever reason, since this would disrupt service to a large number of customers.
Reason for ranking project commissioning date relative to other projects	This project is given 1st priority ranking since this will provide the minimum delivery capacity and reliability levels to meet required service delivery standards.

Performance measures with/without project:

Parameter Under Consideration	Result without Project	Result with Project
Adequacy of Supply	Apparently, there is adequate supply for the whole 34.5kV system, however, the western part could be experiencing supply shortage in 2011 if the project will not be implemented.	There will be adequate supply in the western part and in any part of the 34.5kV system following its commissioning in 2010.
N-1 Reliability	The 34.5kV system will not attain its N-1 capability.	The addition of this project will enable the 34.5kV system to attain N-1 capability starting 2010. (Please see illustration below.)



B. 34.5kV System

MANCOM-approved projection	2006	2007	2008	2009	2010	2011
1. 34.5kV Peak demand	64,469	67,092	70,912	74,867	78,994	84,303
2. Subst. Capacity (kW,0.9pf)	63000	72000	90000	99000	117000	117000
3. Subst.Cap at N-1	44100	50400	63000	69300	81900	81900

Schedule C1.4 Annex B - CEPALCO Main Headquarters

Project Details:			
Name	**CEPALCO Main Headquarters**		
Description	Construction of a building that will house most of the managers and supervisory staffmembers of the company, and the central communications facilities. It will also house a customer service center, a customer training room, control room, several conference rooms, and the incedentals of a green building.		
Project Duration	**2009-2011**		

Project Classification:			
Rank	1st Priority	(Ongoing; 1st Priority; 2nd Priority)	
Project Driver Classification	Load Growth and Network Control	(Load Growth, Network non-growth, network control/safety/metering, non-network)	
Project Type Classification	Growth	(Replacement, Refurbishment, New Assets)	
Cost Disbursement 2009 – 2011	**Forex: US $**	**Local: PhP 283,610,000**	**Total: PhP 283,610,000**

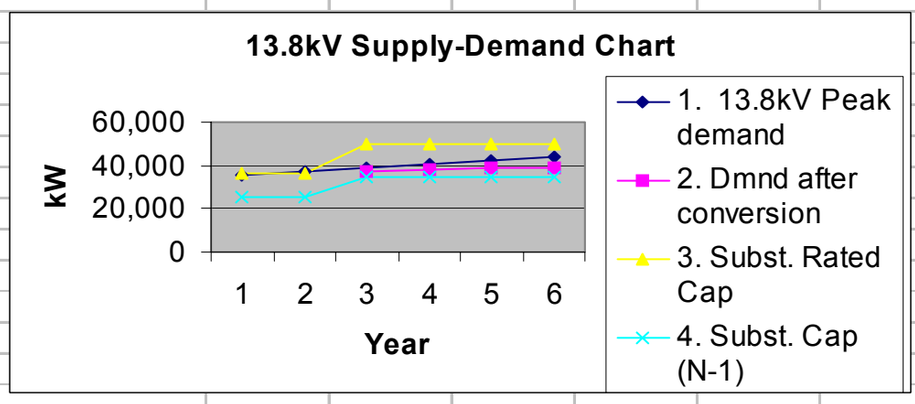
Project Need:	
Project Purpose	The purpose of the project is to provide adequate working spaces for the staff members and provide sufficient spaces to service customers.
Impact if Project Not Implemented	If not implemented, the existing office and incedental spaces used by the company will continue to become congested while customers transacting business with the company will continue to do so in cramped and uncomfortable areas.

Schedule C1.4 Annex C

1. Upgrading of Carmen 10 MVA, 69-13.8kV Power Transformer at Carmen 2007 Real Value: P 352,000
$ 460,914

This old power transformer will be replaced with a new 15 MVA power transformer. The upgrading is necessary to provide adequate capacity to the 13.8kV system. The chart below illustrates the demand and supply situation of the 13.8kV situation within the next 5 years. It shows that the additional 5MVA through upgrading of the old 10 MVA in 2007 will provide adequate supply to the 13.8kV system. The chart also shows that even with this upgrading, the planned N-1 capability is still not reached.

Figure 1. 13.8kV Supply-Demand Chart



A. 13.8kV System Projection →
MANCOM-approved projection

Year	2006	2007	2008	2009	2010	1011
1. 13.8kV Peak dema	35,540	36,986	38,540	40,170	41,893	43,718
2. Dmnd after conversion			37,540	38,170	38,893	38,718
3. Subst. Rated Cap	36,000	36,000	49,500	49,500	49,500	49,500
4. Subst. Cap (N-1)	25,200	25,200	34,650	34,650	34,650	34,650

2. Installation of 10 MVA Power Transformer from Carmen to Macasandig Substation 2008 Real Value: P 14,531,595
$ 335,962

This involves the old 10 MVA, 69-13.8kV power transformer currently installed at Carmen. In 2007, this power transformer will be replaced with a new and bigger 15 MVA transformer. The old transformer will then undergo rehabilitation and later installed at Macasandig substation to augment power supply for the 13.8kV system .

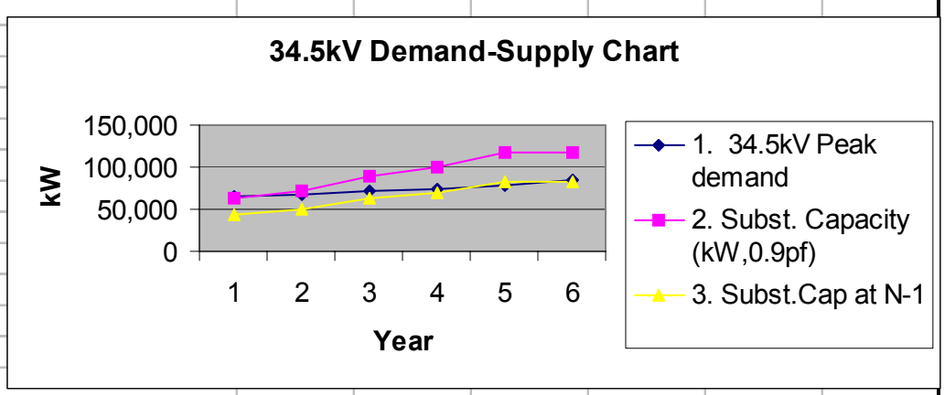
At the Macasandig substation, it will be installed beside an existing 15 MVA transformer bringing the whole substation to a total 25 MVA capacity rating, self-cooled. All other equipment and accessories will be brand new. Its 69kV Circuit breaker and other primary side equipment will all be outdoor type, while the medium voltage vacuum circuit breakers and other secondary side equipment and accessories will all be installed indoor.

The same Figure 1 above shows that the addition of this 10 MVA at Macasandig will avert a possible supply shortage in 2009 if no transformer is added to the 13.8kV system. Even with this adequate supply, the planned N-1 capability is still not reached.

3. Upgrading of Pueblo Substation from 10 MVA to 20 MVA
2007 Real Value: P 352,000
$ 478,215

The upgrading is necessary to provide adequate capacity to the 34.5kV system, especially the upper western part where SM and the Pueblo township is located. The old 10 MVA transformer will replace another 10 MVA transformer at Carmen which is due for rehabilitation. The illustration below shows that the additional 10 MVA resulting from the upgrading of the old transformer will avert a possible supply shortage in 2007. It also shows that the N-1 capability is still not reached even with this additional capacity alone.

Figure 2. 34.5kV Demand-Supply Chart



B. 34.5kV System						
MANCOM-approved projection	2006	2007	2008	2009	2010	2011
1. 34.5kV Peak demand	64,469	67,092	70,912	74,867	78,994	84,303
2. Subst. Capacity (kW,0.	63000	72000	90000	99000	117000	117000
3. Subst.Cap at N-1	44100	50400	63000	69300	81900	81900

4. Installation of the old 10 MVA, 69-34.5kV power transformer from Carmen to Tagoloan substation 2008 Real Value: P 24,221,664
$ 315,534

This refers to the old 10 MVA power transformer from Carmen which will be replaced in 2007 by the other 10 MVA from Pueblo. Upon retirement, it will undergo rehabilitation and eventually installed at Tagoloan substation, beside the old 30 MVA transformer.

The installation in 2009 will provide adequate capacity to the 34.5kV system especially in the eastern part that is being supplied only by the lone 30 MVA transformer. Even then, the 34.5kV system will not reach its N-1 capability in 2009, but this 10 MVA will help in attaining this objective in 2010 with the addition of a new 20 MVA substation at Kauswagan.

5. Line Conversion Projects

These are conversion of lines from 13.8kV to 34.5kV. The projects listed are part of the plan to limit only the 13.8kV system to those areas located at Cagayan Poblacion, the central urban part of the city. The 13.8kV lines located in the outlying areas which are included in the list will be converted to 34.5kV system. These conversions help in reducing system losses.

6. Line Reconductoring

Line reconductoring projects are being planned to those lines both 13.8 and 34.5kV that are expected to experience increased loading in the future. The reconductoring from smaller wire to bigger wires with increased ampacity will enable these lines to handle bigger loads both for normal operation and during switching . Most of these lines form the backbone portion of the distribution system and should therefore have that ready capacity to handle large loads.

7. New Lines

34.5kV Line from Alae to ArHEP
This line will enable CEPALCO to reach potential customers in the outlying area. In addition, it will establish a link between the CEPALCO lines and the Agusan River Hydro Electric Plant having 1.6 MW capacity – a potential source of supply for the CEPALCO franchise.

69kV Line from Minergy to Natumulan

The line is the last phase of the ongoing construction of an alternative 69kV line from Transco's Natumulan Substation to CEPALCO's main substations. The line is an important part of the 69kV loop for it will provide an alternative line supplying the substations. In addition, it serves as a backup line and enable the substations to be supplied whenever its normal supply line is incapacitated for whaterver reason.

34.5kV Line from Taguanao to Tipolohon

The line is intended to serve customers at a fast-growing area in Tipolohon.

8. Installation of Circuit Breaker at Transco-Natumulan and Installation of SCADA ready Disconnect Switches in the T&D System

The circuit breaker is needed to control and protect the proposed 69kV line loop (Item D.1 above). Disconnect switches will also be installed at various points in the distribution system to facilitate easy sectionalization and isolation of lines.

Schedule C1.4 Annex D – Asset Register Database Build-up

Project Details:	
Name	**Asset Register Database Build-Up**
Description	**Build-up of Geographical Information System (GIS) Based Asset Register Database and Implementation of Automated Mapping and Facilities Management Application.**
Project Duration	**2nd Semester 2006 to End of 2007**

Project Classification:			
Rank		(Ongoing; 1st Priority; 2nd Priority)	
Project Driver Classification		(Load Growth, Network non-growth, network control/safety/metering, non-network)	
Project Type Classification		(Replacement, Refurbishment, New Assets)	
Cost Disbursement 2006 – 20011	**Forex: US $**	**Local: PhP 18,539,400.00**	**Total: PhP 18,539,400.00**

Project Recommendation:			
Capex Project Classification:	**Approved Fully**	**Approved at X%**	**Not Approved**
Recommendation:	**Yes**		
Primary Reason(s) for Decision	The build-up of a GIS-based Asset Register is basically the development of a Continuing Property Record that contains all Unitized Property Units with the following attributes: quantity, purchase price, installed (or as-built) cost, year installed or placed in service, and significant changes in value due to maintenance or refurbishment. By adding another data to each property unit – the location or geo-location – the Asset Register becomes GIS-capable. As GIS-capable, Asset Register will have a self-checking feature as the data will have a geo-location on which to physically verify where it is installed thus ensuring the accuracy of the Asset Register. These cannot be satisfactorily attained if the Asset Register is not GIS-capable. Accurate, complete, and up-to-date geo-referenced Asset Register is already a valuable asset, but this value can be further dramatically increased if GIS-based applications are implemented to avail of the data, thus enabling the company to effectively manage the assets. This application, which is an integral part of the project, is the Automated Mapping and Facilities Management (AM/FM) Work associated with assets is 80% geo-spatial in nature (related to a point in the map). The company needs a GIS-based automated mapping software to sustain and maintain the updating of the base map, thus providing accurate, complete and up-to-date data to the users, providing the users capability to view and analyze the spatial data in ways to create thematic maps, like franchise area classification, soil types, shorelines, vegetation		

	growth, etc. Facilities Management (FM) would enable the company to use circuit topology and perform spatial analysis and optimal path determination. FM can readily determine and show Planned Network, Network Under Construction and Network in Operation once AM/FM is interfaced with Work Management System. Queries and verification can easily be made to provide type and quantity of facilities (assets) per voltage level, per feeder, per section, per area. AM/FM will also provide the company the opportunities to manage effectively right-of-way assets, pole usage, and vegetation clearing. With the AM/FM, customers' locations and network connectivity can be reflected on the base maps and distribution network. These will provide the Customer Assistance and Services groups and System Operators the capability to promptly determine the locations of affected customers for transmission to the field crews, thus aiding in hastening the resolution of customers' complaints.
Other Comments	Mapping is a major issue for the company as it is dedicated in improving system reliability. The company's existing base map is in AutoCAD and this map is overlaid with the distribution facilities. These base map and the overlaid facilities need to be converted to GIS-based environment. In essence, GIS-capable Asset Register and GIS-based applications will provide company with tools to improve productivity and implement efficiency initiatives to reduce the cost of constructing, operating and maintaining distribution facilities. Incoming competitive market and stricter regulatory requirements will demand for more efficient operations, while an increasingly complex infrastructure requires more monitoring and maintenance. The GIS-based systems can effectively meet these challenges and contribute to the improvement of system reliability.

Analysis of Project

The existing AutoCAD-based base map, overlaid facilities and over customer locations will have to be converted to GIS-based environment. The conversion will involve acquisition of GIS-based software, hardware (computers and Geographical Position System, or GPS device), training, geo-database design and actual field survey and verification of asset locations. The survey output will then update the existing asset register by providing the asset entities with geo-locations and then reconciled, and all attributes added, as required by ERC in the PBR.

The system will require a relational database system software to store and handle all the attributes and a spatial database engine software to interface with the AM/FM software.

Reasons to Support Recommendation:

Schedule C1.4 Annex E - Work Management System (WMS)

Project Details:	
Name	**Work Management System (WMS)**
Description	Implementation of Work Management System (WMS) application to cover project planning and design, project cost estimating, project scheduling and project monitoring; data on completed projects to serve as inputs to update the Asset Register.
Project Duration	1st and 2nd Semesters of 2008

Project Classification:			
Rank		(Ongoing; 1st Priority; 2nd Priority)	
Project Driver Classification		(Load Growth, Network non-growth, network control/safety/metering, non-network)	
Project Type Classification		(Replacement, Refurbishment, New Assets)	
Cost Disbursement 2008 – 2011	**Forex: US $**	**Local: PhP 10,910,000.00**	**Total: PhP 10,910,000.00**

Project Recommendation:				
Capex Project Classification:		**Approved Fully**	**Approved at X%**	**Not Approved**
Recommendation:		**Yes**		
Primary Reason(s) for Decision	The Work Management System (WMS) application produces the largest benefits in the GIS system as it automates the design, cost estimating and scheduling, resulting to substantial reduction in average price per work order. Likewise, as a result of optimizing the design process, there is also savings in the areas of inventory, materials handling and carrying costs, as WMS will be interfaced with the existing Materials Inventory System (in the Solomon Financial software).			
Other Comments	The WMS application will avail of the GIS-based facilities database (with interface to Asset Register) and interface with AM/FM application for ready assessment on the project locations, line routes, access roads, right-of-way concerns, possible vegetation clearing, etc. Non-implementation of a GIS-based WMS cannot sustain the expected volume of work order generation and processing and will adversely affect the update of the Asset Register. Completed projects from WMS will be reflected (layered) in the AM/FM base map and facilities database on Per-Work-Order, for ready access and reference for project installation date, energization date, total project cost, project duration, etc. and interfaced (indexed) with the corresponding reflected line assets in the Asset Register.			

Analysis of Project

The critical requirement of the timely implementation and effective use and operation of the WMS application is that all data inputs are accurate, complete and up-to-date, as WMS is only as good as the quality of the data provided. The quality and timely requirements of the data input can only be attained with the use of portable data devices (PDAs) by all personnel handling tasks related to the utilization, recording and monitoring of distribution line materials and equipment. Some PDAs that will be used in the field will be equipped with geographical positioning system (GPS) to also capture the installed materials/equipment's and the customers' locations (location coordinates). The base map, facilities symbols and customer locations are readily updated once the PDAs are brought to the central station for uploading to the system. For completed projects, the uploaded data will promptly update the Asset Register. Hence, all the users of WMS will share and use common data, which are accurate, complete and up-to-date. The data storage and handling will be handled by the RDBMS software.

For much clearer prints, a DeskJet Plotter will be acquired during the implementation.

Reasons to Support Recommendation:

Schedule C1.4 Annex F - Installation of Phase Markers

Project Details:	
Name	**Installation of Phase Markers**
Description	**Installation of Phase Markers to Primary and Secondary Distribution Lines**
Project Duration	**2nd Semester 2006 to 1st Semester 2010**

Project Classification:			
Rank		(Ongoing; 1st Priority; 2nd Priority)	
Project Driver Classification		(Load Growth, Network non-growth, network control/safety/metering, non-network)	
Project Type Classification		(Replacement, Refurbishment, New Assets)	
Cost Disbursement 2007 – 2011	**Forex: US $**	**Local: PhP 8,217,526.00**	**Total: PhP 8,217,526.00**

Project Recommendation:			
Capex Project Classification:	**Approved Fully**	**Approved at X%**	**Not Approved**
Recommendation:	**Yes**		
Primary Reason(s) for Decision	The phase marking is necessary in order to have a reliable, common and consistent reference for planning, network modeling, and load balancing.		
Other Comments	Phase markers will also serve as common visual reference for field surveys, line works, proper phase connection of all line equipment and devices (i.e., distribution transformers, protection devices), for connection of customer loads and serve as aids in identifying line faulted lines. Monitoring of the customer loads per phase will lead to proactive load balancing and to prompt identification of customers affected by single-phasing problems.		

Analysis of Project

The tracing of backbone primary pole-to-pole phasing and the updating of the facilities database and base maps are on-going. Data gathered from these will serve as the input for the Project.

The physical installation of phase markers are divided into three (3) phases: 69kV poles with duration of 20 months; 34.5kV and 13.8kV poles with duration of 20 months; and the secondary poles with duration of 18 months. Phase Marking of the 69kV poles can only be performed during scheduled line maintenance; and those of 34.5kV and 13.8kV poles to be on “hot-line” work. The scheme is to install the markers at every 5 spans, unless there is a shift in phase. Points of connections with Transco and laterals will also bear phase markers.

The Project Cost stated covers the materials, labor and administrative services.

Reasons to Support Recommendation:

Schedule C1.4 Annex G - Revamp of 2300 35kV porcelain type fuse cut-outs and replacement with polymer-type or higher BIL rating porcelain type fuse cut-outs

Project Details

Name	Revamp of 2300 35kV porcelain type fuse cut-outs and replacement with polymer-type or higher BIL rating porcelain type fuse cut-outs
Description	This project is intended to replace the existing 27kV rated fused cutouts used in the protection of distribution transformers at the 34.5kV distribution system of Cagayan Electric Power & Light Co., Incorporated. The rating of the proposed cutout is a 36kV with a Basic Insulation Level rating of 170 kV and a longer line to ground distance cutout.
Project duration	July 2007 – June 2011

Project Classification

Rank	Ongoing	(Ongoing; 1st Priority; 2nd Priority)	
Project Categorization	Renewal	(Renewal; Refurbishment; Growth or New Assets)	
Project Sub-Categorization	Overhead conductors and devices - Distribution	(As defined in Appendix F of the DWRG Issues Paper)	
Cost Disbursement 2008 – 2011 (Real Value – 2006)	Forex: US$	Local: PhP 14,370,440	Total: Php 14,370,440

Project Recommendation

Capex Project Classification :	Approved Fully	Approved at X%	Not Approved
Recommendation :	Yes		
Primary Reason(s) for Decision	To reduce the occurrence of flashover at insulator surface particularly at porcelain holders of cutouts which resulted in many feeder interruptions is the primary reason of pursuing this project.		
Other Comments	Fuse cutouts are extensively used in electric distribution systems. Its primary purpose is for protection of distribution transformers, lateral lines and other distribution devices. During dry season or when there are long periods of no rain dust, salt particles and other contaminants build up at the porcelain insulators of cutouts. Porcelain insulators are used to support the blade and contacts of the cutouts. When there are drizzles or slight rain, the said contaminants becomes conductors and this could triggers flashovers, which will develop into line to ground faults. Even though		

	most cutouts will not fail during flashover occurrences, these would result to feeder tripping, which are very annoying to affected customers. The presence of large number of cutouts installed would make line patrol very time consuming particularly when a failed cutout resulted to a permanent fault. Experience shows that flashovers at the existing cutouts used in the 34.5kV distribution system, which are rated 27kV are very common. Cleaning of insulators which include cutouts is an alternative. Cleaning can be done either live or not. Live line cleaning would require the necessary equipment and trained personnel to safety perform maintenance. On the other hand there will many customers that will be affected if the cleaning will be done when the line is interrupted. Considering the quantity of cutouts to be cleaned periodically, the necessary interruptions that many customers will surely does not want to experience and the expensive hotline equipment that is required for cleaning, CEPALCO engineers decided to increase the existing Basic Insulation Level of distribution cutouts for the 34 .5kV distribution system. Natural cleaning by rain shower will be depended.

Analysis of Project

It is widely known that dirty or defective insulators and bushings are the cause of most flashovers, resulting in down-time and loss of production. Atmospheric contamination build-up on electrical apparatus generated from industrial plants and mills as well as some residential and commercial locations contribute heavily to black-outs and brown-outs. This contamination builds up on insulators, bushings, lightning arrestors, current-transformers, potential-transformers, stress cones, potheads, fuse holders, switches, terminators, trificators, and guy-wire insulators. Depending on the resistance values associated with said contamination, tracking, and in extreme circumstances, arcing takes place usually during periods of light to moderate rainfall. When this contamination forms of a bridge of conductive material over your porcelain non-conductor (insulator) the high voltage electricity finds a path to ground (phase-to-ground fault) resulting in a number of possible inconveniences for your firm including, but not limited to: insulator explosion, insulator etching, insulator chipping, circuit-trip, exposed live-lines, damage to transformers and breakers, loss of production, injury to personnel, exposure to electrocution risks to personnel, expensive and time-consuming repairs, and fires.

Reasons to Support Recommendation

This project promotes improvement of reliability of the distribution system of CEPALCO.

Schedule C1.4 Annex H - Installation of Fuse Cut-outs at Distribution Primary Lateral Lines

Project Details

Name	Installation of Fuse Cut-outs at Distribution Primary Lateral Lines
Description	This project is intended to improve the distribution reliability by installing fused cutouts at tapped and lateral lines.
Project Duration	July 2007 – December 2010

Project Classification

Rank	Ongoing	(Ongoing; 1st Priority; 2nd Priority)	
Project Categorization	Growth or New Assets	(Renewal; Refurbishment; Growth or New Assets)	
Project Sub-Categorization	Overhead conductors and devices - Distribution	(As defined in Appendix F of the DWRG Issues Paper)	
Cost Disbursement 2007 – 2011 (Real Value – 2006)	Forex: US$	Local: PhP 2,294,461.51	Total: Php 2,294,461.51

Project Recommendation

Capex Project Classification :	Approved Fully	Approved at X%	Not Approved
Recommendation :	Yes		
Primary Reason(s) for Decision	The primary reason of pursuing this project is to improve the reliability of the distribution system of CEPALCO. These cutouts will protect the main line for any line faults located downstream from the cutouts or in lateral sections of the feeder.		
Other Comments	These cutouts will be used as isolating devices during normal or emergency works along that lateral line. This will prevent at least one interruption per emergency repair work.		

Analysis of Project

Feeder tripping due to fault in the lateral lines should be avoided. In the design of electric power distribution system, faults in lateral lines should not result to feeder or main line interruption. A protective device should response to fault in tapped or lateral lines and isolate the faulted portion. A cheaper way of accomplishing this protective function is the installation of cutouts at tapped lines.

Reasons to Support Recommendation

The impact of this project is on the improvement of reliability in distribution systems. This project would have a major contribution in meeting or exceeding targets in the performance incentive scheme submitted by CEPALCO to the Energy Regulatory Commission.

Schedule C1.4 Annex I - Revamp 1800 35kV porcelain arresters and replacement with composite or polymer-type arresters

Project Details

Name	Revamp 1800 35kV porcelain arresters and replacement with composite or polymer-type arresters
Description	This project is intended to replace existing porcelain insulated arresters with polymer insulation. Since many of the arresters installed in the power distribution system of Cagayan Electric Power & Light Company Incorporated (CEPALCO) are still made of silicon carbide, the replacements are metal oxide varistor (MOV), which will have better protection capabilities.
Project Duration	July 2007 – December 2009

Project Classification

Rank	Ongoing	(Ongoing; 1st Priority; 2nd Priority)	
Project Driver Classification	Renewal	(Renewal; Network non-growth; network control / safety / metering; non network)	
Project Type Classification	Replacement	(Replacement; Refurbishment; New Assets)	
Cost Disbursement 2008 – 2011 (Real Values – 2006)	Forex: US$	Local: PhP 9,035,493.55	Total: Php 9,035,493.55

Project Recommendation

Capex Project Classification :	Approved Fully	Approved at X%	Not Approved
Recommendation :	Yes		
Primary Reason(s) for Decision	The advantages of polymer-housed and metal oxide varistor in terms of public safety and improved reliability are the primary reasons why the existing arresters installed in the 34.5kV distribution system are planned to be replaced. It is expected that substantially lower failure rate, safer operation and better contamination performance than porcelain counterparts.		
Other Comments	CEPALCO's 34.5kV distribution system is multi-grounded. Lightning arresters are installed to protect distribution equipment from the damaging effects of lightning and other high voltage phenomenon. Most of the existing arresters installed were porcelain-housed silicon carbide arresters. Faults due to arresters are usually permanent. Delay in power restoration is usually attributed to the difficulty in locating faulted or failed arrester. Its impact is more on the System Average Interruption Duration Index (SAIDI). Reliability Indices are to be regularly submitted to the Energy Regulatory Commission. The Philippine Distribution Code also stated the annual evaluation of these submitted indices. Since polymer insulators are better than porcelain in contaminated areas, this project targets both the reduction of interruption due to flashovers and failure of arresters due to moisture ingress. As experience, the first few succeeding faults on arresters due to flashover would result to temporary or transient faults only. The		

	installation of polymer-housed arresters will reduce these short interruptions thus improving the System Average Interruption Frequency Index (SAIFI). Aside from porcelain-housed arrester the only available insulation in the market for distribution lightning arrester is polymer. Replacing the existing units with the same porcelain housed arresters will not address safety and reliability.

Analysis of Project

Arresters are used in distribution systems to protect equipment and lines against the damaging effects of lightning and other surges. Since arresters are used as a protective device, it must be of high quality and very reliable. Most of CEPALCO's arresters are porcelain type. Meaning the insulator is made of porcelain. Although porcelain insulators are already used in different applications installed for quite some time, many porcelain type lightning arresters had failed. Causes of failure are usually due to moisture ingress, lightning surges and other contaminants. As experienced there were cases of faulted arresters, which does not explode or show signs of defect and were very difficult to locate. Line crew had to inspect every pole with arrester attached to it. This activity is very time consuming especially during bad weather conditions. For those porcelain arresters which failed and exploded, consideration of public safety due to ejected pieces of shattered porcelain and internal parts is one of the main reasons that CEPALCO wanted to shift to polymer arresters. This has been especially of concern since rights-of-way for most of CEPALCO's distribution network are located in close proximity from main roads and distribution poles are often situated directly in front of pedestrian lanes. Another is the performance of metal oxide arresters which is superior compared to silicon carbide arresters.

Reasons to Support Recommendation

This project promotes improvement of safety and reliability of the distribution system of CEPALCO.

Schedule C1.4 Annex J - Change-out of 8000 35kV rated porcelain pin-type insulators

Project Details

Name	Change-out of 8000 35kV rated porcelain pin-type insulators
Description	Majority of the 34.5kV distribution system of Cagayan Electric Power & Light Company Incorporated (CEPALCO) is situated along coastal roads. This project is intended to replace existing pin-type insulators, which are prone to flashovers.
Project Duration	July 2007 – June 2011

Project Classification

Rank	1st Priority	(Ongoing; 1st Priority; 2nd Priority)	
Project Categorization	Renewal	(Renewal; Refurbishment; Growth or New Assets)	
Project Sub-Categorization	Overhead conductors and devices - Distribution	(As defined in Appendix F of the DWRG Issues Paper)	
Cost Disbursement 2007 – 2011 (Real Value – 2006)	Forex: US$	Local: PhP 23,168,958	Total: Php 23,168,958

Project Recommendation

Capex Project Classification :	Approved Fully	Approved at X%	Not Approved
Recommendation :	Yes		
Primary Reason(s) for Decision	To reduce the frequency of insulator flashover related interruptions caused by some pollutants, Cagayan Electric Power & Light Company Incorporated (CEPALCO) decided to replace all pin-type insulators installed at the 34.5kV distribution system.		
Other Comments	Pin-type insulators installed at pole structures along coastal road are subject to salt and other contaminants which would result to flashovers and eventually power interruptions. Experience with existing pin-type insulators shows that after a long period of no rain, many insulators flashover are likely to happen. Contaminations at the surface of insulators which could become paths to leakage current and will later result to flashover are very common on the 34.5kV distribution systems. Reliability of the CEPALCO's 34.5kV distribution is very much affected on the flashover related interruptions. On the side of the customers their business operations and other processes are affected with many interruptions due to flashover. To promote a more economic activities within its franchise areas it is imperative to address problems related to flashover.		

Analysis of Project

As already stated, majority of CEPALCO's 34.5KV distribution lines were installed and situated along coastal roads. Salts, dust and other contaminants were the main causes of power interruptions on the 34.5KV lines especially during the start of rainy season from a long dry spell. Contamination in the lines will result to flashover. Once wet, these contaminants become good conductors causing line to ground faults, which would result to power interruption. The worst scenario is the breaking of porcelain insulators after a flashover incident. Power supply restoration would require first the replacement of failed insulators. Interruptions due to flashover are very annoying. Just after restoration, another interruption follows. These scenarios should be reduced to a certain level to minimize complaints on power quality.

Since most faults due to flashover are transient in nature, reducing its frequency has a big impact to the System Interruption Frequency Index (SAIFI), which will subsequently reduce the System Duration Frequency Index (SAIDI). The above indices will be submitted regularly to the Energy Regulatory Commission and will be subjected for evaluation annually as stated in the Philippine Distribution Code.

Reasons to Support Recommendation
This project will help in the reduction of interruption due to flashovers.

Schedule C1.4 Annex K - Install Automatic Circuit Reclosers in the Primary Distribution System

Project Details:	
Name	**[ERC-DCP-PGC-016-6-2] Distribution System Reliability Improvement Projects**
Description	**Install Automatic Circuit Reclosers in the Primary Distribution System**
Project Duration	**July 2007 – December 2010**

Project Classification:			
Rank	1st Priority	(Ongoing; 1st Priority; 2nd Priority)	
Project Categorization	Growth-related or New Assets	(Renewal-related; Refurbishment-related; Growth-related or New Assets; Non-network Assets)	
Project Sub-Categorization	(6.) Overhead Conductors and Devices - Distribution	(As defined in Appendix F of the DWRG Issues Paper)	
Cost Disbursement 2007 – 2011	**Forex: US $ 184,224.04**	**Local: PhP 214,500.00**	**Total: PhP**

Project Recommendation:			
Capex Project Classification:	**Approved Fully**	**Approved at X%**	**Not Approved**
Recommendation:	**Yes**		
Primary Reason(s) for Decision (Why the Capex is required?)	To improve CEPALCO's reliability performance, through the reduction in SAIDI and SAIFI, by containing the effects of temporary faults to limited areas.		
Other Comments (Why the Capex is considered to be of reasonable magnitude?)	The initial reliability requirements in the Philippine Distribution Code are based on historical performance of the individual Distributors. From these initial limits, it is likely that the ERC will require incremental improvement in reliability each year. Therefore, it is in the best interest of CEPALCO to take a stepped approach to improving reliability, rather than installing large amounts of equipment in the first year. Substantial improvements in the reliability of feeders can be obtained by doing the following: providing for reclosing of the feeder breaker, installing one mid-feeder recloser, and fusing all laterals. Providing for reclosing of the feeder breaker is of high priority. This will be followed by fusing laterals with fuses that will provide for a "Fuse Saving" scheme. On feeders where fault availability is low at the end of the feeder, there is a need to install mid-feeder reclosers. The application of mid-feeder reclosers is intended to proceed on a slower schedule. The number to be installed each year is determined by the amount of desired reliability improvement and the availability of capital funds. The selection of feeders considers two features: relative reliability of the feeder with respect to other feeders, and the location of important customers. For the greatest impact on overall reliability, the mid-feeder reclosers will be installed at top priority on the		

	worst performing feeders each year. On feeders with particularly sensitive customers closer to the station than the mid-point of the feeder, a mid-point recloser could improve the reliability experienced by those customers. This is particularly true if the feeder relay supports sequence coordination. By installing mid-feeder reclosers on a set number of circuits per year, CEPALCO should experience a steady decrease in SAIFI and SAIDI over time. However, this will cause problems with one index in particular: MAIFI. The lack of reclosing on most of the feeders of CEPALCO has resulted in artificially low MAIFI numbers while greatly increasing the values of SAIFI and SAIDI. Implementing reclosing, along with other coordination changes, will significantly lower SAIFI and SAIDI but will increase MAIFI. CEPALCO would like to request the honorable ERC to please take particular consideration of this tradeoff. Part of CEPALCO's Compliance Plan for reliability improvement is to install mid-feeder reclosers at two reclosers per primary distribution voltage level per year so that every feeder would have one mid-feeder recloser at the end of 2011. A total of thirteen automatic circuit reclosers shall be installed within the second regulatory period (July 2007 – June 2011).

Budget Details of ERC-DCP-PGC-016-6-2 Project

DESCRIPTION	AMOUNT
Investment Cost	
1. Six units, Automatic Circuit Reclosers, 13.8 kV 3-Phase, US$	77,296.80
2. Seven units, Automatic Circuit Reclosers, 34.5 kV 3-Phase, US$	90,179.60
3. Locally-fabricated materials, Peso	195,000.00
Sub-Total: ERC-DCP-PDC-016-6-2 Project CAPEX, Peso	**195,000.00**
Contingency, Peso	**19,500.00**
Sub-Total: ERC-DCP-PDC-016-6-2 Project CAPEX, US $	**167,476.40**
Contingency, US $	**16,747.64**
Total: ERC-DCP-PDC-016-6-2 Project CAPEX, Peso	**214,500.00**
Total: ERC-DCP-PDC-016-6-2 Project CAPEX, US $	**184,224.04**

Reasons to Support Recommendation:

Enables CEPALCO to improve its reliability performance within the second regulatory period (2007-2011).

Schedule C1.4 Annex L - Compliance to the Requirements of Article 3.2.3.4 in DSC-PDC-001 of the Philippine Distribution Code

Project Details:	
Name	**[ERC-DCP-PDC-001-1] Compliance to the Requirements of Article 3.2.3.4 in DSC-PDC-001 of the Philippine Distribution Code**
Description	1. Formulation of Documents That Shall Contain the Operating and Control Policy and Procedures For Regulating the Voltage Within the Specified Limits of the PDC. 2. Creation and Keeping of Records That Will Demonstrate the Instructions, Responses, and Events Relative to Voltage Control of the Distribution System.
Project Duration	**July 2007 – April 2008**

Project Classification:			
Rank	1st Priority	(Ongoing; 1st Priority; 2nd Priority)	
Project Categorization	Non-network Assets	(Renewal-related; Refurbishment-related; Growth-related or New Assets; Non-network Assets)	
Project Sub-Categorization	(11.) Miscellaneous Equipment	(As defined in Appendix F of the DWRG Issues Paper)	
Cost Disbursement 2007 – 2011	**Forex: US $**	**Local: PhP 400,000.00**	**Total: PhP 400,000.00**

Project Recommendation:				
Capex Project Classification:	**Approved Fully**	**Approved at X%**	**Not Approved**	
Recommendation:	**Yes**			
Primary Reason(s) for Decision (Why the Capex is required?)	In order to comply with the second and third measurements of Article 3.2.3.4 in DSC-PDC-001 of the Philippine Distribution Code (PDC), CEPALCO needs to: 1. Formulate documents that shall contain the Operating and Control Policy and Procedures for regulating the voltage within the specified limits of the PDC. 2. Create and keep records that will demonstrate the instruction, responses, and events relative to Voltage Control of the Distribution System.			
Other Comments (Why the Capex is considered to be of reasonable magnitude?)	CEPALCO interprets the second and third measurements of Article 3.2.3.4 in DSC-PDC-001 to be interrelated. The second measurement states “The Distributor has documents containing the operating and control policy and procedures for regulating the voltage within the specified limits of the PDC.” The third measurement states “The Distributor has records that demonstrate the instructions, responses, and events relative to voltage control of the Distribution System.” At present CEPALCO do not meet both aforementioned measurements. After the approval of the honorable ERC of the above projects, CEPALCO will formulate the documents			

	required in the second measurement above, as part of the Standard Documents for System Planning and Operations, in line with its SCADA project. CEPALCO plans to complete its on-going distribution substation SCADA project until the end of year 2008. Once the SCADA project will be completed, all distribution substations shall be unmanned. Monitoring and control of all substation parameters, including the regulation of voltages at the on-load tap changers of power transformers, Automatic Voltage Regulators and switched capacitor banks, shall be centralized at the proposed control center to be located at the CEPALCO Engineering Complex at Puntod, Cagayan de Oro City. Once the second measurement of Articles 3.2.3.4 in DSC-PDC-001 will be met, compliance to the third measurement shall also follow. It is estimated that CEPALCO would take ten (10) months, starting July 2007, to complete both the second and third measurements of Article 3.2.3.4 in DSC-PDC-001. Bulk of the tasks shall be the customization of SCADA software functionalities and the actual documentation of the said documents. Two regular in-house staffs shall be allocated to take charge of this project.

Reasons to Support Recommendation:

This project will enable CEPALCO to comply with the second and third measurements of Article 3.2.3.4 of the Philippine Distribution Code or the:

1. Documents containing the operating and control policy and procedures for regulating the voltage within the specified limits of the PDC; and
2. Records that demonstrate the instructions, responses, and events relative to voltage control of the Distribution System.

Schedule C1.4 Annex M - [ERC-DCP-PDC-001-3] Compliance to the Requirements of Article 3.2.3.4 and Article 3.2.5.2 in DSC-PDC-001 of the Philippine Distribution Code

Project Details:	
Name	**[ERC-DCP-PDC-001-3] Compliance to the Requirements of Article 3.2.3.4 and Article 3.2.5.2 in DSC-PDC-001 of the Philippine Distribution Code**
Description	Proposal to Install Automatic Voltage Regulators at Every Medium Voltage (34.5- and 13.8-kV) Distribution Bus or Feeder
Project Duration	July 2007 – December 2009

Project Classification:			
Rank	1st Priority	(Ongoing; 1st Priority; 2nd Priority)	
Project Categorization	Growth-related or New Assets	(Renewal-related; Refurbishment-related; Growth-related or New Assets; Non-network Assets)	
Project Sub-Categorization	(14.) Power Conditioning Equipment	(As defined in Appendix F of the DWRG Issues Paper)	
Cost Disbursement 2007 – 2011	**Forex: US $ 124,694.81**	**Local: PhP 37,375,251.66**	**Total: PhP**

Project Recommendation:				
Capex Project Classification:	**Approved Fully**	**Approved at X%**	**Not Approved**	
Recommendation:	**Yes**			
Primary Reason(s) for Decision (Why the Capex is required?)	Voltage unbalance is not corrected by on-load tap-changing (OLTC) transformers. An OLTC transformer adjusts the voltage levels on all three phases simultaneously and equally. Automatic Voltage Regulators are the only practical means of ensuring compliance with the unbalance requirements of the Philippine Distribution Code. Proper load balancing can help reduce the number of AVRs required on a feeder, but cannot guarantee compliance under all normal loading conditions. It is possible, with proper load balancing, that a single set of three AVRs could be applied to the medium voltage bus of a distribution station to maintain proper voltage balance. However, long feeders may require additional AVR installations to maintain proper load balance at locations remote from the feeder source. Determining which feeders require an AVR installation is difficult using SynerGEE Electric or any other analysis package. While it is relatively simple to predict which feeders require an AVR installation to correct voltage level, predicting voltage unbalance is much more difficult. The peak unbalance at a given point along a feeder may not occur at peak load. It may only occur under a condition in which one section of the feeder is at peak load, while another is at some load less than its peak. Predicting when and where such conditions can exist is nearly impossible. Determining the feeders that most need an AVR installation for the purpose of correcting unbalance will likely involve field measurements of			

	voltage unbalance at three-phase customers.
Other Comments (Why the Capex is considered to be of reasonable magnitude?)	Article 3.2.3.4 of the Distribution code states "The Distributor shall ensure that no Undervoltage or Overvoltage is present at the Connection Point of any User during normal operating conditions. The ERC may require the distributor to comply with more stringent voltage variation limits, which shall be determined from technical and economic studies." The Code defines an Undervoltage as a voltage variation lasting longer than 1 minute where the RMS magnitude of the voltage is less than 90 percent of nominal. Similarly, an Overvoltage is a voltage variation lasting longer than 1 minute where the RMS magnitude of the voltage is greater than 110 percent of nominal. The Philippine Grid Code, which defines requirements for transmission utilities, allows the transmission supplier to provide a voltage level between 95% and 105% at the connection point to a Distributor. This allows the Distributor only a 5% voltage drop from the connection point with the grid to the point of service to a customer. The drop through the station power transformer can exceed 5% at full load and would tend to worsen with heavy loading. Much more, during peak load conditions, the voltage drop along heavily loaded long radial lines can reach more than 10% from the feeder bus through the end-point. Adjusting the manual tap on a station power transformer can make up the voltage drop through it, but could lead to overvoltage conditions during periods of light loading. The implication of Article 3.2.3.4 is the necessity of installing some form of automatic voltage regulation equipment on every distribution bus or feeder. Station power transformers with On Load Tap Changing (OLTC) capabilities can provide the required voltage regulation in most cases. However, Article 3.2.5.2 sets requirements for voltage unbalance that may force the use of single-phase Automatic Voltage Regulators (AVR). Article 3.2.5.2 of the Distribution code states "The maximum Voltage Unbalance at the Connection Point of any User, excluding the Voltage Unbalance passed on from the Grid, shall not exceed 2.5 percent during normal operating conditions." The Philippine Grid Code allows a voltage unbalance from the grid of up to 1 percent. Discerning what portion of the unbalance is from the Grid when a customer complains about high voltage unbalance could be quite difficult. It is likely the customer will consider 2.5% to be the limit, regardless of Grid levels. Therefore, in order to comply Article 3.2.3.4 and Article 3.2.5.2 in the Distribution code, CEPALCO proposes to install banked single-phase Automatic Voltage Regulators (AVRs) to all distribution substation busses or feeders. Within the second Regulatory Period (July 2007 - June 2011), CEPALCO proposes to install eighteen (18) single-phase AVR units for six (6) 13.8kV feeders and twenty-one (21) single-phase AVR units for seven (7) 34.5kV feeders.

Budget Details of ERC-DCP-PDC-001-3 Project

DESCRIPTION	AMOUNT
Project Cost	
1. Eighteen (18) units 13.8kV/7.96kV and twenty one (21) units 34.5/19.92 kV Single-phase Automatic Voltage Regulators, Pesos	29,120,949.00
2. H-Frame Structures and Components, 13.8 kV (6 sets) and 34.5 kV (7 sets), Pesos	1,363,145.40
3. Capacitor Hangers, 13.8 kV (6 sets) and 34.5 kV (7 sets), Pesos	314,049.45
4. Capacitors, Switches, and Accessories, 13.8 kV (200 kVar – 18 sets) and 34.5 kV (200 kVar – 21 sets)	$ 113,358.92
5. Engineering Design, Consultancy, and Installation Cost, Peso	3,179,357.66
Sub-Total: ERC-DCP-PDC-001-3 Project CAPEX, Peso	**33,977,501.51**
Contingency, Peso	**3,397,750.15**
Sub-Total of ERC-DCP-PDC-001-3 Project CAPEX, US $	**113,358.92**
Contingency, US $	**11,335,89**
Total: ERC-DCP-PDC-001-3 Project CAPEX, Peso	**37,375,251.66**
Total: ERC-DCP-PDC-001-3 Project CAPEX, US $	**124,694.81**

Reasons to Support Recommendation:

Enables CEPALCO to comply with Article 3.2.3.4 and Article 3.2.5.2 of the Philippine Distribution Code that state:

- Article 3.2.3.4 -- “The Distributor shall ensure that no Undervoltage or Overvoltage is present at the Connection Point of any User during normal operating conditions. The ERC may require the distributor to comply with more stringent voltage variation limits, which shall be determined from technical and economic studies.”

- Article 3.2.5.2 -- “The maximum Voltage Unbalance at the Connection Point of any User, excluding the Voltage Unbalance passed on from the Grid, shall not exceed 2.5 percent during normal operating conditions.”

Schedule C1.4 Annex N - Compliance to the Requirements of ERC-DCP-PDC-042-1 of the Philippine Distribution Code and ERC-DSC-PGC-024-1 of the Philippine Grid Code

Project Details:	
Name	**Compliance to the Requirements of ERC-DCP-PDC-042-1 of the Philippine Distribution Code and ERC-DSC-PGC-024-1 of the Philippine Grid Code.**
Description	Development of Safety Coordination that specifies the standard procedures to be used by CEPALCO and Users for the coordination, establishment, maintenance and cancellation of necessary Safety Precautions on 13.8kV up to 34.5kV and 69 kV up to 138kV Equipment when work or testing is to be carried out on the Distribution System of CEPALCO or the User System.
Project Duration	**July 2007 to June 2011**

Project Classification:			
Rank	**1st Priority**	(Ongoing; 1st Priority; 2nd Priority)	
Project Categorization	**Non-network Assets**	(Renewal-related; Refurbishment-related; Growth-related or New Assets; Non-network Assets)	
Project Sub-Categorization	**Miscellaneous Equipment**		
Cost Disbursement (2007 – 2011)	**Forex: US $**	**Local: PhP 2,035,764.50**	**Total: PhP 2,035,764.50**

Project Recommendation:				
Capex Project Classification:	**Approved Fully**	**Approved at X%**	**Not Approved**	
Recommendation:	**Yes**			
Primary Reason(s) for Decision (Why the Capex is required?)	The Philippine Distribution Code (PDC-042) and Philippine Grid Code (PGC-024) require CEPALCO to develop Safety Coordination that specifies the standard procedures to be used by CEPALCO and Users for the coordination, establishment, maintenance and cancellation of necessary Safety Precautions when work or testing is to be carried out on 13.8kV up to 34.5kV and 69kV up to 138kV Equipment on the System of CEPALCO or a User System. The CAPEX is necessary in order to: 1. Achieve Safety on the System of CEPALCO and on another System when work or testing on 13.8kV up to 34.5kV and 69kV			

	up to 138kV Equipment up to the Connection Point of a System that requires the provisions of Safety Precautions. 2. Meet the requirements in the Compliance Plan of the specified safety standards under PDC-042 and PGC-024.
Other Comments (Why the Capex is considered to be of reasonable magnitude?)	The Development of Safety Coordination on the System of CEPALCO and on the User System requires the following safety activities: ♦ Development and adoption of Safety Coordination Procedures ♦ Assignment of Safety Coordinators* ♦ Keeping of Safety Logs and Record of Inter-System Safety Precautions ♦ Location of Safety Precautions* ♦ Implementation of Safety Precautions* ♦ Authorization of Work and/or Testing* ♦ Cancellation of Safety Precautions* Most of the safety requirements (marked with *) are already practiced in the System of CEPALCO and on the User System, and are presently incorporated and implemented when work or testing of 13.8kV up to 34.5kV and 69kV up to 138kV Equipment up to the Connection Point is done. The Compliance Plan of the Philippine Grid Code (PGC-024) and PGC-024, require CEPALCO to correct all of CEPALCO existing safety coordination procedures for Safety Precautions in accordance with the specified standards. This will be achieved through the improvements of existing safety practices, acquisition of additional equipment and use of Safety Rules and Local Safety Instructions.

Reasons to Support Recommendation:

Allows CEPALCO to achieve Compliance Plan No. ERC-DCP-PDC-042-1 and Compliance Plan No. ERC-DCP-PGC-024-1, and enables to develop Safety Coordination that specifies the standard procedures to be used by CEPALCO and Users for the coordination, establishment, maintenance and cancellation of necessary Safety Precautions.

Budget Details of ERC-DCP-PDC-042-1 & ERC-DCP-PGC-042-1 Projects

The following cost estimate represents the costs of the items common to both standards, PGC-024 and PDC-042.

Item	Qty	Unit	Unit Cost, Php Peso	Amount, PhpPeso
A. Operating Items (Annual Cost)				
1. Operations and Maintenanance *(Approximately 8% of the Total Capitalized Cost)* Salary of additional safety personnel, materials & office supplies, gas & oil, equipment repair and maintenance				179,147.28
2. Other costs, Depreciation *(approx. 6.43% of the Total Capitalized Cost)*				143,989.62
Total, Operating Costs				**323,136.90**

B. Capital Items				
1. Office Equipment:				
Computer set	1	set	32,000.00	38,720.00
Printer, deskjet	1	set	8,000.00	9,680.00
Office desk	1	unit	10,000.00	12,100.00
Chair, ergonomic	1	unit	1,500.00	1,815.00
Computer table	1	unit	3,500.00	4,235.00
2. Grounding Clusters:				
for 13.8kV & 34.5kV	3	set	60,000.00	217,800.00
for 69kV &138kV	3	set	60,000.00	217,800.00
3. Multi Range Voltage Detector (MRVD):				
for 13.8kV & 34.5kV *(C403-0979; Range: 1kV up to 34.5kV)*	3	unit	72,000.00	261,360.00
for 69kV & 138kV *(C403-1140; Range: 69kV up to 600kV)*	3	unit	72,000.00	261,360.00
4. Universal Wire Brush *(M4455-63)*	3	pc	5,000.00	18,150.00
5. Universal Pole *(C400-1584)*	3	pc	22,500.00	81,675.00
6. Izusu, IPV	1	unit	600,000.00	726,000.00
Sub-Total, Capital Costs				**1,850,695.00**
Contingency				**185,069.50**
Total Costs: ERC-DCP-PGC-024 & ERC-DCP-PDC-042-1				**2,035,764.50**

Schedule C1.4 Annex O - These projects are applicable to the Connection Points to the Distribution System having Average Monthly Peak Demand of 1 MW and Above

Project Details:	
Name	**Project Number: ERC-DCP-PDC-027-1** **Title: Preparation to Complete the Fixed Asset Boundary Document for all Connection Points** **Project Number: ERC-DCP-PDC-028-1** **Title: Preparation to Complete Electrical Diagrams for All Connection Points** **Project Number: ERC-DCP-PDC-029-1** **Title: Preparation to Complete Connection Point Drawings for All Connection Points** **Project Number: ERC-DCP-PDC-030-1** **Title: Preparation to Complete Distribution System Data for all Connection Points** **Note: These projects are applicable to the Connection Points to the Distribution System having Average Monthly Peak Demand of 1 MW and Above.**
Description	**- see above -**
Project Duration	**July 2007 – April 2008**

Project Classification:			
Rank	1st Priority	(Ongoing; 1st Priority; 2nd Priority)	
Project Categorization	Non-network Assets	(Renewal-related; Refurbishment-related; Growth-related or New Assets; Non-network Assets)	
Project Sub-Categorization	Miscellaneous Eqpt		
Cost Disbursement 2007 – 2011	**Forex: US $**	**Local: PhP 1,389,300**	**Total: PhP 1,389,300**

Project Recommendation:			
Capex Project Classification:	**Approved Fully**	**Approved at X%**	**Not Approved**
Recommendation:	**Yes**		

Primary Reason(s) for Decision (Why the Capex is required?)	Currently, Cepalco have 18 bulk customers (average demand of 1 MW & above) within its franchise area needing to complete the following requirements of the Philippine Distribution Code: 1) Fixed Asset boundary documents 2) Electrical Diagrams 3) Connection Point Drawings 4) Distribution System Data. <u>I. Importance of Fixed Asset Boundary Documents (FABD) as per PDC Chapter 5.6 :</u> The FABD for any Connection Point is important because it provides information and specify the operational responsibilities of CEPALCO and the User of the ff: (a) MV/HV Equipment - requires Responsible user or

	distributor including Responsible Mgmt. Unit. (b) LV Equipment – requires only responsible user or Distributor . (c) Communication & metering equipment - requires only responsible user or Distributor. FABD shows precisely the Connection Point and specify the ff: (a) Equipment and their Ownership (b) Accountable Managers (c) Safety Rules & Procedures including local safety instructions and the safety coordinators or any persons responsible for safety. (d) Operational procedures and responsible party for the operation and control (e) Maintenance requirements and the responsible party undertaking the maintenance (f) Any agreement pertaining to emergency conditions II. Importance of Electrical Diagrams (as per PDC 5.7.2) The Electrical Diagram is important because it contains the accurate record of the lay-out and circuit connections, ratings and identification of equipment, and related apparatus and devices at the Connection point. III. Importance of Connection Point Drawings (as per PDC 5.8.2) The Connection Point Drawing is important because it contains the accurate record of the lay-out and circuit connections, ratings and identification of equipment, and related apparatus and devices at the Connection point. The Connection Point Drawing indicates the Equipment lay-out, common protection, control and auxiliaries. The drawing shall represent, as closely as possible, the physical arrangement the equipment and their electrical connections. IV. Importance of User Registration Data (as per PDC 5.9.1) The data relating to the Connection Point and the User Devt. that are submitted by the User to CEPALCO shall have the Registered Equipment Data (complete list in PDC.6.4 &6.5) To complete said data/diagrams and the like, the CEPALCO representatives need to conduct massive data gathering by visiting and coordinating with the 18 bulk customers across its franchise area.

Budget Details

Item No.	TYPE OF ACTIVITY/ PROJECT REQUIREMENT	TOTAL COST
1)	Meetings / Visits of Bulk Customers	
	a) Total Gasoline Requirements for 18 Customers	P45,360.00
	b) Representation / Allowances	P90,000.00
2)	Car Rental	P180,000.00
3)	Communication Cost (Cellphone/Long Distance)	P21,000.00
3)	Office / Computer / Other Supplies	P145,800.00
4)	Administrative Cost	P720,000.00
5)	Contingency Cost	P187,140.00
	Grand Total	**P1,389,300.00**

ACTIVITY SCHEDULE

1) Notices to existing 18 Bulk Customers – start July 2007
2) Meeting w/ 18 Bulk Customers – w/ in July to August 2007
3) Data Gathering / Site Inspection of 18 Bulk Customers – July 2007 to Feb. 2008
4) Finalization / Validation of Data /Documents gathered – March 2008
5) Submission: April 2008

Schedule C1.4 Annex P

Meter Change-out of All Installed kWh Meters Every Two Years P 18,163,705

Meter change-out or replacement of all installed kWh meters is in compliance with the mandate of Republic Act 7832 (Anti-Electricity Pilferage Act) that requires all electric utilities to calibrate all installed kWh meters every two years.

This activity requires the purchase of additional vehicles, testing equipment, materials and tools. There will also be a need to hire additional personnel resulting to an increase in the monthly usage of fuel, oil and other operational expenses due to the additional vehicles and personnel.

The number of vehicles is based on the number of customers per year, the average daily output per crew, and the average man-days per month. Please refer to the formula below.

$$\text{No. of Crews} = \frac{\text{Annual no. of customers for meter change-out}}{\text{10 customers/day x 22mandays/month}}$$

One crew is composed of two personnel.

Ladders, tools, digital camera, and handheld radio should be provided for every vehicle to ensure efficiency and safety.

Data of customers scheduled for meter change-out will be downloaded to these handheld computers for faster field data updating without resorting to the traditional manually issued job orders.

This desktop computer and printer will be used in the downloading and uploading of data for the meter change out activities.

Schedule C1.4 Annex Q - 20 MVA, 69-34.5kV BALOY SUBSTATION

CAGAYAN ELECTRIC POWER & LIGHT CO.,INC **2007-2011 Capital Expenditure Forecast** **Major Project Information Summary**	

Name	**20 MVA, 69-34.5kV BALOY SUBSTATION**
Project code	
Description	Baloy substation will have a power transformer with 20 MVA capacity, self-cooled. Its primary voltage is 69kV, with 34.5kV secondary. The power transformer and other major equipment are all outdoor type and mounted on steel structures. The substation will be equipped with facilities for remote monitoring and control. RTUs, IEDs, and communication facilities will be installed in steel Cabinets located inside the Control Building.
Commissionin	1st Q 2007

Rank	**1st priority**	(Ongoing; 1st Priority; 2nd Priority)	
Project Driver	**Load Growth**	(Load Growth; Network non-	
Project Type Classification	a. Rank - 1st priority		
	b. Project Driver - Load Growth		
	c. Project Type - Growth		
	d. Expenditure		
Expenditure for the	**Forex:** $1,051,466	**Local:** 24,478,158	**TOTAL:**

Project Purpose	The demand for electricity in the eastern part of the franchise area has grown considerably. Its existing substation supplying the area is already experiencing more than 100% of its rated capacity. The addition of one substation in the eastern part will relieve the existing substation of excesss load and prevent overloading of this substation. A worse-case scenario would happen if this transformer would be out of service for whatever reason, since this would disrupt service to a large number of customers.
Impact if Project Not Implemented	If the project is not implemented there will be shortage of supply for the 34.5kV system in the eastern part. There's only one transformer serving this area and located at Tagoloan substation.
Reason for ranking project commissioning date relative to other projects	This project is given 1st priority ranking since this will provide the minimum delivery capacity and reliability levels to meet required service delivery standards.

Schedule C1.4 Annex P - 20 MVA, 69-34.5kV BALOY SUBSTATION

CAGAYAN ELECTRIC POWER & LIGHT CO.,INC **2007-2011 Capital Expenditure Forecast** **Major Project Information Summary**	

Name	**20 MVA, 69-34.5kV BALOY SUBSTATION**
Project code	
Description	Baloy substation will have a power transformer with 20 MVA capacity, self-cooled. Its primary voltage is 69kV, with 34.5kV secondary. The power transformer and other major equipment are all outdoor type and mounted on steel structures. The substation will be equipped with facilities for remote monitoring and control. RTUs, IEDs, and communication facilities will be installed in steel Cabinets located inside the Control Building.
Commissionin	1st Q 2007

Rank	**1st priority**	(Ongoing; 1st Priority; 2nd Priority)	
Project Driver	**Load Growth**	(Load Growth; Network non-	
Project Type Classification	a. Rank - 1st priority		
	b. Project Driver - Load Growth		
	c. Project Type - Growth		
	d. Expenditure		
Expenditure for the	**Forex:** $1,051,466	**Local:** 24,478,158	**TOTAL:**

Project Purpose	The demand for electricity in the eastern part of the franchise area has grown considerably. Its existing substation supplying the area is already experiencing more than 100% of its rated capacity. The addition of one substation in the eastern part will relieve the existing substation of excesss load and prevent overloading of this substation. A worse-case scenario would happen if this transformer would be out of service for whatever reason, since this would disrupt service to a large number of customers.
Impact if Project Not Implemented	If the project is not implemented there will be shortage of supply for the 34.5kV system in the eastern part. There's only one transformer serving this area and located at Tagoloan substation.
Reason for ranking project commissioning date relative to other projects	This project is given 1st priority ranking since this will provide the minimum delivery capacity and reliability levels to meet required service delivery standards.

SCHEDULE C2. BREAKDOWN OF HISTORICAL CAPITAL EXPENDITURES

		2002	2003	2004	2005	Jan - April 2006
Distribution Plant						
A01	Land and Land Rights (Distribution Purpose)					
A02	Structures and Improvements (Distribution Purpose)	2,517,053	110,484	562,105	1,707,249	
A03	Station Equipment					
A03a	Power transformers	34,702,856				
A03b	Switchgear	37,663,661		1,315,701	2,570,034	
A03c	Protective equipment	4,359,628	1,021,136		608,837	
A03d	Metering & control equipment	8,081,118		207,729		
A03e	Communications equipment			1,757,464		
A03f	Other station equipment	635,002		3,215,171		
A04	Poles, Towers and Fixtures - Distribution	18,079,536	24,187,223	16,101,429	32,094,975	6,714,336
A05	Poles, Towers and Fixtures - Customer					
A06	Overhead Conductors and Devices - Distribution	11,728,946	14,229,244	14,435,272	40,083,132	4,784,356
A07	Overhead Conductors and Devices - Customer					
A08	Underground Conduits - Distribution					
A09	Underground Conduits - Customer					
A10	Underground Conductors and Devices - Distribution					
A11	Underground Conductors and Devices - Customer					
A12	Line Transformers - Distribution	11,898,134	7,893,842	10,165,864	19,568,060	3,397,800
A13	Line Transformers - Customer					
A14	Power Conditioning Equipment					
A15	Services	1,284,250	1,047,479	1,026,855	1,702,486	477,876
A16	Meters, Instruments & Metering Transformers - Customers	19,764,012	7,576,369	10,623,301	14,754,080	950,850
A17	Meters, Instruments & Metering Transformers - Distribution					
A18	Information technology equipment (distribution)					
A19	Regulated Entity Property on Consumers' Premises					
A20	Street Lights and Signal Systems	12,694		16,347	15,901	
A21	Submarine Cables					
	Sub-total Distribution Plant	**150,726,889**	**56,065,777**	**59,427,239**	**113,104,755**	**16,325,217**

SCHEDULE C2. BREAKDOWN OF HISTORICAL CAPITAL EXPENDITURES

		2002	2003	2004	2005	Jan - April 2006
General Plant						
B01	Land and Land Rights (non-network)					
B02	Structures and Improvements (non-network)	1,187,883	63,020	4,603,124	282,050	
B03	Office Furniture and Equipment	2,903,561	2,636,489	2,757,063	23,597,565	794,874
B04	Transportation Equipment	2,071,000	2,382,840	96,600	4,309,657	2,453,920
B05	Stores Equipment					
B06	Tools, Shop and Garage Equipment	255,317	812,647	2,596,003	2,131,898	197,650
B07	Laboratory Equipment	1,665,441		2,989,826		
B08	Information systems equipment (non-network)	334,996	7,955,204	342,460	9,631,670	691,303
B09	Power-operated Equipment					
B10	Communication Plant and Equipment	2,405,708	1,098,998	3,333,827	9,507,588	532,503
B11	Miscellaneous Equipment	97,054	234,217	174,639	431,178	2,121,905
	Sub-total General Plant	**10,920,961**	**15,183,414**	**16,893,541**	**49,891,605**	**6,792,156**
Generation Plant						
	Structures & Improvements			6,199,581		
	Photovoltaic Plant			279,651,564		
	Sub-total Generation Plant	**-**	**-**	**285,851,145**	**-**	**-**
	Materials and Supplies (including spares)	40,100,876	18,274,228	18,843,076	9,471,793	15,058,955
	Construction Work in progress	56,630,799	71,289,683	26,564,634	26,107,220	2,411,888
	Transferred subtransmission assets					
	Allocated Overheads Capitalized	17,739,649	41,090,751	25,374,081	23,000,382	3,193,628
TOTALS		**276,119,174**	**201,903,854**	**432,953,716**	**221,575,754**	**43,781,844**