

Republic of the Philippines
ENERGY REGULATORY COMMISSION
San Miguel Avenue, Pasig City

**IN THE MATTER OF THE
APPLICATION FOR
APPROVAL OF PROPOSED
ELECTRIC CAPITAL
PROJECTS FOR THE YEAR
2010 TO 2012 AND
AUTHORITY TO SECURE
LOAN FROM NEA, WITH
PRAYER FOR PROVISIONAL
AUTHORITY**

ERC CASE NO. 2010-101RC

**DAVAO DEL SUR
ELECTRIC COOPERATIVE,
INC. (DASURECO)**

Applicant.

X-----X

APPLICATION

COMES NOW, applicant **DAVAO DEL SUR ELECTRIC COOPERATIVE, INC.** (DASURECO, for brevity), by and through the undersigned counsel, and unto this Honorable Commission most respectfully states:

1. That applicant is an electric cooperative duly organized and existing under and by virtue of the laws of the Republic of the Philippines, with the principal office at Cogon, Digos City, Province of Davao del Sur, Philippines where it may be served with summons and other legal processes, represented in this instance by its General Manager, **JESUS P. DELA VICTORIA, PEE**, of legal age, Filipino, married and with office address also at DASURECO, Cogon, Digos City, Province of Davao del Sur, Philippines;
2. That herein applicant is the exclusive franchise holder issued by the National Electrification Administration (NEA) to operate an electric light and power services in the City of Digos and the municipalities of the Province of Davao del Sur namely: Sta. Cruz, Matanao, Magsaysay, Bansalan, Hagonoy, Padada, Kiblawan, Sulop, Malalag, Sta. Maria, Malita, Don Marcelino, Jose Abad Santos and Sarangani;

3. That applicant DASURECO consumer profile showed that the large proportion of customers is from the residential sector of 64,409 customers with total sales of 21,048,855 kwh. There are 5,121 commercial customers with single phase requirements with total energy sales of 4,845,511 kwh. The 37 commercial customers with three phase requirements has a total energy sales of 152.784. Among the industrial customers, 298 require to 220 V, three-phase connection and with a total energy sales of 31,196 kwh. Also, there are 5,440 V-three-phase customers in the industrial sector, one 7,620 V and three-phase customer has 31,164 kwh energy sales and 30 customers with 13,200 V, three-phase connection with 37,827,645 kwh energy sales. There are 1,647 public buildings with single phase connection with a total of 1,334,054 kwh energy sales. The number of streetlights connected reached 3,514 and consumes energy of 587,987 kwh. There are other 59 customers with total energy sale of 837,253 kwh;
4. That applicant DASURECO has seven (7) substations with a total base capacity of 65 MVA. One-20 MVA, 2-5 MVA and 1 reserve 5 MVA. The total system electricity demand is a little more than 29 MW from 18 feeders. All substations are within the required loading capacity. Cogon substation with 20 MVA and 4 feeders has 63% loading capacity; Paligue substation with 10 MVA and 3 feeders, has 49% loading capacity; Malita substation, with 5 MVA and 2 feeders, has 34% loading capacity; Matanao substation, with 10MVA and 3 feeders, has 28 loading capacity and Malalag substation, with 5 MVA and 3 feeders, has 45% loading capacity. On the average, the system currently has about 49% loading capacity;
5. The peak electricity demand per feeder shows that Cogon substation has the largest demand with an average feeder peak demand of 3,162 kW. Paligue substation has an average feeder peak demand of 1,634 kW, Malita substation has an average feeder peak demand 838 kW, Matanao substation has an average feeder peak demand 1,681 kW, Astorga substation has an average feeder peak demand 1,399 kW and Malalag substation has an average feeder peak demand 750 kW. Cogon substation is also having the highest energy sales with an average energy sale of 14,769,126.64 kWh which accounts for 33% of the current total energy sales. It is then followed by Matanao substation which accounts for 18% of the total energy sales;

6. That it has identified six (6) projects, classified according to projects that intends to address load growth, projects that intend to improve systems reliability and efficiency, and projects that intend to reduce losses. The following are the projects proposed for implementation upon economic and financial feasibility:

A. Projects that intend to address reliability improvements:

- (1) MV Switchgear;
- (2) 69 KV SF6CKT breaker;
- (3) Isolation Switches

B. Projects that intend to address system loss reduction:

- (1) Dist. Transformer with Amorphous Core; and
- (2) Electronic Single Phase KWH meters with IR.

C. Projects (Tools and Equipment) that intend to improve service efficiency:

Infrared Scanner, Calport 200, Load Profiler Set, Load Logger Set, Transformer Turns Ratio Tester, DGA Tester, Micro Ohmmeter, Insulation Resistance Tester, Power Factor Meter, Phase Sequence Indicator, Volt-Ampere Recorder, AC Hi-Pot Test Set, DC Hi-Pot Test Set, Earth Tester, Flicker Severity Monitoring Equipment, Forklift, 5-toner, Printer, Plotter, Pol Dielectric Test Set and Battery Charger @ different substations.

D. Project that intends to address power quality improvement:

- (1) 7.62kv Power Capacitor

E. 69 kv subtransmission acquisition:

- (1) 69 kv line acquisition

F. Other projects that intend to improve service efficiency

- (1) Dist. System Loss Segregator/Synergy Software;
- (2) Utility Truck with Insulated Boom "Kanglim"
- (3) Hotline Maintenance Tools and Eqpt. 13.2 and 69 kV with Training.

7. That as part of its Distribution Development Plan, applicant DASURECO intends to apply for approval of the following electric projects for 2010-2012:

Table 1: Proposed Capital Expenditure Projects for 2010-2012

Proposed CAPEX PROJECTS	Year				
	2010	2011	2012	2013	2014
Proposed Construction of MV Switchgear	X				
Acquisition of Distribution Transformer with Amorphous Core					
50 kVA		X			
25 kVA	X	X			
15 kVA	X	X			
10 kVA	X	X			
Acquisition of Hotline Maintenance Tools and Equipment 13.2 & 69 kV with Training			X		
Acquisition of Tools and Equipment	X	X	X	X	
Acquisition of Electronic Single Phase kWh Meters with IR	X	X			
Distribution System Loss Segregation/Synergy Software	X				
69 kV SF6 CKT Breaker					
Utility Truck with insulated Boom "Kanglim"			X		
Isolation Switches				X	
7.26 KV Power Capacitor	X	X	X	X	X
SCADA					X
69 kV Line Acquisition	X				

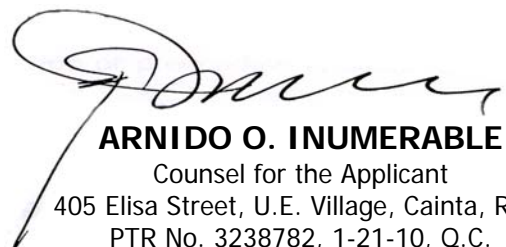
8. That the above project will be implemented on a staggered basis starting 2010 to 2012 and financing of the said projects will be taken from NEA/bank Loan;
9. That the applicant will request to secure a PhP 333,534,773 loan from the NEA/bank;
10. That the proposed projects are consistent with the Distribution Development Plan (DDP), the Philippine Grid Code (PGC) and other relevant government issuances; and in accordance with ERC Resolution on capital projects;
11. That for purposes of and in connection with this application, DASURECO hereby attaches/submits the following documents in compliance with the requirements pertinent hereto:
 - a. Description of the Project; Justification and Impact Study on the System and; Options/ Alternatives considered in lieu of the proposed project;
 - b. Project Financing Plan;
 - c. Five-year Historical and Forecast planning Data consistent with the DDP;
 - d. Technical Analysis;
 - e. Projected Financial and Economic Cost Analysis ;
 - f. Projected Costs and Estimates;
 - g. Proposed Gantt Chart Schedule;
 - h. Single Line Diagram;
 - i. Conceptual Engineering Designs and Drawings;
 - j. Board Resolution Approving the Proposed Projects;
 - k. Sworn Statement;
 - l. Compliance with pre-filing requirements:

1. Certification from the Presiding Officer or Secretary of the Local Government Unit (LGU) Legislative Body of the city or municipality where it principally operates and of the Sangguniang Panlalawigan of Davao del Sur or their duly authorized representatives attesting to the fact that applicant has furnished said legislative bodies of the application with all its annexes and accompanying documents; and
 2. Affidavit of Publication and the newspaper issue containing the published Application in its entirety in a newspaper of general circulation in DASURECO's franchise areal; and
 3. Certification from the City Mayor attesting to the fact that the application has been posted with all its annexes and accompanying documents in three (3) conspicuous places.
12. That the approval of the proposed capital expenditure projects is needed to maintain efficient, reliable and safety delivery of power to DASURECO's existing and future consumers, and will redound to the benefits of the consuming public.

PRAYER

WHEREFORE, premises considered, it is respectfully prayed of this Honorable Commission that pending hearing, the herein submitted application for approval of proposed electric capital projects and authority to secure loan from the National Electrification Administration/bank be provisionally approved *ex parte*, and that the applicant be authorized to adopt and implement the same effective upon such approval and after due notice and hearing and consideration, the application be approved permanently.

Other reliefs just and equitable under the premises are likewise prayed for.
Cainta, Rizal for Pasig City, Metro Manila, Philippines, June 15, 2010.


ARNIDO O. INUMERABLE
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EXPLANATION

Filing and service of the foregoing compliance were done by registered mail instead of personal service due to manpower constraint.


ARNIDO O. INUMERABLE

REPUBLIC OF THE PHILIPPINES)
PROVINCE OF DAVAO DEL SUR) SS.
CITY OF DIGOS)
X-----X

VERIFICATION AND CERTIFICATION

We, **JESUS P. DELA VICTORIA, PEE, ENGR. ESEL P. LURICA, ENGR. DARIUS D. ROLDAN** of legal ages, married, Filipino, and **MAYPEARL LAARNIE E. POLO**, of legal age, single, Filipino with office address at the Main Office of Davao del Sur Electric Cooperative, Inc. (DASURECO), Cogon, Digos City, Davao del Sur, Philippines, after having been sworn to in accordance with law hereby depose and say:

1. That we are the General Manager, Technical Services Division Supervisor, Acting Head of Planning and Design and Accountant, respectively, of the Davao del Sur Electric Cooperative, Inc. (DASURECO) who are duly authorized to represent the cooperative in the filing of the application for the approval of Proposed Capital Expenditure Projects;
2. That we have caused the preparation and filing of the foregoing Application, have read the allegations contained therein, and certify that the same are true and correct based on our personal knowledge;
3. That **DASURECO** has not heretofore commenced any other action or proceedings involving the same issues and parties before any court, tribunal or quasi-judicial agency; to the best of our knowledge, no such action or proceeding is pending, and if we should learn that the same or similar action or proceeding has been filed or is pending, we undertake to report such fact to this Honorable Commission, within five (5) days therefrom.

IN WITNESS WHEREOF, we have hereunto set our hands this _____ day of June, 2010 at Digos City, Davao del Sur.

JESUS P. DELA VICTORIA, PEE
Affiant
SSS ID No.09-0549259-3

ENGR. ESEL P. LURICA
Affiant
SSS ID No.0917957372

ENGR. DARIUS D. ROLDAN
Affiant
SSS ID No.0927298827

MAYPEARL LAARNIE E. POLO
Affiant
SSS ID No.0920570319

SUBSCRIBED AND SWORN to before me at Cogon, Digos City, Davao del Sur this ____ day of June, 2010.

Doc. No. _____;

CRISTETA A. DUMAGAN-ROLDAN
Notary Public – Serial No. 03-2009
Commission expires on December 31, 2010
Roll No. 34611, TIN-153-654-540
IBP No. 723639, Feb. 28, 2009
PTR No. 2493182, Jan. 13, 2010
222 Rizal Avenue, Digos City, Davao Sur

Executive Summary

System planning is essential to assure that the growing demand for electricity can be satisfied by the electric distribution system. In today's environment, electric cooperatives need fast, accurate and economic planning solutions by using appropriate tools to evaluate the consequences of different proposed alternatives and their impact on the rest of the system to provide the necessary economical, reliable, and safe electricity to consumers. It is the fundamental objective of electric distribution system planning is to assure that the growing demand for electricity can be satisfied in an optimum way subject to a number of constraints such as physical constraints including capacity of power transformers, secondary conductors and non-technical constraints such as the minimum cost of production. All these are to be considered to achieve the performance targets set by electric cooperatives.

Electric cooperatives performance can be more challenging particularly when the new reforms brought about by the EPIRA law will be fully implemented in Mindanao. Apart from the stiff competition against large distribution utilities, cooperatives are constantly facing the imposition of rigid and strict government regulations. It is therefore necessary for the electric cooperatives to be more proactive by continuously seeking innovative solutions in systems operation using the STATE-OF-THE-ART TECHNOLOGY. Apart from the operation, it is also necessary for the electric cooperatives to be precise in future planning to avoid risk brought about by changing market.

As part of their future planning, the Capital Expenditure (CAPEX) of DASURECO was carefully prepared to further improve reliability, efficiency and quality of service to consumers. The proposed projects are:

Reliability improvements projects

- i. Proposed Construction of MV Switchgear
- ii. 69KV SF6 CKT Breaker
- iii. Isolation Switches

System loss reduction projects

- i. Acquisition of Distribution Transformer with Amorphous Core
- ii. Acquisition of Electronic Single Phase kWh Meters with IR

Tools and equipment to improve service efficiency and power quality

- i. Infrared Scanner
- ii. CALPORT 200
- iii. Calsource 200
- iv. Load Profiler Set
- v. Load Logger Set
- vi. Transformer Turns Ratio Tester
- vii. DGA Tester

- viii. MICRO OHMMETER
- ix. Insulation Resistance Tester
- x. Power Factor Meter
- xi. Phase Sequence Indicator
- xii. Volt-Ampere Recorder
- xiii. AC Hi-Pot Test Set
- xiv. DC Hi-Pot Test Set
- xv. Earth Tester
- xvi. Flicker Severity Monitoring Equipment
- xvii. Forklift, 5-tonner
- xviii. Printer, Plotter
- xix. Oil Dielectric Test Set
- xx. BATTERY CHARGER @ DIFFERENT SUBSTATIONS

Power quality improvement project

- i. 7.62kV Power Capacitors

Other projects to improve service efficiency

- i. Distribution System Loss Segregator/SynerGee Software
- ii. Utility Truck With Insulated Boom "Kanglim"
- iii. Acquisition of Hotline Maintenance Tools and Equipment 13.2 & 69 kV w/
Training
- iv. 69 kV subtransmission acquisition

The single digit system's loss is one of the indicators of DASURECO's high efficiency. By acquiring more Distribution Transformer with Amorphous Core, the system's loss can be further reduced due to their low core loss. Distribution transformers with Amorphous Core are about 60-70% lower core losses than regular Silicon steel core Distribution transformers, thus monetary savings over the lifetime of transformer by reducing the transformer's total cost of ownership.

Apart from a quality of supply, it is also the mission of DASURECO to provide dependable supply of electricity. When fully realized, the MV switchgear will offer an efficient and highly effective automatic fault detection system thus improving system reliability of the Coop.

Various projects include: purchase of software, kWh meters, power capacitors, isolation switches, and 69 kV Sub-Transmission line. These projects which are to be acquired between the 3-year periods are essential in the operation and maintenance aspect.

The total amount of the 3-year CAPEX program reached Php 333,534,773 which is to be spread annually as follows:

- (i) 2010 – Php 130,506,202
- (ii) 2011 – Php 168,876,202

Table of Contents

Application	i
Prayer	v
VERIFICATION/CERTIFICATION	vi
Executive Summary	vii
1. INTRODUCTION	17
1.1. Brief History of the EC	17
1.2. Vision-Mission Statement	18
1.2.1. Vision Statement.....	18
1.2.2. Mission Statement	19
1.2.3. Specific Goals and Objectives	19
1.3. EPIRA (in general relation to CAPEX and Distribution Plan)	19
1.4. Overview of the EC	19
1.4.1. Franchise Area.....	20
1.4.2. Customer Profile	21
1.4.3. Network Profile.....	22
1.4.4. Energy and Demand Profile of the EC	24
1.5. Summary of Annual CAPEX Program.....	26
1.6. Financing Scheme and Rate Impact	27
2. DEMAND and ENERGY PROJECTIONS	29
2.1. Overview of Projected Demand and Energy for the Planning Period.....	29
2.2. Aggregated Demand and Energy Forecast.....	30
2.3. Demand and Energy Forecast per Substation	31
2.4. Demand and Energy Forecast per Feeder.....	32
3. ENGINEERING AND TECHNICAL ANALYSIS	34
3.1. Single Line Diagram of the Distribution System.....	34
3.2. Distribution Load Profile.....	35
3.2.1. Development of Base Case for the EC	35
3.2.2. Modelling of Distribution System for the Planning Period	35
3.3. Distribution Impact Studies	35

3.3.1.	Technical Analysis and Distribution System Profile	35
3.3.2.	Capacity Requirement Studies.....	35
3.3.3.	Voltage Drop Studies	37
3.3.4.	Systems Loss Studies.....	37
4.	IDENTIFICATION OF OPTIMUM CAPEX PROJECTS	39
4.1.	Problem Descriptions.....	39
4.2.	Identification of Projects.....	41
4.3.	Description of Projects:	42
4.3.1.	Projects that will improve reliability	42
4.3.1.1.	Proposed Construction of MV Switchgear	42
4.3.1.2.	Isolation Switches	42
4.3.1.3.	69KV SF6 Circuit Breaker.....	42
4.3.2.	Projects that will reduce systems loss.....	42
4.3.2.1.	Acquisition of Distribution Transformer with Amorphous Core	42
4.3.2.2.	Acquisition of Electronic Single Phase kWh Meters with IR	43
4.3.3.	Projects that will improve power quality	43
4.3.3.1.	7.62KV Power Capacitor.....	43
4.3.4.	Other projects that will improve the quality of service to customers.....	43
4.3.4.1.	Distribution System Loss Segregator/SynergGee Software.....	43
4.3.4.2.	Utility Truck with Insulated Boom"Kanglim"	43
4.3.4.3.	Acquisition of Tools and Equipment.....	43
5.	CAPEX PROJECTS	45
5.1.	Annual CAPEX Program.....	45
5.2.	Cost Estimates.....	46
6.	ECONOMIC AND FINANCIAL EVALUATION.....	48
6.1.1.	NPR/IRR	48
7.	CAPITAL BUDGETING	49
7.1.	Projected Income Statement, Cashflow and Balance Sheet.....	49
7.2.	Financing Scheme	51
7.3.	Rate Impact for CAPEX Requirement.....	51
8.	DOCUMENTATION OF CAPEX.....	53
8.1.	Historical and Forecast Planning Data.....	53

8.2.	Graphs showing Electricity Demand per Substation per Feeder.....	82
8.3.	Graphs showing Energy Sales per Substation per Feeder	84
8.4.	Technical and Engineering Analyses	86
8.5.	PREDICTIVE RELIABILITY PERFORMANCE ASSESMENT	88
8.6.	Comparison between Silicon and Amorphous Core Distribution Transformers	89
8.7.	Project Costs and Estimates	91
8.8.	Description and Classification of Projects	94
8.9.	Project Financial and Economic Cost Analysis	100
8.10.	Proposed GANTT CHART Schedule	113
8.11.	Single Line Diagram of the System.....	114
8.12.	Board Resolution Approving the Proposed Projects	118

List of figures

Fig. 1.1. Franchise area of DASURECO	20
Fig. 1.2: Locations of substations	233
Fig. 1.3. Peak Electricity Demand per Feeder	255
Fig. 1.4. System's Energy Sales per Feeder	255
Fig. 1.5. Graphical representation of rate adjustment.....	28
Fig. 2.1: Total Monthly Peak Electricity Demand (January 2002 to December 2008).....	29
Fig. 2.2: Total Monthly Peak Energy Sales (January 2005 to December 2008)	29
Fig. 2.3: System electricity demand forecast using Winters' multiplicative model	30
Fig. 2.4. Total Peak Electricity Demand of DASURECO	31
Fig. 2.5. Total Energy Sales of DASURECO	31
Fig. 2.6. Demand per Substation of DASURECO.....	32
Fig. 2.7. Energy Sales per Substation of DASURECO.....	32
Fig. 3.1: Simplified single line diagram of DASURECO Distribution	34
Fig. 3.2: Increase in Percent of Substation Transformer Capacity	35
Fig. 3.3: Projected Demand and Technical Loss (2009 – 2013).....	38
Fig. 5.1: Annual CAPEX	46
Fig. 7.1: Total Projected Energy (MWH) Sales.....	50
Fig. 7.2: Projected Total Amount of Sales and Purchased	50
Fig. 7.3: Projected Total Amount of Sales and Purchased Energy (values are multiplied by 1000).....	52
Fig. 7.4. Graphical representation of rate adjustment.....	52
Fig. 8.1. Electricity Demand per Feeder of Substation 1	82
Fig. 8.2. Electricity Demand per Feeder of Substation 2	82
Fig. 8.3. Electricity Demand per Feeder of Substation 3	82
Fig. 8.4. Electricity Demand per Feeder of Substation 4	83
Fig. 8.5. Electricity Demand per Feeder of Substation 5	83
Fig. 8.6. Electricity Demand per Feeder of Substation 6	83
Fig. 8.7. Energy Sales per Feeder of Substation 1.....	84

Fig. 8.8. Energy Sales per Feeder of Substation 2.....	84
Fig. 8.9. Energy Sales per Feeder of Substation 3.....	84
Fig. 8.10. Energy Sales per Feeder of Substation 4.....	85
Fig. 8.11. Energy Sales per Feeder of Substation 5.....	85
Fig. 8.12. Energy Sales per Feeder of Substation 6.....	85
Fig. 8.13. Single Line Diagram of the Distribution System of DASURECO	114
Fig. 8.14. Substations 2,3 and 6 Single Line Diagram.....	115
Fig. 8.15. Substation 5 Single Line Diagram	116
Fig. 8.16. Substation 5 Single Line Diagram	119

List of Tables

Table 1: Proposed Capital Expenditure Projects for 2010-2012	4
Table 1.1: Coverage area of DASURECO (<i>as of December 2008</i>)	21
Table 1.2: Customer Profile.....	22
Table 1.3: Profiles of Substations	23
Table 1.4: Distribution lines energized (km).....	23
Table 1.5: Number of Distribution transformers.....	24
Table 1.6: Reliability improvement projects	26
Table 1.7: System loss reduction projects	26
Table 1.8: Tools and equipment to improve service efficiency.....	26
Table 1.9: Power quality improvement project.....	27
Table 1.10: 69 kV subtransmission acquisition.....	27
Table 1.11: Other projects to improve service efficiency	27
Table 2.1: Peak Demand per Feeder.....	33
Table 2.2: Energy Sales per Feeder	33
Table 3.1: Peak Demand Forecast and Substation Capacity Profile (2009 – 2013)	36
Table 3.2: Substation Capacity Profile (2009 – 2013)	36
Table 3.3: Voltage profile in each feeder	37
Table 3.4: Technical loss profile of DASURECO.....	38
Table 4.1 Description and Types of Problems.....	40
Table 4.2: Summary of Selected Projects (2009-2013).....	41
Table 4.3: Tools and Equipment	44
Table 5.1: Annual CAPEX Program (2009-2013).....	45
Table 5.2: Projects' Cost Estimates	47
Table 6.1: NPV/IRR: Installation of Distribution Transformer with Amorphous Core	48
Table 6.2: Total loss from silicon core distribution transformers	48
Table 7.1: Consumer Sales and Revenue Data (2009 – 2010) – Complete Data for 5 years is shown in Table 8.65	49
Table 7.2: Projected Statement of Operations.....	511
Table 7.3: Summary of Yearly Loans and amortization.....	51
Table 7.4: Rate adjustment to finance the proposed projects	52
Table 8.1: Historical and Forecasted Monthly System Demand (kW).....	53
Table 8.2: KW Peak Demand Forecast	54
Table 8.3: Energy Sales Forecast.....	55

Table 8.4: Monthly Peak Electricity Demand Data per Feeder (Substation 1 – Feeder 1)	56
Table 8.5: Monthly Peak Electricity Demand Data per Feeder (Substation 1 – Feeder 2)	56
Table 8.6: Monthly Peak Electricity Demand Data per Feeder (Substation 1 – Feeder 3)	57
Table 8.7: Monthly Peak Electricity Demand Data per Feeder (Substation 1 – Feeder 4)	57
Table 8.8: Monthly Peak Electricity Demand Data per Feeder (Substation 2 – Feeder 1)	58
Table 8.9: Monthly Peak Electricity Demand Data per Feeder (Substation 2 – Feeder 2)	58
Table 8.10: Monthly Peak Electricity Demand Data per Feeder (Substation 2 – Feeder 3)	59
Table 8.11: Monthly Peak Electricity Demand Data per Feeder (Substation 3 – Feeder 1)	59
Table 8.12: Monthly Peak Electricity Demand Data per Feeder (Substation 3 – Feeder 2)	60
Table 8.13: Monthly Peak Electricity Demand Data per Feeder (Substation 4 – Feeder 1)	60
Table 8.14: Monthly Peak Electricity Demand Data per Feeder (Substation 4 – Feeder 2)	61
Table 8.15: Monthly Peak Electricity Demand Data per Feeder (Substation 4 – Feeder 3)	61
Table 8.16: Monthly Peak Electricity Demand Data per Feeder (Substation 5 – Feeder 1)	62
Table 8.17: Monthly Peak Electricity Demand Data per Feeder (Substation 5 – Feeder 3)	62
Table 8.18: Monthly Peak Electricity Demand Data per Feeder (Substation 6 – Feeder 1)	63
Table 8.19: Monthly Peak Electricity Demand Data per Feeder (Substation 6 – Feeder 2)	63
Table 8.20: Monthly Peak Electricity Demand Data per Feeder (Substation 6 – Feeder 3)	64
Table 8.21: Monthly Peak Energy Demand Data per Feeder (Substation 1 – Feeder 1)	65
Table 8.22: Monthly Peak Energy Demand Data per Feeder (Substation 1 – Feeder 2)	66
Table 8.23: Monthly Peak Energy Demand Data per Feeder (Substation 1 – Feeder 3)	67
Table 8.24: Monthly Peak Energy Demand Data per Feeder (Substation 1 – Feeder 4)	68
Table 8.25: Monthly Peak Energy Demand Data per Feeder (Substation 2 – Feeder 1)	69
Table 8.26: Monthly Peak Energy Demand Data per Feeder (Substation 2 – Feeder 2)	70
Table 8.27: Monthly Peak Energy Demand Data per Feeder (Substation 2 – Feeder 3)	71
Table 8.28: Monthly Peak Energy Demand Data per Feeder (Substation 3 – Feeder 1)	72
Table 8.29: Monthly Peak Energy Demand Data per Feeder (Substation 3 – Feeder 2)	73
Table 8.30: Monthly Peak Energy Demand Data per Feeder (Substation 4 – Feeder 1)	74
Table 8.31: Monthly Peak Energy Demand Data per Feeder (Substation 4 – Feeder 2)	75
Table 8.32: Monthly Peak Energy Demand Data per Feeder (Substation 4 – Feeder 3)	76
Table 8.33: Monthly Peak Energy Demand Data per Feeder (Substation 5 – Feeder 1)	77
Table 8.34: Monthly Peak Energy Demand Data per Feeder (Substation 5 – Feeder 3)	78
Table 8.35: Monthly Peak Energy Demand Data per Feeder (Substation 6 – Feeder 1)	79
Table 8.36: Monthly Peak Energy Demand Data per Feeder (Substation 6 – Feeder 2)	80
Table 8.37: Monthly Peak Energy Demand Data per Feeder (Substation 6 – Feeder 3)	81

Table 8.38: Simulation with project	86
Table 8.39: Load Transfer Scenario	87
Table 8.40: Failure rates of circuit breakers	88
Table 8.41: Reliability indices of 20 MVA Cogon Substation Switchgear - Without Project	88
Table 8.42: Reliability indices of 20 MVA Cogon Substation Switchgear - With Project	88
Table 8.43: Total loss from silicon core distribution transformers	89
Table 8.44: Cost Estimates of the Proposed Projects	91
Table 8.45: Cost Estimates of the Proposed Construction of MV Switchgear	91
Table 8.46: Cost Estimates of Acquisition of Distribution Transformer with Amorphous Core	91
Table 8.47: Cost Estimates of Acquisition of Hotline Maintenance Tools and Equipment 13.2 & 69 Kv with Training	92
Table 8.48: Cost Estimates of Acquisition of Tools and Equipment.....	92
Table 8.49: Cost Estimates for Other Projects	93
Table 8.50: Medium voltage switchgear	94
Table 8.51: Distribution transformers with amorphous core	94
Table 8.52: Electronic Single Phase Kilowatt-hour Meter with Infrared Red.....	95
Table 8.53: Distribution System Loss Segregator / Synergy Software	95
Table 8.54: 69 KV SF6 Circuit Breaker.....	96
Table 8.55: UTILITY TRUCK WITH INSULATED BOOM"KANGLIM"	96
Table 8.56: HOTLINE MAINTENANCE TOOLS AND EQPT. 13.2 & 69 KV W/ TRAINING.....	97
Table 8.59A: 7.62 KV POWER CAPACITOR	97
Table 8.57: Isolation Switches	98
Table 8.58: TOOLS AND EQUIPMENT	98
Table 8.59: Acquisition of 69KV Sub-Transmission Line.....	99
Table 8.60: 5 year Consumer Sales and Revenue Data	100
Table 8.61: Financial and Statistical Report: Projected Statement of Operations	101
Table 8.62: Projected Balance Sheet	104
Table 8.63: Statement of Cash Flow for the Year Ended	107
Table 8.64: Present Worth of Projects	112
Table 8.65: Projects finance through reinvestment fund (highlighted items)	112

1. INTRODUCTION

1.1. Brief History of the EC

Davao del Sur Electric Cooperative, Inc. (DASURECO) was born on June 1, 1975 to rescue the province from the poor electric service by a family-owned energy firm called the Rural Electrification Corporation (RECORDA). DASURECO ranked as the 63rd electric cooperative incorporated and registered with the National Electrification Administration. It was the initial efforts of the local officials, headed by then Governor Nonito D. Llanos, Sr.- the “Father of Rural Electrification in Davao del Sur,” which paved way for its organization.

The EC started with nine (9) self-generating units (925kW) as its interim source of power with initial consumers of 2,076. Its first energization was in September 1977 with an initial house connection of 5,000. This number has increased to 83,564 this year 2009.

DASURECO is a Category A+ Mega Large Cooperative and the 63rd to be registered and incorporated with the National Electrification Administration. It is the primary distributor of electricity in Davao del Sur, sourcing its power from the National Grid Corporation of the Philippines (NGCP). It powered the fourteen (14) municipalities and one (1) city, which in total is composed of 337 barangays. The main office is located in Cogon, Digos City and it has four (4) sub-offices, the Matanao, Padada, Malalag and Malita.

For over 30 years of faithful service to the people of Davao del Sur, DASURECO has been priced with bountiful harvest of awards that was borne out of the sweat and blood of the Coop’s pioneers. The Cooperative is a consistent “Best Electric Cooperative of the Philippines for demonstrating the best overall performance among electric cooperatives in the country since 1985. In 1994, DASURECO garnered the highest recognition that NEA gives to top performing coops – the Emmanuel N. Pelaez Award. Since 1995, it has become an Category A+ coop. In 1996, it received another Emmanuel N. Pelaez Award for being the Most Outstanding EC in the country and was finally elevated to the Hall of Fame in 1997. In 2001, it was awarded Prompt Payor. In 2004, it received the Single Digit System Loss Award, Most Outstanding Board of Directors Award, and Most Outstanding Department Manager Award (for Engr. Godofredo N. Guya – Engineering and Operations Department). In 2005, it was awarded the Emmanuel N. Pelaez Award for Most Outstanding Electric Cooperative. GM Jesus P. Dela Victoria, on one hand, after receiving Leadership Award (2002) and Outstanding General Manager Award (2003), he was awarded the Pedro G. Dumol Award and was elevated to the Hall of Fame for the Outstanding General Manager Award in 2004. In 2005, he was again given the Pedro G. Dumol Award for Most Outstanding General Manager.

Still on the top rank in 2006, DASURECO bagged again the Single Digit System Loss Award for having achieved the desired system loss level and providing reliable and dependable power supply to its coverage area. It triumphed once again the

Best Electric Cooperative of the Year Award for its outstanding performance in all its operations and promoting the best interest of its member-consumers.

True to its commitment in mission and steadfastness of purpose, DASURECO continued to reap awards in 2007, winning amass the pride of being a Five-Star Cooperative. Also awarded in 2008 for its best performance in the year 2007, the Cooperative received the Francisco G. Silva Grand Lumens Award and again became an Emmanuel N. Pelaez Awardee as Outstanding Electric Cooperative. We are hailed to the Hall of Fame for the Emmanuel N. Pelaez Award for the second time and GM Jesus P. Dela Victoria, PEE was also elevated to the Hall of Fame for being the Outstanding General Manager. He was likewise given the Pedro G. Dumol Award for being the Most Outstanding General Manager in the Philippines. In 2008, Region XI was awarded Best Region with DASURECO. Moreover, the coop garnered the Model Headquarters Facility Award; Special Citation for the Most Complying Electric Cooperative in Audit Evaluation; and, the Special citation for an Electric Cooperative which earned excellent rating in Scorecard on Corporate Governance. It became a recipient of Electric Cooperative with Sustained Financial Performance award and again, the Cooperative was bestowed with the Single Digit System Loss Award for keeping system's loss at a minimum.

2009 added another glorious chapter in the DASURECO's rich history. It has successfully maintained its status as the Category A+ and emerged a Champion. In this year, GM JESUS P. DELA VICTORIA, PEE was slated to the *Grand Hall of Fame* for the Pedro G. Dumol Award as Best General Manager in the Philippines. The Cooperative as well was placed to the Grand Hall of Fame for the Emmanuel N. Pelaez Award. It received the *Special citation for an Electric Cooperative which Earned Excellent Rating in Scorecard on Corporate Governance*; grabbed again the *Best Region Award for Region XI with DASURECO* and the *Special Citation for the Most Complying Electric Cooperative in Audit Evaluation*. Also, a recipient of the *Special citation of EC showcase of excellence through Lakbay Aral* in the same year, a *Special Award for Model EC Employees' Association*, more than other awards, boosted high morale and honored its workforce.

In 2010, it received the most coveted award – the DIAMOND ELECTRIC COOPERATIVE for Emmanuel N. Pelaez Award. Also, it bagged the Single Digit System Loss Award, Special Citations for ECs which earned Excellent Rating in Scorecard on Corporate Governance, Ecs with Best Financial Performance, Ecs attaining 100% Barangay Energization, Best Region Award. Also, its GM, Jesus P. Dela Victoria was given the Diamond GM for Pedro G. Dumol Award and Grand Leadership Award while its Board of Directors was named Most Outstanding as well.

1.2. Vision-Mission Statement

The Davao del Sur Electric Cooperative, Inc. (DASURECO) is a duly registered Electric Cooperative located at Cogon, Digos, Davao del Sur.

1.2.1. Vision Statement

To be recognized as a leading, caring and committed electric cooperative.

1.2.2. Mission Statement

- To be a provider of quality and dependable supply of electricity at a reasonable cost;
- To be a leading partner of our government in improving the quality of life of our member-consumers, in promoting progress and in sustaining development; and
- To be the steward of the welfare of our member-consumers by providing them mindful, accurate and prompt service.

1.2.3. Specific Goals and Objectives

- Fully energize coverage area;
- Improve power quality through sufficient voltage supply, least outages and reasonable cost of electricity;
- Support government programs and projects that will alleviate and sustain the socio-economic well-being of our member-consumers;
- Proactively serve our member-consumers in a fast, focused, friendly and flexible manner; and
- Empower member-consumers through information dissemination and encouragement of feedbacks and suggestions.

1.3. EPIRA (in general relation to CAPEX and Distribution Plan)

Republic Act 9136 or the Electric Power Industry Reform Act (EPIRA) of 2001 mandates ERC to ensure that reforms are implemented for purpose of achieving the following:

- a. To ensure and accelerate the total electrification of the country;
- b. To ensure the quality, reliability, security and affordability of the supply of electric power;
- c. To ensure transparent and reasonable prices of electricity in a regime of free and fair competition and full public accountability to achieve greater operational and economic efficiency and ensure the competitiveness of Philippine products in the global market;
- d. To encourage the efficient use of energy and other modalities of demand side management; and
- e. To protect the public interest as it is affected by the rates and services of electric utilities and other providers of electric power.

1.4. Overview of the EC

1.4.1. Franchise Area

DASURECO's area coverage includes all the 14 municipalities and a city, composed of 337 barangays. Its present 4.78-hectare headquarters site in Cogon, Digos City which is about 1.5 kilometers from the city proper, has long serve as the load center of the entire coop area. DASURECO is geographically found in the southern part of the Philippines. It is bounded on the east by the Davao Gulf on the west by the provinces of South Cotabato, Sultan Kudarat and North Cotabato, on the north by Davao City and on the south by the Celebes Sea. Fig. 1.1 shows the franchise area of DASURECO.

Table 1.1 shows the coverage area of DASURECO with a total of 14 municipalities and 1 city with 337 barangays and with a present total of 95,396 consumers out of 157,054 potential consumers. Digos City which composes of 26 barangays has about 30% of total consumer. Sta. Cruz has a total consumer of 10,180 from 18 barangays while Bansalan has a total consumer of 9,045 from 25 barangays. While Jose Abad Santos has an actual consumer of 623, the potential consumers is expected to be 11,259 and Malita which presently has a total consumer of 6,754 is expected to have 20,526 potential consumers.



Fig. 1.1. Franchise area of DASURECO

Table 1.1: Coverage area of DASURECO (as of December 2008)

No.	Municipality/City	Number of Barangays	Potential Consumers	Actual Consumers To Date
1	Digos City	26	26,306	28,114
2	Sta.Cruz	18	13,881	10,180
3	Matanao	33	9,859	6,607
4	Bansalan	25	11,073	9,045
5	Magsaysay	22	9,066	5,637
6	Hagonoy	21	9,293	6,887
7	Padada	17	5,202	5,920
8	Kiblawan	30	8,339	3,055
9	Sulop	25	5,800	3,170
10	Malalag	15	7,069	4,087
11	Sta.Maria	22	9,291	3,840
12	Malita	30	20,526	6,754
13	Jose Abad Santos	26	11,259	623
14	Don Marcelino	15	6,544	1,030
15	Saranggani	12	3,546	447
	<i>Total</i>	<i>337</i>	<i>157,054.00</i>	<i>95,396</i>

1.4.2. Customer Profile

Table 1.2 shows the customer profile of DASURECO indicating the customer type and the kWhr sold per customer type. Large proportion of customers is from the residential sector of 64,409 customers. There are 5,121 commercial customers with single phase requirements with total energy sales of 4,845,511 kwh. The 37 commercial customers with three phase requirements has a total energy sales of 152,784 kwh. Among the industrial customers, 298 require to 220 V, three-phase connection and with a total energy sales of 31,196 kwh. Also, there are 5, 440 V, three-phase customers in the industrial sector, one 7,620 V and three-phase customer has 31,164 kwh energy sales and 30 customers with 13,200 V, three-phase connection with 37,827,645 kwh energy sales. The table also indicates that there are 1,647 public buildings with single phase connection with a total of 1,334,054 kwh energy sales. The number of streetlights connected reached 3,514 and consumes energy of 587,987 kwh . There are 59 other customers with total energy sales of 837,253 kwh.

Table 1.2: Customer Profile

Customer Type	Voltage Rating	Connection Type	kWH Sales	No. of Customers
RESIDENTIALS	220V	1 \emptyset	21,048,855	64,409
COMMERCIAL	220V	1 \emptyset	4,845,511	5,121
	220V	3 \emptyset	152,784	37
	440V	3 \emptyset		-
INDUSTRIAL	220V	1 \emptyset	-	-
	220V	3 \emptyset	31,196	298
	440V	3 \emptyset	2,451,868	5
	7,620V	3 \emptyset	31,164	1
	13,200V	3 \emptyset	37,827,645	30
PUBLIC BUILDING	220V	1 \emptyset	1,334,054	1,647
STREET LIGHTS	220V	1 \emptyset	587,987	3,514
OTHERS	220V	1 \emptyset	837,253	59

1.4.3. Network Profile

It is important to constantly monitor the loading capacity of a substation. This is a regular procedure as part of load management to determine the overall system's performance. DASURECO has 7 substations with a total base capacity of 65 MVA. One-20 MVA, 3-10 MVA, 2-5 MVA and 1 reserved 5 MVA. Table 1.3 shows the loading capacity of each of the substation. The total system electricity demand is a little more than 29 MW from 18 feeders. It is shown that all substations are within the required loading capacity. Cogon substation with 20 MVA and 4 feeders has 63% loading capacity. Paligue substation with 10 MVA and 3 feeders has 49% loading capacity. Malita substation with 5 MVA and 2 feeders has 34% loading capacity. Matanao substation with 10 MVA and 3 feeders has 50% loading capacity. Sta Cruz substation with 10 MVA and 3 feeders has 28% loading capacity and Malalag substation with 5 MVA and 3 feeders has 45% loading capacity. On the average the system currently has about 49% loading capacity. Fig. 1.2 shows the locations of substations.

SUBSTATION LOCATIONS

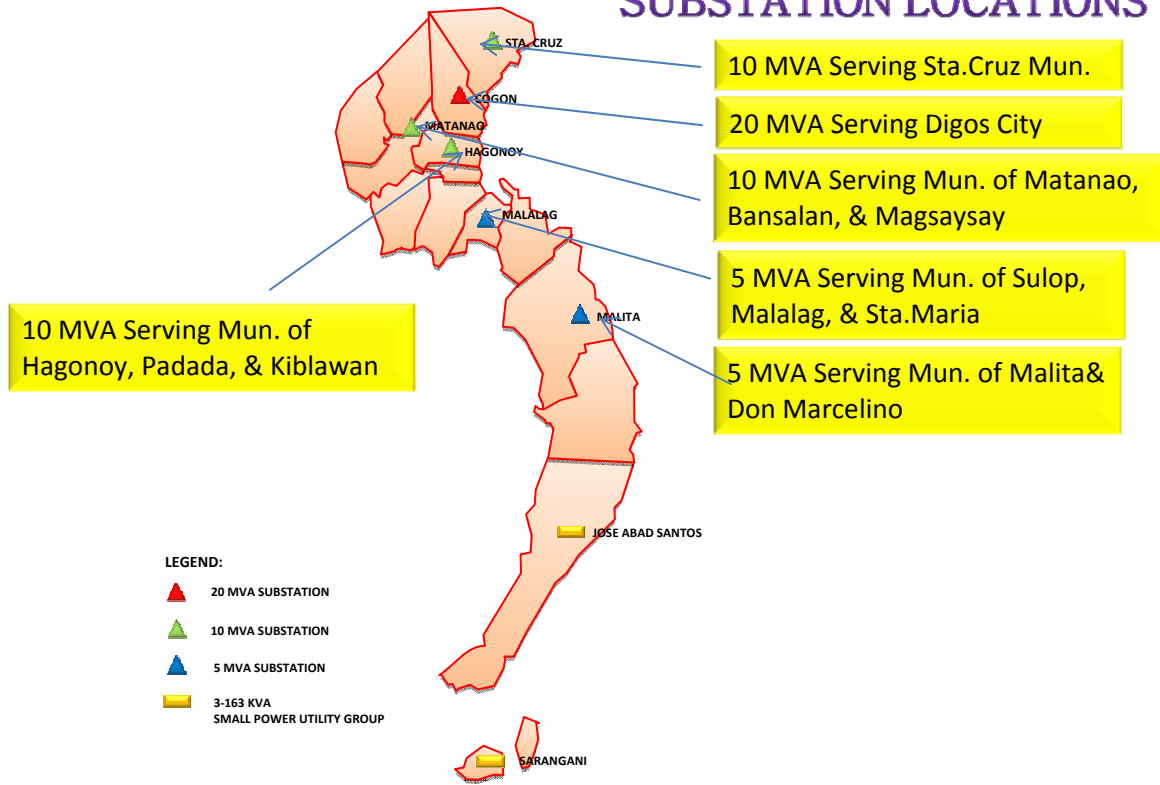


Fig. 1.2: Locations of substations

Table 1.3: Profiles of Substations

SUBS-TATION	LOCATION	BRAND	RATED CAPACITY (MVA)	NO. OF FEEDERS	Loading %	
					kW	capacity
1	Cogon Substation	XIAN	20	4	12649	63
2	Paligue Substation	SHIHLIN	10	3	4903	49
3	Malita Substation	NEW KOREA	5	2	1676	34
4	Matanao Substation	XIAN	10	3	5042	50
5	Sta. Cruz Substation	XIAN	10	3	2798	28
6	Malalag Substation	SHIHLIN	5	3	2250	45

Error! Not a valid bookmark self-reference. shows the total distribution lines energized and their circuit configurations. There are 5.23 km of double circuit, 349.34 km of three-phase circuit, 9.11 vee-phase, 962.98 km of single-phase and 1115.12 km of under built and 744.33 km of secondary circuit. Also, Table 1.5 shows that there are a total of 1,616 of distribution transformers in the distribution system.

Table 1.4: Distribution lines energized (km)

Double Ckt	Three phase	Vee phase	Single phase	Secondary	
				Under Built	Open Secondary
5.23	349.34	9.11	962.98	1115.12	744.33

Table 1.5: Number of Distribution transformers

KVA	NO. OF UNITS
5	10
10	363
15	506
25	551
37.5	64
50	101
75	10
100	10
167	1
TOTAL	1,616

1.4.4. Energy and Demand Profile of the EC

The peak electricity demand per feeder is shown in Fig. 1.3. It is shown that Cogon substation has the largest demand with an average feeder peak demand of 3,162 kW. Paligue substation has an average feeder peak demand of 1,634 kW, Malita substation has an average feeder peak demand 838 kW, Matanao substation has an average feeder peak demand 1,681 kW, Astorga substation has an average feeder peak demand 1,399 kW and Malalag substation has an average feeder peak demand 750 kW. Cogon substation is also having the highest energy sales as shown in Fig. 1.4 with an average energy sale of 14,769,126.64 kWh which accounts for 33% of the current total energy sales. It is then followed by Matanao substation which accounts for 18% of the total energy sales.

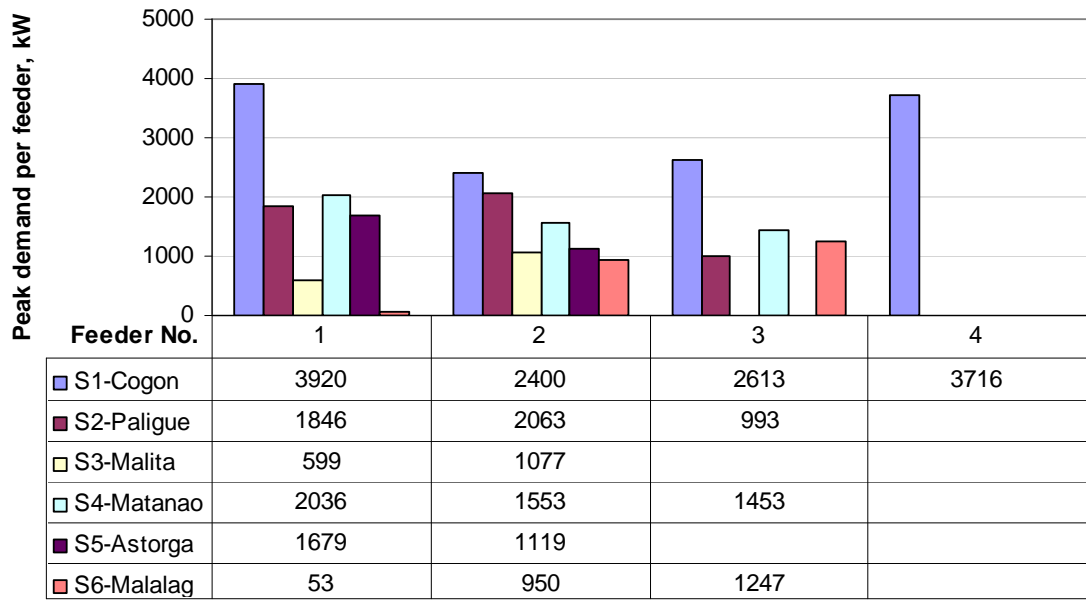


Fig. 1.3. Peak Electricity Demand per Feeder

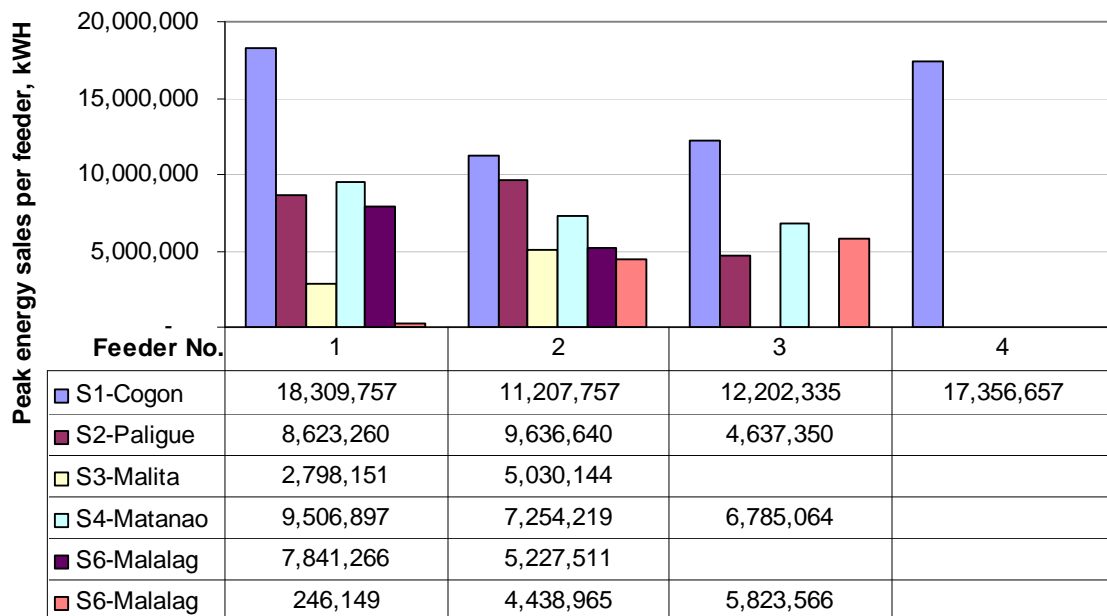


Fig. 1.4. System's Energy Sales per Feeder

1.5. Summary of Annual CAPEX Program

The projects were summarized according to the issues that will be directly addressed.

Table 1.6: Reliability improvement projects

2010-2012 PROPOSED CAPEX PROJECTS			
RELIABILITY IMPROVEMENT PROJECTS			
COUNT	PROJECT DESCRIPTION	COMMISIONING YEAR	COST OF PROJECT
1	MV SWITCHGEAR	2010	14,000,000
2	69KV SF6 CKT BREAKER	2010	3,500,000
3	ISOLATION SWITCHES	2011	3,000,000

Table 1.7: System loss reduction projects

2010-2012 PROPOSED CAPEX PROJECTS			
SYSTEM LOSS REDUCTION PROJECTS			
COUNT	PROJECT DESCRIPTION	COMMISIONING YEAR	COST OF PROJECT
1	DIST. TRANSFORMER WITH AMORPHOUS CORE	2010 & 2011	111,693,000
2	ELECTRONIC SINGLE PHASE KWH METERS WITH IR	2010 & 2011	57,516,925

Table 1.8: Tools and equipment to improve service efficiency

2010-2012 PROPOSED CAPEX PROJECTS			
TOOLS AND EQUIPMENT			
COUNT	PROJECT DESCRIPTION	COMMISIONING YEAR	COST OF PROJECT
1	Infrared Scanner	2010	3,625,000
2	CALPORT 200	2010	731,250
3	Calsource 200	2010	3,000,000
4	Load Profiler Set	2011	5,250,000
5	Load Logger Set	2011	4,500,000
6	Transformer Turns Ratio Tester	2012	201,913
7	DGA Tester	2012	6,250,000
8	MICRO OHMETER	2012	59,313
9	Insulation Resistance Tester	2012	57,250
10	Power Factor Meter	2012	22,094
11	Phase Sequence Indicator	2012	15,450
12	Volt-Ampere Recorder	2012	78,137
13	AC Hi-Pot Test Set	2012	184,113
14	DC Hi-Pot Test Set	2012	230,141
15	Earth Tester	2012	25,750
16	Flicker Severity Monitoring Equipment	2012	1,125,000
17	Forklift, 5-tonner	2012	437,500
18	Printer, Plotter	2012	1,187,500
19	Oil Dielectric Test Set	2012	184,113
20	BATTERY CHARGER @ DIFFERENT SUBSTATIONS	2012	180,000

Table 1.9: Power quality improvement project

2010-2012 PROPOSED CAPEX PROJECTS			
POWER QUALITY IMPROVEMENT PROJECT			
COUNT	PROJECT DESCRIPTION	COMMISIONING YEAR	COST OF PROJECT

1	7.62kV Power Capacitor	2010-2012	14,400,000.00
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1.10: 69 kV subtransmission acquisition

2010-2012 PROPOSED CAPEX PROJECTS			
69 KV SUBTRANSMISSION ACQUISITION			
COUNT	PROJECT DESCRIPTION	COMMISSIONING YEAR	COST OF PROJECT
1	69 KV line acquisition	2010	39,200,000

Table 1.11: Other projects to improve service efficiency

2010-2012 PROPOSED CAPEX PROJECTS			
OTHER PROJECTS			
COUNT	PROJECT DESCRIPTION	COMMISSIONING YEAR	COST OF PROJECT
1	DIST. SYSTEM LOSS SEGREGATOR/SYNERGY SOFTWARE	2010	1,605,000
2	UTILITY TRUCK WITH INSULATED BOOM"KANGLIM"	2012	15,289,098
3	HOTLINE MAINTENANCE TOOLS AND EQPT. 13.2 & 69 KV W/ TRAINING	2012	3,825,000

1.6. Financing Scheme and Rate Impact

Cost estimates of some of the projects were taken from the 2009 NEA price index, prices of other projects and special equipments are based on current bidding/canvass conducted by the Coop. Funding source for these projects will be taken from the NEA loan at 12% per annum.

Fig. 1.5 shows the graphical representation of yearly rate adjustments to accommodate the CAPEX projects. As shown in the table, the yearly rate increases are as follows: Php 0.28 in 2010, Php 0.63 in 2011, Php 0.69 in 2012. It is observed that no rate increase in 2010 will be applied since the start of loan payment will be in 2011. The yearly rate increase was calculated to accommodate the projects identified in the previous section and to make it sure that its impact to DASURECO's consumers will be minimal

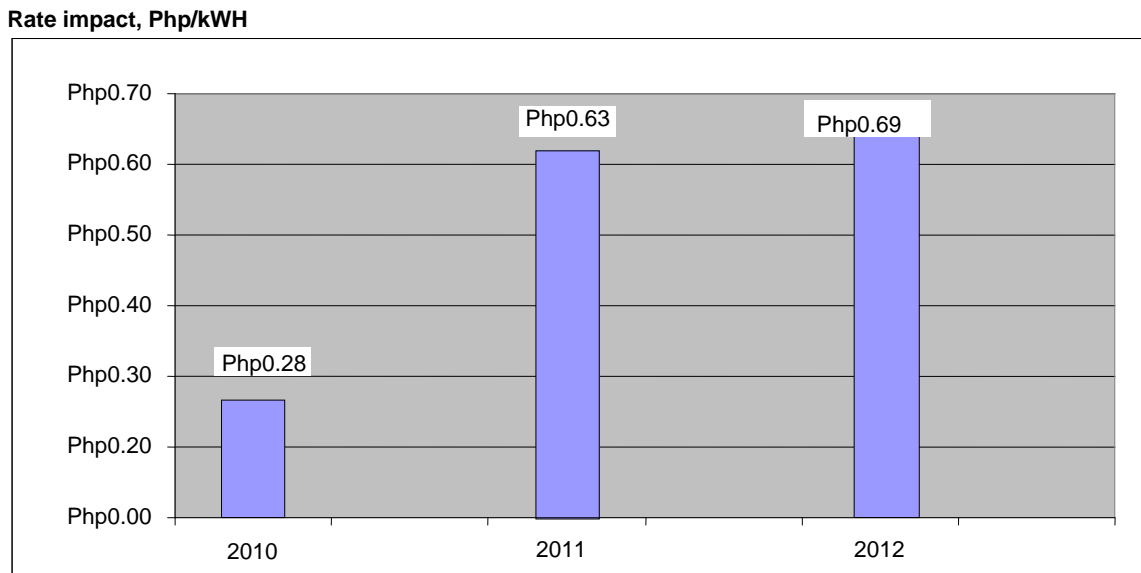


Fig. 1.5. Graphical representation of rate adjustment

Equation Chapter (Next) Section 1

2. DEMAND and ENERGY PROJECTIONS

Two of the significant input parameters in the preparation of the CAPEX are the projected demand and energy. This chapter discusses these parameters used in this report.

2.1. Overview of Projected Demand and Energy for the Planning Period

DASURECO technical team used 7-year system electricity demand (2003 to 2009) and 4-year total energy sales (2006 to 2009) data. As shown in Fig. 2.1 DASURECO's electricity demand continue to increase from 2002 until June 2005 after which there was a significant decline in demand due to the disconnection of large loads. It was then observed that there was a steady increase in demand from July 2005. The sales follow the same trend in increase for the 2005-2009 periods as shown in Fig. 2.2. It is expected that both electricity demand and energy sales will continue to increase at a similar rate in the next five years.

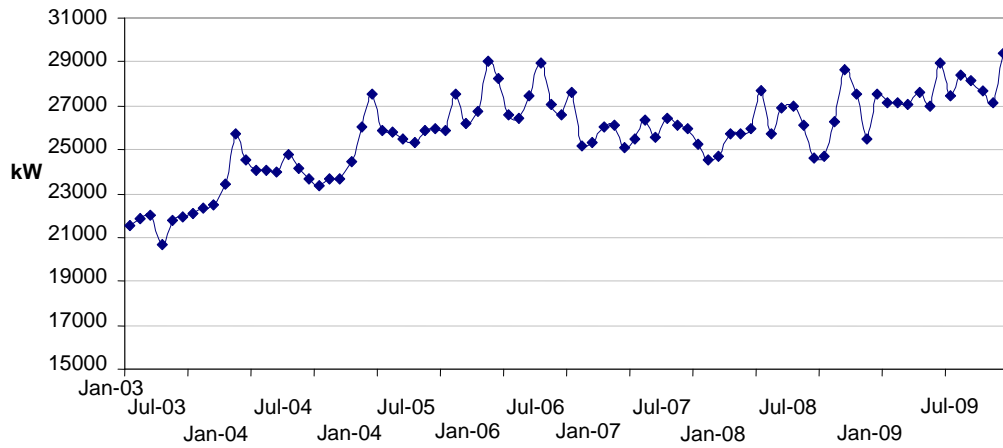


Fig. 2.1: Total Monthly Peak Electricity Demand (January 2002 to December 2009)

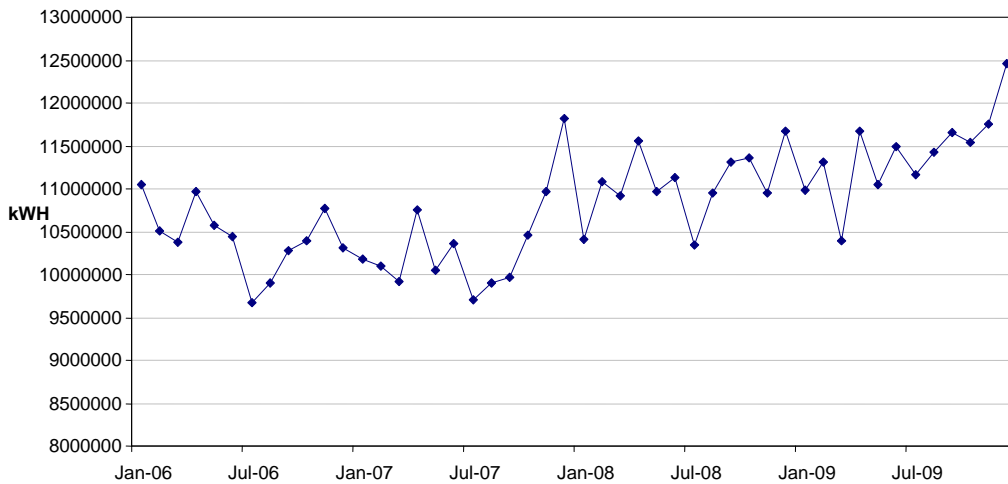


Fig. 2.2: Total Monthly Peak Energy Sales (January 2006 to December 2009)

2.2. Aggregated Demand and Energy Forecast

The load growth of the franchise area served by the EC is the most important factor influencing the expansion of the distribution system. It is thus essential that ECs are able to incorporate accurate forecasting of load in their planning activities. In lieu of the long-range load forecasting (15 or 20 years time horizons), short-term load forecasting (with time horizons of up to 5 years) can also be used. In ideal case, forecasts would predict future loads in detail, extending even to the individual customer level. However in practical application, such is less required.

Table 8.1 shows the monthly historical and forecasted system demand of DASURECO. The monthly historical demand data from January 2003 to December 2009 show significant drop of the demand at the beginning of 4th year due to disconnection of large companies. This 7-year monthly data was used to forecast the 5-year system demand from 2010 to 2014. Using the Winters' multiplicative model and using following smoothing constants of Alpha = 0.2, Gamma = 0.2 and Delta = 0.2 has resulted to a MAPE of 3%. Forecasted monthly demand was then allocated accordingly for each feeder.

The load projections were derived from the historical demand data. Here, the historical electricity demand data runs from January 2003 to December 2009. Fig. 2.4 shows the aggregated demand forecast is the sum of the demand in each feeder and shows a steady increase of about 3.46% per year. As shown in Fig. 2.5, about the same trend in energy sales was observed to increase at about 4.68%.

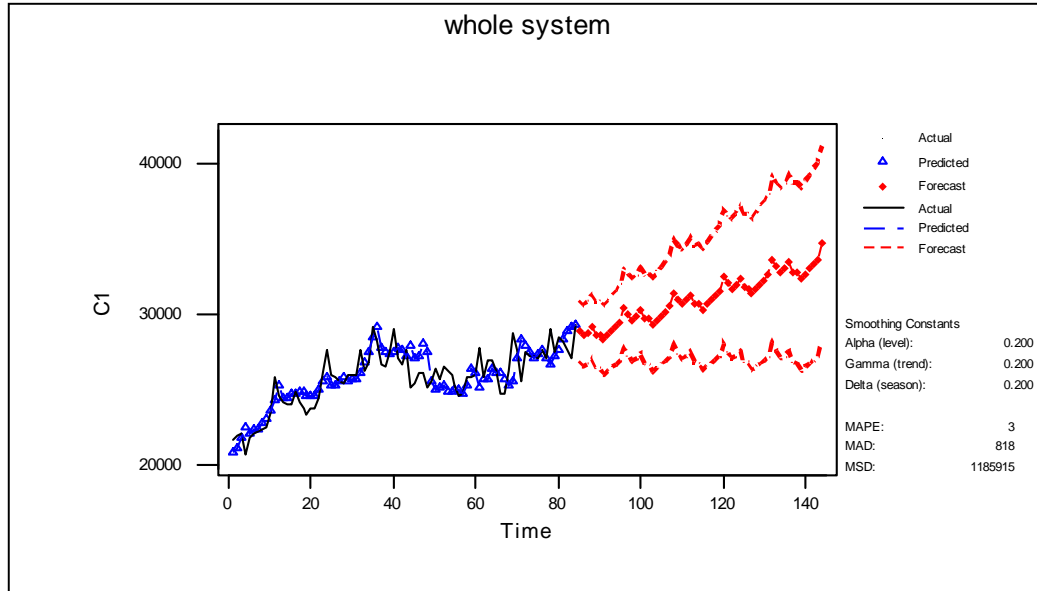


Fig. 2.3: System electricity demand forecast using Winters' multiplicative model

Total Electricity Demand, kW

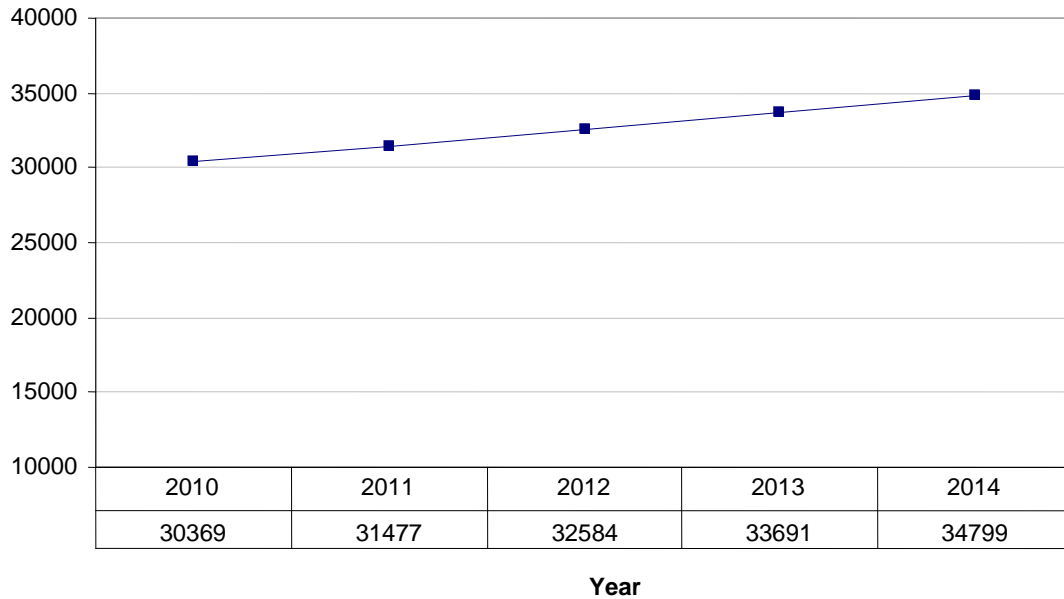


Fig. 2.4. Total Peak Electricity Demand of DASURECO

Total Energy Sales, kWh

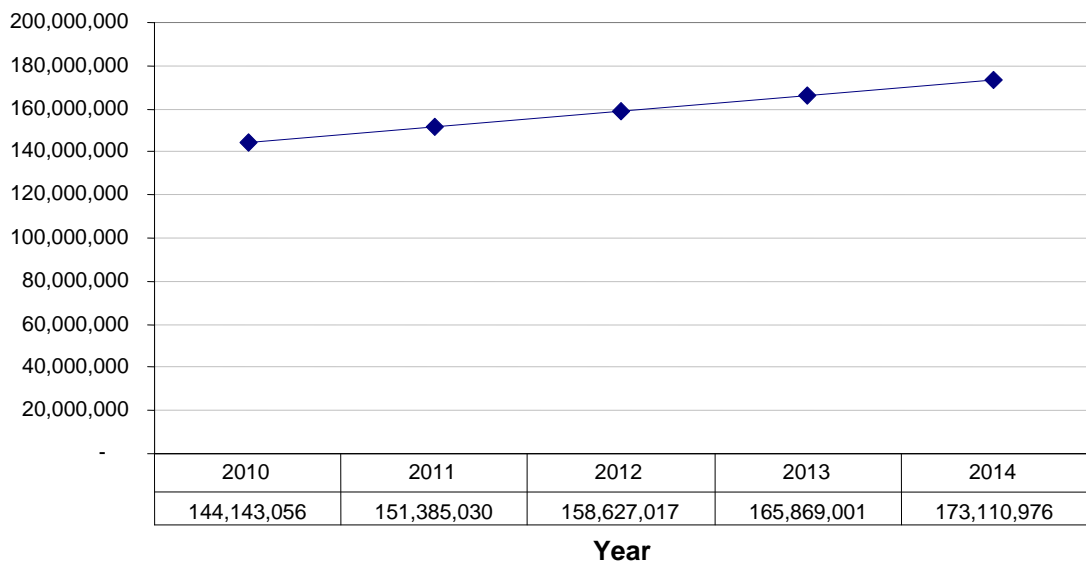


Fig. 2.5. Total Energy Sales of DASURECO

2.3. Demand and Energy Forecast per Substation

The average electricity demand growth rate of each substation is approximately 3.46%. Energy sales per substation have projected growth rate of about 4.68%. Both the electricity demand and energy sales projections are mainly driven by growth as illustrated in Fig. 2.6 and Fig. 2.7 respectively.

Demand per Substation, kW

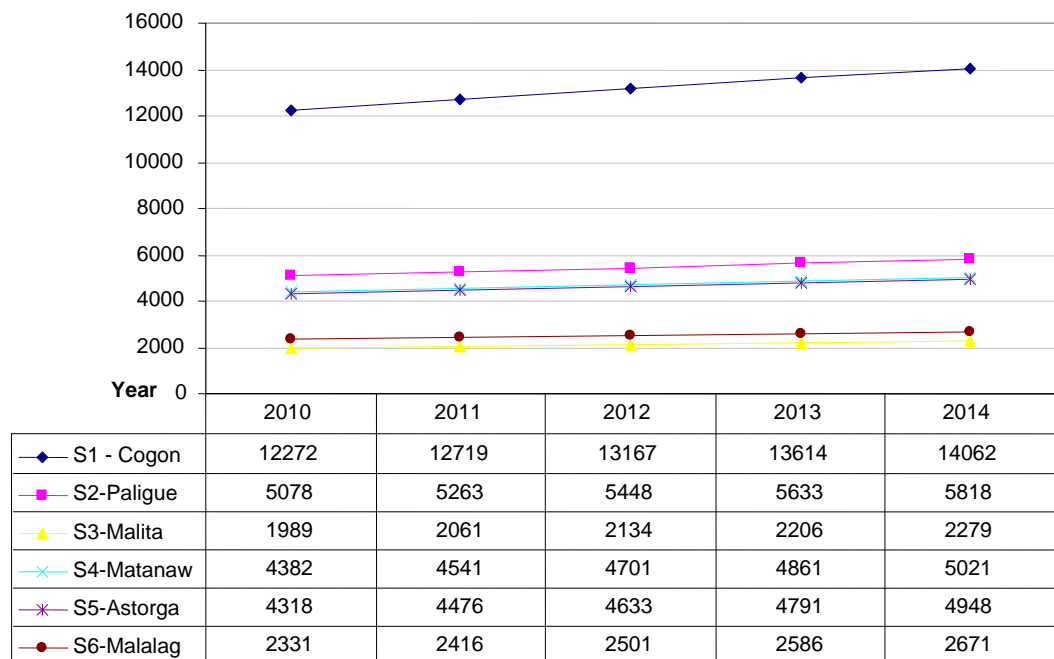


Fig. 2.6. Demand per Substation of DASURECO

Energy Sales per Substation, kWh

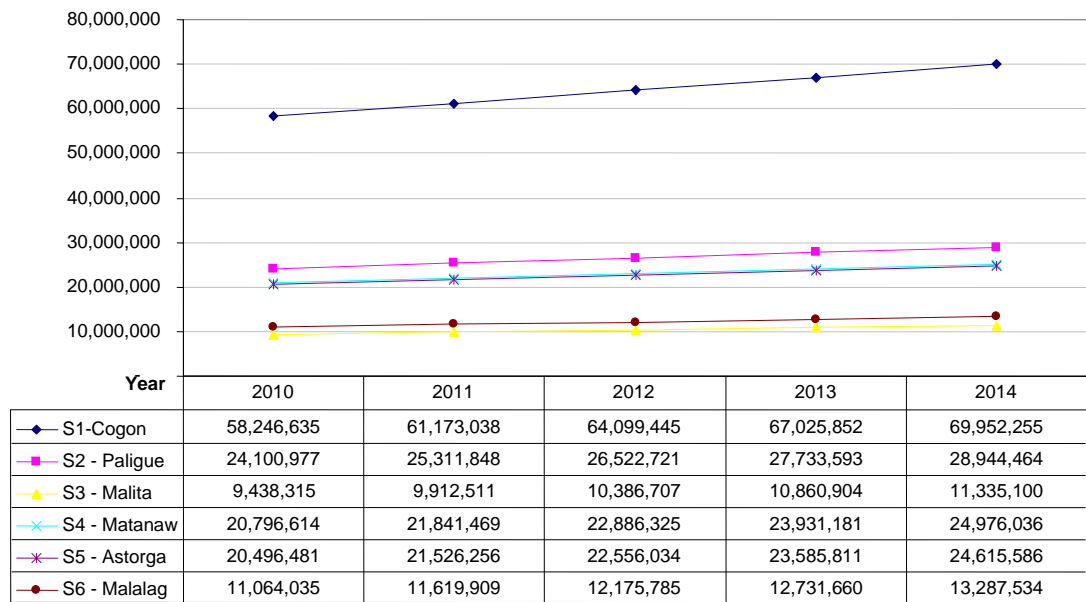


Fig. 2.7. Energy Sales per Substation of DASURECO

2.4. Demand and Energy Forecast per Feeder

Table 2.1 and Table 2.2 show the projected electricity demand and energy sales per feeder. Though proper allocation, the projection per feeder was determined accordingly. A straight forward allocation method was applied by determining a weighted value for each feeder in proportion to the total system demand. This approach ensures that the projected electricity demand is in direct proportion to the size of the feeder and the substation capacity.

Table 2.1: Peak Demand per Feeder

SUBSTATION/metering points	FEEDER No.	PEAK DEMAND FORECAST (KW)				
		2010	2011	2012	2013	2014
S1 – Cogon	1	4061	4209	4357	4505	4653
	2	3804	3943	4081	4220	4359
	3	558	578	598	619	639
	4	3850	3990	4130	4271	4411
S2 – Paligue	1	1912	1982	2052	2122	2191
	2	2137	2215	2293	2371	2449
	3	1028	1066	1103	1141	1178
S3 – Malita	1	768	796	824	852	880
	2	1221	1265	1310	1354	1399
S4 - Matanao	1	2109	2186	2263	2340	2416
	2	768	796	824	852	880
	3	1505	1560	1615	1670	1725
S5 - Astorga	1	3159	3274	3389	3505	3620
	3	1159	1202	1244	1286	1328
S6 - Malalag	1	55	57	59	61	63
	2	984	1020	1056	1092	1128

	3	1292	1339	1386	1433	1480
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Table 2.2: Energy Sales per Feeder

SUBSTATION	FEEDER	FORECASTED				
		2010	2011	2012	2013	2014
S1 – Cogon	1	19,273,083	20,241,393	21,209,705	22,178,016	23,146,326
	2	18,054,628	18,961,721	19,868,815	20,775,909	21,683,002
	3	2,647,184	2,780,183	2,913,182	3,046,181	3,179,179
	4	18,271,740	19,189,741	20,107,744	21,025,746	21,943,747
S2 – Paligue	1	9,076,937	9,532,976	9,989,017	10,445,057	10,901,097
	2	10,142,680	10,652,264	11,161,849	11,671,434	12,181,018
	3	4,881,360	5,126,607	5,371,855	5,617,103	5,862,350
S3 – Malita	1	3,644,274	3,827,368	4,010,462	4,193,556	4,376,650
	2	5,794,041	6,085,143	6,376,245	6,667,347	6,958,449
S4 - Matanao	1	10,009,487	10,512,379	11,015,272	11,518,165	12,021,058
	2	3,643,185	3,826,225	4,009,264	4,192,304	4,375,343
	3	7,143,942	7,502,865	7,861,789	8,220,712	8,579,635
S5 - Astorga	1	14,994,186	15,747,518	16,500,851	17,254,183	18,007,515
	2	5,502,295	5,778,739	6,055,183	6,331,627	6,608,071
S6 - Malalag	1	260,782	273,884	286,986	300,088	313,190
	2	4,671,686	4,906,399	5,141,112	5,375,826	5,610,538
	3	6,131,566	6,439,626	6,747,686	7,055,746	7,363,805

Equation Chapter (Next) Section 1

3. ENGINEERING AND TECHNICAL ANALYSIS

As part of the distribution planning studies, ECs are required to conduct technical analysis to ensure the safety and reliability of the system. The technical analysis requires the profile of the distribution system for the study period of 5 years.

3.1. Single Line Diagram of the Distribution System

Fig. 3.1 shows the simplified diagram of DASURECO’s Distribution System. It shows the demand and the transformer size in each substation. The demand is based on the 2009 load. As shown in the figure, a total of 12.65 MW demand from the four feeders is served by the 20-MVA power transformer of Cogon substation. A 4.903 MW demand from three feeders is served by 10 MVA power transformer of Paligue substation. The 5-MVA Malita substation serves two feeders a total of 1.676 MW load. The Matanao substation has 10-MVA capacity which serves three feeders and having a total capacity of 5.04 MW. The Astorga substation having a total demand of 2.259 MW from two feeders has 10-MVA substation rating. Lastly, the 5-MVA Malalag substation is just about half loading capacity from three feeders.

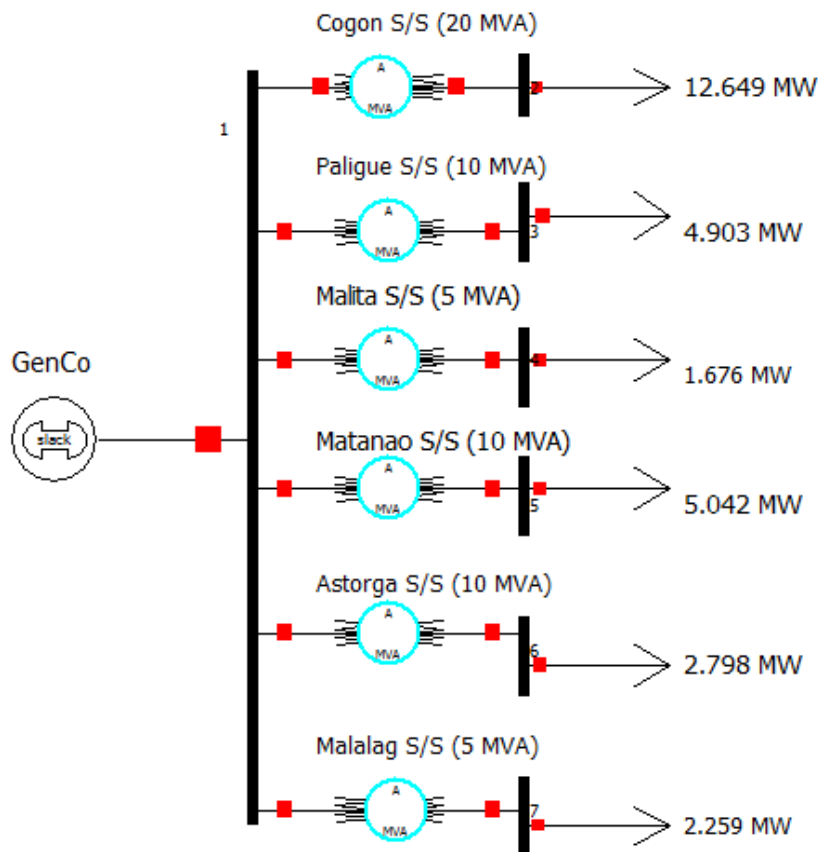


Fig. 3.1: Simplified single line diagram of DASURECO Distribution

3.2. Distribution Load Profile

3.2.1. Development of Base Case for the EC

With the 2009 base case profile of the system and the projected 5-year peak demand forecast, the technical working group of DASURECO was able to simulate the effect of the increasing electricity demand to the system in terms of capacity, power quality and reliability.

3.2.2. Modelling of Distribution System for the Planning Period

Based on the allocated electricity demand per feeder, the distribution system was modelled using peak electricity demand for the particular year.

3.3. Distribution Impact Studies

3.3.1. Technical Analysis and Distribution System Profile

As part of the distribution planning studies, ECs are required to conduct technical analysis to ensure the safety and reliability of the distribution system. The technical analysis requires the profile of the distribution system for the study period of 5 years.

3.3.2. Capacity Requirement Studies

Table 3.1 shows the demand forecast while Table 3.2 shows the capacity profile of each substation from 2010 to 2014. It is shown that the loading capacity of all the substations increases corresponding with the increase in the demand forecast. It is also shown that all substations are within the required capacity limit during the 5-year forecast period. Substation transformers are required to be within 80% of their loading capacity based on their maximum rated capacity of the transformer. For instance, the 20 MVA-transformer in substation 1 (Cogon substation) will have its capacity increased from 62.29 % to 71.4 %. The same trend in the increased of their capacities is expected from the rest of the substation transformers as shown in Fig. 3.2.

Percent of transformers capacity

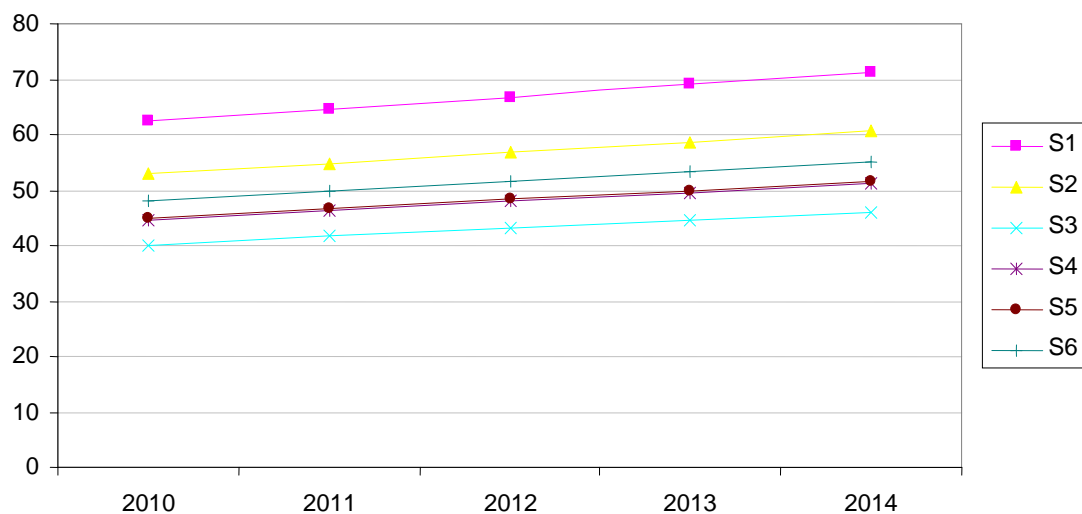


Fig. 3.2: Increase in Percent of Substation Transformer Load

Table 3.1: Peak Demand Forecast and Substation Capacity Profile (2010 – 2014)

SUBSTATION	FEEDER	PEAK DEMAND FORECAST (KW)				
		2010	2011	2012	2013	2014
S1 (20MVA-COGON)	1	4061	4209	4357	4505	4653
	2	3804	3943	4081	4220	4359
	3	558	578	598	619	639
	4	3850	3990	4130	4271	4411
S2 (10MVA-PALIGUE)	1	1912	1982	2052	2122	2191
	2	2137	2215	2293	2371	2449
	3	1028	1066	1103	1141	1178

S3 (5MVA-MALITA)	1	768	796	824	852	880
	2	1221	1265	1310	1354	1399
S4 (10MVA-MATANAO)	1	2109	2186	2263	2340	2416
	2	768	796	824	852	880
	3	1505	1560	1615	1670	1725
S5 (10MVA-ASTORGA)	1	3159	3274	3389	3505	3620
	3	1159	1202	1244	1286	1328
S6 (5MVA-MALALAG)	1	55	57	59	61	63
	2	984	1020	1056	1092	1128
	3	1292	1339	1386	1433	1480

Table 3.2: Substation Capacity Profile (2010 – 2014)

SUBSTATION	FEEDER	CAPACITY PROFILE (%)					ANALYSIS & EVALUATION
		2010	2011	2012	2013	2014	
S1 (20MVA-COGON)	1	62.29	64.57	66.84	69.11	71.4	NO CAPACITY VIOLATION
	2						
	3						
	4						
S2 (10MVA-PALIGUE)	1	52.89	54.82	56.75	58.68	60.6	NO CAPACITY VIOLATION
	2						
	3						
S3 (5MVA-MALITA)	1	40.17	41.64	43.1	44.57	46	NO CAPACITY VIOLATION
	2						
S4 (10MVA-MATANAO)	1	44.71	46.34	47.97	49.6	51.2	NO CAPACITY VIOLATION
	2						
	3						
S5 (10MVA-ASTORGA)	1	44.98	46.62	48.26	49.9	51.5	NO CAPACITY VIOLATION
	3						
S6 (5MVA-MALALAG)	1	48.06	49.82	51.57	53.32	55.1	NO CAPACITY VIOLATION
	2						
	3						

3.3.3. Voltage Drop Studies

The voltage level of the distribution system should be maintained at a minimum level to maintain the desired power quality. Too low voltage causes high current at the connection point which can damage sensitive equipment and appliances such as premature ageing, preheating or malfunctioning of connected equipment. Electric cooperatives are mandated under the Philippine Distribution Code to maintain their voltage level to a minimum of 0.9 pu and a maximum of 1.1 pu. Long duration undervoltages in substation feeders are mainly due to increase in loads. Table 3.3 shows the voltage profile for each feeder in each substation measured at the primary side. The table shows that there is no voltage violation from 2010 to 2014 indicating relatively good power supply quality.

In the Cogon substation, feeders 1 and 3 will still have excellent voltage profile in the next five years while feeders 2 and 4 will have critical voltage values towards the end of the five year forecast. Unanticipated large amount of electricity demand in the next five years can trigger under voltages in these feeders. Drastic voltage corrections such as capacitive reinforcement may be employed should this happen. In the Paligue substation, all the feeders still maintain good to excellent values. The voltage profile of all the feeders in the Malita, Matanao, Astorga and Malalag substations are likely to stay exceptionally within the required lower limit.

Table 3.3: Voltage profile in each feeder

SUBSTATION	FEEDER	VOLTAGE PROFILE (pu)					ANALYSIS & EVALUATION
		2010	2011	2012	2013	2014	
S1 (20MVA-COGON)	1	0.97	0.97	0.97	0.97	0.97	NO VOLTAGE VIOLATION
	2	0.92	0.92	0.91	0.91	0.91	
	3	0.99	0.99	0.99	0.99	0.99	
	4	0.92	0.92	0.92	0.91	0.91	
S2 (10MVA-PALIGUE)	1	0.93	0.93	0.92	0.92	0.92	NO VOLTAGE VIOLATION
	2	0.97	0.97	0.96	0.96	0.96	
	3	0.99	0.99	0.99	0.98	0.98	
S3 (5MVA-MALITA)	1	0.97	0.97	0.96	0.96	0.95	NO VOLTAGE VIOLATION
	2	0.97	0.97	0.97	0.97	0.97	
S4 (10MVA-MATANA0)	1	0.96	0.95	0.95	0.94	0.94	NO VOLTAGE VIOLATION
	2	0.99	0.99	0.99	0.99	0.99	
	3	0.97	0.97	0.96	0.96	0.96	
S5 (10MVA-ASTORGA)	1	0.95	0.95	0.94	0.94	0.94	NO VOLTAGE VIOLATION
	3	0.98	0.98	0.98	0.98	0.97	
S6 (5MVA-MALALAG)	1	0.99	0.99	0.99	0.99	0.99	NO VOLTAGE VIOLATION
	2	0.98	0.98	0.98	0.98	0.97	
	3	0.98	0.98	0.97	0.97	0.97	

3.3.4. Systems Loss Studies

The main factors that contribute for high technical losses are usage of lower size conductors, low voltage pockets, lack of reactive power control, etc. Some of the methods to reduce technical losses includes: re-conductoring (Replacing existing conductor by higher size or conversion of single to double circuit), shunt or series capacitor installation (switched and fixed) and auto voltage booster.

The total system's loss reflected in **Table 3.4** shows significantly low technical loss. Fig. 3.3 shows the rate of increase in the projected demand and technical loss. The total system demand increases at a rate of 1107 kW per year. On the average, the system's technical loss is a little more than 3% and with a corresponding increase at a rate of about 98 kW per year.

Table 3.4: Technical loss profile of DASURECO

SUBSTATION	FEEDER	TECHNICAL LOSS (KW)				
		2010	2011	2012	2013	2014
S1 (20MVA-	1	140	140	150	152	170

COGON)	2	241.2	261.2	262	271.8	281.8
	3	10	10	10	10	10
	4	222	223.1	251	263	274.4
S2 (10MVA-PALIGUE)	1	82	84	89	90	98
	2	35	40	43	47	51
	3	1	1	1	1	1
S3 (5MVA-MALITA)	1	8	11	14	17	21
	2	6	6	6	6	7
S4 (10MVA-MATANAO)	1	39.5	48.3	85.1	140.4	140.8
	2	3.2	4.4	12.3	17.7	17.7
	3	12.5	13.5	41.5	48.5	48.5
S5 (10MVA-ASTORGA)	1	77.1	85.1	93.6	93.8	105.8
	3	14.1	18.5	18.7	19.2	23.7
S6 (5MVA-MALALAG)	1	1	1	1	1	2
	2	13	14	15	16	17
	3	16	19	20	22	26

Technical loss, kW

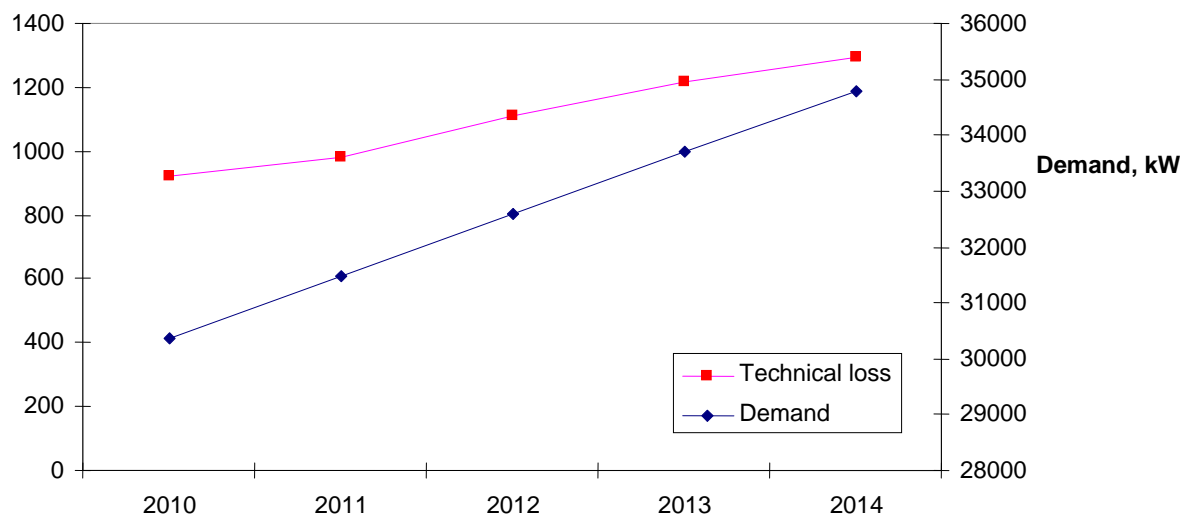


Fig. 3.3: Projected Demand and Technical Loss (2010 – 2014)

Equation Chapter (Next) Section 1

4. IDENTIFICATION OF OPTIMUM CAPEX PROJECTS

4.1. Problem Descriptions

Table 4.1 describes the existing and future problems should the CAPEX projects not be implemented. The problems identified in this section were subdivided into eight types. Problems may be of capacity related, it maybe of new customers, short circuit, power quality, reliability, systems loss or rural electrification type. Some of these problems will also address two or more issues. As shown in the table, there are no capacity and new customers' types of problems identified. It is shown that majority of the problems are of the reliability type issues, followed by power quality, systems loss and short circuit. There are also other projects that will address customer service improvement and these belong to the F-column.

One of the critical problems identified is the inability of the cooperative to quickly restore electrical service following severe outage such as typhoon that will affect the substation and during scheduled substation maintenance. This particular problem will be addressed by a mobile substation. Problem regarding the higher core loss due to the use of silicon-core distribution transformer will be addressed by using amorphous-core transformer. Total technical loss will be reduced significantly since considerable number of distribution transformers will be needed in this project. With no supervisory control and data acquisition, the Coop will have no capacity for real time monitoring thus will affect proactive detection and real time strategic decision making eventually affecting reliability and service efficiency to consumers.

In addition, the higher technical losses will be addressed when amorphous core distribution transformers will be installed replacing the old silicon core transformers. When, electronic kWh meters are to be used, problems of poor meter reading inaccurate kwhmeters will be resolved. This new type of kWh meters can also reduce technical losses. The distribution system should be able to addressed voltage instability by using automatic voltage regulator. This equipment is able to respond to disturbance continuously thus improving the likelihood of cascading fault. (The Coop is also having difficulty in modelling the unbalanced aspect of the distribution system.)

Unavailable logistics will also hamper reliability and safety to service personnel. Monitoring of power quality problems such as flicker will have the advantageous for predictive maintenance purposes. Lastly, payment of Residual Connection Charges to NGCP will be eliminated when Sub-transmission line 69 kV line is acquired.

Table 4.1 Description and Types of Problems

No.	Problem Description	Problem Type
-----	---------------------	--------------

		A. Capacity	B. New Customers	C. Short Circuit	D. Power Quality	E. Reliability	F. Systems Loss	G. Rural Electrification	F. Others
1	Improvement of fault detection			✓		✓			
2	Critical voltage levels at Substation 1, Feeders 1 and 2				✓	✓	✓		
3	Inability to quickly restore electrical service following an outage cause by unforeseen severe events such as typhoon that will affect the substation and during scheduled substation maintenance.			✓		✓			
4	No supervisory control and data acquisition system for proactive problem detection and resolution and Real time strategic decision making					✓			✓
5	Higher technical losses due to the use Silicon core transformers						✓		
6	Poor reading outputs from old kWh meters					✓			✓
7	Inability to regulate voltage automatically thus increase likelihood of transient instability of the distribution system			✓	✓	✓			
8	Difficulty in modelling the unbalanced section of the distribution system								✓
9	Logistics: i. Incapable of hot line repairs ii. Improvement of safety during repairs					✓			✓
10	Inability to monitor power quality such as flicker, monitor dissolved gases of transformers				✓	✓			✓
11	Improvement of routine maintenance capability					✓			✓
12	Improvements of Reactive Power				✓				
13	Regular payment of Residual Sub-transmission Charges to NGCP: procurement of Sub-transmission line 69 kV line								✓

4.2. Identification of Projects

Load flow results show that DASURECO's system performance for 2009 to 2013 projection period is still within acceptable level. This is reflected by its low system's loss, excellent voltage profile and

substations loading capacity which are within the required upper limit in the previous sections. The projects were therefore carefully identified to be able to improve further the system's performance and reliability. With improved reliability, DASURECO is expected to improve consumers' service that is at par with the standards of top ECs. Table 4.2 shows the summary of the selected projects for the projected period.

Table 4.2: Summary of Selected Projects (2010-2014)

Rank	Project Title	Commissioning Date	Project Driver	For Details
1	Construction of MV Switchgear	2010	<i>Efficiency, Reliability and Quality of Service</i>	Table 8.50
2	69KV SF6 CKT BREAKER		<i>Safety, Efficiency, Continuity and Quality of Service</i>	Table 8.54
3	ISOLATION SWITCHES	2012	<i>Safety, Reliability, Efficiency, Continuity and Quality of Service</i>	Table 8.54
4	Acquisition of Distribution Transformer with Amorphous Core 50 Kva 25 Kva 15 Kva 10 Kva	2010 2010 to 2011 2010 to 2011 2010 to 2011	<i>Efficiency, Reliability and Quality of Supply</i> <i>Low System Loss</i>	Table 8.51
5	Acquisition of ELECTRONIC SINGLE PHASE KWH METERS with IR	2010 to 2011	<i>Efficiency, Continuity and Quality of Service</i>	Table 8.52
6	7.62KV POWER CAPACITOR	2010 to 2012	<i>Efficiency and Quality of Service</i>	Error! Reference source not found.A
7	69 KV line acquisition	2011	<i>Reliability, Efficiency, Continuity and Quality of Service</i>	Table 8.59
8	DISTRIBUTION SYSTEM LOSS SEGREGATOR/SYNERGY SOFTWARE	2010	<i>Efficiency and Continuity of Service</i>	Table 8.53
9	UTILITY TRUCK WITH INSULATED BOOM "KANGLIM"	2012	<i>Efficiency and Continuity of Service</i>	Table 8.55
10	Acquisition of Hotline Maintenance Tools and Equipment 13.2 & 69 Kv w/ Training	2012	<i>Safety, Efficiency and Continuity of Service</i>	Table 8.56
11	Acquisition of Tools and Equipment	2010 to 2012	<i>Safety, Efficiency and Continuity of Service</i>	Table 8.48

4.3. Description of Projects:

4.3.1. Projects that will improve reliability

4.3.1.1. Proposed Construction of MV Switchgear

The first project identified is the construction of MV switchgear (Distribution switchgear is commonly referred to as medium-voltage (MV) switchgear). The switchgear will offer an efficient and highly effective automatic fault detection system. Thus when realized, this project will improve the performance of the system by allowing the DASURECO to achieve the desired quality of service. The proposed construction of MV Switchgear will be commissioned in 2010.

4.3.1.2. Isolation Switches

This project involves the purchase of 6 units isolation switches in 2012.

4.3.1.3. 69KV SF6 Circuit Breaker

This project is for compliance with the Philippine Grid code requirement. Also, the 69-kV SF6 is much effective for much high power and high voltages applications. Advantages of SF6 circuit breaker over oil circuit breakers are: Short arcing time, can interrupt much larger current, gives noiseless operation due to its closed gas circuit, no moisture problem, no risk of fire, no carbon deposits so no tracking or insulation problem, and low maintenance cost.

4.3.2. Projects that will reduce systems loss

4.3.2.1. Acquisition of Distribution Transformer with Amorphous Core

This project intends to decrease further the technical loss. The transfer of energy from one level to another involves the use of distribution transformers (DT). In distribution transformers, there are two losses that occur: no-load losses associated with the core and load losses, which is a function of the demand.

These are the breakdowns of the transformers to be purchased:

- 101 units of 50 kVA distribution transformers to be acquired in 2010
- 551 units of 25 kVA transformers will be acquired in 2010 and in 2011
- 506 units of 15 kVA transformers will be acquired in 2010 and in 2011
- 363 units of 10 kVA transformers will be acquired in 2010 and in 2011

4.3.2.2. Acquisition of Electronic Single Phase kWh Meters with IR

Electronic single phase kWh meters with infrared reader are designed to simplify metering in distribution systems. This includes, ease in reading of energy consumption. These equipments will be acquired between 2010 and 2011.

4.3.3. Projects that will improve power quality

4.3.3.1. 7.62KV POWER CAPACITOR

The Installation of capacitors on distribution systems improves efficiency by causing the power factor to move closer to 100%. Capacitors also improve line voltage, which results in lower losses on lines and transformers on the system. The power factor attained with capacitors results in greater loss reduction than that achieved by raising voltage.

4.3.4. Other projects that will improve the quality of service to customers

4.3.4.1. Distribution System Loss Segregator/SynerGee Software

The purchase of Distribution System Loss Segregator/SynerGee helpful in planning and day to day operation of the ECs. Software are will enhance analysis of the EC's distribution circuits which can perform various engineering tasks such as, Load forecasting, load modelling and Reliability modelling. Using advanced tools helps maintain safe, reliable and profitable operations especially in this demanding deregulated market.

4.3.4.2. Utility Truck with Insulated Boom "Kanglim"

This project will be acquired in 2012.

4.3.4.3. Acquisition of Tools and Equipment

This project is also part of improving the efficiency and continuity of service to consumer through the use of essential tools and equipment for proper monitoring, testing and measurement purposes. Table 4.2 shows the various tools and equipment, their description and the number of units that are to be acquired between 2010 and 2014. For example, an Infrared Scanner will be acquired in 2010 for measurement purposes. Various testing equipment will be acquired to enhance testing to check or analyze equipment for predictive and preventive maintenance purposes. The DGA Tester will analyze the type and quantity of gases that are dissolved in the transformer oil. The test, which is usually done annually, can give an early indication of abnormal behaviour of the transformer thus avoiding forced outages due to transformer failure. Another important piece of equipment is for monitoring the severity of flicker (Flicker Severity Monitoring). Flicker is a very important quality issue in the distribution systems. Constant monitoring is necessary to provide good quality to the consumer.

Table 4.3 shows the various tools and equipment.

Table 4.3: Tools and Equipment

No.	Description	No of units	2010	2011	2012
1	Infrared Scanner	1 pc	✓		
2	CALPORT 200	1 pc	✓		
3	Calsource 200	1 set	✓		
4	Load Profiler Set	6 pc		✓	
5	Load Logger Set	6 pc		✓	
6	Transformer Turns Ratio Tester	1 pc			✓
7	DGA Tester	1 pc			✓
8	MICRO OHMETER	1 pc			✓
9	Insulation Resistance Tester	1 pc			✓
10	Power Factor Meter	1 pc			✓
11	Phase Sequence Indicator	1 pc			✓
12	Volt-Ampere Recorder	1 pc			✓
13	AC Hi-Pot Test Set	1 pc			✓
14	DC Hi-Pot Test Set	1 pc			✓
15	Earth Tester	1 pc			✓
16	Flicker Severity Monitoring Equipment	1 pc			✓
17	Forklift, 5-tonner	1 pc			✓
18	Printer, Plotter	1 pc			✓
19	Oil Dielectric Test Set	1 pc			✓
20	BATTERY CHARGER @ DIFFERENT SUBSTATIONS	6 sets			✓

Equation Chapter (Next) Section 1

5. CAPEX PROJECTS

5.1. Annual CAPEX Program

Table 5.1 shows the yearly CAPEX program of DASURECO. In 2009, there are generally 7 CAPEX programs included. In 2010, there are 6 CAPEX programs. In 2011 there are 5 programs, in 2012 there are 3 programs.

Table 5.1: Annual CAPEX Program (2010-2012)

No.	Project Title	Year				
		2010	2011	2012	2013	2014
1	Proposed Construction of MV Switchgear	✓				
2	Acquisition of Distribution Transformer with Amorphous Core					
	50 Kva		✓			
	25 Kva	✓	✓			
	15 Kva	✓	✓			
	10 Kva	✓	✓			
3	Acquisition of Hotline Maintenance Tools and Equipment 13.2 & 69 Kv w/ Training			✓		
4	Acquisition of Tools and Equipment	✓	✓	✓	✓	
5	Acquisition of ELECTRONIC SINGLE PHASE KWH METERS with IR	✓	✓			
6	DISTRIBUTION SYSTEM LOSS SEGREGATOR/SYNERGY SOFTWARE	✓				
7	69KV SF6 CKT BREAKER					
8	UTILITY TRUCK WITH INSULATED BOOM "KANGLIM"			✓		
9	ISOLATION SWITCHES				✓	
10	7.62KV POWER CAPACITOR	✓	✓	✓	✓	✓
11	SCADA					✓
12	69 KV line acquisition	✓				

5.2. Cost Estimates

Fig. 5.1 shows the annual DASURECO's CAPEX for three years. In 2010, the EC will spend Php 130,506,202. In 2011, CAPEX increases to Php 168,876,202. The succeeding three years shows considerable drop. In 2012, CAPEX dropped to Php 32,232,370. The total CAPEX is equal to Php 333,534,773.

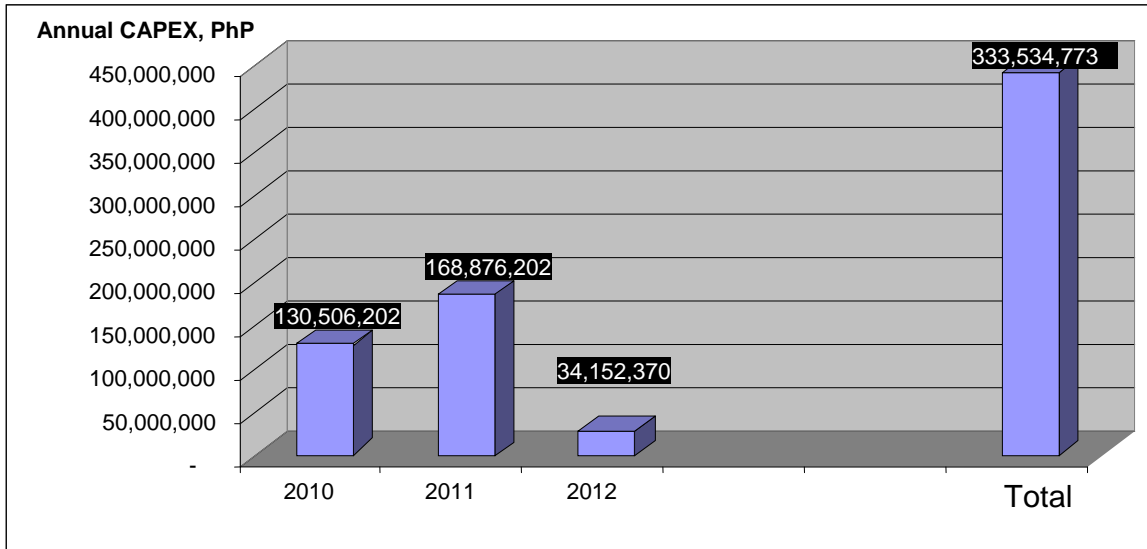


Fig. 5.1: Annual CAPEX

Table 5.1 cost estimates of the various projects. The proposed construction of MV Switchgear will be commissioned in 2010 with a total cost of Php 14,000,000. The second project is the acquisition of various sizes of distribution transformers with amorphous core. There are 101 units of 50 kVA transformers, 551 units of 25 kVA transformers, 506 units of 15 kVA transformers, and 363 units of 10-kVA transformers for a total cost of Php 154,952,403. DASURECO will also purchase 57,000 units of Electronic Single Phase Kilowatt-Hour Meters with infrared reader amounting to Php 54,150,000 between 2010 and 2011.

In addition, Distribution System Loss Segregator Software/Synergy Software will be purchased in 2010 at a cost of Php 1,605,000.00. One set of 69KV SF6 circuit breaker will be purchased at a cost of Php 3,500,000.00 in 2010. Three units of utility truck with insulated boom "KANGLIM" will be purchased in 2012 at a total cost of Php 18,851,040.00. Hotline maintenance tools and equipment 13.2 & 69 kV with training will be purchased in 2012 with a total cost of Php 3,825,000.00. About two-thirds of the cost covers line Live-Line Maintenance Equipment and about one-third of the cost covers Live-Line Maintenance Safety Apparel. Various tools and equipment will also be purchased for a total cost of Php 27,344,522.06. It is also desired to acquire 69-kV at Php 39,200,000.

Table 5.2: Projects' Cost Estimates

No.	Description	Unit Cost (Peso)		No. of Units	TOTAL COST (Peso)	2010	2011	2012
1	MV SWITCHGEAR		14,000,000	1 lot	14,000,000	14,000,000		
2	DISTRIBUTION TRANSFORMER WITH AMORPHOUS CORE	50KVA	150,000	101 pcs.	15,150,000		15,150,000	
		25KVA	115,625	551 pcs.	63,709,375	31,854,688	31,854,688	
		15KVA	95,689	506 pcs.	48,418,634	24,209,317	24,209,317	
		10KVA	76,238	363 pcs.	27,674,394	13,837,197	13,837,197	
3	ELECTRONIC SINGLE PHASE KILOWATT-HOUR METERS WITH INFRARED		950	57,000 pcs.	54,150,000	27,075,000	27,075,000	
4	DISTRIBUTION SYSTEM LOSS SEGREGATOR SOFTWARE/SYNERGY SOFTWARE		1,605,000	1 set	1,605,000	1,605,000		
5	69KV SF6 CKT BREAKER		3,500,000	1 set	3,500,000	3,500,000		
6	UTILITY TRUCK WITH INSULATED BOOM "KANGLIM"		5,096,366	3 sets	15,289,098			15,289,098
7	HOTLINE MAINTENANCE TOOLS AND EQUIPMENT 13.2 & 69 KV W/ TRAINING							
		1 Live-Line Maintenance Equipment Set	2,475,000	1 lot	2,475,000			2,475,000
	2 Live-Line Maintenance Safety Apparel	1,350,000	1 lot	1,350,000			1,350,000	
8	100 KILOWATT-HR METERS W/ GSM (FARGO MAESTRO)		250,000	23 sets	5,750,000			
9	15KV AUTOMATIC VOLTAGE REGULATOR		330,720	57 pcs.	18,851,040			
10	7.62KV POWER CAPACITOR		1,200	120 units	14,400,000	4,800,000	4,800,000	4,800,000
11	ISOLATION SWITCHES		500,000	6 sets	3,000,000		3,000,000	
12	MOBILE TRANSFORMER/SUBSTATION	20MVA	60,000,000	1 lot	60,000,000			
13	SCADA		8,000,000	1 lot	8,000,000			
14	TOOLS & EQUIPMENT							
	1 Infrared Scanner		3,625,000	1 pc	3,625,000	3,625,000		
	2 CALPORT 200		3,000,000	1 pc	3,000,000	3,000,000		
	3 Calsource 200		3,000,000	1 set	3,000,000	3,000,000		
	4 Load Profiler Set		875,000	6 pc	5,250,000		5,250,000	
	5 Load Logger Set		750,000	6 pc	4,500,000		4,500,000	
	6 Transformer Turns Ratio Tester		201,913	1 pc	201,913			201,913
	7 DGA Tester		6,250,000	1 pc	6,250,000			6,250,000
	8 MICRO OHMMETER		59,313	1 pc	59,313			59,313
	9 Insulation Resistance Tester		57,250	1 pc	57,250			57,250
	10 Power Factor Meter		22,094	1 pc	22,094			22,094
	11 Phase Sequence Indicator		15,450	1 pc	15,450			15,450
	12 Volt-Ampere Recorder		78,137	1 pc	78,137			78,137
	13 AC Hi-Pot Test Set		184,113	1 pc	184,113			184,113
	14 DC Hi-Pot Test Set		230,141	1 pc	230,141			230,141
	15 Earth Tester		25,750	1 pc	25,750			25,750
	16 Flicker Severity Monitoring Equipment		1,125,000	1 pc	1,125,000			1,125,000
	17 Forklift, 5-tonner		437,500	1 pc	437,500			437,500
	18 Printer, Plotter		1,187,500	1 pc	1,187,500			1,187,500
	19 Oil Dielectric Test Set		184,113	1 pc	184,113			184,113
20 BATTERY CHARGER @ DIFFERENT SUBSTATIONS		30,000	6 sets	180,000			180,000	
15	69 KV line acquisition				39,200,000		39,200,000	
						130,506,202	168,876,202	34,152,370

Equation Chapter (Next) Section 1

6. ECONOMIC AND FINANCIAL EVALUATION

This section provides the two most-used measures for evaluating an investment, the net present value and the internal rate of return.

6.1.1. NPR/IRR

Table 6.1 shows the NPV/IRR of the acquisition and installation of distribution transformer with amorphous core. The sales of the distribution feeders Assuming 15 years of operation, the NPV at 10% discount rate is 19,641,082.61 and an NPV/IRR of 12.10 The NPV and IRR were computed by considering the total difference between the total loss attributed to amorphous core and silicon core distribution transformers. As shown in Table 6.2 and **Error! Reference source not found.**, the total loss should the cooperative use amorphous core distribution transformers will be a difference of 89,094 kWh per month.

Table 6.1: NPV/IRR: Installation of Distribution Transformer with Amorphous Core

DASURECO			
<i>Project</i>	<i>NPV</i>	<i>IRR</i>	<i>Payback Period (years)</i>
<i>DISTRIBUTION TRANSFORMER WITH AMORPHOUS CORE</i>	19,641,082.61	14.04%	15.07

Table 6.2: Payback period of Amorphous transformers

	Silicon	Zhixin	kW Saves
No. of Units	101	101	
No-Load Losses	0.13	0.08	0.05
Winding Losses at 50kVA	0.48	0.43	0.05
	0.61	0.51	0.10
	Silicon	Zhixin	kW Saves
No. of Units	551	551	
No-Load Losses	0.12	0.036	0.08
Winding Losses at 25kVA	0.35	0.238	0.11
	0.47	0.27	0.19
BID EVALUATION	Silicon	Zhixin	kW Saves
No. of Units	506	506	
No-Load Losses	0.08	0.02	0.06
Winding Losses at 15kVA	0.20	0.16	0.04
	0.27	0.18	0.09
BID EVALUATION	Silicon	Zhixin	kW Saves
No. of Units	363	363	
No-Load Losses	0.07	0.015	0.06
Winding Losses at 10kVA	0.16	0.11	0.05
	0.23	0.13	0.11
Core loss in the system	4,742,290	kwh/year	Silicon
Core loss in the system	2,969,106	kwh/year	Zhixin
	1,773,184	kwh/year	
	10,284,468.36		
PAYBACK PERIOD			
PBP	=	INITIAL INVESTMENT	
		YEARLY CASHFLOW	
	=	154,952,403	
		10,284,468	
	=	15.07 YRS	

Equation Chapter (Next) Section 1

7. CAPITAL BUDGETING

7.1. Projected Income Statement, Cashflow and Balance Sheet

Table 7.1 shows the consumer sales and revenue data for 2009 and 2010 based on the projected energy sales. The complete 5-year data is shown in Table 8.60. The table indicates that in 2009, 55% of the sales are residential, 29% from industrial and 10% are from small commercial class of service. Similar trend in the next 4 years are also observed. As shown in Fig. 7.1, the total projected energy sales increased from 144,143 MWH to 173,111 MWH in 5 years which corresponds to an average increase of 20%. Fig. 7.2 on the other hand shows the projected total amount of sales increased and the total amount of purchase. The projected total amount of sales increased from Php 742,489 to Php 970,256. The projected total amount of sales is part of the utility operating income of the EC. Table 7.2 shows the projected income statement of DASURECO from 2009 to 2013. After considering all the income from sales and revenues and all the expenses, it is shown that the Coop will have negative net margin of Php 13742 in 2009. From 2010 to 2013, DASURECO will have a positive net margin as shown

100

Table 8.61.

Table 7.1: Consumer Sales and Revenue Data (2010 – 2011) – Complete Data for 3 years is shown in Table 8.60

Class of Service	2010					2011				
	No. of Billed	MWH Sold		Average Rate	Amount Sold	No. of Billed	MWH Sold		Average Rate	Amount Sold
RESIDENTIAL	71,787	71,164	5.8268	5.8268	414,659	75,564	74,740	6.1585	6.1585	460,283
SALE FOR RESALE	0	0	0.0000	0.0000	0	0	0	0.0000	0.0000	0
SMALL COMMERCIAL	5,477	15,371	4.6121	4.6121	70,892	5,953	16,143	4.9317	4.9317	79,614
LARGE COMMERCIAL	0	0	0.0000	0.0000	0	17	0	0.0000	0.0000	0
INDUSTRIAL	356	49,634	4.3395	4.3395	215,388	370	52,128	4.6501	4.6501	242,398
LARGE LOADS	0	0	0.0000	0.0000	0	0	0	0.0000	0.0000	0
IRRIGATION	14	999	6.0304	6.0304	6,024	16	1,049	6.4214	6.4214	6,737
PUBLIC BUILDINGS	1,916	4,271	4.5853	4.5853	19,584	1,945	4,485	4.9007	4.9007	21,982
STREET LIGHTS	4,209	2,118	6.3890	6.3890	13,532	4,518	2,224	6.7269	6.7269	14,964
SPECIAL LIGHTINGS	0	0	0.0000	0.0000	0	0	0	0.0000	0.0000	0
COMMUNAL WATER SYSTEM	53	586	4.1137	4.1137	2,410	55	615	4.4118	4.4118	2,715

OTHERS	0	0	0.0000	0.0000	0	27	0	0.0000	0.0000	0
TOTAL	83,812	144,143			742,489	88,465	151,385			828,692
		MWH			Amount		MWH			Amount
ENERGY GENERATED/ PURCHASED		157,405		3.6493	574,415		165,232		3.6321	600,141
COOP USE		363					370			
SYSTEM LOSS		8.4%					8.3%			

Total Sales of Energy, MWH

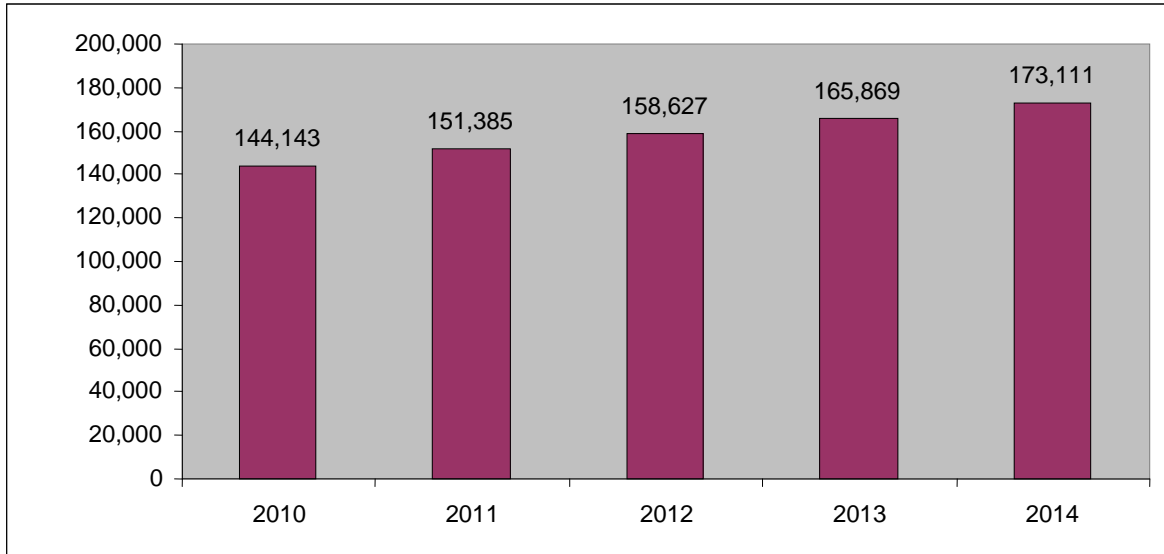


Fig. 7.1: Total Projected Energy (MWH) Sales

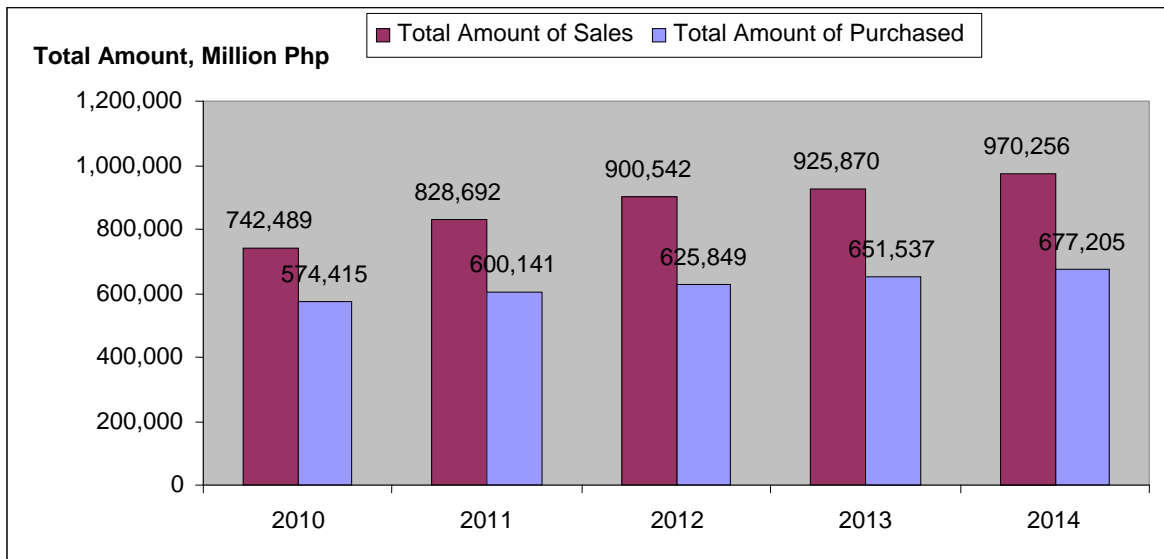


Fig. 7.2: Projected Total Amount of Sales and Purchased

Table 7.2: Projected Statement of Operations

ITEMS	ACTUAL/EST. 2008	2009	2010	2011	2012	2013
1. Utility Operating Income						
1.1 Operating Revenues	753,634	742,489	828,692	900,542	925,870	970,256
Less: a.) Re-Investment fund		30,332	31,856	33,380	34,904	36,428
b.) Universal Charge		5,737	6,025	6,313	6,602	6,890
c.) EVAT		13,659	18,451	23,163	22,894	24,669
d.) Franchise Tax	0	0	0	0	0	0
e.) Business Tax	0	0	0	0	0	0
2. Net Operating Revenue	753,634	692,762	772,361	837,685	861,471	902,269
3. Other Operating Revenue	14,169	18,702	19,999	18,048	19,115	20,181
4. TOTAL	767,803	711,464	792,360	855,734	880,586	922,450
5. Purchased Power	615,371	574,415	600,141	625,849	651,537	677,205
6. Distribution Expenses						
6.1 Operation	18,109	19,932	21,469	23,343	24,958	26,371
6.2 Maintenance	25,638	28,218	30,393	33,047	35,333	37,334
7 Consumers Accounts Expense	26,975	29,689	31,978	34,771	37,176	39,281
8. Administrative & General Expenses	48,668	53,566	57,696	62,734	67,073	70,870
9. Non - Power Cost (6.1+6.2+7+8)	119,389	131,405	141,536	153,895	164,540	173,856
10. Operating Margin (4 - 5 - 9)	33,043	5,644	50,683	75,990	64,509	71,389
11. Depreciation Expense	26,124	28,000	30,000	35,000	38,000	40,000
12. Interest Expense	2,478	5,138	6,415	4,389	2,676	1,606
13. Net Operating Margin (10-11-12)	4,441	-27,494	14,268	36,600	23,833	29,783
14. Non-Operating Revenue	6,533	13,752	15,127	16,640	18,304	20,134
15. Non-Operating Expense	0					
17. NET MARGIN (13 + 14 - 15)	10,974	-13,742	29,395	53,240	42,137	49,917

7.2. Financing Scheme

It is shown

Table 7.3 that all the amount of money to finance the CAPEX will be amortized for five years. In 2010, DASURECO will borrow Php 130,506,202 which will be amortized at Php26,824,901 starting 2010. In 2011, DASURECO will borrow Php 168,876,202 which will be amortized at Php 34,711,663 starting 2012. In 2013, DASURECO will borrow Php 34,152,370 which will be amortized at Php 3,588,831 starting 2014.

Table 7.3: Summary of Yearly Loans and amortization

YEAR	Amount to be Borrowed	Start of Payment	Yearly Amortization	No. of Years to Pay
2010	130,506,202	2010	26,824,901	3
2011	168,876,202	2011	34,711,663	3
2012	34,152,370	2012	3,588,831	3

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7.3. Rate Impact for CAPEX Requirement

Table 7.4 shows the yearly rate adjustment to accommodate the CAPEX projects. As shown in the table, the yearly rate increases are as follows: Php 0.28 in 2010, Php 0.35 in 2011, Php 0.45 in 2012, Php 0.06 in 2013. It is observed that no rate increase in 2009 will be applied since the start of loan payment will be in 2010. The yearly rate increase was calculated to accommodate the projects identified in the previous section and to make it sure that its impact to DASURECO’s consumers will be minimal. Fig. 7.4 shows the graphical representation of rate increase of DASURECO. Some of the projects that can be financed by reinvestment fund are shown in Table 8.65.

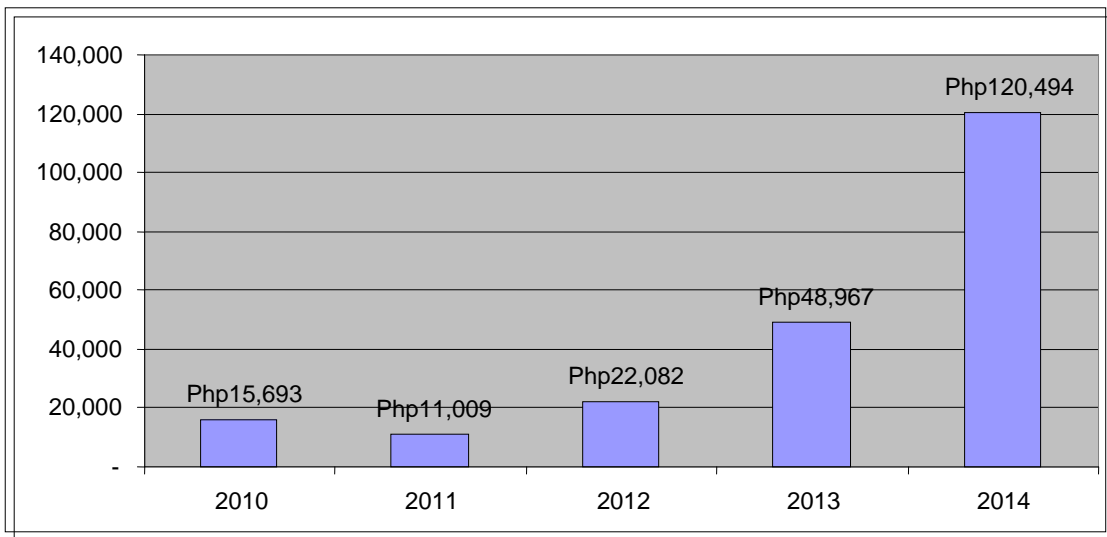


Fig. 7.3: Projected Total Amount of Sales and Purchased Energy (values are multiplied by 1000)

Table 7.4: Rate adjustment to finance the proposed projects

		2010	2011	2012	2013	2014	2015
Total CAPEX Project Cost for the Year		130M	168 M	34 M	0	0	
Projects funded by loan w/ interest	Php	186 M	203 M	37 M	40 M	95 M	
Recovery period	Years	5	5	5	5	5	5
Sales	kWh	186 M	194 M	202 M	210 M	218 M	226 M
Recovery Rate	Php/kWh	0.2814	0.3493	0.0622	0.0371	0.0875	
Total Recovery Rate	Php/kWh	0.2814	0.6307	0.6929	0.4891	0.5765	0.3943

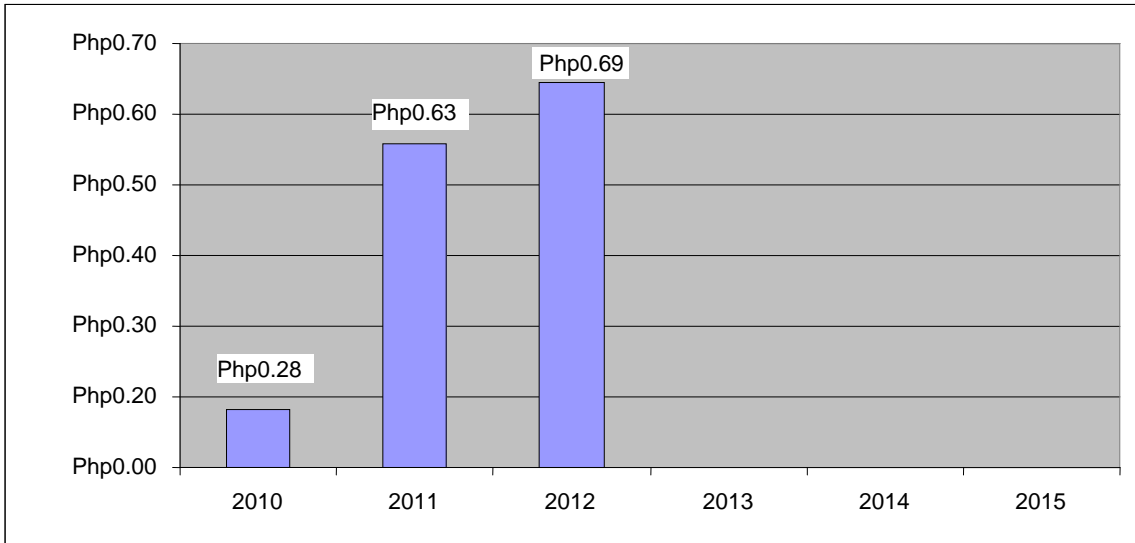


Fig. 7.4. Graphical representation of rate adjustment

Equation Chapter (Next) Section 1

8. DOCUMENTATION OF CAPEX

8.1. Historical and Forecast Planning Data

Table 8.1: Historical and Forecasted Monthly System Demand (kW)

	Historical Data							Forecasted System Demand (kW)				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	21566	24098	25851	26615	25480	27723	27124	28849	29908	30967	32026	33085
Feb	21831	24032	25813	26452	26321	25729	27105	28556	29601	30647	31692	32737
Mar	22005	24006	25507	27465	25584	26896	27075	28760	29809	30859	31908	32958
Apr	20672	24801	25348	28951	26419	26945	27577	29130	30190	31249	32309	33369
May	21798	24146	25911	27028	26135	26130	26972	28597	29635	30672	31709	32746
Jun	21966	23688	25949	26561	25936	24595	28969	28579	29612	30646	31679	32713
Jul	22131	23321	25885	27628	25280	24705	27446	28245	29264	30282	31300	32318
Aug	22308	23647	27542	25141	24534	26241	28368	28548	29575	30601	31627	32653
Sept	22459	23645	26198	25298	24670	28631	28112	28836	29869	30902	31936	32969
Oct	23468	24439	26754	26055	25729	27553	27618	29100	30140	31180	32219	33259
Nov	25753	26060	29051	26074	25729	25487	27089	29431	30479	31527	32576	33624
Dec	24565	27566	28207	25085	25917	27503	29317	30317	31393	32470	33547	34624

Table 8.2: KW Peak Demand Forecast

SUBSTATION/ metering points	FEEDER No.	KW PEAK DEMAND DATA							PEAK DEMAND FORECAST (KW)				
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
S1	1	3400	3686	3885	3871	3533	3829	3920	4061	4209	4357	4505	4653
	2	2081	2256	2378	2370	2162	2344	2400	3804	3943	4081	4220	4359
	3	2266	2457	2589	2580	2354	2552	2613	558	578	598	619	639
	4	3223	3494	3683	3670	3349	3629	3716	3850	3990	4130	4271	4411
S2	1	1601	1736	1830	1823	1664	1803	1846	1912	1982	2052	2122	2191
	2	1789	1940	2045	2038	1859	2015	2063	2137	2215	2293	2371	2449
	3	861	934	984	981	895	970	993	1028	1066	1103	1141	1178
S3	1	520	563	594	592	540	585	599	768	796	824	852	880
	2	934	1013	1067	1064	971	1052	1077	1221	1265	1310	1354	1399
S4	1	1765	1914	2017	2010	1834	1988	2036	2109	2186	2263	2340	2416
	2	1347	1460	1539	1534	1400	1517	1553	768	796	824	852	880
	3	1260	1366	1440	1435	1309	1419	1453	1505	1560	1615	1670	1725
S5	1	1456	1579	1664	1658	1513	1640	1679	3159	3274	3389	3505	3620
	3	971	1052	1109	1105	1009	1093	1119	1159	1202	1244	1286	1328
S6	1	46	50	52	52	47	51	53	55	57	59	61	63
	2	824	894	942	939	856	928	950	984	1020	1056	1092	1128
	3	1081	1172	1236	1231	1124	1218	1247	1292	1339	1386	1433	1480

Table 8.3: Energy Sales Forecast

SUBSTATION	FEEDER	HISTORICAL				FORECASTED				
		2005	2006	2007	2008	2010	2011	2012	2013	2014
1	1	16,743,772	16,604,751	17,736,607	18,309,757	33,251,600.97	34,922,213.69	36,592,829.87	38,263,444.32	33,251,600.97
	2	10,249,187	10,164,090	10,856,921	11,207,757	31,149,416.30	32,714,412.13	34,279,409.68	35,844,407.24	31,149,416.30
	3	11,158,702	11,066,053	11,820,366	12,202,335	4,567,152.34	4,796,613.79	5,026,075.25	5,255,536.70	4,567,152.34
	4	15,872,189	15,740,404	16,813,342	17,356,657	31,523,996.83	33,107,812.09	34,691,630.80	36,275,447.78	31,523,996.83
2	1	7,885,736	7,820,262	8,353,326	8,623,260	9,076,937	9,532,976	9,989,017	10,445,057	10,901,097
	2	8,812,444	8,739,275	9,334,984	9,636,640	10,142,680	10,652,264	11,161,849	11,671,434	12,181,018
	3	4,240,730	4,205,520	4,492,187	4,637,350	4,881,360	5,126,607	5,371,855	5,617,103	5,862,350
3	1	2,558,833	2,537,587	2,710,560	2,798,151	3,644,274	3,827,368	4,010,462	4,193,556	4,376,650
	2	4,599,929	4,561,737	4,872,685	5,030,144	5,794,041	6,085,143	6,376,245	6,667,347	6,958,449
4	1	8,693,797	8,621,614	9,209,303	9,506,897	10,009,487	10,512,379	11,015,272	11,518,165	12,021,058
	2	6,633,785	6,578,706	7,027,141	7,254,219	3,643,185	3,826,225	4,009,264	4,192,304	4,375,343
	3	6,204,756	6,153,239	6,572,672	6,785,064	7,143,942	7,502,865	7,861,789	8,220,712	8,579,635
5	1	7,170,624	7,111,087	7,595,811	7,841,266	14,994,186	15,747,518	16,500,851	17,254,183	18,007,515
	3	4,780,416	4,740,725	5,063,874	5,227,511	5,502,295	5,778,739	6,055,183	6,331,627	6,608,071
6	1	225,097	223,228	238,444	246,149	260,782	273,884	286,986	300,088	313,190
	2	4,059,312	4,025,608	4,300,012	4,438,965	4,671,686	4,906,399	5,141,112	5,375,826	5,610,538
	3	5,325,492	5,281,275	5,641,271	5,823,566	6,131,566	6,439,626	6,747,686	7,055,746	7,363,805
TOTAL SALES		125,214,801	124,175,161	132,639,506	136,925,688	186,388,587	195,753,045	205,117,517	214,481,984	203,650,885

Table 8.4: Monthly Peak Electricity Demand Data per Feeder (Substation 1 – Feeder 1)

S1F1 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	2884	3222	3457	3559	3407	3707	3627	3861	4006	4152	4298	4443
Feb	2919	3214	3452	3537	3520	3440	3625	3822	3966	4110	4254	4398
Mar	2943	3210	3411	3672	3421	3597	3620	3851	3995	4139	4284	4428
Apr	2764	3316	3390	3871	3533	3603	3688	3901	4047	4193	4339	4485
May	2915	3229	3465	3614	3495	3494	3607	3831	3974	4116	4259	4402
Jun	2937	3168	3470	3552	3468	3289	3874	3829	3971	4114	4256	4398
Jul	2959	3119	3461	3694	3380	3304	3670	3785	3925	4065	4206	4346
Aug	2983	3162	3683	3362	3281	3509	3793	3826	3968	4109	4250	4391
Sep	2785	3162	3503	3383	3299	3829	3759	3839	3980	4121	4262	4404
Oct	3138	3268	3578	3484	3440	3684	3693	3897	4040	4183	4326	4469
Nov	3400	3485	3885	3487	3440	3408	3622	3937	4081	4225	4369	4513
Dec	3289	3686	3772	3354	3466	3678	3920	4061	4209	4357	4505	4653

Table 8.5: Monthly Peak Electricity Demand Data per Feeder (Substation 1 – Feeder 2)

S1F2 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	1765	1972	2116	2179	2086	2269	2220	3617	3753	3889	4026	4162
Feb	1787	1967	2113	2165	2154	2106	2219	3581	3715	3850	3985	4119
Mar	1801	1965	2088	2248	2094	2202	2216	3607	3743	3878	4013	4148
Apr	1692	2030	2075	2370	2162	2206	2257	3655	3791	3928	4065	4201
May	1784	1976	2121	2212	2139	2139	2208	3589	3722	3856	3990	4123
Jun	1798	1939	2124	2174	2123	2013	2371	3587	3720	3853	3987	4120
Jul	1811	1909	2119	2261	2069	2022	2247	3546	3677	3808	3940	4071
Aug	1826	1936	2254	2058	2008	2148	2322	3584	3717	3849	3981	4114
Sep	1705	1935	2144	2071	2019	2344	2301	3596	3728	3861	3993	4125
Oct	1921	2000	2190	2133	2106	2255	2261	3650	3784	3918	4052	4186
Nov	2081	2133	2378	2134	2106	2086	2217	3688	3823	3958	4092	4227
Dec	2013	2256	2309	2053	2121	2251	2400	3804	3943	4081	4220	4359

Table 8.6: Monthly Peak Electricity Demand Data per Feeder (Substation 1 – Feeder 3)

S1F3 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	1922	2148	2304	2372	2271	2471	2417	530	550	570	590	610
Feb	1946	2142	2300	2357	2346	2293	2416	525	545	565	584	604
Mar	1961	2139	2273	2447	2280	2397	2413	529	549	569	588	608
Apr	1842	2210	2259	2580	2354	2401	2458	536	556	576	596	616
May	1943	2152	2309	2409	2329	2329	2404	526	546	565	585	605
Jun	1958	2111	2313	2367	2311	2192	2582	526	545	565	585	604
Jul	1972	2078	2307	2462	2253	2202	2446	520	539	558	578	597
Aug	1988	2107	2454	2240	2186	2339	2528	526	545	564	584	603
Sep	1856	2107	2335	2254	2199	2552	2505	527	547	566	585	605
Oct	2091	2178	2384	2322	2293	2455	2461	535	555	575	594	614
Nov	2266	2322	2589	2324	2293	2271	2414	541	560	580	600	620
Dec	2192	2457	2514	2236	2310	2451	2613	558	578	598	619	639

Table 8.7: Monthly Peak Electricity Demand Data per Feeder (Substation 1 – Feeder 4)

S1F4 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	2734	3055	3277	3374	3230	3514	3438	3660	3798	3936	4074	4212
Feb	2767	3047	3272	3353	3336	3261	3436	3624	3760	3896	4033	4169
Mar	2789	3043	3233	3481	3243	3409	3432	3651	3788	3924	4061	4198
Apr	2620	3144	3213	3670	3349	3416	3496	3699	3837	3975	4113	4252
May	2763	3061	3284	3426	3313	3312	3419	3632	3767	3902	4038	4173
Jun	2784	3003	3289	3367	3288	3118	3672	3630	3765	3900	4035	4169
Jul	2805	2956	3281	3502	3204	3132	3479	3589	3721	3854	3987	4120
Aug	2828	2998	3491	3187	3110	3326	3596	3628	3761	3895	4029	4163
Sep	2640	2997	3321	3207	3127	3629	3563	3639	3773	3907	4041	4175
Oct	2975	3098	3391	3303	3261	3493	3501	3694	3830	3965	4101	4237
Nov	3223	3303	3683	3305	3261	3231	3434	3732	3869	4005	4142	4278
Dec	3118	3494	3576	3180	3285	3486	3716	3850	3990	4130	4271	4411

Table 8.8: Monthly Peak Electricity Demand Data per Feeder (Substation 2 – Feeder 1)

S2F1 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	1358	1518	1628	1676	1605	1746	1708	1818	1887	1955	2024	2093
Feb	1375	1514	1626	1666	1658	1620	1707	1800	1868	1936	2003	2071
Mar	1386	1512	1606	1730	1611	1694	1705	1814	1882	1950	2018	2086
Apr	1302	1562	1596	1823	1664	1697	1737	1837	1906	1975	2043	2112
May	1373	1521	1632	1702	1646	1646	1699	1804	1871	1939	2006	2073
Jun	1383	1492	1634	1673	1633	1549	1824	1803	1870	1937	2004	2071
Jul	1394	1469	1630	1740	1592	1556	1728	1783	1849	1915	1981	2047
Aug	1405	1489	1735	1583	1545	1653	1787	1802	1869	1935	2002	2068
Sep	1312	1489	1650	1593	1554	1803	1770	1808	1874	1941	2007	2074
Oct	1478	1539	1685	1641	1620	1735	1739	1835	1903	1970	2037	2105
Nov	1601	1641	1830	1642	1620	1605	1706	1854	1922	1990	2057	2125
Dec	1549	1736	1776	1580	1632	1732	1846	1912	1982	2052	2122	2191

Table 8.9: Monthly Peak Electricity Demand Data per Feeder (Substation 2 – Feeder 2)

S2F2 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	1518	1696	1819	1873	1793	1951	1909	2032	2108	2185	2262	2338
Feb	1536	1692	1817	1862	1852	1811	1908	2012	2087	2163	2239	2314
Mar	1549	1689	1795	1933	1801	1893	1906	2026	2102	2178	2254	2330
Apr	1455	1745	1784	2038	1859	1896	1941	2053	2130	2207	2283	2360
May	1534	1699	1824	1902	1839	1839	1898	2016	2091	2166	2241	2316
Jun	1546	1667	1826	1869	1825	1731	2039	2015	2090	2165	2240	2314
Jul	1558	1641	1822	1944	1779	1739	1932	1992	2066	2140	2213	2287
Aug	1570	1664	1938	1769	1727	1847	1996	2014	2088	2162	2237	2311
Sep	1466	1664	1844	1780	1736	2015	1978	2020	2094	2169	2243	2317
Oct	1652	1720	1883	1834	1811	1939	1944	2051	2126	2201	2276	2352
Nov	1789	1834	2045	1835	1811	1794	1906	2072	2147	2223	2299	2375
Dec	1731	1940	1985	1765	1824	1936	2063	2137	2215	2293	2371	2449

Table 8.10: Monthly Peak Electricity Demand Data per Feeder (Substation 2 – Feeder 3)

S2F3 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	730	816	876	901	863	939	919	978	1015	1052	1088	1125
Feb	739	814	874	896	891	871	918	968	1005	1041	1077	1114
Mar	745	813	864	930	866	911	917	975	1012	1048	1085	1122
Apr	700	840	858	981	895	913	934	988	1025	1062	1099	1136
May	738	818	878	915	885	885	913	970	1006	1043	1079	1115
Jun	744	802	879	900	878	833	981	970	1006	1042	1078	1114
Jul	750	790	877	936	856	837	930	959	994	1030	1065	1101
Aug	756	801	933	851	831	889	961	969	1005	1041	1076	1112
Sep	705	801	887	857	836	970	952	972	1008	1044	1080	1115
Oct	795	828	906	882	871	933	935	987	1023	1059	1096	1132
Nov	861	883	984	883	871	863	917	997	1034	1070	1106	1143
Dec	833	934	955	850	878	931	993	1028	1066	1103	1141	1178

Table 8.11: Monthly Peak Electricity Demand Data per Feeder (Substation 3 – Feeder 1)

S3F1 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	441	492	528	544	521	567	554	730	758	785	813	840
Feb	446	491	527	541	538	526	554	723	750	777	804	832
Mar	450	491	521	561	523	550	553	728	755	783	810	837
Apr	422	507	518	592	540	551	564	738	765	793	820	848
May	445	493	529	552	534	534	551	724	751	778	805	832
Jun	449	484	530	543	530	503	592	724	751	778	805	832
Jul	452	477	529	565	517	505	561	716	742	769	795	822
Aug	456	483	563	514	501	536	580	724	750	777	804	830
Sep	426	483	535	517	504	585	574	726	753	779	806	833
Oct	480	499	547	532	526	563	564	737	764	791	818	845
Nov	520	533	594	533	526	521	554	744	772	799	826	853
Dec	503	563	576	513	530	562	599	768	796	824	852	880

Table 8.12: Monthly Peak Electricity Demand Data per Feeder (Substation 3 – Feeder 2)

S3F2 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	792	885	950	978	936	1018	996	1161	1204	1248	1292	1336
Feb	802	883	948	972	967	945	996	1149	1192	1236	1279	1322
Mar	808	882	937	1009	940	988	995	1158	1201	1244	1288	1331
Apr	759	911	931	1064	971	990	1013	1173	1217	1261	1304	1348
May	801	887	952	993	960	960	991	1152	1195	1237	1280	1323
Jun	807	870	953	976	953	904	1064	1151	1194	1237	1279	1322
Jul	813	857	951	1015	929	908	1008	1138	1180	1222	1264	1306
Aug	820	869	1012	924	901	964	1042	1150	1193	1235	1278	1320
Sep	765	869	962	929	906	1052	1033	1154	1196	1239	1281	1324
Oct	862	898	983	957	945	1012	1015	1171	1214	1257	1300	1343
Nov	934	957	1067	958	945	936	995	1183	1227	1270	1313	1357
Dec	904	1013	1036	922	952	1010	1077	1221	1265	1310	1354	1399

Table 8.13: Monthly Peak Electricity Demand Data per Feeder (Substation 4 – Feeder 1)

S4F1 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	1497	1673	1795	1848	1769	1925	1883	2005	2081	2156	2232	2308
Feb	1516	1669	1792	1837	1828	1786	1882	1985	2060	2135	2209	2284
Mar	1528	1667	1771	1907	1776	1867	1880	2000	2075	2150	2225	2300
Apr	1435	1722	1760	2010	1834	1871	1915	2026	2102	2178	2253	2329
May	1513	1676	1799	1877	1815	1814	1873	1990	2064	2138	2212	2286
Jun	1525	1645	1802	1844	1801	1708	2011	1989	2063	2136	2210	2284
Jul	1537	1619	1797	1918	1755	1715	1906	1966	2039	2111	2184	2257
Aug	1549	1642	1912	1746	1703	1822	1970	1987	2061	2134	2207	2281
Sep	1446	1642	1819	1756	1713	1988	1952	1994	2067	2140	2214	2287
Oct	1629	1697	1858	1809	1786	1913	1918	2024	2098	2172	2247	2321
Nov	1765	1809	2017	1810	1786	1770	1881	2044	2119	2194	2269	2344
Dec	1708	1914	1958	1742	1799	1910	2036	2109	2186	2263	2340	2416

Table 8.14: Monthly Peak Electricity Demand Data per Feeder (Substation 4 – Feeder 2)

S4F2 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	1143	1277	1370	1410	1350	1469	1437	730	757	785	812	840
Feb	1157	1273	1368	1401	1394	1363	1436	723	750	777	804	831
Mar	1166	1272	1351	1455	1355	1425	1434	728	755	782	810	837
Apr	1095	1314	1343	1534	1400	1428	1461	737	765	793	820	848
May	1155	1279	1373	1432	1385	1384	1429	724	751	778	805	832
Jun	1164	1255	1375	1407	1374	1303	1535	724	751	778	804	831
Jul	1172	1236	1371	1464	1339	1309	1454	716	742	768	795	821
Aug	1182	1253	1459	1332	1300	1390	1503	723	750	777	803	830
Sep	1103	1253	1388	1340	1307	1517	1489	726	752	779	806	832
Oct	1243	1295	1417	1380	1363	1460	1463	737	764	791	818	845
Nov	1347	1381	1539	1381	1363	1350	1435	744	771	799	826	853
Dec	1303	1460	1494	1329	1373	1457	1553	768	796	824	852	880

Table 8.15: Monthly Peak Electricity Demand Data per Feeder (Substation 4 – Feeder 3)

S4F3 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	1069	1194	1281	1319	1263	1374	1344	1431	1485	1539	1593	1647
Feb	1082	1191	1279	1311	1304	1275	1343	1417	1470	1523	1577	1630
Mar	1090	1190	1264	1361	1268	1333	1342	1427	1481	1534	1588	1641
Apr	1024	1229	1256	1435	1309	1335	1367	1446	1500	1554	1608	1662
May	1080	1196	1284	1339	1295	1295	1337	1420	1473	1526	1579	1632
Jun	1088	1174	1286	1316	1285	1219	1435	1419	1472	1525	1577	1630
Jul	1097	1156	1283	1369	1253	1224	1360	1403	1455	1507	1559	1611
Aug	1105	1172	1365	1246	1216	1300	1406	1418	1471	1523	1575	1628
Sep	1032	1172	1298	1254	1222	1419	1393	1423	1475	1528	1580	1632
Oct	1163	1211	1326	1291	1275	1365	1369	1444	1497	1550	1603	1656
Nov	1260	1291	1440	1292	1275	1263	1342	1459	1513	1566	1619	1673
Dec	1219	1366	1398	1243	1284	1363	1453	1505	1560	1615	1670	1725

Table 8.16: Monthly Peak Electricity Demand Data per Feeder (Substation 5 – Feeder 1)

S5F1 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	1235	1380	1480	1524	1459	1588	1553	3004	3117	3230	3343	3457
Feb	1250	1376	1478	1515	1507	1473	1552	2974	3086	3198	3309	3421
Mar	1260	1375	1461	1573	1465	1540	1550	2996	3108	3220	3333	3445
Apr	1184	1420	1452	1658	1513	1543	1579	3035	3149	3262	3376	3489
May	1248	1383	1484	1548	1497	1496	1545	2980	3091	3202	3313	3424
Jun	1258	1357	1486	1521	1485	1408	1659	2979	3090	3200	3311	3422
Jul	1267	1336	1482	1582	1448	1415	1572	2945	3054	3163	3272	3381
Aug	1277	1354	1577	1440	1405	1503	1625	2977	3087	3197	3307	3416
Sep	1193	1354	1500	1449	1413	1640	1610	2986	3096	3206	3316	3426
Oct	1344	1400	1532	1492	1473	1578	1582	3032	3143	3254	3365	3477
Nov	1456	1492	1664	1493	1473	1460	1551	3063	3175	3287	3399	3511
Dec	1409	1579	1615	1437	1484	1575	1679	3159	3274	3389	3505	3620

Table 8.17: Monthly Peak Electricity Demand Data per Feeder (Substation 5 – Feeder 3)

S5F3 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	823	920	987	1016	973	1058	1036	1102	1144	1185	1227	1268
Feb	833	918	985	1010	1005	982	1035	1091	1132	1173	1214	1255
Mar	840	916	974	1049	977	1027	1034	1099	1141	1182	1223	1264
Apr	789	947	968	1105	1009	1029	1053	1114	1155	1197	1239	1280
May	832	922	989	1032	998	998	1030	1094	1134	1175	1216	1257
Jun	839	904	991	1014	990	939	1106	1093	1134	1174	1215	1256
Jul	845	890	988	1055	965	943	1048	1081	1121	1161	1201	1241
Aug	852	903	1052	960	937	1002	1083	1092	1133	1173	1213	1254
Sep	795	903	1000	966	942	1093	1073	1096	1136	1177	1217	1257
Oct	896	933	1021	995	982	1052	1054	1113	1153	1194	1235	1276
Nov	971	995	1109	995	982	973	1034	1124	1165	1206	1247	1288
Dec	939	1052	1077	958	989	1050	1119	1159	1202	1244	1286	1328

Table 8.18: Monthly Peak Electricity Demand Data per Feeder (Substation 6 – Feeder 1)

S6F1 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	39	43	46	48	46	50	49	52	54	56	58	60
Feb	39	43	46	48	47	46	49	52	54	56	58	60
Mar	40	43	46	49	46	48	49	52	54	56	58	60
Apr	37	45	46	52	47	48	50	53	55	57	59	61
May	39	43	47	49	47	47	48	52	54	56	58	60
Jun	39	43	47	48	47	44	52	52	54	56	58	60
Jul	40	42	47	50	45	44	49	51	53	55	57	59
Aug	40	43	50	45	44	47	51	52	54	56	58	59
Sep	37	43	47	45	44	51	51	52	54	56	58	60
Oct	42	44	48	47	46	50	50	53	55	57	59	60
Nov	46	47	52	47	46	46	49	53	55	57	59	61
Dec	44	50	51	45	47	49	53	55	57	59	61	63

Table 8.19: Monthly Peak Electricity Demand Data per Feeder (Substation 6 – Feeder 2)

S6F2 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	699	781	838	863	826	899	879	936	971	1006	1042	1077
Feb	708	779	837	858	853	834	879	927	961	996	1031	1066
Mar	713	778	827	890	829	872	878	933	968	1003	1038	1073
Apr	670	804	822	939	856	874	894	946	981	1016	1052	1087
May	707	783	840	876	847	847	874	929	963	998	1032	1067
Jun	712	768	841	861	841	797	939	928	963	997	1032	1066
Jul	717	756	839	896	820	801	890	918	951	985	1019	1053
Aug	723	767	893	815	795	851	920	927	962	996	1030	1064
Sep	675	767	849	820	800	928	911	930	965	999	1033	1067
Oct	761	792	867	845	834	893	895	945	979	1014	1049	1083
Nov	824	845	942	845	834	826	878	954	989	1024	1059	1094
Dec	797	894	914	813	840	892	950	984	1020	1056	1092	1128

Table 8.20: Monthly Peak Electricity Demand Data per Feeder (Substation 6 – Feeder 3)

S6F3 Month/Yr	HISTORICAL							FORECASTED				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	917	1025	1099	1132	1084	1179	1154	1228	1275	1321	1367	1414
Feb	929	1022	1098	1125	1119	1094	1153	1216	1262	1308	1353	1399
Mar	936	1021	1085	1168	1088	1144	1152	1225	1271	1317	1363	1409
Apr	879	1055	1078	1231	1124	1146	1173	1241	1288	1334	1380	1427
May	927	1027	1102	1150	1112	1111	1147	1219	1264	1310	1355	1400
Jun	934	1007	1104	1130	1103	1046	1232	1218	1263	1309	1354	1399
Jul	941	992	1101	1175	1075	1051	1167	1204	1249	1293	1338	1383
Aug	949	1006	1171	1069	1043	1116	1207	1217	1262	1307	1352	1397
Sep	886	1006	1114	1076	1049	1218	1196	1221	1266	1311	1356	1401
Oct	998	1039	1138	1108	1094	1172	1175	1240	1285	1331	1376	1422
Nov	1081	1108	1236	1109	1094	1084	1152	1252	1298	1344	1390	1436
Dec	1046	1172	1200	1067	1102	1170	1247	1292	1339	1386	1433	1480

Table 8.21: Monthly Peak Energy Demand Data per Feeder (Substation 1 – Feeder 1)

S1F1 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	1,477,156	1,360,777	1,391,573	1,468,091	1,555,082	1,635,065	1,715,048	1,795,032	1,875,015
Feb	1,405,558	1,349,492	1,481,539	1,513,628	1,579,774	1,660,681	1,741,587	1,822,494	1,903,400
Mar	1,386,700	1,326,762	1,459,151	1,390,666	1,528,706	1,606,665	1,684,623	1,762,581	1,840,540
Apr	1,465,776	1,438,070	1,544,691	1,561,018	1,659,223	1,743,479	1,827,736	1,911,992	1,996,248
May	1,414,580	1,343,688	1,466,861	1,477,830	1,577,666	1,657,443	1,737,221	1,816,998	1,896,775
Jun	1,395,811	1,384,892	1,489,326	1,536,451	1,612,709	1,693,916	1,775,123	1,856,330	1,937,538
Jul	1,292,537	1,298,799	1,382,758	1,493,682	1,523,478	1,599,872	1,676,265	1,752,658	1,829,052
Aug	1,322,993	1,324,419	1,464,240	1,528,203	1,573,827	1,652,417	1,731,006	1,809,596	1,888,186
Sep	1,374,077	1,333,201	1,512,115	1,559,642	1,614,853	1,695,157	1,775,461	1,855,765	1,936,069
Oct	1,390,725	1,398,079	1,519,132	1,542,671	1,637,195	1,718,274	1,799,353	1,880,432	1,961,511
Nov	1,439,329	1,466,740	1,464,777	1,572,815	1,666,927	1,749,139	1,831,352	1,913,564	1,995,776
Dec	1,378,528	1,579,833	1,560,444	1,665,060	1,743,642	1,829,285	1,914,929	2,000,573	2,086,216

Table 8.22: Monthly Peak Energy Demand Data per Feeder (Substation 1 – Feeder 2)

S1F2 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	904,196	832,958	851,809	898,647	1,456,769	1,531,695	1,606,622	1,681,549	1,756,475
Feb	860,369	826,050	906,879	926,521	1,479,900	1,555,692	1,631,483	1,707,275	1,783,066
Mar	848,826	812,137	893,175	851,254	1,432,060	1,505,090	1,578,120	1,651,150	1,724,180
Apr	897,230	880,271	945,535	955,529	1,554,326	1,633,256	1,712,185	1,791,115	1,870,044
May	865,892	822,497	897,894	904,608	1,477,925	1,552,659	1,627,393	1,702,126	1,776,860
Jun	854,403	847,719	911,645	940,492	1,510,753	1,586,826	1,662,899	1,738,972	1,815,045
Jul	791,187	795,020	846,413	914,312	1,427,163	1,498,727	1,570,291	1,641,854	1,713,418
Aug	809,830	810,702	896,289	935,443	1,474,329	1,547,950	1,621,571	1,695,192	1,768,814
Sep	841,099	816,078	925,595	954,687	1,512,761	1,587,988	1,663,215	1,738,443	1,813,670
Oct	851,290	855,792	929,890	944,299	1,533,691	1,609,644	1,685,597	1,761,550	1,837,503
Nov	881,041	897,820	896,618	962,751	1,561,543	1,638,558	1,715,572	1,792,587	1,869,602
Dec	843,824	967,047	955,178	1,019,215	1,633,408	1,713,637	1,793,866	1,874,096	1,954,325

Table 8.23: Monthly Peak Energy Demand Data per Feeder (Substation 1 – Feeder 3)

S1F3 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	984,435	906,875	927,399	978,393	213,593	224,578	235,564	246,550	257,536
Feb	936,719	899,354	987,355	1,008,741	216,984	228,097	239,209	250,322	261,435
Mar	924,151	884,206	972,435	926,794	209,970	220,678	231,385	242,093	252,801
Apr	976,850	958,386	1,029,442	1,040,323	227,897	239,469	251,042	262,615	274,187
May	942,731	895,486	977,573	984,884	216,695	227,652	238,610	249,567	260,525
Jun	930,223	922,946	992,545	1,023,951	221,508	232,662	243,816	254,969	266,123
Jul	861,397	865,570	921,524	995,448	209,252	219,745	230,237	240,730	251,223
Aug	881,694	882,644	975,826	1,018,454	216,167	226,962	237,756	248,550	259,345
Sep	915,738	888,497	1,007,732	1,039,406	221,802	232,832	243,862	254,892	265,922
Oct	926,834	931,735	1,012,409	1,028,096	224,871	236,007	247,144	258,280	269,416
Nov	959,225	977,492	976,184	1,048,185	228,955	240,247	251,539	262,831	274,123
Dec	918,705	1,052,863	1,039,941	1,109,661	239,492	251,255	263,018	274,781	286,545

Table 8.24: Monthly Peak Energy Demand Data per Feeder (Substation 1 – Feeder 4)

S1F4 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	1,400,264	1,289,943	1,319,136	1,391,670	1,474,287	1,550,114	1,625,942	1,701,770	1,777,597
Feb	1,332,393	1,279,246	1,404,419	1,434,838	1,497,696	1,574,399	1,651,102	1,727,805	1,804,508
Mar	1,314,516	1,257,698	1,383,196	1,318,276	1,449,281	1,523,190	1,597,098	1,671,005	1,744,914
Apr	1,389,476	1,363,213	1,464,284	1,479,760	1,573,017	1,652,896	1,732,775	1,812,653	1,892,532
May	1,340,945	1,273,743	1,390,505	1,400,903	1,495,698	1,571,330	1,646,963	1,722,595	1,798,227
Jun	1,323,153	1,312,802	1,411,800	1,456,473	1,528,920	1,605,908	1,682,896	1,759,884	1,836,872
Jul	1,225,255	1,231,191	1,310,779	1,415,929	1,444,325	1,516,750	1,589,174	1,661,598	1,734,022
Aug	1,254,126	1,255,477	1,388,020	1,448,654	1,492,058	1,566,564	1,641,071	1,715,578	1,790,084
Sep	1,302,551	1,263,802	1,433,403	1,478,456	1,530,953	1,607,084	1,683,216	1,759,348	1,835,480
Oct	1,318,332	1,325,304	1,440,055	1,462,368	1,552,134	1,629,000	1,705,867	1,782,733	1,859,600
Nov	1,364,406	1,390,390	1,388,529	1,490,944	1,580,321	1,658,262	1,736,203	1,814,144	1,892,084
Dec	1,306,770	1,497,596	1,479,216	1,578,387	1,653,050	1,734,244	1,815,438	1,896,633	1,977,826

Table 8.25: Monthly Peak Energy Demand Data per Feeder (Substation 2 – Feeder 1)

S2F1 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	695,689	640,879	655,383	691,420	732,388	770,057	807,727	845,396	883,065
Feb	661,969	635,564	697,753	712,866	744,018	782,122	820,226	858,330	896,434
Mar	653,088	624,859	687,210	654,956	719,966	756,682	793,398	830,113	866,829
Apr	690,330	677,281	727,496	735,185	781,435	821,117	860,798	900,480	940,162
May	666,218	632,830	690,841	696,007	743,025	780,597	818,169	855,741	893,314
Jun	657,379	652,236	701,421	723,615	759,529	797,774	836,020	874,266	912,511
Jul	608,740	611,689	651,231	703,472	717,504	753,483	789,461	825,440	861,418
Aug	623,084	623,755	689,606	719,731	741,216	778,229	815,242	852,255	889,268
Sep	647,143	627,891	712,154	734,537	760,538	798,359	836,179	873,999	911,820
Oct	654,983	658,447	715,458	726,544	771,061	809,246	847,431	885,617	923,802
Nov	677,874	690,783	689,859	740,741	785,063	823,782	862,501	901,221	939,939
Dec	649,239	744,047	734,915	784,185	821,193	861,528	901,864	942,199	982,534

Table 8.26: Monthly Peak Energy Demand Data per Feeder (Substation 2 – Feeder 2)

S2F2 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	777,445	716,193	732,401	772,673	818,379	860,471	902,564	944,656	986,748
Feb	739,762	710,254	779,751	796,640	831,374	873,952	916,530	959,108	1,001,686
Mar	729,836	698,290	767,968	731,924	804,499	845,526	886,552	927,578	968,605
Apr	771,455	756,873	812,989	821,582	873,185	917,526	961,867	1,006,207	1,050,548
May	744,510	707,199	772,026	777,799	830,265	872,248	914,232	956,216	998,200
Jun	734,632	728,885	783,850	808,652	848,707	891,443	934,179	976,915	1,019,651
Jul	680,278	683,573	727,762	786,142	801,748	841,951	882,154	922,356	962,559
Aug	696,307	697,057	770,646	804,311	828,244	869,603	910,962	952,321	993,679
Sep	723,193	701,679	795,844	820,858	849,835	892,096	934,357	976,618	1,018,878
Oct	731,955	735,826	799,537	811,926	861,593	904,261	946,930	989,599	1,032,268
Nov	757,536	771,962	770,929	827,791	877,239	920,505	963,770	1,007,035	1,050,300
Dec	725,536	831,485	821,280	876,341	917,611	962,682	1,007,753	1,052,825	1,097,895

Table 8.27: Monthly Peak Energy Demand Data per Feeder (Substation 2 – Feeder 3)

S2F3 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	374,122	344,647	352,447	371,826	393,861	414,119	434,376	454,634	474,891
Feb	355,989	341,789	375,232	383,360	400,115	420,606	441,098	461,589	482,081
Mar	351,212	336,032	369,562	352,217	387,181	406,926	426,670	446,415	466,160
Apr	371,240	364,223	391,227	395,362	420,237	441,577	462,917	484,257	505,597
May	358,274	340,319	371,515	374,293	399,581	419,786	439,992	460,197	480,403
Jun	353,520	350,754	377,205	389,140	408,456	429,024	449,592	470,159	490,727
Jul	327,364	328,949	350,214	378,308	385,857	405,205	424,553	443,902	463,250
Aug	335,077	335,438	370,851	387,051	398,609	418,513	438,418	458,323	478,227
Sep	348,015	337,662	382,976	395,014	408,999	429,338	449,677	470,016	490,355
Oct	352,232	354,094	384,754	390,715	414,658	435,193	455,728	476,264	496,799
Nov	364,542	371,484	370,987	398,350	422,188	443,011	463,833	484,655	505,477
Dec	349,143	400,128	395,217	421,713	441,618	463,309	485,001	506,692	528,383

Table 8.28: Monthly Peak Energy Demand Data per Feeder (Substation 3 – Feeder 1)

S3F1 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	225,743	207,958	212,664	224,358	294,044	309,168	324,292	339,416	354,539
Feb	214,802	206,233	226,413	231,317	298,714	314,012	329,310	344,608	359,907
Mar	211,920	202,760	222,992	212,526	289,057	303,798	318,539	333,280	348,021
Apr	224,004	219,770	236,064	238,559	313,736	329,668	345,600	361,531	377,463
May	216,180	205,346	224,170	225,846	298,315	313,400	328,484	343,569	358,654
Jun	213,312	211,643	227,603	234,805	304,941	320,296	335,651	351,006	366,362
Jul	197,529	198,486	211,317	228,269	288,069	302,514	316,959	331,403	345,848
Aug	202,184	202,402	223,769	233,544	297,589	312,449	327,309	342,170	357,030
Sep	209,991	203,744	231,086	238,349	305,346	320,531	335,715	350,900	366,084
Oct	212,535	213,659	232,158	235,755	309,571	324,902	340,233	355,564	370,895
Nov	219,962	224,151	223,852	240,362	315,193	330,738	346,283	361,829	377,374
Dec	210,671	241,435	238,472	254,459	329,699	345,893	362,087	378,281	394,475

Table 8.29: Monthly Peak Energy Demand Data per Feeder (Substation 3 – Feeder 2)

S3F2 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	405,811	373,839	382,300	403,321	467,502	491,547	515,593	539,638	563,683
Feb	386,142	370,739	407,015	415,831	474,925	499,248	523,571	547,894	572,217
Mar	380,961	364,494	400,865	382,050	459,573	483,009	506,446	529,882	553,319
Apr	402,685	395,074	424,365	428,850	498,810	524,140	549,470	574,800	600,129
May	388,620	369,144	402,983	405,997	474,292	498,275	522,258	546,242	570,225
Jun	383,464	380,464	409,155	422,101	484,827	509,240	533,653	558,066	582,479
Jul	355,092	356,812	379,878	410,351	458,001	480,967	503,933	526,899	549,865
Aug	363,459	363,851	402,263	419,835	473,137	496,764	520,390	544,016	567,643
Sep	377,493	366,263	415,415	428,472	485,471	509,613	533,755	557,896	582,038
Oct	382,067	384,087	417,343	423,810	492,188	516,562	540,937	565,312	589,686
Nov	395,419	402,950	402,410	432,091	501,126	525,841	550,557	575,272	599,987
Dec	378,716	434,019	428,693	457,433	524,189	549,936	575,683	601,430	627,176

Table 8.30: Monthly Peak Energy Demand Data per Feeder (Substation 4 – Feeder 1)

S4F1 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	766,978	706,550	722,541	762,270	807,633	849,172	890,711	932,251	973,790
Feb	729,802	700,691	769,253	785,915	820,457	862,476	904,494	946,513	988,532
Mar	720,010	688,889	757,629	722,070	793,934	834,422	874,910	915,398	955,886
Apr	761,069	746,683	802,043	810,520	861,718	905,477	949,236	992,994	1,036,753
May	734,486	697,677	761,632	767,327	819,362	860,794	902,227	943,659	985,091
Jun	724,741	719,071	773,296	797,765	837,562	879,736	921,911	964,086	1,006,261
Jul	671,119	674,370	717,963	775,558	791,219	830,894	870,569	910,244	949,919
Aug	686,932	687,672	760,271	793,482	817,368	858,183	898,999	939,815	980,630
Sep	713,456	692,232	785,129	809,806	838,675	880,381	922,087	963,793	1,005,499
Oct	722,100	725,919	788,772	800,994	850,278	892,387	934,495	976,604	1,018,712
Nov	747,337	761,569	760,550	816,646	865,720	908,417	951,113	993,811	1,036,507
Dec	715,767	820,290	810,223	864,542	905,561	950,040	994,520	1,038,999	1,083,478

Table 8.31: Monthly Peak Energy Demand Data per Feeder (Substation 4 – Feeder 2)

S4F2 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	585,241	539,132	551,333	581,649	293,957	309,076	324,195	339,314	354,434
Feb	556,874	534,661	586,977	599,691	298,624	313,918	329,212	344,506	359,799
Mar	549,402	525,655	578,107	550,974	288,971	303,707	318,444	333,180	347,917
Apr	580,732	569,755	611,998	618,466	313,642	329,569	345,496	361,423	377,350
May	560,448	532,361	581,162	585,508	298,226	313,306	328,386	343,467	358,547
Jun	553,012	548,686	590,062	608,733	304,850	320,200	335,551	350,902	366,252
Jul	512,096	514,576	547,841	591,788	287,983	302,423	316,864	331,305	345,745
Aug	524,162	524,727	580,123	605,465	297,500	312,356	327,212	342,067	356,923
Sep	544,401	528,206	599,091	617,921	305,255	320,435	335,615	350,795	365,975
Oct	550,997	553,911	601,871	611,197	309,479	324,805	340,131	355,458	370,784
Nov	570,254	581,114	580,336	623,140	315,099	330,639	346,180	361,720	377,261
Dec	546,165	625,921	618,239	659,687	329,600	345,789	361,979	378,168	394,357

Table 8.32: Monthly Peak Energy Demand Data per Feeder (Substation 4 – Feeder 3)

S4F3 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	547,391	504,264	515,677	544,032	576,421	606,068	635,716	665,363	695,011
Feb	520,859	500,083	549,015	560,907	585,574	615,564	645,553	675,543	705,532
Mar	513,871	491,659	540,719	515,341	566,645	595,541	624,438	653,335	682,232
Apr	543,174	532,907	572,418	578,468	615,023	646,254	677,486	708,717	739,948
May	524,202	497,932	543,576	547,641	584,793	614,363	643,935	673,506	703,077
Jun	517,247	513,201	551,901	569,364	597,782	627,883	657,984	688,085	718,186
Jul	478,977	481,297	512,410	553,515	564,707	593,024	621,340	649,657	677,973
Aug	490,263	490,791	542,605	566,308	583,369	612,500	641,631	670,762	699,893
Sep	509,193	494,045	560,346	577,958	598,577	628,343	658,109	687,875	717,642
Oct	515,362	518,088	562,946	571,669	606,858	636,912	666,965	697,019	727,072
Nov	533,373	543,531	542,804	582,840	617,879	648,352	678,826	709,300	739,773
Dec	510,843	585,440	578,255	617,023	646,315	678,060	709,806	741,551	773,297

Table 8.33: Monthly Peak Energy Demand Data per Feeder (Substation 5 – Feeder 1)

SSF1 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	632,601	582,761	595,950	628,719	1,209,832	1,272,057	1,334,283	1,396,509	1,458,735
Feb	601,939	577,928	634,478	648,221	1,229,042	1,291,986	1,354,930	1,417,875	1,480,819
Mar	593,863	568,194	624,890	595,561	1,189,312	1,249,962	1,310,613	1,371,263	1,431,914
Apr	627,728	615,862	661,524	668,515	1,290,852	1,356,402	1,421,953	1,487,503	1,553,053
May	605,803	575,443	628,192	632,890	1,227,402	1,289,467	1,351,533	1,413,599	1,475,664
Jun	597,765	593,088	637,813	657,995	1,254,665	1,317,843	1,381,021	1,444,199	1,507,377
Jul	553,537	556,219	592,174	639,678	1,185,245	1,244,678	1,304,110	1,363,543	1,422,976
Aug	566,580	567,190	627,070	654,462	1,224,415	1,285,557	1,346,698	1,407,840	1,468,982
Sep	588,457	570,951	647,573	667,926	1,256,333	1,318,808	1,381,284	1,443,759	1,506,234
Oct	595,587	598,736	650,578	660,658	1,273,715	1,336,793	1,399,871	1,462,950	1,526,028
Nov	616,401	628,140	627,300	673,568	1,296,846	1,360,806	1,424,766	1,488,726	1,552,685
Dec	590,363	676,573	668,270	713,072	1,356,529	1,423,158	1,489,788	1,556,418	1,623,047

Table 8.34: Monthly Peak Energy Demand Data per Feeder (Substation 5 – Feeder 3)

S5F3 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	421,734	388,507	397,300	419,146	443,962	466,797	489,631	512,466	535,300
Feb	401,293	385,286	422,985	432,147	451,012	474,110	497,208	520,306	543,404
Mar	395,909	378,796	416,594	397,041	436,432	458,689	480,945	503,201	525,458
Apr	418,485	410,575	441,016	445,677	473,693	497,748	521,802	545,857	569,911
May	403,868	383,628	418,795	421,927	450,410	473,185	495,961	518,737	541,513
Jun	398,510	395,392	425,209	438,663	460,414	483,598	506,782	529,966	553,150
Jul	369,025	370,812	394,783	426,452	434,940	456,749	478,559	500,368	522,178
Aug	377,720	378,127	418,046	436,308	449,314	471,750	494,187	516,624	539,060
Sep	392,305	380,634	431,715	445,284	461,026	483,952	506,878	529,805	552,731
Oct	397,058	399,157	433,718	440,439	467,405	490,552	513,699	536,847	559,994
Nov	410,934	418,760	418,200	449,045	475,893	499,364	522,835	546,306	569,776
Dec	393,576	451,049	445,513	475,381	497,794	522,245	546,695	571,146	595,596

Table 8.35: Monthly Peak Energy Demand Data per Feeder (Substation 6 – Feeder 1)

S6F1 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	19,858	18,294	18,708	19,736	21,042	22,124	23,206	24,288	25,371
Feb	18,896	18,142	19,917	20,349	21,376	22,470	23,565	24,660	25,755
Mar	18,642	17,836	19,616	18,696	20,685	21,740	22,794	23,849	24,904
Apr	19,705	19,333	20,766	20,986	22,451	23,591	24,731	25,871	27,011
May	19,017	18,064	19,720	19,867	21,347	22,427	23,506	24,586	25,665
Jun	18,765	18,618	20,022	20,655	21,821	22,920	24,019	25,118	26,217
Jul	17,376	17,461	18,589	20,080	20,614	21,648	22,681	23,715	24,749
Aug	17,786	17,805	19,685	20,545	21,295	22,359	23,422	24,485	25,549
Sep	18,473	17,923	20,328	20,967	21,850	22,937	24,024	25,110	26,197
Oct	18,696	18,795	20,423	20,739	22,153	23,250	24,347	25,444	26,541
Nov	19,350	19,718	19,692	21,144	22,555	23,667	24,780	25,892	27,005
Dec	18,532	21,239	20,978	22,384	23,593	24,752	25,911	27,070	28,228

Table 8.36: Monthly Peak Energy Demand Data per Feeder (Substation 6 – Feeder 2)

S6F2 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	358,118	329,903	337,369	355,920	376,943	396,330	415,718	435,106	454,493
Feb	340,760	327,167	359,180	366,960	382,928	402,540	422,151	441,762	461,373
Mar	336,188	321,656	353,752	337,149	370,550	389,446	408,343	427,240	446,137
Apr	355,359	348,642	374,491	378,449	402,186	422,610	443,033	463,456	483,879
May	342,947	325,760	355,622	358,281	382,417	401,755	421,092	440,430	459,768
Jun	338,396	335,749	361,068	372,493	390,912	410,596	430,280	449,964	469,648
Jul	313,359	314,877	335,232	362,124	369,282	387,800	406,317	424,834	443,352
Aug	320,743	321,088	354,986	370,493	381,487	400,536	419,586	438,636	457,686
Sep	333,127	323,217	366,593	378,115	391,431	410,896	430,362	449,827	469,292
Oct	337,163	338,946	368,294	374,001	396,847	416,500	436,153	455,806	475,459
Nov	348,947	355,592	355,116	381,309	404,054	423,981	443,909	463,837	483,765
Dec	334,206	383,010	378,310	403,672	422,649	443,408	464,168	484,928	505,687

Table 8.37: Monthly Peak Energy Demand Data per Feeder (Substation 6 – Feeder 3)

S6F3 Month/Yr	HISTORICAL				FORECASTED ENERGY (KWH)				
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	469,821	432,806	442,601	466,938	494,736	520,182	545,628	571,074	596,520
Feb	447,049	429,217	471,215	481,422	502,592	528,331	554,071	579,811	605,551
Mar	441,051	421,987	464,095	442,313	486,345	511,147	535,948	560,750	585,552
Apr	466,202	457,390	491,302	496,494	527,868	554,673	581,478	608,284	635,089
May	449,919	427,371	466,547	470,036	501,921	527,301	552,682	578,062	603,443
Jun	443,949	440,476	473,692	488,681	513,070	538,905	564,740	590,576	616,411
Jul	411,102	413,093	439,797	475,078	484,682	508,985	533,289	557,593	581,897
Aug	420,789	421,242	465,713	486,057	500,700	525,702	550,705	575,707	600,710
Sep	437,036	424,035	480,940	496,057	513,752	539,300	564,848	590,396	615,944
Oct	442,331	444,670	483,172	490,659	520,860	546,654	572,449	598,243	624,038
Nov	457,790	466,508	465,884	500,247	530,319	556,474	582,629	608,784	634,939
Dec	438,452	502,479	496,312	529,586	554,725	581,971	609,218	636,465	663,712

8.2. Graphs showing Electricity Demand per Substation per Feeder

Peak Demand Forecast, kW

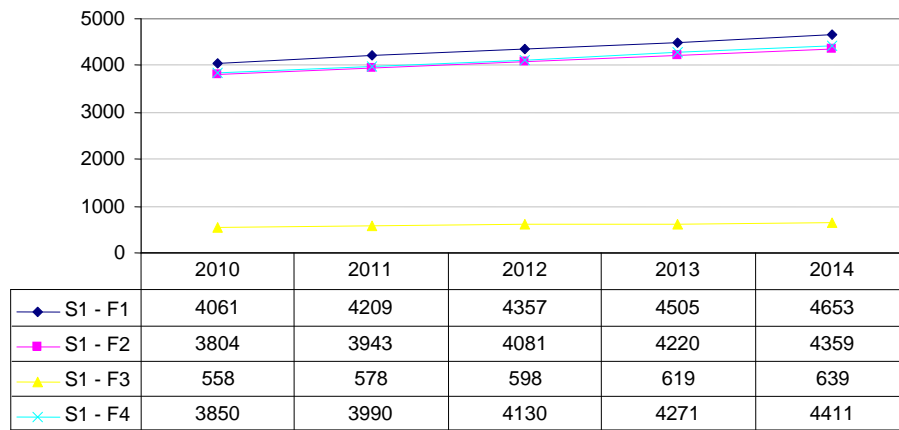


Fig. 8.1. Electricity Demand per Feeder of Substation 1

Peak Demand Forecast, kW

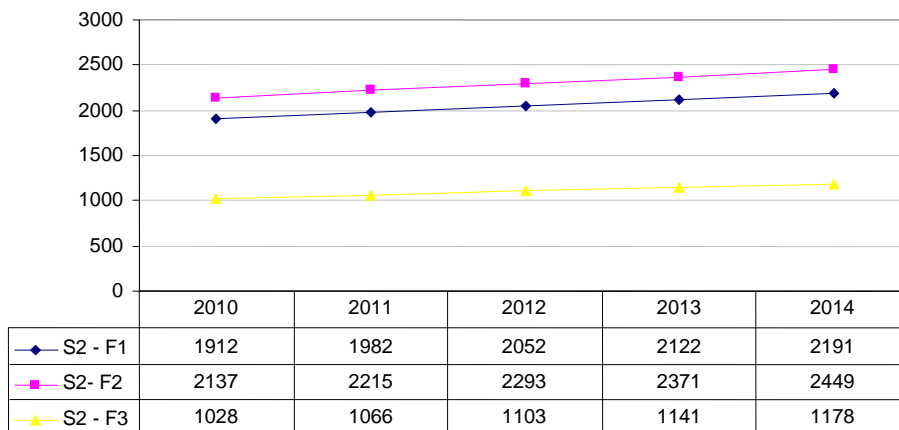


Fig. 8.2. Electricity Demand per Feeder of Substation 2

Peak Demand Forecast, kW

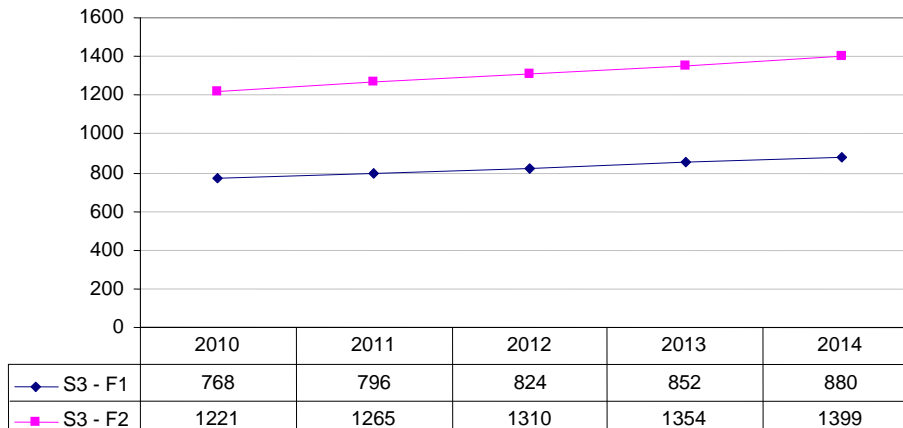


Fig. 8.3. Electricity Demand per Feeder of Substation 3

Peak Demand Forecast, kW

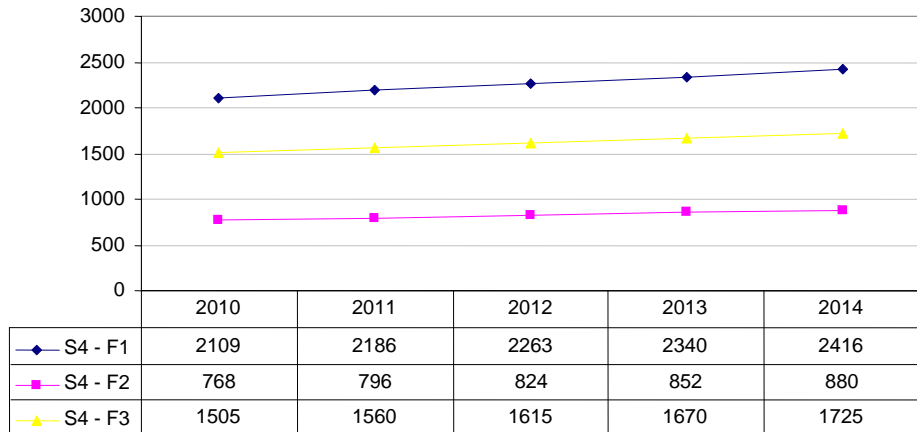


Fig. 8.4. Electricity Demand per Feeder of Substation 4

Peak Demand Forecast, kW

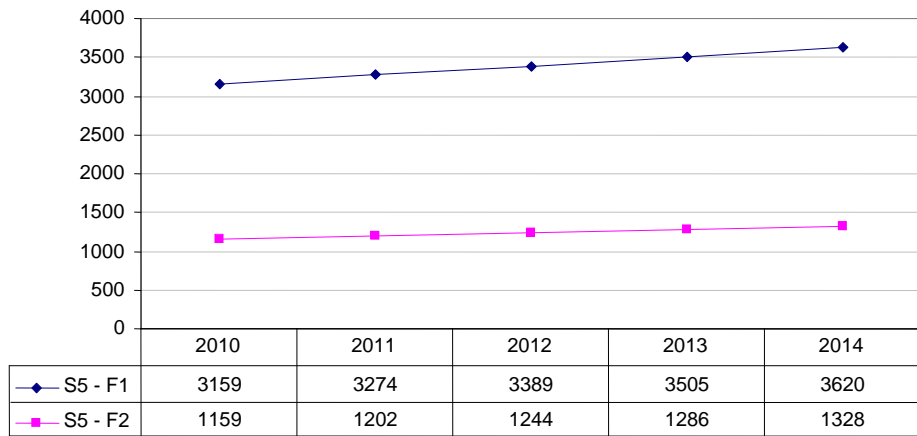


Fig. 8.5. Electricity Demand per Feeder of Substation 5

Peak Demand Forecast, kW

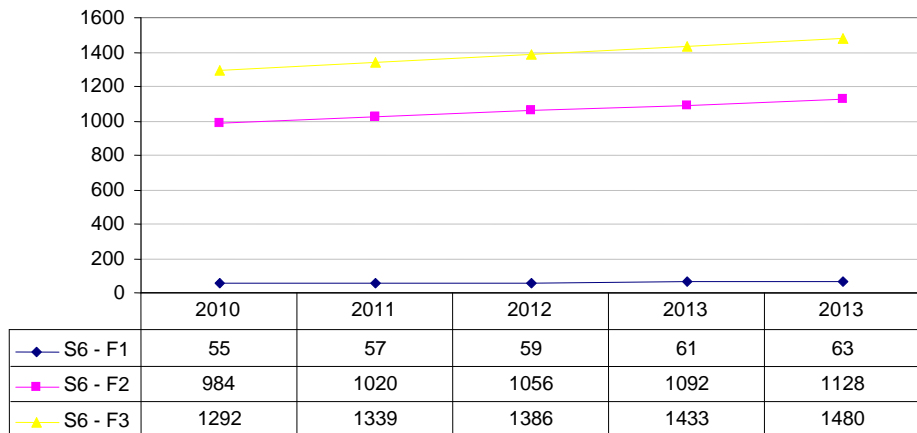


Fig. 8.6. Electricity Demand per Feeder of Substation 6

8.3. Graphs showing Energy Sales per Substation per Feeder

Energy Sales per Feeder of Substation 1, kWh

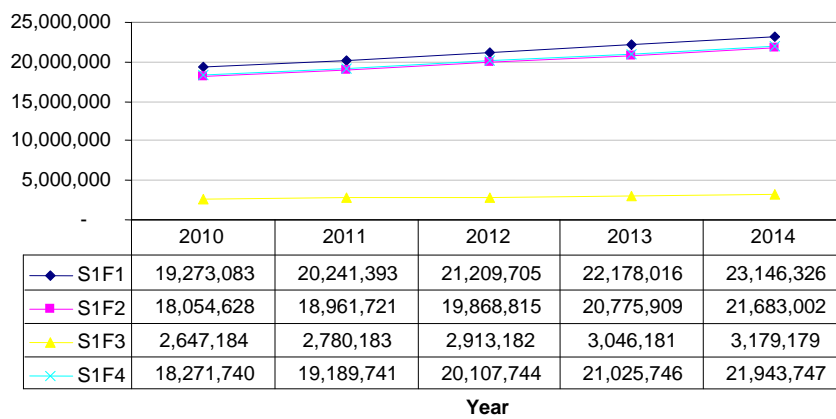


Fig. 8.7. Energy Sales per Feeder of Substation 1

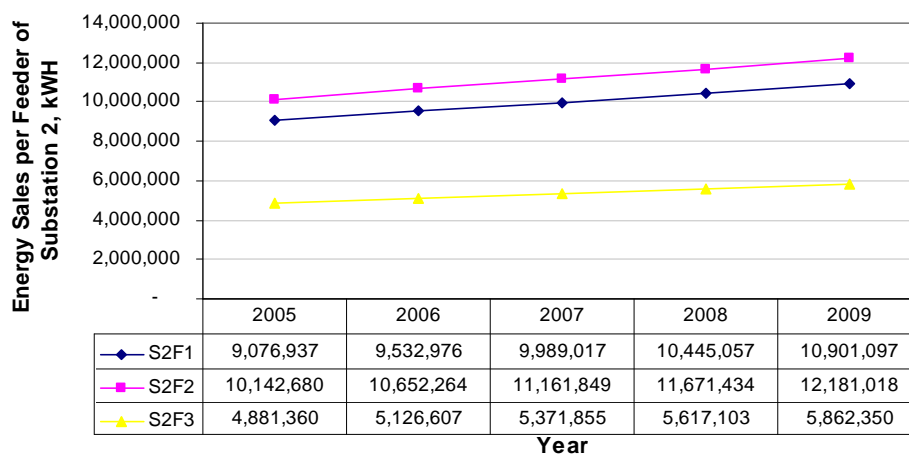


Fig. 8.8. Energy Sales per Feeder of Substation 2

Energy Sales per Feeder of Substation 3, kWh

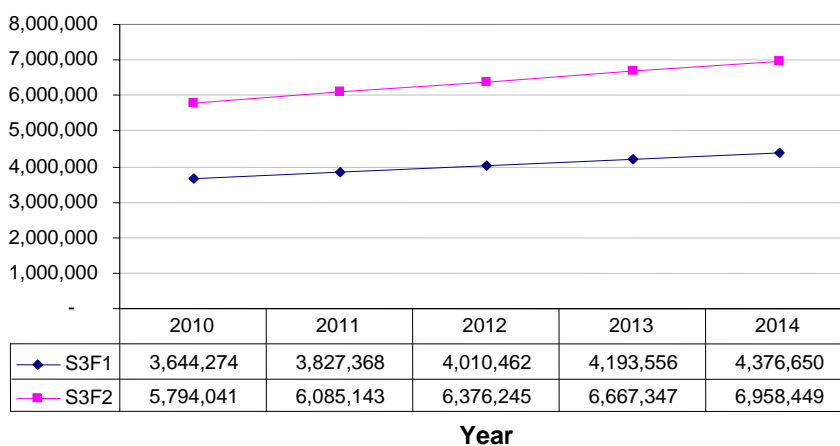


Fig. 8.9. Energy Sales per Feeder of Substation 3

Energy Sales per Feeder of Substation 4, kWh

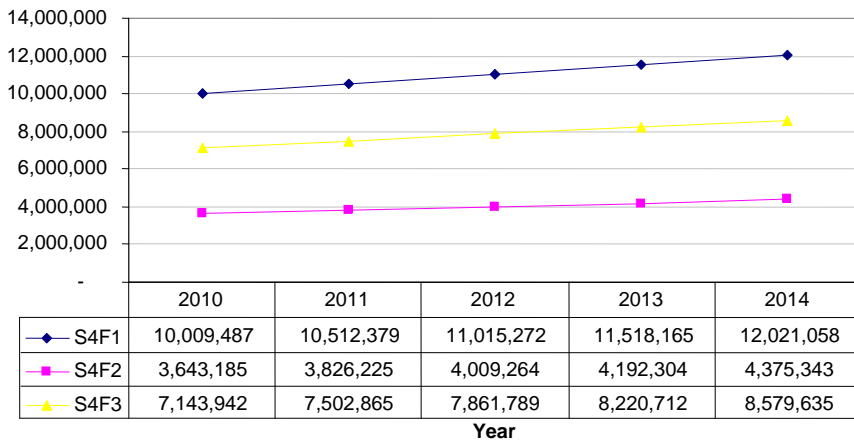


Fig. 8.10. Energy Sales per Feeder of Substation 4

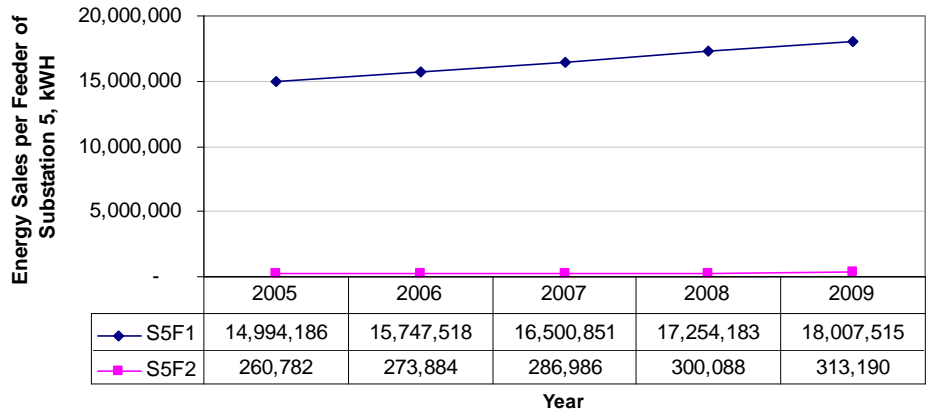


Fig. 8.11. Energy Sales per Feeder of Substation 5

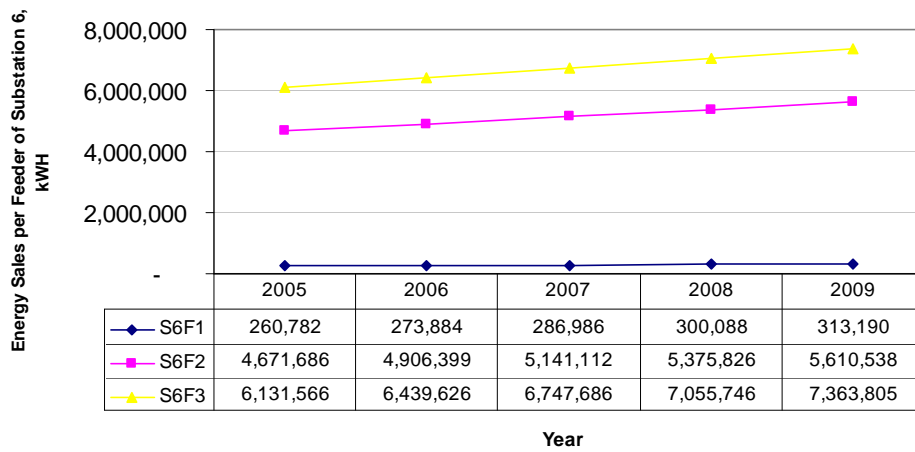


Fig. 8.12. Energy Sales per Feeder of Substation 6

8.4. Technical and Engineering Analyses

Table 8.38: Simulation with project

SUBSTATION	FEEDER	PEAK DEMAND FORECAST (KW)					CAPACITY PROFILE (%)					TECHNICAL LOSS (KW)					VOLTAGE PROFILE (pu)					ANALYSIS & EVALUATION
		2010	2011	2012	2013	2014	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014	
S1 (20MVA-COGON)	1	4061	4209	4357	4505	4653	62.3	64.6	66.8	69.1	71.4	140	140	150	152	170	0.97	0.97	0.97	0.97	0.97	NO CAPACITY VIOLATION, NO VOLTAGE VIOLATION
	2	3804	3943	4081	4220	4359						241	261	262	272	282	0.92	0.92	0.91	0.91	0.91	
	3	558	578	598	619	639						10	10	10	10	10	0.99	0.99	0.99	0.99	0.99	
	4	3850	3990	4130	4271	4411						222	223	251	263	274	0.92	0.92	0.92	0.91	0.91	
S2 (10MVA-PALIGUE)	1	1912	1982	2052	2122	2191	52.9	54.8	56.8	58.7	60.6	82	84	89	90	98	0.93	0.93	0.92	0.92	0.92	NO CAPACITY VIOLATION, NO VOLTAGE VIOLATION
	2	2137	2215	2293	2371	2449						35	40	43	47	51	0.97	0.97	0.96	0.96	0.96	
	3	1028	1066	1103	1141	1178						1	1	1	1	1	0.99	0.99	0.99	0.98	0.98	
S3 (5MVA-MALITA)	1	768	796	824	852	880	40.2	41.6	43.1	44.6	46	8	11	14	17	21	0.97	0.97	0.96	0.96	0.95	NO CAPACITY VIOLATION, NO VOLTAGE VIOLATION
	2	1221	1265	1310	1354	1399						6	6	6	6	7	0.97	0.97	0.97	0.97	0.97	
S4 (10MVA-MATANAO)	1	2109	2186	2263	2340	2416	44.7	46.3	48	49.6	51.2	39.5	48.3	85.1	140	141	0.96	0.95	0.95	0.94	0.94	NO CAPACITY VIOLATION, NO VOLTAGE VIOLATION
	2	768	796	824	852	880						3.2	4.4	12.3	17.7	17.7	0.99	0.99	0.99	0.99	0.99	
	3	1505	1560	1615	1670	1725						12.5	13.5	41.5	48.5	48.5	0.97	0.97	0.96	0.96	0.96	
S5 (10MVA-ASTORGA)	1	3159	3274	3389	3505	3620	45	46.6	48.3	49.9	51.5	77.1	85.1	93.6	93.8	106	0.95	0.95	0.94	0.94	0.94	NO CAPACITY VIOLATION, NO VOLTAGE VIOLATION
	3	1159	1202	1244	1286	1328						14.1	18.5	18.7	19.2	23.7	0.98	0.98	0.98	0.98	0.97	
S6 (5MVA-MALALAG)	1	55	57	59	61	63	48.1	49.8	51.6	53.3	55.1	1	1	1	1	2	0.99	0.99	0.99	0.99	0.99	NO CAPACITY VIOLATION, NO VOLTAGE VIOLATION
	2	984	1020	1056	1092	1128						13	14	15	16	17	0.98	0.98	0.98	0.98	0.97	
	3	1292	1339	1386	1433	1480						16	19	20	22	26	0.98	0.98	0.97	0.97	0.97	

Table 8.39: Load Transfer Scenario

SUBSTATION SOURCE	LOAD TRANSFER:		CAPACITY (%)					TECHNICAL LOSS (KW)					VOLTAGE PROFILE (pu)					ANALYSIS & EVALUATION
	FROM	TO	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014	
S2	S2F1	S6F2	66	68	71	76	79	132	138	146	155	164	0.92	0.91	0.91	0.9	0.9	LOW VOLTAGE
S6	S6F2	S2F1	97	101	105	113	116	254	259	277	309	318	0.87	0.86	0.86	0.85	0.84	LOW VOLTAGE
S3	S3F1	S6F3	73	76	81	88	93	176	215	249	308	351	0.87	0.85	0.84	0.82	0.8	LOW VOLTAGE
S6	S6F3	S3F1	73	77	81	86	91	73	84	96	110	128	0.93	0.92	0.91	0.9	0.89	LOW VOLTAGE
S4	S4F2	S1F2	86	89	91	93	95	380	389	401	415	432	0.88	0.88	0.88	0.86	0.86	LOW VOLTAGE
S1	S1F2	S4F2	68	69	71	72	74	446	456	466	476	486	0.9	0.9	0.89	0.89	0.88	LOW VOLTAGE
S2	S2F2	S1F4	92	93	95	96	98	430	455	480	505	530	0.89	0.89	0.88	0.88	0.87	LOW VOLTAGE
S1	S1F4	S2F2	76	78	80	82	84	735	751	767	783	799	0.75	0.74	0.73	0.72	0.71	LOW VOLTAGE
S5	S5F1	S1F3	47	49	50	51	53	183	188	193	198	203	0.83	0.83	0.82	0.82	0.81	LOW VOLTAGE
S1	S1F3	S5F1	78	80	82	83	85	334	389	444	499	554	0.84	0.84	0.83	0.83	0.83	LOW VOLTAGE

* Load transfer occurs during yearly Preventive Maintenance Schedule

8.5. PREDICTIVE RELIABILITY PERFORMANCE ASSESMENT

Electric cooperatives are also encouraged to provide statistical reports on outages and reliability indices. As shown in Table 8.40, the failure rates of circuit breakers of the feeders in the Cogon substations. Table 8.40 shows reliability indices of the circuit breakers in the Cogon substation.

Table 8.40: Failure rates of circuit breakers

CIRCUIT BREAKER	λ /YR	r(hrs)	u(hrs/yr)	No. of Consumer	Average Demand
1	33.21	0.5	16.6	8533	3889
2	38.05	0.5	19.03	9340	3904
3	73.41	0.5	36.70	6046	3508
4	52.26	0.5	26.13	8704	3905

Table 8.41: Reliability indices of 20 MVA Cogon Substation Switchgear - Without Project

Ckt Breaker	SAIFI	SAIDI	CAIFI	ASUI	ASAI	ASCI	ENS
1	33.2055	6.64316327	0.200062112	0.000758352	0.999241648	7.566870115	64,568.10
2	38.0509	7.612341647	0.200056745	0.000868989	0.999131011	7.952396213	74,275.38
3	73.4075	14.68792508	0.200087661	0.001676704	0.998323296	21.29617402	128,756.67
4	52.2638	10.45594933	0.200060892	0.001193602	0.998806398	11.72393576	102,045.14

Table 8.42: Reliability indices of 20 MVA Cogon Substation Switchgear - With Project

Ckt Breaker	SAIFI	SAIDI	CAIFI	ASUI	ASAI	ASCI	ENS
1	0.044811142	0.008965012	0.200062112	1.02340E-06	0.999998977	0.010211563	87.14
2	0.066279241	0.013259609	0.200056745	1.51365E-06	0.999998486	0.013851936	129.38
3	0.080435062	0.016094063	0.200087661	1.83722E-06	0.999998163	0.023334948	141.08
4	0.07241968	0.014488346	0.200060892	1.65392E-06	0.999998346	0.016245338	141.40

8.6. Comparison between Silicon and Amorphous Core Distribution Transformers

These tables show comparison between silicon and amorphous core distribution transformers in terms of the total core and copper losses. It is shown that the total monthly energy served will be 89,094 kwh/month.

Table 8.43: Total loss from silicon core distribution transformers

	Silicon	ZnOIn	kW Saves
No. of Units	101	101	
No-Load Losses	0.13	0.08	0.05
Winding Losses at 50kVA	0.48	0.43	0.05
	0.61	0.51	0.10
	Silicon	ZnOIn	kW Saves
No. of Units	551	551	
No-Load Losses	0.12	0.036	0.08
Winding Losses at 25kVA	0.35	0.238	0.11
	0.47	0.27	0.19
	Silicon	ZnOIn	kW Saves
No. of Units	506	506	
No-Load Losses	0.08	0.02	0.06
Winding Losses at 15kVA	0.20	0.16	0.04
	0.27	0.18	0.09
	Silicon	ZnOIn	kW Saves
No. of Units	363	363	
No-Load Losses	0.07	0.015	0.06
Winding Losses at 10kVA	0.16	0.11	0.05
	0.23	0.13	0.11
Core loss in the system	4,742,290	kwh/year	Silicon
Core loss in the system	2,969,106	kwh/year	ZnOIn
	1,773,184	kwh/year	

8.7. Project Costs and Estimates

Table 8.44: Cost Estimates of the Proposed Projects

No.	Description	Unit Cost (Peso)		No. of Units	TOTAL COST (Peso)	2010	2011	2012
1	MV SWITCHGEAR		14,000,000	1 lot	14,000,000	14,000,000		
2	DISTRIBUTION TRANSFORMER WITH AMORPHOUS CORE	50KVA	150,000	101 pcs.	15,150,000		15,150,000	
		25KVA	115,625	551 pcs.	63,709,375	31,854,688	31,854,688	
		15KVA	95,689	506 pcs.	48,418,634	24,209,317	24,209,317	
		10KVA	76,238	363 pcs.	27,674,394	13,837,197	13,837,197	
3	ELECTRONIC SINGLE PHASE KILOWATT-HOUR METERS WITH INFRARED		950	57,000 pcs.	54,150,000	27,075,000	27,075,000	
4	DISTRIBUTION SYSTEM LOSS SEGREGATOR SOFTWARE/SYNERGY SOFTWARE		1,605,000	1 set	1,605,000	1,605,000		
5	69KV SF6 CKT BREAKER		3,500,000	1 set	3,500,000	3,500,000		
6	UTILITY TRUCK WITH INSULATED BOOM "KANG LIM"		5,096,366	3 sets	15,289,098			15,289,098
7	HOTLINE MAINTENANCE TOOLS AND EQUIPMENT 13.2 & 69 KV W/ TRAINING 1 Live-Line Maintenance Equipment Set 2 Live-Line Maintenance Safety Apparel		2,475,000	1 lot	2,475,000			2,475,000
			1,350,000	1 lot	1,350,000			1,350,000
8	ION KILOWATT-HR METERS W/ GSM (FARGO MAESTRO)		250,000	23 sets	5,750,000			
9	15KV AUTOMATIC VOLTAGE REGULATOR		330,720	57 pcs.	18,851,040			
10	7.62KV POWER CAPACITOR		1,200	120 units	14,400,000	4,800,000	4,800,000	4,800,000
11	ISOLATION SWITCHES		500,000	6 sets	3,000,000		3,000,000	
12	MOBILE TRANSFORMER/SUBSTATION	20MVA	60,000,000	1 lot	60,000,000			
13	SCADA		8,000,000	1 lot	8,000,000			
14	TOOLS & EQUIPMENT							
1	Infrared Scanner		3,625,000	1 pc	3,625,000	3,625,000		
2	CALPORT 200		3,000,000	1 pc	3,000,000	3,000,000		
3	Calsource 200		3,000,000	1 set	3,000,000	3,000,000		
4	Load Profiler Set		875,000	6 pc	5,250,000		5,250,000	
5	Load Logger Set		750,000	6 pc	4,500,000		4,500,000	
6	Transformer Turns Ratio Tester		201,913	1 pc	201,913			201,913
7	DGA Tester		6,250,000	1 pc	6,250,000			6,250,000
8	MICRO OHMETER		59,313	1 pc	59,313			59,313
9	Insulation Resistance Tester		57,250	1 pc	57,250			57,250
10	Power Factor Meter		22,094	1 pc	22,094			22,094
11	Phase Sequence Indicator		15,450	1 pc	15,450			15,450
12	Volt-Ampere Recorder		78,137	1 pc	78,137			78,137
13	AC Hi-Pot Test Set		184,113	1 pc	184,113			184,113
14	DC Hi-Pot Test Set		230,141	1 pc	230,141			230,141
15	Earth Tester		25,750	1 pc	25,750			25,750
16	Flicker Severity Monitoring Equipment		1,125,000	1 pc	1,125,000			1,125,000
17	Forklift, 5-tonner		437,500	1 pc	437,500			437,500
18	Printer, Plotter		1,187,500	1 pc	1,187,500			1,187,500
19	Oil Dielectric Test Set		184,113	1 pc	184,113			184,113
20	BATTERY CHARGER @ DIFFERENT SUBSTATIONS		30,000	6 sets	180,000			180,000
15	69 KV line acquisition				39,200,000		39,200,000	
						130,506,202	168,876,202	34,152,370

Table 8.45: Cost Estimates of the Proposed Construction of MV Switchgear

Project 1 : Proposed Construction of MV SWITCHGEAR				
	Year	2010	2011	2012
Summary of Project Cost Estimates				
Instrument Transformers		5,765,271.11		
Circuit Breakers		1,287,577.21		
LV Disconnect Switches		201,784.49		
HV Switches		249,828.41		
Electrical Hardware & Components		1,076,183.94		
Relaying - LV Line related		442,004.12		
Relaying - Feeders		303,637.61		
Local Control / annunciation		146,053.53		
Battery/Charger		80,713.80		
Grounding/Instrumentation Wiring		48,043.93		
LVAC Lighting		101,853.12		
Station Metering		1,153,054.22		
Site Prep & Grading		445,847.63		
Control Bldg		42,278.65		
Finish Grading & Fencing		317,089.91		
Erection & Installation		960,878.52		
Grounding & Aux Services		105,696.64		
Control & Instrumentation		311,324.64		
Labor Cost		960,878.52		
	Sub-total	29,613,272		

Table 8.46: Cost Estimates of Acquisition of Distribution Transformer with Amorphous Core

Project 2 : Acquisition of DISTRIBUTION TRANSFORMER WITH AMORPHOUS CORE						
	Year	2010	2011	2012		
Summary of Project Cost Estimates						
50 KVA			9,627,863			
25 KVA		31,854,688	31,854,688			
15 KVA		24,209,317	24,209,317			
10 KVA		13,837,197	13,837,197			
	Sub-total	69,901,202	79,529,065			

Table 8.47: Cost Estimates of Acquisition of Hotline Maintenance Tools and Equipment 13.2 & 69 Kv with Training

Project 3 : Acquisition of HOTLINE MAINTENANCE TOOLS AND EQUIPMENT 13.2 & 69 KV W/ TRAINING						
	Year	2010	2011	2012	2013	2014
Summary of Project Cost Estimates						
Live-Line Maintenance Equipment Set				2,475,000		
Live-Line Maintenance Safety Apparel				1,350,000		
	Sub-total			3,825,000		

Table 8.48: Cost Estimates of Acquisition of Tools and Equipment

Project 4 : Acquisition of Tools and Equipment						
	Year	2010	2011	2012	2013	2014
1	Infrared Scanner	3,625,000				
2	CALPORT 200	3,000,000				
3	Calsource 200	3,000,000				
4	Load Profiler Set		5,250,000			
5	Load Logger Set		4,500,000			
6	Transformer Turns Ratio Tester			201,913		
7	DGA Tester			6,250,000		
8	MICRO OHMETER			59,313		
9	Insulation Resistance Tester			57,250		
10	Power Factor Meter			22,094		
11	Phase Sequence Indicator			15,450		
12	Volt-Ampere Recorder			78,137		
13	AC Hi-Pot Test Set			184,113		
14	DC Hi-Pot Test Set			230,141		
15	Earth Tester			25,750		
16	Flicker Severity Monitoring Equipment			1,125,000		
17	Forklift, 5-tonner			437,500		
18	Printer, Plotter			1,187,500		
19	Oil Dielectric Test Set			184,113		
20	BATTERY CHARGER			180,000		
	Sub-total	9,625,000	9,750,000	10,238,272		

Table 8.49: Cost Estimates for Other Projects

OTHERS:

	Description	2010	2011	2012	2013	2014
5	Acquisition of ELECTRONIC SINGLE PHASE KWH METERS with IR	28,758,030	28,758,896			
6	DISTRIBUTION SYSTEM LOSS SEGREGATOR/SYNERGY SOFTWARE	1,605,000				
7	69KV SF6 CKT BREAKER	3,500,000				
8	UTILITY TRUCK WITH INSULATED BOOM "KANGLIM"			15,289,098		
9	7.62kV POWER CAPACITOR	4,800,000	4,800,000	4,800,000		
10	ISOLATION SWITCHES		3,000,000			
11	69 KV line acquisition		39,200,000			
	Sub-total	36,743,030	75,758,896	20,089,098		

8.8. Description and Classification of Projects

Table 8.50: Medium voltage switchgear

Project Details			
Name of Project	Medium Voltage Switchgear		
Project Code			
Description	Construction of new Medium Voltage Switchgear and control room.		
Commissioning Date	2010		
Project Classification			
Rank	1st priority	(1st priority; 2nd priority)	
Project Driver	Network Control/Safety/Metering	(Load Growth; Network non-growth; Network control/safety/metering; Non-network; Statutory)	
Project Type	Renewal	Renewal; Refurbishment; Growth	
Expenditure for the Period CY2008-CY2010 (in Millions)	Forex:	Local:	TOTAL:
Project Need			
Project Purpose	Improves System Reliability and Safety		
Impact if Project Not Implemented	Long duration of Interrupted power		
Reason for Ranking Project, Commissioning date, relative to other projects			

Table 8.51: Distribution transformers with amorphous core

Project Details			
Name of Project	Distribution Transformer with Amorphous Core		
Project Code			
Description	Acquisition of Dist. Transformer with Amorphous Core		
Commissioning Date	2010 and 2011		
Project Classification			
Rank	1st priority	(1st priority; 2nd priority)	
Project Driver	Load Growth	(Load Growth; Network non-growth; Network control/safety/metering; Non-network; Statutory)	
Project Type		Renewal; Refurbishment; Growth	
Expenditure for the Period CY2008-CY2010 (in Millions)	Forex:	Local:	TOTAL:
Project Need			
Project Purpose	To reduce core losses contributed by Distribution transformers		
Impact if Project Not Implemented	High System Loss		
Reason for Ranking Project, Commissioning date, relative to other projects			

Table 8.52: Electronic Single Phase Kilowatthour Meter with Infrared Red

Project Details			
Name of Project	Electronic Single Phase Kilowatthour Meter with Infrared Red		
Project Code			
Description	Acquisition of Electronic Single Phase KWHr meter with IR		
Commissioning Date	2010 and 2011		
Project Classification			
Rank	1nd priority	(1st priority; 2nd priority)	
Project Driver	Network Metering	(Load Growth; Network non-growth; Network control/safety/metering; Non-network; Statutory)	
Project Type	Renewal	Renewal; Refurbishment; Growth	
Expenditure for the Period CY2008-CY2010 (in Millions)	Forex:	Local:	TOTAL:
Project Need			
Project Purpose	Replacement of old kwhmeters		
Impact if Project Not Implemented	High non-Technical losses		
Reason for Ranking Project, Commissioning date, relative to other projects			

Table 8.53: Distribution System Loss Segregator / Synergy Software

Project Details			
Name of Project	Distribution System Loss Segregator / Synergy Software		
Project Code			
Description	Acquisition of DSL or Synergy Software		
Commissioning Date	2010		
Project Classification			
Rank	1st Priority	(1st priority; 2nd priority)	
Project Driver	Network control	(Load Growth; Network non-growth; Network control/safety/metering; Non-network; Statutory)	
Project Type		Renewal; Refurbishment; Growth	
Expenditure for the Period CY2008-CY2010 (in Millions)	Forex:	Local:	TOTAL:
Project Need			
Project Purpose	To provide assistance in analyzing the Distribution system improvements A very useful tool in planning.		
Impact if Project Not Implemented	Unable to determine and monitor problematic part in the system. Provide threat of high system loss in future operation.		
Reason for Ranking Project, Commissioning date, relative to other projects			

Table 8.54: 69 KV SF6 Circuit Breaker

Project Details			
Name of Project	69 KV SF6 Circuit Breaker		
Project Code			
Description	Intallation of 69KV SF6 Circuit Breaker @ Malita Substation		
Commisioning Date	2010		
Project Classification			
Rank	1st Priority	(1st priority; 2nd priority)	
Project Driver	Statutory	(Load Growth; Network non-growth; Network control/safety/metering; Non-network; Statutory)	
Project Type		Renewal; Refurbishment; Growth	
Expenditure for the Period CY2008-CY2010 (in Millions)	Forex:	Local:	TOTAL:
Project Need			
Project Purpose	PGC & PDC compliance		
Impact if Project Not Implemented	Violation		
Reason for Ranking Project, Commisioning date, relative to other projects			

Table 8.55: UTILITY TRUCK WITH INSULATED BOOM"KANGLIM"

Project Details			
Name of Project	UTILITY TRUCK WITH INSULATED BOOM"KANGLIM"		
Project Code			
Description			
Commisioning Date	2012		
Project Classification			
Rank	1st Priority	(1st priority; 2nd priority)	
Project Driver	Non-network	(Load Growth; Network non-growth; Network control/safety/metering; Non-network; Statutory)	
Project Type		Renewal; Refurbishment; Growth	
Expenditure for the Period CY2008-CY2010 (in Millions)	Forex:	Local:	TOTAL:
Project Need			
Project Purpose	Provide safety to linemen. Improve system reliability.		
Impact if Project Not Implemented	Linemen working with Hot wire are hazardous. Frequent power interruptions.		
Reason for Ranking Project, Commisioning date, relative to other projects			

Table 8.56: HOTLINE MAINTENANCE TOOLS AND EQPT. 13.2 & 69 KV W/ TRAINING

Project Details			
Name of Project	HOTLINE MAINTENANCE TOOLS AND EQPT. 13.2 & 69 KV W/ TRAINING		
Project Code			
Description			
Commissioning Date	2012		
Project Classification			
Rank	1st priority	(1st priority; 2nd priority)	
Project Driver	Non-network	(Load Growth; Network non-growth; Network control/safety/metering; Non-network; Statutory)	
Project Type		Renewal; Refurbishment; Growth	
Expenditure for the Period CY2008-CY2010 (in Millions)	Forex:	Local:	TOTAL:
Project Need			
Project Purpose	Provide safety to linemen. Improve system reliability. Improve service		
Impact if Project Not Implemented	Linemen working with Hot wire are hazardous. Frequent power interruptions. Poor service		
Reason for Ranking Project, Commissioning date, relative to other projects			

Table 8.59A: 7.62KV POWER CAPACITOR

Project Details			
Name of Project	Improvement of Reactive Power		
Project Code			
Description	Installation of 7.62kV Power Capacitor		
Commissioning Date			
Project Classification			
Rank	2nd priority	(1st priority; 2nd priority)	
Project Driver	Load Growth	(Load Growth; Network non-growth; Network control/safety/metering; Non-network; Statutory)	
Project Type	2010, 2011, 2012, 2013 & 2014	Renewal; Refurbishment; Growth	
Expenditure for the Period CY2008-CY2010 (in Millions)	Forex:	Local:	TOTAL:
Project Need			
Project Purpose	Improves Voltage		
Impact if Project Not Implemented	Long duration of Interrupted power		
Reason for Ranking Project, Commissioning date, relative to other projects			

Table 8.57: Isolation Switches

Project Details			
Name of Project	Isolation Switches		
Project Code			
Description	Installation of Isolation Switches		
Commissioning Date			
Project Classification			
Rank	2nd priority	(1st priority; 2nd priority)	
Project Driver	Network Control	(Load Growth; Network non-growth; Network control/safety/metering; Non-network; Statutory)	
Project Type		Renewal; Refurbishment; Growth	
Expenditure for the Period CY2008-CY2010 (in Millions)	Forex:	Local:	TOTAL:
Project Need			
Project Purpose	Improves System Reliability and Safety		
Impact if Project Not Implemented	Long duration of Interrupted power		
Reason for Ranking Project, Commissioning date, relative to other projects			

Table 8.58: Tools and Equipment

Project Details			
Name of Project	Tools and Equipment		
Project Code			
Description	Acquisition of tools and equipment with accord to power system, reliability and service improvements.		
Commissioning Date	2010, 2011 and 2012		
Project Classification			
Rank	1st priority	(1st priority; 2nd priority)	
Project Driver	Non-network	(Load Growth; Network non-growth; Network control/safety/metering; Non-network; Statutory)	
Project Type		Renewal; Refurbishment; Growth	
Expenditure for the Period CY2008-CY2010 (in Millions)	Forex:	Local:	TOTAL:
Project Need			
Project Purpose	Provides preventive measures in the power system problems. Safety purposes & Improves the power system quality and service.		
Impact if Project Not Implemented	Utility cannot determine the specific problem of certain things . To harm\danger to utility personnels		
Reason for Ranking Project, Commissioning date, relative to other projects			

Table 8.59: Acquisition of 69KV Sub-Transmission Line

Project Details			
Name of Project	Acquisition of 69KV Sub-Transmission Line		
Project Code			
Description			
Commissioning Date	2011		
Project Classification			
Rank	2nd priority	(1st priority; 2nd priority)	
Project Driver	Statutory	(Load Growth; Network non-growth; Network control/safety/metering; Non-network; Statutory)	
Project Type		Renewal; Refurbishment; Growth	
Expenditure for the Period CY2008-CY2010 (in Millions)	Forex:	Local:	TOTAL:
Project Need			
Project Purpose	PGC & PDC compliance To reduce power bill payment		
Impact if Project Not Implemented	Violation Suffers subtransmission power bill payment		
Reason for Ranking Project, Commissioning date, relative to other projects			

8.9. Project Financial and Economic Cost Analysis

Table 8.60: 5 year Consumer Sales and Revenue Data

Class of Service	2010				2011				2012				2013			
	No. of Billed	MWH Sold	Average Rate	Amount Sold	No. of Billed	MWH Sold	Average Rate	Amount Sold	No. of Billed	MWH Sold	Average Rate	Amount Sold	No. of Billed	MWH Sold	Average Rate	Amount Sold
RESIDENTIAL	73,148	71,884	8.9478	643,419	77,448	76,741	8.1139	623,183	81,343	81,893	5.9305	484,475	84,828	88,778	5.8119	511,119
SALE FOR RESALE	0	0	0.0000	0	0	0	0.0000	0	0	0	0.0000	0	0	0	0.0000	0
SMALL COMMERCIAL	5,570	15,833	8.9448	141,874	6,055	18,888	8.1114	153,990	6,422	17,807	5.9281	105,584	6,787	18,980	5.8888	111,888
LARGE COMMERCIAL	0	0	0.0000	0	0	0	0.0000	0	0	0	0.0000	0	0	0	0.0000	0
INDUSTRIAL	388	50,181	5.9019	296,048	388	53,919	5.1937	280,037	381	57,982	4.9299	285,844	385	62,377	4.8520	305,820
LARGE LOADS	0	0	0.0000	0	0	0	0.0000	0	0	0	0.0000	0	0	0	0.0000	0
IRRIGATION	14	1,010	8.8990	8,985	14	1,010	8.0711	8,130	14	1,010	5.8890	5,948	14	1,010	5.8301	5,8301
PUBLIC BUILDINGS	1,938	4,318	6.3974	27,608	1,973	4,498	5.8297	26,314	2,000	4,894	5.4808	26,980	2,020	4,888	5.4082	11,082
STREET LIGHTS	4,470	2,138	7.8578	16,786	4,899	2,250	6.2248	14,003	5,092	2,384	6.0381	14,275	5,288	2,504	5.9777	15,177
SPECIAL LIGHTINGS	0	0	0.0000	0	0	0	0.0000	0	0	0	0.0000	0	0	0	0.0000	0
COMMUNAL WATER SYSTEM	53	592	6.7385	3,990	53	658	5.9072	3,888	53	731	5.7300	4,187	53	812	5.6727	4,627
OTHERS	6	0	0.0000	0	35	0	0.0000	0	50	0	0.0000	0	58	0	0.0000	0
TOTAL	85,557	145,832		953,892	90,843	155,781		900,542	95,382	188,271		925,871	99,208	177,348		925,871
		MWH		Amount		MWH		Amount		MWH		Amount		MWH		Amount
ENERGY GENERATED/ PURCHASED		179,227		730,141		192,495		825,849		208,490		851,537		221,399		905,888
COOP USE		383				370				378				385		
SYSTEM LOSS		8.4%				8.4%				8.3%				8.3%		

Table 8.61: Financial and Statistical Report: Projected Statement of Operations

FINANCIAL & STATISTICAL REPORT		R E C : DASURECO		For the Years (2009-2013)		
SECTION A : PROJECTED STATEMENT OF OPERATIONS						
ITEMS	ACTUAL/EST. 2008	2009	2010	2011	2012	2013
1. Utility Operating Income						
1.1 Operating Revenues	753,634	742,489	828,692	900,542	925,870	970,256
Less: a.) Re-Investment fund		30,332	31,856	33,380	34,904	36,428
b.) Universal Charge	<i>Operating Revenue</i>	5,737	6,025	6,313	6,602	6,890
c.) EVAT	<i>presented net of</i>	13,659	18,451	23,163	22,894	24,669
d.) Franchise Tax	<i>these charges</i>	0	0	0	0	0
c.) Business Tax		0	0	0	0	0
2. Net Operating Revenue	753,634	692,762	772,361	837,685	861,471	902,269
3. Other Operating Revenue	14,169	18,702	19,999	18,048	19,115	20,181
4. TOTAL	767,803	711,464	792,360	855,734	880,586	922,450
5. Purchased Power	615,371	574,415	600,141	625,849	651,537	677,205
6. Distribution Expenses						
6.1 Operation	18,109	19,932	21,469	23,343	24,958	26,371
6.2 Maintenance	25,638	28,218	30,393	33,047	35,333	37,334
7 Consumers Accounts Expense	26,975	29,689	31,978	34,771	37,176	39,281
8. Administrative & General Expenses	48,668	53,566	57,696	62,734	67,073	70,870
9. Non - Power Cost (6.1+6.2+7+8)	119,389	131,405	141,536	153,895	164,540	173,856
10. Operating Margin (4 - 5 - 9)	33,043	5,644	50,683	75,990	64,509	71,389
11. Depreciation Expense	26,124	28,000	30,000	35,000	38,000	40,000
12. Interest Expense	2,478	5,138	6,415	4,389	2,676	1,606
13. Net Operating Margin (10-11-12)	4,441	-27,494	14,268	36,600	23,833	29,783
14. Non-Operating Revenue	6,533	13,752	15,127	16,640	18,304	20,134
15. Non-Operating Expense	0					
17. NET MARGIN (13 + 14 - 15)	10,974	-13,742	29,395	53,240	42,137	49,917

Table 8.62: Projected Balance Sheet

SECTION C: PROJECTED BALANCE SHEET						
	Actual/Est.	Projected				
	2008	2009	2010	2011	2012	2013
ASSETS AND OTHER DEBITS						
UTILITY PLANT						
Gross Utility In Service	642,264	841,202	789,519	850,070	898,689	917,374
Appraisal Increment	-					
Accumulated Depreciation	345,196	373,196	403,196	438,196	476,196	516,196
Accumulated Depreciation - Appraisal Increment	-					
Net Utility Plant	297,069	468,007	386,323	411,874	422,494	401,178
Const. Work in Progress	8,664	86,267	70,974	49,860	37,899	36,327
Total Utility Plant	305,732	554,274	457,297	461,734	460,392	437,505
OTHER PROPERTY & INVESTMENT						
Non-Utility Property		-	-	-	-	-
Investment	34,609	34,609	34,609	34,609	34,609	34,609
Reinvestment Fund	17,455	2,455	(2,545)	21,394	52,593	71,165
Sinking Fund – Retirement	31,884	33,884	30,884	27,884	24,884	21,884
Sinking Fund – Membership	2,037	2,050	2,064	2,078	2,092	2,107
Sinking Fund - Customer Deposit (Meter & Bill Dep)	-	-	-	-	-	-
Sinking Fund - PDAF & Others	69,425	69,425	69,425	69,425	69,425	69,425
Total Other Property & Investment	155,411	142,424	134,437	155,390	183,603	199,190
CURRENT & ACCRUED ASSETS						
Cash in Bank-General & Other Funds	22,232	15,693	11,009	22,082	48,967	120,494
Special Deposits	-	5,000	5,000	5,000	5,000	5,000
Working Funds	129	300	300	300	300	300
Temporary Cash Investment	20,311	20,816	20,816	20,816	20,816	20,816
Total Current & Accrued Assets	42,672	41,809	37,125	48,198	75,083	146,610
NOTES AND ACCOUNTS RECEIVABLES						
Total Accounts Receivable-Sales	94,359	89,878	91,329	98,788	101,967	106,717
Allowance of Uncollectible Accounts	1,499	1,500	1,500	1,500	1,500	1,500
Net Accounts Receivable - Energy	92,860	88,378	89,829	97,288	100,467	105,217

Consumer Accounts Receivable - Others	-					
Consumer Accounts Receivable - (UCME/UCES)	252	634	612	642	687	716
Consumer Accounts Receivable - (Dist VAT)	-	2,360	2,692	3,218	3,043	3,275
Advances to Officers & Employees	33	33	33	33	33	33
Other Accounts Receivable	6,584	6,584	6,584	6,584	6,584	6,584
Due from Other RECs	7,175	7,175	7,175	7,175	7,175	7,175
Total Notes & Accounts Receivable	106,905	105,166	106,926	114,942	117,989	123,000
MATERIAL SUPPLIES						
Fuel Stock Inventory	270	270	270	270	270	270
Material & Supplies - Others	88	88	88	88	88	88
Material & Supplies-Electric	21,564	21,564	21,564	21,564	21,564	21,564
Material & Supplies-Housewiring	73	73	73	73	73	73
Office Supplies	728	728	728	728	728	728
Stores Expense Undistributed	-					
Total Materials & Supplies	22,722	22,722	22,722	22,722	22,722	22,722
OTHER CURRENT & ACCRUED ASSETS						
Prepayments	1,154	1,154	1,154	1,154	1,154	1,154
Misc. Current & Accrued Assets	6	6	6	6	6	6
Total Other Current & Accrued Assets	1,160	1,160	1,160	1,160	1,160	1,160
DEFERRED DEBITS						
Retirement Work in Progress						
Other Deferred Charges	6,851	6,851	6,851	6,851	6,851	6,851
Total Deferred Debits	6,851	6,851	6,851	6,851	6,851	6,851
TOTAL ASSETS & OTHER DEBITS	641,454	874,406	766,518	810,997	867,802	937,038
	2008	2009	2010	2011	2012	2013
LIABILITIES AND OTHER CREDITS						
EQUITIES AND MARGINS						
Membership	409	422	435	449	463	478
Donated Capital		2,503				

Donated Capital-PSALM	69,182	69,182	56,247	45,651	50,716	58,863
Donated Capital-Subsidies	10,695	10,695				
Contribution In Aid of Construction	3,397	329				
Contribution In Aid of Construction - Reinvestment	210,788	241,120	272,976	306,356	341,260	377,688
Contribution in Aid of Construction - Subsidy	93,664	105,589	105,589	109,550	109,550	109,550
Revaluation Increment	-					
Housewiring Equity	-					
Appropriated Margins	-					
Operating Margins-Current	9,029	(13,742)	29,395	53,240	42,137	49,917
Operating margins-Prior Years	29,936	38,965	25,223	54,618	107,859	149,996
Other Margins	-	-	-	-	-	-
Total Equities & Margins	427,100	455,063	489,866	569,864	651,984	746,491
LONG TERM DEBT						
Long Term Debt –NEA	32,632	72,470	52,570	31,717	21,013	10,309
Other Long Term Debt	6,467	112,649	6,467	6,467	6,467	6,467
Total Long Term Debt	39,098	185,118	59,036	38,183	27,479	16,775
Short Term Debt	-	-	-	-	-	-
Customer Deposit	63,774	63,624	63,494	63,354	63,234	63,104
Total Long Term & Short Term Debt ⁶³⁵⁰⁷	102,872	248,742	122,530	101,537	90,713	79,879
CURRENT AND ACCRUED LIABILITIES						
Notes Payable						
Accounts Payable - PSALM (UCME/UCES)	854	478	502	526	550	574
Accts Payable-Supplier	139	93,391	79,839	66,287	52,735	39,183
Accounts Payable-GENCO	31,465	20,351	20,728	21,679	22,658	23,637
Accounts Payable-TRANSCO	17,017	10,794	10,836	11,191	11,562	11,934
Accounts Payable-Others	17,765	17,765	17,765	17,765	17,765	17,765
Due to RECs	3,835	3,835	3,835	3,835	3,835	3,835
Taxes Accrued	-					
Interest Accrued - Long Term Debt	414	414				
Interest Accrued - Short Term Debt	-					
Matured Short & Long Term Debts	71,488	147,028	133,505	121,283	109,105	96,928
Matured Interest Payable						
EVAT Payable	(515)	31	585	1,280	1,967	2,707

Franchise Tax Payable	-	-	-	-	-	-
Business Tax Payable	-	-	-	-	-	-
Withholding Tax Payable	509	509				
Total Current & Accrued Liabilities	71,482	147,568	134,090	122,563	111,072	99,635
OTHER CURRENT & ACCRUED LIAB.						
Misc. Current & Accrued Liabilities	25,425	22,425	19,425	16,425	13,425	10,425
DEFERRED CREDITS						
Consumers Advances for Construction	13,968					
Other Deferred Credits	607	607	607	607	607	607
Total Deferred Credits	14,575	607	607	607	607	607
RESERVES						
Reserves						
TOTAL LIABILITIES & OTHER CREDITS	641,454	874,405	766,518	810,997	867,801	937,037

Table 8.63: Statement of Cash Flow for the Year Ended

	Actual/Estimate	Projected				
	2008	2009	2010	2011	2012	2013
CASH BALANCE BEGINNING	26,643	21,856	114,933	40,362	48,183	116,967
CASH INFLOW						
Collection of Consumers A/R						
From Sales & Outstanding Accts	720,849	696,237	772,291	831,555	860,355	899,298
From 5% Reinvestment Fund	30,348	29,119	30,900	32,378	33,857	35,335
From Universal Charge	5,297	5,507	5,844	6,124	6,404	6,683
From EVAT	44,837	13,112	17,897	22,468	22,207	23,929
From Franchise Tax	-	-	-	-	-	-
From Business Tax	-	-	-	-	-	-
Other Operating Revenues						
Other Revenue	5,373	5,167	5,684	4,000	4,500	5,000
Reconnection & Other Fees	1,516	2,121	2,334	1,500	1,500	1,500
Loan from NEA	47,000	53,520				
Loan from Banks/Other Financing Institution		106,182	99,239	29,352	26,101	68,000
Proceeds from Short Term Debts		-	-	-	-	-
Subsidy	8,224	11,925	-	3,961	-	-
Collection from Cash Advances	-	-	-	-	-	-
Collections from Non - Operating Revenue	4,938	13,752	15,127	16,640	18,304	20,134
Transfer from Reinvestment Fund	13,800	15,000	20,000	10,000	5,000	20,000
Transfer from PDAF and Others	16,402	-	-	-	-	-
Receipt of DOE Subsidy/LGU		2,503			772	
TOTAL INFLOWS	898,586	954,145	969,317	957,979	979,000	1,079,879
CASH AVAILABLE FOR DISBURSEMENT	925,228	976,001	1,084,250	998,340	1,027,183	1,196,847
CASH OUTFLOW						
Cost of Power	594,049	580,338	587,740	611,994	637,072	662,174
Non-Power Cost	-					
Salaries & Wages	29,658	32,720	35,992	39,591	42,363	44,905
SSS & Medicare	2,442	2,881	3,169	3,486	3,730	3,954

Employees Benefits	31,584	30,509	33,560	36,916	39,500	41,870
Utilities	1,050	740	814	895	958	1,016
Office Supplies/Materials	2,570	3,277	3,605	3,965	4,243	4,497
Travel	3,058	7,270	7,997	8,797	9,412	9,977
Transportation	6,433	7,415	8,157	8,972	9,600	10,176
Repairs & Maintenance	3,881	3,796	4,176	4,593	4,915	5,210
Directors per diems	1,196	1,411	1,552	1,707	1,827	1,936
Representation Allowance	1,384	2,002	2,202	2,422	2,592	2,748
Outside Professional Services	24,768	25,505	28,056	30,861	33,021	35,003
Seminars/Trainings	580	1,515	804	662	1,078	892
Institutional Activities	3,433	8,806	7,540	6,722	6,695	6,789
Registration & Insurance	569	1,128	1,241	1,365	1,460	1,548
Sundries	1,915	2,430	2,673	2,940	3,146	3,335
SUB-TOTAL	114,520	131,405	141,536	153,895	164,540	173,856
OTHER USES:						
Accounts Payable-PSALM	-	6,113	6,001	6,289	6,578	6,866
EVAT Remittance to BIR/GENCO/TRANSCO	47,232	13,112	17,897	22,468	22,207	23,929
Franchise Tax Remittance	-	-	-	-	-	-
Business Tax Remittance	-	-	-	-	-	-
Refund for Customer Deposit	123	150	130	140	120	130
Accounts Payable-Others	-	-	-	-	-	-
Others (Please Specify and provide schedule)	-	-	-	-	-	-
Other Expense	5,379					
Non - Operating Expense	-	-	-	-	-	-
SUB-TOTAL	52,734	19,375	24,028	28,897	28,905	30,925
CASH FOR DEBT SERVICE						
NEA	4,482	18,820	26,315	25,242	13,380	12,310
Bank Loans-Amort.		-	-	-	-	-

Payables to A/P Supplier		13,552	13,552	13,552	13,552	13,552
Payables to Short Term Debts (NEA STCF Principal + Interest)		-	-	-	-	-
SUB – TOTAL		4,482	32,372	39,867	38,794	26,932
CASH FOR CAPITAL EXPENDITURES						
Expansion (Refund Line Ext. Deposit)		-	14,747	-	-	-
Expansion (Connections)		1,317	7,334	8,740	10,052	8,966
Rehab/Revamp		7,104	9,839	3,138	5,083	10,169
Rehab/Upgrading of Dx Line		16,216	16,481	25,355	29,729	25,165
Add-Ons (Connections)		33	9,150	9,446	9,751	10,066
Substation from Reinvestment		1,359	-	-	-	-
MV Switchgear			14,000			
Distribution Transformers with Amorphous Core			50,963	60,730		
Electronic KWHmeter with Infrared			28,758	28,759		
Distribution System Loss Segregator/Synergy Software			1,605			
69KV SF6 Circuit Breaker			3,500			
Hotline Maintenance Tools and Equipment 15 & 69kV with Training					3,825	
Tools & Equipment			7,356	9,750	25,527	
Ion KWHmeters with GSM(Fargo Maestro)					5,750	
15KV Automatic Voltage Regulator						18,851
Isolation Switches					1,500	
Mobile Power Transformer Substation						60,000
SCADA						8,000
Rehab/Upgrading of Substation		1,447	-	-	-	-
69 kV Sub-Transmission Line		-	-	-	-	-
Rehab 69 kV Sub-Transmission Line		-	-	-	-	-
Logistics		-	3,869	150	379	212
Others (Funded by subsidies/other sources)		-	-	-	-	-
Acquisition of 69 kv from TRANSCO		-	7,500	114,000	-	-
General Account		48,718	16,717		19,392	17,740
						18,095

SUB-TOTAL	76,195	191,818	260,069	103,738	79,567	139,965
TOTAL OUTFLOWS	841,980	955,308	1,053,241	937,319	937,016	1,032,781
Sinking Fund						
Sinking Fund reinvestment	47,794		15,000	33,939	36,199	38,572
Sinking Fund retirement	14,846	5,000	5,000	5,000	5,000	5,000
Sinking Fund Others	2,417					
SUB-TOTAL	65,057	5,000	20,000	38,939	41,199	43,572
CASH ENDING BALANCE	18,191	15,693	11,009	22,082	48,967	120,494

Table 8.64: Present Worth of Projects

Rank	Project Name	Needed Datas			Result	Total Present Worth
		Future Value	Rate (%)	Period (Years)	Present Value	
1	MV SWITCHGEAR	Php14,000,000.00	10%	0	Php14,000,000.00	Php14,000,000.00
2	DISTRIBUTION TRANSFORMER WITH AMORPHOUS CORE	Php50,962,596.97	10%	0	Php50,962,596.97	Php106,172,054.43
		Php60,730,403.21	10%	1	Php55,209,457.46	
3	ELECTRONIC SINGLE PHASE KILOWATT-HOUR METERS WITH INFRARED	Php28,758,029.92	10%	0	Php28,758,029.92	Php54,902,480.37
		Php28,758,895.50	10%	1	Php26,144,450.45	
4	DISTRIBUTION SYSTEM LOSS SEGREGATOR SOFTWARE/SYNERGY SOFTWARE	Php1,605,000.00	10%	0	Php1,605,000.00	Php1,605,000.00
5	69KV SF6 CKT BREAKER	Php3,500,000.00	10%	0	Php3,500,000.00	Php3,500,000.00
6	UTILITY TRUCK WITH INSLATED BOOM"KANGLIM"	Php15,289,098.00	10%	2	Php12,635,618.18	Php12,635,618.18

7	HOTLINE MAINTENANCE TOOLS AND EQUIPMENT 13.2 & 69 KV W/ TRAINING	Php3,825,000.00	10%	2	Php3,161,157.02	Php3,161,157.02
8	ION KILOWATT-HR METERS W/ GSM(FARGO MAESTRO)	Php5,750,000.00	10%	3	Php4,320,060.11	Php4,320,060.11
9	15KV AUTOMATIC VOLTAGE REGULATOR	Php18,851,040.00	10%	3	Php14,163,065.36	Php14,163,065.36
10	ISOLATION SWITCHES	Php1,500,000.00	10%	3	Php1,126,972.20	Php1,126,972.20
11	7.62KV POWER CAPACITOR	Php14,400,000.00	10%	5		
12	MOBILE TRANSFORMER/SUBSTATION	Php60,000,000.00	10%	4	Php40,980,807.32	Php40,980,807.32
13	SCADA	Php8,000,000.00	10%	4	Php5,464,107.64	Php5,464,107.64
14	TOOLS & EQUIPMENT	Php7,356,250.00	10%	0	Php7,356,250.00	Php24,681,268.23
		Php9,750,000.00	10%	1	Php8,863,636.36	
		Php10,238,272.06	10%	2	Php8,461,381.87	
15	69 KV line acquisition	Php114,000,000.00	10%	1	Php103,636,363.64	Php103,636,363.64

Table 8.65: Projects finance through reinvestment fund (highlighted items)

	2008	2009	2010	2011	2012	2013
Reinvestment Fund	30,348,151	29,118,742	30,900,273	32,378,487	33,856,699	35,334,910
Remaining Reinvestment plus New Reinvestment		59,466,893	90,367,166	96,175,115	79,400,931	58,965,887
#Project(s)						
1 MV SWITCHGEAR			3,764,079.63	3,764,079.63	3,764,079.63	3,764,079.63
2 DISTRIBUTION TRANSFORMER WITH AMORPHOUS CORE			13,701,948.07	13,701,948.07	13,701,948.07	13,701,948.07
3 ELECTRONIC SINGLE PHASE KILOWATT-HOUR METERS WITH INFRARED			7,731,965.32	7,731,965.32	7,731,965.32	7,731,965.32
				7,732,198.04	7,732,198.04	7,732,198.04
4 DISTRIBUTION SYSTEM LOSS SEGREGATOR SOFTWARE/SYNERGY SOFTWARE			431,524.84	431,524.84	431,524.84	431,524.84
5 69KV SF6 CKT BREAKER			941,019.91	941,019.91	941,019.91	941,019.91
14 TOOLS & EQUIPMENT						
7 HOTLINE MAINTENANCE TOOLS AND EQUIPMENT 13.2 & 69 KV W/ TRAINING					1,028,400.33	1,028,400.33
15 69 KV line acquisition						
6 UTILITY TRUCK WITH INSLATED BOOM"KANGLIM"					4,110,670.16	4,110,670.16
8 ION KILOWATT-HR METERS W/ GSM(FARGO MAESTRO)						1,545,961.27
9 15KV AUTOMATIC VOLTAGE REGULATOR						
10 ISOLATION SWITCHES						
11 7.62KV POWER CAPACITOR						
12 MOBILE TRANSFORMER/SUBSTATION						
13 SCADA						
Total	0	0.00	26,570,537.76	50,630,883.90	55,769,954.39	57,315,915.66
Ending Balance	30,348,151	59,466,893	63,796,629	45,544,231	23,630,976	1,649,971

8.10. Proposed GANTT CHART Schedule

8.11. Single Line Diagram of the System

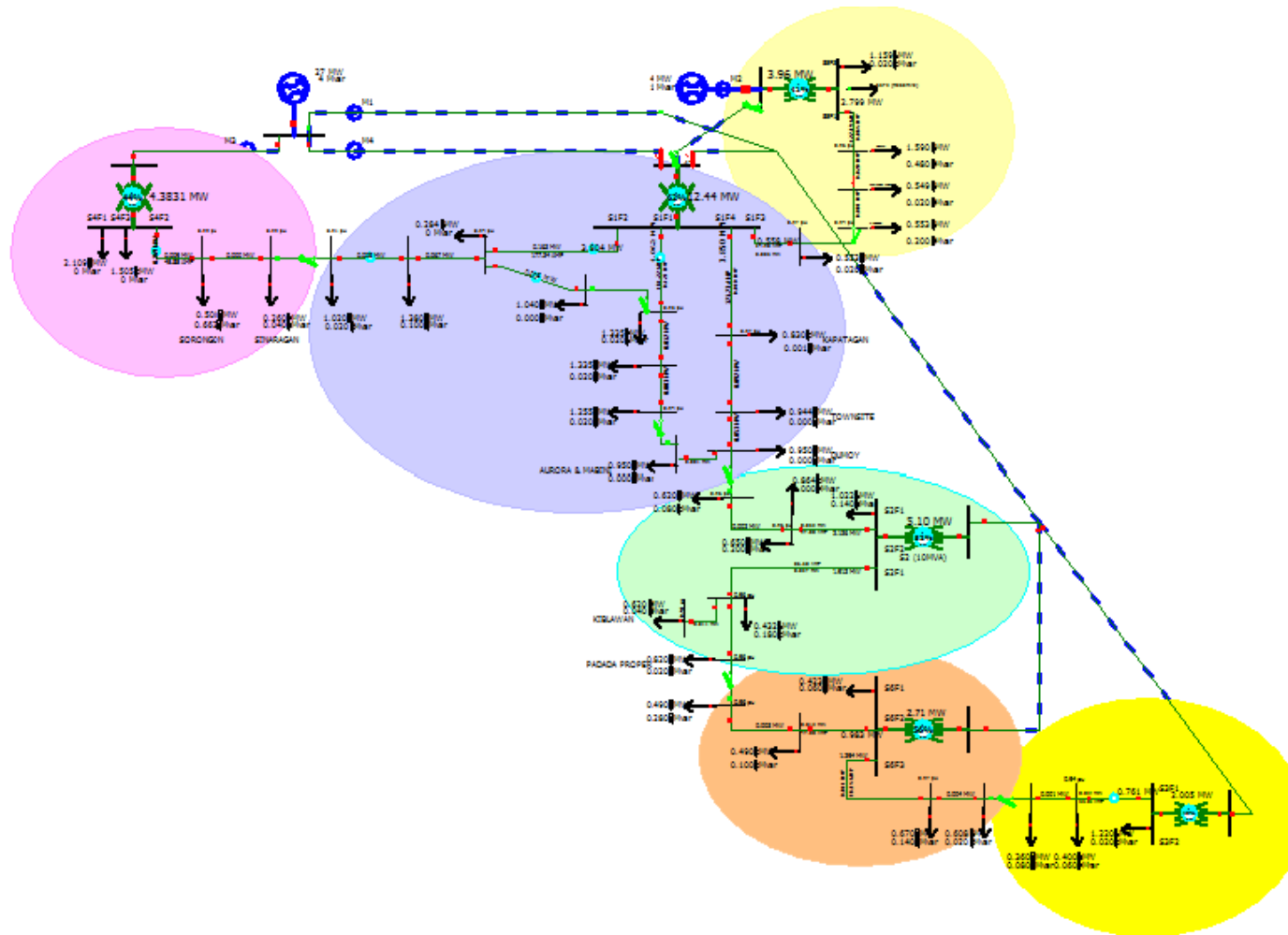


Fig. 8.13. Single Line Diagram of the Distribution System of DASURECO

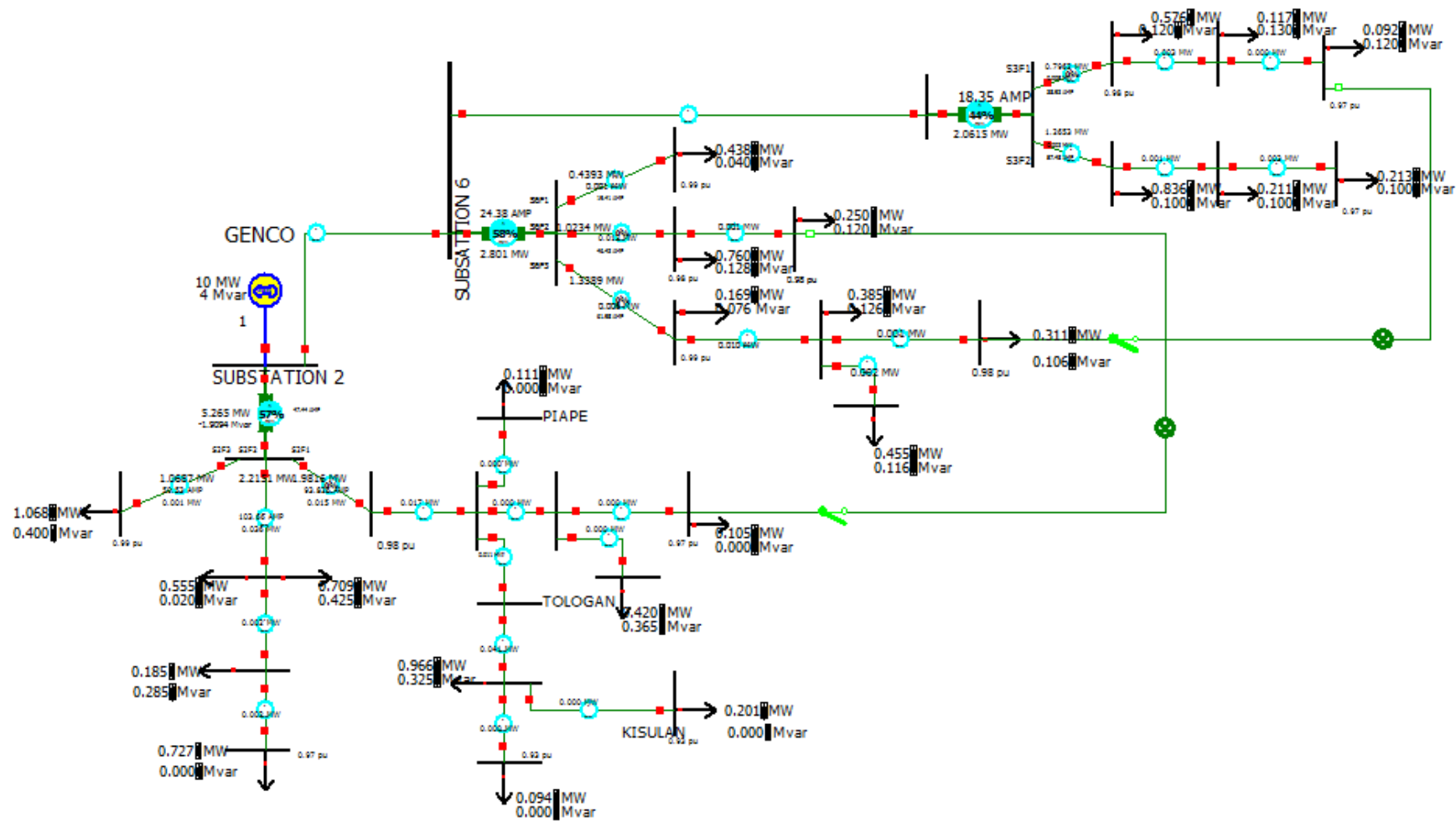


Fig. 8.14. Substations 2,3 and 6 Single Line Diagram

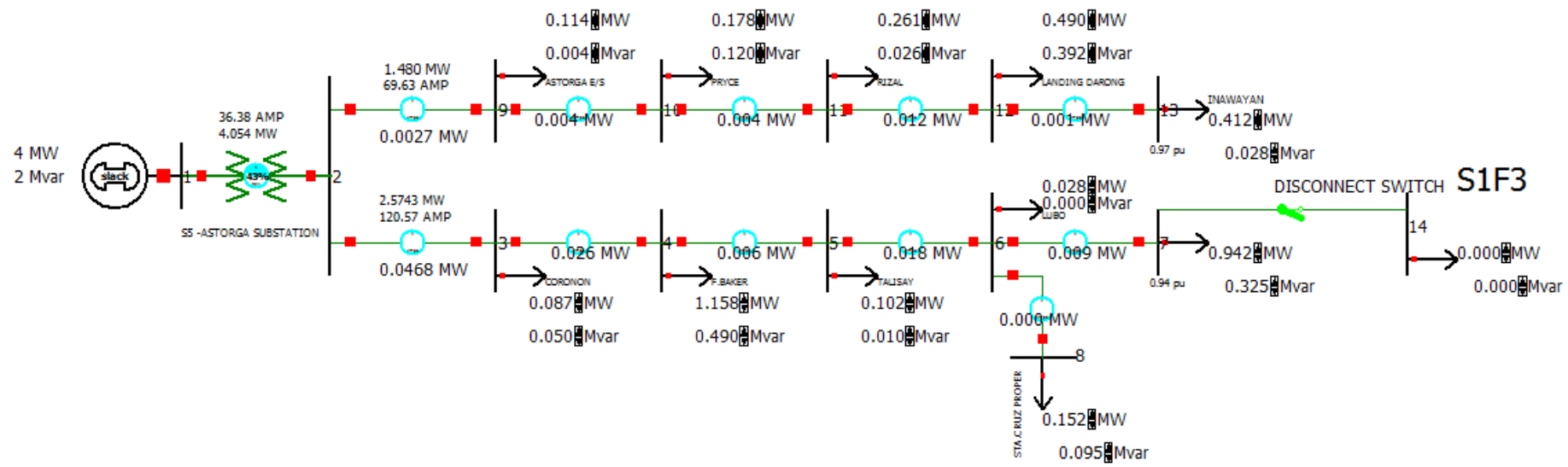


Fig. 8.15. Substation 5 Single Line Diagram

8.12. Board Resolution Approving the Proposed Projects