MUNICIPAL LIGHT AND POWER
1977-1982 C.I.P.

The Capital Improvement Program for the Municipal Light and Power Department reflects the goals of the Department to maintain continued reliable electric service and to provide for anticipated future load growth and demands upon the electric utility.

During the last year growth has exceeded the historical rate. Furthermore, it has become increasingly apparent that the reduced load during the winter of 1973-1974 had no lasting effect on long term growth. Even allowing for the possibility of slower growth in the next few years it is apparent that generation in addition to the waste heat facility under construction will be required in this budget period.

It has been our hope to defer costly decisions about future generating plants until after firm plans had been made by Federal or State agencies concerning the Upper Susitna Hydroelectric development. Federally-financed construction now appears unlikely and the question of State-financed construction is unresolved. Additionally, even if this project should proceed, the first power available would be 1986 or later. Thus for realistic financial planning the costs of generation to supply the additional load anticipated in the early 1980's is included in this budget projection.

To meet this requirement two additional units, No. 8 and No. 9, are included with tentative on-line dates of July, 1981 and July, 1983. Even though the latter unit will not be required until after the end of the current six-year period, the funds will have to be committed some years earlier.

The projected costs are based on simple cycle gas turbines which would be the logical choice if large blocks of energy will be available from Federal or State agencies a few years thereafter. However, if large Federal or State projects are not built it is unlikely that relatively low capital cost gas turbine generation will be a feasible alternative for long term base load generation. This is due to the anticipated high cost of natural gas and likely Federal restrictions on the use of natural gas or oil for base load generation. We should be cognizant of the possibility that very high cost coal-fired generation could be required in place of the relatively inexpensive gas turbines indicated in this budget.

With the larger projected expenditures it is even more essential that an appreciable portion of these expenses be financed from revenues by committing retained earnings to construction.

CAPITAL IMPROVEMENTS PROGRAM SUMMARY

(1) Department Municipal Light & Power (2) Division

(3) PROJECT TITLE(S)	TOTAL PROJECT COST (4)	TO BE FUNDED (IN THOUSANDS) (5) G/O BONDS	REVENUE BONDS	FEDERAL	STATE	OTHER *		(6) 19 77	(7) 19 78	(8) 19 79	(9) 19 80	(10) 19 81	(11) 19 82
Generation	42565.0							9355.0	5490.0	8660.0	4830.0	9350.0	4880.0
Substations	2799.0							539.0	180.0	730.0	440.0	680.0	230.0
Transmission	3295.0							265.0	470.0	0.0	2020.0	0.0	540.0
OH Feeders	336.0							246.0	10.0	10.0	10.0	10.0	50.0
UG Feeders	1228.0							628.0	50.0	50.0	50.0	50.0	400.0
OH Distribution	60.0							10.0	10.0	10.0	10.0	10.0	10.0
UG Dist., Res'l	460.0							64.0	69.0	74.0	79.0	84.0	90.0
UG Dist., Com'l	358.0							50.0	54.0	57.0	61.0	66.0	70.0
UG Dist., CBD	975.0							261.0	155.0	108.0	212.0	117.0	122.0
Street Lights, Art.	660.0							110.0	110.0	110.0	110.0	110.0	110.0
Street Lights, Res'l	300.0							50.0	50.0	50.0	50.0	50.0	50.0
Land, Land Rights	225.0							25.0	30.0	35.0	40.0	45.0	50.0
Transformers	2304.0							373.0	302.0	349.0	379.0	425.0	476.0
Meters	1054.0							156.0	163.0	170.0	179.0	188.0	198.0
Services	1362.0							168.0	188.0	211.0	236.0	264.0	295.0
Equipment	615.0							115.0	70.0	125.0	80.0	135.0	90.0
General Plant	500.0							0.0	250.0	0.0	250.0	0.0	0.0
TAL (12)	59096.0							12415.0	7651.0	10749.0	9036.0	11584.0	7661.0

* OTHER SOURCE OF FUNDS (13)

ote: The total shown for 1977 is based n deferring $5,030,000 of the present 976 CIP of $7,358,000. Should the amounts vailable in 1976 differ from the anticiated $2,328,000 corresponding adjustments ould be necessary for 1977.

FUNDING (14)						
General Obligation Bonds						
Revenue Bonds	10755.0	5851.0	8549.0	6436.0	8584.0	4261.0
Federal						
State						
Other						
Retained Earnings	1660.0	1800.0	2200.0	2600.0	3000.0	3400.0
TOTAL	12415.0	7651.0	10749.0	9036.0	11584.0	7661.0

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Generation

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	42565.0		9355.0	5490.0	8660.0	4830.0	9350.0	4880.0
(15) Overhead								
TOTAL	42565.0		9355.0	5490.0	8660.0	4830.0	9350.0	4880.0
(16) Source of Funds								
Bonds – Revenue	42565.0		9355.0	5490.0	8549.0	4830.0	8584.0	4261.0
Grants –								
Operational Retained Earnings	0.0		0.0	0.0	111.0	0.0	766.0	619.0
TOTAL	42565.0		9355.0	5490.0	8660.0	4830.0	9350.0	4880.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

Additional generating capacity required to meet an estimated 12% annual load growth

1977 - Contract for Unit 7 boiler, Unit 7, switchgear and transformers
1978 - Contract for installation of Unit 7 boiler, Unit 7 and design of Unit 8. Install switchgear and transformers
1979 - Contract for Unit 8. Continue installation of switchgear and transformers
1980 - Contract for installation of Unit 8 and design of Unit 9. Continue installation of switchgear.
1981 - Contract for Unit 9. Continue installation of switchgear
1982 - Contract for installation of Unit 9. Continue installation of switchgear.

(continued on next page) ...

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Generation

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19____ (5)	Estimated Requirements in Thousands 19____ (6)	19____ (7)	19____ (8)	19____ (9)	19____ (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements								
(15) Overhead								
TOTAL								
(16) Source of Funds								
Bonds –								
Grants –								
Operational								
TOTAL								

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $_____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size) (continued)...

Due to financing delays the scheduling of both phases of the Waste Heat Recovery Generation Project (i.e., completion of Unit No. 6, Unit No. 7, and Waste Heat Boiler) are based on financial limitations rather than load requirements. Thus when existing load and anticipated fuel costs are taken into account it is apparent that this project must be completed as soon as possible irregardless of future load increases. The scheduling of Units No. 8 and No. 9 are based on the assumption that our load increases at the same rate in the future that it has over the past 12 years. If the rate of growth of increases an accelerated schedule will be required, and if growth slows down the schedule shown could be allowed to slip. It would, however, require a sustained growth rate decrease to have a significant effect on the total generation requirements.

The figures shown are based on anticipated equipment costs, with reasonable allowances for escalation, and scheduling has taken into account current manufacturing lead time.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Substations

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	2799.0		539.0	180.0	730.0	440.0	680.0	230.0
(15) Overhead								
TOTAL	2799.0		539.0	180.0	730.0	440.0	680.0	230.0
(16) Source of Funds								
Bonds – Revenue	630.0		519.0	111.0	0.0	0.0	0.0	0.0
Grants –								
Operational Retained Earnings	2169.0		20.0	69.0	730.0	440.0	680.0	230.0
TOTAL	2799.0		539.0	180.0	730.0	440.0	680.0	230.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

Additional substation capacity to meet normal load growth
1977 - Contract for one 25 MVA substation. Install supervisory control equipment. ($20,000)
1978 - Install substation contracted for in 1977
1979 - Contract for one 25 MVA substation and switchgear for APA substation.
1980 - Install substation and switchgear contracted for in 1979
1981 - Contract for one 25 MVA substation
1982 - Install substation contracted for in 1981

(continued on next page) ...

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light and Power

(2) Project Title: Substations

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19____ (5)	Estimated Requirements in Thousands 19____ (6)	19____ (7)	19____ (8)	19____ (9)	19____ (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements								
(15) Overhead								
TOTAL								
(16) Source of Funds								
Bonds –								
Grants –								
Operational								
TOTAL								

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $_____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size) (continued)...

Over the period of time covered by this projection, three new distribution substations will be needed to supply the growing demand. The first two will be installed on or near existing substation sites in Mountain View and at the International Airport. The third distribution substation will be installed on a new site not yet selected.

In addition to its own generation, ML&P purchases bulk power from the Alaska Power Administration through APA's Anchorage substation, presently at 35,000 volts. When certain of ML&P's subtransmission lines are converted to 115,000 volts for needed additional capacity, service at the Anchorage substation will also be converted to 115,000 volts. This will require 115,000 volt switchgear at that location. To monitor and control the exchange of power with the APA system, supervisory control and data acquisition equipment is to be installed at the Anchorage substation.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Transmission & Subtransmission

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	3295.0		265.0	470.0	0 .0	2020 .0	0 .0	540.0
(15) Overhead								
TOTAL	3295.0		265.0	470.0	0 .0	2020 .0	0 .0	540.0
(16) Source of Funds								
Bonds – Revenue	1403 .0		47.0	0.0	0 .0	1356 .0	0 .0	0.0
Grants –								
Operational Retained Earnings	1892 .0		218.0	470.0	0 .0	664 .0	0 .0	540.0
TOTAL	3295 .0		265.0	470.0	0 .0	2020 .0	0 .0	540.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

Addition of transmission and subtransmission line capacity to meet load growth

1977 - Reconductor 35 kv line and construct 35 and 115 kv lines (Reconductor Gov't Hill 35 KV - $218,000)
1978 - Reinsulate 35 kv line for 115 kv
1979 - No construction
1980 - Reinsulate 25 kv lines for 115 kv and construct 35 and 115 kv lines.
1981 - No construction
1982 - Construct additional 115 kv lines.

(continued on next page)...

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light and Power

(2) Project Title: Transmission and Subtransmission

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19____ (5)	Estimated Requirements in Thousands 19____ (6)	19____ (7)	19____ (8)	19____ (9)	19____ (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements								
(15) Overhead								
TOTAL								
(16) Source of Funds								
Bonds –								
Grants –								
Operational								
TOTAL								

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $_____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size) (continued) ...

Transmission lines are used to carry large blocks of energy between generation plants and major switching stations. Subtransmission lines carry energy to the distribution substations. The difference between transmission and subtransmission is one of function so one physical line might perform both functions.

Existing 35,000 volt transmission and subtransmission lines have barely sufficient capacity to handle present loads. To reduce losses and provide the capacity required, undersized conductors must be replaced. The very substantial increases in capacity necessary in the years ahead can be provided most economically by reinsulating and rebuilding existing 35,000 volt lines to operate at 115,000 volts. Specifically, the program is first to convert the transmission between Generating Stations No. 1, No. 2, and the Alaska Power Administration station, to 115,000 volts. Also to be converted to 115,000 volt operation is the circuit from Anchorage substation west along the southern portion of the ML&P service area, and then north to Generating Station No. 1. When the generating capacity installed at Generating Station No. 2 requires it, a new 115,000 volt line must be constructed from Generating Station No. 2 west. Distribution substations at new sites will of course require 115,000 volt subtransmission lines to serve them. Conversion to 115,000 volts has been delayed due to financial problems,so much of this work is dictated by present system loading.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Overhead Distribution Feeders

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	336.0		246.0	10.0	10.0	10.0	10.0	50.0
(15) Overhead								
TOTAL	336.0		246.0	10.0	10.0	10.0	10.0	50.0
(16) Source of Funds								
Bonds – Revenue	226.0		226.0	0.0	0.0	0.0	0.0	0.0
Grants –								
Operational Retained Earnings	110.0		20.0	10.0	10.0	10.0	10.0	50.0
TOTAL	336.0		246.0	10.0	10.0	10.0	10.0	50.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets, Same Size)

1977 Conversion 4KV to 12KV - $20,000.
Continuing program to construct new feeders and upgrade existing feeders to meet load growth.

As the load grows, overhead distribution feeders (main circuits between distribution substations and into the distribution system) must be increased in capacity. The relatively large expenditure in 1977 is to complete the feeders out of the large distribution substations which were installed in 1971 through 1975. Expenditures are then modest until 1982 when feeders must be provided for the new substation to be installed then. The relatively small expenditures from 1978 on are because most distribution feeders will be installed underground.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Underground Distribution Feeders

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	1228.0		628.0	50.0	50.0	50.0	50.0	400.0
(15) Overhead								
TOTAL	1228.0		628.0	50.0	50.0	50.0	50.0	400.0
(16) Source of Funds								
Bonds – Revenue	608.0		608.0	0.0	0.0	0.0	0.0	0.0
Grants –								
Operational Retained Earnings	620.0		20.0	50.0	50.0	50.0	50.0	400.0
TOTAL	1228.0		628.0	50.0	50.0	50.0	50.0	400.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

Continuing program to construct new feeders and upgrade existing feeders to meet load growth. Portions of distribution feeders are placed underground rather than overhead. The large expenditures scheduled for 1977 are to catch up with work deferred in prior years due to financial limitations. The new substation location will necessitate larger expenditures in 1982.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Overhead Distribution

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	60.0		10.0	10.0	10.0	10.0	10.0	10.0
(15) Overhead								
TOTAL	60.0		10.0	10.0	10.0	10.0	10.0	10.0
(16) Source of Funds								
Bonds –								
Grants –								
Operational Retained Earnings	60.0		10.0	10.0	10.0	10.0	10.0	10.0
TOTAL	60.0		10.0	10.0	10.0	10.0	10.0	10.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $_____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

Extend overhead distribution facilities as required to serve new customers.
In this category are the extensions of overhead distribution lines necessary to serve new customers. As most new distribution is underground the amount of overhead required will decrease but inflation will likely increase unit costs.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light and Power

(2) Project Title: Underground Distribution, Residential

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	460 .0		64.0	69.0	74 .0	79.0	84 .0	90 .0
(15) Overhead								
TOTAL	460 .0		64.0	69.0	74 .0	79.0	84 .0	90 .0
(16) Source of Funds								
Bonds –								
Grants –								
Operational Retained Earnings	460.0		64.0	69.0	74.0	79.0	84.0	90.0
TOTAL	460.0		64.0	69.0	74.0	79.0	84.0	90.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets, Same Size)

Extend underground distribution facilities as required to serve new residential customers.
This project covers anticipated extension of underground distribution facilities to serve residential customers.
The annual increase shown is due to both increased load and inflation.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Underground Distribution, Commercial

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	358.0		50.0	54.0	57.0	61.0	66.0	70.0
(15) Overhead								
TOTAL	358.0		50.0	54.0	57.0	61.0	66.0	70.0
(16) Source of Funds								
Bonds –								
Grants –								
Operational Retained Earnings	358.0		50.0	54.0	57.0	61.0	66.0	70.0
TOTAL	358.0		50.0	54.0	57.0	61.0	66.0	70.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $_____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

Extend underground distribution facilities as required to serve new commercial and industrial customers. Similarily, new commercial and industrial customers will require that underground distribution facilities be extended to serve them. The annual increase shown is due to both increased load and inflation.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Underground Distribution, CBD

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	975 .0		261.0	155.0	108.0	212 .0	117.0	122 .0
(15) Overhead								
TOTAL	975 .0		261.0	155.0	108.0	212 .0	117.0	122 .0
(16) Source of Funds								
Bonds –								
Grants –								
Operational Retained Earnings	975 .0		261 .0	155 .0	108 .0	212 .0	117 .0	122 .0
TOTAL	975 .0		261 .0	155 .0	108 .0	212 .0	117 .0	122 .0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

In the Central Business District, establish a 35 kv underground distribution system and expand it as required to meet load growth. At present the Central Business District is served by a 4,000 volt distribution system, about 1/3 of it underground. ML&P has had a continuing program to convert overhead distribution facilities in the Central Business District to underground. This will continue. The 4,000 volt underground system in the Central Business District is operating near capacity. Adding the capacity required to serve additional load will require extensive modification. Economic studies by consulting engineers and the ML&P staff have determined that additional load in the Central Business District can be served most economically by establishing a new 35,000 volt distribution system there. The load on the 4,000 volt system will be held constant, and a growth taken on the new 35,000 volt system. This will allow us to obtain full benefits from the existing system without investing more money in technologically obsolete equipment.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Street Lights, Arterial and CBD

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	660.0		110.0	110.0	110.0	110.0	110.0	110.0
(15) Overhead								
TOTAL	660.0		110.0	110.0	110.0	110.0	110.0	110.0
(16) Source of Funds								
Bonds –								
Grants –								
Operational Retained Earnings	660.0		110.0	110.0	110.0	110.0	110.0	110.0
TOTAL	660.0		110.0	110.0	110.0	110.0	110.0	110.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

A continuing program to improve lighting of arterials and streets in the Central Business District

The constant annual amount projected reflects consideration of inflation, saturation of service, and conversion to high pressure sodium vapor at a measured rate. If major lighting projects should be undertaken, additional amounts will be required.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Street Lights, Residential and Miscellaneous

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	300.0		50.0	50.0	50.0	50.0	50.0	50.0
(15) Overhead								
TOTAL	300.0		50.0	50.0	50.0	50.0	50.0	50.0
(16) Source of Funds								
Bonds –								
Grants –								
Operational Retained Earnings	300.0		50.0	50.0	50.0	50.0	50.0	50.0
TOTAL	300.0		50.0	50.0	50.0	50.0	50.0	50.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

A continuing program to provide street lighting in new residential subdivisions and improve lighting elsewhere. The constant annual amount projected reflects consideration of inflation and saturation of our service area.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Land and Land Rights

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land	225.0		25.0	30.0	35.0	40.0	45.0	50.0
(13) Buildings								
(14) Other Improvements								
(15) Overhead								
TOTAL	225.0		25.0	30.0	35.0	40.0	45.0	50.0
(16) Source of Funds								
Bonds –								
Grants –								
Operational Retained Earnings	225.0		25.0	30.0	35.0	40.0	45.0	50.0
TOTAL	225.0		25.0	30.0	35.0	40.0	45.0	50.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

This covers the acquisition of easements, permits and miscellaneous small plots as required by system growth. There is a possibility that major acquisition may be required for a receiving substation but it is not possible to evaluate this at this time.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Transformers and Capacitors

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	2304.0		373.0	302.0	349.0	379.0	425.0	476.0
(15) Overhead								
TOTAL	2304.0		373.0	302.0	349.0	379.0	425.0	476.0
(16) Source of Funds								
Bonds –								
Grants –								
Operational Retained Earnings	2304.0		373.0	302.0	349.0	379.0	425.0	476.0
TOTAL	2304.0		373.0	302.0	349.0	379.0	425.0	476.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

Purchase and initial installation of distribution transformers to serve new customers and upgrade service to existing customers. Installation of distribution capacitors to control power factor and voltage.

The amount of distribution transformers required is closely related to load growth because additional transformers are required to serve new customers. As the load increases the average size of the transformers required tends to increase, thus the decreased unit cost tends to offset the effect of inflation.

Capacitors are required to reduce losses and maintain system voltage. A relatively large amount must be expended for capacitors in 1977 to help mitigate the effect of previously deferred expenditures in other areas.

Should planned transmission and distribution system improvements be delayed the future amounts for capacitors will have to be significantly increased.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Meters

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	1054.0		156.0	163.0	170 .0	179.0	188 .0	198.0
(15) Overhead								
TOTAL	1054 .0		156.0	163.0	170 .0	179.0	188 .0	198.0
(16) Source of Funds								
Bonds –								
Grants –								
Operational Retained Earnings	1054 .0		156 .0	163 .0	170 .0	179 .0	188 .0	198 .0
TOTAL	1054 .0		156 .0	163 .0	170 .0	179 .0	188 .0	198 .0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

Revenue metering equipment reflects projected historical growth plus consideration for inflation. Also included is $100,000 per year for automatic meter reading equipment which allows ML&P to read meters via telephone lines from a office location by modifying existing meters. Meters will be converted each year to reduce the cost of meter reading, service connects and disconnects, and problems of trying to read meters during weather and traffic restrictions.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Services

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings								
(14) Other Improvements	1362.0		168.0	188.0	211.0	236.0	264.0	295.0
(15) Overhead								
TOTAL	1362.0		168.0	188.0	211.0	236.0	264.0	295.0
(16) Source of Funds								
Bonds –								
Grants –								
Operational Retained Earnings	1362.0		168.0	188.0	211.0	236.0	264.0	295.0
TOTAL	1362.0		168.0	188.0	211.0	236.0	264.0	295.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

Services to new customers and to upgrade service to existing customers.
This project covers the cost of service lines, both overhead and underground, from the utility's distribution system to the customers meters. The increasing amounts shown reflect anticipated growth and inflation.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: Equipment, tools and furniture

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)	615.0		115.0	70.0	125.0	80.0	135.0	90.0
(12) Land								
(13) Buildings								
(14) Other Improvements								
(15) Overhead								
TOTAL	615.0		115.0	70.0	125.0	80.0	135.0	90.0
(16) Source of Funds								
Bonds –								
Grants –								
Operational Retained Earnings	615.0		115.0	70.0	125.0	80.0	135.0	90.0
TOTAL	615.0		115.0	70.0	125.0	80.0	135.0	90.0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $ _____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

Office equipment, furniture, vehicles, tools, mobile radios etc.
This project covers the anticipated routine addition and replacement of small tools, furniture, small vehicles and similar equipment. In addition, it is anticipated that in 1977, 1979, and 1981 it will be necessary to purchase one new line truck and replace two existing line trucks.

CAPITAL PROJECT ESTIMATE

(1) Department and Division: Municipal Light & Power

(2) Project Title: General Plant

Estimated Cost	Estimated Total Cost (3)	Approp. Prior Years (4)	New Appropriation 19 77 (5)	Estimated Requirements in Thousands 19 78 (6)	19 79 (7)	19 80 (8)	19 81 (9)	19 82 (10)
(11) Equipment (Moveable)								
(12) Land								
(13) Buildings	500 .0		0	250 .0	0	250 .0	0	0
(14) Other Improvements								
(15) Overhead								
TOTAL	500 .0		0	250 .0	0	250 .0	0	0
(16) Source of Funds								
Bonds – Revenue	500 .0		0	250 .0	0	250 .0	0	0
Grants –								
Operational								
TOTAL	500 .0		0	250 .0	0	250 .0	0	0

(17) Gross Floor Area _____ Sq. Ft.

(18) Building Cost Per Sq. Ft. $_____

(19) Project Status _____

(20) Architectural and Engineering Fees: _____

(21) Percent of Building Cost _____ %

(22) Estimated Start Date _____

(23) Estimated Completion Date _____

(24) Project Description and Justification (Continue on Additional Sheets. Same Size)

Office, laboratory and shop at Generating Station 2

As Generating Station No. 2 develops, it will become the headquarters for the generating function. Generating Station No. 1 will become a satellite, probably operated by remote control from Generating Station No. 2. This project covers the building and facilities to establish the generating headquarters at Generating Station No. 2.