Attachment H

DENNIS C. PROUTY
DIRECTOR
515/281-5279
FAX 281-8451

STATE OF IOWA
LEGISLATIVE FISCAL BUREAU

STATE CAPITOL
DES MOINES, IOWA
50319

MEMORANDUM

TO: Legislative Fiscal Committee

FROM: Dave Reynolds

DATE: May 18, 2001

RE: Department of General Services Lease Purchase Notification

The Department of General Services has submitted a lease purchase notification for lighting and other electrical upgrades to the Historical Building and the Grimes Building. The Department is working with the State of Iowa Facilities Improvement Corporation (SIFIC) to manage the project and coordinate the lease-purchase financing for the improvements.

The total cost of the lease purchase agreement is $325,500. This includes $270,000 in principal and $55,500 in interest at an estimated rate of 4.7%. The agreement will be for a period of seven years. Annual payments will total approximately $59,500 and will be paid from the Department's General Fund appropriations. The State of Iowa Facilities Improvement Corporation estimates an annual utility savings of $59,500 which is intended to offset the lease payment.

If you have any questions, do not hesitate to contact me at (515) 281-6934.

G:\subcom\capitals\lease\dps.doc

Thomas J. Vilsack
GOVERNOR
Sally J. Pederson
LT. GOVERNOR

DGS Department of General Services
STATE OF IOWA

May 1, 2001

Dennis Prouty, Director
Legislative Fiscal Bureau
State Capital Building
LOCAL

Dear Mr. Prouty:

Enclosed is a Lease Purchase Prior Notification form for energy management improvement projects at the New Historical and Grimes buildings of the Capitol Complex. The New Historical building project includes replacing incandescent lighting with a combination of fluorescent, metal halide, and high pressure sodium lighting, and replacing the existing lighting controls with standard control technology, including installing low voltage wiring to all the electrical closets, removing the existing electronic relays, and installing standard lighting relays for all the circuits. At the Grimes building, this project involves installing lighting relays on all the building interior lights to control lighting usage through the existing Siemens building automation system. The State of Iowa Facilities Improvement Corporation staff are working with Department of General Services staff on this project.

The Department of General Services anticipates borrowing $270,000 at 4.7% for a period of 7 years. The Department will pay $59,519 annually for 7 years. The first lease payment will begin on December 1, 2002, with subsequent payments on the same date quarterly until 2008. The annual projected energy savings are $59,915.

Please call Don Ashwill at 515/281-5798 if you have any questions.

Sincerely,

Ed Mahlstadt
Capitol Complex Maintenance Administrator
Department of General Services

Enclosures

cc: Jo Shea, DNR

LEASE-PURCHASE PRIOR NOTIFICATION

(FOR PURCHASES OF $50,000 OR MORE)

For Reporting Requirements per Section 8.46, Code of Iowa

Agency Name:	Budget Unit/ Fund Name:	Budget Unit/ Fund No.:
Department of General Services	Capitol Complex	

ACQUISITION INFORMATION

Description of Acquisition:

Grimes: Install lighting relays on all the building interior lights and control the hours lights are on through the Siemens building automation system.

New Historical: This project involves replacing incandescent lighting with a combination of fluorescent, metal halide, and high pressure sodium lighting, and replacing the existing lighting controls with standard control technology, including installing low voltage wiring to all the electrical closets, removing the existing electronic relays, and installing standard lighting relays for all the circuits.

Type of Acquisition	Duration of Contract (Mo/Yr)	Contract Type:	Estimated Useful Life:
☐ New ☒ Replacement ☐ Continuation	Start: June 2001 End: March., 2008	Third Party Financing	20 years

Funding Sources	$	Estimated Cost if Purchased Outright:
General Fund	$ 325,503.00	$261,130
Federal	$	Principal:
Revolving Fund	$	$270,000.00
Road Use Tax	$	Finance Charge:
Other (Specify)	$	$55,503.31
Total	$ 325,503.00	Interest Rate: 4.7%

CASH FLOW

	FY	FY	FY	FY	FY	Total Cost
Principal	*see*	*attached*	*form*			
Interest						
Total						

JUSTIFICATION/CONSEQUENCES OF DELAY OR ABANDONMENT

The simple payback on this project is 4.1 years with an annual energy savings of $59,519, which makes the project cost neutral during the financing period of 81 months. The consequences of not proceeding with this project is an annual loss of $59,519 that could be realized in energy savings, and the lost opportunity of receiving infrastructure improvements with no additional costs to the state.

Contact Person:	Title:	Phone Number:
Mr. Don Ashwill	Utilities Manager, Department of General Services	515/281-5798

Please return to the Legislative Fiscal Bureau

LoanValue Amortization for: Capitol Complex - '01 Grimes & NHist

Annual Interest Rate	4.7000%	Compound Frequency	Monthly
Effective Annual Rate	4.8026%	Payment Frequency	Quarterly
Periodic Rate	1.1750%	Loan Start Date	06/01/2001
Daily Rate	0.0129%	Pmt Start Date	12/01/2002
Number of Payments	21	Loan End Date	03/01/2008

Amortization Method = U.S. Rule (Simple) Loan Amount $ 270,000.00

Pmt #	Date	Payment	Period Interest	Interest Paid	Principal Paid	Balance Due Interest	Balance Due Principal	Balance Due Total
-6	06/01/2001	0.00	0.00	0.00	0.00	0.00	270,000.00	270,000.00
-5	09/01/2001	0.00	3,184.94	0.00	0.00	3,184.94	270,000.00	273,184.94
-4	12/01/2001	0.00	3,184.94	0.00	0.00	6,369.88	270,000.00	276,369.88
2001	Totals	0.00	6,369.88	0.00	0.00			
-3	03/01/2002	0.00	3,184.94	0.00	0.00	9,554.82	270,000.00	279,554.82
-2	06/01/2002	0.00	3,184.94	0.00	0.00	12,739.76	270,000.00	282,739.76
-1	09/01/2002	0.00	3,184.94	0.00	0.00	15,924.70	270,000.00	285,924.70
1	12/01/2002	14,880.00	3,184.94	14,880.00	0.00	3,950.15	270,000.00	273,950.15
2002	Totals	14,880.00	12,739.76	14,880.00	0.00			
2	03/01/2003	14,880.00	3,184.94	7,135.09	7,744.91	0.00	262,255.09	262,255.09
3	06/01/2003	14,880.00	3,093.58	3,093.58	11,786.42	0.00	250,468.67	250,468.67
4	09/01/2003	14,880.00	2,954.55	2,954.55	11,925.45	0.00	238,543.22	238,543.22
5	12/01/2003	14,880.00	2,813.88	2,813.88	12,066.12	0.00	226,477.10	226,477.10
2003	Totals	59,520.00	12,046.95	15,997.10	43,522.90			
6	03/01/2004	14,880.00	2,671.54	2,671.54	12,208.46	0.00	214,268.64	214,268
7	06/01/2004	14,880.00	2,527.53	2,527.53	12,352.47	0.00	201,916.17	201,916.
8	09/01/2004	14,880.00	2,381.82	2,381.82	12,498.18	0.00	189,417.99	189,417.99
9	12/01/2004	14,880.00	2,234.39	2,234.39	12,645.61	0.00	176,772.38	176,772.38
2004	Totals	59,520.00	9,815.28	9,815.28	49,704.72			
10	03/01/2005	14,880.00	2,085.22	2,085.22	12,794.78	0.00	163,977.60	163,977.60
11	06/01/2005	14,880.00	1,934.29	1,934.29	12,945.71	0.00	151,031.89	151,031.89
12	09/01/2005	14,880.00	1,781.58	1,781.58	13,098.42	0.00	137,933.47	137,933.47
13	12/01/2005	14,880.00	1,627.07	1,627.07	13,252.93	0.00	124,680.54	124,680.54
2005	Totals	59,520.00	7,428.16	7,428.16	52,091.84			
14	03/01/2006	14,880.00	1,470.74	1,470.74	13,409.26	0.00	111,271.28	111,271.28
15	06/01/2006	14,880.00	1,312.57	1,312.57	13,567.43	0.00	97,703.85	97,703.85
16	09/01/2006	14,880.00	1,152.52	1,152.52	13,727.48	0.00	83,976.37	83,976.37
17	12/01/2006	14,880.00	990.59	990.59	13,889.41	0.00	70,086.96	70,086.96
2006	Totals	59,520.00	4,926.42	4,926.42	54,593.58			
18	03/01/2007	14,880.00	826.75	826.75	14,053.25	0.00	56,033.71	56,033.71
19	06/01/2007	14,880.00	660.98	660.98	14,219.02	0.00	41,814.69	41,814.69
20	09/01/2007	14,880.00	493.25	493.25	14,386.75	0.00	27,427.94	27,427.94
21	12/01/2007	14,880.00	323.54	323.54	14,556.46	0.00	12,871.48	12,871.48
2007	Totals	59,520.00	2,304.52	2,304.52	57,215.48			
22	03/01/2008	13,023.31	151.83	151.83	12,871.48	0.00	0.00	0.00

LoanValue Amortization for: Capitol Complex - '01 Grimes & NHist

Annual Interest Rate	4.7000%	Compound Frequency	Monthly
Effective Annual Rate	4.8026%	Payment Frequency	Quarterly
Periodic Rate	1.1750%	Loan Start Date	06/01/2001
D[illegible]ate	0.0129%	Pmt Start Date	12/01/2002
N[illegible] of Payments	21	Loan End Date	03/01/2008

Amortization Method = U.S. Rule (Simple) Loan Amount $ 270,000.00

mt #	Date	Payment	Period Interest	Interest Paid	Principal Paid	Balance Due Interest	Balance Due Principal	Balance Due Total
.008	Totals	13,023.31	151.83	151.83	12,871.48			
	Grand Totals	325,503.31	55,782.80	55,503.31	270,000.00			

Rounding Amount(1,856.69) adjusted to last payment amount.

Finance Calculation Sheet

Department of General Services						
EMI Cost	Study Cost	DNR FEE	Escrow Fee	Evensen Dodge Fee	Alhers Fee	Total Fees
$247,000	$0	$14,130	$2,750	$1,140	$1,140	$19,160

EMI Cost	Total Fees	Total	**Amount to Finance** (total costs rounded up to nearest $5,000)
$247,000	$19,160	$266,160	**$270,000**

Fees:

Evenson Dodge-Financial Advisor

Finance Amount	Base Fee	Additional Fee
<$500,000	$600	Plus $2 per $1,000
>$500,000	$600	Plus $1.50 per $1,000
>$1,000,000	$600	Plus $1 per $1,000

ED Fee calculation
$1,140

Alhers-Bond Counsel

Finance Amount	Base Fee	Additional Fee
<$500,000	$600	Plus $2 per $1,000
>$500,000	$600	Plus $1.50 per $1,000

Alhers Fee calculation
$1,140

Escrow Fee

Set-Up Fee	Annual Fee
$500	$1,500

Proceeds from the lease are kept in this account.
May only be open for 18 months.

DNR Fee

Base Fee - 4%	$9,880
Lease & Proj Mgmt Service	$3,000
Study Tech Review	$1,250
Total	$14,130

Total Financial Team Fees	$5,030
Total Fees	$19,160

MEMORANDUM OF AGREEMENT

I understand that the State of Iowa Facilities Improvement Corporation (SIFIC) will provide program management for the Iowa Department of General Services, for the identification and implementation of various energy management improvements at the Grimes State Office and New Historical Buildings. Engineering estimates for total implementation costs for these improvements are $247,000.00.

Program management services to be provided by SIFIC under this agreement will include, but is not limited to, the following:

- Review of all engineering submittals to ensure accuracy;
- Coordination of lease-purchase financing to fund the acquisition, installation, construction management, and commissioning services as necessary to ensure the installation of these improvements; and,
- Provision of education and/or assistance on the monitoring and tracking of energy costs and savings.

The Department of General Services concurs with these efforts. To that end, we agree to, but are not limited to, the following:

- Make the engineering analyses of the above named buildings conducted by Department of General Services' staff available for review by SIFIC's energy engineering staff;
- Provide monthly progress reports throughout the construction phase of the project to SIFIC; and
- Provide annual energy consumption and savings reports to SIFIC for the life of the lease or for a period to be determined by mutual agreement.

It is of mutual agreement and understanding that if the project is discontinued while in process, the Department of General Services will reimburse SIFIC for services provided to that point.

DATE:	March 19, 2001
ORGANIZATION NAME:	Iowa Department of General Services
ADDRESS:	Hoover State Office Building
CITY:	Des Moines
STATE:	Iowa
ZIP:	50319
TELEPHONE NUMBER:	515-281-5798
FAX NUMBER	515-281-8748
CONTACT PERSON:	Don Ashwill
NUMBER OF BUILDINGS:	Two

This agreement may be executed in any number of counterparts, each of which shall constitute one and the same document.

By: _____ STATE OF IOWA FACILITIES IMPROVEMENT CORPORATION

Title: President Designee

Date: 4-2-01

By: _____ (3/29/01) DEPARTMENT OF GENERAL SERVICES

Title: Director

Date: _____

Federal ID Number: _____

BRIEFING

BACKGROUND

The State of Iowa Facilities Improvement Corporation (SIFIC) was incorporated August 1, 1986, under the provision of Chapter 504 of the Code of Iowa. The Corporation was created to facilitate the use of lease-purchase financing for energy management improvements in state agency facilities.

Energy conservation revenue bonds in the amount of $12,245,000 were sold on September 18, 1986. The proceeds from the sale were used to acquire energy improvements for buildings under the management of the Departments of General Services, Human Services, Corrections, and Veterans Affairs. In fiscal year 1989, three additional state agencies–the Departments of Public Safety, Transportation, and the Department for the Blind–were added to the program using remaining funds.

PROGRAM SUCCESS

The SIFIC program is achieving energy and dollar savings for participating state agencies. In fact, actual dollar savings are exceeding the total lease payments made by the agencies.

- A total of $11,406,428 has been expended for the installation of energy management improvements for the facilities of the participating agencies.

- Total energy dollar savings for fiscal year 1989 through fiscal year 2000 were approximately $23,354,000, which represents 136% of the $17,142,405 in total lease payments made by the participating agencies during the same time period.

- Because of the financial success of the program, the SIFIC bonds were called in for early redemption on June 1, 1999, thirteen (13) months prior to their original call-in date of June 30, 2000.

In summary, the program is achieving energy and dollar savings for the participating state agencies. Since the program's inception, the actual dollar savings have met or exceeded estimates.

State of Iowa Facilities Improvement Corporation

Program Services and Fees

The State of Iowa Facility Improvement Corporation (SIFIC) Program, is a program whose ongoing efforts are to make Iowa's public facilities energy efficient and cost effective. Costs associated with managing this program include start-up costs, facilitating the lease financing process, engineering expertise, and staff costs for program management. To cover these costs, fees are assessed depending upon which services are required, and are as listed below.

Lease-purchase (large) Projects:

Base Fee: Four percent (4%) of total costs for Energy Management Improvements. The Base Fee is intended to recover program start-up costs and day-to-day operating expenses.

Lease Financing Process and Project Management Services: $3,000. This fee includes, but is not limited to:

- Preparation of notification forms for the State's Legislative Fiscal Bureau;
- Coordination of the Fiscal Team which secures financial provider and prepares necessary documents;
- Facilitation of the lease document signing process;
- Coordination of project services;
- Monitoring of bill payment and escrow account activity; and,
- Assisting with rebate applications, if applicable.

Engineering Services: The fee for engineering services is broken down as follows:

- Technical review of engineering analyses -

Small study (five EMIs or less)	**$1,250**
Large study (greater than five EMIs)	**$2,500**

- Update previously completed engineering analyses -

Small study (five EMIs or less)	**$2,500**
Large study (greater than five EMIs)	**$5,000**

- Complete new engineering analyses in-house -

Small study (less than ten EMIs)	**$10,000**

Note: engineering services for studies with ten EMIs or more will be contracted to the SIFIC Program engineering firm.

- Contracted engineering services -

The cost for an engineering analysis will be passed on to the participating client without assessed fee, and a six-month, interest-free loan is provided to cover the cost of an engineering analysis; this loan can be rolled into the lease financing for the project:

Monitoring work progress of contractor (meetings at facility, process payments to contractor, etc.)	**$2,000**
Review of contractor-completed study	**$2,500**

Capital Fund – Small Projects (less than $100,000):

Base Fee: There will be no base fee for these small projects; however, the loans for these small projects will be subject to interest, at a rate to be determined by the Treasurer's office at loan closure.

Project Management Services: $500 (up to $50,000), or $1,000 ($50,001 – 100,000). This fee includes, but is not limited to:

- Preparation of notification forms for the State's Legislative Fiscal Bureau (for projects over $50,000)
- Facilitation of the loan document signing process;
- Coordination of project services;
- Monitoring of bill payment and Capital Fund activity; and,
- Assisting with rebate applications, if applicable.

Engineering Services:

- For projects requiring little or no engineering services, no fee will be assessed;
- For projects requiring engineering services, fees will be assessed according to the above schedule for engineering services.

Optional Services:

The following services are optional, but can be provided either by DNR staff or the SIFIC Program engineering firm. Costs and/or fees for these services will be negotiated as necessary. The optional services include, but are not limited to:

- EMI design;
- Construction management;
- Monthly energy accounting of utility bills to verify savings; and,
- On-site monitoring visits.

If you have any questions, please contact Dan Lane at (515) 281-6696, or Jo Shea at (515) 242-5852.

ENERGY AUDIT

Project Title: Grimes Building Lighting Controls

Date: February 2, 2001

Building: Grimes

Location: All Areas

Existing Conditions: The lighting in the building is controlled by line voltage wall switches located in the hallways. It is impossible for us to consistently turn the lights out at night. As a result the building lighting is on many more hours than needed. For the purposes of this audit it is assumed that the T-12 lighting will already be replaced with T-8 lighting.

Proposed Changes: Install lighting relays on all the building interior lights and control the hours lights are on through the Siemens building automation system.

Building Impacts: Occupants would need to call to have lights turned on after hours or on weekends. The occupants in most other Capitol Complex buildings already have to do this and it is not a problem.

Yearly Utility Savings:	Electricity; 317,285 kWh Gas; -4,372 therms Water; 0 cubic feet Cost; $ 19,602
Initial Cost:	$ 47,000
Payback:	2.4 years

Donald Ashwill
Facilities Engineer

Capitol Complex Main Loop Yearly Energy Usage Totals

Grimes Building T-8 Lighting - 1/01

Gas Usage

	Occupied Days	Unoccupied Days	Nights	Totals	Percent of Total
Main Gas	149,628 ccf	41,899 ccf	283,926 ccf	475,453 ccf	91.2%
Voc. Rehab. Gas	9,488 ccf	302 ccf	5,033 ccf	14,824 ccf	2.8%
Old Historical	975 ccf	0 ccf	0 ccf	975 ccf	0.2%
Wallace Gas	7,508 ccf	3,243 ccf	19,085 ccf	29,836 ccf	5.7%
Total Gas	167,599 ccf	45,445 ccf	308,044 ccf	521,088 ccf	100.0%

Electric Usage

	Occupied Days	Unoccupied Days	Nights	Totals	Percent of Total
Compressor Electric	714,462 kWh	76,496 kWh	77,258 kWh	868,216 kWh	4.2%
Condenser Pump Electric	95,441 kWh	8,639 kWh	10,166 kWh	114,246 kWh	0.5%
Cooling Tower Electric	56,717 kWh	5,212 kWh	6,627 kWh	68,556 kWh	0.3%
EDP Chiller Electric	178,332 kWh	67,411 kWh	355,830 kWh	601,573 kWh	2.9%
Emp. Serv. Computer Chiller Electric	165,635 kWh	66,169 kWh	281,637 kWh	513,441 kWh	2.5%
Lucas Computer Chiller Electric	29,151 kWh	11,637 kWh	46,375 kWh	87,163 kWh	0.4%
Old Voc. Rehab. Cooling	176,228 kWh	35,409 kWh	28,009 kWh	239,647 kWh	1.1%
Old Historical Cooling	262,568 kWh	28,920 kWh	6,603 kWh	298,091 kWh	1.4%
EDP Misc. Equipment	38,418 kWh	15,351 kWh	69,148 kWh	122,917 kWh	0.6%
Emp. Serv. Computer Misc. Equip.	55,691 kWh	22,252 kWh	100,236 kWh	178,178 kWh	0.9%
Wallace DCI Cooling	33,273 kWh	4,482 kWh	4,492 kWh	42,247 kWh	0.2%
Lucas Computer Misc. Equip.	40,263 kWh	16,080 kWh	70,733 kWh	127,077 kWh	0.6%
Electric HWH Electric	259,256 kWh	0 kWh	0 kWh	259,256 kWh	1.2%
Air Handler Electric	1,461,519 kWh	237,649 kWh	894,444 kWh	2,593,611 kWh	12.4%
Chilled Water Pumps Electric	330,500 kWh	68,371 kWh	175,502 kWh	574,374 kWh	2.8%
Interior Lighting Electric	4,111,783 kWh	379,595 kWh	642,037 kWh	5,133,415 kWh	24.6%
Office Equipment Electric	3,387,111 kWh	113,240 kWh	490,741 kWh	3,991,092 kWh	19.1%
Main Frame Computers Electric	1,494,675 kWh	597,324 kWh	2,493,690 kWh	4,585,689 kWh	22.0%
Exterior Lighting Electric	12,987 kWh	2,184 kWh	442,380 kWh	457,551 kWh	2.2%
Total Electric	12,904,012 kWh	1,756,420 kWh	6,195,908 kWh	20,856,340 kWh	100.0%
Peak kW	6,706 kW				
Main Gas	$332,817				
Voc. Rehab. Gas	$12,600				
Old Historical	$829				
Wallace Gas	$25,361				
Total Gas	$371,607				
Main Electric Cost	$1,362,242				
Total En[illegible] ost	$1,733,849				

Capitol Complex Main Loop Yearly Energy Usage Totals

Grimes Building T-8 Lighting - 1/01

Gas Usage

	Occupied Days	Unoccupied Days	Nights	Totals	Percent of Total
Main Gas	149,628 ccf	41,899 ccf	283,926 ccf	475,453 ccf	91.2%
Voc. Rehab. Gas	9,488 ccf	302 ccf	5,033 ccf	14,824 ccf	2.8%
Old Historical	975 ccf	0 ccf	0 ccf	975 ccf	0.2%
Wallace Gas	7,508 ccf	3,243 ccf	19,085 ccf	29,836 ccf	5.7%
Total Gas	167,599 ccf	45,445 ccf	308,044 ccf	521,088 ccf	100.0%

Electric Usage

	Occupied Days	Unoccupied Days	Nights	Totals	Percent of Total
Compressor Electric	714,462 kWh	76,496 kWh	77,258 kWh	868,216 kWh	4.2%
Condenser Pump Electric	95,441 kWh	8,639 kWh	10,166 kWh	114,246 kWh	0.5%
Cooling Tower Electric	56,717 kWh	5,212 kWh	6,627 kWh	68,556 kWh	0.3%
EDP Chiller Electric	178,332 kWh	67,411 kWh	355,830 kWh	601,573 kWh	2.9%
Emp. Serv. Computer Chiller Electric	165,635 kWh	66,169 kWh	281,637 kWh	513,441 kWh	2.5%
Lucas Computer Chiller Electric	29,151 kWh	11,637 kWh	46,375 kWh	87,163 kWh	0.4%
Old Voc. Rehab. Cooling	176,228 kWh	35,409 kWh	28,009 kWh	239,647 kWh	1.1%
Old Historical Cooling	262,568 kWh	28,920 kWh	6,603 kWh	298,091 kWh	1.4%
EDP Misc. Equipment	38,418 kWh	15,351 kWh	69,148 kWh	122,917 kWh	0.6%
Emp. Serv. Computer Misc. Equip.	55,691 kWh	22,252 kWh	100,236 kWh	178,178 kWh	0.9%
Wallace DCI Cooling	33,273 kWh	4,482 kWh	4,492 kWh	42,247 kWh	0.2%
Lucas Computer Misc. Equip.	40,263 kWh	16,080 kWh	70,733 kWh	127,077 kWh	0.6%
Electric HWH Electric	259,256 kWh	0 kWh	0 kWh	259,256 kWh	1.2%
Air Handler Electric	1,461,519 kWh	237,649 kWh	894,444 kWh	2,593,611 kWh	12.4%
Chilled Water Pumps Electric	330,500 kWh	68,371 kWh	175,502 kWh	574,374 kWh	2.8%
Interior Lighting Electric	4,111,783 kWh	379,595 kWh	642,037 kWh	5,133,415 kWh	24.6%
Office Equipment Electric	3,387,111 kWh	113,240 kWh	490,741 kWh	3,991,092 kWh	19.1%
Main Frame Computers Electric	1,494,675 kWh	597,324 kWh	2,493,690 kWh	4,585,689 kWh	22.0%
Exterior Lighting Electric	12,987 kWh	2,184 kWh	442,380 kWh	457,551 kWh	2.2%
Total Electric	12,904,012 kWh	1,756,420 kWh	6,195,908 kWh	20,856,340 kWh	100.0%
Peak kW	6,706 kW				
Main Gas	$332,817				
Voc. Rehab. Gas	$12,600				
Old Historical	$829				
Wallace Gas	$25,361				
Total Gas	$371,607				
Main Electric Cost	$1,362,242				
Total Energy Cost	$1,733,849				

ENERGY AUDIT

Project Title: New Historical Building Lighting Retrofit

Date: February 6, 2001

Building: New Historical

Location: All Areas

Existing Conditions: The lighting controls originally installed in the New Historical building are a power line carrier system. These controls works by sending a high frequency signals on the building power lines which switch electronic relays turning the lights on or off. Unfortunately, this system has never worked well. Noise on the power lines will sometimes cause lights to turn on or off at random. Also, the system was not successful for the manufacturer and parts are no longer available. As a result most of the lights in the building are controlled by turning circuit breakers on and off. In consequence the lighting runs many more hours than needed.

There is a large variety of lighting types in the building, including T-12 fluorescent lights with magnetic ballasts, incandescent lamps, and quartz lamps. Due to the nature of the building some incandescent lamps will have to remain, notably in the exhibit halls.

Proposed Changes: Install a new lighting controls system using standard control technology. This will involve installing low voltage wiring to all the electrical closets, removing the existing electronic relays, and installing standard lighting relays for all the circuits.

Install T-8 lamps with electronic ballasts in all the fluorescent fixtures. Install screw in fluorescent lamps where fluorescent lamps are acceptable. Rewire the indirect quartz fixtures in the lobby to metal halide lamps. Finally, replace the incandescent fixtures in the storage areas with high pressure sodium fixtures.

Building Impacts: Lighting controls would eliminate the need to turn lights on and off by circuit breakers. We could remotely operate the lights making scheduling for special events much easier.

Light levels would be unchanged.

Yearly Utility Savings:	Electricity; 814,642 kWh Gas; 0 therms Water; 0 cubic feet Cost; $ 39,917
Initial Cost:	$ 200,000
Payback:	5.0 years

Donald Ashwill
Facilities Engineer

New Historical Lighting Retrofit Costs

Unit Costs

Fixture Type	Quantit	Changes	Ballast Cost	Lamp Cost	Lamp Disposal Cost	Material Cost	Labor Cost	Total Cost	Extended Cost
	38	3 lamp F32T8, ballast and lamps	$18.00	$3.90	$1.20	$23.10	$18.50	$41.60	$1,581
	28	2 lamp F32T8, ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$907
	20	4 lamp F32T8, ballast and lamps	$21.00	$5.20	$1.60	$27.80	$21.00	$48.80	$976
4	4	4 lamp F32T8, ballast and lamps	$21.00	$5.20	$1.60	$27.80	$21.00	$48.80	$195
5	126	4 lamp F32T8, ballast and lamps	$21.00	$5.20	$1.60	$27.80	$21.00	$48.80	$6,149
6	32	2 lamp F32T8, ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$1,037
7	0	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
8	26	2 lamp F32T8, ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$842
9	8	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
10	11	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
11	49	2 - 2 lamp F32T8 and 2 - 2 lamp F17T8, ballasts and lamps	$44.00	$10.40	$3.20	$57.60	$32.00	$89.60	$4,390
12	5	2 lamp F32T8, ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$162
13	7	2 lamp F32T8, ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$227
14	270	2 lamp F32T8, ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$8,748
15	11	2 lamp F96T12/HO, electronic ballast	$40.00	$6.00	$1.20	$47.20	$18.50	$65.70	$723
16	20	2 lamp F32T8, ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$648
17	22	1 lamp F32T8, ballast and lamps	$9.00	$1.30	$0.80	$11.10	$13.50	$24.60	$541
18	0	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
19	33	2 lamp F32T8, ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$1,069
20	93	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
21	40	2 lamp F32T8, ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$1,296
22	131	1 lamp F32T8, ballast and lamps	$9.00	$1.30	$0.40	$10.70	$13.50	$24.20	$3,170
23	15	2 lamp F32T8, ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$486
24	132	2 lamp F25T8, ballast and lamps	$12.00	$2.80	$0.80	$15.60	$16.00	$31.60	$4,171
25	3	Screw in 26 watt spring lamp with reflector	$0.00	$18.00	$0.00	$18.00	$5.00	$23.00	$69
26	119	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
27	34	Screw in 26 watt spring lamp with reflector	$0.00	$18.00	$0.00	$18.00	$5.00	$23.00	$782
28	9	Screw in 18 watt spring lamp with reflector	$0.00	$15.00	$0.00	$15.00	$5.00	$20.00	$180
29	35	Screw in 26 watt spring lamp with reflector	$0.00	$18.00	$0.00	$18.00	$5.00	$23.00	$805
30	14	Screw in 23 watt spring lamp	$0.00	$11.00	$0.00	$11.00	$5.00	$16.00	$224
31	13	Screw in 23 watt spring lamp	$0.00	$11.00	$0.00	$11.00	$5.00	$16.00	$208
32	9	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
33	4	Screw in 18 watt spring lamp	$0.00	$10.00	$0.00	$10.00	$5.00	$15.00	$60
34	10	2 lamp F32T8, ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$324
35	9	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
36	26	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
37	3	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
38	856	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
	9	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
	35	Screw in 23 watt spring lamp with reflector	$0.00	$15.00	$0.00	$15.00	$5.00	$20.00	$700
	40	Screw in 23 watt spring lamp with reflector	$0.00	$15.00	$0.00	$15.00	$5.00	$20.00	$800
42	2	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
43	79	1 - 2 lamp F32T8 and 1 - 4 lamp F32T8, ballasts and lamps	$34.00	$7.80	$2.40	$44.20	$27.00	$71.20	$5,625
44	24	2 lamp F32T8 ballast and lamps	$13.00	$2.60	$0.80	$16.40	$16.00	$32.40	$778
45	32	Custom retrofit to 1 - 100 watt Metal Halide	$60.00	$25.00	$0.00	$85.00	$64.00	$149.00	$4,768
46	8	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
47	1	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
48	119	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
49	20	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
50	7	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
51	0	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
52	280	New fixtures, 1 lamp 70 watt HPS	$110.00	$20.00	$0.00	$130.00	$16.00	$146.00	$40,880
53	73	New fixtures, 1 lamp 100 watt HPS	$120.00	$22.00	$0.00	$142.00	$16.00	$158.00	$11,534
54	5	New fixtures, 1 lamp 50 watt HPS	$100.00	$18.00	$0.00	$118.00	$16.00	$134.00	$670
55	5	Screw in 23 watt spring lamp	$0.00	$11.00	$0.00	$11.00	$5.00	$16.00	$80
56	8	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
57	0	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
58	8	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
59	18	1 lamp 175 watt metal halide, ballast and lamp	$60.00	$30.00	$0.00	$90.00	$24.00	$114.00	$2,052
60	0	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
61	5	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
62	45	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
63	32	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
64	21	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
65	53	1 lamp 70 watt metal halide reflector bulb, ballast and lamp	$50.00	$45.00	$0.00	$95.00	$24.00	$119.00	$6,307
66	4	1 lamp 70 watt metal halide reflector bulb, ballast and lamp	$50.00	$45.00	$0.00	$95.00	$24.00	$119.00	$476
F1	34	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
F2	2	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
F3	2	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
F4	14	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
F5	6	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
F6	3	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
	31	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
	2	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
	477	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0
Exit	48	New LED exit light fixtures	$60.00	$0.00	$0.00	$60.00	$16.00	$76.00	$3,648
LED Exit	9	None	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0

Total Cost $118,288

New Historical Building
Proposed Lighting Controls and Lighting Retrofit - 2/01

Zone	Weekday Lighting kW	Weekend Lighting kW	Night Lighting kW
L1	27.3	16.2	1.4
L2	3.7	2.3	0.8
L3	0.0	0.0	0.0
L4	4.0	1.3	0.0
1D	1.7	0.2	0.1
1W	58.9	58.7	1.9
1E	45.3	38.2	2.6
2W	66.7	66.6	2.3
2E	28.7	22.5	3.1
3W	18.0	11.3	2.1
Exterior	19.3	19.3	16.1
Totals	273.6	236.6	30.4
Hours	2,340	936	5,460
kWh	640,313	221,481	166,206

Total kWh	1,028,000
Savings	814,642

New Historical Building
Existing Lighting Controls and Light Fixtures - 2/01

Zone	Weekday Lighting kW	Weekend Lighting kW	Night Lighting kW
L1	41.5	9.8	1.8
L2	6.7	2.2	0.9
L3	0.0	0.0	0.0
L4	9.9	1.7	0.0
1D	2.6	2.6	2.1
1W	60.3	60.2	3.9
1E	77.5	59.7	5.5
2W	71.1	71.1	3.1
2E	45.3	31.0	15.8
3W	35.9	26.5	20.3
Exterior	38.4	38.4	38.0
Totals	389.2	303.2	91.4
Hours	2,730	1,092	4,914
kWh	1,062,501	331,071	449,070

Total kWh	1,842,642	
Electric Savings	814,642	kWh
Cost Savings	$39,917	