



APPROVED
BY THE CITY COUNCIL

OCT 4 1988

OFFICE OF THE
CITY CLERK

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DEPARTMENT OF
GENERAL SERVICES

CITY OF SACRAMENTO
CALIFORNIA

5730 - 24TH STREET
BUILDING FOUR
SACRAMENTO, CA
95822-3699

OFFICE OF THE DIRECTOR

September 22, 1988

916-449-5548

City Council
Sacramento, California

DIVISIONS:

Honorable Members in Session:

COMMUNICATIONS
FACILITY MANAGEMENT
FLEET MANAGEMENT
PROCUREMENT SERVICES

**SUBJECT: PARKING GARAGES LIGHTING CONVERSION PROJECT
STATUS REPORT (DA 41)**

SUMMARY

This is an informational report, advising the City Council that the subject project replacing all lighting fixtures with energy efficient lighting and modifying switching to provide for automatic day/night switching of lighting in the City's parking garages has been completed.

BACKGROUND

This was an extremely gratifying and successful project for which the City has received much recognition. It was a team effort that began in 1983 which involved Frank Puccinelli, the City's Energy Systems Coordinator, Joe Yee, the City's Electrical Engineer (retired), General Services, Public Works-Engineering Division and Transportation Division staff, SMUD's conservation staff, and various electrical consultants working and experimenting together that made the program work.

In June of 1983 an outside electrical engineering consultant was selected by a committee to evaluate, design, provide construction drawings (switching, fixture arrangements and electrical circuits) and estimated cost for the conversion of Parking Garage H - 11th & L Streets. Staff reviewed the consultant's report on Parking Garage H and determined that the project was cost effective and should be undertaken. In September of 1984, based on staff's evaluation of the project, the Council authorized by resolution hiring two (2) limited term positions and the purchase of necessary materials for retrofitting Parking Lot H.

With the conversion of Parking Lot H underway, staff working with SMUD, developed the four year program for conversion of the remaining seven parking structures, etc. (see Exhibit I).

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The original scope of the project focused on the reduction of energy consumption, reduction of maintenance cost (i.e., fewer lamps and longer life lamps), and bringing lighting levels up to standard. However, as the work progressed on Lot H, we also became concerned with the safety of the patrons and security. The scope was expanded to provide more adequate lighting in stairwells, exterior, top decks, etc. (see Exhibit II).

The consultant's estimated cost for the Parking Structure H conversion was \$123,000, based on contracting out the project. However, with City Council's authorization to hire limited term staff, we were able to convert Parking Structures A - (7th and L Streets) and B - (10th and I Streets) along with Parking Structure H. The three parking structures were completed for \$110,202, \$12,798 below the estimated costs for doing Lot H alone.

Over the next three fiscal years, the remaining five Parking Structures were converted as follows:

- FY 85-86 Lot E 13th & I Streets
- Lot R Front Street and Capitol Mall

- FY 86-87 Lot G 4th and L Streets
- Lot P 2nd and I Streets

- FY 87-88 Lot K 5th/7th & J/L Streets

This project has received SMUD's recognition, and three awards have been received including SMUD's Executive Award, the highest award granted in their service area. The awards were based on the conservation efforts for Parking Structures H, E, and R. 1988 SMUD Conservation Awards will be given later this year for Parking Structures G and K.

In March of 1986, City Council authorized the submission on an application for a \$76,765 Energy Conservation Assistance Loan for 5 years at 8.89% interest from the State of California Energy Commission to accelerate the program. SMUD's Energy Services Department staff assisted in the calculations which resulted in the City's receiving a California Energy Commission Loan. However, when we started the conversion of Lot K in FY 87-88, substantial cost savings had been achieved. Thus, the City did not request any draw downs and requested that the loan be closed out.

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FINANCIAL INFORMATION

The cost of the conversion program for eight parking structures was \$525,467. The projected budget was \$653,000. \$600,000 of Parking Funds were appropriated, leaving \$74,533 to be returned to the Parking Fund balance.

There are three areas in which the City will receive long term savings as a result of this project.

- o Reduced Demand Requirement (KW) (Ref. Exhibit I)
- o Reduced Energy Consumption (KWH) (Ref. Exhibit I)
- o Relamping costs (Labor and Materials) (Ref. Exhibit IV)

A recap of the overall cost mitigation is provided below:

	<u>KW</u>	<u>Reduction KWH</u>	<u>Avg. %</u>	<u>Annual Costs (Today's \$)</u>
o Annual - Demand Load (KW)	431.5		42.0	\$ 31,586
Consumption (KWH)		5,210,865	52.0	210,729
Relamping Costs	_____	_____		<u>64,640</u>
ESTIMATED TOTALS -	<u>431.5</u>	<u>5,210,865</u>		<u>\$306,955</u>

- o 10 Year Cost Avoidance - \$4.9 million

The return on the City's investment for this project (i.e., cost pay back) is 1.7 years.

In addition to being an excellent long term cost avoidance and safety program for the City, this project has also reduced peak electrical demand on the SMUD system by 431.5 kilowatts, thereby conserving critical energy resources for Sacramento City residents.

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EDITORIAL

The energy mitigation has far exceeded our projected estimates. Our accomplishments (i.e., expanded project scope and the return of \$74,533 to Parking Fund balance) were made possible by managing the project ourselves as opposed to contracting out. Contractor's overhead/profit was eliminated as well as a significant savings being realized on materials. The fixture and lamp savings were as follows:

		<u>Per Unit</u>		
		<u>Retail</u>	<u>City Cost</u>	<u>Discount</u>
HPS Fixtures	150W	\$168.25	\$132.48	27%
	100W	162.99	128.34	27%
	150WRS	253.68	199.75	27%
HPS Lamps	150W	65.57	13.00	79.1%
	100W	63.42	12.00	79.1%
All other materials				35%-40%

Team work, innovative ideas, commitment, dedication, flexibility, and elimination of costly change orders, by not contracting out, are what made this project successful and gratifying. We had a lot of heroes who took the extra step.

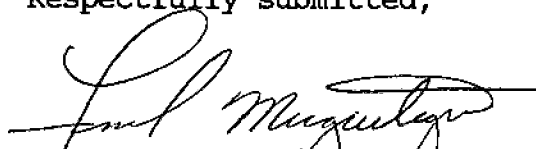
Energy management represents good City management! Since energy is the second largest budget item after personnel costs, it makes good economic and management sense to reduce energy use whenever and wherever possible.

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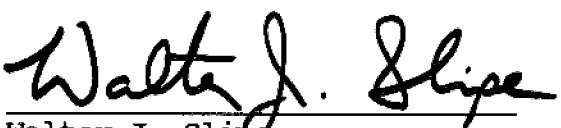
RECOMMENDATION

This report is for City Council information and no action is required.

Respectfully submitted,


Frank Mugartegui
Director of General Services

FOR COUNCIL INFORMATION ONLY:


Walter J. Slipp
City Manager

October 4, 1988
All Districts

cc: SMUD - Energy Services Department
California Energy Commission
Department Directors
Division Managers

PARKING GARAGE ENERGY CONSERVATION PROJECT - DA 41
PROJECT BUDGET AND CONSERVATION RESULTS SCHEDULE

Parking Structure	Planned Schedule	Project Budget Estimate	Annual Demand & Consumption Reduction				
			Demand		Consumption		\$
			Load(KW)	%	KWH	%	
Lot H - 11th & L Sts.	84-85	\$123,000	161.1	53%	1,544,315	66%	\$ 74,245
Lot B - 10th & I Sts.	84-85	-0-	29.5	66%	194,011	59%	10,005
Lot A - 7th & L Sts.	84-85	-0-	25.4	71%	178,000	60%	9,058
Lot E - 13th & I Sts.	85-86	67,000	63.0	33%	678,840	57%	32,064
Lot R - Front & Capitol Mall	85-86	35,000	38.0	55%	275,545	64%	13,925
Lot G - 4th & L Sts.	86-87	94,000	70.0	43%	451,980	42%	23,402
Lot P - 2nd & I Sts.	86-87	39,000	2.5	4%	19,200	6%	960
Lot K - 5th/7th & J/L Sts.	87-88	<u>295,000</u>	<u>42.0</u>	8%	<u>1,868,974</u>	65%	<u>78,656</u>
TOTALS		<u>\$653,000</u>	<u>431.5</u>		<u>5,210,865</u>		<u>\$242,315</u>

Notes:

1. Source of Funds:

412 Parking Fund	- \$600,000
California Energy Commission Loan	- <u>76,765</u>
	<u>\$676,765</u>

2. Expenditures as of June 30, 1988 - \$525,467

3. Demand/Consumption figures provided by SMUD's Energy Services Department

EXHIBIT II

PARKING GARAGE ENERGY CONSERVATION PROJECT - DA41
 FIXTURE REPLACEMENT SCHEDULE
 PLANNED VS. ACTUAL

Parking Structure		High Pressure Sodium (HPS)						Other Types			Totals	
		250W	150W	150WRS	100W	70W	50W	35W	LPS 18W	Quartz 150W		Misc.
Lot H - 11th & L Sts.	Planned	10	249						-			259
	Actual	-	250						27			277
Lot B - 10th & I Sts.	Planned		-						-			-
	Actual		69						4			73
Lot A - 7th & L Sts.	Planned		-						-			-
	Actual		76						4			80
Lot E - 13th & I Sts.	Planned		184	-	40	23						247
	Actual		104	58	76	-						238
Lot R - Front & Capitol Mall	Planned		81	-	-	15			12	40	-	148
	Actual		71	46	3	-		16	20	-	16	172
Lot G - 4th & L Sts.	Planned		240		-	26			42	80		388
	Actual		304		16	-	35	10	33	-		398
Lot P - 2nd & I Sts.	Planned	10	120			4						134
	Actual	-	174			-						174
Lot K - 5th/7th&J/L Sts.	Planned		420	200	112		-	-	-		-	732
	Actual		435	139	88		18	10	25		4	719
TOTALS -	Planned	20	1294	200	152	68	-	-	54	120	-	1908
	Actual	-	1483	243	183	-	53	36	113	-	20	2131

Variance 223

RECAP

. Installed 223 or 11.6% fixtures over planned

. Lamps installed - HPS 2018

LPS 113

Total 2131

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PARKING GARAGE ENERGY CONSERVATION PROJECT - DA 41
FLUORESCENT LAMPS REMOVED

<u>Parking Structure</u>	<u>Quantities Removed</u>
Lot H - 11th & L Sts.	3,971 Tubes
Lot B - 10th & I Sts.	364 Tubes
Lot A - 7th & L Sts.	412 Tubes
Lot E - 13th & I Sts.	2,043 Tubes
Lot R - Front & Capitol Mall	1,108 Tubes
Lot G - 4th & L Sts.	2,568 Tubes
Lot P - 2nd & I Sts.	474 Tubes
Lot K - 5th/7th & J/L Sts.	<u>2,396 Tubes</u>
 TOTALS	 <u>13,336</u>

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PARKING GARAGE ENERGY CONSERVATION PROJECT - DA 41
PROJECTED LABOR AND RELAMPING COST SAVINGS

Estimated Costs Prior to Conversion

Basis - 13,336 (F40's) Tubes x 8760 hrs. (24 hrs./day) divided by 20,000 hrs. (lamp life)=5,841 Annual Replacements
Stair Well Lamps 298 x 8760 hrs. (24 hrs./day) divided by 20,000 hrs. (lamp life)= 130.5 Annual Replacements

<u>Cost Calc.</u> - Labor 5841 lamps x .5 hr. x \$25.00/hr.	= \$73,012.50
Material - 5841 lamps x \$1.09 ea.	= <u>6,366.69</u>
Sub Total	\$79,379.19
Labor 130.5 x .5 hrs. x \$25.00/hr.	= 1,631.25
Material 130.5 x \$1.09	= <u>142.25</u>
Total Estimated Cost	<u>\$81,152.69</u>

Estimated Costs After Conversion

Basis - 1962 (50, 100, & 150W HPS) x 6570 hrs. (18 hrs./day) divided by 24,000 hrs. (lamp life)=537.09 Annual Replacements
149 (35W hrs. & 18W LPS) x 6570 hrs. (18 hrs./day) divided by 16,000 hrs. (lamp life) = 61.1 Annual Replacements

<u>Cost Calc.</u> - Labor 537.09 lamps x .5 hr. x \$25.00/hr.	= \$ 6,713.63
Material 537.09 lamps x \$15.00/ea.	= 8,056.35
Labor 61.1 lamps x .5 hr. x \$25.00/hr.	= 763.75
Material 61.1 lamps x \$16.00 ea.	= <u>977.60</u>
Total Estimated Cost	<u>\$16,511.33</u>

COST SAVINGS RECAP

Labor 3,284 hrs. annual or 1.3 FTE
Annual \$ Savings \$64,640

Note: No consideration given for ballast reduction from 6668 to 2141, which also reduces M&O costs since the life of ballasts is subjective.

Assumptions: 1. Lamp Life of Fluorescents 20,000 hours
2. Lamp Life of HPS/LPS 24,000 hours
3. Lights Operating 18 hours/day