



FINAL SUBMITTAL

EXECUTIVE SUMMARY

ENERGY SAVINGS OPPORTUNITY SURVEY FORT MC PHERSON, GEORGIA

Prepared for

SAVANNAH DISTRICT
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

THIS QUALITY INSPECTED 2

Under

CONTRACT NO. DACA21-91-C-0097

⁴ FORT GILLEM ESOS also done under same contract.

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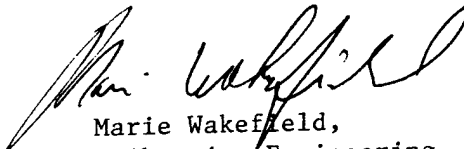


DEPARTMENT OF THE ARMY
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CONTRACT NO. DACA21-91-C-0097

September 1992

EMC No. 3105-000

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COMMANDER SUMMARY

PURPOSE OF STUDY

The purpose of the study was to analyze energy requirements and energy conservation opportunities (ECOs) for selected buildings at Fort McPherson, Georgia.

RESULTS

Of the individual ECOs evaluated, 14 ECOs had a savings-to-investment (SIR) ratio greater than 1.0. Those ECOs having an SIR greater than 1.0 are, by definition, economically feasible. The total estimated construction cost for the 14 ECOs is \$1,500,675.

The individual ECOs were grouped into projects for possible funding under four main funding areas: 1) Energy Conservation Investment Program (ECIP); 2) Quick Return on Investment Program (QRIP); 3) Family Housing projects; and 4) Non-Appropriated Funds (NAF) projects, funded by agencies and organizations maintaining clubs, commissary, exchange, and related buildings.

At Fort McPherson, one project was evaluated for ECIP funding:

- ECO 1, Add duct insulation
- ECO 1, Add roof insulation
- ECO 1, Add pipe insulation
- ECO 7, Control hot water circulation pumps
- ECO 11, Replace street lights
- ECO 12, Revise or repair HVAC controls
- ECO 15, Lighting controls in Building 200
- ECO 18, Replace exit sign bulbs with fluorescent bulb kits
- ECO 19, Previous lighting study review, for light fixture replacement

ECO 8, install low flow shower and faucet fixtures, was evaluated as a QRIP project. ECO 16, one-way FM radio control of air-conditioning condensing units, was evaluated for Family Housing project funding. Three ECOs were evaluated for NAF facilities funding:

- ECO 1, Add pipe insulation
- ECO 7, Control hot water circulation pumps
- ECO 12, Revise or repair HVAC controls

Table 1 on the following page summarizes the savings, costs, and project economics of the proposed projects. It is recommended the Army fund and implement construction of the energy conservation projects to lower facility utility consumption in order to meet the energy reduction goals of Executive Order 12759 of April 17, 1991.

TABLE 1
ECONOMIC PROJECT SUMMARY

ECO NO.	ANNUAL DEMAND SAVINGS (kW)	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL GAS SAVINGS (MBtu)	TOTAL ENERGY SAVINGS (MBtu)	ANNUAL ENERGY SAVINGS (\$)	ANNUAL DEMAND CREDIT (\$)	NON-ENERGY SAVINGS (\$)	TOTAL COST AVOID (\$)	CONST COST (\$)	SIR	SIMPLE PAYBACK (yrs)
ECP	895	3,692,847	1,818	14,413	102,669	91,807	252	194,726	1,148,881	1.9	5.9
QRIP	0	0	1,001	1,001	4,675	0	6,495	11,170	10,956	12.4	1.0
FAMILY HOUSING	214	0	0	0	0	21,983	0	21,983	81,982	2.8	3.7
OTHER ENERGY PROJECT	69	311,397	(24)	1,039	7,828	7,196	0	15,024	192,644	1.2	12.8
NAF ECO-1	0	4	695	695	3,245	0	0	3,245	3,667	21.0	1.1
NAF ECO-7	0	33,679	378	493	2,624	0	0	2,624	11,003	3.2	4.2
NAF ECO-12	4	173,997	413	1,006	6,366	411	0	6,776	45,699	1.8	6.7
TOTAL	1,182	4,211,924	4,281	18,647	127,407	121,397	6,747	255,548	1,494,832		

EXECUTIVE SUMMARY

PURPOSE OF STUDY

This study was conducted under Contract No. DACA21-91-C-0097, issued by the Corps of Engineers, Savannah District, in September 1991. The study analyzes energy requirements and energy conservation opportunities (ECOs) for selected buildings at Fort McPherson, Georgia.

ECOs EVALUATED

The 17 ECO projects identified in the SOW to be evaluated for selected buildings are listed in Table ES-1 on page ES-2.

During the entrance interview conference, ECO 18 was included. ECO 18, which converts incandescent exit sign light bulbs to fluorescent bulbs, was evaluated for all buildings specified for ECO 15, lighting controls.

Based on discussions with DEH, it was also decided to include the results of previous lighting studies (see Section 1.6), which were originally evaluated as shared energy savings projects. The results are included as ECO 19; economics are based on design, bid, and construction, direct by the Government, rather than by an energy service contractor under a shared energy savings contract.

Subsequent to the field survey, each ECO for each building was reviewed to determine if it was technically feasible. ECOs which are not technically feasible were eliminated from further evaluation. A complete list of these ECOs, and the reasons they were eliminated, are included in Table ES-2 on page ES-3.

In addition, as the facilities were surveyed, some ECOs included in the SOW were found to apply to buildings not identified in the ECO matrix (Annexes B and C). With the approval of DEH, these buildings were added to the original list.

Table ES-3 on page ES-5 contains a building-ECO matrix, indicating which ECOs are:

- Applicable and evaluated projects
- Not applicable and dropped from further evaluation
- Added as an applicable project.

**TABLE ES-1
ENERGY CONSERVATION OPPORTUNITY LIST**

ECO NUMBER	ECO DESCRIPTION
1	Insulate Walls, Roofs, Pipes, and Ducts
2	Insulate Windows
3	Weatherstripping and Caulking
4	Domestic Hot Water Temperature (Measurement Only)
5	Install High Efficiency Electric Motors
6	Economizers
7	Control Hot Water Circulation Pump
8	Install Low-flow Shower and Faucet Fixtures
9	Heat Reclaim from Hot Refrigerant Gas
10	Prevent Air Stratification
11	Replace Street Lights
12	Revise or Repair HVAC Controls
13	Thermal Storage
14	Radiant Heaters and Loading Dock Seals
15	Separate Light Switches
16	Investigate Post Demand Usage
17	Boiler Operation Schedule
18	Replace Exit Sign Bulbs with Fluorescent Bulb Kit
19	Previous Lighting Review Study

**TABLE ES-2
NONFEASIBLE ECOs**

BLDG. NO.	ECO NO.	REASON ECO NONFEASIBLE
22	1	Has adequate insulation
	2	Has double pane windows
	8	Has low-flow fixtures
	12	Has adequate controls for HVAC
27	1	Has adequate insulation
	2	Has double pane windows
28	1	Has adequate insulation
	2	Has double pane windows
40	1	Has adequate insulation
41	1	Has adequate roof insulation
41	2	Has double pane windows
42	1	Has adequate wall, roof, and pipe insulation
61	1	Has adequate insulation
100	1	Has adequate insulation
	2	Has double pane windows
101	1	Has adequate insulation
102	1	Has adequate wall, roof, and pipe insulation
	3	Has adequate caulking and weatherstripping
105	1	Has adequate wall, roof, and pipe insulation
	2	Has double pane windows
109	1	Has adequate wall, roof, and duct insulation
117	4	No DHW in building
131	6	Building has openable windows, thus economizers are not required
155	1	Has adequate insulation
170	6	Building has openable windows, thus economizers are not required
171	6	Building has openable windows, thus economizers are not required

**TABLE ES-2
NONFEASIBLE ECOs
(Concluded)**

BLDG. NO.	ECO NO.	REASON ECO NONFEASIBLE
178	1	Has adequate insulation
	2	Has double pane windows
	3	Has adequate weatherstripping and caulking
179	1	Has adequate insulation
	2	Has double pane windows
	3	Has adequate weatherstripping and caulking
181	2	Has double pane windows
184	1	Has adequate insulation
187	13	Building too small for thermal storage
200	9	Has heat reclaim
206	7	Existing controls are new and in excellent condition
250	12	Has adequate controls for HVAC
358	1	Has adequate insulation
	2	Has double pane windows
360	14	Has air curtains and unit heaters; loading dock seals are not applicable
	10	Building being remodeled such that air stratification will not occur
400	1	Has adequate wall, roof, and pipe insulation
	2	Has double pane windows
	3	Has adequate caulking and weatherstripping
522	1	Has adequate wall, roof, and duct insulation
	2	Has double pane windows
27, 28, 102, 105, 109, 111- 126, 178, 179, 187, 250, 366	5	No motors over 1 horsepower
General	17	This ECO applied to buildings at Fort Gillem, only

TABLE ES-3
BUILDING ECO MATRIX

BLDG #	DESCRIPTION	ECO NUMBER																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
022	Administration	N	N	A	A	A			N				N				A			A*
027	Guest	N	N	A	A	N			A								A			A*
028	Guest	N	N	A	A	N			A								A			A*
040	UPH	N	A	A	A	A			A								A			A*
041	Administration	A	N	A	A	A										A	A		A*	A*
042	Chapel	A	A	N	A	A											A			A*
056	UPH		A*	A*	A	A			A				A				A			A*
058	UPH		A*	A*	A	A			A				A				A			A*
060	UPH		A*	A*	A	A			A				A	A*			A			A*
061	Mess Hall/Lab	N	A	A	A	A											A			A*
062	UPH				A	A			A								A			A*
100	Dental	N	N	A	A	A							A*				A			A*
101	Dental	N	A	A	A	A							A				A			A*
102	Police	A	A	N	A	N											A			A*
105	Lab	A	N	A	A	N											A			A*
109	Guest	A	A	A	A	N			A								A			A*
111	Administration	A	A	A	A	N											A			A*

A - Applicable and evaluated project
N - Not applicable and dropped from further analysis
A* - Added as an applicable project

TABLE ES-3
BUILDING ECO MATRIX

BLDG #	DESCRIPTION	ECO NUMBER																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
112	Administration	A	A	A	A	N											A			A*
114	Administration	A	A	A	A	N											A			A*
116	Administration	A	A	A	A	N											A			A*
117	Classroom	A	A	A	N	N											A			A*
118	Administration	A	A	A	A	N											A			A*
120	Administration	A	A	A	A	N											A			A*
121	Administration	A	A	A	A	N											A			A*
122	Administration	A	A	A	A	N											A			A*
124	Administration	N	A	A	A	N											A			A*
126	Administration	A	A	A	A	N											A			A*
131	Administration				A	A	N					A*					A			A*
155	NCO Club	A	A	A	A	A											A			A*
168	Admin. (VOQ)	A*			A	A			A								A			A*
170	Hospital				A	A	N	A		A		A*	A*			A	A		A*	A*
171	Hospital				A	A	N	A		A		A*	A*			A	A		A*	A*
178	Training	N	N	N	A	N											A			A*
179	Classroom	N	N	N	A	N											A			A*

A - Applicable and evaluated project
N - Not applicable and dropped from further analysis
A* - Added as an applicable project

TABLE ES-3
BUILDING ECO MATRIX

BLDG #	DESCRIPTION	ECO NUMBER																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
181	Administration	A	N	N	A	A	A*			A		A	A*			A	A		A*	A*
184	Storage	N	A	N	A	A	A					A	A*			A	A		A*	A*
187	PX Maintenance				A	N							N			A				A*
200	Administration				A	A			N			A*	A			A			A*	A*
206	Administration				A	A		N								A				A*
246	Administration				A	A	A					A	A			A			A*	A*
250	Library				A	N						N				A				A*
358	Administration	N	N	A	A	A	N					A				A				A*
360	Commissary	A*			A	A				A				N		A				A*
363	Maintenance				A	A			A*							A			A*	A*
366	Storage				A	N					A			N		A			A*	A*
400	Moral Support	N	N	N	A	A										A			A*	A*
401	Bowling				A	A			A*							A			A*	A*
500	Dining Facility				A	A	N	A		A		A	A*			A				A*
514	Day Care				A	A	A					A*								A*
522	Guest	N	N	A	A	A				A						A				A*

A - Applicable and evaluated project
 N - Not applicable and dropped from further analysis
 A* - Added as an applicable project

RESULTS

Of the individual ECOs evaluated, 14 projects had an SIR greater than 1.0 (see Table ES-5 on page ES-11). Those ECOs having an SIR greater than 1.0 are by definition economically feasible. The total estimated construction cost for the 14 projects is \$1,500,675.

Table ES-4 on page ES-9 lists the economic summary of each individual ECO, in ECO number order. Table ES-5 on page ES-11 lists the economic summary of each individual ECO, in order by SIR.

All ECOs determined to have an SIR less than 1.0 should be dropped from further analysis. These include:

- ECO 1, Wall Insulation
- ECO 2, Insulated Windows
- ECO 6, Economizers
- ECO 9, Heat Reclaim from Hot Refrigerant Gas
- ECO 10, Prevent Air Stratification
- ECO 13, Thermal Storage

TABLE ES-4
ECONOMIC SUMMARY OF ECOs, LISTED BY ECO NUMBER

ECO NO.	ANNUAL DEMAND SAVINGS (kW)	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL GAS SAVINGS (MBtu)	TOTAL ENERGY SAVINGS (MBtu)	ANNUAL ENERGY SAVINGS (\$)	ANNUAL DEMAND CREDIT (\$)	NON-ENERGY SAVINGS (\$)	TOTAL COST AVOID (\$)	CONST COST (\$)	SIR	SIMPLE PAYBACK (yrs)	
1-Wall Insulation		NO BUILDINGS WITH SIR GREATER THAN 1.0										
1-Roof Insulation	4	3,164	51	62	318	406	0	724	3,791	3.4	5.2	
1-Duct Insulation	0	29,656	243	345	1,893	0	0	1,893	9,625	4.0	5.1	
1-Pipe Insulation	0	24	880	880	4,110	0	0	4,110	10,717	9.1	2.6	
2-Insulate Window		NO BUILDINGS WITH SIR GREATER THAN 1.0										
3-Caulking	2	22	1	1	5	234	0	240	1,485	2.4	6.2	
4-HW Temp		NOT APPLICABLE - MEASUREMENT ONLY										
5-High Eff. Motor	54	264,518	0	902	6,745	5,594	0	12,339	162,986	1.1	13.2	
6-Economizer		NO BUILDINGS WITH SIR GREATER THAN 1.0										
7-HW Pump Control	0	128,957	876	1,316	7,379	0	0	7,379	33,008	2.9	4.5	
8-Shower/Faucet	0	0	1,001	1,001	4,674	0	6,495	11,169	10,956	12.4	1.0	
9-Heat Reclaim		NO BUILDINGS WITH SIR GREATER THAN 1.0										
10-Air Stratification		NO BUILDINGS WITH SIR GREATER THAN 1.0										
11-Street Lights	0	43,362	0	148	1,111	0	417	1,527	6,917	3.4	4.5	
12-HVAC Controls	93	1,380,662	1,386	6,094	41,678	9,505	1,143	52,327	273,301	2.2	5.2	
13-Thermal Storage		NO BUILDINGS WITH SIR GREATER THAN 1.0										
14-Dock Seals		NOT APPLICABLE										
14-IR Heaters		NOT APPLICABLE										

TABLE ES-4
 ECONOMIC SUMMARY OF ECOs, LISTED BY ECO NUMBER
 (CONCLUDED)

ECO NO.	ANNUAL DEMAND SAVINGS (kW)	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL GAS SAVINGS (MBtu)	TOTAL ENERGY SAVINGS (MBtu)	ANNUAL ENERGY SAVINGS (\$)	ANNUAL DEMAND CREDIT (\$)	NON-ENERGY SAVINGS (\$)	TOTAL COST AVOID (\$)	CONST COST (\$)	SIR	SIMPLE PAYBACK (yrs)
15-Light Control B200	163	761,510	0	2,599	19,419	16,734	0	36,152	142,464	3.8	3.9
15-Light Control	13	46,857	(25)	135	1,077	1,368	0	2,445	28,173	1.3	11.5
16-Demand	214	0	0	0	0	21,983	0	21,983	81,982	3.4	4.5
17-Boiler		NOT APPLICABLE									
18-Exit Sign	12	102,755	0	351	2,631	1,204	(1,181)	2,654	16,567	2.5	6.2
19-Lighting Retrofit	627	1,467,180	0	5,003	37,413	64,368	0	101,781	718,703	2.1	7.1

TABLE ES-5
ECONOMIC SUMMARY OF ECOs, LISTED BY SIR

ECO NO.	ANNUAL DEMAND SAVINGS (kW)	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL GAS SAVINGS (MBtu)	TOTAL ENERGY SAVINGS (MBtu)	ANNUAL ENERGY SAVINGS (\$)	ANNUAL DEMAND CREDIT (\$)	NON-ENERGY SAVINGS (\$)	TOTAL COST AVOID (\$)	CONST COST (\$)	SIR	SIMPLE PAYBACK (yrs)
8-Shower/Faucet	0	0	1,001	1,001	4,674	0	6,495	11,169	10,956	12.4	1.0
1-Pipe Insulation	0	24	880	880	4,110	0	0	4,110	10,717	9.1	2.6
1-Duct Insulation	0	29,656	243	345	1,893	0	0	1,893	9,625	4.0	5.1
15-Light Control B200	163	761,510	0	2,599	19,419	16,734	0	36,152	142,464	3.8	3.9
1-Roof Insulation	4	3,164	51	62	318	406	0	724	3,791	3.4	5.2
11-Street Light	0	43,362	0	148	1,111	0	417	1,527	6,917	3.4	4.5
7-HW Pump Control	0	128,957	876	1,316	7,379	0	0	7,379	33,008	2.9	4.5
16-Demand	214	0	0	0	0	21,983	0	21,983	81,982	2.8	3.7
18-Exit Sign	12	102,755	0	351	2,631	1,204	(1,181)	2,654	16,567	2.5	6.2
3-Caulking	2	22	1	1	5	234	0	240	1,485	2.4	6.2
12-HVAC Controls	93	1,380,662	1,386	6,094	41,678	9,505	1,143	52,327	273,301	2.2	5.2
19-Lighting Retrofit	627	1,467,180	0	5,003	37,413	64,368	0	101,781	718,703	2.1	7.1
15-Light Control	13	46,857	(25)	135	1,077	1,368	0	2,445	28,173	1.3	11.5
5-High Eff. Motor	54	264,518	0	902	6,745	5,594	0	12,339	162,986	1.1	13.2
TOTAL	1,183	4,228,667	4,413	18,837	128,453	121,396	6,874	256,723	1,500,675	2.7	5.8
4-HW Temp											
2-Insulate Window											
1-Wall Insulation											

NOT APPLICABLE - MEASUREMENT ONLY

NO BUILDINGS WITH SIR GREATER THAN 1.0

NO BUILDINGS WITH SIR GREATER THAN 1.0

TABLE ES-5
ECONOMIC SUMMARY OF ECOs, LISTED BY SIR

ECO NO.	ANNUAL DEMAND SAVINGS (kW)	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL GAS SAVINGS (MBtu)	TOTAL ENERGY SAVINGS (MBtu)	ANNUAL ENERGY SAVINGS (\$)	ANNUAL DEMAND CREDIT (\$)	NON-ENERGY SAVINGS (\$)	TOTAL COST AVOID (\$)	CONST COST (\$)	SIR	SIMPLE PAYBACK (yrs)
9-Heat Reclaim				NO BUILDINGS WITH SIR GREATER THAN 1.0							
6-Economizer				NO BUILDINGS WITH SIR GREATER THAN 1.0							
17-Boiler				NOT APPLICABLE							
14-IR Heaters				NOT APPLICABLE							
10-Air Stratification				NO BUILDINGS WITH SIR GREATER THAN 1.0							
14-Dock Seals				NOT APPLICABLE							
13-Thermal Storage				NO BUILDINGS WITH SIR GREATER THAN 1.0							

ENERGY PROJECT DEVELOPMENT

Individual ECOs were grouped into projects for possible funding under four main funding areas:

- Energy Conservation Investment Program (ECIP) projects
- Non-ECIP, including Quick Return on Investment Program (QRIP), Military Construction Army (MCA) program, and low-cost/no-cost projects
- Family Housing Projects, funded by housing program budgets
- Non-Appropriated Funds (NAF) Projects, funded by agencies and organizations maintaining clubs, commissary, exchange, and related buildings.

Following the Interim Submittal, Fort McPherson DEH provided EMC with a list of buildings which have reimbursed utilities (NAF buildings), plus buildings which are to be torn down in the near future. These facilities were eliminated from the ECO projects. Elimination of these facilities required the ECIP projects recommended in the Interim Submittal to be revised to take into account lower individual ECO construction cost estimates.

At Fort McPherson, one project was evaluated for ECIP funding:

- ECIP Project, including the following ECOs:
 - ECO 1, Add pipe insulation
 - ECO 1, Add roof insulation
 - ECO 1, Add duct insulation
 - ECO 7, Control hot water circulation pumps
 - ECO 11, Replace street lights
 - ECO 12, Revise or repair HVAC controls
 - ECO 15, Lighting controls in Building 200
 - ECO 18, Replace exit signs bulbs with fluorescent bulb kits
 - ECO 19, Previous lighting study review, for light fixture replacements.

One project was evaluated for QRIP funding:

- QRIP Project - ECO 8, Install low-flow shower and faucet fixtures.

One project at Fort McPherson was evaluated for funding by housing program budgets:

- Housing Project - ECO 16, One-way FM radio control of air-conditioning condensing units.

ECOs evaluated for NAF facilities which have an SIR greater than 1.0 and a simple payback less than 8 years, were lumped together for consideration by NAF related organizations.

Three energy projects evaluated for Fort McPherson, did not qualify for ECIP or Non-ECIP funding. Fort McPherson should consider funding these projects through other funding avenues, such as operations and maintenance budgets. These ECOs include:

- ECO-3, Weatherstripping and caulking
- ECO-5, Install high efficiency electric motors
- ECO-15, Separate (automatic) light switches

Table ES-6 on page ES-15 provides an economic summary of projects which should be considered for funding. Overall, there are \$1,148,881 of potential ECIP projects, \$92,938 of Non-ECIP projects, \$60,369 of NAF projects, and \$192,644 of other energy projects to fund.

TABLE ES-6
ECONOMIC PROJECT SUMMARY

ECO NO.	ANNUAL DEMAND SAVINGS (kW)	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL GAS SAVINGS (MBtu)	TOTAL ENERGY SAVINGS (MBtu)	ANNUAL ENERGY SAVINGS (\$)	ANNUAL DEMAND CREDIT (\$)	NON-ENERGY SAVINGS (\$)	TOTAL COST AVOID (\$)	CONST COST (\$)	SIR	SIMPLE PAYBACK (yrs)
ECIP	895	3,692,847	1,818	14,413	102,669	91,807	252	194,726	1,148,881	1.9	5.9
QRIP	0	0	1,001	1,001	4,675	0	6,495	11,170	10,956	12.4	1.0
FAMILY HOUSING	214	0	0	0	0	21,983	0	21,983	81,982	2.8	3.7
OTHER ENERGY PROJECT	69	311,397	(24)	1,039	7,828	7,196	0	15,024	192,644	1.2	12.8
NAF ECO-1	0	4	695	695	3,245	0	0	3,245	3,667	21.0	1.1
NAF ECO-7	0	33,679	378	493	2,624	0	0	2,624	11,003	3.2	4.2
NAF ECO-12	4	173,997	413	1,006	6,366	411	0	6,776	45,699	1.8	6.7
TOTAL	1,182	4,211,924	4,281	18,647	127,407	121,397	6,747	255,548	1,494,832		

RECOMMENDATIONS

- It is recommended the Army fund the construction of the ECIP Project to lower facility utility consumption in order to meet energy reduction goals of the Department of Defense.
- It is recommended the Army fund construction of the QRIP Project and Housing Project to lower facility utility consumption in order to meet energy reduction goals of the Department of Defense.
- It is recommended the results of the energy evaluations on NAF buildings be provided to the related organizations for possible funding.

ENERGY CONSUMPTION

Electricity, natural gas, and water and sewer use will be conserved if the ECOs identified in this study are implemented.

Electrical energy consumption for FY90 and FY91 is tabulated in Table ES-7 on page ES-17. The average monthly electrical consumption varies from a minimum of 2,725,200 kWh in November, to a maximum of 4,348,800 kWh in August. Electrical consumption for Building 200 is 32% of the total electrical energy used at Fort McPherson. The electrical consumption of Building 200 for FY90 and FY91 is also presented in Table ES-7 for information purposes.

Natural gas consumption for FY90 and FY91 is tabulated in Table ES-8 on page ES-18. The average monthly natural gas consumption varies from a minimum of 13,718 therms in August, to a maximum of 155,068 therms in January.

**TABLE ES-7
ELECTRICAL ENERGY CONSUMPTION
FORT MC PHERSON**

Month	Post-wide Electrical Consumpt. kWh, FY90	Post-wide Electrical Consumpt. kWh, FY91	Bldg. 200 Electrical Consumpt. kwh, FY90	Bldg. 200 Electrical Consumpt. kWh, FY91	Post-wide Electrical Consumpt. kWh Avg.90/91	Bldg. 200 Electrical Consumpt. kWh Avg.90/91
Oct.	2,966,400	3,290,400	1,163,200	1,298,400	3,128,400	1,230,800
Nov.	2,512,800	2,937,600	1,328,800	1,262,400	2,725,200	1,295,600
Dec.	3,081,600	2,865,600	1,206,400	1,217,600	2,973,600	1,212,000
Jan.	3,441,600	2,844,000	1,155,200	1,152,800	3,142,800	1,154,000
Feb.	2,577,600	2,844,000	1,207,200	1,295,200	2,710,800	1,251,200
March	2,937,600	2,671,200	1,044,000	1,100,000	2,804,400	1,072,000
April	2,620,800	3,110,400	1,046,400	1,315,200	2,865,600	1,180,800
May	3,088,800	3,038,400	1,128,000	1,113,600	3,063,600	1,120,800
June	3,686,400	3,513,600	1,188,800	1,274,400	3,600,000	1,231,600
July	3,801,600	4,226,400	1,163,200	1,449,600	4,014,000	1,306,400
Aug.	4,471,200	4,226,400	1,269,600	1,240,800	4,348,800	1,255,200
Sept.	3,672,000	3,607,200	1,590,400	993,600	3,639,600	1,292,000
TOTAL	38,858,400	39,175,200	14,491,200	14,713,600	39,016,800	14,602,400

**TABLE ES-8
NATURAL GAS CONSUMPTION
FORT MC PHERSON**

Month	Post-wide Natural Gas Consumption (Therms - FY90)	Post-wide Natural Gas Consumption (Therms - FY91)	Post-wide Natural Gas Consumption (Therms - Avg.)
Oct.	40,565	33,899	37,232
Nov.	69,750	71,820	70,785
Dec.	128,769	117,323	123,046
Jan.	147,128	163,007	155,068
Feb.	113,588	122,905	118,247
March	93,751	99,507	96,629
April	57,239	30,242	43,741
May	19,608	16,032	17,820
June	15,426	13,597	14,512
July	14,101	12,819	13,460
Aug.	13,957	13,479	13,718
Sept.	15,100	13,974	14,537
TOTAL	728,982	708,604	718,793

The percentage comparison of historical consumption and costs for electricity and natural gas is tabulated in Table ES-9 below. Table ES-10 below provides a comparison of the percent of energy and dollars saved after the ECOs recommended are implemented.

**TABLE ES-9
FY91 UTILITY USAGE AND COST COMPARISON**

UTILITY	CONSUMPTION FY91		COST FY91	
	(MBtu)	(%)	(\$)	(%)
Electricity	133,705	65	1,897,111	82
Natural Gas	70,860	35	421,996	18
Total	204,565	100	2,319,107	100

**TABLE ES-10
PERCENT ENERGY AND DOLLAR SAVINGS**

UTILITY	ENERGY SAVINGS			DOLLAR SAVINGS		
	Base Energy (MBtu)	Energy Savings (MBtu)	Percent Savings (%)	Base Energy (\$)	Energy Savings (\$)	Percent Savings (%)
Electricity	133,705	14,375	10.8	1,897,111	107,381	5.7
Natural Gas	70,860	4,281	6.0	421,996	19,992	4.7
Total	204,565	18,656	9.1	2,319,107	127,374	5.5