COUNCIL ACTION FORM

SUBJECT: ENERGY EFFICIENCY AND CONSERVATION BLOCK GRANT PROJECT SELECTION

BACKGROUND:

As part of its program to stimulate the economy, the federal government established an Energy Efficiency and Conservation Block Grant (EECBG) program. The City of Ames received notice that it was eligible to receive a direct grant of \$544,000 for qualifying projects. Council last considered this program at two meetings in June, 2009, and directed that the City's grant application include the projects shown below. Council selection of actual projects was to be determined <u>after</u> the grant was received and the highest priority alternatives had been studied and evaluated.

INITIATIVE	DESCRIPTION	POSSIBLE PROJECTS (with estimated costs)	
MAJOR ENERGY EFFICIENCY IMPROVEMENTS TO CITY FACILITIES	Create at least one "showcase City facility" by installing energy efficient lighting systems, heating/cooling systems (such as ground source heat pumps), solar power generation, wind energy, and/or other energy- saving improvements at existing City facilities	 Replace City hall heat pumps with ground source heat pumps (\$500,000) Complete energy efficiency re-make of Animal Control facility (\$100,000) 	
STREET LIGHTING & PARKING LOT LIGHTING DEMONSTRATION PROJECTS	 Replace mercury vapor street lights with LED or inductive lighting along an arterial street corridor Replace existing public parking lot lighting with LED or inductive lighting 	 City Hall west parking lot (\$18,000) Mortensen Rd. from State Ave. west to Middle School, (\$31,500) 	
ENERGY CONSERVATION EDUCATION	Expand community education efforts to educate and persuade citizens to reduce fossil fuel use and energy emissions.	 Collaborate with Ames Community School District in conservation education for students (\$9,000) Purchase a "solar tent" from Iowa Thin Film Technologies, Inc. for use at public events Enhance Electric Services' Demand Side Management 	

INITIATIVE	DESCRIPTION	POSSIBLE PROJECTS
		(DSM) programs
		to encourage energy savings through water conservation
HYBRID VEHICLES	Replace additional City vehicles with hybrid vehicles	• Sedans - \$23,000 each (grant covers increment only)

After extensive discussion on June 23, the Council's top priorities seemed to be energy efficiency improvements to City facilities and the parking lot/street lighting pilot projects.

Based on Council's direction, staff submitted the needed paperwork and the grant was awarded in November. However, representatives of the Department of Energy (DOE) indicated that additional detail on these proposals was needed before the potential projects could be approved. Subsequently, staff used \$13,500 of the EECBG money to conduct preliminary architectural/engineering studies for the Animal Control and City Hall projects. The results of these two studies are summarized in the detailed project descriptions below.

CITY HALL HEAT PUMP REPLACEMENT PROJECT

The goal of this project is to replace the existing heat pumps with new, more energy efficient heat pumps. These new heat pumps should be compatible with the use of a geothermal well field that could potentially be installed in the future.

Currently, there are 171 heat pumps in City Hall that were installed new in 1990 during the renovation of this building. These heat pumps have outlived their expected life by five years and are less energy efficient than today's units. This project includes replacing all 171 of these heat pumps, plus adding two new units to areas that have been remodeled or enclosed since 1990. Approximately 30 of these heat pumps are in areas of the building that are scheduled for major remodeling, which will include replacing those heat pumps through a coordinated effort between this project and the City Hall basement/Police Department renovation project. This latter project is being financed through a federal Homeland Security Grant plus \$600,000 in general fund monies.

Evaluation of this heat pump replacement project was completed by a third party architecture/engineering firm, and included construction cost estimates, life-cycle cost analyses, a review of the existing thermostat control system, and recommendations.

The life-cycle cost analysis utilized the "Energy Efficiency Ratio" (EER) to rate the heat pumps. The heat pumps currently in service are rated at 10.1 EER. New heat pumps are rated at two levels – 14 EER and 16 EER. Upgrading to new heat pump models involves the following factors which were taken into account in the analysis:

- 1. New models have larger cabinets that add expense for additional duct and piping reworks.
- 2. Higher efficiency pumps are available only in larger capacities, consequently some lower efficiency units still must be installed in areas requiring smaller units.
- 3. Higher efficiency units have more features than are needed in our situation, and that may add to cost but not to energy savings.
- 4. Any new heat pump will be an improvement over the existing units. However, the energy modeling shows that there is not a large savings in energy between the 14 EER and 16 EER units. While the 16 EER units have a 30% savings in compressor energy, compressor energy accounts for only 20% of the total building energy usage. The energy savings simple pay-back for the 16 EER units would be over 200 years.

For the reasons cited above, use of the 16 EER heat pump units is not recommended. The cost and savings for the 14 EER units are as follows:

	173 - 14 EER heat pumps
Project Cost	\$ 926,600
Annual Energy Reduction	69,358 kWh
Annual CO2 Reduction	57 Tons (3.7% reduction)

The engineering analysis determined that we should limit the design of the heat pump replacements to units which approximately match in dimensions and electrical requirements of the current heat pumps. This will allow 3 to 4 different reputable manufactures to bid, while keeping the installation cost down. There are no rebates available for water source heat pumps utilizing a conventional system such as the current boiler and fluid combination.

It should be noted that the City Hall Mechanical and Structural Improvements project in the approved 2010-15 Capital Improvements Plan (page 137) shows this project being funded with \$500,000 in EECBG funding and \$380,000 in General Obligation bond proceeds.

ANIMAL CONTROL ENERGY IMPROVEMENT PROJECT

Architectural and engineering review of the Animal Shelter has generated the following menu of energy conservation options, each with a specific cost and pay-back period.

Tier 1—Replace or update systems that provide a return on investment during the <i>anticipated life cycle of the building. With this goal in mind, the actions described below would provide the most cost-effective investments:

Option	Cost	Annual Savings	Payback Period
Energy Recovery Ventilator	\$4,800	\$850	5.6 years
in Kennel Area			

Front Entry Vestibule and	\$12,000-21,000	\$840	14-25 years
Building Insulation			
Tier 1 Total	\$16,800-25,800	\$1,690	

Tier 2—Provide a demonstration project for energy efficiency strategies that might be employed in residential and small business environments. This tier would include all items in the first tier plus four additional components:

Option	Cost	Annual Savings	Payback Period
Change to energy efficient lighting throughout	\$10,000	\$470	21 years
Update all mechanical systems (Furnace and A/C)	\$7,000	\$400	17 years
Replace water heater	\$1,400	\$60	23 years
Replace plumbing system	\$1,400	\$100	14 years
Tier 2 Total	\$19,800	\$1,030	

Tier 3—Additional options that exceed the anticipated life of this building but which could be incorporated to enhance the value of this site as an educational setting:

Option	Cost	Annual Savings	Payback Period
Geothermal Heat Pump	\$12,000-\$14,000	\$400	30-35 years
Greywater recycling	\$3,500	\$80	44 years
Solar Radiant Floor Heat	\$44,000	\$350	126 years

If Council desires to pursue the Animal Control Energy Improvement Project, direction should be given regarding which tiers or individual elements Council desires to include.

PARKING LOT LIGHTING PILOT PROJECT

In response to Council's request that an LED parking lot lighting project be identified, staff has developed a plan wherein twelve existing high pressure sodium luminaires could be replaced with twelve LED luminaires utilizing the existing poles and wiring. This project would take place in the parking lot on the west side of City Hall.

	Site		Cost	Annual energy savings
City	Hall	west	\$18,000	\$360 - \$720, with added savings in deferred
parkir	ng lot			maintenance costs over the life of the luminaires

STREET LIGHTING PILOT PROJECTS

Two possible areas were identified for testing of LED light fixtures along collector streets. All installation work would be performed by Electric Services crews.

Location	Cost	Lighting
South 16 th Street (South	\$31,500	Replace existing lights with LED street
Duff to Vet Med)		lighting
Mortensen Road (State	\$31,500	Install 15 new LED street lights along
Avenue to Middle School)		street that is currently unlit

The first test site is along South 16th Street from South Duff Avenue west to the Vet Med College. For \$31,500, the existing street lights along this section of street could be replaced with LED street lighting.

The second test site is along Mortensen Road between State Avenue and the Ames Middle School. For \$31,500, LED lights could be installed on the existing power poles along this section of Mortensen Road. This would involve installation of approximately fifteen LED light fixtures between State Avenue and the Middle School, including one or two lights at the intersection of State & Mortensen to better illuminate that area. The lighting along the roadway would probably be below standards, but lighting would also be provided for the pedestrian/bike trail on the north side of the road.

Action Being Requested

Council is being asked to review the projects described above (City Hall heat pumps, Animal Control Shelter energy improvements, parking lot lighting, and LED street lighting) and to make a final decision regarding which project(s) should actually be funded with the remaining \$530,500 of this EECBG grant.

Based upon Council's final decision, staff will submit a revised application to the DOE for their approval. It should be noted that, with the exception of the Mortensen Road lighting, all other projects that are <u>not</u> funded through this federal EECBG grant may still be considered for funding under the State of Iowa's competitive EECBG grant program.

ALTERNATIVES:

- 1. Select the City Hall Heat Pump Replacement Project for funding with the City's \$544,000 EECBG grant.
- 2. Select the Animal Control Energy Improvement Project for funding with the City's \$544,000 EECBG grant, and allocate the remaining funding to the City Hall Heat Pump Replacement Project.
- 3. Select some other project or combination of projects for funding with this EECBG grant.

MANAGER'S RECOMMENDED ALTERNATIVE:

All of these projects would fulfill the intent of the EECBG program and would contribute to energy efficiency and conservation within the community. However, the 2010-15 Capital Improvements Plan offsets a large portion of the cost of the City Hall Mechanical and Structural Improvements project (\$500,000 out of the \$926,600 total project cost) with this federal EECBG funding. To the extent that this grant is used to fund other projects, the tax-supported GO Bond funding would need to be increased in order to replace the twenty-year-old City Hall heat pumps.

It was staff's understanding that the Council's top priority for these funds was to make energy improvements at the Animal Control Shelter and at City Hall. Given the age and condition of the heat pumps in City Hall, it appears that this project will be needed regardless of the estimated pay-back or carbon reduction achievements. The utilization of this federal funding source will allow us to reduce property tax support for this important project.

Therefore, it is the recommendation of the City Manager that the City Council accept Alternative #1 and select the City Hall Heat Pump Replacement Project for funding with the City's federal EECBG grant.

Even with this action, the Council could still pursue a demonstration project at the Animal Control Shelter by utilizing a portion of the \$100,000 available in a donations account for the facility and/or by pursuing an Iowa Energy Efficiency and Conservation Block Grant for that project.