Project	Jail LED Lights	Park Facilities	Emergency Mgt LED Lights
		Sustainability Initiatives	
Description	Eliminate all the fluorescent and compact fluorescent bulbs that are being used in the Dane County jail on the 6th and 7th floors of the City County building and replace with LEDs. We are currently installing a 32 watt 4' T8 fluorescent tube that is driven by an electronic ballast and this project would replace those with 18 watt 4' LED tubes that utilize a built-in driver. There is a total of 961 light fixtures in the jail and jail emergency evacuation stairwells that each have 2 lamps in each fixture for a total of 1922 lamps in the jail.	The Parks Division is proposing to retrofit park facilities via six sustainability initiatives: 1. Low consumption toilets and urinals will replace the existing toilets and urinals. Ten toilets and ten urinals will be installed at Token Creek Park, three toilets will be installed at CamRock Park, and three toilets will be installed at Goodland Park. The low consumption toilets and urinals will reduce water consumption. 2. Sensor faucets will be installed to replace traditional handle-operated faucets. Ten sensor faucets in total will be installed. The sensor faucets will reduce water consumption by 85% and eliminate wasteful use. 3. Occupancy sensors will be installed in every bathroom. They will automatically turn on the lights when a person enters the bathroom and will stay on for a limited period of time before turning off. Twenty bathrooms will be equipped with occupancy sensors that will reduce energy consumption and wasteful use of electricity.	Replace and enhance 57 productive overhead lighting for common office space, individual office space, and conference room/emergency operations center for Dane County Emergency Management. This lighting upgrade will include replacing all existing fluorescent fixture ballasts and bulbs with LED ballasts and bulbs.

		4. Glass skylights will be installed in bathrooms. The glass in the bathroom ceiling will reduce electricity use during daylight hours. 5. LED restroom lights will be installed to replace existing standard incandescent bulb lighting. The LED bulbs have a 50,000 hour, or 20-year, life which will reduce costs and disposal volume. 6. LED parking lighting will be used to replace the existing metal halide lights. Eight lights will be installed at Mendota Park, six at Goodland Park, and four at Stewart Park. The LED lights will reduce electricity consumption and eliminate the disposal of mercury-laden bulbs.	
Amount requested	\$ 50,000	\$46,800 (added to \$7,560 currently budgeted for labor).	Approx. \$7,000
Estimated Cost	Annual operational cost	Annual operational cost	Annual operational cost
Savings and Other Sustainability	savings: At the rate that the county currently purchases	savings : \$4,487.13	<u>savings</u> : \$4,409 (energy savings and maintenance savings combined)
Benefits	electricity it would be a savings of at least \$110,000 over the life of	Energy conservation	, l
	the lamp (10 year conservative warranty), or approx. \$11,000	savings: \$4,239.09 annually. See the attached Appendix for	Energy conservation savings: \$1,365 annually (based on
	annual county savings plus additional savings for reductions in maintenance for bulb changes.	detailed calculation of energy savings.	estimate that this project will eliminate the consumption of approx. 13,658 kWh annually)

Estimated Cost Savings and Other Sustainability Benefits

Energy conservation savings: \$11,000 annually. This project will eliminate the consumption of approx. 118,000Kwh annually.

Water conservation savings:

None estimated

* Greenhouse Gas Emissions

Avoided: Will eliminate the generation of approx. 108 metric tons of CO₂ equivalent emissions annually (based on energy savings alone). This is equivalent to saving (annually) 12,159 gallons of gasoline or 116,070 pounds of coal that will not be burned or reducing the annual GHG emissions of 22.7 passenger vehicles.

Other environmental, social, and economic benefits:

The improved lighting conditions will help to ensure and maintain the safety of the deputies and non-sworn jail staff, as well as the 388 inmates that the jail is capable of housing.

Maintenance cost savings:

None estimated, but will reduce maintenance via fewer lighting changes. Will be measured.

Project payback: 3.74 years

Water conservation

savings: \$248.04 annually. See the attached Appendix for detailed calculation of water savings.

*Greenhouse Gas

Emissions Avoided: Will eliminate the generation of approx. 11.8 metric tons of CO2 equivalent emissions annually (based on energy savings alone). This is equivalent to saving (annually) 1,331 gallons of gasoline or 12,707 pounds of coal that will not be burned or reducing the annual GHG emissions of 2.5 passenger vehicles.

Another component of the project besides electricity savings is the reduced water use, which would also require less energy needed for delivery (pumping) and treatment (clarifier) at the wastewater facility.

Other environmental, social, and economic

benefits: - Opportunity to educate and do outreach on these improvements at park sites to change public behavior

Water conservation savings:

None estimated

* Greenhouse Gas Emissions

Avoided: Will eliminate the generation of approx. 9.4 metric tons of CO2 equivalent emissions annually (based on energy savings alone). This is equivalent to saving (annually) 1,060gallons of gasoline or 10,116 pounds of coal that will not be burned or reducing the annual GHG emissions of 2 passenger vehicles.

Other environmental, social, and economic benefits:

Replacing overhead fluorescent lighting with LED lights will enhance the quality of light, providing for a better and more effective distribution of light while reducing the glare and brightness of the existing lighting. Additionally, installing dimming capability and motion sensing switches will aid in further energy and cost savings.

Maintenance cost savings:

Approx. \$3,045 annually

<u>Project payback:</u> 0.93 years (based on combined maintenance

Measurement		On a one-to-one utility bill	On a one-to-one utility bill
			segregated out on the bill). Maintenance costs will be reduced because of the anticipated life of the LED bulbs, which will reduce or eliminate maintenance entirely.
Proposed Tracking and Measurement by Department		The project will be tracked based on the energy savings estimates reported from the manufacturers of the products. Once the product is purchased the energy consumption of the new product will be compared to the existing from utility bills.	The project will be tracked based on the energy savings estimates reported from the manufacturers of the products and Focus on Energy. Tracking actual reductions will be difficult to determine due to the manner in which the Public Safety Building is billed for electricity consumption (we are not aware that our office and EOC are specifically
		*Source of emissions calculations: http://www.epa.gov/cleanenergy/ energy-resources/calculator.html	
		Project payback: Approx. 10.5 (for requested amount12 years for total project cost)	
	Energy custom incentive of \$6,930 in rebate once the project is complete). *Source of emissions calculations: http://www.epa.gov/cleanenergy/energy-resources/calculator.html	waste stream - Greater reliability of equipment - No scheduled maintenance for life of lighting Maintenance cost savings: Approx. \$2,700 annually	include an estimated Focus on Energy custom incentive of \$855 minimum in rebate once the project is complete). *Source of emissions calculations: http://www.epa.gov/cleanenergy/ener gy-resources/calculator.html
	(includes an estimated Focus on	- Elimination of heavy metals in	and energy savings) (Does not

Schedule	comparison schedule post- implementation	comparison schedule post- implementation
Actual Outcomes		

Sustainability Principles	Jail LED Lights	Park Facilities Sustainability Initiatives	Emergency Mgt LED Lights
Reduces and eventually eliminates county government's contribution to iossil fuel dependence and to wasteful use of scarce metals and minerals	Yes Through lifecycle reductions in fossil fuel–based energy -No heavy metals used in LED bulbs	Yes - Through lifecycle reductions in fossil-fuel-based energy. - For the LED restroom lighting, the LED's contain no mercury and a recent Energy Department study determined that LEDs have a much smaller environmental impact than incandescent bulbs. - For the LED parking lighting, they will reduce the number of mercury laden metal halide lamps that are frequently removed and disposed in the waste stream. Also, the LED fixtures contain green technology and are mercury and UV free. The finish on the LED lights contains no VOC or toxic heavy metals. - Glass skylights will take	Yes Through lifecycle reductions in fossil fuel–based energy -No heavy metals used in LED bulbs

		advantage of natural daylight, which will result in an energy and costs savings. - LED restroom lights are seven times more energy efficient than the current conventional incandescent lights and will cut energy use by more than 80%. - LED parking lighting will provide an approximately 70% reduction in energy resulting in a cost saving as well as greenhouse gas reductions.	
Reduces and eventually eliminates county government's contribution to dependence upon persistent chemicals and wasteful use of synthetic substances	Yes Through lifecycle GHG emission reductions Will eliminate emission of 108 metric tons of CO2 annually. No heavy metals used in LED bulbs	This project will reduce disposal of both incandescent bulbs (restroom lighting) and metal halide lamps (parking lighting). Will eliminate emission of approx. 11.8 metric tons of CO2 annually.	Yes Through lifecycle GHG emission reductions Will eliminate emission of 9.4 metric tons of CO2 annually. No heavy metals used in LED bulbs

Reduces and eventually eliminates county government's contribution to encroachment upon nature and harm to life-sustaining ecosystems (e.g., land, water, wildlife, forest, soil, ecosystems)	- Reduce GHG impacts on environment - Reduce fossil-fuel related polluted air emissions - Reduce the generation of solid waste.	- Reduces the amount of water delivered to the wastewater treatment plan reducing wastewater fees and volume treated On average the toilets will reduce 1.9 gallons per flush, which equates to approximately 13,000 gallons of water per year (assuming 2 flushes per day during park open season) On average the sensor faucets will reduce approximately 32,000 gallons of water per year (Also, it will reduce sewer costs and water needing treatment at the sewerage plant Occupancy sensors will be installed to reduce lighting costs and save energy during off peak hours.	- Reduce GHG impacts on environment - Reduce fossil-fuel related polluted air emissions - Reduce the generation of solid waste.
Reduces and eventually eliminates county government's contribution to conditions that undermine people's ability to meet their basic human needs	Yes - Reduced fossil fuel-based energy use will reduce polluted air emissions and GHGs and their impacts on	Yes - Reduces wastewater fees paid by the county - Will reduce disposal of	Yes - Reduced fossil fuel-based energy use will reduce polluted air emissions and GHGs and their impacts on public health

public health and safety - Reduced staff time and maintenance will allow staff to spend more time providing other services - Reduced utility costs will free up funding to serve other county resident needs - Ensure and maintain the safety of the deputies and non-sworn jail staff, as well as the 388 inmates that the jail is capable of housing.	materials and associated maintenance costs. - Through potential education and outreach with public, which can lead to greater understanding of and participation in sustainability efforts by public	and safety - Reduced staff time and maintenance will allow staff to spend more time providing other services -Will improve work conditions of staff - This project would be visible to agency representatives within and outside of county government while attending meetings and during emergency operations center activations. This project could be a model for other county departments looking for environmentally friendly lighting projects Reduced utility costs will free up funding to serve other county resident needs

Project	Code Compliance for CNG Vehicle Parking & Maintenance	CNG Upgrade for New Weed Hauling Truck	Treasurer/ Planning and Development Kitchen Efficient Refrigerator
Description	The project includes installation of detectors for CO, NO2, and CH4 (methane), completely new fire alarm systems, increased ventilation and exhaust equipment, new "no open flame" heating units, and emergency gas and electrical shut-offs. **NOTES: Following feedback from the Sustainability Subcommittee, staff also looked into systems that would allow us to completely defuel CNG vehicles, which would allow us to perform maintenance on the vehicles in a normal maintenance shop without building modifications. After talking with several vendors of CNG equipment and other CNG fleet owners, we determined that there is currently no such system available.	Purchase new CNG dump truck to replace old diesel dump truck. **NOTES: The Lakes Management team is responsible for aquatic weed harvesting on all of the County's lakes, as well as performing construction work on many special County construction projects. To help facilitate both of these job roles, Lakes Management owns several dump trucks. These dump trucks are used to haul lake weeds to compost sites and farmers' fields and for hauling rocks, dirt, and construction & demolition debris from county construction sites. One of these trucks is scheduled for replacement in 2014, with \$60,000 budgeted to purchase a used diesel dump truck. The Lakes Management crew is committed to CNG, and would prefer to demonstrate the effectiveness of CNG in a larger	Purchase energy efficient refrigerator to replace 1970s-era refrigerator in new shared kitchen. **NOTES: Dane County is renovating the 1st floor of the City-County Building, which includes the Treasurer's Office and the Planning and Development Department. As part of the project, a shared break room is designated to provide staff with a space for safe storage, preparation, consumption, and cleanup of more healthy and affordable food and beverage options for lunches and breaks. In addition to a place to eat, the break room is designed to include running water and space for a fridge and microwave. Currently, the Planning and Development Department has been using a 1970s Sears Coldspot 63141 Series side-by-side refrigerator for 13-16 years, which is consuming electricity at a cost that is unsustainable compared to that of

NOTES: Although building code compliance for CNG vehicles can be done on new buildings for very little additional expense, that is not always the case on existing. older buildings. That is because, as building codes change, older buildings are often grandfathered in. They usually do not need to perform significant upgrades to comply with new building codes until a large enough renovation project is undertaken in that building.

In this case, the upgrades we need to make to the HVAC and alarm systems for CNG vehicles trigger a code requirement to bring the entire space up to current building codes.

By improving the buildings to meet current building and safety codes, not only will we be accommodating CNG vehicles. We will also be improving worker comfort and worker safety through increased ventilation and new fire, CO, NO2, and CH4 detection and alarm systems.

vehicle such as this dump truck rather than using diesel. To this end, they searched tirelessly for a used CNG dump truck, but were unable to find one. In the absence of a used CNG dump truck, the only other option, if the county is to purchase a CNG vehicle, is to purchase new. Staff obtained a quote for a new CNG dump truck for \$136,310.

NOTES: The county's cost to produce CNG at our Robertson Road fueling station is \$2.00 per gallon less than the county's cost to purchase diesel fuel. Based on the odometers of our existing dump trucks, this vehicle will travel approximately 10,000 miles per year, with a listed fuel efficiency of 5 mpg. Based on those numbers, this CNG truck will displace 2,000 gallons of diesel per year, save \$4,000/yr in fuel costs and have a projected payback of 19 years. This vehicle is expected to last 40 years, so there would be a total fuel savings of \$160,000 over the life of the vehicle (based on current fuel costs). As a point of reference for the expected vehicle life, the next three dump trucks that are slated for replacement were built in 1971 and 1972 and are still in use today.

purchasing a new, efficient Energy Star model (see Appendix B).

		It is also worth noting that the 3 FTEs in this program have taken three separate training courses for: 1) CNG kit installation on vehicles; 2) maintenance of CNG vehicles; and 3) maintenance of CNG fueling stations. In addition, this vehicle is housed at the Robertson Road shop. This is where the County has a CNG fueling station already installed, making it an ideal candidate for CNG.	
Amount requested	\$480,000	\$76,310 (would be added to \$60,000 currently budgeted for truck replacement)	\$644
Estimated Cost Savings and Other Sustainability Benefits	Energy conservation savings: None estimated. Energy savings would come indirectly through the existing and any additional CNG vehicles the county is able to acquire by virtue of having a compliant facility in which to store and maintain the CNG vehicles. Water conservation savings: None estimated Greenhouse Gas Emissions Avoided: Again, GHG emissions avoided would	Annual operational cost savings: \$4,000/yr in fuel costs (based on current truck mileage and diesel costs.) This vehicle is expected to last 40 years, so there would be a total fuel savings of \$160,000 over the life of the vehicle. Energy conservation savings: A CNG truck will displace 2,000 gallons of diesel fuel per year.	Annual operational cost savings: \$203.16 per year (based on energy savings) Energy conservation savings: The project is estimated to save the county 1410.825 kWh per year (a 79% improvement in efficiency) Water conservation savings: None estimated Greenhouse Gas Emissions Avoided: Will eliminate the generation of approx. 1 metric ton of CO2 equivalent emissions

come indirectly through the existing and any additional CNG vehicles the county is able to acquire by virtue of having a compliant facility in which to store and maintain the CNG vehicles.

Other environmental, social, and economic

benefits: Worker safety and comfort. Increased efficiencies and savings for other county departments.

This project will allow the Highway Department and all County Department to expand their CNG fleet.

Maintenance cost

savings: The project will reduce maintenance expenses through the ability to do inhouse maintenance on CNG vehicles rather than sending them out. These savings could accrue

<u>Project payback</u>: None estimated.

Water conservation savings:

None estimated

Greenhouse Gas Emissions

Avoided: Increased use of CNG and BioCNG reduces carbon monoxide by 90%, ground-level ozone emissions by 75%, and greenhouse gas (GHG) emissions by 25%. It produces little or no fine particle pollution. BioCNG reduces life-cycle GHG emissions by 90%. Based on these rates, this dump truck will reduce emissions by 4.9 metric tons of CO2e if using CNG and 17.64 tons of CO2e if using BioCNG.

Other environmental, social, and economic benefits:

Reduced fuel costs will free up funding to serve other county resident needs.

This will demonstrate that CNG can successfully be used in large vehicles such as dump trucks. There are more dump trucks that the county owns, with three in the Lakes Management program scheduled for replacement in the next couple of years. In addition,

annually (based on energy savings alone). This is equivalent to saving (annually) 109 gallons of gasoline or 1,045 pounds of coal that will not be burned or reducing the annual passenger vehicle miles driven by 2,316 miles.

Other environmental, social, and economic benefits:

This project can serve as a pilot test for improving energy efficiency across the county. It is my understanding that there is no established baseline for energy consumption by existing refrigerators and other break room appliances throughout Dane County offices. The effort put into preparing calculations for this report may prove that a countywide survey and upgrade in break room appliances could greatly improve the environmental and financial sustainability of county operations.

Maintenance cost savings:

None estimated.

Project payback: 3.1 years.

the county owns other large pieces of off-road equipment, all of which use large amounts of fuel. By demonstrating CNG on this dump truck, the county will be more prepared to switch other large pieces of equipment to CNG as CNG options become available for those types of equipment.

This will also increase CNG usage at our existing CNG fuel pump. With increased CNG usage at this pump, our cost per gallon of CNG for all county users decreases. This is due to the fixed monthly costs of the CNG station being spread out over more gallons. With decreased costs per gallon for CNG, this will make CNG even more attractive to other County Departments as they consider future vehicle purchases.

Maintenance cost savings:

None estimated

Project payback: 19 years. This vehicle is expected to last 40 years. As a point of reference for the expected vehicle life, the next three dump trucks that are slated for replacement were built in 1971 and 1972 and are still in use today.

Proposed Tracking and Measurement by Department

We are continuing to track the total amount of CNG used as a measure of the total amount of gasoline and diesel displaced. The amount of CNG used is readily tracked via our fuel management system, which is managed by Jim Matzinger. The amount of CNG fuel used can quickly be used to calculate an emission reduction.

All users of the CNG pump at Robertson Road must have a county-issued fuel card to use the pump. Similar to what is currently done for the diesel dump trucks at this location, the fuel card will be designated for this CNG dump truck only. The amount of CNG dispensed to this vehicle will be tracked via our fuel management card system, which is managed by Jim Matzinger. The amount of CNG fuel dispensed can quickly be used to calculate an emission reduction associated with this building.

Every four years, after measuring the electricity demands for a week, the measured kWh would be recorded on the Appliance Cost of Operation Calculation Worksheet to calculate the cost of operating the current refrigerator. Then, the measured/calculated values can be used to compare the Current Fridge Operational Cost to a New Fridge Operational Cost if purchased that year (a replacement unit will need to be determined for this calculation). When the cost-savings breaches a 75% cost-savings in operation by purchasing a new refrigerator, then time has come to replace the current unit. The cost-savings is calculated by the following formula:

(Current Fridge Operational Cost – New Fridge Operation Cost) ÷ (Current Fridge Operational Cost) If a 75% cost-savings never occurs, then the refrigerator can continue to be used until it no longer operates and can then be replaced with a more sustainable model. SMART funds would be appropriate if and when the cost-savings does breach the 75% operations cost (see Appendix H).

Measurement Schedule	Not established.	Not established.	Initially, post-implementation and then every 4 years.
Actual Outcomes			

Sustainability Principles	Code Compliance for CNG Vehicle Parking & Maintenance	CNG Upgrade for New Weed Hauling Truck	Treasurer/ Planning and Development Kitchen Efficient Refrigerator
Reduces and eventually eliminates county government's contribution to fossil fuel dependence and to wasteful use of scarce metals and minerals	Yes Indirectly. Through switch to CNG or bio-CNG and diesel fossil fuel reduction	Yes Fossil fuel–based electricity reduction	Yes Fossil fuel – based electricity reduction
Reduces and eventually eliminates county government's contribution to dependence upon persistent chemicals and wasteful use of synthetic substances	Yes Indirectly. GHG and other criteria air pollutant emission reductions from diesel fossil fuel reduction	Yes GHG and other criteria air pollutant emission reductions from electricity use reduction	Yes GHG and other criteria air pollutant emission reductions from reduction in natural gas use
Reduces and eventually eliminates county government's contribution to encroachment upon nature and harm to life-sustaining ecosystems (e.g., land, water, wildlife, forest, soil, ecosystems)	Yes Indirectly. - Reduce GHG impacts on environment - Reduced fossil fuel consumption will reduce polluted air emissions	Yes - Reduced GHG impacts on environment - Reduced fossil fuel-based energy use will reduce polluted air emissions and GHGs	Yes - Reduced GHG impacts on environment - Reduced fossil fuel-based energy use will reduce polluted air emissions and GHGs

- Reduced fossil fuel-based energy use will reduce polluted air emissions and GHGs and	- Reduced fossil fuel-based energy use will reduce polluted
county resident needs - Improved staff safety - Reduced maintenance of new system will allow staff to spend more time on other county projects	air emissions and GHGs and their impacts on public health and safety - Reduced energy costs will free up funding to serve other county resident needs
	and safety - Reduced energy costs will free up funding to serve other county resident needs - Improved staff safety - Reduced maintenance of new system will allow staff to spend more time on other