



CITY OF KIRKLAND
Department of Public Works
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MEMORANDUM

To: Marilynne Beard, Interim City Manager

From: Ray Steiger, P.E., Interim Public Works Director
Donna Burris, Internal Services Manager
Van Sheth, Management Analyst

Date: May 6, 2010

Subject: ENERGY EFFICIENCY & CONSERVATION BLOCK GRANT - PROJECT UPDATE

RECOMMENDATION:

It is recommended that Council approve the reprogramming of \$54,000 in 2009 Grant funds from the City Hall parking lot light upgrades to upgrades of the public street lights in Juanita Village and additional traffic signal conversions.

BACKGROUND:

The American Recovery and Reinvestment Act of 2009 provided multiple funding opportunities for local governments; one such opportunity is the Energy Efficiency and Conservation Block Grant (EECBG). The overall intent of the EECBG Program is to assist eligible entities in creating and implementing strategies to:

- Reduce fossil fuel emissions in a manner that is environmentally sustainable and, to the extent practicable, maximize benefits for local and regional communities;
- Reduce the total energy use of the eligible entities; and
- Improve energy efficiency in the building sector, the transportation sector, and other appropriate sectors.

The City of Kirkland received \$211,500 in EECBG funding, and staff from various departments met to discuss potential uses of this grant funding. The uses developed were consistent with Kirkland's emissions goals and Climate Protection Action Plan. At their May 19, 2009 meeting, Council approved Staff recommendations from a menu of project options (Table 1 and Attachment A).

Although optimistic during the identification of the various projects, it has become apparent during the last year of investigation and staff work with Puget Sound Energy, that the concept proposed in Project #1 is not feasible with today's technology. The lighting conversion that was originally envisioned for the existing City Hall parking lot lights is not compatible with the lights. The electronics used in the existing City Hall lights do not have an LED conversion "kit" that is made. The costs to replace all of the existing lights to be LED compatible far exceed the grant amount and with the pending City Hall

expansion and/or renovation can be addressed at that time. Because the use of the funds is somewhat flexible within the City's objectives, Staff is proposing an alternate use for the \$54,000 originally programmed to the City Hall parking lot light modifications.

<i>Project #</i>	<i>Description</i>	<i>Est Cost</i>	<i>Status</i>
1	<i>Convert City Hall Parking Lot Lights to LED Technology</i>	<i>\$54,000</i>	<i>Not feasible</i>
2	<i>Convert Traffic Signals to LED Technology</i>	<i>\$69,500 (after rebates)</i>	<i>Compiling list of mat'ls</i>
3	<i>Replace Single Pane Windows & Skylights at F S # 27</i>	<i>\$28,000</i>	<i>Contract awarded</i>
4	<i>Positive Energy Program</i>	<i>\$60,000</i>	<i>Pending</i>
<i>TOTAL</i>		<i>\$211,500</i>	

Table 1 – City of Kirkland EECBG Projects (2009)

STAFF PROPOSAL:

The staff proposal has two elements for reprogramming the \$54,000 from the original Project 1: 1)conversion of public street lights in Juanita Village to LED, and 2)converting additional traffic signal lights to LED.

There are a number of public street lights in the Juanita Village development that are compatible with the LED conversion process. With this staff proposal, the 42 overhead area lights in Juanita Village shopping area will be converted from 175 watt lamps to 90 watt LEDs. This continues the objectives of the original City Hall parking lot light conversion by representing a highly visible demonstration project and an opportunity to convey to Kirkland citizens City efforts to reduce energy costs as well as greenhouse gas emissions in our municipal operations. This element of reprogrammed funds is estimated to use \$35,000.

The second element of the staff recommendation is to utilize the remaining \$19,000 on additional traffic signals.

Attachment A

**City of Kirkland
ENERGY EFFICIENCY & CONSERVATION BLOCK GRANT
(May 2009)**

PROJECT DESCRIPTIONS

Project 1 - Convert City Hall Parking Lot Lights to Light-Emitting Diode (LED) Technology

Staff Contact: Donna Burris

Converting the 19 overhead area lights in the City Hall parking lot from 250 watt lamps to 90 watt LEDs represents a highly visible demonstration project and an opportunity to convey to Kirkland citizens that the City is striving to lead by example by making efforts to reduce energy costs as well as greenhouse gas emissions in our municipal operations. Also, the upgrade to LED lighting will reduce the maintenance needs as the lifetime of LED can be translated into a 10 to 15 year life expectancy. In contrast, conventional lamps burn out after 2 to 4 years incurring higher manpower and related maintenance costs for bulb replacement.

Total energy savings at 11 hours a day are estimated to be 12,205 kWh and a savings of 6 tons of carbon dioxide equivalent (CO₂e). Staff has begun discussions with Puget Sound Energy (PSE) regarding a potential joint venture in which PSE would fund 5-10 of the area lights. This project can be completed in 2-4 weeks. Without stimulus funding, budget constraints will limit our ability to upgrade to this more efficient lighting. Since this work would be conducted with in-house labor, indirect jobs created/maintained would be in the manufacturing of the LED lamps and poles.

Project 2 - Convert Traffic Signals to LED Technology

Staff Contact: Donna Burris

Currently, approximately 44% of the City of Kirkland's signal system has been converted to LED amounting to 454 of the total 1,028 signal lamps leaving 574 remaining to be converted. This conversion has been accomplished over time as City crews replaced existing lights with LED. The City has received PSE rebates for a total of 171 red and green signals for a total rebate of \$3,196. In the past the yellow ball has not been converted to LED as it is utilized very little and lasts much longer compared to red and green incandescent bulbs; however, the yellow LED lamp requires 7-12 watts vs. the current incandescent version which requires 170 watts – a significant opportunity for energy savings.

If the City pursues a system-wide LED conversion to include 3M signal types, pedestrian indicators and yellow signals, a total of 1,077 signals remain to be converted for a total cost after PSE rebates of \$167,325. The Street Manager is confident current staff can complete the conversion and meet the demands of the grant, total staff time to complete the job would equate to 1400 labor hours or \$44,000. A summary of what remains to be converted and additional details about this program can be found in Attachment A. A lower level of funding could be utilized to replace a portion of the remaining incandescent signals.

Project 3 - Replace Single Pane Windows and Skylights at Fire Station 27

Staff Contact: Donna Burris

Retrofitting the 16 single-paned windows and 8 skylights at Fire Station 27 located at 11210 NE 132nd Street in north Totem Lake can be seen as an example of the City's efforts to reduce energy costs as well as greenhouse gas emissions in our municipal operations. Energy efficient windows reduce the amount of energy needed to heat and cool the building. According to Environmental Protection Agency's ENERGY STAR, this project offers a savings of 25 million British Thermal Units (BTUs) and 4 tons of CO₂e. This project will be completed Spring 2010. Indirect jobs created/maintained would be in the manufacturing and installation of windows.

Project 4 – Positive Energy Program

Staff Contact: Erin Leonhart

Puget Sound Energy is contracting with OPower formerly Positive Energy (<http://www.opower.com>) and partnering with cities to provide energy reporting for residential customers (see Attachment B – sample report). The report contains information and analysis about electricity and natural gas consumption in comparison with a resident's neighbors to help increase understanding about energy usage. The report also provides personalized action steps to reduce utility usage and costs. Reports are customized for the community and provide information about City programs and opportunities.

This program would present a helpful outreach method to engage the community about the Climate Protection Action Plan and encourage behaviors that will reduce the community's greenhouse gas emissions. OPower employs a statistical test and control methodology to sample energy use results over meaningful time periods (12-24 months) and measure exact impact within the community. Six other east King County cities are considering this program

Project: Convert traffic signals from incandescent to LED

This funding would allow the Public Works Department to complete the conversion of incandescent signals to LED. Expanding energy efficiency efforts in our operations will help us with compliance of the US Mayors' Climate Protection Agreement and the resolution adopting greenhouse gas reduction targets. Since traffic signals operate 24 hours a day, 365 days a year, the opportunity for energy savings is significant. When compared with incandescent light bulbs LED signals are far superior; Benefits of LED signals include:

- Energy Efficient
- Increased Safety
- Cost Savings
- Proven Technology

LED signals are much more **Energy Efficient** than incandescent light bulbs. LED signals:

- Use less electricity to produce the same amount of light output as traditional traffic signals; consuming 80-90% less energy or 15- 20 watts compared to 100
- Use less energy therefore, lower greenhouse gas emissions and lower energy costs
- Reduced impacts on the environment can be measured and reported fairly easily

LED signals are proven to increase the **Safety** of motorist; through:

- Improved visibility
 - the vibrant colors are much more visible to the elderly,
 - and do not "wash out" in the morning and afternoon when the sun is shining directly into them
- High reliability
 - because LED's are made without filaments they have a very low chance of burning out;
 - many Cities report a 150%+ reduction in failures,
- Emergency backup systems
 - Since only a very small amount of energy is required to operate, operating signals using an emergency backup system is feasible. In the future this would enable major intersections to operate during power failures.

Cost Savings realized from:

- Reduced maintenance costs from replacing failed lamps; LED's last 5 times longer than current bulbs; LED lights last 5-10 years compared to one year for incandescent.
- A 90% reduction in power usage will result in lower energy bills.
- PSE is currently offering rebates to agencies that operate traffic signals with electricity supplied by PSE, please see the chart below for details.
- According to the State of Washington, the typical payback rate for converting to LED traffic signals is thought to be approximately 3 years.

The conversion of incandescent signals to LED is **Proven Technology**, one example:

- Portland, Oregon
 - reported an annual energy & maintenance savings of \$400,000 after the conversion;

- and a net payback of less than 3 years.
- Background info:
 - Project cost \$1.0 Million after \$715K in rebates and \$500,000 from Oregon's Business Energy Tax Credit.
 - 140 flashing amber beacons, several light rail transit signals, 6,900 red and 6,400 green incandescent signal lamps were replaced with LED lamps.
- Reported savings:

Energy use & savings:	Before	After
Kilowatt hours per year	\$ 6.1 Mill	\$ 1.2 Mill
Electric costs per year	\$ 420,000	\$ 85,000
Energy savings per year		\$335,000

Maintenance savings:	Before	After
Average lamp life	~ 2 Years	~ 6 Years
Maintenance costs per year	\$ 60,000	\$ 15,000
Maintenance savings per yr		\$ 45,000

*www.portlandonline.com/shared/cfm/image.cfm?id=111737

The City of Kirkland's Traffic Signal System:

Currently, approximately 44% of the City of Kirkland's signal system has been converted to LED amounting to 454 of the total 1,028 signals leaving 574 remaining to be converted. This conversion has been accomplished over time as City crews replaced existing lights with LED. The City has received PSE rebates for a total of 171 red and green signals for a total rebate of \$3,196. In the past the yellow ball has not been converted to LED as it is utilized very little and lasts much longer compared to red and green incandescent bulbs; however, the yellow LED lamp requires 7-12 watts vs. the current incandescent version which requires 170 watts – a significant opportunity for energy savings.

If the City pursues a system-wide LED conversion to include 3M signal types, pedestrian indicators and yellow signals, a total of 1,077 signals remain to be converted for a total cost after PSE rebates of \$167,325. The Street Manager is confident current staff can complete the conversion and meet the demands of the grant, total staff time to complete the job would equate to 1400 labor hours or \$44,000. A summary of what remains to be converted, the cost and associated PSE rebates are described in the table below.

COST OF SIGNALS TO BE CONVERTED

Signal Type	Quantity	LED cost w/new specs (\$)	Total	PSE rebate	LED cost/unit after rebate	Total cost after rebate	Energy Savings / Unit (kwh) LED vs. Incandescent	Total Energy savings per year (kwh) LED vs. Incandescent
Green O	213	\$104	\$22,118	\$20	\$84	\$17,858	494 kwh	105,222 kwh
Green <	22	\$90	\$1,974	\$20	\$70	\$1,534	224	4,928
Red O	140	\$64	\$8,974	\$10	\$54	\$7,574	584	81,760
Red <	12	\$60	\$723	\$10	\$50	\$603	808	9,696
Bi-Modes	23	\$123	\$2,838	\$15	\$108	\$2,493	451*	10,373
Ped Indicators - convert to countdown type	164	\$276	\$45,205	\$10	\$266	\$43,565	498	149,400
Subtotal	574	\$717	\$81,832	\$85	\$632	\$73,627	3059 kwh	361,379 kwh
3M (these do not accept LED lamps so the entire fixture needs to be replaced)	45	\$600	\$27,000	\$35	\$565	\$25,425	451*	20,295
Ped Indicators (from LED to new countdown spec within 10 years)	136	\$276	\$37,487	\$10	\$266	\$36,127	498	149,400
Yellow O	282	\$109	\$30,730	\$5	\$104	\$29,320	100	28,200
Yellow <	40	\$76	\$3,026	\$5	\$71	\$2,826	100	4,000
Total	1077	\$1,777	\$180,075	\$140	\$1,637	\$167,325	3610 kwh	413,874 kwh

*Energy savings is estimated based on an average energy savings of traffic signals.

Conclusion:

LED signals are superior to incandescent in their life length as well as maintenance cost to replace outages. According to PSE, a typical incandescent signal bulb lasts 8,000-10,000 hours versus an LED which lasts 40-50,000 hours. Incandescent signals burn out and must be replaced annually compared to an LED which lasts 2-3 years.

The savings this equipment provides would be of great benefit to our operating budget and the citizens of Kirkland. Even a small conversion reaps big benefits. The chart above shows approximately 413,874 kwh savings. Cities have reported a tremendous amount of energy savings (87.25%) and a significant reduction in utility cost (79.77%) when LED traffic signal technology is implemented. Traffic signal LEDs are energy efficient, durable, cost effective, sustainable, will produce long-term results, and the energy savings is easily measured and reported.

Example of an LED traffic signal:





Account number:

We are pleased to provide this personalized report to you. The purpose of the report is to:

Provide information This report is an educational tool to help you understand your home's energy use in the context of other homes' energy use. This information is private and not shared with anyone else.

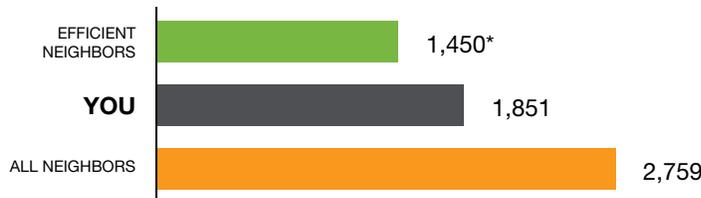
Track progress We will help you learn about how your home's usage changes over time and where you likely have opportunities to save.

Share energy efficiency tips On the back of the report, we provide ideas for saving energy and money. For more ideas, visit our special website at www.psereports.com

*****AUTO**MIXED AADC 430



November Neighbor Comparison | You used **28% MORE** energy than your efficient neighbors.



HOW YOU'RE DOING:



* This energy index combines electricity (kWh) and natural gas (therms) into a single measurement.

WHO ARE YOUR "NEIGHBORS"?

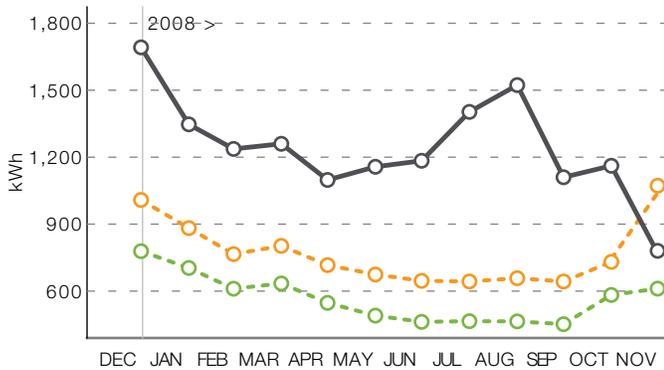
ALL NEIGHBORS
Approximately 100 occupied nearby homes that are similar in size to yours (avg 2,023 sq ft) and have both electricity and natural gas service.

EFFICIENT NEIGHBORS
The most efficient 20 percent from the "All Neighbors" group.

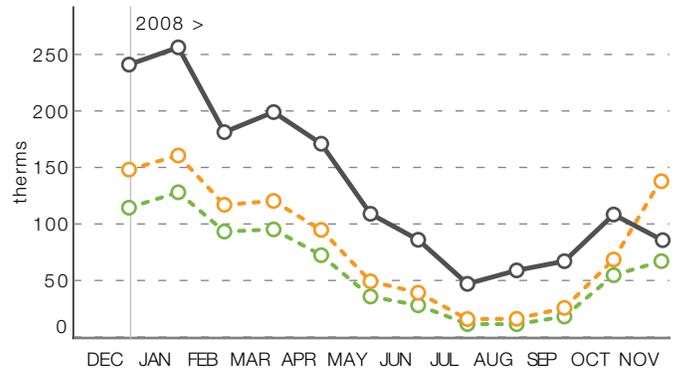
Last 12 Months Neighbor Comparison

You used **74% MORE** energy than your neighbors. This costs you about **\$1,385 EXTRA** per year.

Electricity | 70% more electricity than your neighbors



Natural Gas | 77% more natural gas than your neighbors



Personalized Action Steps

Set your thermostat for comfort and savings

Switch to compact fluorescent bulbs

Upgrade your washer and get money back

Personal Comparison | How your energy use this year compares to last year.

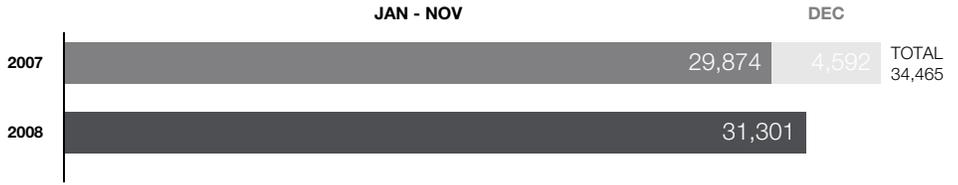
About This Graph

This section shows how much energy you've used so far this year and compares that amount to the same period last year.

As the months go by you can see how your progress compares to last year.

Your Progress

So far this year, you've used **5% MORE** energy than last year.



* This energy index combines electricity (kWh) and natural gas (therms) into a single measurement.

Action Steps | Personalized tips chosen for you based on your energy use and housing profile

Quick Fixes

Things you can do right now

Set your thermostat for comfort and savings

Heating in the winter in our area requires a lot of energy. By setting your thermostat appropriately, you can be comfortable while saving energy and money.

Set the thermostat up to 10 degrees lower than your preferred setting (or off) when you're away from home or sleeping. This temperature reduction can save you up to 10% on heating.

Consider a programmable thermostat to help you save.

SAVE UP TO \$65 IN ANNUAL HEATING COSTS

Smart Purchases

Save a lot by spending a little

Switch to compact fluorescent bulbs

Compact fluorescent light bulbs (CFLs) use 75% less energy and last up to 10 times longer than standard incandescent light bulbs. Replace a few of your incandescent bulbs and start saving money now.

Today's CFLs provide high-quality light and are available in a variety of sizes and shapes.

PSE offers a discount of up to \$3 on certain bulbs—find participating retailers at PSE.com.

SAVE \$60 OR MORE OVER THE LIFE OF A BULB

Great Investments

Big ideas for big savings

Upgrade your washer and get money back

Washing your clothes in a machine uses significant energy, especially if you use warm or hot water. In fact, when using warm or hot water cycles, up to 90% of the total energy used for washing clothes goes towards water heating.

Some premium-efficiency clothes washers use about half the water of older models—resulting in significant savings.

PSE offers rebates for some washers. Contact us for details.

REBATE OF \$100 FOR ELIGIBLE WASHERS

To find more ways to save energy and money and for more information about this report visit:

 www.psereports.com



runs on OPOWER