Climate Action Manual

City & Borough of Juneau

December 2011

CITY & BOROUGH OF JUNEAU
ALASKA'S CAPITAL CITY

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Chapter 1

Energy Use & GHG Inventory

I. METHODOLOGY

The 2008 Local Government Operations Protocol[1] (LGOP) provides overall guidance for conducting baseline and periodic updates of greenhouse gas (GHG) emissions inventories. The LGOP's formed the basis of both the 2007 and the 2010 energy use and GHG inventories for Juneau.

General Reporting Principles

To ensure that greenhouse gas (GHG) data represents a true accounting of community and local government emissions, future GHG inventories should use the following reporting principles:

- *Relevance*: ensure that the CBJ/local government and community-wide greenhouse gas emissions inventories reflect emissions of the local government and the area of the City and Borough of Juneau.
- *Completeness:* account for all internal, energy use, GHG sources, and emissions-causing activities within the CBJ inventory boundary. Determine whether to account for external sources, such as cruise ship, barge and air service that is not currently included.
- *Consistency*: disclose any changes to the data, inventory boundary, methods, or any relevant factors in subsequent inventories. The 2007 and 2010 inventories used consistent boundaries, analysis of data and quantification of emissions. This consistency enables meaningful trend analysis over time, identification of reductions and increases, and comparisons of emissions.
- *Transparency*: disclose all relevant data sources and assumptions, along with specific descriptions of methodologies and data sources. All relevant issues should be addressed and documented in a factual and coherent manner to provide a trail for future review and replication.
- *Accuracy*: ensure that the quantification of GHG emissions in the CBJ report provides a level of accuracy sufficient to enable users to make decisions with reasonable assurance as to the integrity of the reported information.

In addition to these general reporting principles, specifics regarding quantifying GHG emissions for Juneau are discussed below.

[1] ICLEI 2008.

GHGs Assessed

The greenhouse gases estimated for the 2007 and 2010 Juneau emissions reports included: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_20). All GHG emissions were converted to metric tons of CO_2 equivalent ($MTCO_2e$) to allow GHG emissions to be compared and aggregated.

Reporting Frequency

In keeping with international standards, the 2007 and 2010 inventories reported GHG emissions occurring on a calendar year basis. The CBJ local government records, available on a six-month basis, were organized to facilitate reporting by calendar year. The January – June data of a specific year was paired with the July – December data of the same year.

The LGOP recommends that comprehensive inventory emissions be completed at regular intervals following the base year. We recommend that CBJ follow standard practice and conduct annual energy use and emissions inventories.

Significant Changes in Reporting

CBJ should develop qualitative or quantitative criterion to define any significant change to data, inventory boundary, methods, or other relevant factor that would cause a significant change in the base year emissions inventory. For example, an annexation of additional borough land or significant changes in GHG calculation methodology might trigger a need to recalculate base year emissions. Emissions should not be recalculated for organic growth or decline in Juneau, such as an additional mine opening, or decreased economic activity.

Sources Assessed

City and Borough of Juneau GHG emissions inventories for 2007 and 2010 have included both community-wide emissions and, as a subset, local government emissions.

Community-wide Emissions Assessed

Includes all *internal* direct emissions associated with the consumption of electricity and fuel (propane, diesel, gas, aviation fuel, jet fuel, marine fuel, wood) purchased within the boundaries of the City and Borough of Juneau, including electricity and fuel delivered directly to the Greenscreek and Kensington mines; and, waste emissions. These inventories do not include: emissions from barges or cruise ships (only electricity from AEL&P is included), most passenger and freight jet service to and from Juneau (only that portion of Alaska Airlines fuel purchased in Juneau is collected), and waste oil used as heating fuel.

Local Government Emissions Assessed

Includes all fuel tanks and electric meters paid by the City and Borough of Juneau during a calendar year. The 2007 and 2010 reports did not estimate the GHG emissions produced by local government employees commuting to work.

Calculation Methodology

Annual activity data (e.g., gallons of fuel by fuel type, kWhs of electricity) that measures energy use is collected and used to calculate GHG emissions. The activity data is used in conjunction with a LGOP emission factor and global warming factor (GWF) to determine GHG emissions using the following generalized equation:

Activity Data x Emission Factor x GWF = Emissions

The emissions calculated from each activity and each emissions factor is then added to determine the community-wide emissions inventory and a subset are calculated to determine the City and Borough of Juneau local government emissions inventory.

Excel Data Program

We recommend collecting this information in Excel. Excel provides the ability to develop relational databases that are flexible in terms of program compatibility. Using Excel allows for the easiest import of data into programs used to track energy use and GHG emissions (e.g., Portfolio Manager) and provides easy transition to tracking programs that CBJ may choose to use. Excel also enables the development of graphs from tabular data.

2. JUNEAU'S ANNUAL COMMUNITY-WIDE ENERGY USE AND GHG EMISSIONS REPORTS

The following section provides specifics on Juneau's community-wide GHG emissions calculations and, when used in conjunction with the accompanying Excel spreadsheets, streamlines the generation of annual community-wide energy use and GHG emissions updates.

Step 1

Gather primary source data on fuel and electricity sales in Juneau and solid waste disposal.

Fuel Distributors

Contact Juneau fuel distributors by email and follow up with phone calls. Information from each distributor must remain confidential, although aggregate information can be made public. Request yearly sales figures; be sure to ask for all fuel sales in a given year, because from year to year a company may sell different fuels.

1. **Delta Western**: James Davenport, jamesd@deltawestern.com, (907) 586-2800.
2. **Petro Marine**: Jim Cawdrey, Plant Manager, jimc@harborent.com, (907) 586-4400 (office) 907 586-4402 (fax); 907-321-5037 (cell).
3. **Taku Oil:** Jeff Hansen, Sales; jeffhans@gci.net, (907) 586-1276.
4. **Amerigas (propane):** Harry Carpenter, Manager, Harry.Carpenter@amerigas.com.
5. **Arrowhead (propane):** Laura Kronsperger; lkron@ati.lynden.com. Sharilyn Zellhuber; szell@ati.lynden.com (907) 826-2944; propane sent from Seattle to mine site.

Other Fuel Use
Contact local mining operations and Juneau International Airport to obtain information on their fuel obtained directly from distributors outside of Juneau. The businesses and operations obtaining fuel directly from outside distributors may change from year to year.

1. **Kensington Mine:** Kevin Eppers, Coeur Alaska, keppers@coeur.com. In 2010, provided stationary equipment fuel use and emissions. Additional work may need to be done to ensure that all fuel used is accounted for in GHG emissions inventory (e.g., non stationary equipment, marine and/or vehicle gasoline) without double counting (need to subtract Kensington fuel from local distributor if they provided fuel to Kensington).
2. **Greens Creek Mine**: Jennifer Saran, Environmental Affairs Manager, Hecla Greens Creek Mining Company, jsaran@hecla-mining.com, 907-790-8474. Provided total gallons diesel for facilities, total gallons diesel for non stationary equipment, total kWh from AEL&P, total gallons propane (from Juneau distributor) and whether fuel came from Juneau (to avoid double counting).
3. **Juneau International Airport**: John Coleman, Administrative Officer, john_coleman@ci.juneau.ak.us, (907) 586-0960. Provides gallons of fuel pumped at Juneau International Airport, including all fuel pumped by Alaska Airlines. Need to ensure that fuel is not double counted.

Electricity Use
Contact AEL&P for community electrical use (kWh) and diesel use (gallons) in any given year to produce electricity. Scott Willis, scott.willis@aelp.com , (907) 463-6396. Provides residential, commercial, government, streetlights, total kWh's, and total gallons diesel used (these gallons must be subtracted from diesel provided by fuel distributors, to avoid duplicate counting).

Wood Fuel Use
The amount of wood used for fuel (cords and pellet pounds) is calculated on a per household basis as outlined in the appendices of the *2010 Greenhouse Gas Emissions Inventory, City and Borough of Juneau*. To obtain an accurate number of household contact the Juneau Economic Development Council.

To determine if an improved method has been developed for estimating how many households burn pounds of pellets and/or cords of wood, contact Alice Edwards, Alaska Department of Environmental Conservation, alice.edwards@alaska.gov, (907) 465-5109.

Whether or not the GHG emissions from wood burning are determined to be carbon neutral or not, the energy from wood burning should be estimated, and the GHG emissions calculated. Burning wood produces emissions including carbon dioxide, methane and nitrous oxide. In both the 2007 and 2010 studies these emissions have been included in the total GHG emissions.

Solid Waste Disposal
Contact Eric Vance, District Manager, Capitol Disposal, evance@wm.com, (907)780-7801 x-230 (office), (907) 321-2819 (cell). Capitol Disposal provides total tons of solid waste disposal

at the landfill for a calendar year; 80% municipal solid waste and 20% construction/demolition waste. Determination of GHG emissions is outlined in the appendices of *2010 Greenhouse Gas Emissions Inventory, City and Borough of Juneau.*

Step 2

Insert the primary source activity data (e.g., gallons of fuel, kWhs of electricity) gathered in STEP 1 into the Community Base Excel worksheet. See the accompanying spreadsheet entitled: *GHG Community Workbook*. The functions in the Excel spreadsheet will automatically calculate the MMBtu's of energy used and the MTCO2e's of GHG emissions.

The functions imbedded in Sheets 2 and 3 (Energy Use & GHG Emissions by Sector, and Energy Use & GHG Emissions by Source) will automatically calculate and provide information for the tables used in the 2007 and 2010 analyses. These spreadsheets also provide the 2007 and 2010 community-wide energy use and GHG emissions inventory results for comparison purposes.

3. CBJ'S ANNUAL LOCAL GOVERNMENT ENERGY USE AND GHG EMISSIONS REPORT

Few surprises were revealed while working with City and AEL&P staff to gather the 2010 energy use (fuel and electricity) and GHG emissions for CBJ/local government. During the 2007 GHG emissions inventory, confusion regarding tanks and/or meters that were no longer in use were identified and corrected. The 2010 update, identified a small number of fuel tanks that were no longer in use and could be taken off the list, along with new tanks. A yearly review of the CBJ fuel tanks and meters associated with specific facilities or equipment will provide a continuing review and update of these energy use spreadsheets.

The following section provides specific recommendations for tracking the City and Borough of Juneau's local government energy use and GHG emissions. Currently, there are three sets of Excel spreadsheets that contain all the information needed on CBJ energy use:

1. Building oil purchases (Department of Finance, Purchasing);
2. CBJ fleet fuel use (Consumption Statistics by Cost Center); and,
3. CBJ electric use (AEL&P meter readings).

To develop a user-friendly and efficient record keeping system, we recommend building on these three existing record keeping systems. These spreadsheets contain the information needed to track CBJ energy use and GHG emissions. These energy information collection systems should be modified slightly to generate annual updates by building and by department to provide feedback to departments regarding energy use and GHG emissions reduction. These existing tools and recommended modifications for monitoring and reporting energy use and GHG emissions are discussed below.

CBJ Facility Fuel Purchased

CBJ should continue its current practice of gathering data on monthly facility fuel purchase by tank number. This information is provided by the fuel distributor to CBJ and includes the type of fuel, gallons purchased, cost, PDS number, and fuel tank number.

Currently, Diane Andresen, CBJ Purchasing records monthly fuel purchase from contracted distributor by tank number. CBJ Purchasing should add two columns to their spreadsheet to enable these purchases to be sorted by **Building Name** and by **Department**.

To Calculate MMBtu and $MTCO_2e$ from Fuel Purchased

In addition, a column to calculate **MMBtu** and a second column to calculate **$MTCO_2e$** per fuel tank should be added. This will allow CBJ to determine easily the amount of energy purchased (MMBtu) and the corresponding GHG emissions ($MTCO_2e$) from using diesel fuel. The following formulas should be used.

To determine MMBtu:

MMBtus from **diesel #1** = gallons diesel #1 x 0.139
MMBtus from **diesel #2** = gallons diesel #2 x 0.138

To determine $MTCO_2e$, for each fuel:

$MTCO_2e$ = $MTCO_2e$ from CO2 + $MTCO_2e$ from CH_4 + $MTCO_2e$ from N_2O

$MTCO_2e$ **diesel #1** = (gallons diesel #1 x 10.18/1000) + (gallons diesel #1 x 0.0015 x 21/1000) + (gallons diesel #1 x 0.0001 x 310/1000)

$MTCO_2e$ **diesel #2** = (gallons diesel #2 x 10.21/1000) + (gallons diesel #2 x 0.0015 x 21/1000) + (gallons diesel #2 x 0.0001 x 310/1000)

An example of the changes needed in the spreadsheet, based on the six month January-June 2010 Division of Purchasing spreadsheet, is included on the accompanying Excel spreadsheet titled: *6mo CBJ Heating Fuel & GHG Calculations*.

CBJ Fleet Fuel Use Data

CBJ should continue its current practice of recording fleet fuel usage through the individual key fobs assigned to each vehicle. When a vehicle is refueled the operator uses the key fob and records the mileage before the city pump will begin to fill the vehicle. This method collects fleet fuel data on a per vehicle basis. Information that can be obtained from the current system includes how much fuel a vehicle uses in a year, miles per gallon, costs for fuel for each vehicle. This per vehicle data can be aggregated for Departments by cost center.

This system should be used to monitor vehicle, fleet, and department fuel use for vehicles, both the overall fuel use and the miles per gallon per vehicle. Fleet fuel use data can be obtained by Scott Klawonn, CBJ Automotive Shop Supervisor, Public Works, and is already available by Cost Center.

The mileage figure is only as accurate as the number keyed in by the vehicle operator. Vehicle operators should be required check the accuracy of the number that they key in though a duplicate key in requirement, to ensure that both numbers are the same. In addition, mileage inputs should be checked on a regular basis by each division/department and any questionable mileage figures discussed with the person who keyed it in.

To Calculate MMBtu and MTCO2e from Fleet Fuel Data

Currently, the fleet fuel monitoring system includes the following information, vehicle refueled, department, fluid type (diesel/gasoline), Tr. Count, distance (miles), engine hours, consumption (gallons), price (dollars). As noted above, all of this information except the mileage is gather from swiping the key fob before refueling. From this information, miles per gallon, price per mile, gallons per hour and price per hour can be calculated (where applicable). **MMBtu** and **MTCO2e** calculations should be added to the information provided to managers, using the following formulas:

To calculate MMBtus:

MMBtus from **gasoline** = gallons gasoline x 0.125
MMBtus from **diesel #1** = gallons diesel #1 x 0.139
MMBtus from **diesel #2** = gallons diesel #2 x 0.138

To calculate $MTCO_2e$, for each fuel:

$MTCO_2e$ = $MTCO_2e$ from CO_2 + $MTCO_2e$ from CH_4 + $MTCO_2e$ from N_2O

$MTOC_2e$ **gasoline** = (gallons gasoline x 8.78/1000) + (gallons gasoline x 0.000438 x 21/1000) + (gallons gasoline x 0.00029 x 310/1000)

$MTCO_2e$ **diesel** = (gallons diesel x 10.21/1000) + (gallons diesel x 0.000023 x 21/1000) + (gallons diesel x 0.0000275 x 310/1000)

CBJ Electricity Use Data

AEL&P provides CBJ with monthly electricity usage and purchase price by meter number. Currently the information tracked by AEL&P for each CBJ meter includes, Location Code, Fiscal Period, Service Street Name, Primary Name, KWH, and Cost. CBJ should work with AEL&P to include **three columns that identify the Facility Name, Category (e.g., facility, lighting, schools, water, wastewater), and CBJ Department.** Doing this would enable CBJ to sort by the categories included in the 2007 and 2010 emissions inventories and provide specific information on facilities and equipment electrical usage to departments.

Adding these columns would also simplify monitoring electrical use for streetlights, water pumping, and wastewater lift stations.

To Calculate MMBtus and $MTCO_2e$ from Electricity Usage

Two columns should be added to the information currently provided by AEL&P in an Excel spreadsheet format to calculate **MMBtu** and **$MTCO_2e$** according to the following calculations:

To calculate MMBtu:

MMBtus from electricity = MWhs x 3.413

To calculate Total $MTCO_2e$:

We recommend a yearly calculation of $MTCO_2e$ from electricity because the emissions of GHG from Juneau hydropower depends on the number of gallons of diesel burned in any given year to meet Juneau's electric energy demand. To complete this calculation contact AEL&P to determine how many gallons of diesel fuel oil were burned in a given year, and use the following formula:

Total $MTCO_2e$ from diesel burned for electricity production = (gallons of diesel x 10.21/1000) + (gallons of diesel x 0.0015 x 21/1000) + (gallons of diesel x 0.0001 x 310/1000)

To calculate $MTCO_2e$ per KWh:

$MTCO_2e$ per KWh = Total $MTCO_2e$/Total MWh x 1000

To determine the GHG emissions associated with any meter for a specific year, multiply the MTCO2e per KWh by the KWhs of electricity used by the meter.

Chapter 2

Energy Use Tracking

1. GENERAL INFORMATION

Portfolio Manager offers the convenience of tracking all types of energy usage and costs for one or several buildings independently or together; and, provides building and energy managers with an effective tool to assist them with understanding the changes in energy and water use from the implementation of different strategies and actions.

Portfolio Manager, an interactive energy management tool, allows the user to track and assess energy and water consumption for individual facilities as well as across entire building portfolios on a secure online environment. Portfolio Manger is provided at no cost by the U.S. Environmental Protection Agency (EPA). EPA provides free webinars on how to use Portfolio Manger and supports the program. Portfolio Manager is a tested software, used by many local governments to assist with setting investment priorities, identifying under-performing buildings, verifying efficiency improvements, and receiving EPA recognition for superior energy performance.

Setting Investment Priorities

Portfolio Manager assists with setting investment priorities by providing a platform to track energy and water use as compared with the costs of these resources. This tool for understanding the relative costs associated with a given level of performance assists building managers in evaluating investment opportunities for specific buildings and identifying the best opportunities across their portfolio.

Portfolio Manager's built-in financial tool allows manager to compare cost savings across buildings while also allowing the calculation of cost savings for a specific project. Being able to quickly and clearly obtain figures showing cumulative investments in facility upgrades or annual energy costs informs decision making for building energy management. Portfolio Manager can use information CBJ and the State have already gathered concerning past building construction and energy use.

Building Energy Performance

Portfolio Manager tracks how much energy is used by a facility or group of facilities, how energy performance compares to similar facilities, and progress on reaching energy reduction and GHG reduction goals. Portfolio Manager accomplishes this by tracking changes in energy and water use; and, comparing those changes to the facility benchmark before and after energy efficiency improvements. Using Portfolio Manager building managers can share facility specific energy information or aggregate information from several buildings. Energy managers may view all facilities and energy data centrally, while the maintenance of information is done at a building

level. Portfolio Manger can be customize to provide the information most needed, and either group facilities together or track their progress separately.

The Alaska Housing Finance Corporation is benchmarking the energy consumption of public buildings throughout Alaska. This database, when it is released, will allow the CBJ to compare the energy performance of their buildings with other similar buildings in Alaska.

2. IMPLEMENTATION OF PORTFOLIO MANAGER

Implementation of Portfolio Manager at CBJ would not be difficult as much of the facility information needed has recently been gathered for the Alaska Housing Finance Corporation's Alaska Energy Efficiency Revolving Loan Fund Program (AEERLF) through a contract with NORTECH Engineering, and the remaining information is readily obtainable from the current fuel purchasing and use spreadsheets described in Chapter One. The information needed to get started includes[2]: name, address, year built, gross floor area (sf), weekly operating hours, # of workers on main shift, # of personal computers, percent of floor area that is heated and 12 months of measured energy consumption and cost data, number of heating and cooling degree days.

Developing a building's benchmark (analysis of energy use and cost) is the first step in being able to assess performance over time relative to energy management goals, and to identify strategic opportunities for savings and recognition. An easy way to conduct this analysis is to enter energy consumption and cost data into Portfolio Manager.

In addition, CBJ should begin to use Portfolio Manager to collect and track all types of energy used in specific buildings. Portfolio Manger simplifies the energy tracking process on a building by building level and enables building or facility managers to compare the energy use of specific types of buildings to similar buildings in Juneau and around the country.

3. TRACKING ENERGY USE FOR CBJ NON-BUILDING ENTITIES

While Portfolio Manager is a valuable tool to track energy and water use and costs for buildings, it is not as useful for other CBJ systems and energy uses, such as lighting, water pumping, and wastewater pumping, and vehicle fleet efficiency.

Vehicle Fleet Energy Use

To track the energy use of the vehicle fleet, CBJ should use the software and data collection system already in place and modify the existing software and spreadsheets as described above to track MMBtus and MTCO2e.

[2] Portfolio Manger – ENERGY STAR Benchmark Starter Kit, http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager_benchmarking.

Street Lighting Energy Use

In 2010 over 55% of all CBJ street lighting was unmetered. Unmetered lighting prevents CBJ from tracking street light energy use on an individual light fixture basis. AEL&P charges a set rate based on the wattage of each fixture. The cost includes electricity use and lamp replacements. To determine annual energy use, the CBJ will need to catalog the number of street lights and their wattage and use this information to estimate the number of annual hours of operation.

The remaining 45% of CBJ street lighting and other CBJ outdoors lighting (e.g., playing fields, harbor and airport runway lighting) can be tracked by working with AEL&P to modify their spreadsheets in order to more easily identify specific lights.

Identifying all public lighting (street lighting and other lighting) with GPS locations and metering, at a minimum, groups of streetlights would assist CBJ, state and federal government with tracking and reducing energy use for outdoor lighting. AEL&P should be able to provide monthly information on electrical usage for groups of lights. CBJ should meter specific lights and test the energy use of different types of fixtures and lighting to determine which type of lighting would be most energy efficient and meet lighting needs.

Water Pumping Energy Use

CBJ has two water sources, Last Chance Basin and Salmon Creek. The vast majority of the energy use is electricity. Electricity is used to process and distribute water to the distribution system. In addition, there are five pump stations that pump from the distribution system to serve locations at higher elevations.

The water facilities are all metered, but the meter does not differentiate between pumping energy and building energy (lights, heat, ventilation). However, the building loads are minor compared to the pumping loads and all electric use can be considered as necessary for the process of distributing water.

To track the energy use associated with water processing and pumping, CBJ should track energy use by each water facility and track the amount of water pumped through the facility and calculate the kWh per gallon of water. Energy conservation goals should be based on reducing the kWh per gallon of water.

Specific actions to reduce electricity use associated with the CBJ water system are outlined in the CBJ's *Water System Energy Audit, Final Report, August 13, 2009*. This study includes energy use data, proposes energy conservation opportunities, and provides life cycle costs analyses for Last Chance Basin and salmon Creek, and the six CBJ water pump stations. After implementation of energy conservation opportunities, energy conservations should be measured by the reduction in kWh per gallon of water delivered.

Wastewater Energy Use

CBJ has three wastewater treatment facilities, Mendenhall, Juneau-Douglas and Auke Bay. This system consumes both electricity and fuel oil. In 2010, over 84% of the 6.2 million kWhs of

electricity use was for these treatment facilities (Mendenhall Treatment facility alone was over 3 million kWhs) with the remaining 15% of electrical usage supplying the many lift stations within CBJ. In addition, wastewater processing in 2010 required almost 155,500 gallons of fuel. The CBJ wastewater system consumes both building energy (lights, ventilation, and heat) and process energy. These energy usages are not separately metered.

Specific actions to reduce energy use associated with the CBJ Mendenhall and Juneau Douglas wastewater treatment facilities are outlined in the CBJ's *Mendenhall Wastewater Treatment Plant Energy Audit* and the *Juneau Douglas Wastewater Treatment Plant Energy Audit* (August 2009). These studies provide energy use data, propose energy conservation opportunities and include life cycle costs analyses for energy improvements to both the building energy use and the process energy use.

CBJ should determine current energy consumption at each facility on a per gallon of wastewater basis to establish a benchmark to measure against in the future. After implementation of energy conservation opportunities, CBJ should track energy conservation and consumption at each facility by the reduction in kWh per gallon of wastewater processed.

Chapter 3

Public Outreach & Education

Meeting the community's Greenhouse Gas (GHG) emission reduction targets and increasing energy conservation and efficiency will require changes in government operations, resident's behavior, and business practices. Increasing public awareness of the importance of reducing energy use and GHG emissions and presenting local solutions to energy challenges are key steps in implementing Juneau's Climate Action Plan. A public education campaign is one of the simplest and most economical ways to reduce energy use and meet GHG emissions targets.

The purpose of this Public Outreach and Education Plan is to:

- Present a list of public education and outreach opportunities;
- Facilitate implementation of the Juneau Climate Action Plan by providing specific; step-by-step information; and
- Identify new ways to engage, educate, and excite the public.

The most effective way to put the public outreach and education plan into action would be to assign the tasks to a CBJ staff person. This person would develop media campaigns, design award programs, develop the website, and organize and advertize educational opportunities, and work to engage community partners. This person could also take on other energy use and GHG emission monitoring and reporting to reduce CBJ energy costs through conservation and increased efficiency.

Public outreach for the Juneau Climate Action Plan should:

- Show that the CBJ is leading by example;
- Use a range of communication techniques to reach the widest audience; and
- Celebrate successes frequently.

1. START-UP OUTREACH ACTIONS

Design a Logo

Develop a logo to brand climate action activities, information, and events. The logo should be simple, easy to recognize, and represent both energy and emissions reductions. Examples of climate action logos are shown in Appendix 2. Put the logo on the project website, all energy efficiency related communication, and on re-usable shopping bags, stickers, magnets, or mugs to be given out as rewards or prizes.

Develop a Website (Ongoing Maintenance Required)

A website can be developed to provide a range of information about local energy issues, green building techniques, actions to reduce water and energy consumption, tips on local food production, upcoming educational opportunities, and information on rebates, incentives, and other funding sources. The website will be used by CBJ staff and the public.

In order to be effective the website must be well designed and be kept up to date. This website could be part of the CBJ's main website (www.juneau.org) or could be built on to the existing Juneau Commission on Sustainability's website (www.sustainablejuneau.blogspot.com). Wherever the website is located, it should include the following elements:

- Current GHG emissions inventory and targets;
- Link to the full Climate Action Plan;
- Easy access to lists of climate actions for each sector;
- Periodic update on the progress of the Climate Action Plan implementation;
- Tips for local conditions (building techniques, vegetable varieties, etc);
- Listing of upcoming energy and GHG emissions events;
- Success stories and examples of innovate projects undertaken by local residents and business owners;
- Links to external resources;
- A community forum for residents to share resources; and
- An " Ask the Experts" forum for increasing information sharing.

Table 1 lists examples of climate action plan websites. They differ in terms of graphical quality, organization, and information presented, but each has strengths.

TABLE 3.1 EXAMPLES OF CLIMATE ACTION WEBSITES	
Cornell University	www.sustainablecampus.cornell.edu/climate/actions.cfm
Well designed website with clear list of actions for students, staff, and faculty.	
City of Whitehorse	www.taiga.net/whitehorsegreenguide
Comprehensive information on local sustainability actions and government programs. Links to local businesses that carry green products and tools for evaluating appliances and electronics.	
City of Portland	www.portlandonline.com/portlandcan/index.cfm?c=52421
Organized and clear website with lots of local advice about climate actions, a community calendar, and lots of background information in a section called *Climate 101*.	
City of Olympia	www.olympiawa.gov/en/community/sustainability/climate-change.aspx

A basic website with lists of actions and incentives, and a detailed history of Climate Action Planning in Olympia.	
District of Saanich, BC	www.saanich.ca/living/climate/index.html
Graphically rich website easy actions for residents, a detailed timeline for implementation of the climate action plan, and the opportunity to sign up for a climate action newsletter.	
City of Piedmont	www.ci.piedmont.ca.us/climate.shtml
Simple website with good background information and detailed list of the community's climate action achievements to date.	
City of Benecia	www.beniciaclimateactionplan.com/cap.html
Well organized and polished website with lots of links to external programs.	

2. ANNUAL OR QUARTERLY OUTREACH ACTIONS

Awards

Create an award program administered by the Juneau Commission on Sustainability to recognize outstanding achievements for green building practices, GHG emissions reduction, and energy efficiency. Awards could be given out to non-profits, schools, members of the public, business people, community leaders, or government departments. An annual open house could be organized to allow the public to view the award winners.

Newsletter

Publish and distribute a Climate Action newsletter. This newsletter could give background information about energy use and GHG emissions in Juneau, highlight actions completed to date, celebrate award winners, and announce upcoming events. Newsletters could be distributed using an email list that residents can sign up for, sent home through the schools, or could be mailed along with the utility bill. The release of the newsletter should be accompanied by outreach to the local media so that highlights are included in local newspapers and on radio stations. A monthly or bi-monthly local newspaper column could be used instead or in addition to the newsletter.

Car-Free Challenge

Declare one day a year as a car-free day and encourage residents to use alternative modes of transportation. This event can be held in conjunction with Bike-to-Work day, Walk-to-School Day, Earth Day, or another existing campaign. Publicize the personal and environmental savings to be gained by forgoing the car once a week. Encourage participation by providing fun rewards such as a free pancake breakfast for people who used alternative transportation. Another option is to create a challenge between workplaces or departments to get the largest ratio of employees using alternative transportation. Advertize the contest and provide prizes for the

winners. Use the car-free challenge day as an opportunity to provide bicycle safety education for adults and children.

3. ONGOING OUTREACH ACTIONS

Educate

Conduct workshops to educate the community on methods for and benefits of reducing GHG emissions, using renewable energy, local food production, weatherizing homes and businesses, , and using alternative transportation. The workshops could be held twice a year, in spring and fall and specific workshops should be held to target each sector.

Workshops could be organized in conjunction with other community groups or existing events. A brown-bag lunch series could be held for CBJ employees on topics related to borough operations.

Topics could include:

- Home weatherization;
- Growing food locally;
- Green building techniques;
- Bicycle tune-ups;
- Small-scale renewable energy systems; and
- Vehicle maintenance for energy efficient operation.

Build Community Partnerships

In order to implement an effective Public Outreach and Education Plan community partners are needed. Partnerships will make it possible to share resources, avoid duplicating efforts, and get information out to a wider audience. Team with existing events such as the Home Show and the Juneau Sunday Market.

Potential partners include:

- Juneau Economic Development Council;
- Juneau School District;
- Juneau Commission on Sustainability;
- University of Southeast Alaska;
- Southeast Alaska Building Industry Association;
- Local citizen advocacy groups (cycling, gardening, etc);
- University of Alaska Southeast (Cooperative Extension Services);
- Alaska Electric Light and Power Company;

- State of Alaska;
- US Coast Guard; and
- Tlingit Haida Regional Housing Authority.

Social Media

Social media can be used to raise awareness about the Juneau Climate Action Plan and energy use. Consider using a facebook page, email list-serve, twitter or youtube to get messages out. This can be a good way to involve youth or other community members who do not usually come to public meetings. There are several links under in the Additional Resources section that give tips and suggestions about how to use social media effectively. One caution is that social media should only be used if it will be checked and updated regularly.

Celebrate Success

Take opportunities to celebrate Juneau Climate Action Plan and energy reduction successes. This could be achievements by CBJ staff or departments, residents, business owners, or other governmental bodies. Successes can be celebrated by issuing press releases, prizes, or throwing a party.

4. IMPLEMENTATION

A coordinator is needed to implement the Public Outreach and Education Plan effectively. Ideally this person would be a CBJ employee tasked with public outreach, setting up education opportunities, and communicating with CBJ staff, businesses, and community partners. Public outreach regarding energy efficiency and GHG reduction would be a part-time function and could be combined with other aspects of implementing the Climate Action Plan to make it a full time position. Having a CBJ employees tasked with this function is needed in order to influence Borough operations and decision making. It may be possible to use savings resulting from energy conservation and efficiency upgrades to defray these staff costs.

5. ADDITIONAL RESOURCES

TABLE 3.2 ADDITIONAL RESOURCES
Climate Action Campaign Toolkit
www.imcoolcampaign.org
Social Media Toolbox for Climate Action
www.digitalverdure.com/1/post/2009/12/the-social-media-toolbox-for-grassroots-climate-action.html
350.org

www.350.org
ICLEI Outreach and Communication Guide
www.usclimatenetwork.org/resource-database/Outreach and Communications Guide.pdf

Chapter 4

CBJ Fleet Energy Use, Maintenance & Replacement

1. INTRODUCTION

As part of the Climate Action Plan project, the Skilbred Consulting team was contracted to review and provide recommendations for improvements to the City and Borough of Juneau (CBJ) vehicle fleet replacement schedule, with the objective of reducing energy use and greenhouse gas (GHG) emissions. CBJ vehicle transportation in 2010 contributed 27% (11% Capital Transit and 16% vehicle fleet) to local government GHG emissions. In addition to reducing GHG emissions, as energy prices rise, reducing fuel use will become an increasingly significant factor in controlling costs incurred by the CBJ, local businesses, and individuals.

CBJ maintains a fleet of vehicles to provide government functions such as police and fire protection, building and street maintenance, and public transportation. This report provides data on the existing fleet and its energy consumption and presents recommendations for replacing fleet vehicles with more fuel-efficient or alternate fuel vehicles and for improving maintenance and operation practices.

When assessing the prudence of replacing existing fleet vehicles with more fuel efficient models, it is important to keep in mind the savings in operating costs associated with decreased fuel consumption, particularly as fuel costs rise over time, as well as the lower costs of maintaining newer vehicles. However, both fleet replacement and maintenance of existing vehicles will be important to address over the coming years; even though the fuel efficiency of a new vehicle purchased may provide the single greatest GHG reduction and fleet fuel efficiency, proper maintenance of existing vehicles also has a significant role to play in increasing fuel efficiency and lowering emissions.

As energy prices continue to rise, the largest variable cost associated with the life of a vehicle, fuel, will comprise an ever greater portion of vehicle fleet expenditures. Increased fuel efficiency through proper maintenance, modifications (e.g., synthetic oils and high performance oil filters), and operation (e.g., reducing idling, coming up to stop signs and lights more slowly, and other driving habit adjustments) can save substantial amounts of fuel, reduce GHG emissions, and reduce maintenance time and costs. Together, proper maintenance and vehicle operation alone can be expected to reduce overall CBJ fleet fuel consumption by five to 10 percent.

2. DATA COLLECTION METHODS

To determine current fleet operation and management costs and replacement schedules, meetings were held with the Deputy City Manager, the Finance Department, and the automotive shop supervisors for both Public Works and the Airport.[3] These meetings provided insights into current fleet operations, vehicle maintenance procedures, and purchasing/replacement schedules.

In addition, the Finance Department provided a list of all CBJ wheeled vehicles (as of June 30, 2010)[4]. (For budget purposes, the Finance Department annually collects vehicle information, including make, model, year, year purchased, useful life, and total costs, including depreciation.) The CBJ Purchasing Division also provided fleet fuel consumption figures by department for 2007 - 2010.

The CBJ uses a fuel management system for all fleet vehicles with the exception of the airport fleet, which has its own fueling stations. The Public Works department assigns a key fob to each vehicle that is kept on the key ring for the vehicle. Because the key fob must be used to authorize distribution of fuel, with each refueling, the date and time, identification of who did refueling, and fuel use calculations are all automatically recorded. Drivers manually enter the mileage. This system collects all information necessary to compile and make year-to-year comparisons of fuel costs, including gallons used and miles driven, by model year, vehicle type, vehicle description, department, division, and driver. At this time, only information aggregated by department is readily available, and it is generally acknowledged that driver mileage entry can result in incorrect mileage data.

3. CBJ FLEET FINDINGS AND RECOMMENDATIONS

CBJ Fleet Vehicle Replacement

Department vehicle purchasing goes through the Purchasing Department, but that department does not specify which vehicles to purchase.

Recommendations:

1. CBJ should develop a form for requesting department staff to fill out when the department needs a new vehicle. This information should be used to determine the type of vehicle to be purchased and whether buying a newer model replacement would be appropriate. The form should include information such as:

    - The vehicle currently being used;
    - The vehicle's uses (e.g., snow plowing, pulling 1200 lbs, driving to meetings);

[3] Scott Klawonn, Dept: Public Works; Bob Vos, Dept: Public Works, Office: Capital Transit; Jerry Mahle, Norman Hales, and Frank Mason, Dept: Airport; Office: Field Maintenance.

[4] CBJ Fleet, Listing of Capital Assets (wheeled only), June 20, 2010.

- If requesting a 4-wheel drive vehicle, a statement presenting the reasons 4-wheel drive rather than front-wheel or 2-wheel drive is required;
- The seasons of the year the vehicle or equipment will be used; and
- If the department is requesting an additional vehicle rather than a replacement, a statement as to why the additional vehicle is needed (all requests for additional vehicles should be carefully scrutinized).

2. Only properly trained personnel should serve as point persons in charge of equipment and vehicle purchases. These employees, all of whom should possess specific knowledge of vehicles, equipment, and engines, including options available for improving fuel efficiency, should be assigned the following duties:

   - Research and determine the most fuel-efficient vehicles available to meet the needs of the requesting department. When replacing an existing vehicle, examine all past operation and maintenance records for the replaced vehicle to accurately identify the new vehicle's anticipated uses.
   - Meet with staff from the requesting department to discuss vehicle options appropriate to meet the department's needs.
   - Anticipate potential future uses of the vehicle to meet other needs of the CBJ fleet, including any transfer of high use vehicles to other departments/divisions after a specific number of years, so that all anticipated uses over the vehicle's life are taken into account. For example, when purchasing new vehicles where initial use will be high, CBJ should investigate and purchase vehicles that are able to meet more than one need; the vehicle should be selected with an eye toward where it might be deployed after it is no longer useful to the department that originally purchased it.
   - Determine the most fuel-efficient vehicle to replace another vehicle or to add to the fleet, based on a thorough analysis of the vehicle's anticipated uses.
   - Educate department staff about driving and maintenance options to maximize the fuel efficiency of existing and new vehicles.
   - Evaluate and identify vehicle and heavy equipment sharing opportunities within or across departments.

CBJ Fleet Vehicles and Depreciation Tracking

CBJ both depreciates and assesses a cost by vehicle to each department each year based on the estimated life of the vehicle. The goal is to depreciate vehicles accurately in order to ensure funds are available to replace vehicles at the end of their estimated life. The assessed funds are pooled in a revolving equipment fund and used to purchase new vehicles.

The depreciation rate and the estimated life of the vehicle for replacement purposes is often, but not always, based on the same number of years. From the CBJ Listing of Capital Assets (June 30, 2010), it appears that many of the vehicles in the CBJ fleet (166 of the 313 vehicles) will have exceeded their estimated useful life in 2012 and will be fully depreciated. However, after discussions with the CBJ Finance Department, it has been determined that this list may

not accurately depict the situation both in terms of the total number of CBJ vehicles and useful life of each vehicle for a variety of reasons, including the purchase of vehicles with state or federal funding and the continued use of vehicles that were to be replaced.

Recommendations:

1. Trained point person should determine the useful life of each vehicle based on both current vehicle uses and anticipated future uses. When projecting the useful life of a specific vehicle, all uses CBJ may have for the vehicle should be considered. For example, while the first department that uses a vehicle may need to use it daily and for many miles, when it is no longer satisfactory for the first department, the vehicle may still be suitable for another department that may use it less frequently.
2. CBJ should track all vehicles currently in operation. New vehicles should be added to the tracking system when they are purchased (including: make, model, year manufactured, year purchased, estimated replacement cost, and estimated useful life). This information should be complete, accurate, and readily available, and should incorporate all CBJ vehicles, including those operated by the airport, schools, hospital, Care-a-Vans, Capital Transit, and vehicles that have been replaced but are still in use.
3. Before a department purchases a surplus vehicle, the point person should decide whether the replaced vehicle should be used or taken out of service completely. Currently, when a vehicle is replaced, there is no requirement that the vehicle be taken out of service; the vehicle may continue to be used, which increases the size of the fleet. While there may be good reasons for keeping older vehicles in service, the decision to retain a replaced vehicle needs to be made only after careful deliberation on a case-by-case basis.
4. CBJ should conduct a review of its fleet to learn how each older vehicle is currently being used and to determine which vehicles should be replaced by the most fuel-efficient vehicles available. Older vehicles, including those that have already exceeded their projected useful lives, are prime candidates for evaluation as to the appropriateness of the type of vehicle for its current uses, cost-savings that may result from replacing it a more fuel-efficient vehicle, and whether the vehicle is a candidate for department sharing and pooling.
5. Individual vehicle purchases should take into consideration all of the vehicle's current and anticipated future uses, contribution to GHG reduction goals, up-front costs, and lifecycle operation and maintenance costs.

CBJ Fleet and Bidding Specifications

CBJ staff use state specifications for bidding and purchasing vehicles—a common practice for municipalities. The State of Alaska's bidding specifications, however, do not always provide specifications for the most fuel-efficient vehicles, such as hybrids and electric vehicles. If the State had specifications for bidding for these types of vehicles, CBJ would be able to piggyback on them.

In addition, the municipal bid process frequently gives favorable weight to those with the lowest bid. This can make it difficult to select fuel-efficient vehicles if the estimated operating and maintenance costs for the life of the vehicle are not included in the bid request.

Table 1 demonstrates the potential fuel cost savings for vehicles traveling 45,000 miles with the cost of a gallon of fuel at $3.65.

TABLE 4.1: COST SAVINGS FOR INCREASED MILES PER GALLON (MPG)

Average Miles per Gallon	Gal fuel used to travel 45,000 mi.	Cost of fuel ($3.65/gal)	Savings over 45,000 mi
16	2,812	$10,266	0
22	2,045	$7,466	$2,800
40	1,125	$4,106	$6,159

Although electric vehicles are fairly uncommon, hybrid models are commercially available and becoming the industry standard. The number of new hybrid models has increased from 2 in 2003, to almost 40 in 2011, and now includes trucks, SUVs, and passenger cars. Mileage comparisons vary greatly but can be as much as 60% greater on a hybrid vehicle. While hybrid vehicles are more expensive to purchase, they can return significant cost savings over the life of the vehicle, especially as fuel prices increase.

Electric plug-ins have recently begun to be marketed in the U.S. These vehicles provide significant mileage advantages and their technology is rapidly improving. All electric vehicles greatly reduce maintenance because there are no oil or fuel filters to change, and moving parts are minimized with traction motors lasting over 10 years with very little servicing and very robust power electronics.
Power electronics are standardized and rugged for factory applications such as locomotive and ship propulsion and power systems. Electric propulsion equipment is mature and dependable. Current battery technology is sufficient to power vehicles effectively and efficiently for local transportation within the CBJ. In addition, electric vehicles can supply AC power for small power tools and lights.

Recommendations:

1. CBJ should go beyond State bid specifications, where the State of Alaska does not include low and energy-efficient vehicles. CBJ should work with the State to update its bidding specifications and/or look at specifications from other municipalities to ensure bidding specifications include fuel-efficient vehicles such as electric and hybrid models.
2. The bid system for vehicles should ensure that the lowest bid is selected only if it is best suited to current and future needs and only after life cycle costs are included in the cost analysis.
3. CBJ should educate staff regarding energy efficient vehicles and purchase some number of hybrids and low-speed vehicles to try them out where they meet current needs.

4. CBJ should provide training to shop staff on servicing and repairing energy-efficient hybrids and electric vehicles. CBJ should consider expanding training opportunities to automotive shops that work on CBJ vehicles
5. Staff training should be provided for newer Tier IV diesel emissions vehicles.
6. CBJ should determine the ability of all-electric sedans or hatch-backs to fill the need for short-range personal transportation vehicles. These vehicles greatly reduce fuel use and require less maintenance than gasoline or diesel engines.
7. CBJ should make a determination as to whether deploying electric buses for use by Capital Transit and Care-a-Van would lower these systems' lifecycle operation and maintenance costs.
8. CBJ should determine whether currently available heavy-duty electric trucks could increase energy savings and increase capabilities of the CBJ fleet by providing large amounts of conventional electric power for hand tools and equipment with an auxiliary power unit to give extended field service times and always-warm plug in capabilities.
9. CBJ would be prudent to purchase second or later generation vehicles.

Fleet Data Collection: Fuel Usage and Maintenance

CBJ collects information needed to determine annual vehicle use for many vehicles in a database that automatically gathers refueling information from the vehicle key fob (amount, gasoline/diesel, date, time, driver). The driver enters the odometer reading and that can result in incorrect mileage. In addition, although CBJ operates vehicle maintenance shops, vehicle maintenance may be conducted by any CBJ shop, the school district, the airport, Eaglecrest, the police department, or by a local business.

Table 2 presents annual CBJ fleet fuel usage, costs, and average per gallon cost (gasoline and diesel combined) for 2007-2010 using the fleet fuel information provided by the Purchasing Division. Vehicle fuel use does not show either a consistent decrease or increase over these four years. However, this information does show that year-to-year fuel use increased when the price decreased and fuel use decreased when the price increased.

A comparison of 2007 and 2010 fuel use and costs in Table 2 shows that even though fuel use decreased (386,059 gallons to 372,085 gallons) during that period, there was a dramatic increase in fuel cost per gallon (from $2.403/gallon to $2.972/gallon), which led to an increase in City fuel expenditures. In 2010, CBJ paid $177,946 more for fuel than in 2007, even though 13,974 fewer gallons were purchased. Given the fluctuating, but steadily rising, cost of fuel, CBJ departments should focus on decreasing fuel use. If fuel usage in 2009 had remained at 2008 levels, CBJ would have paid over $16,000 less on vehicle fuel.

TABLE 4.2 SUMMARY OF FLEET FUEL USE AND COST 2007-2010			
Year	**Gallons**	**Total Cost**	**Per Gallon Average**
2007	386,059	$927,853	$2.403
2008	384,781	$1,260,761	$3.277
2009	391,624	$997,564	$2.547
2010	372,085	$1,105,799	$2.972

Although fuel costs have not increased every year, the general price trend for fuel reflects a steady increase over time. Estimates for 2011 and 2012 average oil prices vary. The U.S. Energy Information Administration estimates average prices in the U.S. between $3.60 and $3.67 per gallon for gasoline, and $3.87 to $3.95 for diesel[5]. Prices in Juneau are generally higher. The increasing price of fuel underscores the value of fuel efficiency and its importance when considering vehicle fleet replacement, maintenance, and operations/management.

The goal of vehicle and equipment maintenance practices is to keep vehicles and equipment in good operating condition. Preventative maintenance routines and intervals based on local driving conditions and manufacturer's recommendations for each type of vehicle or equipment and each type of maintenance promote the longevity of the vehicle or equipment. Maintenance costs represent a significant portion of the total cost to own and operate vehicles or heavy equipment. These costs increase as a vehicle or equipment ages. Reliability and escalating maintenance costs are key factors in determining when to replace fleet vehicles. Preventative maintenance is critical for avoiding the repair or costly replacement of major vehicle components. Mechanics adjust the manufacturer's recommendations based on a specific vehicle's use. For example, engine idling incurs wear and tear that will require future maintenance. So the maintenance for a vehicle that runs idle 50 percent of the time may be as frequent as that of a comparable vehicle that drives more miles.

> Vehicle design, including mass, rolling resistance, aerodynamic drag, and engine and transmission efficiency, is an important factor affecting a vehicle's fuel economy on the prescribed driving schedules. Fuel economy can also be greatly affected by driver/owner behavior. Hard acceleration, excessive idling, and carrying unnecessary weight can all negatively affect fuel economy. Proper vehicle maintenance, on the other hand, can help the vehicle perform as it was designed, thus positively affecting fuel economy, emissions, and the overall drivability of a vehicle.
>
> *-US Dept of Energy, Oak Ridge Lab, 2009*

Accurate and complete vehicle maintenance records are critical for making fleet management decisions. Vehicle maintenance costs are variable and distinct to each vehicle. Delinquent or too-frequent preventive maintenance intervals are counterproductive to controlling costs.

[5] U.S. Energy Information Agency, Short-Term Energy Outlook, June 7, 2011, http://www.eia.gov/steo.

Recommendations:

1. Records should be maintained in an automated system that can produce, in a timely fashion, reports that synopsize vehicle maintenance logs, fuel usage logs, and cumulative costs of parts, labor, and overhead by vehicle over the vehicle's life.
2. Trained personnel should be assigned to conduct an evaluation of all CBJ vehicles after gathering the following information by vehicle for two years: vehicle usage, actual vehicle miles driven or hours operated; gallons of fuel consumed (diesel or gas); why vehicle was needed (e.g., attend a meeting, hauling equipment, inspection); which department/division used the vehicle; and the maintenance the vehicle received.
3. CBJ should use one database or software system to track all fleet maintenance and fuel use data. All departments and other CBJ institutions (including, hospital, airport, Eaglecrest, and school district) should use the same database management system. Specific personnel should be trained to enter and generate the reports needed to manage the vehicles.
4. CBJ should develop checklists to ensure that all vehicles receive standardized maintenance and service at specific times/miles. Vehicle maintenance checklists should be developed for all routine maintenance and to prepare vehicles for different seasons.
5. Checklists should be completed by the entity that services the vehicle; private businesses servicing CBJ vehicles should be required to complete the checklist. A checklist will ensure that each time a vehicle undergoes maintenance specific services are covered.
6. CBJ should enter the information from these standard checklists into the main vehicle database, and reports on problems and maintenance should be provided to city shops and departments. Each department should enter each new vehicle's maintenance schedule into the database upon purchase.
7. Department staff should regularly review fleet information to determine whether vehicles are operating efficiently, including attainment of optimum miles per gallon for each vehicle.
8. CBJ vehicle fleet maintenance personnel should receive continuing education and training on technological improvements available to improve fuel efficiency in CBJ vehicles. The following technological improvements have already been developed and may be beneficial for specific vehicles.

    - Synthetic oils and lubricants may reduce oil changes, reducing maintenance hours, and increase gas mileage. In general, synthetic oils allow for engine oil changes from between 10,000 and 20,000 miles or annually; compared to 3,000 to 5,000 miles or every three months for conventional engine oil. In addition, synthetic oils protect and perform better than petroleum oils at both high and low temperature extremes. Synthetic oils have low pour points and flow readily at low temperatures for easier winter starting, significantly reducing engine wear. Like conventional motor oils, synthetic oils can be recycled; synthetics can also be used in furnaces designed to burn waste oils.

- Extended performance filters, introduced in 2008, can replace conventional cylinder spin-on filters for gasoline vehicles and allow for engine oil replacement on a 30,000-mile basis. The Microgreen Company provides free oil analysis to monitor filer performance for some vehicle fleets (www.microgreenfilter.com).
- Auxiliary power units and hybrid vehicles can assist in reducing idling automatically. Main-engine idling can be reduced with on-board auxiliary power units. These auxiliary power units are becoming standard in the long haul trucking business.

9. Staff should use vehicle tracking information to assess the effectiveness of changes in maintenance (synthetic oils, effectiveness of maintenance checklist, maintaining correct tire pressure, etc.) and purchasing (e.g., hybrid and electric vehicles).

General Fleet Operations and Management

Recommendations:

1. Educate and train employees on all fleet vehicles they may use. Most employees should use a vehicle from the CBJ fleet rather than being assigned a specific vehicle or having a sense of a particular vehicle as being their vehicle.
2. Develop and enforce policy regarding when employees need to drive a CBJ vehicle home. Evaluate who needs to drive vehicles home on a case-by-case basis, including job requirements and daily work schedule. For example, the fire chief may need to have emergency equipment in their vehicles at all times, so driving a vehicle home would be required. In addition, a building inspector that lives some distance from the fleet pool could drive a vehicle home if they are able to conduct inspections going to or from work on specific days.
3. Set up a computer system that allows building inspectors to drive home with what they need to do for inspections and retrieve a printout in the morning from their home computer so they can begin work directly when they leave home rather than coming into the office first.
4. Solicit employee ideas to increase fuel efficiency.
5. Establish semi-annual meetings for mechanics, shop personnel, and interested employees from all CBJ departments and affiliates to share ideas for improving efficiency.
6. Encourage management and employees to test ideas and vehicles that employees believe may result in greater fuel efficiency. CBJ has a creative group of employees who are interested in fuel economy and may take the initiative where the culture encourages them to do so.
7. Incentivize CBJ fleet fuel efficiency. Allow a portion of savings from fuel efficiency to accrue to the department or division that increases fuel efficiency.
8. Reduce funds budgeted for vehicle replacement and maintenance when a department decreases its number of vehicles.

9. As with other aspects of fleet management, replacing a vehicle too soon or too late wastes money; replacement standards should be based on industry guidelines and experience in operating and maintaining vehicles and equipment. In determining when a vehicle should be replaced, personnel should analyze the costs associated with the vehicle and identify the point at which the vehicle has reasonably depreciated but is not yet incurring significant maintenance costs. Replacing vehicles at this point avoids escalating maintenance costs while optimizing vehicle resale value.
10. Three criteria should be considered when establishing the vehicle replacement schedule: vehicle mileage, age, and use. There is no universal management guide that can be applied to all types of fleets because each municipality's fleet and usage is unique.
11. A review should be undertaken to determine whether the current vehicle and equipment fleet is sized to meet current CBJ needs.
12. The vehicle and equipment replacement schedule should be reviewed annually before the operating and capital budgets are prepared and a plan prepared for the reassignment or disposal of vehicles and equipment that have reached their age and mileage thresholds and will be replaced in the next budget cycle.

General Vehicle Fuel Efficiency Measures

Specific actions should be undertaken for each vehicle and by each driver to ensure optimum vehicle fuel efficiency. A list of these is presented below. While this may not be an exhaustive list, all CBJ personnel who drive fleet vehicles should have a clear understanding of what is needed to operate the vehicle(s) and equipment they use in an efficient manner. Keeping vehicles properly maintained decreases maintenance requirements and increases miles per gallon up to 40%. Proper maintenance includes tire inflation, 3.3% (up to $0.11/gal); using manufacturer's recommended grade of motor oil, 1-2 % ($0.04-0.07/gal); fixing a car noticeably out of tune, 4% ($0.15/gal); replacing a clogged air filter in a carbureted engine, 2 to 14% ($0.07 -0.25/gal); and, fixing a faulty oxygen sensor, 40%[6].

Recommendations:

1. *Keep Engine Properly Tuned* - Vehicles with a noticeably out-of-tune engine (as evidenced by increased engine noise, average gas mileage falling by 10-15%, or failing an emissions test) should be fixed to improve gas mileage and avoid more serious engine damage. Depending on the type of repair and vehicle, repairing an out-of-tune engine can improve gas mileage by an average of 4 percent—the equivalent of saving $0.15 per gallon. Fixing a serious maintenance problem, such as replacing a faulty oxygen sensor, can improve mileage by as much as 40 percent .
2. *Keep Tires Properly Inflated* - Vehicle tire pressure is usually found on a sticker on the driver's side door, in the glove box, or in the owner's manual. This pressure, rather than the maximum pressure printed on the tire's sidewall, should be used to properly inflate tires. When a tire is below its recommended pressure, the vehicle uses 0.3%

[6] http://www.fueleconomy.gov/feg/maintain.shtml, U.S. Department of Energy, Energy Efficiency and Renewable Energy, June 2011.

more gas for every one psi of pressure. Properly inflated tires can increase gas mileage by up to 3.3% (equivalent of $0.11 per gallon), improve safety, and last longer.

3. *Use Recommended Grade of Motor Oil and Air Filters* - Using the manufacturer's recommended grade of motor oil can improve vehicle gas mileage by 1-2% (equivalent of $0.04-.08 per gallon). For example, using 10W-30 motor oil in an engine where 5W-30 is recommended can lower gas mileage by 1-2%. Ultimately, greater fuel efficiency is found with motor oils with a lower viscosity (5W rather than 10W) and in cooler climates, like Juneau, even lower viscosity motor oils (e.g., 0W-20) may work well in vehicles that are not considered high performance or that don't tow excessive weight (low viscosity in these vehicles adversely affects engine wear)[7]. CBJ should determine which fleet vehicles may improve efficiency if they use motor oils that contain friction-reducing additives.

General Vehicle Operating Efficiency: Changing Driver Behavior

Besides proper maintenance, discussed above, for vehicles already purchased, optimum vehicle fuel economy improvements can be made by changing driver behavior.

Recommendations:

1. Reducing Idling - Idling can use a quarter to a half a gallon of fuel per hour, depending on size of engine and use of the air conditioner, whereas it takes only a few seconds worth of fuel to restart a vehicle. Turning off the engine when a vehicle is parked saves fuel and money—an estimated fuel cost savings of $0.01-0.03 per minute.[8] Decreasing idling time also reduces the carbon footprint and increases the efficiency of a vehicle fleet. Heavy equipment manufacturer Komatsu estimates that idling consumes nearly 20% of a typical construction machine's lifetime fuel burn. This has an impact on main engine life and carbon emissions. Determining when best to shut off an engine is often difficult, with many variables having a large influence on vehicle performance.
2. Decreasing Aggressive Driving - Aggressive driving includes speeding, rapid acceleration and deceleration, and leaving a stopped position quickly. Aggressive driving can lower gas mileage by 33% at highway speeds and 5% in town. The fuel economy benefit of not driving aggressively is estimated to be 5-33%, which translates to gasoline savings of $0.18-1.20 per gallon.
3. Driving the Speed Limit - Although vehicles have an optimal fuel economy at different speeds, gas mileage usually decreases significantly at speeds above 60 mph. The U.S. Department of Energy estimates that each five miles per hour driven over 60 mph costs the equivalent of an additional $0.29/gallon for gas. The fuel economy benefits of observing the speed limit are estimated at 7-33%, with gasoline cost savings of $0.26-0.84 per gallon.

[7] Energy and Environmental Analysis, Inc., Owner Related Fuel Economy Improvements, Arlington, Virginia, 2001.
[8] U.S. Department of Energy, Energy Efficiency and Renewable Energy, June 2011. All fuel cost savings in this section are estimates based on a fuel cost of $3.65/gallon.

4. Eliminating Excess Weight - Each additional 100 pounds in a typical car reduces the vehicle's fuel economy by up to 2%. Excess weight has a greater effect on smaller vehicles than on larger ones. Hauling only the equipment needed to perform current tasks reduces excess weight in vehicles. The U.S. Department of Energy estimates a fuel economy benefit of 1-2%; this benefit results in gasoline savings of $0.04-0.07 per gallon. In addition, loaded roof racks or carriers can decrease vehicle fuel economy by 5 percent, through aerodynamic drag.
5. Using Overdrive and Cruise Control - Using vehicle overdrive gears reduces the vehicle's engine speed and results in saving gas and reduced engine wear. In addition, using cruise control on the highway helps to maintain a constant speed and, in many cases, will save gas
6. Reducing Vehicle Miles: Combining Trips and Carpooling - Short trips taken from a cold start can use twice as much fuel as one longer multipurpose trip covering the same distance with a warm engine. Carpooling with other city employees to meetings reduces driving, thereby saving fuel and money and reducing GHG emissions. Planning trips can increase vehicle efficiency and decrease vehicle use.
7. Reducing Vehicle Miles: Teleconferencing - Determining which meetings must be in person and where teleconferencing would be sufficient, even in smaller communities like Juneau, can reduce miles driven and thereby reduce fleet fuel use and cost.

Chapter 5
CBJ Sustainability Fund

1. BACKGROUND

In 2008 the City and Borough of Juneau Assembly adopted an ordinance establishing a energy Sustainability Fund.[9] The Assembly intended for this fund to be used "primarily to capitalize conservation projects of the City and Borough, and to educate Juneau residents about the importance of energy conservation." In addition, the Sustainability Fund is expected to be a revolving loan fund for self energy performance contracting. Funds used for CBJ projects that are approved must be repaid to the fund through energy savings within a ten-year period. This chapter is focused on options for developing a funding mechanism for the Sustainability Fund.

As sustainability fund is one tool that can be used to increase energy efficiency in certain situations and for specific target markets. The CBJ Sustainability Fund is specifically for city buildings and general energy efficiency education, but could also be used for other sectors. However, no single funding mechanism will meet all energy efficiency and clean energy financing needs for all of Juneau. This report examines a range of financing mechanisms to capitalize the CBJ Sustainability Fund include donations, government funding, public benefit charge, and specific use charges. Other energy efficiency financing options besides a sustainability fund should also be examined by CBJ to more fully meet the needs. These financing options include rate structures, on-bill loans and on-tariffs, and property tax based repayment mechanisms. The study *Recent Innovations in Financing for Clean Energy*[10] provides an excellent reference for examining these financing options for energy conservation, efficiency and clean energy that have been undertaken around the country.

It is in the interest of both the City and Borough of Juneau and its residents to reduce energy use and increase energy efficiency to decrease energy costs, meet greenhouse gas reduction targets, and ensure that clean hydroelectricity is used as efficiently as possible; putting off the increased costs of additional hydroelectric production. Doing so will both extend the ability of current hydroelectricity production to meet Juneau's needs, and permit hydroelectricity (clean energy) to meet the needs of Greens Creek, cruise ships and dual system buildings.

The CBJ Sustainability Fund with a stream of income could, at some point, go beyond financing CBJ buildings and assist homeowners and businesses with reducing and conserving energy and transitioning to use of non-carbon emitting renewable energy sources.

[9] CBJ Ordinance Establishing the Sustainability Fund, Serial No. 2008-21(b)am, adopted July 14, 2008.
[10] *Recent Innovations in Financing for Clean Energy*, Brown, Mathew and Conover, Beth, Southwest Energy Efficiency Project, 2009.

Increasing energy efficiency and conservation potential is closely tied to financing – the cost of investment per Btu that one is willing to pay. The least expensive energy efficiency measures are undertaken by individuals, businesses, government entities first and the remaining more expensive energy savings opportunities that require a greater level of capital investment and have a longer return on investment are secondary. For example, replacing inefficient freezers and ventilation systems, and weatherizing buildings is more expensive than replacing inefficient light bulbs. However, investing in energy conservation and efficiency initiatives leads to positive returns through reduced energy costs. The Sustainability Fund overcomes the cost hurdle by having the capital available to invest in these more expensive measures with longer terms before savings are realized.

2. FUNDING MECHANISMS

Communities, states, and countries use several funding scenarios to capitalize energy conservation and efficiency sustainability funds. These funding mechanisms include: (1) donations; (2) local and other government capitalization; (3) public benefit charge/energy use fee; (4) specific sector fees; and (5) lottery or pull-tabs funds. In some areas more than one of these funding mechanisms has been used in order to leverage public funds or enhance existing funds by finding partners on project-specific basis to accomplish tasks that could not be accomplished alone. A combination of these funding mechanisms should be more fully explored by CBJ for short and long term funding of the Sustainability Fund.

Donations

Donations from Businesses

When the Sustainability Fund was first proposed, it was envisioned that businesses that could benefit from general increased energy conservation and efficiency in Juneau would be approached as possible donors to the fund. This mechanism for funding the Sustainability Fund should be pursued. Businesses should be contacted to determine if they would be willing to assist with funding the Sustainability Fund. Primary businesses to target include those that would benefit from additional electricity availability:

- AEL&P has long been concerned with the increasing electricity demand and the need to promote energy efficiency in order to meet electricity demand with current hydroelectric power capacity.
- Cruise Lines have an economic interest in being able to use hydroelectricity when in port in Juneau. The cost of hydroelectricity is significantly less than fuel costs.
- Greens Creek Mine has an economic interest in being able to use hydroelectricity because of the reduced costs.
- Dual fuel buildings have an economic interest in being able to use hydroelectricity because of reduced costs.

This program would require limited city resources to undertake. Community and city leaders would request donations from specific businesses.

Voluntary 'Carbon Offset' Program or Voluntary 'Energy Offset' Program
These programs encourage voluntary contributions from local citizens and businesses and could be modeled after offset programs in which individuals calculate their energy use or greenhouse gas emissions (e.g., from vacation travel, personal automobile use, fuel oil heating, etc.) and make a financial contribution to a sustainability fund or a renewable energy fund. Funds can also be allocated to a specific project that would reduce energy use and/or greenhouse gas emissions by a certain amount. These programs encourage voluntary contributions from local citizens and visitors and could be modeled after offset programs, such as the one set up by the State of Colorado.

The startup for this type of program requires city resources: providing a carbon calculator and/or energy use calculator on the website, advertising the program, and getting people to use it. Once such a program is established it could be largely automated to reduce administrative burden. However, it is unclear how much funding would be generated since this method would be voluntary.

Building a Micro-Lending System to Fund Specific Projects
This funding mechanism is modeled after micro-lending practices throughout the world. Individuals and businesses provide local funding (can be either donations or no interest loans) to fund specific energy conservation and efficiency projects. Several donors may contribute to any one project. Donors are paid back with savings from reduced energy costs. These payments and can then be either reinvested in another project or repaid to the donor.

Starting up this type of donor funding would require educating people and businesses in Juneau about it, developing a tracking mechanism, developing a website with projects listed, including energy cost savings projections (repayment would be based on projected cost savings to ensure some certainty to donors/lenders), and projected timelines for repayment. Longer timelines result in greater amortization of the project. As with all donor-funded options, this would require people and businesses voluntarily contributing to the fund. The positive aspects of these projects for the entire community would have to be clearly articulated and promoted to the public (e.g., reducing energy use reduces the cost of your government, reducing energy use prolongs the life of current hydroelectricity generating capacity, reducing fuel oil decreases greenhouse gas emissions, and makes Juneau more sustainable).

Local and Other Government Funding

Appropriate funds from the CBJ Operating Budget
Establish funding for the CBJ Sustainability Fund as priority and use operating funds, remaining funds from capital project reserves, and municipal 'windfalls' or unexpected revenue, such as state revenue sharing dollars that were not anticipated or sales/property tax revenues that exceed budget projections to capitalize the Fund.

Ann Arbor, Michigan used this method, in part, to fund their revolving loan energy fund. However, they did so ten years ago at a time when the city coffers were relatively full. Given current CBJ finances and the deficit we are facing in 2012, it would be difficult to obtain this type of funding. That said, this type of funding should be considered for future funding of a broader revolving loan fund for local government, businesses, and residents to use.

Transfer Funds from Existing CBJ Depreciation Funds
Capitalizing the Sustainability Fund with CBJ facility depreciation funds could be justified, as the projects to be funded will correct deficiencies in CBJ buildings and facilities to increase overall performance and extend the useful life of those facilities. Depreciation fund for vehicles and equipment could also be used to replace old equipment and vehicles with more efficient ones.

Our recommendation is to begin with depreciation funds as the initial seeding for the Sustainability Fund and then, through public outreach, build on the success of these projects to increase public support. At that point the Assembly could consider a 'sustainability fee' or another funding mechanism to further grow, expand and add flexibility to the Sustainability Fund.

Allocate Operating Cost Savings
Identify and allocate a percentage of existing and future operating cost savings from reduced utility bills that are the result of energy efficiency projects that have already been undertaken, to capitalize the Sustainability Fund for future projects. Those projects funded by municipal bonds would first pay off the bonds and then have funds go to the Sustainability Fund for a specific number of years or until the fund reaches a specific amount. Those projects funded through the general fund could immediately deposit a portion of their energy cost savings into the Sustainability Fund. Funds could come from investments in facility and system weatherization and upgrades that have occurred during the past several years (i.e., Centennial Hall, Augustus Brown pool, heat pump savings, Harborview school, Auke Bay school, all school renovations, JAHC building).

Use Municipal Bonding and Taxing Authority
In other communities, sustainability and energy funds have established successful revolving energy funds through municipal bonds and local taxing authority. These funds have been effectively used to implement energy efficiency measures for city properties as well as private property. CBJ has used bonds and sales tax funds to undertake renovation projects, such as school renovations, the next step would be to place energy saving from these projects into the Sustainability Fund.

Obtain Direct Government Funding
Several community sustainability funds were established with federal funds through the U.S. Department of Energy. This was particularly true with the Energy Efficiency and Conservation Block Grants that were distributed by the federal government in 2009. Possibilities for direct government funding through grants and appropriations should be investigated with such agencies as the U.S. Department of Energy, U.S. Environmental Protection Agency, Alaska State Energy Office, Alaska Energy Authority, and Alaska Legislature.

Although federal funding is not as readily available now as in the recent past, opportunities may arise that CBJ should be prepared to take advantage of. Juneau is uniquely situated to become a demonstration community in local green sustainable energy and to provide opportunities for energy conservation and efficiency pilot projects.

Public Benefit Charge or System/Energy Benefit Charge

Public benefit energy charges are all based on energy use: the amount used, the type of building using the energy, or the type of energy used. Most of these charges could be added to existing invoices, bills and payment systems (e.g., electricity bills, oil fuel bills, and/or property taxes) although doing so may involve some changes in authorizing language and billing systems. The ease of collecting funds through already established systems is a benefit to these options, as is the certainty of the funding amount each year and the limited cost per residence or business.

If any public benefit charge or energy benefit charge type of funding mechanism is used for the CBJ Sustainability Fund, we recommend that a timeline be included with the Sustainability Fund establishment language detailing when the uses of the Fund would be broadened to include the ability of the private sector to take advantage of these funds for energy conservation and efficiency upgrades. This would promote by-in from the community.

Energy Benefit Charge: Charge on Amount of Energy Used

Use a tariff or a small fee of a fraction of a cent per kWh or per Btu sold in Juneau to provide an ongoing funding mechanism for the CBJ Sustainability Fund. For example, a $.00125/kWh and $.05 per gallon energy benefit charge in Juneau in 2010, based on the energy use figures from the 2010 Greenhouse Gas Emissions Inventory Update, would have resulted in over $100,000. The size of the tariff or fee should be limited to maintain equity, and to ensure that the fee does not unfairly burden low-income customers.

Energy Use Fee: Charge by Type of Building

This funding mechanism would assess a minimum charge on all buildings that use energy. The amount of the charge could vary depending on the type of building: residence, commercial, government. For example, charging only $1.00 per month to 12,000 residences in the city would generate $144,000 per year.

Public Benefit Charge: Charge on Type of Energy Used

This energy use charge would be based on the type of energy used. This funding mechanism could also provide a public benefit by internalizing some of the external cost of various type of energy. The charge (a specific amount or percentage) for vehicle gasoline could be distinct from vehicle diesel, which would be different than that charged for stationary diesel used for heating or equipment. The amount of funding that could be generated would depend on the difference in charges for various types of energy. For example, based on 2010 energy use information, a $.05 per gallon charge on building diesel heating oil and a $.10 per gallon charge on vehicle gasoline would have generated $1,501,685.

Specific Use Charges

Some specific use charges, such as for one-time water and wastewater system upgrades, could added temporarily to provide funds to support an energy upgrade or renovation of the water or waste water system. The fees would provide the capital needed to undertake energy conservation and efficiency measures. The results of these measures would be decreased energy use and operating costs that could be passed on to the consumer through reduced rates. The ongoing rate would cover operations, maintenance and repairs. Other use fees,

such as public transportation or those aimed at changing water use would be ongoing. Public buy-in would be easiest if there was a guaranteed specific reduction in fees for these utilities for a specified period of time after the upgrades have been installed.

Water Use Fee
A surcharge on water use would be applied to existing water bills. The funds collected through this fee would be applied to a one-time water system-wide upgrade to increase energy conservation and efficiency of water delivery throughout the CBJ.

Water use fees could also be contingent on the amount of water used with the goal of reducing energy use through the water supply system. This fee system would involve metering water and assessing a fee for actual water usage and could including a surcharge that decreases with decreased water use. This system could provide funds for upgrading the water system, while also resulting in some behavioral modification as reduced water and energy use.

Wastewater Use Fee
Surcharge on wastewater use could be applied to existing bills with the goal of funding a one-time wastewater energy efficiency and conservation upgrade.

Public Transportation Use Fee
In order to promote public transportation and increase ridership Corvallis, Oregon adopted a mechanism to provide free public bus transportation by replacing property tax support and bus fares with a system based on average number of trips per property type. This system generates different fees by property type based on an average number of trips per month. Buildings would be assessed fees based a potential monthly trip average for the number of people in the building.

In Juneau, raising $5 million (2009 Capital Transit funding from taxes) only from the current 12,000 residences would cost $34.75 per month, and raising $1 million (Capital Transit funding that comes from fares) would be $6.94 per month. The Corvallis model also assesses a transportation fee to businesses, which, if done in Juneau would reduce the user fee on residences. However, it is interesting to note that both these amounts based on residences alone are less than a current adult month pass of $36.00.

CBJ could also investigate having all or a portion of regular high school bus service provided by Capital Transit. This could combine CBJ and State funds to fund extra Capital Transit buses or additional routes for high school students and the public.

Even if Juneau was not so ambitious as to try and replace public bus costs or fares alone, a trip mechanism fee to support energy efficient transportation improvements could assist with implementing those elements of the Juneau Transportation Plan which decrease energy use and greenhouse gas emissions. For example, charging single-family residences, a specific fee for example $10 would bring in about $120,000 per year using 12,000 residences. Again, this trip mechanism fee would be calculated to include businesses as well.

Pull-tab or Lottery Sales

Establishing a voluntary raffle or lottery with the proceeds going to the Sustainability Fund has been proven to be effective in other states, such as Washington, where the proceeds go to education and habitat recovery. This system for raising funds for the Sustainability Fund would have to be investigated further to see what restrictions, if any CBJ might encounter. In addition, CBJ would have to advertise and promote the pull-tab or lottery sales to ensure funding.

Studies have shown that pull-tab and lottery sales can be regressive, taking funds from those who can least afford it (Demographic Survey of Texas Lottery Players, 2008). As this may be the case for pull-tab or lottery sales in Juneau as well, if such a system is put in place to provide part of the funding for a Sustainability Fund it is recommended that CBJ ensure the Fund undertakes projects that assist low income populations.

3. RECOMMENDATIONS

1. CBJ establish a sequenced level of funding for the Sustainability Fund to meet various needs over time, including:

    - Capital needs to undertake a revolving loan fund for energy conservation and efficiency projects for CBJ facilities and systems in a timely manner;
    - Funding needed to educate Juneau residents about the importance of energy conservation;
    - Funding needed to provide an Energy Use and Efficiency position at CBJ;
    - Funding needed to undertake a revolving loan fund for private entities; and
    - Funding needed to further the top ten recommendations of the CBJ Climate Action Plan.

2. CBJ provide funds from the current CBJ building and equipment depreciation funds to provide the capital for undertaking energy efficiency and conservation projects CBJ should begin small and expand program as it becomes a proven success.

3. CBJ establish that repayment to the Sustainability Fund from energy efficiency projects based on a projected energy savings rather than a fluctuating actual energy savings. CBJ would determine the projected savings and a portion of it would be used to repay the Sustainability Fund.

4. CBJ examine water, waste water and public transportation surcharges separately from funding for the Sustainability Fund.

5. CBJ undertake an assessment of the variety of alternatives for financing energy efficiency and clean energy projects community wide. This would include developing a clear understanding of the current financing mechanisms available to businesses and the

public, (such as loans, AHFC rebate program, Federal tax breaks on energy efficient system and appliances); identifying the financing gaps in these systems that prevent people or businesses from undertaking energy efficiency and energy production projects; and, developing financing mechanisms that assist with upgrades and projects, such as property tax reduction and pay back, electric company on-bill tariffs and on-bill loans, fuel company on-bill tariffs and on-bill loans, local energy buy-back programs (Advanced Renewable Tariffs and Feed In Tariffs), peak load pricing and smart grid technology, energy producer transitioning to energy producer and service company, split or shared incentive situations.

4. RECOMMENDATIONS

TABLE 5.1 ADDITIONAL RESOURCES
Recent Innovations in Financing for Clean Energy; Southwest Energy Efficiency Project: Brown, Mathew and Conover, Beth; 2009.
Fairbanks First Fuel Analysis; Alaska Conservation Alliance and Natural Capitalism Solutions; 2010.
Sustainability Initiatives Funding Briefing Paper; Corvallis, OR City Council; 2010.

Appendix 1. Logo Examples