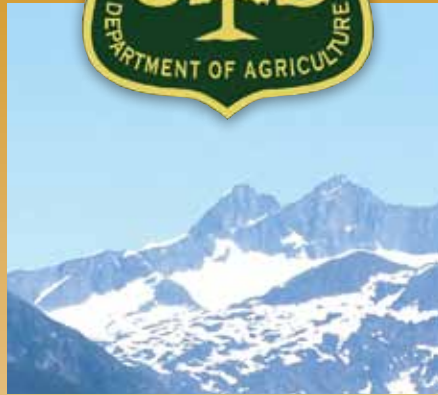


Tongass National Forest

first Environmental Footprint Report



Message from the Tongass Green Team Co-Chair



This is our first Tongass National Forest Environmental Footprint Report, in what I hope will become an annual report. Our environmental footprint is a measure of the demands of the Forest Service on the natural system in terms of consumption of renewable and non-renewable resources. This document describes our environmental footprint, how we can reduce it and some of our success stories of sustainable operations across the Tongass. The vision of the Tongass Green Team is that sustainability principles will be integrated throughout all aspects of the Tongass operations as a regular course of business, with the ultimate goal of reducing our impact on the environment. For example, the Tongass employees are changing personal work habits, such as reducing printing and implementing recycling programs. Please take the time to read about these accomplishments and I look forward to sharing more success stories next year!

Many hands make light work but we need all hands to be involved in creating sustainability.

Sincerely,

Michele M. Parker
Tongass Green Team Co-Chair



Contents

<i>4</i>	Executive Summary
<i>10</i>	Introduction
<i>12</i>	Moving Forward—Indicators of Progress and Next Steps
<i>13</i>	Footprint Area Accomplishments
<i>14</i>	Energy Use in Facilities
<i>20</i>	The Way We Move: Fleet and Transportation
<i>26</i>	Water Use in Facilities
<i>28</i>	Green Purchasing
<i>29</i>	Waste Prevention and Recycling
<i>34</i>	Sustainable Leadership
<i>37</i>	Literature and Resources
<i>38</i>	Appendix I: In-Town Facilities
<i>40</i>	Appendix II: Greenhouse Gas Inventory



The Tongass National Forest is dedicated to sustainable operations. The *2008 Tongass National Forest Environmental Footprint Report* provides a transparent look at the Tongass' environmental stewardship that can help the Tongass reduce its environmental impact, and communicate the importance of sustainability and conservation. This report is part of the Tongass Green Team's (TGT) vision of integrating sustainability principles throughout all aspects of the Tongass' operations as a regular course of business.

The Tongass is subject a number of sustainability requirements, including Executive Order 13423 *Strengthening Federal Environmental, Energy, and Transportation Management*, which sets goals for federal agencies in energy, greenhouse gas emissions, transportation, water, waste, and purchasing. The Tongass is covered by the United States Forest Service (USFS) national Environmental Management System (EMS) and participates in voluntary sustainability initiatives such as the Environmental Protection Agency (EPA)—Climate Leaders Program. As of 2009, the Tongass has to comply with Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*.

This report covers the environmental impact areas of energy, transportation, water, purchasing, waste, and sustainable leadership for Fiscal Year 2008 (October 1, 2007 – September 30, 2008). It includes all districts and operations in the Tongass National Forest. Data for the report comes from written questionnaires, data requests, interviews, record reviews, and an energy and water audit. As the first comprehensive effort to collect data across the Tongass, the report identified a number of data gaps. As data collection is improved, so will the reliability and completeness of the data. Earlier data (FY 2003 and FY 2007) collected by McNeil Technologies for the national USFS Environmental Footprint Reports are referenced for comparison.

The TGT is taking a systematic approach to reducing environmental impacts. One aspect is this report. The approach also includes the development of a Sustainability Action Plan (Action Plan) to identify and prioritize specific actions that will reduce environmental impacts. A companion Implementation Plan will identify specific steps for implementing the actions and provide an easy way to track progress. The Action and Implementation Plans, and future footprint reports will be used to prioritize, track, and report on activities and accomplishments.

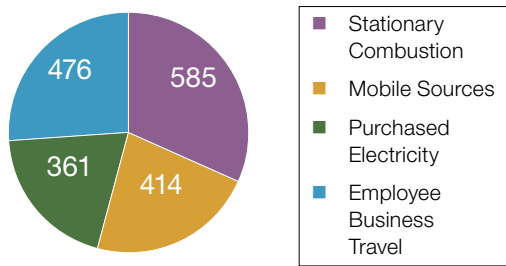
Energy Use in Facilities

FY 2008 Highlights

- Conducted energy audits on 10 percent of buildings.
- Conducted initial feasibility assessment to evaluate sites for energy projects.
- Continued light conversion project to replace 800 light fixtures. (Saves 25 percent to 50 percent energy per light, reduces maintenance costs, estimated payback of three to five years).
- Upgraded floating camp solar system to reduce fuel consumption by 75 percent.
- Installed solar generator systems in two floating camps.
- Installed eight Energy Star hand dryers at the Mendenhall Glacier Visitor Center (80 percent reduction in energy use).

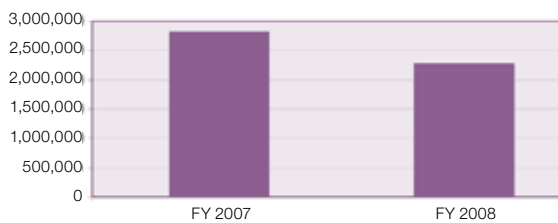


Graph 1. FY 2007 GHG Emissions by Source (MTCO2e)*



*Metric Tons of Carbon Dioxide Equivalent.

Graph 2. Estimated Electricity Use (kWh)



Energy use, specifically burning petroleum-based fuels, results in greenhouse gas emissions and other pollution. EO 13423 requires federal facilities to reduce energy intensity by 3 percent annually (30 percent by 2015), use new renewable energy sources (at least 3 percent of energy purchases from renewable energy sources by 2007 and 7.5 percent by 2013) and conduct annual energy and water audits on at least 10 percent of facilities.

In the Tongass, there are about 180 buildings that cover 513,215 square feet. These include in-town facilities like visitor centers, dormitories, residences, offices, marinas, and storage buildings. There are also 24 remote camps. Energy is used for lighting, powering equipment, refrigeration, and heating (e.g. melting snow on sidewalks, heating water, and heating buildings). In-town facilities are powered by hydroelectric power or diesel generators. Remote facilities primarily use fuel oil for heating and electricity.

The Tongass staff have identified numerous options for improving the energy efficiency of buildings or using renewable energy. Current energy saving initiatives include a large-scale lighting upgrade to more efficient fixtures. Other options range from simple low/no cost actions like asking staff to turn out lights in unused rooms or improving weather stripping to whole system retrofits and solar generators. These options will be incorporated and evaluated in the Action Plan.

The Way We Move: Fleet and Transportation

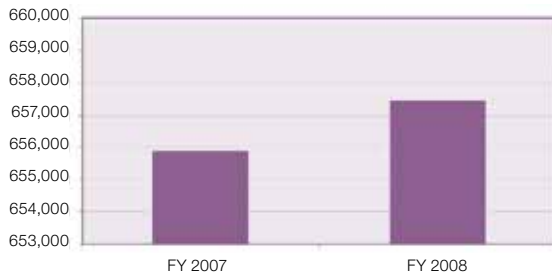
FY 2008 Highlights

- Using Vehicle Allocation Methodology (VAM) to right-size the fleet.
- Purchase gas/electric hybrids to improve fuel efficiency.
- Encourage staff to be more mindful of ways to reduce driving.
- Promote use of video conferencing to reduce travel to meetings.

Because of the geography, the Tongass staff use motor vehicles, aircraft and watercraft for transportation. These vehicles burn fossil fuels, which release greenhouse gases and other pollutants into the air, plus contribute negative environmental impacts from the production, refining, and transportation

of fossil fuels. EO 13423 requires federal facilities to reduce fleet total petroleum products use by 2 percent annually through 2015 and increase nonpetroleum-based fuel use by 10 percent annually. The USFS EMS includes a Fleet Management Implementation Plan designed to meet these requirements.

Graph 3. Vehicle Miles Travelled (VMT)



The majority of the Tongass vehicles are light duty pickup trucks and heavy-duty vehicles (larger pick up trucks and SUVs) plus passenger cars, project equipment (off-road vehicles including ATVs, snowmobiles, and trail bikes), and construction equipment. The current average estimated fleet efficiency of the fleet based on EPA average values per vehicle is 14 miles per gallon. The Tongass boat fleet consists of over 200 boats, primarily outboard motor boats and aluminum hulled work boats, and includes three large motorized vessels (longer than 61 feet). The vast majority of the Tongass vehicles use gasoline and there are currently no sources of alternative fuels in the Tongass. When vehicle or boat travel is not an efficient option, staff charter aircraft and helicopters for travel to remote sites.

In 2008, the Tongass spent \$373,056 on 56,790 gallons of fuel (gasoline and diesel) for vehicles and watercraft. Staff logged 2,288 hours of flight time for a cost of \$1,537,624 (data on aircraft fuel use was not available).

In the future, the Tongass fleet manager will continue to use the Vehicle Allocation Method (VAM) to make improvements in the overall

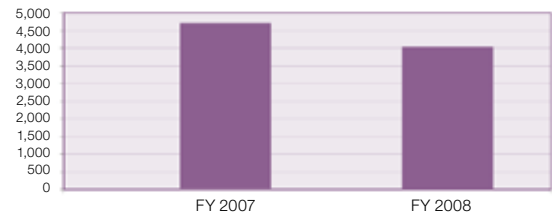
fleet for maximum efficiency and the Tongass staff will look for other ways to improve transportation efficiency. The Tongass is also planning to collect more accurate data on fuel use and efficiency to help identify the best ways to make the fleet more efficient.

Water Use in Facilities

FY 2008 Highlights

- Conducted water audits on 10 percent of buildings.
- Identified gaps in the data.
- Created Action Plan to reduce water consumption.

Graph 4. Water Use (Thousands Gallons)



Clean water is a critical resource for communities and healthy habitats. It takes energy and chemicals to pump and treat drinking water, energy to make hot water, and more resources for wastewater treatment. Under EO 13423, federal facilities are required to reduce water consumption intensity by 2 percent annually or 16 percent by the end of FY 2015, and to conduct energy and water audits on at least 10 percent of buildings every year. In 2008, the Tongass used over four millions gallons of water, mostly for typical domestic uses and in some buildings, for heating.

The Tongass has abundant fresh water and as a result, water conservation has not been

a priority issue. As a result, there are many options for reducing water use. One benefit of reducing hot water use is the energy savings. The 2009 water audit identified several low cost actions like the installation of low flow faucets (77 percent savings of water) or low flow shower heads (32 percent savings of water) that save both water and energy.

Green Purchasing

What We Do

- Purchase environmentally preferable items such as more efficient light bulbs and recycled content paper.
- Staff authorized to make purchases receive training that includes green procurement.
- Green products are specified in janitorial contracts.
- Action Plan includes steps to increase green purchasing.



Green purchasing is the purchase of environmentally preferable products and services. These are products made using less energy, from recycled or renewable materials, or from less toxic materials. Products that are more energy or water-efficient, have less packaging, are manufactured locally, or that replace disposable or toxic products are also environmentally preferable. EO 13423 sets several requirements for green purchasing at federal facilities including the purchase of bio-based, environmentally preferable, energy or water-efficient, and recycled-content products; the purchase of 30 percent postconsumer fiber content paper, and the purchase of Electronic

Product Environmental Assessment Tool (EPEAT)-registered electronic products.

The responsibility for purchasing at the Tongass is distributed over different offices and districts. The Tongass staff currently buy a number of environmentally preferable products such as recycled content paper and energy efficient light bulbs, and larger contracts, such as janitorial contracts, contain green provisions. For local purchases, there are few environmentally preferable options.

The Tongass has not formally collected detailed data on green purchasing practices. The Action Plan will include steps to collect data and activities to encourage increased green purchasing.

Waste Prevention and Recycling

FY 2008 Highlights

- The Tongass-wide recycling of ink toner cartridges, batteries, and fluorescent lamps.
- Recycling in selected Districts of aluminum cans, glass, cardboard, paper, and plastic.
- Recycling partnerships with local organizations such as Big Brothers/Big Sisters, Community Connections, and Boy and Girl Scouts.
- Forest-wide hazardous waste minimization plan.



Garbage is representative of the wasted energy and natural resources that were used to create and transport the now discarded paper, plastics, metals, and wood to the energy used to transport and process the waste, whether landfilling or recycling. Hazardous waste has additional safety and regulatory liability issues and is expensive to handle. EO 13423 requires federal

agencies to implement recycling programs and to reduce the quantity of toxic and hazardous chemicals and materials used.

The Tongass has a large operation and generates a significant amount of waste. However, data is limited as comprehensive information on waste composition, quantities, or recycling has not been collected in the past. From Yakutat to Prince of Wales, the Tongass employees recycle a wide range of materials including paper, aluminum, glass, plastic, cardboard, batteries, tin, electronic waste and fluorescent lamps. However, recycling is limited in some areas.

The Tongass' goal is to make forest operations as waste-free as possible and to divert any remaining waste with reuse and recycling. The Tongass' recycling efforts also often serve as a catalyst for recycling programs in small communities. Plans to reduce waste include reviewing operations with the Pollution Prevention (P2) in mind (reduce, reuse, recycle), implement waste tracking so that targeted approaches to waste reduction can be implemented, expand recycling opportunities, and implement strategies for districts to share materials through an online resource.



Sustainable Leadership

FY 2008 Highlights

- Create Environmental Footprint Report, Greenhouse Gas Inventory, and Action Plan.
- Participate in EPA Climate Leaders Program.
- Continued management support for the Tongass Green Team.
- Engage local communities in environmental activities such as Prince of Wales Island Earth Day event in the Craig District and recycling programs.

Sustainable leadership encompasses the creation of a management climate that reduces barriers to sustainable operations and integrates sustainable habits into Forest Service culture. Sustainable Leadership includes meeting or exceeding the EO 13423 requirements and sustainable operations policies, promoting place-based sustainability initiatives, communicating the vision of sustainable operations, and creating the organizational capacity to implement sustainable solutions.

The Tongass has made significant progress in fulfilling its vision of sustainable leadership. Senior Tongass leadership chartered the TGT to promote sustainable operations and reduce the environmental footprint of the Tongass operations. The team's mandate is broad and includes working internally to initiate and support projects, make recommendations to the forest leadership, and work with local communities and other government agencies. The Tongass is also implementing the USFS EMS, which specifically addresses Fleet Management. For the future, Tongass is working on initiatives like the creation of an Alaska Collective Board consisting of representatives from the Tongass, Chugach, Regional Office and Pacific Northwest Research Station. The goal is to create opportunities to promote and broaden Forest Service Sustainable Operations capabilities in the Alaska region through networking and knowledge sharing.

The success of the Tongass' sustainability leadership can be measured quantitatively and qualitatively and will be seen in the success in reaching goals in the environmental footprint areas. This report helps measure results by providing transparency and tracking progress in reducing environmental impacts over time.



We must work and must be committed to a shared vision, a vision that conserves our forests and the vital resources important to our survival while wisely respecting the need for a forest economy that creates jobs and vibrant rural communities. Our shared vision must begin with a complete commitment to restoration.

Tom Vilsack, August 14, 2009

The Tongass is part of a national forest system that provides countless benefits to Americans—clean water, wildlife habitat, healthy salmon fisheries, recreation, climate change mitigation, and economic value from tourism and wood products. Forests also provide a valued connection with nature and are a source of cultural heritage for Americans and indigenous peoples. The United States Forest Service (USFS), an agency in the U.S. Department of Agriculture (USDA), manages the health of this national treasure.

In 2009, USDA Secretary Tom Vilsack laid out a new vision for America's forests that stressed conservation and restoration. The Tongass National Forest, dedicated to the protection and restoration of the forest follows this conservation ethic. This sustainability report is part of the new effort. It provides a transparent look at the environmental stewardship of the Tongass' operations, is a valuable tool to help the Tongass reduce its environmental impact, and communicates the importance of sustainability and conservation.

At 17-million acres, the Tongass is the largest unit in the Forest Service. This dramatic landscape contains the world's largest temperate rain forest and hundreds of miles of shoreline, islands, muskegs (peat bogs), caves, and wetlands. The ecosystem supports abundant fish and wildlife including bears, bald eagles, deer, and salmon as well as less prominent species such as marten, bats, and mice. Pictographs and petroglyphs scattered on

shoreline rocks record the heritage of ancient people in the area. The Tongass' 31 communities, including the state capital of Juneau, are home to about 75,000 people including Alaska native tribes like the Tlingit, Haida, and Tsimshian.

Headquarters for the Tongass are located in Ketchikan, with other supervisory offices in Sitka and Petersburg. The forest, which includes three visitor centers, is partitioned into ten ranger districts: Admiralty National Monument, Craig, Hoonah, Juneau, Ketchikan-Misty Fiords, Petersburg, Sitka, Thorne Bay, Wrangell, and Yakutat. Almost one third of the Tongass (5.7 million acres) is set aside as wilderness, a designation that prohibits activities such as logging or road building. The Tongass employs over 400 people in diverse jobs ranging from archaeologist to telecommunication specialist. Seasonal employment from spring through summer brings in forestry aids and technicians, biological science aids and technicians, laborers, and guides.

Over one million tourists visit the Tongass annually for fishing, wildlife and bird watching, boating, hiking, camping, and hunting. The Forest maintains several campgrounds and more than a hundred rustic cabins, many accessible only by boat or plane. The Tongass supports numerous residents with subsistence hunting and fishing, and local communities derive economic benefits from recreationists and logging operations. Sections of the Tongass are open to logging, with a plan to move

towards the sustainable harvesting of younger trees. In addition, mining claims are located within the Tongass.

Operations at the Tongass have numerous environmental impacts from energy and water use, transportation, procurement, and waste. However, the Tongass employees are committed to reducing these impacts and developing more sustainable operations. The USFS identified six environmental footprint areas: energy, water, green purchasing, fleet and transportation, waste prevention and recycling, and sustainable leadership. This report compiles data on these footprint areas, documents efforts the Tongass has taken to reduce the impacts, and outlines plans for the future.

In 2008, the Tongass Leadership Team created *A Strategy for Management and Priority Setting FY 2008 thru FY 2012* to establish a framework of strategic goals for the future direction of the Forest. The strategic plan identified five priorities:

- 1** An Integrated Approach to Restoration and Enhancement.
- 2** Our Role in Addressing Climate Change.
- 3** Recreation and Wilderness Management.
- 4** Timber Management.
- 5** Telling Our Story.

This first annual Environmental Footprint Report supports this strategy by providing information about operations to optimize decision-making and to communicate sustainability efforts. It also directly links to Priority 2, Our Role in Addressing Climate Change, and Priority 5, Telling Our Story.

The Tongass National Forest Vision

In the 2008 *A Strategy for Management and Priority Setting*, the Tongass Leadership Team laid out a vision for the Forest:

“The Tongass National Forest is a place where people live connected to the land and sea, making their living surrounded by unparalleled natural abundance and wildness.

We are a Forest of resilient communities, healthy ecosystems, and welcomed visitors. We value and appreciate our employees. We lead by maintaining or restoring healthy and sustainable resources while fostering and supporting a diverse economy. We work cooperatively at the local level to identify common goals and achieve global, national, regional, Forest, and community objectives. We increase public and institutional trust through continuous learning, communication, integrity, and sound resource decisions. Our work and our reputation provide reason for partners and publics to advocate on our behalf.”

This vision supports the mission of the USFS:

The mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation’s forests and grasslands to meet the needs of present and future generations.

Moving Forward— Indicators of Progress and Next Steps

EO 13423 directs federal agencies to:

- Improve energy efficiency and reduce greenhouse gas emissions.
- Use more renewable energy.
- Reduce water consumption.
- Purchase more environmentally friendly products.
- Reduce toxic and hazardous chemicals and materials.
- Reduce solid waste (waste prevention and recycling programs).
- Implement greener construction, renovation and management of buildings.
- Improve fleet efficiency and the use of alternative fuels.
- Implement Environmental Management Systems (EMS).

The objectives of the annual Environmental Footprint Report are to encourage more sustainable operations by helping to incorporate a sustainability ethic into all Forest operations, communicating the Tongass' priorities and activities, providing a benchmark for measuring progress, and highlighting successes. Gathering and presenting information creates transparency, which helps promote compliance with environmental laws and regulations, encourages

performance improvement, and develops a shared view of the goals of the organization.

Sustainability, “meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs,”¹ is a simple concept that is immensely difficult to implement. The USFS is at the forefront of sustainable management with experience balancing the many, often conflicting, uses of the national forests for numerous stakeholders. Sustainability is embedded in the mission of the USFS, which is why the Tongass views sustainability as a critical mission and has made reducing the environmental footprint of forest operations a priority.

Federal agencies must comply with federal requirements that encourage sustainability. *EO 13423 Strengthening Federal Environmental, Energy, and Transportation Management* sets sustainability goals for federal agencies and requires agencies to implement *Environmental Management Systems (EMS)*. The Forest Service has a national level EMS that applies to forest units and identifies fleet management, water, and energy as significant impacts. The Energy Policy Act of 2005 (EPA 2005) and the Energy Independence and Security Act of 2007 (EISA) impose additional requirements related to energy and fuel use. On October 5, 2009, President Obama signed EO 13514 *Federal Leadership in Environmental, Energy, and Economic Performance*. This EO, which contains sustainability requirements for federal agencies related to greenhouse gas emissions, energy, and other sustainability areas, is not covered in this 2008 report but will be in future reports.

The Tongass must demonstrate progress towards meeting the goals of EO 13423. In addition, Forest Service Performance Accountability System (PAS) goals, required by the Government Performance and Results Act, are established annually for each Forest

¹ From the 1987 World Commission on Environment and Development (the Brundtland Commission).

Service Region. As part of the USDA and the USFS, the Tongass contributes to meeting goals under these requirements.

The Tongass also participates in voluntary sustainability efforts. In 2007, the USFS joined the Environmental Protection Agency (EPA) Climate Leaders Program. Members of Climate Leaders commit to completing an inventory of their greenhouse gas emissions, setting reduction goals, and reporting annually to EPA. The Tongass is one of six USFS pilot locations selected to conduct a greenhouse gas emissions inventory. The Energy and Transportation sections discuss data from this inventory and the full inventory and inventory management plan are in *Appendix III*.

This Environmental Footprint Report, which is not required, will help the Tongass meet its sustainability goals and comply with federal sustainability requirements. The Tongass is using data from this report to develop an Action Plan that will provide a road map and identify priorities for implementing environmental initiatives. Future reports will help track progress in implementing the Action Plan.

If you have questions or comments about the Tongass' Environmental Footprint Report, contact Michele Parker, Tongass Environmental Engineer at mmparker@fs.fed.us or (907) 772-5850.

Footprint Area Accomplishments

This report contains baseline information on the six environmental footprint areas identified by the USFS Sustainable Operations Program and based on EO 13423. An "environmental footprint" is the cumulative impact an organization's

operations and activities have on the environment. Impacts from vehicle use, for example, include:

- Air and water pollutants from exhaust.
- Carbon dioxide from internal combustion affects the climate and is acidifying oceans.
- Contaminants from fuel spills and engine repair drips.
- Waste materials from vehicle disposal.
- Natural resource extraction, habitat degradation, and water pollution from vehicle production, fuel production, and road building and maintenance.

The impact of each individual vehicle at the Tongass National Forest contributes to the overall environmental impact or "footprint" from transportation.

The Tongass' footprint areas addressed here are: Energy, Transportation, Water, Purchasing, Waste, and Sustainable Leadership.

For each area, the report describes environmental impacts and presents quantitative data. The report does not attempt to quantify all direct impacts (for example, all pollutants from vehicles) or address indirect impacts (for example, emissions from shipping). In the future, a life cycle analysis may be used to capture these additional impacts.

A comprehensive footprint document requires support from many staff and different disciplines, and all districts and operations in the Tongass National Forest are included in the report. Data is from the Tongass' internal records and outside partners such as utility providers. Information was gathered through written questionnaires, data requests, interviews with staff, utility invoices, and record reviews. The report also references data collected by McNeil Technologies for the national FY 2003 and FY 2007 USFS Environmental Footprint reports.

Data collection in the past was not required and not all units have collected data consistently. Therefore complete datasets were not available in each footprint area. However, sufficient data was available to gain an understanding of the Tongass' environmental footprint. This effort also helps identify data gaps and opportunities to expand analyses in the future. The data should improve in future reports with the implementation of standard approaches to data collection.

The reporting period is Fiscal Year 2008 (October 1, 2007 – September 30, 2008). The greenhouse gas inventory, in Appendix II, reflects data from Fiscal Year 2007 (October 1, 2006 – September 30, 2007).

The scope of the Tongass' environmental footprint is defined by the operations and activities conducted to manage the forest and occurring within the Tongass geographical boundaries.

Each footprint area includes a brief introduction and the following four sections:

- 1** Regulatory Requirements— Brief description of the regulatory requirements related to the specific footprint area.
- 2** Current Practices— Characterization of the footprint area, data and a description of the Tongass' current practices.
- 3** Success Stories—Brief description of success stories from field units describing actions taken to reduce the Tongass' footprint.
- 4** Moving Forward—Plans for next steps and strategies for reaching goals in the footprint area.

Energy Use in Facilities

Energy Requirements from EO 13423, EPACT2005, and EISA

- Reduce energy intensity (consumption per gross square foot of building) by 3 percent annually or 30 percent by 2015 using a 2003 baseline.
- Explore renewable energy opportunities on agency property.
- Purchase at least half of statutorily required renewable energy from new renewable sources.
- Enable Energy Star® features on 100 percent of computers and monitors.
- Conduct annual energy and water audits on at least 10 percent of facilities.
- Ensure at least 3 percent of energy purchases are from renewable energy sources by 2007 and 7.5 percent by 2013.
- Design buildings to be 30 percent more efficient than current standards so long as they are life-cycle cost effective.
- Apply sustainable design principles to new construction and renovation.

The Tongass facilities primarily use electricity, propane, and fuel oil for heating, lighting, and other electrical needs. While energy use is crucial to managing the Tongass, it impacts both environmental and financial resources. The burning of fossil fuels (such as fuel oil)

releases greenhouse gases, which contribute to climate change, and toxic pollutants, which are linked to serious health conditions such as heart disease, stroke, and asthma. Energy development and generation also cause pollution and degrade natural habitat. In addition, energy costs are high, rising, and unpredictable. The Tongass has taken a proactive approach to quantifying the energy footprint from facilities and working to reduce the environmental impact while maintaining comfortable living and working conditions.

Regulatory Requirements

The Tongass is subject to a number of requirements related to energy from EO 13423. A major goal of these requirements is to reduce overall energy consumption and to encourage the use of renewable energy. The USFS has also set an internal energy goal of becoming an energy neutral Agency by 2020 with reductions of energy intensity of 25 percent by 2012; 50 percent by 2016; and 100 percent by 2020.

Current Conditions

The climate, size, and location of the Tongass present significant energy management challenges. While the Tongass' climate may be moderate for Alaska, it is cool and rainy year round. Near sea level, summer temperatures average from 46 to 70 degrees Fahrenheit with winter temperatures ranging from 28 to 42 degrees Fahrenheit. Annual precipitation varies between 90 and 160 inches per year. The remoteness and geographic separation of the Tongass districts present limitations, even in cities like Juneau. In 2008, for example, an avalanche took out power lines from the hydropower dam to Juneau and for over three months the city depended on diesel generators for electricity, which quadrupled energy costs.

The number, age, and remote locations of the Tongass' buildings also provide unique opportunities for a more sustainable energy strategy.

Solar Power

Remote camps on the Tongass have largely depended on diesel generators for power. Diesel generators create pollution and can potentially spill fuel. In addition, transporting diesel to the remote sites makes this power source expensive. The Tongass began introducing renewable power at four remote sites by switching from diesel generators to solar generators in 2004. In 2008, the Tongass upgraded the solar system at a floating camp, which reduced fuel consumption by 75 percent, and installed new solar systems on two more floating camps, including 6,680 watts of photovoltaic panels at Thorne Bay. Solar generators require less maintenance than diesel generators, do not generate greenhouse gases or other pollutants, and have a constant energy cost. They have proven to be a cost-effective and environmentally preferable option for the remote sites.



Lighting Retrofit

As part of the Tongass' energy reduction strategy, staff have begun replacing an estimated 800 light fixtures with more energy efficient fixtures. Each replacement will save an estimated 25 to 50 percent of energy over the old fixtures. The replacement project also reduces deferred maintenance since many of the targeted lights have already exceeded their life span. The reduced energy costs provide a return on investment of three to five years.

The Tongass has also installed motion sensors and timer switches at Thorne Bay and in other areas so lights turn off automatically when not in use.



There are 178 buildings across the Tongass, with 459,711 square feet in area. In-town buildings, which range from a 1916 family residence to the 2007 Juneau Office Building, include dormitories, residences, offices, two marinas, two shops, storage buildings, and warehouses. There are two visitor centers, the Ketchikan Discovery Center and the Juneau Mendenhall Glacier Visitors Center. In-town facilities total 383,227 square feet in area and are listed in Appendix II.

The Tongass employees also work at four office buildings leased from the Government Services Administration—Juneau Regional Office, Ketchikan Supervisors Office, Sitka RD/SO, and Yakutat Administrative Office. Leased buildings can present a challenge to implementing sustainable measures because the Tongass has limited control over the operation and maintenance and it can be difficult to obtain data on leased buildings.

There are 24 remote camps, many of which are accessible only by boat or plane, and four housing barges. Occupancy at the remote camps and barges varies from year to year. In FY 2008, 19 camps were occupied for a total of 2,447 person nights.

The Tongass' facilities use energy for lighting, powering equipment, refrigeration, and heating (space, water, and sidewalks). Local utility companies supply electricity from hydropower in Petersburg, Wrangell, Sitka, Juneau, and Ketchikan. Utilities that supply Craig, Hoonah, Thorne Bay and Yakutat are diesel powered. Hydropower is a clean renewable energy source that does not contribute to greenhouse gas emissions. Diesel is based on burning non-renewable fossil fuel and emits greenhouse gases and other pollutants. Due to the Tongass' cool rainy climate, air conditioning is not needed, except to cool the computer server in the summer.

Remote facilities primarily depend on fuel oil for heating and electricity. Transporting the fuel oil

to remote sites virtually doubles the cost of the fuel to around \$7 per gallon. Energy saving measures, such as more efficient lighting, are particularly important at these facilities because generator fuel consumption is reduced by around 0.1 gallons per hour for every kilowatt reduction of energy. This also reduces the greenhouse gas emissions and pollution generated by burning fuel oil. Some facilities use propane for hot water.

Table 1 presents energy use and expenditures in the Tongass. In 2008, the Tongass spent approximately \$311,138.16 on electricity, \$474,538.42 on fuel oil, and \$29,116 on propane, for a total of \$814,792. This information is from the Tongass Transaction Register.

The discrepancy between the two consumption values shown below: estimated consumption (Table 1), based on expenditures using average energy prices for the region, and documented consumption (Table 2), based on utility records, highlights the significance of developing a data collection strategy that ensures completeness.

The choice of expenditure versus direct consumption is a balance between accuracy and cost of data collection. Expenditure data is less expensive to collect and is a common data source for estimating energy consumption in the USFS. The FY 2007 McNeil Technologies study used expenditure data for energy use across the USFS. Actual usage data from utility bills should be more accurate as it is a direct rather than indirect measure. However, for FY 2008, not all usage data was available so the more complete expenditure data provides a better estimate of energy use.

Table 3 shows, for FY 2008, energy and CO₂ intensity (the amount of energy used per gross square foot (GSF) using both data sources.

It is important to use the same source when comparing data from year to year. Table 4 and Graph 1 shows the FY 2008 electricity consumption estimated from expenditures compared to FY 2007 and FY 2003 expenditure-based amounts from the McNeil Technology reports.

Table 1. FY 2008—Estimated Energy Consumption Based on Expenditures

	Transaction Register Expenditures	Average Price per Unit in Alaska for FY 2008*	Total Estimated Consumption (calculated from expenditures)	Estimated GHG Emissions (MTCO ₂ e)**
Electricity	\$311,138	13.6c/kWh	2,281,070 kWh	499
Fuel oil	\$474,538	\$3.72/gal	127,564 gal	1,302
Propane	\$29,116	\$2.51/gal	11,612 gal	67
Total	\$814,792	—	—	1,868

* Source: U.S. Energy Information Administration.

** Calculated using EPA Climate Leaders Simplified Greenhouse (GHG) Emissions Calculator protocol.

Table 2. FY 2008 Documented Energy Consumption from Utility Records

	Documented Consumption (based on utility records)	Estimated GHG Emissions (MTCO ₂ e)*
Electricity	1,668,286 kWh	365
Fuel oil	54,776 gal	559
Propane	572 gal	3
Total	—	927

* Calculated using EPA Climate Leaders Simplified GHG Emissions Calculator protocol.

Table 3. FY 2008 Energy and CO₂ Intensity Comparison—Expenditures and Documented Consumption.

	Total Estimated Energy Use (Billion BTU)	Facilities Area (GSF)	Energy Intensity (BTUs/GSF)	CO ₂ Intensity (pounds/GSF)
Expenditure Data	16.5	459,711	35,791	8.9
Documented Consumption	13.4	459,711	29,058	4.5

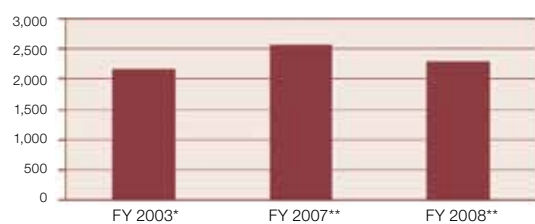
Table 4. Energy Consumption Estimates Based on Expenditures, Comparison for FY 2003, FY 2007, and FY 2008.

	FY 2003*	FY 2007**	FY 2008**
Electricity (kWh)	2,155,295	2,560,446	2,281,070
Fuel Oil (gallons)	58,425	98,336	127,564
Propane (gallons)	2,832	11,115	11,612

* Data from McNeil Technologies report.

** Data from Tongass Transaction register.

Variation between years reflects the challenges of collecting and interpreting this data. For example, the FY 2008 fuel oil consumption estimate is more than double that of FY 2003 and propane values also vary significantly. Variations could be from actual changes in use or from inaccuracies in categorizing and collecting expenditures. For a complete understanding of energy use, data tracking should be thorough and consistent, and analyses conducted to account for large variations.

Graph 5. Electricity Consumption Comparison for FY 2003, FY 2007 and FY 2008 (Thousands of kWh)

* FY 2003 and FY 2007 data from McNeil Technologies reports.

** FY 2008 estimated based on the Tongass Transaction Register.

In 2009, the Tongass conducted detailed energy and water audits on nine buildings (selected as representative of Tongass buildings), or about 10 percent of the square footage of facilities.

The audits included interviews with occupants and building managers, review of documentation and mechanical drawings, and inspections. The Tongass also conducted an initial feasibility assessment for energy projects that evaluated sites for electrical, water, and fuel oil savings.

According to the audit, the majority of audited buildings were well insulated with adequate weather stripping. In the nine audited buildings, energy and water projects that cost \$228,000 would result in annual savings of \$30,000 with a simple payback of eight years. (Water projects that reduce hot water use also reduce energy.) Proposed projects ranged from simple hot water pipe insulation, to the installation of energy recovery systems and whole building retrofits. In addition to saving money, these projects would reduce greenhouse gases and other pollutants. These recommendations are likely to apply to other buildings in the Tongass.

The Tongass staff are already taking important steps to reduce energy consumption. The TGT distributed smart power strips, which stop current from flowing to electronic devices when not in use (many electronics do not actually turn off when switched off). Vending misers, which

power down vending machines during idle periods, have been installed in multiple locations and old appliances are being replaced by more efficient models, like an older refrigerator and microwave in the Petersburg Supervisors Office.

Evaluating need, and instituting behavioral and operational changes are important ways to save energy and money. When the avalanche increased the cost of energy in Juneau, staff at the Juneau office reduced energy use by 20 percent by turning off lights and appliances when not needed. Other simple actions like installing motion sensors and ensuring that employees know how to program temperature controls can lead to energy savings with little to no upfront costs.

The Tongass is actively supporting Southeast Alaska community efforts to switch from fossil fuels, which release pollution and greenhouse gases, to renewable energy sources like biomass and hydropower. By providing funding for a boiler system that uses wood chips, hog fuel (shredded bark and unusable wood pieces) and cordwood from local sawmills, the Tongass helped the City of Craig become the first town in Alaska to use wood waste to heat buildings, including the Craig elementary and middle schools, and the Craig Aquatic Center. Similar wood-fired systems are planned for the Southeast Alaska Discovery Center in Ketchikan and the Thorne Bay Ranger District office and warehouse.

In 2008, the Tongass drafted a Final Environmental Impact Statement for Kootznoowoo, Inc. to develop a hydro-electric plant on Thayer Creek in Admiralty National Monument. This facility would reduce the City of Angoon's reliance on diesel-powered generators, thus providing cheaper power and reducing the carbon footprint.

Energy and Water Audit Recommendations

- Install an energy recovery ventilator.
- Install demand controlled ventilation.
- Upgrade lighting.
- Conduct a comprehensive building upgrade.
- Winterize building.
- Install hot water reset controls.
- Add insulation.
- Reduce hot water temperatures.
- Improve weather stripping.
- Incorporate temperature setbacks.
- Insulate hot water pipes.
- Install low flow faucet aerators and shower heads.
- Improve record-keeping.
- Winterize when possible.
- Close unused spaces when possible.

Future Plans

There are many opportunities for energy reduction and renewable energy use in the Tongass. The baseline data in this report and the Greenhouse Gas Emissions Inventory are important first steps to recognizing these opportunities. Because data gaps reduce the ability to accurately measure progress, improving energy data collection across the Tongass is very important. Moving forward, employees will track energy use and cost by recording and analyzing utility bills on an ongoing basis.

Mendenhall Visitor Center Hand Dryers

Tongass staff at the Mendenhall Visitor Center recently installed high-velocity Mitsubishi Jet Towel hand dryers to replace traditional paper towels in visitor restrooms. The benefits are four-fold: the dryers are energy efficient, operate at low decibels, reduce the use of paper products, and minimize waste.

The new dryers are about 90 percent more energy efficient than standard dryers, using 1100 watts compared to 2500 watts. They also have the same drying effect after only 10 seconds compared to the standard 30 seconds, thus saving more energy from the shorter running time.

Staff are encouraging visitors to use the dryers by posting restroom signs with information about their benefits.



Each district has identified individuals responsible for implementing the new data collection strategy.

Data tracking is also necessary because energy use values are performance measure categories in the Forest Service PAS. Region 10 energy measures for FY 2010 are in Table 5.

Table 5. USFS FY 2010 Region 10 PAS Energy Goals.

Performance Measure	Unit of Measure	Assigned Regional Target
Cost of Electricity	US Dollar	\$373,299
Cost of Fuel Oil	US Dollar	\$334,659
Cost of Natural Gas	US Dollar	\$20,051

Current initiatives such as the lighting retrofit and biomass feasibility analysis are ongoing, and the TGT is working to educate staff about ways to reduce energy in their daily activities and to promote behavioral changes.

The Action Plan being developed based on data from this report will identify and prioritize specific actions that will help the Tongass comply with EO 13423 and reach its energy goals. Future footprint reports will track progress towards these goals and highlight accomplishments.

The Way We Move: Fleet and Transportation

The size, remoteness, and climate of the Tongass make transportation a challenge. In addition to road vehicles, employees use boats and aircrafts in order to properly manage the forest. Burning fossil fuel for transportation

releases greenhouse gases, about 20 pounds of carbon dioxide for every gallon of fuel used, and a variety of other pollutants including carbon monoxide and nitrogen oxides. The handling and storage of fuels can impact the environment through spills and drips of petroleum, and the release of volatile organic compounds (VOCs). In addition, the production, refining, and transportation of fossil fuels also release pollutants, deplete resources and degrade habitat. For these reasons, it is important for the Tongass staff to use fuel as efficiently as possible and to continually explore opportunities to use renewable or cleaner fuel.

Regulatory Requirements

Executive Order 13423 contains fleet-related requirements that apply to the Tongass.

These include:

- Reduce fleet total petroleum products use by 2 percent annually through 2015 using a 2005 baseline.
- Increase nonpetroleum-based fuel use by 10 percent annually.

The Forest Service EMS identifies fleet management as a significant aspect, and includes a Fleet Management Implementation Plan designed to help the USFS meet the EO 13423 requirements. The plan has specific guidance

for acquisition, operation and use, maintenance, and monitoring, communication, and training.

Current Conditions

Driving is an integral part of how employees at the Tongass do business. The Tongass' geography and weather present a challenge to implementing sustainable transportation options. The terrain is mountainous and includes over 1,000 islands. The weather can be extreme. Many roads are unpaved, and snow and ice blanket the area in the winter. Because of the distance and lack of roads, employees regularly use boats and small fixed-wing aircraft, and occasionally use helicopters. In addition, fuel options are limited.

Vehicles

The majority of the Tongass vehicle fleet are light duty trucks (pickup trucks with gross weight under 8,500 pounds) and heavy-duty vehicles (larger pickup trucks and SUVs over 8,500 pounds). The fleet also includes passenger cars, project equipment (off-road vehicles including ATVs, snowmobiles, and trail bikes purchased with funds allocated for specific projects), and construction equipment. No Government Services Administration (GSA) vehicles are used on the Tongass. The vast majority of the Tongass vehicles use gasoline.

Table 6. FY 2008 Miles Driven and Fuel Use—Gasoline.

	Heavy Duty Trucks	Light Duty Trucks	Passenger Cars	Tractors	Vehicle Miles Driven	Gallons
Craig	5	9	—	—	83,411	5,513
Hoonah	6	2	—	—	19,353	1,402
Juneau	10	9	3	—	79,086	5,520
Ketchikan	21	9	1	—	90,431	6,194
Petersburg	21	9	1	—	90,431	6,194
Sitka	6	4	—	—	14,981	1,066
Thorne Bay	28	9	—	—	217,664	17,407
Wrangell	11	5	—	—	46,035	3,259
Yakutat	7	1	—	—	22,810	1,614
Tongass (Total)	115	59	4	0	655,895	47,032

Table 7. FY 2008 Miles Driven and Fuel Use—Diesel.

	Heavy Duty Trucks	Light Duty Trucks	Passenger Cars	Tractors	Vehicle Miles Driven	Gallons
Hoonah	—	—	—	1	161	23
Juneau	—	1	—	—	871	60
Wrangell	1	—	—	1	524	75
Tongass (Total)	1	1	0	2	1,556	158

Table 8. FY 2007 and FY 2008 Transportation totals.

	Fuel: Gasoline + Diesel (Gallons)	Vehicle Miles Driven (Miles)
FY 2007	46,931	646,219
FY 2008	46,079	639,026
Percent Change from FY 2007 to FY 2008	1.8 percent reduction	1.1 percent reduction

Table 9. The Number of Project Equipment Vehicles by Type.

Non-Road Vehicles (ATVs, UTVs, Snowmachines, Trail Bikes)	Small Construction Equipment	Large Construction Equipment
51	26	22

The Tongass fleet manager maintains the Equipment Management Inventory System (EMIS) that tracks vehicles, including boats and trailers, by a unique Equipment Number. Vehicle odometer readings are recorded at the beginning and end of each fiscal year for trucks and cars. The Tongass has little data related to the use of project equipment.

Tables 6 and 7 show the miles driven and estimated fuel usage for each district by fuel type. Using EPA average fuel efficiency values² by vehicle type, the current average fleet efficiency is estimated to be 14 miles per gallon. Although Thorne Bay Ranger District has more total vehicle miles driven, proportionately the number of road miles, vehicles and miles driven between Thorne Bay and Ketchikan and Petersburg are very close. Thorne Bay's miles result from the District having the most roads, over 2,000 miles, for access to six communities, and a high volume of timber sale and other resource related activities.

Table 8. compares fuel use and vehicles miles driven in FY 2007 and FY 2008. In FY 2007, trucks, cars and tractors used 46,709 gallons

of gasoline and 222 gallons of diesel, and traveled an estimated 646,219 miles. In FY 2008, trucks, cars and tractors used 45,944 gallons of gasoline and 135 gallons of diesel, and traveled 639,026 miles. Total fuel use decreased 1.8 percent and miles driven by 1.1 percent from FY 2007 to FY 2008.

Table 9 shows project equipment vehicles by type. Fuel consumption and duration of use of these vehicles has not been recorded historically. However, the Tongass fleet manager plans to collect fuel consumption by project equipment in the near future.

Starting in FY 2009, to improve fuel use monitoring and efficiency estimates, employees were asked to record odometer readings at each refueling. In addition, each vehicle is assigned a unique purchase card that will allow more detailed tracking of fuel data.

The Tongass fleet manager is using the USFS Vehicle Allocation Methodology (VAM) to right-size the fleet. VAM helps assess the quantities and types of vehicles needed to ensure using the right sized vehicle for the job. Employees

² Available at www.fueleconomy.gov

are encouraged to consider the environmental and financial impacts of vehicles they request and preference is given to more environmentally sound vehicles where economically feasible.

The only fuel distributor in Southeast Alaska does not supply any alternative fuels such as biodiesel and E85. However, the Tongass purchased two hybrid electric vehicles in the past year, which are extremely popular among employees. Based in Juneau and Petersburg, these vehicles are already seeing significant use, illustrating employees' commitment to reducing the Tongass' environmental impacts and meeting fuel reduction goals.

Watercraft

The Tongass staff routinely use boats to reach remote locations. The fleet consists primarily of outboard motor boats and aluminum hulled work boats, plus three large motorized vessels (longer than 61 feet). All Tongass boats use gasoline except for three diesel ranger boats. In addition, the Tongass operates four barges that serve as housing for field staff working in

remote areas. Tongass employees also occasionally hire boats from local charter companies. A summary of the Tongass boat fleet is in Table 10 below.

Boat travel data has not been closely tracked. However, the Tongass Dispatch maintains a record of the number and length of boat trips, including charters. For FY 2008, Dispatch recorded an estimated 1,600 hours that Tongass boats spent on the water. Staff used chartered boats an additional 30 hours. The Vehicle Fleet Manager estimates that Tongass boats average six gallons per hour (gph). Since the Tongass recorded 1,630 hours on the water, this translates to an estimated 9,600 gallons of fuel used by the Tongass watercraft and 180 gallons by chartered boats.

Aircraft

Staff charter aircraft and helicopters for travel to remote sites when vehicle or boat travel is not an efficient option. Because of the high cost of flying, employees try to minimize travel by air and combine trips when possible. Statistics from the FY 2008 Aircraft Report are in Table 11.

Table 10. FY 2008 Boat Inventory.

	Outboard Motor Boat 6-70 HP	Outboard Motor Boat 90-250 HP	Aluminum or Almar Boat	Barge	Other	Total
Craig	4	5	2	1	1	13
Hoonah	5	5	2	—	—	12
Juneau	15	7	3	—	3	28
Ketchikan	20	24	5	2	11	62
Petersburg	3	11	12	1	1	28
Sitka	13	17	4	—	2	36
Thorne Bay	3	8	3	—	—	14
Wrangell	2	13	8	—	2	25
Yakutat	5	—	—	—	—	5
Totals	70	90	39	4	20	223

Table 11. FY 2008 Aircraft Use and Expenditures.

Aircraft	Hours	Passengers	Freight (pounds)	Cost (\$)
Fixed-wing	1,927	3,739	302,155	\$1,081,764
Helicopters	361.6	484	499,550	\$455,860
Total	2,288.6	4,223	801,705	\$1,537,624

Video-Conferencing Capabilities

Video-conferencing capabilities across the Tongass have expanded dramatically in recent years, reducing the need to travel to meetings. Employees across the forest can participate in meetings and conferences without having to fly, boat or drive from their districts to the meeting location. Given the Tongass' decentralized organization and geographical layout, this important initiative has saved time and money, and reduced the environmental impacts from travel.

The USFS has made the expansion of video-conferencing across the Agency a priority since FY 2004 with significant gains made in FY 2008. Service-wide, video-conferencing efforts in FY 2008 offset an estimated \$5,609,800 in avoided travel expenses, not to mention the savings in employee travel time, greenhouse gas emissions and other pollutants.

The following Tongass sites have video-conferencing equipment:

- Ketchikan SO
- Petersburg SO
- Sitka SO
- Craig RD
- Juneau RD
- Ketchikan-Misty Fjords RD
- Hoonah RD
- Thorne Bay RD
- Wrangell RD
- Yakutat



Fixed wing craft include Beaver, Otter, and Cessna. Beaver and Cessna aircraft use Avgas while Otters and helicopters use Jet A.

By necessity, the Tongass employees also log significant travel on commercial aircraft. Data on this travel has not been tracked so is not reported here. While not yet quantified, it is important to note that the impacts from travel on commercial flights and watercraft by the Tongass staff are large, and expected to represent a significant portion of the forest's total greenhouse gas emissions once included in the Tongass greenhouse gas inventory.

In FY 2008, the Tongass spent \$358,611.63 on gasoline and \$14,445.19 on diesel for a total of \$373,056 for transportation fuel (Table 12). This is less than 1 percent of the Tongass' total budget.

Table 12. FY 2008 Transportation and Fuel Expenditures.

Fuel Type	Annual Expenditure
Gasoline	\$358,611.63
Diesel	\$14,445.19
Total	\$373,056

Moving Forward

The Tongass has several programs underway to reduce the environmental impacts from transportation. An important element is to right-size the fleet. Actions and responsibilities related to fuel consumption are defined for employees for vehicle acquisition, operation and use, and maintenance. Employees are provided awareness training on fuel reduction objectives and encouraged to use "eco-driving" techniques to reduce fuel consumption. They are also encouraged to share rides, and combine trips. The Tongass has installed bike racks and many employees bike to work during warmer

months. The Tongass also plans to further reduce the use of petroleum fuel by purchasing additional gas-electric hybrid vehicles.

The Tongass employees are committed to collecting better data for tracking fuel use and efficiency. A new purchase card system and the fuel logs now assigned to each vehicle will capture data on fuel use per vehicle. After testing, this system will be expanded to include project vehicles.

It would be useful to collect more data on the boat fleet, specifically fuel usage and the average gallons per boat, for each boat in the fleet. This is complicated by the fact that the individual boat engines are changed out regularly. At a minimum, the Tongass employees will track hours of use per boat and maintain fuel logs for each boat.

The FY 2010 Region 10 PAS measures that will be used to assess progress related to transportation are in Table 13:

Table 13. USFS FY 2010 Region 10 PAS transportation goals.

Performance Measure	Unit of Measure	Assigned Regional Target
Miles driven by FS passenger carrying vehicles	Miles Driven	859,370
Gallons of FS vehicle fuel consumption	Gallons Used	52,276

To better understand the environmental and financial impacts from transportation, the TGT will explore ways to track commercial air flights. In addition, to estimate avoided environmental and financial impacts, the TGT will also look at gathering data on video conferencing, carpooling and biking by employees across the Tongass.

Eco-driving Tips

USFS defines eco-driving as “a style of driving that significantly reduces the *impact of gasoline on the environment.*”

Eco-driving tips include:

- Accelerate and decelerate smoothly. This makes the automobile more efficient which means better fuel mileage.
- Avoid excess idling in non-traffic situations. Shutting off an automobile while sitting at a drive-through or otherwise stopped or parked reduces fuel consumption and engine wear.
- Keep tires inflated to the recommended pressure. This alone can reduce the average amount of fuel used by 3 or 4 percent.
- Plan and consolidate your trips to reduce driving and bypass congested routes, which leads to less idling, fewer start-ups, and less stop-and-go traffic.
- Share a ride and/or carpool. This reduces the total number of vehicles in operation which results in less congestion, less pollution, less gasoline use, and reduced travel time.



Water Use in Facilities

The Tongass is bordered by the Gulf of Alaska in the west, interspersed with numerous coves, and home to magnificent glaciers. Local communities benefit from the salmon that thrive in the Tongass’ waters and enjoy recreation from the many streams. In areas like the Tongass, where fresh water is abundant, the environmental impact on water is unseen but nevertheless exists. It takes energy to pump, treat, and heat water for use, and it takes energy and chemicals to treat wastewater. In addition, storm water runoff pollutes streams, lakes and ultimately the ocean with contaminants such as road salt, pesticides, and fertilizers. Plastic trash in oceans and the presence of pharmaceuticals in wastewater are growing concerns. The importance of water is reflected in the USFS goal to become the world leader for water conservation and water source protection by 2020.

Regulatory Requirements

Executive Order 13423 has several water-related requirements, including:

- Reduce water consumption intensity by 2 percent annually or 16 percent by the end of FY 2015 using an FY 2007 baseline.
- Conduct energy and water audits on at least 10 percent of buildings per year.

Current Practices

Water consumption has not been a priority issue at the Tongass because of the abundance of water in Alaska. Water use is not metered in most Tongass buildings. Currently, Thorne Bay and Juneau Ranger Districts and the Mendenhall Visitor Center are the only facilities metered by the Forest Service. In-town facilities receive water from the city water supply and are generally billed at a flat rate that does not depend on the volume of water used. In remote locations, water is pumped from a nearby water source.

Table 14. FY 2008 Representative Water Consumption for Four Metered Facilities in Petersburg.

	Building Use	Water Use (Gallons)	Building Size (GSF)	Water Intensity (Gallons/GSF)	Total Cost
Petersburg Supervisors Office—123 Scow Bay Loop	Office	95,600	11,760	8.13	\$771.61
Scow Bay—362 Mitkof Highway	Warehouse	17,400	4,224	4.12	\$684.99
Barracks—402 A Fram Street	Dormitory	184,000	8,352	22.03	\$3,262.63
Ranger House & Dispatch—406 Fram Street	Family	20,400	1,969	10.36	\$685.07

Table 15. FY 2008 Estimated Water Consumption.

	Water Use (Gallons)	Facilities (GSF)	Water Intensity (Gallons/GSF)
In-Town Facilities	3,804,883.86	347,174	11.0
Remote Facilities	220,230	166,041	*
Total	4,025,114	513,215	—

* This value was not calculated because remote sites are visited infrequently, whereas as Tongass staff use water at in-town facilities throughout the year.

Table 16. Water Consumption Comparison for FY 2003, FY 2007 and FY 2008.

	FY 2003*	FY 2007*	FY 2008
Water (Gallons)	2,639,048	4,7740,333	4,025,114

*Data from McNeil Technologies report.

Water is used for typical domestic uses and in some buildings, for heating. Most water fixtures are not water-efficient, and there are currently no water conservation best management practices in place. As a result, there is great potential for significant water conservation, which will also reduce energy use.

Water and sewer data was estimated for Petersburg facilities based on utility bills, and is used to suggest trends about water usage across the Tongass. Table 14 presents water use for a representative sample of Tongass in-town buildings.

In-town facility water consumption was estimated based on square footage by building type using the water intensity values provided in the table as representative of their building type. The estimated water consumption for in-town facilities is 3,804,883.86 gallons based on a water intensity of 11 gallons per square foot.

Water consumption for remote facilities was estimated to be 220,230 gallons. This was based on the number of person nights for FY 2008 (2,447 person nights) and assumes the average staff member uses 90 gallons of water per day.

Total FY 2008 estimated water consumption for the Tongass was 4,025,113.86 gallons. Table 16 compares water consumption in FY 2003, FY 2007 and FY 2008.

In 2009, the Tongass conducted detailed energy and water audits on nine buildings or about 10 percent of facilities based on square footage. The water audit found that, in the nine audited buildings, simple upgrades could result in annual water savings of 40 percent. For example, low flow faucets would result in a 77 percent water saving and in showers a 32 percent savings, both of which reduce energy use. These upgrades have a payback of less than a year. The audit also recommended the installation of low flow urinals and the retrofit of toilets for dual flush modes.

Mendenhall Glacier Visitor Center

One of the buildings included in the water audit was Juneau's Mendenhall Glacier Visitor Center. Every year about 440,000 visitors come to see magnificent Mendenhall Glacier and stop at the visitor center. With as many as 3,500 people visiting in one day, there are significant opportunities to reduce water use, which are listed in Table 17.

Table 17. Potential Water Savings at Mendenhall Glacier Visitor Center.

	Annual Water Savings (Gallons)	Annual Cost Savings (Dollars)
Low-flow faucet aerators and low-flow showerheads	97,000	\$2,158
Low-flow urinals	45,400	\$400
Dual flush toilets	45,400	\$400
Total	187,000	\$2,958



Moving Forward

In order to show progress towards meeting the water reduction goals of EO 13423, the Tongass employees at the Districts need to develop a strategy to improve water use tracking. This strategy will include contacting local utility suppliers to access monthly consumption data and exploring the possibility of installing water meters on more facilities. To track water use at remote facilities, staff can record water tank levels before and after camp visits.

Water use at leased facilities can be more difficult to track, depending on whether or not the leased space is shared and on the cooperation of the building owner. The data tracking strategy should include contacting building owners to determine the best way to gather or estimate water consumption.

There are opportunities for the Tongass to reduce water use, and subsequently energy use, in buildings by installing low-flow faucet aerators and low-flow showerheads, dual flush toilets and low-flow urinals. Although recommendations in the water audit were for specific buildings, the actions will most likely apply to most buildings. The recommendations are relatively low cost with short pay back periods and are being included in the Action Plan.

Green Purchasing

The Tongass is a large organization and managing the forest requires the Tongass staff to purchase many products and services annually. Therefore, the purchasing decisions of staff can effect both the environment and the market. From resource use and habitat destruction to air emissions and water pollution, the manufacturing, packaging, transportation, use, and

disposal of products have many impacts on the environment. Fortunately, the availability of environmentally-friendly products has increased dramatically in recent years. These “green” products are designed to have a reduced impact on the environment and therefore use less energy, less toxic materials, or create less waste. In addition to products, green purchasing extends to the procurement of services. For example, choosing companies that conduct business using environmentally friendly practices and products, such as custodial companies that use non-toxic cleaners, is a green purchasing decision.

Regulatory Requirements

The Tongass is responsible for meeting several regulatory requirements related to green purchasing. Under Executive Order 13423, agencies must implement practices for green purchasing that include:

- Purchase of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products.
- Use of 30 percent postconsumer fiber content paper.
- Purchase of Electronic Product Environmental Assessment Tool (EPEAT)-registered electronic products.

The EO also requires that contractor operations of government-owned facilities or vehicles comply with the EO requirements, and that tenants and concessionaires help the agency comply with the EO.

Agencies can meet green purchasing requirements with products that are certified as environmentally preferable or identified by agencies such as the EPA or the USDA. Alternatively, purchasers can use a life-cycle analysis to show how factors such as locally produced products or a product with minimal packaging has a reduced environmental impact. A green purchasing program can also include elements

that encourage an organization to move away from wasteful buying habits such as purchasing disposable instead of reusable products or individually packaged products instead of bulk.

Current Practices

Green purchasing is not any one employee's responsibility; it must be a partnership between procurement personnel and the specialists who provide technical information for a particular good or service. While the Tongass has had many individual successes and green purchasing champions, it does not yet have a comprehensive green purchasing program. Green purchasing practices overlap all other footprint areas. For example, the Tongass' purchase of hybrid vehicles is a transportation as well as a green purchasing success. It is generally a challenge to track and report all green purchasing activities and the USFS has not yet identified an organized system for this.

Interviews with the Tongass staff suggest that awareness of green purchasing opportunities and requirements varies. All purchase card-holders receive specific training on green purchasing practices as part of the online GSA purchasing training. This training is required for staff authorized to make micropurchases (under \$3000) and approving officials who review these purchases.

Buying environmentally preferable products online through GSA is made simple by icons that illustrate the environmental characteristics of products. Locally there are challenges to expanding green purchasing due to limited availability of environmentally preferable products. For example, biobased products are not available in the area.

Contracts for services are a large part of the purchases made by the Tongass and therefore employees who make contracting decision have an opportunity to increase green purchasing. Purchasing agents and contract officers authorized to make larger purchases are

responsible for contract clauses that specify the use of green products. For example, all janitorial contracts require the use of green products. There are additional controls on the purchase of hazardous materials that include waste minimization elements.

While the Tongass has not yet collected data on green purchasing practices, the presence of the following environmentally preferable products are evidence of green purchasing decisions employees are making in multiple Districts:

- 30 percent post-consumer content paper.
- Energy efficient light bulbs.
- Energy efficient appliances, including computers, monitors, fax machines, and microwaves.
- Non-toxic cleaning products.

Moving Forward

The Tongass is considering a number of actions to track and encourage green purchasing. This includes expanding training on green purchasing since not all the Tongass employees are aware of the requirements of EO 13423 and the benefits of buying green products. Employees should also be encouraged to record purchasing decisions that document the choice of greener products.

The Action Plan will include specific actions to improve green purchasing and the collection of data.

Waste Prevention and Recycling

Garbage represents the wasted energy and natural resources that were used to create

and transport once useful products. Collecting and processing waste for disposal in a landfill or incinerator, or for recycling also uses energy and produces pollution. Hazardous and toxic waste has safety and regulatory liability issues and is expensive to handle. Since the Tongass has a large number of employees and facilities, the Tongass operations produce a significant amount of waste. However, the Tongass also has significant opportunities to reduce garbage and can serve as a catalyst for recycling efforts in many of the small communities. The Tongass is working to make forest operations as waste-free as possible and to divert remaining waste with reuse and recycling.

Regulatory Requirements

EO 13423 requires federal agencies to implement and encourage recycling programs. It also requires agencies to reuse, donate, sell, or recycle all nonusable electronic products and to reduce the quantity of toxic and hazardous chemicals and materials used.

Current Conditions

Most waste in the Tongass is picked up by municipal or private haulers, depending on the District. Waste from in-town facilities is primarily collected by the city or city contractor and disposed of in landfills. Waste generated at remote facilities is carried out and disposed

Table 18. FY 2008 Solid Waste and Recycling Estimated Amounts for Select Districts.

	Solid Waste (Pounds)	Recycled Materials (Pounds)	Total (Pounds)	Percent Recycled	Cost (US Dollars)
Ketchikan	70,333	11,750	82,083	14.3 percent	\$6,556.00
Petersburg	75,467	7,079	82,546	8.5 percent	—
Juneau	—	6,000	—	—	—
Thorne Bay	17,600	—	—	—	\$4,500

Table 19. Recycling Capabilities by District.

Area	Activities	Material
Hoonah	Employees collect aluminum cans in the office and pick cans up from the roads and fields for the Big Brothers/Big Sisters can recycling program.	Aluminum cans
Craig	Employees collect aluminum cans and a volunteer drops them off at the recycling center.	Aluminum cans
Juneau-Admiralty	Local contractor picks up recyclables from Juneau facilities.	Aluminum, tin, glass, plastic, paper, grocery bags, and cardboard
Ketchikan	Community Connections (part of the Alaska Department of Health and Social Services) picks up material weekly from Ketchikan offices.	Glass, aluminum and paper
Petersburg	Petersburg Indian Association picks up material weekly from Petersburg offices. Aluminum cans are donated to the Boy and Girl Scouts in Petersburg. Volunteers promote recycling through the local school's Earth Club recycling program.	Glass, plastic, paper, aluminum and cardboard
Sitka	Volunteers drop off recyclables with the city.	Aluminum, glass, tin, paper, plastic, and cardboard
Thorne Bay	Employees collect aluminum cans for recycling for the local school district to use as a fundraiser.	Aluminum cans
Wrangell	A local nonprofit accepts aluminum for recycling. A Tongass employee collects paper and cardboard for use as kindling.	Aluminum cans, paper and cardboard
Yakutat	Employees collect paper and aluminum cans for recycling	Paper, Aluminum cans

of in dumpsters at the Tongass in-town facilities or burned at the local community's dump. Recyclables are typically bundled by recycling facilities and shipped south via barge, often to Seattle.

The Tongass has not previously tracked waste amounts or composition. For this report, waste generation and recycling information was provided by the cities and recycling partners in Juneau, Ketchikan, Petersburg and Thorne Bay (Table 18). The City of Ketchikan provided data on actual waste and recycling amounts collected from the Tongass facilities at 3031 Tongass and 50 Main Street. Waste and recycling data for Petersburg Ranger District and Supervisors Office in-town facilities was estimated based on dumpster sizes, collection rates and account records provided by the City of Petersburg Public Works Department. The Green Guys recycling company in Juneau estimated the amount of recycling materials collected from the Tongass Juneau facilities using the same methods. Similarly, Thorne Bay Ranger District waste estimates were determined based on account records listing dumpster sizes, collection rates and charges provided by the City of Thorne Bay.

Both the cities of Wrangell and Sitka provided waste data for the entire cities, but could not determine the percent contribution from the Tongass.

In the future, the Tongass plans to collect more comprehensive data on waste composition and recycling by tracking collection rates and monitoring bin capacity.

Recycling programs and opportunities vary by location (Table 19). The remote nature of many communities, transportation challenges and lack of commercial recyclers all make broad recycling difficult in many communities. All forest units recycle paper, aluminum cans, batteries, ink toners and fluorescent lamps to some extent. Some areas also recycle glass, plastic, tin,

Recycling Partnerships

Many Tongass employees volunteer to promote recycling in their communities. Led by Michele Parker, Petersburg employees encouraged students at the Petersburg Elementary School to start an Earth Club. In partnership with Petersburg Indian Affairs, a local non-profit, volunteers from the Petersburg Ranger District and Supervisor's Office mentor the Earth Club participants. They educate the children about the benefits of recycling and waste reduction, and promote an aluminum can donation program for the Boy and Girl Scouts.

In Ketchikan, the Tongass has a recycling partnership with a local non-profit group called Community Connections, a part of the State of Alaska Department of Health and Social Services. Tongass employee Ian Clark has picked up paper, cans, glass and cardboard for recycling through Community Connections for years. In 2005, the Forest Service Chief presented Ian with the Forest Service Volunteer of the Year award.



Table 20. Tongass-wide Recycling.

Ink Toner cartridges	Sent to a recycler using prepaid labels or returned directly to the manufacturer	All Units
Batteries (alkaline, lithium, nickel cadmium, nickel hydride, mercury, lead, silver, cell phone batteries, laptop batteries, PDA, calculator and cordless tool batteries).	Recycled according to Universal Waste Regulations using the Big Green Box.	All Units
Fluorescent Lamps	Collected in accordance with the Universal Waste Regulations.	All Units
Waste Oil	In Yakutat, waste oil is sent to the local auto body shop to be reused in a burner.	Limited

and cardboard. In addition, the Tongass units participate and are often leaders in local recycling programs. Information on local recycling opportunities is available to employees through the internal website and on flyers posted in the workplace. The Environmental Engineering Program also produces newsletters and an annual recycling report.

Interest in recycling is high among the Tongass employees with active recycling in 11 offices from Yakutat to Ketchikan. Some programs depend on volunteers and partnerships with local non-profits and volunteers; others function with recycling contractors; and some with municipal help.

The TGT also works to provide opportunities and encourage all units to recycle specific wastes, which are listed in Table 20.

The Tongass employees are expected to avoid printing documents where possible and to use duplex printing (printing on both sides of the paper) when printing is necessary. Many printers across the Tongass are set to automatically print double-sided, and a fax machine in Thorne Bay prints faxes double-sided.

Some Tongass employees implement their own recycling and waste minimization practices on a daily basis by reusing paper that has printed material on one-side only, referred to as “GOOS” (Good On One Side) paper. Employees have a designated area to collect GOOS paper and make it available to everyone in the workplace.

In addition to waste diversion, reducing the use of toxic and hazardous materials is an important sustainability goal. The Tongass enforces a forest-wide *Hazard Communication/Waste Minimization Plan*. Employees are trained on the Plan and expected to order only the minimum amount of a hazardous material required, avoid ordering in bulk, and to use up all hazardous materials, if possible, to avoid generating hazardous waste. In addition, Tongass maintains most of its fleet through commercial vendors to reduce the storage of bulk fuel and hazardous materials.

Employees maintain an inventory of hazardous materials for each District and routinely contact other Districts and units to see if remaining hazardous material can be used elsewhere. At all units, hazardous waste is taken to designated collection points managed by local cities and municipalities. A primary goal of the Plan is to reduce or eliminate all hazardous wastes, and the waste minimization principles can apply to all wastes. The plan also encourages green purchasing as a hazardous waste avoidance strategy, and emphasizes the responsibility of the hazardous material purchaser to coordinate disposal once the material becomes a hazardous waste.

Proper disposal of used electronic equipment, or “e-waste,” reduces waste and prevents hazardous materials from entering the environment. The Tongass employees send discarded electronic equipment back to GSA. Computer-related waste including

CDs, diskettes, DVDs, ink cartridges, and cell phones are disposed of in the Green Disk Technotrash Cans distributed in multiple offices. Full cans are mailed out for recycling.

Fluorescent lamps are recycled in accordance with Universal Waste regulations at all units. Spent lamps are collected in prepaid boxes intended specifically for used fluorescent lamps and mailed for recycling.

Moving Forward

The Tongass employees have done much to reduce waste and increase recycling, and continue to look for ways to improve. The Action Plan will document many of these opportunities. For example, all the Tongass employees should consider their daily activities with the Pollution Prevention (P2) slogan in mind—reduce, reuse, recycle. Expanding recycling, especially paper, plastic and glass is important. For example, where these materials cannot currently be recycled in the local community, they can be transported to a community that can recycle them.

The Tongass is planning to implement a waste tracking system that will establish a more accurate profile of waste disposal activities and opportunities. This system may be as simple as conducting an inventory of trash cans, dumpsters and recycling receptacles, including their sizes and collection rates. Periodically, it would be useful analyze the contents. Employees can also work with the sanitation departments of the local cities and communities to gather waste data. Information on the waste stream will allow employees to develop specific approaches to reducing the waste and reusing items.

An online sharing program is another way to reduce waste. The Tongass is considering an online system to list usable items that one District does not need but may be useful to another District to help reduce waste and save money from unnecessary purchases.

Recycling at Remote Sites

Recycling capabilities are continually being expanded. For example, four new recycling containers will soon be installed at recreational sites on the Petersburg Ranger District's Mitkof Island. All of these sites—Man Made Hole, Blind River Rapids, Blind Slough, and Ohmer Creek Campground—are popular with tourists and locals throughout the year. Currently, volunteers sort the garbage into recyclables and non-recyclables. The bins, which are specially designed to withstand the harsh Alaskan weather, will make recycling easier for the visitors and more efficient for volunteers.



For years, the Tongass has recycled batteries through the Rechargeable Battery Recycling Corporation (RBRC) program. The Forest Service has a Memorandum of Understanding with RBRC to provide free recycling of old rechargeable batteries from cell phones, power tools, video equipment, and computers for about 500 USFS offices. Recyclable batteries are mailed to RBRC at no cost, and proceeds from the recycled items benefit the Boys and Girls Clubs of America. Unfortunately, RBRC recently stopped sending mailers to Alaska. The TGT is interested in working with RBRC to reinstitute this program.

As opportunities to reduce waste and increase recycling expand across the Tongass, it is important to communicate these opportunities to employees and visitors. Often, waste reduction opportunities are missed simply because people are unaware of them or recycling cans are not visible. Clearly labeled cans and signage play an important role in increasing waste diversion.

Sustainable Leadership

The USFS seeks to create a management climate that reduces barriers to sustainable operations and integrates sustainable habits into USFS culture. Since reducing the environmental footprint of the USFS begins at the forest level, the Tongass is committed to being a leader in sustainable operations. This report communicates the Tongass' vision of sustainability, highlights current activities and future plans, and sustainability successes, and reports data that will help the Tongass achieve its goals. This section in particular provides information on the Tongass' sustainable leadership activities.

Regulatory Requirements

The USFS identified several specific activities under the Sustainable Leadership Footprint Focus Area. These include meeting or exceeding the requirements of EOs and policies related to sustainable operations, promoting place-based sustainability initiatives, communicating the sustainable operations vision, and creating the organizational capacity required to implement sustainable solutions.

Current Conditions

The Tongass relies on the TGT to build organizational capacity, communicate the sustainable vision internally and externally, and implement sustainable initiatives. The Tongass leadership initiated the team in September 2007. TGT members represent all Districts, levels, and departments within the Tongass. They work internally to initiate and support projects, make recommendations to the forest leadership, and work with local communities and other government agencies. TGT is supported by modest Forest Service funds that are awarded to stimulate grassroots sustainable efforts in forest units.

TGT is responsible for creating an action plan and reporting annually on sustainable operations accomplishments. To encourage sustainable practices, the TGT presents Green Team awards to employees who exemplify the sustainability ethic. The TGT also distributes reusable canteens and bags with the tag line "creating habits today, conserving resources for tomorrow" to encourage behavioral change and help staff avoid using disposable cups and bags.

In addition to internal operations, the Tongass works with local communities to communicate sustainability goals and promote sustainable practices. For example, Craig and Thorne Bay Ranger Districts partner with the Island Tribal Environmental Coalition, the City of Thorne Bay, City of Craig, Prince of Wales Tribal Enterprise Consortium, and the Marine Conservation

Alliance Foundation to host an Earth Day event at Prince of Wales Island. Every year, over 400 local residents attend the event. The theme of last year's celebration was waste reduction and recycling. This event is also an educational opportunity; the Tongass employees share information on environmental topics like climate change, invasive species, wildflowers, watersheds, and more.

The Tongass' sustainable leadership is evident regionally. The Chugach National Forest is following the Tongass' lead by undertaking a similar environmental inventory and action plan project. The Tongass employees are offering support to the Chugach employees by sharing lessons learned and sustainability resources.

Demonstrating national leadership, the Tongass is one of only six pilot forests in the Forest Service to join the EPA Climate Leaders program. Following Climate Leaders well-established protocol, the Tongass has developed their first greenhouse gas inventory. This baseline inventory includes FY 2007 emissions from stationary combustion sources, the vehicle fleet, purchased electricity, and chartered flights. Conducting the inventory provides a better understanding of emissions from forest operations which enables employees to work towards meeting realistic emissions reduction goals. The accompanying Inventory Management Plan (IMP) will ensure that the inventory is maintained from year to year, allowing the Tongass to track progress towards reduction goals. The inventory and IMP are in Appendix II.

Moving Forward

The success of the Tongass' sustainability leadership efforts can be measured quantitatively and qualitatively. Sustainable leadership is about encouraging each employee to support the implementation of sustainability principals both in their own work environment and within their particular discipline. The goal is for sustainable practices to become habitual. TGT members envision that sustainability will be viewed

Excerpt from the Tongass Green Team Charter

Vision

Sustainable practices will be integrated throughout all aspects of the Tongass National Forest operations as a regular course of business, with the goal of reducing our impact on the environment. All Tongass employees and their contractors will demonstrate and promote sustainable practices in their day-to-day activities and changed behaviors.

Purpose

The TGT is a dedicated group of employees, regardless of discipline or organizational level, which facilitates the pragmatic implementation of sustainable operations principles. The TGT is a formal group specifically chartered by leadership to promote and foster sustainable operations that reduce the environmental footprint of Tongass National Forest operations. The TGT will work to help the Tongass National Forest meet the relevant goals of Executive Order (EO) 13423 as well as the vision and goals outlined in the Tongass National Forest strategic plan. The team will make recommendations to the forest leadership as requested or needed. The TGT will also work with members of the local community or other state, federal, or local agencies so that sustainable operations efforts can become successful on a larger more community- or ecosystem-connected basis.



similarly to how safety is viewed in the Federal government as “the way things are done.” The TGT will continue to promote sustainable operations principles at all levels. To a certain extent, progress towards meeting the goals of the environmental footprint areas is a measure of the effectiveness of TGT in these efforts.

The Tongass has proposed the creation of an Alaska Collective Board consisting of representatives from the Tongass, Chugach, Regional Office and Pacific Northwest Research Station. This collective would function like the Forest Service’s Western Collective, which “facilitate[s] overall coordination and collaboration of Sustainable Operations practices throughout [the Western Region], while providing the management and leadership climate to ensure such activities and practices are successful.”

The Alaska Collective would create opportunities to promote and broaden USFS Sustainable Operations in the Alaska region through networking and knowledge sharing. The objectives would be similar to the Western Collective’s:

- Incorporate and maintain long-term programs, practices, tools, and policies that integrate environmental footprint principles throughout the organization by removing barriers and promoting the use of appropriate technologies.

- Institute a culture that emphasizes education, rewards positive actions, and recognizes achievements that reduce our environmental footprint in long lasting ways.
- Integrate environmental footprint considerations into daily decisions, habits, planning and operations.
- Increase capacity and capabilities to implement Sustainability Principles throughout the region.

This report and the work capturing data for the report has led to the creation of an Action Plan that includes specific measurable steps that the Tongass can take to reduce its environmental footprint. Implementation of the Action Plan will begin in 2010 with the intent to revise it annually to ensure continual improvement.

Data tracking will occur on an on-going basis so that the Tongass’ environmental footprint can be examined annually. An annual questionnaire will be sent to each District to gather additional information on activities that impact the environment. Energy and water audits are already planned for an additional 25 percent of the Tongass facilities this summer.

The Tongass will share lessons learned from this project by working with other forests, regions and the Washington Office.



Literature and Resources

The Energy Independence and Security Act of 2007 (EISA)

www1.eere.energy.gov/femp/regulations/eisa.html

The Energy Policy Act of 2005 (EPAAct 2005).

www1.eere.energy.gov/femp/regulations/epact2005.html

EPA Climate Leaders.

www.epa.gov/climateleaders/

EPA Climate Leaders and the US Forest Service.

www.fs.fed.us/sustainableoperations/climate-change-greenhouse-gas-inventories.shtml

Executive Order 13423—Strengthening Federal Environmental, Energy, and Transportation Management (EO 13423). Federal Register Vol. 72, No. 17. January 26, 2007.

www1.eere.energy.gov/team/pdfs/eo13423.pdf

State of the Tongass 2008. R10-MB-637. April 2009.

www.fs.fed.us/r10/tongass/state_of_tongass_2008.pdf

A Strategy for Management and Priority Setting Action Plan. Tongass National Forest. FY 2008 thru FY 2012. Tongass Leadership Team, Ketchikan, AK 2005. Revised and Approved May 2008.

http://fsweb.stikine.r10.fs.fed.us/tongass/public_services/tongass_strategy_final.pdf

2003 Summary Energy and Water Data for 2007 National Environmental Footprint Report. McNeil Technologies. 2007.

www.fs.fed.us/sustainableoperations/documents/FS-SummaryEnergyWater2003.xls

2007 Summary Energy and Water Data for 2007 National Environmental Footprint Report. McNeil Technologies. 2007.

www.fs.fed.us/sustainableoperations/documents/FS-SummaryEnergyWater2007.xls

USFS Environmental Management System.

www.fs.fed.us/ems/

USFS FY 2007 National Environmental Footprint Report. May 2008.

www.fs.fed.us/sustainableoperations/documents/fy2007-environmental-footprint.pdf

USFS 2009 Fleet Management Implementation Plan.

<https://fs.usda.gov/wps/myportal>

USFS Sustainable Operations.

www.fs.fed.us/sustainableoperations/

Appendix: In-Town Facilities

ADMIN_ORG	BUILD_ID	BUILD_NAME	CATEGORY	GROSS_SQFT	YEAR_CONSTRUCTED
IN-TOWN					
PETERSBURG					
100521	1955	So Office (Harris Building)	Office	11,760	2000-05-01
100521	1038	Prd 402 B Fram St., Petersburg	Warehouses	1,582	1977-05-01
100521	1015	Prd 402 C Fram St., Petersburg	Warehouses	1,468	1964-05-01
100521	1001	Prd 402 D & E Fram St., Petersburg	Family Housing	3,072	1978-05-01
100521	1024	Prd 402A Fram, Petersburg Barracks	Dormitories/Barracks	8,352	1999-07-01
100521	1036	Prd 406 Fram St., Petersburg	Family Housing	1,969	1984-05-01
100521	1920	Prd Marine Facility Floats	Service	4,400	1985-05-01
100521	1901	Prd Scow Bay Warehouse	Warehouses	4,224	1968-05-01
100521	1919	Prd Storage Bldg.(Marine Fac.)	Storage	336	1985-05-01
100521	1904	Prd Work Ctr. Warehouse & Corri.	Warehouses	5,992	1979-05-01
WRANGELL				43,155	
100522	1013	Wrd 316 First Ave., Wrangell	Family Housing	1,594	1960-05-01
100522	1009	Wrd 808 & 810 Zimovia Hwy., Wrangell	Family Housing	2,592	1973-05-01
100522	1040	Wrd Frosty Bay Annex Cabin	Dormitories/Barracks	224	1993-05-01
100522	1018	Wrd Wrangell Barracks	Dormitories/Barracks	3,025	1987-05-01
100522	1701	Wrd Wrangell District Office	Office	9,394	1987-05-01
100522	1937	Wrd Wrangell Flammable Stor.Bldg.	Storage	320	1987-05-01
100522	1934	Wrd Wrangell Garage	Storage	3,360	1987-05-01
100522	1928	Wrd Wrangell Marine Facility	Service	5,440	1986-05-01
100522	1935	Wrd Wrangell Warehouse	Warehouses	4,200	1987-05-01
100522	1936	Wrd Wrangell Wood Shed .	Storage	1,200	1987-05-01
100522	Pp-7119	Wrd, Trailer Space 38	Dormitories/Barracks	880	1990-07-01
100522	Pp-7120	Wrd, Trailer Space 39	Dormitories/Barracks	880	1990-07-01
SITKA				33,109	
100531	1019	Crew Quarters, Cascade Creek	Dormitories/Barracks	1,440	1963-04-01
100531	1029	Duplex, 416 Geodetic Way	Dormitories/Barracks	3,168	1977-04-01
100531	1030	Duplex, 418 Geodetic Way	Dormitories/Barracks	3,168	1995-04-01
100531	1946	Fuel/Paint Shed, Srd	Storage	189	1980-04-01
100531	1809	Pole Building	Storage	1,440	1980-04-01
100531	1007	Residence, 402 Monastery	Family Housing	1,444	1956-04-01
100531	1006	Residence, 501 Sawmill Creek	Family Housing	1,444	1956-04-01
100531	1008	Residence, Hpr	Family Housing	1,444	1959-04-01
100531	1807	Shop, Auto And Wood	Service	3,160	1963-04-01
100531	1806	Soils Lab	Service	308	1976-04-01
100531	1912	Tree Cooler, Srd	Storage	200	1983-09-01
100531	1911	Warehouse, Cascade Creek	Warehouses	10,000	1982-04-01
100531	1704	White House	Family Housing	2,872	1916-01-01
Hoonah				30,277	
100532	1059	Crew Quarters, Hrd	Dormitories/Barracks	4,296	1987-04-01
100532	1050	Duplex, Blue	Family Housing	3,400	1985-04-01
100532	1052	Duplex, Cedar	Family Housing	3,400	1985-04-01
100532	1051	Duplex, Green	Family Housing	3,400	1985-04-01
100532	1053	Duplex, Red	Family Housing	3,400	1985-04-01
100532	1947	Fuel/Paint Shed, Hrd	Storage	300	1989-04-01
100532	1071	Hoonah Six-Plex	Family Housing	4,210	1995-04-01
100532	1954	Hoonah Warehouse Covered Parking	Storage	1,500	2003-01-01
100532	1706	Office, Hrd Admin	Office	7,205	1994-04-01
100532	1913	Tree Cooler, Hrd	Storage	486	1983-04-01
100532	1949	Warehouse, Hrd	Warehouses	5,024	1998-04-01

ADMIN_ORG	BUILD_ID	BUILD_NAME	CATEGORY	GROSS_SQFT	YEAR_CONSTRUCTED
JUNEAU				36,621	
100533	1951	Anm/Jrd Collocated Admin Dry Storage	Warehouses	11,700	2006-11-01
100533	1950	Anm/Jrd Collocated Admin Warehouse	Warehouses	4,400	2006-11-01
100533	1707	Anm/Jrd Collocated Office	Office	17,400	
100533	1079	Juneau Administrative Housing #1	Dormitories/Barracks	8,064	2005-07-01
100533	1081	Juneau Administrative Housing #2	Dormitories/Barracks	7,056	2005-07-01
100533	33V01	Mendenhall Glacier Visitor Centr	Other Institutional Uses	10,617	1962-09-01
CRAIG				59,237	
100551	1037	Craig Flexible Housing	Family Housing	12,432	2003-08-01
100551	1-8137	Craig Trailer #1	Family Housing	840	1991-09-01
100551	1057	Crg Bunkhouse	Dormitories/Barracks	1,680	1963-06-01
100551	1-2101	Crg Gas House	Storage	120	1960-06-01
100551	1703	Crg Office	Office	7,644	1995-06-01
100551	1933	Crg Warehouse	Warehouses	1,800	1960-06-01
100551	1944	Crg. Fire Cache	Storage	528	1991-06-01
KETCHIKAN				25,044	
100552	1032	Krd Dormitory	Dormitories/Barracks	4,896	1984-06-01
100552	1702	Krd Office	Office	8,043	1986-06-01
100552	1-8406	Krd Radio Shop	Office	924	1991-06-01
100552	1931	Krd Warehouse	Warehouses	9,514	1966-06-01
100552	2-2205	Se Discovery Center	Other Institutional Uses	21,101	1994-06-01
THORNE BAY				44,478	
100554	1033	Tnb Dormitory	Dormitories/Barracks	7,666	1984-06-01
100554	1025	Tnb Duplex I	Family Housing	5,164	1984-06-01
100554	1044	Tnb Duplex Ii	Family Housing	5,164	1984-06-01
100554	1027	Tnb Duplex Iii	Family Housing	5,164	1985-09-01
100554	1046	Tnb Duplex Iv	Family Housing	5,164	1984-06-01
100554	1034	Tnb Duplex V	Family Housing	5,164	1984-09-01
100554	1945	Tnb Gas & Oil	Storage	505	1982-09-01
100554	1705	Tnb Office	Office	7,193	1983-06-01
100554	1049	Tnb Quad I	Family Housing	5,456	1984-06-01
100554	1054	Tnb Quad Ii	Family Housing	5,456	1984-06-01
100554	1031	Tnb Quad Iii	Family Housing	5,456	1984-06-01
100554	1-8403	Tnb Trailer #2	Family Housing	967	1989-06-01
100554	1-8400	Tnb Trailer #5	Family Housing	967	1989-06-01
100554	1-8402	Tnb Trailer #6	Family Housing	967	1978-06-01
100554	1903	Tnb Warehouse	Warehouses	14,800	1982-06-01

75,253

GRAND TOTAL

347,174



TONGASS NATIONAL FOREST FY2007 Greenhouse Gas Inventory



The inventory was developed using the *Environmental Protection Agency (EPA) Climate Leaders Program* Inventory Guidance documents and technical assistance, and follows the example inventory developed for the National Forests of the Greater Yellowstone Area. It covers emissions from all activities over which the Forest Service has operational control within the Forest's geographical boundaries (with the exception of wildfire suppression). These are referred to as direct emissions or Scope 1 emissions. Indirect emissions or Scope 2 emissions, from purchased electricity, are also included in the inventory. Additionally, optional emissions (Scope 3) from small aircraft business travel are included. Detailed information on each source category is provided below.

Data was collected from key personnel such as the Facilities Manager (Molly Murphy), Fleet Manager (Roy Mitchell) and Aviation Manager (John Krosse). Each District was sent a questionnaire and environmental inventory database and asked to verify the data already received and to fill in missing data. In order to avoid underestimating emissions when usage data was not available, purchase data from the Tongass Transaction Register was converted into estimate usage amounts (e.g. propane) using average FY2007 cost data from the Energy Information Administration.

For questions regarding the inventory or to comment on possible inconsistencies or errors you notice in the data, please contact Michele Parker, Tongass Environmental Engineer, at mmpparker@fs.fed.us. Details regarding management of the inventory are in the Inventory Management Plan.

Stationary

- Stationary combustion sources on the Tongass include boilers and water heaters fueled by propane and diesel fuel (fuel oil #2).
- The Facilities Manager provided fuel oil usage data in the form of monthly refill amounts in gallons.
- Fuel oil data can be viewed for each District on separate worksheets, as well as for the Forest as whole.
- Propane usage data was not available, so usage was estimated based on the amount spent on propane recorded in the Transaction Register (\$22,325.64), which was converted based on average FY2007 cost of propane for the region (\$2.01/gal) according to Energy Information Administration data. (<http://tonto.eia.doe.gov/dnav/pet/hist/g9900650002m.htm>)

Mobile

- This category includes emissions from all road vehicles in the EMIS inventory provided by Tongass' Fleet Manager.
- Fuel use was not documented for FY2007. For vehicles, this was estimated using odometer readings to determine miles traveled and fuel economy values in miles per gallon (MPG) obtained from www.fueleconomy.gov.
- Vehicle miles traveled (VMT) for the year were calculated by subtracting the odometer reading from end of the previous fiscal year from the odometer readings from the end of the baseline fiscal year.
- Combined MPG was calculated using the following formula: $1 / [(0.55/\text{city mpg}) + (0.45/\text{highway mpg})]$
- Where fuel economy values were not available for particular vehicles, values were obtained from the manufacturer or from the GHG Protocol's guidance

readings from the end of the baseline fiscal year.

- Combined MPG was calculated using the following formula: $1 / [(0.55/\text{city mpg}) + (0.45/\text{highway mpg})]$
- Where fuel economy values were not available for particular vehicles, values were obtained from the manufacturer or from the GHG Protocol's guidance for calculating emissions from mobile sources (e.g. tractor).
- The vast majority of the vehicles and watercraft are fueled by gasoline; a minority are fueled by diesel.
- Most vehicles are light duty trucks or heavy duty trucks. Vehicles are classified as heavy duty trucks according to their exemption from testing based on a gross vehicle weight rating (GVWR) over 8,500 pounds. (The list of these vehicles is available from www.fueleconomy.gov/feg/which_tested.shtml.)
- Note that the Tongass has very few passenger cars and tractors.
- Emissions from watercraft and project vehicles (e.g. snowmobiles, trail bikes and all-terrain vehicles) are not included in this baseline inventory since fuel use was not available, could not be estimate with sufficient accuracy, and this tool does not currently include calculation methodology. It is recommended that these sources are included in the future.
- Data can be viewed for each District on separate worksheets, as well as for the Forest as a whole.

Electricity

- Electricity usage data in kilowatt-hours (kWh) per month was obtained directly from the utility provider.
- The EPA Climate Leaders Program provided the inventory team with the 2005 eGRID tool, which was used to determine the appropriate eGRID subregion to input for each District. All Districts fall into the AKMS (ASCC Miscellaneous) subregion. (Note: Juneau, Ketchikan, Petersburg, Sitka and Wrangell's utility providers are hydroelectric power plants. AKMS (ASCC Miscellaneous) provides regional emissions factors.)
- Craig, Thorne Bay and Yakutat did not have electricity data available for FY2007. Therefore, FY2008 values were used.
- Sitka did not have electricity data available for October through January of FY2007. Therefore, FY2008 values were used.
- Data was not available for the following leased facilities: Juneau Regional Office, Ketchikan Supervisors Office, and Yakutat Office. (According to EPA Climate Leaders protocol, these would be Scope 3 emissions.)
- Data can be viewed for each District on separate worksheets, as well as for the Forest as a whole.

Refrigeration and Air Conditioning

- Emissions from refrigeration and air conditioning are at most de minimis and not worth pursuing at this time. Refrigeration equipment is minimal and regularly maintained on the Tongass, so leakage is extremely unlikely. Air conditioning is used only to cool the computer server during the summer months, and is also regularly maintained, so leakage is extremely unlikely.

Fire Extinguishers

- Emissions from fire extinguishers are at most de minimis and not worth pursuing at this time. Fire extinguishers are regularly maintained on the Tongass, so leakage is extremely unlikely.

Business Travel on Small Aircraft

- Business air travel is an optional source category for the inventory. Tongass staff decided to include this category because their unique geography requires that staff travel between islands and remote locations on small aircraft frequently.
- Small aircraft trips are either chartered or contracted flights on fixed wing aircraft and helicopters.
- The aviation manager provided data on the duration (in minutes) of each trip by aircraft type (Cessna, Beaver, Otter or Helicopter) and by District.
- Fuel usage data was estimated based on trip durations and fuel economy factors. Fuel economy factors (in gallons per hour) for each aircraft type were provided by Ken More Air, which services the aircraft. (Beaver: 23 gal/hr. Cessna: 14 gal/hr. Otter: 42 gal/hr. Helicopter: 32 gal/hr.)
- Flights on large commercial aircraft are not included in the inventory at this time since data was not available. The inventory team assume this would be a



EPA Climate Leaders Simplified GHG Emissions Calculator (SGEC) Version 2.8

This calculator is designed as a simplified calculation tool to help organizations in estimating their greenhouse gas (GHG) emissions for reporting to the EPA's Climate Leaders program. All methodologies and default values provided are based on the most current Climate Leaders Greenhouse Gas Inventory Protocol guidance. The calculator will determine the direct and indirect emissions from all sources at a company when activity data is entered into the various sections of the workbook.

Tool Instructions:

- (A) Click on the grey boxes below to go to the appropriate Tool Sheet.
- (B) Enter data in Tool Sheet in ORANGE cells only. Final GHG emissions will be provided in CO₂ equivalent emissions in BLUE or GREEN cells. If data is not known or applicable, leave default value (blank, zero or other) in cell.
- (C) Enter data in appropriate units, if needed convert units prior to entering into tool.
- (D) Guidance for each calculation method is provided in the references at bottom of each sheet.

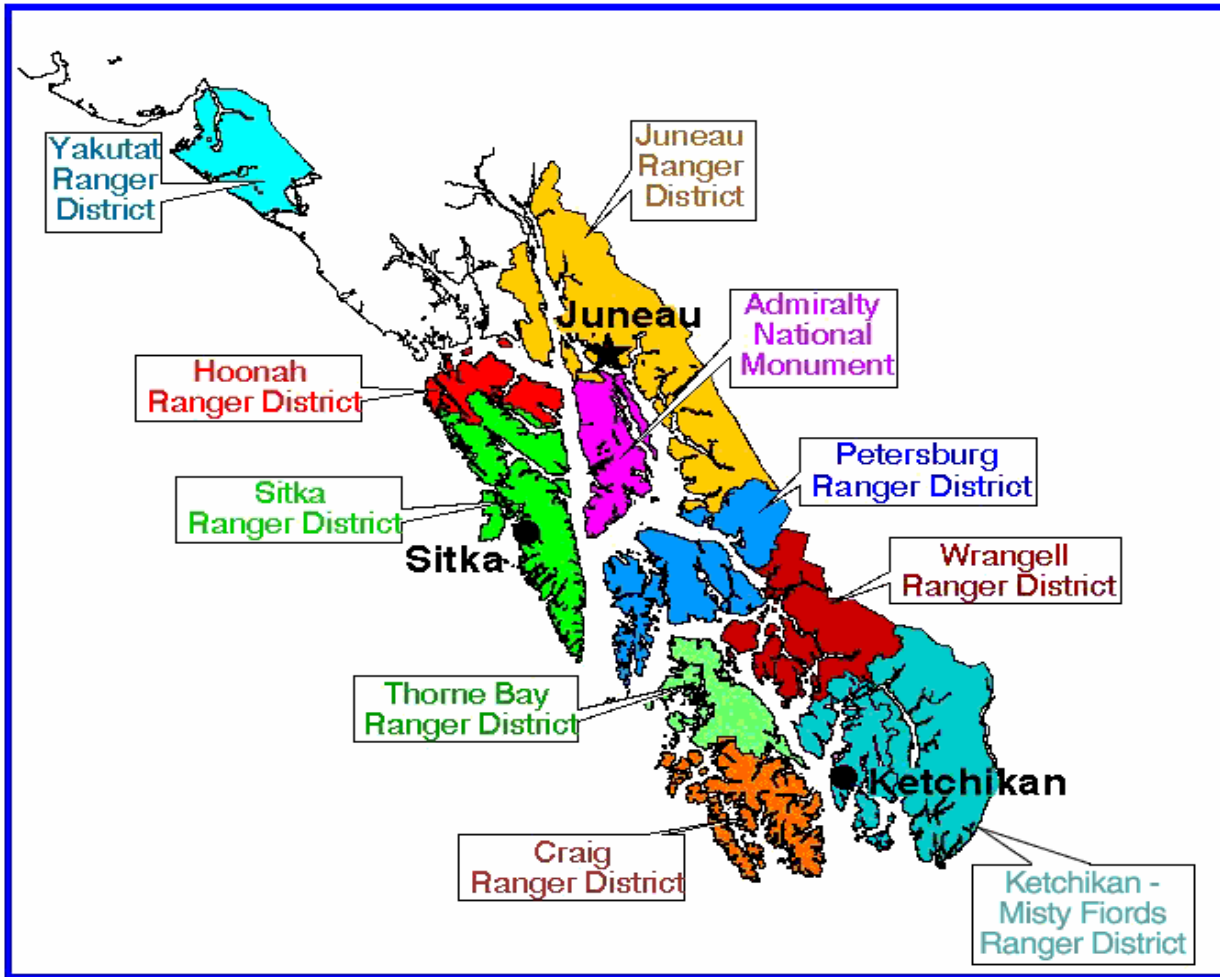
Tool Sheets:

Direct 1.0	Direct Emissions from Stationary Combustion Sources - Traditional Sources
Direct 2.0	Direct Emissions from Mobile Sources
Direct 3.0	Direct Emissions from Refrigeration and Air Conditioning Equipment
Direct 4.0	Direct Emissions from Fire Suppression Equipment
Indirect 1.0	Indirect Emissions from Purchase of Electricity
Indirect 2.0	Indirect Emissions from Purchase of Steam
Optional 1.0	Optional Emissions from Business Travel
Optional 2.0	Optional Emissions from Employee Commuting
Conversion Factors	Useful Conversion Factors

Version Notes:

Tool release date: July 1, 2008

Map of the Tongass National Forest Ranger Districts



Source: Tongass National Forest website at www.fs.fed.us/r10/tongass/maps/districtsmap.html

Summary Page



Instructions:

- (A) Use this summary sheet to fill out the Annual GHG Inventory Summary and Goal Tracking Form.
- (B) The total GHG emissions from each source category are provided below. Enter the data below into the appropriate cell of the Annual GHG Inventory Summary and Goal Tracking Form (page 1 - Corporate Inventory - U.S.)
- (C) If using this tool for a single facility or source, you can save the files under the facility or source name and you must sum all of the emission categories (e.g. Stationary Combustion) for each facility or source to a corporate total which then can be entered into the Annual GHG Inventory Summary and Goal Tracking Form.

Company Information:

Forest Name:	Tongass National Forest
Forest Address:	648 Mission Street Federal Building Ketchikan AK 99901
Name of Preparer:	Michele Parker (Tongass) / Carol Guy (PRIZIM Inc.)
Phone Number of Preparer:	MP: 907-772-5850; CG: 301-840-2222x159
Date Prepared:	November 2009

Summary of Company Emissions:

Direct Emissions

Stationary Combustion	585	CO ₂ -e (metric tons)
Mobile Sources	413	CO ₂ -e (metric tons)
Refrigeration / AC Equip. Use / Fire Suppression	0	CO ₂ -e (metric tons)

Indirect Emissions

Purchased and Consumed Electricity	361	CO ₂ -e (metric tons)
Purchased and Consumed Steam	0	CO ₂ -e (metric tons)

Optional Emissions

Employee Business Travel	476	CO ₂ -e (metric tons)
Employee Commuting	0	CO ₂ -e (metric tons)
Biomass Emissions from Stationary Sources	0	CO ₂ -e (metric tons)
Biomass Emissions from Mobile Sources	0	CO ₂ -e (metric tons)

Total Company Emissions

Total GHG Emissions (not including Optional Emissions)	1,359	CO ₂ -e (metric tons)
Total Optional Emissions	476	CO ₂ -e (metric tons)

1.0. Direct Emissions from Stationary Combustion Sources (Standard)



Instructions:

(A) Enter fuel data for each unit, facility or site in ORANGE cells of Table 1. Company-wide fuel use is reported in Table 2. Company-wide emissions is reported in Table 3, biomass emissions are reported separately.

Step 1. Enter the total fuel combusted for each unit, facility or site (by fuel type) in Table 1.

- Select "Fuel Combusted" from drop down box. Enter "Quantity Combusted" in appropriate units.
- Appropriate units for "Quantity Combusted" is listed under "Units" in Table 1 and also summarized in Table 2.
- See example entry in first row (RED Italics).

Table 1. Stationary Source Fuel Combustion

Source ID	Source Description	Fuel Combusted	Quantity Combusted	Units
<i>BLR-012</i>	<i>East Power Plant</i>	<i>Bituminous Coal</i>	<i>500</i>	<i>tons</i>
Tongass NF	Tongass NF Transaction Register	Propane	11,115	gallons
504 9th Street	Craig	Distillate Fuel Oil (#1, 2 & 4)	2,093	gallons
430A Airport Rd	Hoonah	Distillate Fuel Oil (#1, 2 & 4)	4,207	gallons
Crew Quarters	Hoonah	Distillate Fuel Oil (#1, 2 & 4)	1,846	gallons
Blue Duplex	Hoonah	Distillate Fuel Oil (#1, 2 & 4)	907	gallons
Warehouse	Hoonah	Distillate Fuel Oil (#1, 2 & 4)	1,121	gallons
Six-plex	Hoonah	Distillate Fuel Oil (#1, 2 & 4)	1,977	gallons
8510 Mendenhall	Juneau	Distillate Fuel Oil (#1, 2 & 4)	7,642	gallons
8461 Dairy Rd	Juneau	Distillate Fuel Oil (#1, 2 & 4)	8,410	gallons
3031 Tongass Av	Ketchikan	Distillate Fuel Oil (#1, 2 & 4)	1,195	gallons
123 Scow Bay Lo	Petersburg	Distillate Fuel Oil (#1, 2 & 4)	2,056	gallons
Scow Bay Wareh	Petersburg	Distillate Fuel Oil (#1, 2 & 4)	1,852	gallons
Nursery	Petersburg	Distillate Fuel Oil (#1, 2 & 4)	1,541	gallons
402B Fram - ISO	Petersburg	Distillate Fuel Oil (#1, 2 & 4)	356	gallons
402C - Old Bunkr	Petersburg	Distillate Fuel Oil (#1, 2 & 4)	732	gallons
402 D/E Fram - D	Petersburg	Distillate Fuel Oil (#1, 2 & 4)	600	gallons
406 Fram - Rang	Petersburg	Distillate Fuel Oil (#1, 2 & 4)	573	gallons
Portage	Petersburg	Distillate Fuel Oil (#1, 2 & 4)	2,970	gallons
Kake	Petersburg	Distillate Fuel Oil (#1, 2 & 4)	7	gallons
Cascade Creek C	Sitka	Distillate Fuel Oil (#1, 2 & 4)	702	gallons
416 Geodetic Wa	Sitka	Distillate Fuel Oil (#1, 2 & 4)	633	gallons
402 Monastery	Sitka	Distillate Fuel Oil (#1, 2 & 4)	268	gallons
501 Sawmill Cree	Sitka	Distillate Fuel Oil (#1, 2 & 4)	398	gallons
Auto and Woodst	Sitka	Distillate Fuel Oil (#1, 2 & 4)	962	gallons
Cascade Creek V	Sitka	Distillate Fuel Oil (#1, 2 & 4)	809	gallons
White House	Sitka	Distillate Fuel Oil (#1, 2 & 4)	570	gallons
1312 Federal Wa	Thorne Bay	Distillate Fuel Oil (#1, 2 & 4)	1,855	gallons
525 Bennett	Wrangell	Distillate Fuel Oil (#1, 2 & 4)	4,763	gallons

Table 2. Total Company-Wide Stationary Source Fuel Combustion

Fuel Type	Quantity Combusted	Units
Anthracite Coal	0	tons
Bituminous Coal	0	tons
Sub-bituminous Coal	0	tons
Lignite Coal	0	tons
Natural Gas	0	scf
Distillate Fuel Oil (#1, 2 & 4)	51,045	gallons
Residual Fuel Oil (#5 & 6)	0	gallons
Kerosene	0	gallons
LPG	0	gallons
Propane	11,115	gallons
Wood and Wood Waste	0	tons
Landfill Gas (50%CH ₄ , 50%CO ₂)	0	scf

Table 3. Total Company-wide CO₂, CH₄ and N₂O Emissions from Stationary Source Fuel Combustion

Fuel Type	CO ₂ (kg)	CH ₄ (g)	N ₂ O (g)
Anthracite Coal	0.0	0.0	0.0
Bituminous Coal	0.0	0.0	0.0
Sub-bituminous Coal	0.0	0.0	0.0
Lignite Coal	0.0	0.0	0.0
Natural Gas	0.0	0.0	0.0
Distillate Fuel Oil (#1, 2 & 4)	517,867.7	77,874.6	4,247.7
Residual Fuel Oil (#5 & 6)	0.0	0.0	0.0
Kerosene	0.0	0.0	0.0
LPG	0.0	0.0	0.0
Propane	63,824.6	11,132.1	607.2
Total Fossil Fuel Emissions	581,692.3	89,006.7	4,854.9
Wood and Wood Waste	0.0	0.0	0.0
Landfill Gas (50%CH ₄ , 50%CO ₂)	0.0	0.0	0.0
Total Non-Fossil Fuel Emissions	0.0	0.0	0.0
Total Emissions for all Fuels	581,692.3	89,006.7	4,854.9
Total CO₂ Emissions - Equivalent (metric tons)			585.1
Total Biomass CO₂ Emissions - Equivalent (metric tons)			0.0

Notes:

- CO₂ emissions estimated using emission factors provided in Tables B-5 and B-6 of the *Climate Leaders Greenhouse Gas Inventory Protocol - Direct Emissions from Stationary Combustion Sources (May 2008)*.
- CH₄ and N₂O emissions estimated using emission factors provided in Tables A-1 (commercial sector values), B-1 and B-2 of the *Climate Leaders Greenhouse Gas Inventory Protocol - Direct Emissions from Stationary Combustion Sources (May 2008)*.
- CH₄ and N₂O factors for "commercial petroleum" used for kerosene, LPG and propane. CH₄ and N₂O factors for "natural gas" used for landfill gas.

2.0. Direct Emissions from Mobile Sources



Instructions:

(A) Enter data in ORANGE cells in proper units as appropriate in Table 1. Final emissions data is provided in Table 6. Biomass emissions are not reported in the total CO₂ emissions, but are reported separately in Table 6.

- Step 1.** Enter Biodiesel and Ethanol percentages if known, or leave default values.
- Biodiesel assumed to be mix of biofuel and diesel (GHG emissions from biofuel need not be reported)
 - Ethanol assumed to be mix of ethanol and gasoline (GHG emissions from ethanol need not be reported).

Biofuel Percent:	20	%
Ethanol Percent:	80	%

- Step 2.** Enter "Vehicle Year", "Fuel Usage" and "Miles Traveled" for each vehicle or group of vehicles (by vehicle type, vehicle year and fuel type) in Table 1.
- Select "Vehicle Type" from drop down box (closest type available). Enter "Fuel Used" in appropriate units.
 - If mileage or amount of fuel used unknown, estimate using approximate fuel economy values (see Table 7).
 - See example entry in first row (RED Italics).

Table 1. Mobile Source Fuel Combustion and Miles Traveled

Source ID	Source Description	Vehicle Type	Vehicle Year	Fuel Usage	Units	Miles Traveled
<i>Fleet-012</i>	<i>HQ Fleet</i>	<i>Gasoline Heavy-Duty Vehicles</i>	<i>1990</i>	<i>500</i>	<i>gal</i>	<i>15,000</i>
1555	Craig Fleet	Gasoline Light-Duty Trucks	1999	233	gal	5,166
1585	Craig Fleet	Gasoline Heavy-Duty Vehicles	2001	422	gal	5,576
1624	Craig Fleet	Gasoline Heavy-Duty Vehicles	2002	382	gal	6,081
1662	Craig Fleet	Gasoline Light-Duty Trucks	2003	118	gal	1,590
1664	Craig Fleet	Gasoline Heavy-Duty Vehicles	2003	1,083	gal	14,625
1672	Craig Fleet	Gasoline Heavy-Duty Vehicles	2003	556	gal	9,009
1685	Craig Fleet	Gasoline Light-Duty Trucks	2004	394	gal	5,715
1710	Craig Fleet	Gasoline Heavy-Duty Vehicles	2005	408	gal	6,612
1711	Craig Fleet	Gasoline Light-Duty Trucks	2005	351	gal	5,235
1712	Craig Fleet	Gasoline Light-Duty Trucks	2005	318	gal	4,388
1737	Craig Fleet	Gasoline Light-Duty Trucks	2006	576	gal	8,357
1738	Craig Fleet	Gasoline Light-Duty Trucks	2006	393	gal	5,856
1736	Craig Fleet	Gasoline Heavy-Duty Vehicles	2007	265	gal	3,949
1935	Hoonah Fleet	Gasoline Light-Duty Trucks	1995	7	gal	94
1506	Hoonah Fleet	Gasoline Heavy-Duty Vehicles	1997	58	gal	807
1505	Hoonah Fleet	Gasoline Heavy-Duty Vehicles	1999	144	gal	1,795
1612	Juneau Fleet	Gasoline Heavy-Duty Vehicles	2001	162	gal	2,030
1632	Hoonah Fleet	Gasoline Heavy-Duty Vehicles	2001	139	gal	2,015
1667	Hoonah Fleet	Gasoline Heavy-Duty Vehicles	2003	355	gal	4,897
1693	Hoonah Fleet	Gasoline Heavy-Duty Vehicles	2004	278	gal	3,843
1694	Hoonah Fleet	Gasoline Light-Duty Trucks	2004	267	gal	3,609
1713	Hoonah Fleet	Gasoline Heavy-Duty Vehicles	2005	282	gal	3,888
1545	Juneau Fleet	Gasoline Heavy-Duty Vehicles	1998	7	gal	100
1651	Juneau Fleet	Gasoline Heavy-Duty Vehicles	1999	197	gal	2,760
1576	Juneau Fleet	Gasoline Light-Duty Trucks	2000	113	gal	1,683
1577	Juneau Fleet	Gasoline Light-Duty Trucks	2000	63	gal	1,044
1589	Juneau Fleet	Gasoline Heavy-Duty Vehicles	2001	104	gal	1,430
1596	Juneau Fleet	Gasoline Heavy-Duty Vehicles	2001	422	gal	5,825
1617	Juneau Fleet	Gasoline Passenger Cars	2001	0	gal	1
1618	Juneau Fleet	Gasoline Passenger Cars	2001	131	gal	2,421
1631	Juneau Fleet	Gasoline Light-Duty Trucks	2001	120	gal	1,783
1634	Juneau Fleet	Gasoline Light-Duty Trucks	2002	958	gal	12,929
1640	Juneau Fleet	Gasoline Passenger Cars	2002	104	gal	2,045
1661	Juneau Fleet	Gasoline Heavy-Duty Vehicles	2003	249	gal	3,442
1674	Juneau Fleet	Gasoline Heavy-Duty Vehicles	2004	65	gal	902
1676	Juneau Fleet	Gasoline Light-Duty Trucks	2004	998	gal	13,767

Source ID	Source Description	Vehicle Type	Vehicle Year	Fuel Usage	Units	Miles Traveled
1681	Juneau Fleet	Gasoline Heavy-Duty Vehicles	2004	131	gal	1,813
1683	Juneau Fleet	Gasoline Heavy-Duty Vehicles	2004	72	gal	999
1684	Juneau Fleet	Gasoline Heavy-Duty Vehicles	2004	0	gal	0
1703	Juneau Fleet	Gasoline Light-Duty Trucks	2005	110	gal	1,485
1709	Juneau Fleet	Gasoline Heavy-Duty Vehicles	2005	76	gal	1,051
1717	Juneau Fleet	Gasoline Light-Duty Trucks	2005	189	gal	2,555
1723	Juneau Fleet	Gasoline Light-Duty Trucks	2005	92	gal	1,367
1729	Juneau Fleet	Gasoline Light-Duty Trucks	2005	216	gal	2,922
1732	Juneau Fleet	Diesel Light-Duty Trucks	2005	96	gal	1,397
1983	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	1996	33	gal	560
1514	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	1997	11	gal	151
1516	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	1997	3	gal	38
1517	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	1997	81	gal	1,123
1582	Ketchikan Fleet	Gasoline Light-Duty Trucks	2000	469	gal	6,661
1584	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2001	14	gal	179
1601	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2001	218	gal	2,872
1602	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2001	242	gal	3,191
1613	Ketchikan Fleet	Gasoline Passenger Cars	2001	2	gal	33
1621	Ketchikan Fleet	Gasoline Light-Duty Trucks	2002	399	gal	6,211
1645	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2003	1,353	gal	19,674
1650	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2003	225	gal	3,272
1652	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2003	94	gal	1,362
1653	Ketchikan Fleet	Gasoline Light-Duty Trucks	2003	30	gal	419
1655	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2003	1	gal	10
1658	Ketchikan Fleet	Gasoline Light-Duty Trucks	2003	100	gal	1,530
1659	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2003	186	gal	2,704
1669	Ketchikan Fleet	Gasoline Light-Duty Trucks	2003	694	gal	10,549
1670	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2003	138	gal	2,153
1675	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2004	142	gal	2,060
1690	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2004	156	gal	2,263
1691	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2004	4	gal	58
1701	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2005	145	gal	2,104
1724	Ketchikan Fleet	Gasoline Light-Duty Trucks	2005	111	gal	1,645
1735	Ketchikan Fleet	Gasoline Light-Duty Trucks	2006	115	gal	1,782
1739	Ketchikan Fleet	Gasoline Heavy-Duty Vehicles	2006	67	gal	1,048
1752	Ketchikan Fleet	Gasoline Light-Duty Trucks	2006	12	gal	163
1743	Ketchikan Fleet	Gasoline Light-Duty Trucks	2007	521	gal	7,040
1524	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	1998	72	gal	1,223
1527	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	1998	146	gal	2,480
1563	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	1999	188	gal	2,813
1564	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	1999	271	gal	4,060
1570	Petersburg Fleet	Gasoline Light-Duty Trucks	2000	116	gal	1,744
1590	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2001	133	gal	2,134
1599	Petersburg Fleet	Gasoline Light-Duty Trucks	2001	179	gal	2,870
1600	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2001	1,039	gal	16,630
1615	Petersburg Fleet	Gasoline Light-Duty Trucks	2001	478	gal	8,118
1627	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2002	205	gal	3,284
1628	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2002	116	gal	1,853
1665	Petersburg Fleet	Gasoline Light-Duty Trucks	2003	311	gal	5,286
1666	Petersburg Fleet	Gasoline Light-Duty Trucks	2003	73	gal	1,246
1679	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2004	122	gal	1,955
1680	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2004	136	gal	2,312
1702	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2005	95	gal	1,523
1706	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2005	354	gal	5,658
1707	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2005	110	gal	1,764
1708	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2005	229	gal	3,667
1740	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2006	233	gal	3,962
1741	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2006	93	gal	1,586
1744	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2006	120	gal	2,042



Source ID	Source Description	Vehicle Type	Vehicle Year	Fuel Usage	Units	Miles Traveled
1745	Petersburg Fleet	Gasoline Light-Duty Trucks	2006	390	gal	6,637
1742	Petersburg Fleet	Gasoline Heavy-Duty Vehicles	2007	5	gal	76
1507	Sitka Fleet	Gasoline Light-Duty Trucks	1997	153	gal	2,112
1558	Sitka Fleet	Gasoline Heavy-Duty Vehicles	1999	112	gal	1,394
1562	Sitka Fleet	Gasoline Heavy-Duty Vehicles	1999	8	gal	100
1571	Sitka Fleet	Gasoline Light-Duty Trucks	2000	83	gal	1,147
1572	Sitka Fleet	Gasoline Heavy-Duty Vehicles	2000	320	gal	4,000
1588	Sitka Fleet	Gasoline Light-Duty Trucks	2001	136	gal	1,976
1597	Sitka Fleet	Gasoline Heavy-Duty Vehicles	2001	140	gal	2,038
1677	Sitka Fleet	Gasoline Heavy-Duty Vehicles	2004	6	gal	100
1682	Sitka Fleet	Gasoline Heavy-Duty Vehicles	2004	154	gal	2,242
1529	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	1998	799	gal	4,794
1532	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	1997	316	gal	3,477
1539	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	1998	38	gal	537
1553	Thorne Bay Fleet	Gasoline Light-Duty Trucks	1999	253	gal	3,031
1554	Thorne Bay Fleet	Gasoline Light-Duty Trucks	1999	21	gal	247
1583	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2000	31	gal	433
1586	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2001	343	gal	4,121
1591	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2001	635	gal	7,620
1592	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2001	305	gal	3,658
1593	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2001	1,397	gal	16,767
1594	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2001	194	gal	2,329
1595	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2001	433	gal	5,197
1622	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2002	435	gal	5,660
1623	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2002	1,096	gal	10,962
1625	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2002	605	gal	7,865
1626	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2002	272	gal	3,541
1651	Thorne Bay Fleet	Gasoline Light-Duty Trucks	2003	360	gal	4,685
1660	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2003	293	gal	3,803
1663	Thorne Bay Fleet	Gasoline Light-Duty Trucks	2003	115	gal	1,720
1673	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2003	492	gal	6,402
1686	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2004	441	gal	5,739
1689	Thorne Bay Fleet	Gasoline Light-Duty Trucks	2004	508	gal	8,131
1692	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2004	265	gal	3,440
1697	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2005	532	gal	6,386
1699	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2005	463	gal	5,555
1700	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2005	343	gal	4,121
1705	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2005	454	gal	5,443
1714	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2005	425	gal	5,100
1718	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2005	527	gal	6,318
1719	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2005	587	gal	7,042
1720	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2005	547	gal	6,566
1721	Thorne Bay Fleet	Gasoline Light-Duty Trucks	2005	569	gal	7,391
1733	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2006	171	gal	2,229
1755	Thorne Bay Fleet	Gasoline Light-Duty Trucks	2006	424	gal	5,939
1756	Thorne Bay Fleet	Gasoline Heavy-Duty Vehicles	2006	959	gal	13,425
1759	Thorne Bay Fleet	Gasoline Light-Duty Trucks	2006	371	gal	4,818
1760	Thorne Bay Fleet	Gasoline Light-Duty Trucks	2006	603	gal	7,840
1549	Wrangell Fleet	Gasoline Light-Duty Trucks	1998	102	gal	1,739
1551	Wrangell Fleet	Gasoline Light-Duty Trucks	1998	46	gal	916
1565	Wrangell Fleet	Gasoline Heavy-Duty Vehicles	1999	174	gal	2,610
1569	Wrangell Fleet	Gasoline Heavy-Duty Vehicles	2000	85	gal	1,277
1598	Wrangell Fleet	Gasoline Heavy-Duty Vehicles	2001	365	gal	4,560
1604	Wrangell Fleet	Gasoline Light-Duty Trucks	2001	103	gal	1,487
1605	Wrangell Fleet	Gasoline Heavy-Duty Vehicles	2001	218	gal	1,309
1616	Wrangell Fleet	Gasoline Light-Duty Trucks	2001	894	gal	12,969
1687	Wrangell Fleet	Diesel Heavy-Duty Vehicles	2004	25	gal	325
1688	Wrangell Fleet	Gasoline Heavy-Duty Vehicles	2004	162	gal	2,138
1704	Wrangell Fleet	Gasoline Heavy-Duty Vehicles	2005	204	gal	3,037

Source ID	Source Description	Vehicle Type	Vehicle Year	Fuel Usage	Units	Miles Traveled
1715	Wrangell Fleet	Gasoline Heavy-Duty Vehicles	2005	221	gal	2,981
1716	Wrangell Fleet	Gasoline Heavy-Duty Vehicles	2005	178	gal	2,402
1754	Wrangell Fleet	Gasoline Light-Duty Trucks	2006	269	gal	4,819
1753	Wrangell Fleet	Gasoline Heavy-Duty Vehicles	2007	31	gal	450
1568	Yakutat Fleet	Gasoline Heavy-Duty Vehicles	1999	521	gal	7,036
1574	Yakutat Fleet	Gasoline Heavy-Duty Vehicles	2000	329	gal	4,444
1575	Yakutat Fleet	Gasoline Heavy-Duty Vehicles	2000	213	gal	3,094
1603	Yakutat Fleet	Gasoline Heavy-Duty Vehicles	2001	232	gal	3,250
1644	Yakutat Fleet	Gasoline Heavy-Duty Vehicles	2002	179	gal	2,789
1695	Yakutat Fleet	Gasoline Heavy-Duty Vehicles	2004	384	gal	5,565
1698	Yakutat Fleet	Gasoline Heavy-Duty Vehicles	2005	267	gal	3,474
1155	Wrangell Fleet	Diesel Agricultural Equip.	1996	78	gal	545
1172	Hoonah Fleet	Diesel Agricultural Equip.	2000	23	gal	161
1620	Unk	Gasoline Light-Duty Trucks	2001	221	gal	2,766
1696	Unk	Gasoline Heavy-Duty Vehicles	2004	251	gal	3,459
1521	Unk	Gasoline Light-Duty Trucks	1998	67	gal	1,133
1523	Unk	Gasoline Heavy-Duty Vehicles	1998	57	gal	968
1638	Unk	Gasoline Light-Duty Trucks	2002	368	gal	5,892
1649	Unk	Gasoline Heavy-Duty Vehicles	2003	76	gal	1,222

Table 2. Total Company-Wide Mobile Source Fuel Usage and CO₂ Emissions

Fuel Type	Fuel Usage	Units	CO ₂ (kg)
Motor Gasoline	46,338	gallons	408,236.0
Diesel Fuel	222	gallons	2,256.8
Residual Fuel Oil (#5, & 6)	0	gallons	0.0
Avgas	0	gallons	0.0
Jet Fuel	0	gallons	0.0
LPG	0	gallons	0.0
Ethanol (gasoline component only)	0	gallons	0.0
Biodiesel (diesel component only)	0	gallons	0.0
Liquefied Natural Gas (LNG)	0	gallons	0.0
Compressed Natural Gas (CNG)	0	scf	0.0



Table 3. Total Company-Wide Highway Gasoline Mobile Source Mileage and CH₄/N₂O Emissions

Vehicle Type	Vehicle Year	Mileage (miles)	N ₂ O (g)	CH ₄ (g)
Gasoline Passenger Cars	1984-1993	0	0.0	0.0
	1994	0	0.0	0.0
	1995	0	0.0	0.0
	1996	0	0.0	0.0
	1997	0	0.0	0.0
	1998	0	0.0	0.0
	1999	0	0.0	0.0
	2000	0	0.0	0.0
	2001	0	0.0	0.0
	2002	0	0.0	0.0
	2003	0	0.0	0.0
	2004	0	0.0	0.0
	2005-present	0	0.0	0.0
	Gasoline Light-Duty Trucks (Vans, Pickup Trucks, SUVs)	1987-1993	0	0.0
1994		0	0.0	0.0
1995		94	8.5	4.9
1996		0	0.0	0.0
1997		0	0.0	0.0
1998		1,739	126.6	68.0
1999		5,166	291.4	165.8
2000		0	0.0	0.0
2001		0	0.0	0.0
2002		0	0.0	0.0
2003		1,590	18.1	24.6
2004		9,324	123.1	141.7
2005-present		38,430	388.1	603.4
Gasoline Heavy-Duty Vehicles		1985-1986	0	0.0
	1987	0	0.0	0.0
	1988-1989	0	0.0	0.0
	1990-1995	0	0.0	0.0
	1996	0	0.0	0.0
	1997	807	139.3	74.6
	1998	0	0.0	0.0
	1999	1,795	257.6	103.8
	2000	0	0.0	0.0
	2001	9,621	1,188.2	508.0
	2002	6,081	794.8	332.0
	2003	28,531	3,537.8	1,520.7
	2004	3,843	109.5	131.0
	2005-present	15,497	274.3	505.2

Table 4. Total Company-Wide Highway non-Gasoline Mobile Source Mileage and CH₄/N₂O Emissions

Vehicle Type	Vehicle Year	Mileage (miles)	N ₂ O (g)	CH ₄ (g)
Diesel Passenger Cars	1960-1982	0	0.0	0.0
	1983-present	0	0.0	0.0
Diesel Light-Duty Trucks	1960-1982	0	0.0	0.0
	1983-1995	0	0.0	0.0
	1996-present	0	0.0	0.0
Diesel Heavy-Duty Vehicles	1960-present	325	1.6	1.7
Motorcycles	Non-Catalyst Control	0	0.0	0.0
	Uncontrolled	0	0.0	0.0
CNG Light-Duty Vehicles		0	0.0	0.0
CNG Heavy-Duty Vehicles		0	0.0	0.0
CNG Buses		0	0.0	0.0
LPG Light-Duty Vehicles		0	0.0	0.0
LPG Heavy-Duty Vehicles		0	0.0	0.0
LNG Heavy-Duty Vehicles		0	0.0	0.0
Ethanol Light-Duty Vehicles		0	0.0	0.0
Ethanol Heavy-Duty Vehicles		0	0.0	0.0
Ethanol Buses		0	0.0	0.0

Table 5. Total Company-Wide Non-Highway Mobile Source Mileage and CH₄/N₂O Emissions

Vehicle Type	Fuel Usage (gallons)	N ₂ O (g)	CH ₄ (g)
Residual Oil Ships and Boats	0	0.0	0.0
Diesel Ships and Boats	0	0.0	0.0
Gasoline Ships and Boats	0	0.0	0.0
Diesel Locomotives	0	0.0	0.0
Gasoline Agricultural Equip.	0	0.0	0.0
Diesel Agricultural Equip.	101	25.9	145.5
Gasoline Construction Equip.	0	0.0	0.0
Diesel Construction Equip.	0	0.0	0.0
Jet Fuel Aircraft	0	0.0	0.0
Avgas Aircraft	0	0.0	0.0
Biofuel Vehicles (diesel component only)	0	0.0	0.0
Other Diesel Sources	0	0.0	0.0
Other Gasoline Sources	0	0.0	0.0

Table 6. Total CO₂ Emissions from Mobile Sources

Total CO₂ Emissions - Equivalent (metric tons)	412.8
Total Biomass CO₂ Emissions - Equivalent (metric tons)	0.0

Notes:

- CO₂, CH₄ and N₂O emission factors for vehicles from Tables 2 and 3, A-6 and A-7, and B-1 through B-7 of the *Climate Leaders Greenhouse Gas Inventory Protocol - Direct Emissions from Mobile Combustion Sources (May 2008)*.
- Emission factors updated with latest values from *U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2005* as needed.
- Average mpg values from the U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 2005, Table VM-1.
- Bus mpg values from American Public Transportation Association, Public Transportation Fact Book, Page 23, April 2006.
- Densities of fuels from Table A-36, *U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2005*.

Table 7. Average Fuel Economy by Vehicle Type

Vehicle Type	Average Fuel Economy (mpg)
Passenger Cars	22.5
Motorcycles	50
Diesel Buses (Diesel Heavy-Duty Vehicles)	3.7
CNG Buses	2.4
LNG Buses (LNG Heavy-Duty Vehicles)	1.8
Other 2-axle, 4-tire Vehicles	16.2
Single unit 2-axle 6-tire or more Trucks	8.8
Combination Trucks	5.9



1.0. Indirect Emissions from Purchase of Electricity

Instructions:

(A) Enter total electricity purchased (kWh) for each unit, facility or site in ORANGE cells of Table 1 for each eGRID subregion. Final emissions data is provided in Table 2.

Step 1. Select eGRID "Subregion" from drop box and enter "Electricity Purchased" for each unit, facility or site.

- Use map (Figure 1) at bottom of sheet to determine appropriate eGRID subregion.

- Emission rates for each eGRID subregion are provided in Table 3.

- See example entry in first row (RED Italics).

Table 1. Total Amount of Electricity Purchased by eGRID Subregion

Source ID	Source Description	eGRID Subregion	Electricity Purchased (kWh)	CO ₂ Emissions (lb)	CH ₄ Emissions (lb)	N ₂ O Emissions (lb)
Craig	Alaska Power and Telephone	AKMS (ASCC Miscellaneous)	157,846	75,781.7	3.8	0.7
Hoonah	Inside Passage Electric Cooperative	AKMS (ASCC Miscellaneous)	50,547	24,267.6	1.2	0.2
Juneau	Alaska Electric Light and Power	AKMS (ASCC Miscellaneous)	223,052	107,087.1	5.3	1.0
Juneau Regional Office (leased from GSA)		AKMS (ASCC Miscellaneous)				
Ketchikan SO (leased from GSA)		AKMS (ASCC Miscellaneous)				
Ketchikan-Misty Fiords	Ketchikan Public Utilities	AKMS (ASCC Miscellaneous)	479,640	230,274.7	11.4	2.1
Petersburg SO	City of Petersburg	AKMS (ASCC Miscellaneous)	171,840	82,500.2	4.1	0.8
Petersburg RD	City of Petersburg	AKMS (ASCC Miscellaneous)	160,772	77,186.5	3.8	0.7
Sitka RD/SO (leased from GSA)	City and Borough of Sitka	AKMS (ASCC Miscellaneous)	24,163	11,600.6	0.6	0.1
Thorne Bay	Alaska Power and Telephone	AKMS (ASCC Miscellaneous)	216,750	104,061.5	5.2	1.0
Wrangell	City of Wrangell	AKMS (ASCC Miscellaneous)	164,599	79,023.8	3.9	0.7
Yakutat RD	Yakutat Power C/O AVEC	AKMS (ASCC Miscellaneous)	2,315	1,111.4	0.1	0.0
Yakutat Office (leased from Kwaan Assoc.)	Yakutat Power C/O AVEC	AKMS (ASCC Miscellaneous)				
Total Emissions for All Subregions			1,651,524	792,895.2	39.3	7.3

Table 2. Total Emissions from Electricity Purchases

Total CO₂ Emissions - Equivalent (metric tons)	361.1
--	--------------

Notes:

- CO₂, CH₄ and N₂O emissions estimated using methodology provided in Climate Leaders Greenhouse Gas Inventory Protocol - Indirect Emissions from Purchase/Sales of Electricity and Steam (July 2008).
- Emission factors in Table 3 are from eGRID2006, which represents 2004 national data.

Table 3. CO₂, CH₄ and N₂O eGRID2006 Emission Factors by Subregion (2004 Data)

Subregion	CO ₂ Factor (lb CO ₂ /MWh)	CH ₄ Factor (lb CH ₄ /MWh)	N ₂ O Factor (lb N ₂ O/MWh)
AKGD (ASCC Alaska Grid)	1,257.19	0.0266	0.0064
AKMS (ASCC Miscellaneous)	480.10	0.0238	0.0044
AZNM (WECC Southwest)	1,254.02	0.0175	0.0148
CAMX (WECC California)	878.71	0.0366	0.0085
ERCOT (ERCOT All)	1,420.56	0.0214	0.0148

FRCC (FRCC All)	1,327.66	0.0528	0.0150
HIMS (HICC Miscellaneous)	1,456.17	0.0999	0.0182
HIOA (HICC Oahu)	1,728.12	0.0911	0.0212
MORE (MRO East)	1,858.72	0.0314	0.0289
MROW (MRO West)	1,813.81	0.0264	0.0287
NEWE (NPCC New England)	908.90	0.0795	0.0152
NWPP (WECC Northwest)	921.10	0.0217	0.0140
NYCW (NPCC NYC/Westchester)	922.22	0.0384	0.0060
NYLI (NPCC Long Island)	1,412.20	0.0684	0.0117
NYUP (NPCC Upstate NY)	819.68	0.0242	0.0114
RFCE (RFC East)	1,095.53	0.0244	0.0168
RFCM (RFC Michigan)	1,641.41	0.0340	0.0253
RFCW (RFC West)	1,556.39	0.0196	0.0244
RMPA (WECC Rockies)	2,035.81	0.0241	0.0302
SPNO (SPP North)	1,971.42	0.0236	0.0303
SPSO (SPP South)	1,761.14	0.0301	0.0230
SRMV (SERC Mississippi Valley)	1,135.46	0.0413	0.0132
SRMW (SERC Midwest)	1,844.34	0.0214	0.0288
SRSO (SERC South)	1,490.37	0.0388	0.0248
SRTV (SERC Tennessee Valley)	1,494.89	0.0233	0.0237
SRVC (SERC Virginia/Carolina)	1,146.39	0.0291	0.0191

Figure 1. eGRID2006 Subregions (2004 Data)

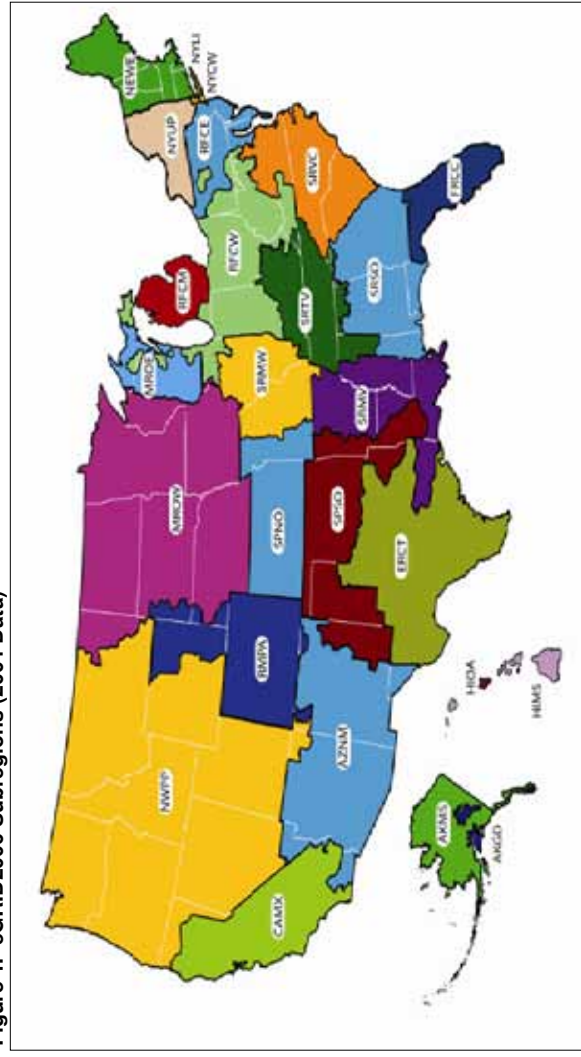


Table 2. Total Company-Wide Mobile Source Fuel Usage and CO₂ Emissions

Fuel Type	Fuel Usage	Units	CO ₂ (kg)
Motor Gasoline	0	gallons	0.0
Diesel Fuel	0	gallons	0.0
Residual Fuel Oil (#5, & 6)	0	gallons	0.0
Avgas	39,096	gallons	325,275.0
Jet Fuel	14,818	gallons	141,806.3
LPG	0	gallons	0.0
Ethanol (gasoline component only)	0	gallons	0.0
Biodiesel (diesel component only)	0	gallons	0.0
Liquefied Natural Gas (LNG)	0	gallons	0.0
Compressed Natural Gas (CNG)	0	scf	0.0

Table 3. Total Company-Wide Highway Gasoline Mobile Source Mileage and CH₄/N₂O Emissions

Vehicle Type	Vehicle Year	Mileage (miles)	N ₂ O (g)	CH ₄ (g)
Gasoline Passenger Cars	1984-1993	0	0.0	0.0
	1994	0	0.0	0.0
	1995	0	0.0	0.0
	1996	0	0.0	0.0
	1997	0	0.0	0.0
	1998	0	0.0	0.0
	1999	0	0.0	0.0
	2000	0	0.0	0.0
	2001	0	0.0	0.0
	2002	0	0.0	0.0
	2003	0	0.0	0.0
	2004	0	0.0	0.0
	2005-present	0	0.0	0.0
Gasoline Light-Duty Trucks (Vans, Pickup Trucks, SUVs)	1987-1993	0	0.0	0.0
	1994	0	0.0	0.0
	1995	0	0.0	0.0
	1996	0	0.0	0.0
	1997	0	0.0	0.0
	1998	0	0.0	0.0
	1999	0	0.0	0.0
	2000	0	0.0	0.0
	2001	0	0.0	0.0
	2002	0	0.0	0.0
	2003	0	0.0	0.0
	2004	0	0.0	0.0
	2005-present	0	0.0	0.0
Gasoline Heavy-Duty Vehicles	1985-1986	0	0.0	0.0
	1987	0	0.0	0.0
	1988-1989	0	0.0	0.0
	1990-1995	0	0.0	0.0
	1996	0	0.0	0.0
	1997	0	0.0	0.0
	1998	0	0.0	0.0
	1999	0	0.0	0.0
	2000	0	0.0	0.0
	2001	0	0.0	0.0
	2002	0	0.0	0.0
	2003	0	0.0	0.0
	2004	0	0.0	0.0
2005-present	0	0.0	0.0	

Table 4. Total Company-Wide Highway non-Gasoline Mobile Source Mileage and CH₄/N₂O Emissions

Vehicle Type	Vehicle Year	Mileage (miles)	N ₂ O (g)	CH ₄ (g)
Diesel Passenger Cars	1960-1982	0	0.0	0.0
	1983-present	0	0.0	0.0
Diesel Light-Duty Trucks	1960-1982	0	0.0	0.0
	1983-1995	0	0.0	0.0
	1996-present	0	0.0	0.0
Diesel Heavy-Duty Vehicles	1960-present	0	0.0	0.0
Motorcycles	Non-Catalyst Control	0	0.0	0.0
	Uncontrolled	0	0.0	0.0
CNG Light-Duty Vehicles		0	0.0	0.0
CNG Heavy-Duty Vehicles		0	0.0	0.0
CNG Buses		0	0.0	0.0
LPG Light-Duty Vehicles		0	0.0	0.0
LPG Heavy-Duty Vehicles		0	0.0	0.0
LNG Heavy-Duty Vehicles		0	0.0	0.0
Ethanol Light-Duty Vehicles		0	0.0	0.0
Ethanol Heavy-Duty Vehicles		0	0.0	0.0
Ethanol Buses		0	0.0	0.0

Table 5. Total Company-Wide Non-Highway Mobile Source Mileage and CH₄/N₂O Emissions

Vehicle Type	Fuel Usage (gallons)	N ₂ O (g)	CH ₄ (g)
Residual Oil Ships and Boats	0	0.0	0.0
Diesel Ships and Boats	0	0.0	0.0
Gasoline Ships and Boats	0	0.0	0.0
Diesel Locomotives	0	0.0	0.0
Gasoline Agricultural Equip.	0	0.0	0.0
Diesel Agricultural Equip.	0	0.0	0.0
Gasoline Construction Equip.	0	0.0	0.0
Diesel Construction Equip.	0	0.0	0.0
Jet Fuel Aircraft	14,818	4,565.5	3,972.0
Avgas Aircraft	39,096	4,169.4	275,181.6
Biofuel Vehicles (diesel component only)	0	0.0	0.0
Other Diesel Sources	0	0.0	0.0
Other Gasoline Sources	0	0.0	0.0



Table 6. Total CO₂ Emissions from Mobile Sources

Total CO₂ Emissions - Equivalent (metric tons)	475.7
Total Biomass CO₂ Emissions - Equivalent (metric tons)	0.0

Notes:

1. CO₂, CH₄ and N₂O emission factors for vehicles from Tables 2 and 3, A-6 and A-7, and B-1 through B-7 of the *Climate Leaders Greenhouse Gas Inventory Protocol - Direct Emissions from Mobile Combustion Sources (May 2008)*.
2. Emission factors updated with latest values from *U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2005* as needed.
3. Average mpg values from the U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 2005, Table VM-1.
4. Bus mpg values from American Public Transportation Association, Public Transportation Fact Book, Page 23, April 2006.
5. Densities of fuels from Table A-36, *U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2005*.

Table 7. Average Fuel Economy by Vehicle Type

Vehicle Type	Average Fuel Economy (mpg)
Passenger Cars	22.5
Motorcycles	50
Diesel Buses (Diesel Heavy-Duty Vehicles)	3.7
CNG Buses	2.4
LNG Buses (LNG Heavy-Duty Vehicles)	1.8
Other 2-axle, 4-tire Vehicles	16.2
Single unit 2-axle 6-tire or more Trucks	8.8
Combination Trucks	5.9

