Agency GHG Calculator Instructions

Background

In 2009, the Legislature and Governor adopted the State Agency Climate Leadership Act codified in RCW 70.235.050. The Act directs state agencies, including universities, colleges, and community and technical colleges to lead by example in reducing their greenhouse gas (GHG) emissions to:

- 15 percent below 2005 levels by 2020
- 36 percent below 2005 levels by 2035
- 57.5 percent below 2005 levels by 2050

The requirements for state agencies include the following:

- Annually estimate greenhouse gas emissions from agency operations
- Every other year (in even years) report actions taken in the past two years to meet the emission reduction targets
- Project greenhouse gas emissions to 2035 (one-time requirement due June 30, 2010)
- Develop a strategy to reduce greenhouse gas emissions (one time requirement due June 30, 2011)

Every other year (in even years) Ecology compiles the information on agency GHG emissions and actions taken and submits a report to the Governor and Legislature. The first report was submitted in December 2010 and is posted on Ecology's website.

Estimating Greenhouse Gas Emissions

Agencies can use an Excel-based greenhouse gas calculator to estimate their greenhouse gas emissions. **A simplified greenhouse gas calculator is also available and should be used only by agencies that only have passenger vehicles or lease vehicles from the state motor pool.** The calculators are posted on Ecology's website.

Universities and community and technical colleges that participate in the American College and University President's Climate Commitment (ACUPCC) can submit to Ecology the ACUPCC report in lieu of using the calculator provided by Ecology.

We ask that agencies report on a calendar-year basis to provide a consistent basis for comparison across agencies and to maintain consistency with state and federal greenhouse gas reporting programs. Please clearly note if you use the fiscal year time period.

Sources of Greenhouse Gas Emissions

Agencies should estimate emissions from the following sources:

- **Energy use in buildings and stationary equipment** (e.g., generators) such as electricity, natural gas, propane, fuel oil, diesel, or other fuels.

- **Fuel used in motor vehicles** owned by the agency or leased from the state motor pool, including passenger vehicles, heavy-duty vehicles, off-road vehicles, ferries, boats, and aircraft.
- **Business travel in vehicles not owned by the agency** including vehicles owned by employees and air travel.
- **Employee commuting** for worksites that participate in the commute trip reduction program.

There is a separate calculator for large agencies that want to estimate **"fugitive emissions"** from refrigerants and compressed gases leaked from commercial refrigeration, commercial air conditioning equipment and heat pumps, fire suppression equipment, and other types of equipment.

State and Federal GHG Reporting Overlap

Only about five or six of the largest universities and agencies may be required to report to Ecology or EPA under the statewide or federal greenhouse gas reporting program. The state and federal programs apply to agencies with a **single facility** that emits **over 10,000 or 25,000** metric tons of greenhouse gas emissions from a boiler or other **on-site stationary source**. We will work individually with these agencies to minimize any duplicative reporting requirements.

Greenhouse Gas Calculator

The sections below provide an overview and instructions for using the greenhouse gas calculator, which includes a cover page and eight tabs. The spreadsheets are locked so that you can only input data into the appropriate cells. The unlocked cells where you enter your data are highlighted in yellow. Cells highlighted in blue are optional. Please be sure to report in the units requested.

Cover Page: Contents and Notes

The cover page has links to the eight worksheets in the calculator. Agencies will enter their data into worksheets 1-4. A summary of agency GHG emissions will be automatically generated in worksheet 5. Use worksheet 6 for **optional** facility-level reporting. Worksheets 7 and 8 contain emissions factors and conversion factors for your reference.

Comments Sections

At the agency level, keep detailed notes on what information was gathered from whom so you can analyze changes over time as well as inform others how the numbers were collected in case of staffing changes or management inquiry. Enter any comments or notes you have on the methodology, data accuracy, assumptions, or any other information in the boxes provided. Please keep the comments in the data template brief, and directly related to the data.

Worksheet 1: General Agency Information

FTEs, Employees

Report the total FTEs and total employees. You can either calculate the average for the reporting year or report the total FTEs and total employees on a set date – for example, December 31 of the reporting year.

Students, patients, inmates, etc.

If you directly serve a population and this has a direct effect on your energy consumption, report the total population you serve, such as number of students, patients, offenders, etc. You can either calculate the average for the reporting year or report the students, patients, or inmates on a set date - December 31 of the reporting year.

Building Space

Please report square footage in the space provided. Report square footage for conditioned space. Conditioned space is space that uses electricity, natural gas, or other forms of energy.

Worksheet 2: Building Energy Use

Step 1: Enter the total annual fuel used by your agency in table 1 in the units specified. Report energy use for all space owned by your agency, space leased from another state agency where you receive a utility bill (do not include space leased from DES), and for all privately leased space.

DES will report energy use for the Capitol Campus and for all DES-owned buildings. If you lease from another state agency, that agency will report energy use for your space unless you receive a utility bill with your actual energy consumption.

Step 2: If you cannot get your energy use information from a utility bill for some or all of your facilities, estimate the energy use based on square footage and the type of space. Use table 2 and 3 to enter your square footage by space type. The tables will calculate your estimated kWh and/or therms. Enter this total into table 1.

Step 3: If you do not have your utility bills or square footage, estimate energy use by dividing total purchases of electricity or natural gas by the prices provided in table 4 to get the kWh and/or therms. Add the total estimated kWh and therms to table 1 in the yellow highlighted cells to calculate GHG emissions.

Worksheet 3: Fleet Energy Use

Report fuel consumption in vehicles and motorized equipment owned by your agency or directly operated by your agency – this includes short-term rentals and vehicles permanently assigned from the DES Motor Pool. Ecology will provide agencies with data on fuel use by motor pool vehicles.

Some agencies may only have one category of vehicles – passenger vehicles and light-duty trucks. If this is the case, you can use the simplified GHG calculator. All other agencies should use the full greenhouse gas calculator and split out fuel use by vehicle category (light-duty, heavy-duty, off-road, ferry, boat, and aircraft.)

The vehicle categories are separated because different types of vehicles have different emissions factors for methane (CH4), nitrous oxide (N2O) and also hydrofluorocarbons (HFCs). If you are not able to separate out fuel use by vehicle category, enter fuel use into the vehicle category in which it is used the most or make an estimate and document the approach.

Ecology is working with the departments of Commerce, Enterprise Sevices, and Agriculture to eliminate duplicative reporting requirements for biofuel usage.

Light Duty On-Road Motor Vehicles:
This includes passenger cars, trucks, SUVs, pick-up trucks, vans, motorcycles, and other on-road vehicles under 8,500 pounds, as per SAAM policy/OFM guidelines.

Activity Data to report on includes:

Fuel use in gallons or the specified unit. This is the most important piece of activity data to include for each type of fuel and vehicle category. This is used to quantify carbon dioxide (CO2) emissions.

Biofuel %. The default biofuel % is already included here, and can be adjusted if necessary.

Number of vehicles. This is used to estimate the leakage of refrigerants, or hydrofluorocarbon (HFC) emissions. If you have vehicles that fall into more than one fuel category, only report the number of vehicles once in any given category.

Miles traveled. This is used to estimate methane (CH4) and nitrous oxide (N2O) emissions and also is useful in measuring progress in increasing fuel efficiency.

Notes. This is an optional section where you can enter any notes.

Fuel Types include the following:

Gasoline: Statewide average ethanol content in 2011 was 8.9%, based on Department of Agriculture testing.

Ethanol (E85 Flex Fuel)

Diesel/Biodiesel: There are three categories:

- **Retail Purchases.** Statewide average biodiesel content in 2011 is estimated at 2%.
- **Diesel purchased at WSDOT Fueling Stations.** Statewide average biodiesel content in 2011 at these stations was 13%. Regionally, the average was 21% in Western Washington and 4% in Eastern Washington. Use the statewide and regional averages as appropriate to calculate a percent biodiesel for your agency.

- **Bulk Purchases**. Biodiesel content is set at 0% and should be adjusted by each agency based on its records.

Compressed Natural Gas (CNG): Report in units of gallons of gasoline equivalent (GGE)

Plug-in Hybrids: If data is available report the gallons of gasoline and kWh electricity used. If this information can't be separated out leave this section blank.

Electric-only Vehicles: If data is available report kWh.

Heavy Duty On-Road Motor Vehicles:
This includes cargo transport vehicles and more specialized heavy equipment, such as buses, heavy-duty trucks, semi-trucks, snow plows, fire engines, and other on-road vehicles over 8,500 pounds. Enter the fuel use. If you don't have miles traveled or hours of operation, you can either make an estimate or leave these sections blank.

Off-Road Motor Vehicles:
This includes construction, agricultural, lawn, and other equipment not used on the roads, including yellow irons, tractors, ATVs, forklifts, lawnmowers, etc. Enter the fuel use. Reporting miles traveled or hours of operation is optional.

Ferries:
This category will only be used by WSDOT and other agencies that own or operate ferries. In this section enter data on gallons of diesel/biodiesel blend and kWh of shore power consumed by ferries. Adjust the biofuel % to correspond with agency records. Enter the number of ferries and hours of operation. If you don't have the hours of operation you can make an estimate or leave it blank.

Boats:
This includes any watercraft owned or operated by your agency (except ferries.) Enter the fuel use. Hours of operation are optional and only used to track efficiency changes over time (similar to mpg for on-road).

Aircraft:
For aircraft, enter the gallons of aviation gasoline and/or jet fuel, the number of aircraft, and hours of operation. If you don't have hours of operation make an estimate or leave this blank. Note the type of aircraft.

Tables 6 and 7 (summarizing total fuel use, # of vehicles and miles traveled) are automatically generated based on the data entered into Table 5.

Worksheet 4: Employee Business Travel and Commuting

This worksheet quantifies emissions for employee business travel in employee-owned vehicles, business-related air travel, and employee commuting. These are indirect (scope 3) emissions from sources not owned or operated by your agency but where the emissions are indirectly influenced by your agency's work.

Personally Owned Vehicles

Report on miles traveled in personally owned vehicles. This includes vehicles driven for state business but owned by employees. Employees apply for a travel reimbursement to recoup costs for the use of their vehicles. Calculate miles traveled by dividing total dollars reimbursed by the rate of agency reimbursement per mile. For 2011, the reimbursement rate is $0.51 per mile.

Air Travel

Enter the miles traveled in short, medium, and long distance flights.

- **Short flights** are 0-300 miles (based on a one-way flight) and include all in-state flights and flights to parts of Canada and Oregon.
- **Medium flights** are 300-700 miles (based on a one-way flight) and include flights to Idaho, western Montana, southern and western Oregon, and Northern California.
- **Long flights** are over 700 miles (based on a one-way flight) and include flights to southern California, the Midwest, and the East Coast.

The calculator provides air travel distances for common destinations and there is also a link you can use to get mileage for other destinations. If you do not have the miles traveled you can use the table in the calculator to estimate miles traveled based on the number of one-way flights and the destination. To estimate air miles traveled based on cost, divide the total airfare expenditures by $0.156 per passenger mile.

Employee Commuting

Enter total GHG emissions from employee commuting. This information will come from the WSDOT CTR Reports. Only certain agencies with worksites in the nine largest counties (Clark, Thurston, Pierce, King, Kitsap, Snohomish, Whatcom, Yakima and Spokane) with over 100 employees per worksite or co-located worksites participate in the CTR program. Starting in 2011 all worksites in Thurston County will start to participate in the CTR program.

If data is available, universities and community and technical colleges can report on emissions from student commuting separately by entering this into the comments section in the first tab of the workbook called Contents and Notes.

Worksheet 5: GHG Emissions Summary

This worksheet contains a summary of GHG emissions by source. These numbers will be automatically generated based on the data entered into worksheets 1-4. Carbon dioxide emissions associated with bioenergy sources are not included in the totals.

Worksheet 6: Energy Use by Facility

This worksheet is optional and can be used to track building-related energy consumption by facility and/or site. The information included in this worksheet is **not linked** to worksheet 2 on building energy use. You will have to total the data and enter it into worksheet 2 to quantify GHGs related to building energy use.

Worksheet 7: Emissions Factors

Emissions factor

The average emission rate of a pollutant from a unit of activity. For example, emissions of carbon dioxide per gallon of gasoline consumed.

Carbon dioxide equivalent (CO2e)

A measure used to compare the emissions from various greenhouse gases based on their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed as "metric tons of carbon dioxide equivalents (MMTCO2e)." The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP.

MTCO2e = (million metric tons of a gas) * (GWP of the gas)

Global Warming Potential (GWP)

Global Warming Potential (GWP) is a measure of the contribution of a greenhouse gas to global warming over a specific time period relative to carbon dioxide. Carbon dioxide (CO2) is the reference gas and has a GWP of 1. Methane (CH4) has a GWP of 21 and a given mass of CH4 is 21 times more potent compared to the same mass of CO2 over a 100 year time horizon. GWP is used to convert emissions of greenhouse gases into a common measure, the carbon dioxide equivalent (CO2e), by multiplying emissions of a greenhouse gas times the GWP.

Worksheet 8: Conversion Factors

Conversion factors are included for your reference. There is also a link to an online conversion calculator.

More information

Ecology's website: http://www.ecy.wa.gov/climatechange/WAleadership.htm

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