

CHAPTER 1: Introduction

Hi. I'm John Nangle. I'm an engineer with the National Renewable Energy Laboratory (NREL) supporting the Federal Energy Management Program (FEMP) by presenting these introductory courses on greenhouse gas reporting within the Federal Government.

This demonstration is an overview of the Department of Energy's Federal Energy Management Program's Annual Greenhouse Gas (GHG) and Sustainability Data reporting tool. The tool is a Microsoft Excel 2007 workbook which combines each agency's activity data with GHG emissions factors to calculate an agency's total greenhouse gas emissions.

Each federal agency is required to report its total greenhouse gas emissions by January 31st 2011 in order to meet the requirements established by Executive Order 13514. Greenhouse gas emissions are reported by Scope: Scope 1 is direct emissions, Scopes 2 and 3 are indirect emissions. This graphic illustrates which emissions sources lie within each Scope. This is useful to be aware of since the FEMP reporting tool is laid out by emissions source category and, where applicable, fuel type. The calculated emissions are then summarized into the three Scopes. Reporting is required for all three emissions scopes.

The reporting workbook is available on the FedCenter Web site along with other tools to help with greenhouse gas reporting. The reporting tool can be used in conjunction with the inventory management plan, which allows agencies to document data and assumptions in a transparent and repeatable manner for later verification. A template for an IMP is also available under the GHG section of FedCenter.

This demonstration is a step-by-step guide on how to complete the reporting workbook with additional contact information provided at the end. You may pause and resume the demonstration at any point.

Let's begin.

CHAPTER 2: Layout and structure of the program and workbook

The FEMP greenhouse gas reporting tool is a Microsoft Excel 2007 workbook with 44 tabs. Each tab is numbered and color-coded according to the emissions source or fuel type and the reporting area. Section 1 tabs relate to electricity; section 2 tabs relate to Renewable Energy, and section 3 tabs relate to Scope 1, 2 and scope 3 emissions sources, such as fuels and power use, fugitive emissions, waste, transportation, water and wastewater. Additional reporting functionality for new building design, source energy credits, and water intensity is located in tabs beginning with a 4. While this section will not be discussed in detail in this demonstration, we would like to draw your attention to tabs 4.5 and 4.6. Tab 4.5 provides a performance summary that you may use to track your agency's progress toward different regulatory goals. Tab 4.6 provides a summary of your agency's GHG inventory, organized according to scope and emissions source. Both of these tabs will be automatically populated based on your inputs on other pages of this workbook.

The first tab provides a workbook overview where the status of data entry can be tracked. During this demonstration we will clarify where information needs to be entered by stating a column letter and a row number. For example, the agency name should be entered into C2. The date of data entry should be entered into cell C3. The name of the person preparing the inventory report should be entered into cell G2 and the contact phone number for that person should be entered into cell G3. Please enter the year for which data is being reported, by fiscal year. Fiscal year 2008 baseline data is required in January 2011, as is data from FY 2010. FY 2009 data is optional. A separate workbook needs to be created for each fiscal year being reported. For example, in January 2011, agencies must submit a workbook with total emissions for the baseline year of 2008 as well as a separate workbook with total emissions for FY2010.

The text in column C provides an overview of every tab available in the workbook, including appendices, which contain all of the calculation factors required for reporting. The Energy Upload Sheet and the GHG Upload Sheet provide summary data that FEMP will use for uploading into its database. As data is entered into each tab and the

tab is completed, you may update the status in the workbook overview tab to track progress on reporting. Reporting status updates begin in cell F9 where the status can be selected from the drop down menu. Where data is entered into the workbook that is not standard or where assumptions have been modified by using advanced methodologies, the information needs to be entered into the Workbook Overview tab beginning in cell G25. Column H indicates where non-standard entry may occur, if necessary. Completing these cells will improve the transparency of an agency's inventory and assist in tracking methodologies from year to year.

The blue underlined text is hyperlinked to allow the user to be directed to the tab name. We'll click on the electricity instructions link to be redirected now.

CHAPTER 3: Electricity

Each major section of the reporting workbook has an instruction tab with additional explanatory text. Before entering data into the worksheets, we recommend that these instructions be read. General directions are provided to guide agencies through the data entry process. Please pause this demonstration now or come back to this page and read these instructions.

After reading through the instructions you'll be ready to begin entering data into tab 1.2 for Energy Goal (GHG Target) reporting. Since this reporting workbook is intended to combine FEMP Annual Energy reporting with GHG reporting, electricity consumption is separated according to whether it is subject to, or excluded from, energy intensity reduction targets, greenhouse gas reduction targets, or both. EO 13514 exclusions allowable for GHG reduction targets are not the same as those allowable under FEMP's guidelines for excluding buildings from energy reporting. Please refer to chapter 2 of the Federal Greenhouse Gas Accounting and Reporting guidance for more information about which facilities are subject or excluded from each goal. Separate annual energy consumption will be reported as follows: Tab 1.2 requires electricity reporting for facilities subject to both energy intensity and GHG reduction targets; Tab 1.3 requires electricity reporting for facilities excluded from energy intensity reduction targets but subject to GHG reduction targets; Tab 1.4 requires electricity reporting for facilities that are subject to energy intensity targets but exempt from GHG reduction targets; and Tab 1.5 requires reporting for facilities that are subject to neither energy intensity nor GHG reduction targets. The layout of each tab is the same, as is the type of information required to complete reporting.

Agencies that lease 100 percent of their facilities under fully serviced leases and do not directly pay for utilities should not input any information into the electricity reporting portion of this workbook. These would be considered Scope 3 indirect emissions and are not being addressed at this time under the CEQ guidance.

For all other agencies, only two general types of information are needed to complete tabs 1.2 through 1.5: electricity billing zip code, and total annual electricity consumption for each zip code. Total electricity use (in kilowatt hours and megawatt hours) and the associated emissions are automatically calculated in rows 4 through 6 from the data populated in the table below. This information should not be changed or over-written. Data should be entered beginning in row 10 for each zip code. A facility name is optional for the zip code. The zip code for where the electricity is used is required and should be entered into column B. Based on the zip code, the tool will automatically determine the eGrid region and will assign and apply the appropriate emission factors accordingly. The country is defaulted to the United States in Column C. If the electricity use is outside of the US, please select the appropriate country from the alphabetical drop-down list. For United States territories, such as Guam, please select U.S. Territory (which appears above United States in the drop-down list). The total annual electricity consumption in kilowatt hours should be entered into column D. This is automatically converted into megawatt hours and, based on the eGrid Subregion within the United States, the emission rates are calculated. The columns to the right of column D are provided for calculation transparency and are automatically populated. Each zip code and associated electricity KWH should be entered, going down the column. If an agency needs to enter more than 50 zip codes the rows may be unhidden up to 500 rows, or additional rows may be added per the instructions at the bottom of the sheet.

Training Audio
Greenhouse Gas and Sustainability Data Report Demonstration

Once the consumption in kilowatt hours has been entered into each individual tab where necessary, Tab 1.6 will provide a summary of the information entered. The only data input required in Tab 1.6 is the electricity cost data in thousands of US dollars. Cost data can be entered as one total in cell F12 or broken down along the same lines as the energy and GHG data in cells F6 through F11. Do not include any costs associated with renewable energy; these will be entered in a separate section of the workbook. The remaining cells in this tab are provided for transparency and quick comparison of emissions types. The lower section of the sheet shows the emissions factors associated with each eGrid subregion. More information on eGRID emissions factors is available in the Federal GHG Accounting and Reporting guidance and its associated Technical Support Document.

Sources for electricity consumption data include utility bills, existing agency energy reporting systems, and centralized accounting or payment systems. Cost data should be available on energy bills, from finance departments, etc. At this time, agencies are only required to report energy consumption for buildings in which they are directly responsible for paying the utility bill.

Tab 1.7 provides a location for direct entry of data according to eGrid region. If this break out is already known by an agency, this sheet can be used to streamline reporting. Rather than inputting individual facility zip codes and electricity consumption, if agency energy data is aggregated by eGrid region this annual consumption can be entered by total megawatt hours into each region. Beginning in row 12, the total annual energy consumption should be entered by goal area in columns D through G according to the relevant eGrid region. Cost data can be entered into F46 through F54, similarly to the data entry methodology for Tab 1.6, previously mentioned. The tables below row 57 are provided for reporting transparency and are automatically populated. This sheet may be used in combination with the zip code apportioning tool, but agencies should be mindful to avoid double counting of emissions. For example, an agency may use the direct entry sheet to report domestic electricity by eGRID subregion and the zip code sheets to report overseas consumption.

Tab 1.8 is a summary sheet, combining the totals from the direct entry sheet and the electricity summary sheets. An agency may use both methods as long as there is no overlapping data entry which results in double counting.

Completion of the tabs in section 1 of this workbook automatically populates tab 3.13, "Scope 3 transmission and distribution losses." No further data inputs are needed to complete this tab.

This concludes the electricity reporting portion of this demonstration. The next module will show how to enter data into the renewable energy section of the workbook.

CHAPTER 4: Renewable Energy

Agencies are given credit for renewable energy projects that are sited on federal land and through the purchase of energy from renewable sources. The worksheets in Section 2 relate specifically to Renewable Energy. The data entered into Section 2 sheets is designed to fulfill energy- and GHG-related reporting requirements under EO 13514, EPCA Section 203, EO 13423, and the Department of Defense's Renewable Energy Production Goal.

Only renewable energy information should be entered in Worksheet 2.2. All fossil energy use should be entered in Worksheet 3.2, even if it is combined with a renewable fuel. For example, the coal used in a cofired coal and biomass plant would be separately reported in Worksheet 3.2, while the biomass used in the co-firing would be reported in Worksheet 2.2.

Tab 2.1 is instructions tab with additional explanatory text. Please pause the demonstration now or come back to this page and read these instructions.

Most data will be entered into sheet 2.2 'Renewable Energy Data', so let's begin there. This sheet is broken into several color-coded sections. The blue columns A through K provide basic information about the project and should be completed for every project or purchase by your agency. The yellow columns, L through W, should only be completed for renewable energy projects that generate electricity, or renewable electricity purchases. The

Training Audio
Greenhouse Gas and Sustainability Data Report Demonstration

green columns X through AI should only be completed for renewable energy projects that do not produce electricity, but may, for instance, produce thermal energy. Both the yellow and the green cells should be completed if a project generates both electric and non-electric energy. All of the columns beyond AI are provided for transparency purposes only and are automatically populated. No additional data need be entered into these columns.

Each row in tab 2.2 can be used to represent a separate renewable energy project or purchase, or it can be used to group purchases or projects that have the same characteristics. For example, an agency's multiple off grid-PV projects could be grouped into one line. On-grid and off-grid projects could not be grouped because there are different factors associated with the location of the project. All projects that are grouped into the same line must use the same technology and must be either off-grid or sited in the same eGrid region for electric projects. For REC purchases that combine output from projects at different locations or multiple technologies, treat each technology or location that is bundled into the REC as a separate line with its share of the overall REC purchase so the tool can calculate the individual emission impacts of each component of the REC purchase.

Columns A.1 and A.2 provide a place to enter the capacity and description of the project or purchase. These are optional entries but are useful for distinguishing among different agency projects and tracking changes over time. If the project generates grid-tied renewable electricity, the zip code of the generator must be entered into column A.3 so that appropriate eGRID factors can be used to determine emission impacts. No entry is needed if the project is an off-grid electric system, or the project does not generate any electricity. If you are entering data for a REC purchase, enter the zip code for the place where the energy is generated.

Column A.4 provides a dropdown menu that allows an agency to select whether the renewable energy project impacts goal subject or goal excluded facilities, as defined by energy reporting. This entry will determine how the renewable energy is incorporated into agency energy intensity calculations. If the facility served by the renewable energy is excluded from energy performance requirements, choose "excluded." Otherwise, choose "Goal subject." Treat all systems that do not directly serve a facility, for instance a remote sensor, as excluded.

Column A.5 provides a dropdown menu to identify whether the project is on or adjacent to Federal or Indian land. This entry helps to determine the transmission losses associated with the project, as well as whether it qualifies for the EPAct bonus. In column A.6 indicate whether the project was placed in service before or after January 1, 1999. Under EO 13423, one half of the renewable energy that an agency uses must come from projects put into place after this date.

Column A.7 and A.8 are very important. Column A.7 is the place to indicate whether the agency owns the RECs for the project, or whether this is a short or long-term REC or green power purchase. RECs must include ALL environmental attributes. If only a portion of RECs for a project are retained by an agency, select "Agency Owns Project and RECs" and input the percentage of the RECs from the project that the agency owns in column A.8. This value should always be 100% for REC and Green Power purchases, or if all RECs from a project are retained by an agency. If an agency only owns a portion of the RECs from a project, enter the percentage of the RECs retained by the agency. This entry helps determine what share of the project can be considered a "hosted" facility that the agency allows on its property. The "hosted" element of a project can be reported as a Scope 3 emission reduction, and if the agency purchases RECs separately can be used in a REC swap to claim the EPAct bonus for projects on Federal or Indian land.

In column A.9, indicate whether the agency owns the transmission and distribution system that delivers electricity from the renewable energy project. If the agency does, any transition and distribution (T&D) losses are Scope 1 losses. If it does not, they are considered Scope 3 losses. Only answer yes if all T&D between the project and end user is owned by the agency. This mainly applies to organizations like TVA and the Power Marketing Administrations. If the project is non-electric, choose the last option.

Training Audio
Greenhouse Gas and Sustainability Data Report Demonstration

In column A.10, indicate whether the project impacts scope 1 or scope 2 emissions. As a reminder, a project is considered scope 1 if the agency owns and controls the generation. If the agency is purchasing the renewable energy from a third-party owner, even if it is on the agency's site, it is scope 2. Note that even if an agency owns a renewable energy project that produces electricity and is on-grid and is technically in scope 1, its emission impacts will be expressed in scope 2 because it reduces purchases of conventional electricity.

Finally, use the dropdown menu in column A.11 to indicate whether the renewable energy generated is electric energy, non-electric energy, or some combination of the two (combined heat and power for example). This is important to determining whether the energy can be counted toward the EPart Section 203 goal, which applies only to electrical systems. This box is also the place to indicate whether the project is on- or off-grid.

Now, we'll move to section B, which should only be completed for projects that generate electricity. Do not enter anything in these yellow columns for daylighting, groundsource heat pumps, solar heating and cooling, or solar hot water projects. These projects will be entered into the non-electric section.

In column B.1 use the dropdown menu to select the type of renewable fuel used to generate electricity. The type of fuel chosen from this list will automatically populate the default higher heating values in column B.8 and the fuel units of measure in B.6. In B.2, enter the number of kilowatt hours generated by the project in the reporting year, or the number of kilowatt-hours of renewable electricity purchased. Columns B.3 and B.4 will be automatically calculated based on the other inputs in the spreadsheet.

For biomass fuel types such as municipal solid waste, wood, etc., fuel data will need to be entered in column B.5. For power or REC purchases, this value is the amount of biomass fuel used by the energy provider. For on-site projects the agency owns, it is the amount of fuel the agency uses in the biomass project. If the amount of fuel used is unknown, do not enter anything into this cell. The amount of fuel will be automatically calculated using the default heat rate, and the result will be automatically entered in B.9.

No data should be manually entered for columns B.7 and B.8. Column B.7 automatically translates the amount of biomass fuel use in B.5 into millions of BTUs using default higher heating values for the type of biomass fuel. This will be used to calculate GHG emissions from the biomass fuel. B.8 shows the default heat rate in BTU per MWH for the biomass fuel, which is used in B.9 to provide an alternate calculation of million BTUs of fuel. This value is only used by the spreadsheet if the user does not enter information on biomass fuel use in B.5. This should represent fuel used for entire system, even if some or all RECs are not owned by agency. If your agency knows the heat rate of its fuel, you may use this heat rate to calculate fuel use, which may then be entered into column B.5, overriding the default.

If the project is a renewable energy purchase, enter the amount of money spent on the REC or power purchase in this fiscal year in column B.10. B.11 automatically calculates the \$/kWh spent for the project or purchase. If the project is not a renewable energy purchase, enter the capital cost for the project in B.12. Only enter a value in B.12 for the year of the project's installation; do not report capital costs for projects completed in prior years.

Don't forget that other resources are available, such as the Federal GHG Guidance and the instructions in tab 2.1.

All projects that do not produce electricity should be entered in section C, the non-electric renewable energy section. In column C.1, select the type of renewable fuel used from the pull-down menu. The type of fuel chosen from this list will automatically populate the default higher heating values in column C.6 and the fuel units of measure in C.5.

In column C.2, enter the amount of non-electric renewable energy generated by the project in million BTUs during the reporting year. If the site purchases delivered non-electric RENEWABLE energy, enter the total amount here even if RECs for the project are not owned by the agency. The entry in column A.8 describing REC percentages will be used to calculate how much is covered by RECs. If the BTU data is for purchased fuel such as landfill gas or tons of wood and the BTU value is unknown, enter the amount of fuel purchased in C.4. That value will be

Training Audio
Greenhouse Gas and Sustainability Data Report Demonstration

copied to C.2 If you don't have a calculation of how much energy a Ground Source Heat Pump saves compared to an air-to-air heat pump, enter the rating of the GSHP in tons in C.4 and the renewable energy value will be calculated in C.7. That value will be copied to C.2. If you don't have a calculation for how much energy a ground source heat pump saves compared to an air-to-air heat pump, enter the rating of the GSHP in tons in C.4 and the renewable energy value will be calculated in C.7. That value will be copied to C.2. Refer to the instructions in tab 2.1 for other items like ground source heat pumps.

Column C.3 automatically calculates the quantity of renewable energy from the project or purchase that is covered by RECs owned by the agency. This calculation is based on the input in column C.2 and the percentage of RECs that the agency owns, which is entered in column A.8.

In column C.4, enter the amount of biomass fuel used by the project, if the project uses biomass fuel. For direct energy or REC purchases, enter the amount of biomass fuel used by the energy provider. For on-site projects the agency owns, it is the amount of fuel the agency uses in the biomass project. If the fuel use or capacity is unknown, do not enter anything into this column. The amount of fuel will be automatically calculated using a default conversion efficiency of 70 percent and will be automatically calculated in column C.8. Do not enter values for MSW -- the emission factors for MSW already take fuel use into account.

Column C.6 shows the default higher heating value (HHV) of the biomass fuel that will be used to automatically translate the amount of biomass fuel use in C.4 into millions of BTUs, which is then entered into C.7. Column C.8 shows the default biomass fuel use based on an assumed conversion efficiency of 70%, which provides an alternate calculation of fuel use if the user does not know the amount of fuel used in the project. This value is only used by the tool if the user does not enter information on biomass fuel use in C.4. If your agency knows the higher heating value of its fuel, calculate fuel use separately and enter the result into column C.4. Default biomass fuel use is not calculated for MSW because the emission factors for MSW already include assumptions on the proportion of biomass fuel.

Column C.9 checks the biomass fuel entry and produces an error message if the fuel entry results in a conversion efficiency greater than or equal to 100%.

In column C.10, enter the amount of money spent on non-electric energy from the project this year. Column C.11 uses this information to automatically estimate cost per million BTUs. Finally, enter the capital cost of the project in column C.12 if the project was installed during the reporting year. Do not report capital costs for projects completed in prior years.

Once all agency projects have been entered into Tab 2.2, refer to Tab 2.3 for a summary. No data entry is required here; this tab summarizes how all the projects entered on Tab 2.2 contribute toward agency renewable energy goals under EISA, as well as how they impact an agency's scope 1, 2, and 3 emissions.

Please note that no renewable energy purchases or RECs should be included in the FY 2008 baseline. RECs are not included in the baseline to avoid penalizing agencies who have made proactive investment in renewable energy prior to EO 13514.

This concludes the renewable energy portion of this demonstration. The next module will provide an overview of the scope 1 emissions tabs in the workbook.

CHAPTER 5: Scope 1 Sources

Now let's discuss Tabs 3.1 through 3.9, which is where activity data for scope 1 greenhouse gas emissions will be entered. Scope 1 emissions are considered direct emissions from sources that are owned and controlled by agencies.

Training Audio
Greenhouse Gas and Sustainability Data Report Demonstration

Tab 3.1 is the instructions tab with explanatory text of each emission source. Default calculation methodologies are incorporated into the workbook. Agencies also have the option of using advanced methodologies to calculate emissions in some categories; refer to column F to determine whether this tool can be used to apply an advanced methodology. Column G provides information about where in the Technical Support Document you can find more information about the calculation methodologies applied for each emission source.

Let's begin with Tab 3.2, which provides a place to input data related to stationary combustion sources, such as agency-controlled power plants, diesel generators, or natural gas. Throughout this workbook, cells are color coded to assist data entry. If the font in the cell is blue, the user should directly enter the specified activity data into this cell. If the font in the cell is orange, this is a default methodology assumption that can be modified to utilize an advanced methodology. If the font in the cell is black, no entry is needed; these cells include automatic calculations and other information that are presented for the sake of transparency.

To combine annual energy reporting with GHG reporting, this worksheet is broken into sections according to whether facilities using a certain fuel are subject to or excluded from energy goals and/or GHG reduction targets. Enter data for EISA 2007 goal-subject facilities in the top cells, rows 9 through 38. Enter data for goal excluded facilities in rows 47 through 76. If facilities are included in GHG targets, enter fuel use data in row D. Refer to row H for the appropriate units in which fuel data should be entered. If the facilities are not included in the GHG target, enter fuel consumption for those facilities in column E, target excluded. Finally, enter any international fuel consumption in column F. Enter total fuel costs in row I.

If your agency uses fuel that is not listed on this worksheet, use the dropdown menu in rows 28 through 30 and 66-68. By selecting a specific fuel, the emission factors will automatically be populated; simply enter consumption data in the appropriate units. Similarly, if your agency uses a continuous emission monitoring system to directly measure emissions, use rows 36 through 38 or 74 through 76 to enter fuel consumption. In this case, you will also need to enter total carbon dioxide, methane, and nitrous oxide emissions measured in rows X through AA.

Now let's continue on to mobile emissions reporting. Use tab 3.3 to enter fuel consumed by mobile sources that are *not* included in fleet reporting through the FAST system. These sources include non-fleet vehicles, such as non-road vehicles, lawnmowers, agriculture equipment, research aircraft, and ships. Just as in stationary emissions reporting, report fuel consumption according to whether it is included in the GHG target (such as a research aircraft), excluded from the GHG target (such as military aircraft), or consumed in international vessels. If your agency uses a fuel that is not included in rows 9 through 16, enter it in rows 18 through 20. You must also provide emission factors and make the appropriate calculations to determine metric tons of carbon dioxide equivalent. If you have questions regarding the emission factors and calculations used for determining emissions, refer to the Technical Support Document.

Use Tab 3.4 for report emissions from all fleet vehicles. This tab has been designed to leverage reporting from the Federal Automotive Statistical Tool, or FAST. To use this worksheet, you will need access to the FAST database. Contact your agency's representative responsible for FAST reporting regarding the generation of an agency data queue report that can be used to complete tab 3.4.

We'll give a brief demonstration showing how to transfer data from FAST to the reporting worksheet. After logging into the FAST system, you will see this page. Click "Reports and then click "Query Tool." Then, choose "Section III: Fuel Costs and Usage." To obtain a report with the appropriate data, select the reporting year, your agency's abbreviation or name. Select fleet locale. You may enter either "Domestic" or "Foreign into this field to narrow the results. We will leave the text box blank and sort by locale once we download the query. Select fuel group, fuel name, fuel type, and vehicle exemption. You must also select fuel consumption in gallons of gasoline equivalent, or GGE. Finally, you may select fuel cost, or run cost as a separate query. Then click "run query," and download the results to Microsoft Excel. Now, you should have all the data you need to populate columns E, F, and I of the reporting workbook.

Training Audio
Greenhouse Gas and Sustainability Data Report Demonstration

If your agency uses B20, which is a blend of renewable biodiesel and petroleum diesel, you may enter this data in one of two ways: either sum the alternative and petroleum components of biodiesel given in FAST, and enter the sum into the appropriate B20 category within the reporting workbook. Alternatively, enter the alternative B20 in the appropriate B100 category, and then enter the diesel B20 in the appropriate diesel category. Either entry method will yield the same result.

Agencies are encouraged to export their own data from FAST and input it into this worksheet so that they can see the impact of fleet on their emissions. However, FEMP will also be able to provide this service if an agency chooses to leave this tab blank.

Once the mobile source tabs have been completed, move on to tabs 3.5 and 3.6, which are intended to capture reporting for fugitive gas emissions resulting from HVAC, refrigeration, and electrical equipment. These worksheets use the default material balance approach to calculate emissions from these sources.

Tabs 3.5 and 3.6 require two types of data for each F-gas that an agency uses: first, the total quantity purchased or issued, and, second, the total quantity returned to supply over the reporting year. This data can be found in a number of places. Chemical management systems may track requisition, purchase, receipt, storage, issue, shipment, disposition, and identification of equipment and supply materials. Net growth or decline of the total charge, or nameplate capacity, of F-gas consuming equipment is also useful when using an advanced methodology approach to refine these estimates. If F-gas purchase data are not available from local sources, best judgment estimates may be needed.

The first step in this worksheet is to identify the type of data that your agency will report. Depending on your agency's internal chemical management system, choose fiscal year, calendar year, or three-year rolling average. Endeavor to use the same reporting procedure for both refrigerants and F-gases, and across different reporting years. In other words, if your agency chooses to report three-year rolling average data in FY 2010, it must continue to do so for each subsequent year, as well as for the base year. Three-year averages must be calculated separately and entered into this workbook.

Once your agency has chosen how it wants to report fugitive emissions, enter the quantity purchased or issued and the quantity returned to supply for each refrigerant in the agency's chemical inventory. Since many refrigerants are composed of several different HFCs and PFCs, this reporting workbook provides a calculator in tab 3.5 to break each refrigerant into its constituent gases. These gases are automatically calculated in columns I through V and are shown only for transparency; no data should be input into these cells. At the bottom of this worksheet, you can see the sum of each greenhouse gas emitted as a result of refrigerant use. These sums are automatically added to the other F-gases on Tab 3.6. Therefore, do not add refrigerants to both tab 3.5 and 3.6; otherwise, this will result in emission double counting.

Use tab 3.6 to enter non-refrigerant high global warming potential gas quantities issued or purchased, or returned to supply. Don't forget to report GHG target excluded and/or international gases separately from GHG target-subject gases. If your agency uses high global warming potential fugitive gases that are not included in this spreadsheet, use rows 55 through 57 to report these gases. For these rare examples, a global warming potential must be manually entered in column Q. Contact your FEMP representative if you have questions regarding where to find these values.

Moving on to tab 3.7: use this worksheet to record data regarding any agency-owned wastewater treatment facilities. Do not enter contracted wastewater treatment data here; it will be reported elsewhere in the workbook. GHG emissions resulting from wastewater treatment depend on the treatment process used and the number of people the facility serves. In rows 7 through 13, use the dropdown menus to report whether or not your agency uses each process to treat wastewater. If your agency uses one of these treatment processes, report the number of people served by that specific treatment process.

Training Audio
Greenhouse Gas and Sustainability Data Report Demonstration

The rest of this worksheet provides detailed information and calculations for emissions from wastewater treatment facilities. Default assumptions are entered in orange text, and the sources of assumptions are tracked with comments. Your agency may keep detailed records of its wastewater treatment procedures. If specific information is available, you may use an advanced methodology approach and modify the assumptions in orange text to more accurately reflect your agency's wastewater treatment profile. If you change an assumption in any of these worksheets, make sure to track your changes in the Workbook Overview tab. Enter the cell of the new assumption in column H and be sure to notate in your qualitative statement

Tab 3.8 provides a framework for reporting emissions from on-site, agency-owned landfills. Do not enter off-site, contracted solid waste disposal on this tab. Enter the total quantity of waste disposed to agency landfills during the reporting year, as well as the landfill open and closure dates. These cells are for record-keeping and serve as basic entries into EPA's Landfill Gas Emissions Model, but agencies should endeavor to utilize all available historic data to produce a more accurate emission estimate. Agencies can use EPA's Landfill Gas Emissions Model to directly calculate landfill gas production, and, then, enter the resulting biogenic carbon dioxide and methane emissions into cells D13 and D14. An advanced method is to compile and sum the agency's facility-specific LandGEM outputs used for existing regulatory reporting. Landfill-specific open and closing dates, along with multi-year municipal solid waste totals, would be incorporated into these individual LandGEM model outputs.

As in the wastewater treatment calculations, defaults have been provided in orange text for data elements such as percentage uncontrolled release gases, land fill gas collection system efficiency, and venting loss. If your agency has more specific data, you may override these assumptions using an advanced methodology.

The final scope 1 emission source included in this reporting workbook is process emissions. If your agency performs industrial processes, such as manufacturing or aluminum, cement, or paper production, use the cells in columns D, E, and F to directly input the amount of emissions resulting from these processes. Please refer to the Technical support document for guidance on where to find calculations for determining these emissions.

This concludes the scope 1 section of the workbook. Next, we'll discuss scope 2 emissions resulting from purchased steam and hot water, purchased chilled water, and purchased combined heat and power.

CHAPTER 6: Scope 2 purchased steam, hot water, chilled water, and CHP

In this module, we'll discuss how to report scope 2 emissions resulting from purchased steam and hot water, purchased chilled water, and purchased combined heat and power. We will not discuss scope 2 emissions resulting from purchased electricity as these emissions are calculated in section 1 of the workbook and are discussed in Chapter 3 of this demonstration.

Open Tab 3.10 of the reporting workbook. This worksheet will calculate emissions from purchased steam and hot water. Purchased steam or district heating provides space heating in buildings or process heating for some agencies. Data for these calculations comes from purchasing records based on metered steam and hot water consumption. If metered data is not available, refer to Federal Energy Management guidance for alternate methods for estimating use.

Much like the scope 1 stationary combustion tab, this worksheet is organized according to whether the facilities using purchased steam or hot water are subject to or excluded from energy and/or GHG reduction targets. Rows 7 through 34 apply to EISA 2007 goal-subject buildings, while rows 37 through 66 apply to goal excluded buildings. Within each section, enter consumption data according to whether the buildings are GHG target-subject, target-excluded, or international.

Emissions for steam and hot water depend on the type of fuel used to heat water. In some cases, obtaining emission factors directly from the supplier may be possible. If it is not, this worksheet will calculate emission factors based on the default methodology and assumption that steam and hot water are being produced by a natural gas boiler. Enter total energy consumed in billion British Thermal Units in columns D, E, and F. Note that

Training Audio
Greenhouse Gas and Sustainability Data Report Demonstration

purchased steam needs to be reported separately from purchased hot water. Also enter cost data in column I. If the exact fuel mix is known, select the fuels from the drop-down menus, or enter it directly into the cell that says “enter custom plant fuels.”

The tool assumes default boiler efficiency, steam production efficiency, and distribution loss values given in orange text. If your agency has more specific information regarding these values, an advanced methodology approach may be used, and these assumptions may be changed. If a custom fuel is added, you must enter plant specific emission factors in columns X, Y, and Z. These values are determined from the plant's records and/or monitoring studies. Alternatively, data from continuous monitoring systems may be entered in rows 20, 32, 52, or 64. Once again, plant specific emissions determined from the plant's continuous monitoring system must be entered in columns AC, AD, and AE.

Now, we'll move to purchased chilled water. Use this worksheet only if your agency purchases chilled water for cooling purposes. This worksheet is divided into several sections. The first two sections, rows 7-12 and rows 17-24, calculate emissions based on the default methodology given in the technical support document. The default methodology should be used if an electric-driven chiller is used to chill the water. Data for EISA 2007 goals subject buildings should be input into rows 8 through 12, while data associated with goal excluded building should be reported in rows 20 through 24. The remaining rows of the worksheet include methodologies for two advanced methodologies. Advanced methodology 1 should be used if a non-electric chiller is used. In many cases, these industrial chillers are absorption or engine-driven. Coefficient of performance need not be known. Advanced methodology 2 should be used if a non-electric chiller is used and the coefficient of performance is known.

For electric-driven chillers, enter the eGRID subregion in which the chiller is located. Then, enter the yearly cooling demand in billion BTUs, using columns E and F to indicate whether the facility is GHG-target included or excluded. Cooling demand can be found on cooling bills. Enter cost data in column J. If coefficient of performance and/or transmission loss can be obtained from the supplier, enter them columns P and Q. Otherwise, use the defaults provided in orange.

If your agency decides to use Advanced methodology 1, you will need to determine the type of chiller being used; usually absorption or engine-driven. For each type, select the plant fuel and enter cooling load and cost. If an absorption chiller is powered by waste heat, which is highly likely, then emissions must be allocated based on the proportion of energy used for this purpose.

If the coefficient of performance and the emission factors of a chiller are known, use Advanced methodology 2. After entering the type of fuel and the cooling load, adjust the coefficient of performance and transmission loss. Then, enter plant-specific emission factors in columns T, U, V, and W. These values come from the plant's records and/or monitoring studies. If your agency can obtain these values from the chilled water supplier, this methodology provides the higher accuracy emissions estimate.

If your agency purchases electricity, steam and hot water from a combined heat and power plant, use tab 3.12 to calculate emissions. Once again, this worksheet is divided into EISA 2007 goal-subject and goal-excluded buildings. It is also divided according to default versus advanced methodologies.

Since the output of a CHP results simultaneously in heat and electricity, your agency must decide which “share” of the total emissions is a result of electricity and heat; otherwise, emissions may be double-counted. In the default methodology, only the quantity of electricity, steam, and/or hot water consumed from the CHP need be entered. However, this simplification will likely overestimate emissions. To use this method, enter the plant name and the eGRID region in which it is located in columns C and D. Use columns E and F to record electricity purchased from the CHP. Then, enter the steam and/or hot water purchased. If the boiler efficiency, steam production efficiency, and/or distribution loss factors for the plant are known, you may override the defaults in columns P, Q, and R.

We recommend using advanced methodology 1 for CHP. This methodology requires minimal utility purchase information and existing energy/emission datasets from eGRID, which includes many plant-specific emissions. First, enter the name of the CHP plant and the type of fuel it uses regions beginning in rows C and D37 or C and D51, depending on whether the CHP serves energy goal-subject or excluded buildings. In columns E and F, enter your agency's consumption of electricity, steam, and/or hot water based on metered data or utility bills. Then, in columns S through Y, enter the plant's annual biogenic and non-biogenic CO₂, CH₄, and N₂O. These values may be downloaded from the eGRID website. This is the EGRID website homepage. Download the most recent "plant and aggregation files." Open the "eGRID Plant, Boiler, and Generator Data Files." On the "plant" tab, find the CHP used by your agency using the state and county data elements to simplify the search. You will find the plant's specific emission factors in columns AZ, BA, and BB: Plant Annual CO₂, CH₄, and N₂O emissions rates, respectively. Copy these values into columns U, W, and Y for "Plant Annual GHG emissions". For plant unadjusted annual GHG emissions, use the values in columns BS, BT, and BU of the e-GRID output. If a facility is not present in eGRID, use advanced methodology 2. Enter plant name, fuel, and annual consumption in columns C through G and cost in column J. To determine the plant's emission factors, obtain total emissions of CO₂, CH₄, and N₂O from the CHP facility operator and enter them in columns AA, AC, AE, and AG.

CHAPTER 7: Scope 3 Emissions Sources

In these final modules, we'll discuss the reporting workbook tabs devoted to the six scope 3 categories required for FY 2010 reporting. These categories include transmission and distribution losses from purchased electricity; business air travel, business ground travel, employee commuting, contracted wastewater treatment, and contracted waste disposal.

Let's start on tab 3.13, which shows the calculations for scope 3 emissions from transmission and distribution losses. This tab requires no data input—T&D losses are automatically calculated using the data you entered in the electricity reporting tabs in section 1. This worksheet is included for transparency purposes only. If your agency has non-electric scope 2 emissions from purchased steam, hot water, chilled water, or combined heat and power, T&D losses are automatically computed within tabs 3.10 through 3.12 and are considered scope 2 emissions. You do not need to make any separate calculations.

For scope 3 emissions from business air travel, your agency has two options for entering data. If your agency uses GSA's Travel MIS, use the entry field in cell D.18. All you need to do is download your agency's CO₂ Travel Summary Level 1 report and find the total quantity of GHG emitted. Enter this number directly into cell D18. A detailed description of how to access and download an agency-level GHG report from GSA's Travel MIS is included in the Technical Support Document.

If your agency does not use GSA's Travel MIS, refer to agency travel records or contact your agency's travel agents to determine the number of passenger miles flown by employees of your agency during the reporting year. As possible, break total miles into short, medium, and long haul segment classes. Short haul is defined as flights of less than 300 passenger miles; medium haul describes flights of between 300 and 700 passenger miles; and long haul refers to any flights exceeding 700 passenger miles. Enter the total passenger miles flown in each segment into cells D8, D9, and D10. If your agency is unable to segregate data according to segment class, then enter the total passenger miles flown into cell D11. The rest of the cells on this worksheet are included for calculation and transparency purposes only. No further data entry is required.

Now click tab 3.15 to enter data to calculate emissions from business ground travel. Rental cars usage is the only travel mode required for reporting in FY 2010. However, this worksheet will also allow you to enter data about personal vehicle use or mass transit usage, if your agency collects or plans to collect this data.

Data regarding rental vehicles can be entered in a number of ways and can be obtained from your agency's travel agency, travel records, or GSA's Travel MIS. The minimum data required to use the default methodology is the total number of agency business trips associated with a vehicle rental. Divide trip rentals according to whether the

Training Audio
Greenhouse Gas and Sustainability Data Report Demonstration

vehicle is a car or SUV. A default average rental mileage per trip has been provided; this number is an average based on GSA's Office of Travel and Transportation records. If your agency has data on the average number of rental miles traveled per trip, you may override this default but should note this new assumption in your agency's qualitative statement.

Three advanced methodologies are available for agencies that have data beyond just the number of rentals. Do not enter rental information in both the default and advanced methodology sections as this will result in double counting of emissions.

Some agencies are able to obtain very detailed information about their vehicle rentals. If your agency can access the annual rental miles traveled according to vehicle type, enter this information in Cells H17 through H28. Alternatively, if your agency or travel agent tracks rental fuel purchases, enter the total fuel purchased for each vehicle in cells D36-D38. If known, the average fuel economy of vehicles can be changed from the defaults provided in orange when using an advanced methodology. A final way to calculate emissions from rental vehicles is to enter the number of agency trips requiring a rental passenger car, SUV or truck in cells D46-D48, and the exact number of miles traveled by each type of rental vehicle in cells D46-D46-48.

In some agencies, employees may use their personal vehicles for business travel. This travel is separate from everyday commuting reported in tab 3.16. If your agency records and reimburses business travel by employees driving personal vehicles, enter total reimbursed mileage in cells D56 and D57.

Finally, if your agency tracks business travel using alternative modes of transportation such as buses, subways, or commuter rails, cells D62 through D68 may be used to enter this data. You will need to input the number of agency business trips and the average miles traveled by each mode per trip. This information may be available in travel agent records or travel reimbursement forms.

If your agency is unable to obtain complete business ground travel data, you may extrapolate from a representative sample of employees. You must report your extrapolation approach as part of your agency's qualitative statement.

Employee commuting can be a significant source of emissions for many agencies and often presents challenges in terms of data collection. Information such as frequency of commute, average one-way distance traveled by employee per day, and mode of transport can be collected using an employee survey. To assist agencies in collecting data, FEMP has posted an employee commuter survey on FedCenter. This survey has been designed to provide the minimum level of information required to complete this tab of the GHG and Sustainability Reporting tool. Your agency has the option of using this survey, or using a different means of collecting this data. Extrapolation may be necessary to determine commuting patterns based on a representative sample of employees.

Ultimately, three general pieces of information need to be recorded in this form. Total commute distance traveled by all agency employees on a typical day is reported in column D. These miles should be divided according to mode of travel. A default number of commute days per year has also been entered in orange. If your agency's commuter survey indicate that this number may be different due to options, such a telecommuting or alternative work schedules, this assumption may be changed.

Let's move onto tab 3.17 for reporting on contracted wastewater treatment. This worksheet is fairly straightforward; the only data required is the total number of federal employees served by a contracted wastewater treatment facility. This population should exclude those federal employees served by an agency-owned wastewater treatment facility. It should also exclude contractors who may work on-site.

The rest of the spreadsheet includes calculations based on the default assumptions given in orange text. This default methodology utilizes national average wastewater treatment statistics. If your agency has detailed

information regarding the processes used to treat its wastewater, these orange values may be replaced with agency-specific values when using an advanced methodology.

Finally, use tab 3.18 to capture data related to contracted solid waste disposal. The only required data for this calculation is the number of short tons of municipal solid waste disposed for your agency by a contractor, which is entered in cell D7. This value should not include any waste disposed in agency owned landfills. It should also not include any waste diverted from the landfill through waste management efforts, such as recycling or composting.

As in the contracted wastewater treatment worksheet, national default assumptions are provided in orange text. If your agency has detailed information about its contracted solid waste disposal, you may modify these assumptions when using an advanced methodology.

CHAPTER 8: Additional help/contacts and Closing Remarks

If any additional questions arise during the use of this workbook, please contact the following agency support team members:

Eliza Hotchkiss or Jessica Katz at NREL

Kathleen Judd at PNNL

Rob Hardison at LMI

More information and resources are available on the FedCenter website, including templates for creating data calls and an inventory management plan. Additionally, if there are any questions directly related to the reporting tool, please contact Chris Tremper at FEMP.

We hope this demonstration has been helpful in understanding the FEMP GHG and Sustainability Report tool. Please don't hesitate to contact us if you need guidance or technical assistance during the preparation process for your GHG and Sustainability Report by January 31st, 2011.

Thank you!