

## TECHNICAL NOTES: METHODOLOGY FOR MEASURING RESULTS<sup>1</sup>

### **ENERGY STAR**

For more details on current ENERGY STAR program accomplishment metrics and related technical notes, go to [energystar.gov/numbers](https://energystar.gov/numbers).

### **Energy Supply Programs**

#### **Green Power Partnership (GPP)**

As a condition of partnership, GPP Partners report data annually on their use of qualifying green power, expressed in megawatt-hours. These data are screened to ensure Partner green power use meets GPP eligibility requirements (e.g., minimum amount of use, resource eligibility, generation vintage etc.) and any issues are resolved with the Partner.

EPA requires that all voluntary green power use be incremental to what is already required (e.g. renewable energy use required by state renewable portfolio standards) or otherwise available to Partners absent voluntary green power procurement. GPP Partners' voluntary green power use data is based on and substantiated through the partner's ownership of the renewable energy certificates (RECs) to preclude double counting. EPA only counts GPP Partners' voluntary green power use that follows program participation or engagement. EPA estimates that the majority of recognized green power use is due to the influence of the partnership, as Partners make commitments to meet and exceed EPA minimum green power usage requirements (often at incremental cost) to remain in the program. Further, EPA notes that its efforts to foster greater demand for green power resources has likely led to additional market transformation benefits (e.g. lowered transaction costs, improved product offerings, increased overall value), leading to additional voluntary green power use that is not included in the program's GHG emissions reduction estimates (i.e., residential green power procurement and use).

#### **Voluntary Methane Emissions Reductions Programs**

EPA's voluntary methane programs facilitate recovery of methane from landfills, oil and natural gas systems, agriculture (manure management), and coal mines, as well as promote use of the recovered methane as a clean energy resource. Each program estimates the emissions reductions associated with their partners and/or activities on an annual basis by tracking data and applying program-specific methodologies. Value of gas mitigated assumes all methane mitigated is sold as natural gas, using the average annual gas price from EIA.

#### **Natural Gas STAR Program**

The Natural Gas STAR Program calculates annual emissions reductions based on the emissions reductions reported to the Program annually by oil and natural gas partner companies. The Natural Gas STAR Program focuses on implementation of methane mitigation technologies and practices that are

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undertaken by companies voluntarily and are not covered by regulations. Partner companies have the option of using default calculation methodologies or company-specific methodologies, which must be documented on their annual reports.

### **AgSTAR Program**

AgSTAR uses a methodology that estimates emission reductions from anaerobic digester projects, both direct methane emissions reduced and indirect carbon dioxide emissions avoided. AgSTAR maintains a database of anaerobic digester systems at livestock facilities in the United States that serves as the basis for these emission reductions estimates. Direct methane emissions reductions result from the capture and use of biogas that otherwise would escape into the atmosphere from livestock manure management systems. Digester biogas methane projects that generate energy also have a secondary benefit of avoided emissions of carbon dioxide from displaced fossil fuel combustion.

### **Landfill Methane Outreach Program (LMOP)**

LMOP uses a methodology that estimates emission reductions, both direct and indirect, from landfill gas energy projects implemented at landfills. The direct reductions represent the collection and destruction of methane generated from landfills that are not subject to EPA's air regulations. Indirect reductions are calculated as the avoided carbon dioxide emissions from the combustion of fossil fuels. LMOP maintains a comprehensive database of municipal solid waste landfills and landfill gas energy projects in the United States. LMOP calculates annual reductions from projects for which the program provides assistance or technical information, and for projects involving program partners.

### **Coalbed Methane Outreach Program (CMOP)**

CMOP tracks emissions reductions achieved from coal mine methane recovery projects in the United States. The program uses a methodology to estimate emissions reductions attributable to program activities based upon a tiered approach depending on the extent of the program's involvement in the specific project or the type of project.

## **Voluntary Fluorinated Greenhouse Gas Emissions Reduction Programs**

Through fluorinated greenhouse gas (FGHG) partnership programs, EPA identifies cost-effective emissions reductions opportunities, recognizes industry accomplishments, and facilitates the transition toward best environmental practices and technologies that are more environmentally friendly.

### **SF6 Emissions Reduction Partnership for Electric Power Systems (EPS)**

The SF6 Emissions Reduction Partnership for Electric Power Systems has been estimating emissions of SF6 using a facility-specific mass-balance methodology provided by the 2006 IPCC Guidelines as the Tier 3 approach for estimating emissions from electrical transmission and distribution facilities. EPA calculates program achievements as the difference between annual estimated emissions under BAU practices and annual reported emissions under the program. In 2012, the Greenhouse Gas Reporting Program began providing annual facility-level emissions data from this sector, from both partners and non-partners. In most cases, these data replace the partnership-collected data since the majority of partner facilities are subject to mandatory reporting through the Greenhouse Gas Reporting Program.

## **Responsible Appliance Disposal Program (RAD)**

RAD program benefits are calculated based on data reported annually by partners, including: the number and age of appliances collected; type and quantity of refrigerant recovered and reclaimed or destroyed; type and quantity of foam blowing agent recovered and reclaimed or destroyed; weight of metals, plastics, and glass recycled; quantity of hazardous waste products managed; and used oil recovered. Benefits calculated include emissions avoided from the proper recovery of refrigerants and foam blowing agents and the recycling of durable materials (i.e., metals, plastics, and glass). Although the energy savings from the removal of old, working units from the electricity grid could be calculated, these benefits are not included in the RAD totals to avoid potential double-counting with ENERGY STAR.

To estimate annual emissions avoided from the proper recovery of refrigerants and foam blowing agents, the net masses of individual refrigerants and foam-blowing agents recovered from appliances are used. Net masses are the actual masses recovered or removed, multiplied by the efficiency of destruction and reclamation processes. These masses are then multiplied by their global warming potential (GWP), and summed.

To calculate annual emissions avoided from the recycling of durable materials, RAD multiplies the total mass of ferrous metals, non-ferrous metals, plastics, and glass recovered from appliances by emissions factors from EPA's Waste Reduction Model (WARM). WARM emission factors account for the difference between emissions from the alternative scenario (i.e., recycling) and baseline scenario (i.e., landfilling).

## **GreenChill Partnership**

To determine emissions reductions from the GreenChill Partnership, partners provide annual reports of their corporate banks of refrigerant (i.e., refrigerant contained in equipment owned by the partner) as well as emissions. EPA analyzes this information from partners, extrapolates trends, and compares the results to typical U.S. non-GreenChill supermarkets. GreenChill partners provide emissions data disaggregated by chemical. These data are used to calculate emissions in CO<sub>2</sub> equivalents and to determine the weighted average emissions rate of the GreenChill partners. To ensure calculations are correct, each partner is given a report it can use to double-check its corporate-wide emissions rates, and partnership averages are provided so that partners can assess the reasonableness of those averages, benchmark their own emissions rates, and set goals to improve.

The average partner emissions are then compared to the national average for typical U.S. supermarkets, based on information from EPA's Vintaging Model, the partners, and other industry experts. The emissions reductions from the partnership are then taken as the difference of the emissions from the typical U.S. store and the partnership average store, multiplied by the number of stores represented by the data provided by the partners.