King County 2015 GHG Inventory

# Data Sensitivity to Local Conditions

In the King County 2015 greenhouse gas inventory, some values are associated with locally-derived data, and thus are sensitive to changes in policy within King County and between King County and larger-scale jurisdictions (i.e. Washington state or national). Other values are based on national or regional data, and thus may not accurately reflect King County progress or programmatic influence. In this section, we briefly discuss data sources within the King County greenhouse gas inventory and their associated sensitivity to local influence.

Table 1. Summary of data sensitivity to local conditions for the King County 2015 communitywide inventory

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Inventory sector or source | Values are sensitive to local conditions | Values are sensitive to local conditions, with some exceptions | Values are based on scaled regional/state data | Values are based on scaled national data | Unknown |
| Electricity |  | ✓ |  |  |  |
| Natural Gas | ✓ |  |  |  |  |
| Petroleum heating |  |  | ✓ |  |  |
| Non-road equipment/vehicles |  |  |  |  | ✓ |
| Steam | ✓ |  |  |  |  |
| Industrial processes |  | ✓ |  |  |  |
| On-road vehicles (incl. transit) | ✓ |  |  |  |  |
| Rail |  | ✓ |  |  |  |
| Marine vessels |  | ✓ |  |  |  |
| Solid waste | ✓ |  |  |  |  |
| Potable water |  | ✓ |  |  |  |
| Wastewater | ✓ |  |  |  |  |
| Agriculture | ✓ |  |  |  |  |
| Solid waste disposal facilities | ✓ |  |  |  |  |
| Soil management |  | ✓ |  |  |  |
| Residential development | ✓ |  |  |  |  |
| Fugitive gas |  |  |  | ✓ |  |

# Sensitivity, by Sector

## Residential

**Electricity** emissions data is derived from emission factors and consumption data for two local providers, Seattle City Light and Puget Sound Energy, and are thus sensitive to local changes in fuel mix and electricity use. Line loss estimations, however, are based on regional values, and thus overall electricity emissions are mixed in their sensitivity to local conditions.

Emissions associated with **natural gas** are calculated with a nationally derived emissions factor and local usage data provided by PSE. These numbers are **sensitive** to local activity.

**Petroleum heating** emissions are derived from a statewide value of oil-heated homes that is scaled to King County by population and a national emissions factor. These numbers are **not sensitive** to local activity.

**Petroleum (non-road)** emissions are derived from the EPA NONROAD model, which calculates emissions based on a nationally built model that provides county-specific outputs. It is **unknown** the extent to which these outputs are sensitive to local activity or fuel mix.

## Commercial

**Electricity** emissions data is derived from emission factors and consumption data for two local providers, Seattle City Light and Puget Sound Energy, and are thus sensitive to local changes in fuel mix and electricity use. Line loss estimations, however, are based on regional values, and thus overall electricity emissions are mixed in their sensitivity to local conditions.

Emissions associated with **natural gas heating** are calculated with a nationally derived emissions factor and local usage data provided by PSE. These numbers are **sensitive** to local activity.

**Natural gas equipment** emissions are derived from the EPA NONROAD model, which calculates emissions based on a nationally built model that provides county-specific outputs. It is **unknown** the extent to which these outputs are sensitive to local conditions or fuel mix.

**Petroleum heating** emissions are derived from a statewide value of oil-heated homes that is scaled to King County by population and a national emissions factor. These numbers are **not sensitive** to local activity.

**Petroleum equipment** emissions are derived from the EPA NONROAD model, which calculates emissions based on a nationally built model that provides county-specific outputs. It is **unknown** the extent to which these outputs are sensitive to local activity or fuel mix.

**Steam** emissions from Enwave are reported to the Puget Sound Clean Air Agency. Emissions are from local data and thus are **sensitive** to local activity and fuel mix.

## Industrial

**Electricity** emissions data is derived from emission factors and consumption data for two local providers, Seattle City Light and Puget Sound Energy, and are thus sensitive to local changes in fuel mix and electricity use. Line loss estimations, however, are based on regional values, and thus overall electricity emissions are mixed in their sensitivity to local conditions.

**Process Emissions** are associated with local manufacturing of certain products (e.g., cement, glass, steel) and are based on national emission factors and local manufacturing data. Emissions data are **sensitive** to local activity.

**Stationary Combustion** is based on local use of natural gas, petroleum scaled from statewide data by the proportion of industrial employees, and outputs from the EPA NONROAD model. Although the natural gas consumption is locally-specific, the petroleum and NONROAD data are not, and thus the overall reported value is **not sensitive** to local conditions.

## Transportation

**On-road vehicle** activity and fuel mix are county-specific and modeled by the Puget Sound Regional Council using local data. These emissions are **sensitive** to local change.

**Truck freight and service** vehicle activity and fuel mix are modeled by the Puget Sound Regional Council using local data. These emissions are **sensitive** to local change.

**Transit** vehicle activity and fuel mix are derived from local fuel data and fuel mix. These emissions are **sensitive** to local change.

**Freight Passenger and Rail** data was taken from the Puget Sound Clean Air Agency (PSCAA) 2011 Maritime Air Emissions Inventory report and scaled to 2015 by tonnage. This data is based on activity data from local providers, but because of this scaling, is **not sensitive** to changing efficiency.

**Marine** data were obtained from three sources: EPA NONROAD, Washington State Department of Transportation (WSDOT), and the 2011 Puget Sound Maritime Air Emissions Inventory. It is unknown the extent to which NONROAD modeled **pleasure craft emissions** are sensitive to local conditions. **WSDOT ferry** fuel expenditures were used to determine ferry emissions, and thus are sensitive to local conditions. Emissions from ocean-going vessels were based on local port data, but were then scaled to 2015, and thus are not entirely reflecting of local conditions. Overall, marine emissions are mixed in their sensitivityto local conditions in the target year.

**Off-road vehicles and other mobile equipment** are modeled in the EPA NONROAD model for King County. The extent to which the NONROAD model takes into account local conditions is unknown.

## Solid Waste

**Generation and disposal** of solid waste were calculated by applying local waste composition and tonnage values to the EPA WARM v14 model. Emissions factors in the WARM model were modified to reflect local waste transport-related emissions and landfill methane recovery rates. These emissions are thus **sensitive** to local conditions.

## Water and Wastewater

**Potable water** emissions are based on US Community Protocol assumptions of energy use per unit water consumed. Electricity emission factors and water use statistics are from local sources. Although energy use per unit water may change with time, this analysis is generally **sensitive** to local activity.

**Wastewater** process emissions are based on local wastewater treatment facility treatment processes and population served, and are thus **sensitive** to local activity.

## Agriculture

**Domesticated animal production emissions are** based on county animal populations measured by the US Census Bureau and nationally accepted emission factors, and is thus **sensitive** to local activity.

**Manure decomposition** emissions are based on local animal populations measured by the US Census Bureau and nationally accepted emission factors, and is thus **sensitive** to local activity.

## Supplementary Emission Sectors

Emissions from **operation of solid waste disposal facilities** are based on locally measured or modeled landfill emissions, and are thus **sensitive** to local conditions.

**Soil management** emissions are based on EPA emission factors and county-specific cropland statistics from the US Census Bureau. Although the emission factors are not sensitive to local conditions, the basis on county-specific activity data makes these emission values fairly **sensitive** to local conditions.

**Residential development** emissions were derived from local King County data and are thus **sensitive** to local activity.

**Fugitive gas** emissions are mixed. The majority of fugitive emissions—**refrigerant** emissions—are scaled from a national value reported by the EPA, are thus not sensitive to local activity. **Switchgear insulation** SF6 emissions data, however, are based on utility-specific reporting and are thus sensitive to local conditions. Because SF6-dervied GHG emissions are relatively small, however, this sector is largely not sensitive to local conditions.