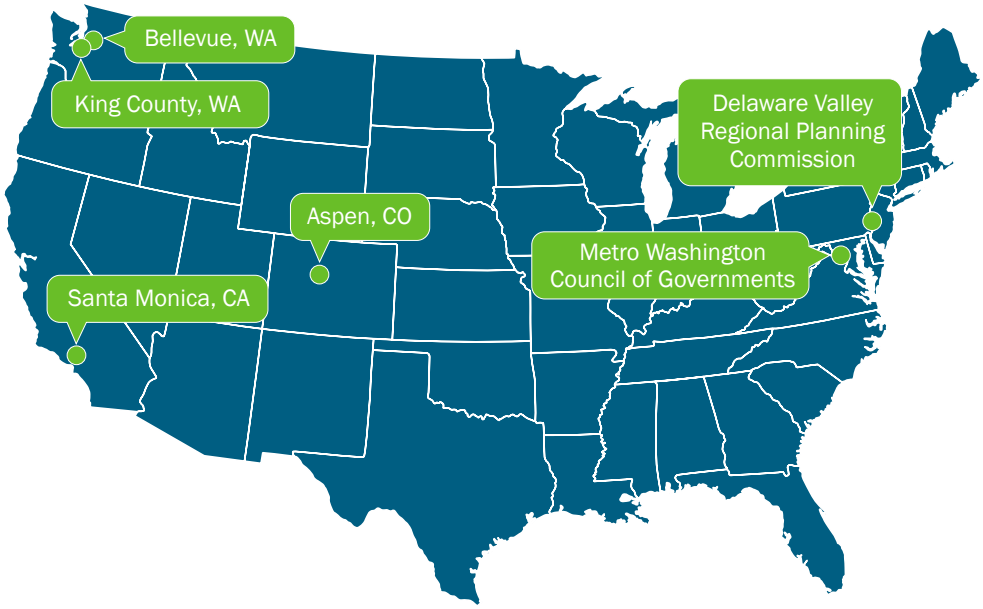
U.S. DEPARTMENT OF
ENERGY

Office of
ENERGY EFFICIENCY & RENEWABLE ENERGY

Drivers of Change Analysis for Local GHG Emissions: Data for Better Decisions



The City of Bellevue, Washington, and ICLEI – Local Governments for Sustainability with funding from the Energy Department's Cities Leading through Energy Analysis and Planning (Cities-LEAP) program, developed a toolkit to give cities more insight into what is driving changes in local greenhouse gas (GHG) emissions from year to year.

The toolkit allows cities to attribute changes between two inventories to the impacts of policies and programs along with other external drivers, such as economic activity and weather (see Figure 1). This analysis will support policymakers to better communicate about their progress and refine their policy approaches.

> "Seeing what factors impact your emissions is powerful. This project opens up the 'black box' of GHG inventories. It helps agencies to focus on the areas they can affect the most."
>
> – Garrett Wong, City of Santa Monica

Understanding External Drivers and Impacts of Programs and Policies

One challenge in using past inventory trends to inform future action is an inability to fully understand the underlying factors that drove observed trends. For example, if a city sees a decline in emissions, to what extent did external factors such as population growth and weather play a role, as opposed to local programs or policies such as home energy retrofit subsidies or building codes?

Drivers of change analysis quantifies the impact of weather, population and economic growth, utility emissions factors, and vehicle fuel efficiency, allowing cities to see underlying trends in per-capita energy use and vehicle miles travelled (VMT).

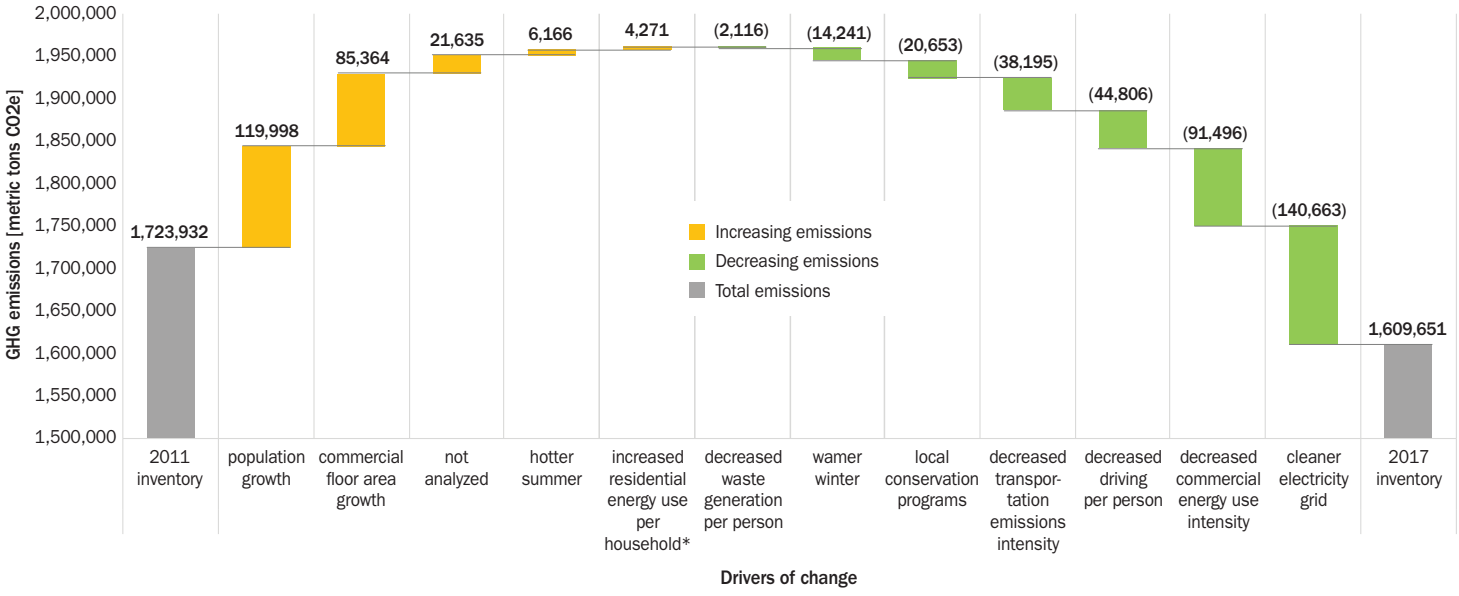


Figure 1. Drivers of change for City of Bellevue, Washington.

*After accounting for weather. This change is the net effect of factors that may include occupant behavior, changes to building types and uses, federal appliance standards, utility programs and new electronic devices.

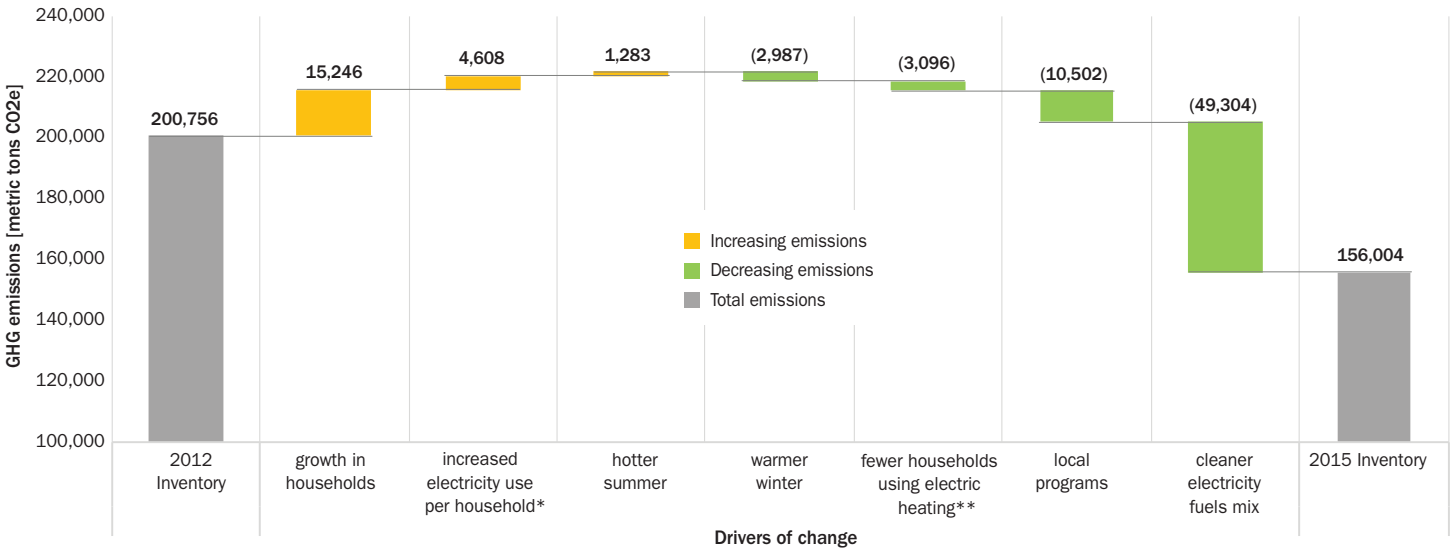


Figure 2. Detail of drivers of change for residential electricity emissions, City of Bellevue, Washington

*After accounting for weather. This change is the net effect of factors that may include occupant behavior, changes to building types and uses, federal appliance standards, utility programs and new electronic devices.

**This is the effect only on *electricity* emissions, not the net emissions effect.

Prioritizing Policies

The drivers of change analysis can give an indication of whether policies or programs have been effective. For example, as the regional transportation planning agency for the Washington, D.C. region, the Metro Washington Council of Governments (MWCOG) has placed an emphasis on planning for land use and transportation systems that reduce reliance on personal vehicles. The drivers of change analysis for the region shows that reductions in per-capita VMT has been one of the largest contributors to reducing regional GHG emissions. This result provides evidence that the transit-oriented development land-use and transportation policies are having the desired effect and shows the value of continued work in this area. The drivers of change analysis can also identify areas where new policies are needed, if, for example, per-household or per-floor-area energy use is shown to be increasing after accounting for weather (see Figure 2).

Effective Planning

The results of drivers of change analysis can help cities more effectively develop strategies to reduce GHG emissions. Understanding the past drivers of change helps identify the most effective levers to reduce future emissions. The results can also help develop better forecasts of how population growth, emissions factors, and even predicted changes in climate could affect emissions.

Contribution Analysis Toolkit

The toolkit is intended to allow any local government that has completed more than one GHG inventory to easily complete their own drivers of change analysis. The toolkit includes:

- An excel-based analysis tool
- A library of online training modules that walk the user through data collection and using the tool
- A detailed instruction document.

More information on the Drivers of Change analysis and Contribution Analysis Toolkit may be found on the Cities-LEAP website: https://www.energy.gov/eere/analysis/cities-leading-through-energy-analysis-and-planning-cities-leap-demonstration-projects.

U.S. DEPARTMENT OF ENERGY
Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

For more information, visit:
energy.gov/eere/cities

DOE/GO-102018-5100 · August 2018