**In Defense of City Greenhouse Gas Inventory Methods – The Policy Case**

On February 2, 2021, *Nature Communications* published a study (study)[[1]](#footnote-1) whose results imply that U.S. cities are under-reporting greenhouse gas (GHG) emissions in their “self-reported inventories.” The study was cited in an article in the New York Times[[2]](#footnote-2) which concluded that cities are using “inconsistent and flawed data” and are “vastly” underestimating their emissions. The Association of Environmental Professionals (AEP) Climate Change Committee disagrees with this assertion. Most cities that have prepared a GHG emissions inventory use global protocols developed and certified by global experts. These protocols ensure that cities account for GHG emissions in a consistent manner that supports local climate action.[[3]](#footnote-3) Cities are not undercounting emissions, rather they are measuring what they can influence and reduce.

***Policy Drives City Inventories***

The premise of the study and article misses the primary purpose and motivation behind city GHG inventories. Cities develop GHG inventories to inform local climate planning and policy development, often through Climate Action Plans (CAPs). The inventories establish a baseline of emissions from which to set reduction goals and measure progress toward reducing emissions. As with other planning activities undertaken by cities, climate planning needs to be tailored to what a city can control and influence. In other words, GHG reduction actions in a CAP must be effective at reducing emissions that the city can directly influence. This principle forms the basis of accounting methods used to develop cities’ GHG inventories.

Cities across the U.S., and particularly in California, have relied on established GHG accounting protocols such as ICLEI’s *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions[[4]](#footnote-4)* and the *Global Protocol for Community Greenhouse Gas Emissions Inventories (GPC)[[5]](#footnote-5)* to develop their inventories. These protocols were established to provide local policymakers and their communities with an understanding of how their community’s activities translate into GHG emissions. This understanding allows planners and decisionmakers to focus on actions that have the best opportunity to reduce emissions.

***How do the Methods Differ?***

There are fundamental differences between the methods reported in the study and the GHG protocols cited above. The study only includes Scope 1 emissions[[6]](#footnote-6) by calculating and compiling GHG emissions from sources within the boundaries of a city and combining this with measured changes in fossil fuel-based carbon dioxide (CO2) concentration in the atmosphere directly over cities.[[7]](#footnote-7) This method assigns emissions from sources located within city boundaries to the city regardless of whether the city can influence or control such sources. For example, all emissions from vehicles traveling on a freeway segment within a city are assigned to the city, independent of whether the trips started or ended in the city (i.e., trips that city land use planning can influence). Similarly, emissions from a power plant within city boundaries are assigned to the city regardless of where the electricity is sold (and conversely, emissions from electricity imported by a city are excluded from that city’s inventory in the study).

In contrast, city inventories based on established accounting protocols focus on capturing the *activities* within a city that generate emissions. Vehicle emissions are quantified only for trips that have an origin and/or destination within city boundaries. This leverages the city’s land use authority and allows policymakers to devise GHG reduction strategies that can influence the trip origin or destination, trip length, or mode of travel. For example, the city may implement a commute trip reduction program at local employment centers through its permitting processes or build bike and pedestrian infrastructure to encourage non-motorized travel. Similarly, city inventories include Scope 2 emissions from electricity consumed within the city and often Scope 3 emissions from water consumed and waste generated within the city.[[8]](#footnote-8) Accounting for these emissions allows the city to implement actions such as enhanced building energy codes or onsite renewable energy ordinances to reduce electricity use and decarbonize the electricity supply.

Local city inventories quantify GHG emissions using the level of activity occurring within city boundaries (e.g., annual electricity consumption in kilowatt-hours [kWh]) and associated emission factors (e.g., carbon dioxide equivalent [CO2e] per kWh based on the grid supply). These intermediate measures of activity can be just as valuable for policy-making as the associated GHG emissions. Cities can typically influence the activity within their boundaries to reduce emissions, while the emission factor (with some exceptions) is typically regulated by other levels of government. For example, a power plant in California is regulated by the California Air Resources Board (CARB) and the local air district. Furthermore, retail sellers of electricity in California are required to achieve a progressively higher mix of renewable sources within their portfolios under the state-mandated Renewables Portfolio Standard (RPS). The ability of a city to further reduce emissions from an in-boundary power plant is limited given the regulatory framework governing such sources. Such centralized emission sources typically also serve larger markets (e.g., regional, national, international markets in the case of ports, cement plants, and petroleum refining) and their emissions are driven by the larger regional, national, or international demand. Therefore, GHG inventory methods based on established protocols focus on emissions for which a city is most effective at reducing beyond federal and state regulatory activities. Cities’ influence on, and accounting of, activity data also provides a pathway to monitor progress. For example, overall electricity consumption over time can be tracked to confirm effectiveness of local actions, monitor progress, and course correct, as necessary.

***Cities are not Undercounting Emissions… they are Measuring what they can Reduce!***

Cities in the U.S. and across the world have made great strides in climate action and are committed to achieving meaningful emissions reductions within their jurisdiction. The assertion that they are under-reporting emissions, using inconsistent and flawed data, and are not considering appropriate accounting methods serves to undermine these efforts. The AEP Climate Change Committee firmly believes that best practices used to develop tailored local GHG inventories which rely on the ICLEI and GPC protocols are consistent, accurate, and appropriate methods that should continue to be used to support local climate action planning efforts.

ICLEI has issued a response to the study that can be found here: <https://icleiusa.org/u-s-cities-are-not-vastly-undercounting-emissions/>

ICLEI’s Technical FAQ details the methodology differences between the study and cited inventory protocols: <https://docs.google.com/document/d/1iuZgyypbq2P3yEvqdyNNSXKwpO4JuN241Hp5TjjlGFQ/edit>

1. Gurney, K.R., Liang, J., Roest, G. *et al.* Under-reporting of greenhouse gas emissions in U.S. cities. *Nat Commun* **12,**553 (2021). <https://doi.org/10.1038/s41467-020-20871-0> [↑](#footnote-ref-1)
2. See: https://www.nytimes.com/2021/02/02/climate/cities-greenhouse-gas-emissions.html [↑](#footnote-ref-2)
3. The use of the term “city” is intended to encompass other entities such as communities, townships, and counties that may develop geographically-specific inventories to support climate planning. [↑](#footnote-ref-3)
4. Developed by ICLEI – Local Governments for Sustainability in 2012 with input from experts at the World Resource Institute, the U.S. Environmental Protection Agency, and more than 80 cities, state agencies, foundations, and universities. Available at <https://icleiusa.org/publications/us-community-protocol/>. [↑](#footnote-ref-4)
5. Developed in 2014 through a partnership between World Resources Institute, C40 Cities Climate Leadership Group and ICLEI – Local Governments for Sustainability. Available at <https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities>. [↑](#footnote-ref-5)
6. Scope 1 refers to GHG emissions from sources located within the city boundary. [↑](#footnote-ref-6)
7. The study uses the Vulcan Project (version 3.0) to quantify and measure CO2 emissions over cities. For more detail, see: <https://vulcan.rc.nau.edu/index.html> [↑](#footnote-ref-7)
8. The study notably omits Scope 2 and 3 emissions and exclusively focuses on in-boundary Scope 1 emissions. Non-CO2 GHGs are also not addressed in the study. [↑](#footnote-ref-8)