

Double Counting in Municipal Greenhouse Gas Emissions Inventories

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ABSTRACT

The issue of double counting greenhouse gases (GHG) is increasingly becoming a problem due to a lack of national guidance on GHG management. For example, consider a city conducting a community-wide GHG emissions inventory. If a power plant within city limits annually emits 1,000 metric tons of carbon dioxide equivalent (MTCDE) from its electricity production, these emissions are included in the city's inventory. Also, a large business is purchasing electricity generated from this same power plant, which the amount of electricity they purchase annually is equivalent to 10 MTCDE annually. In this scenario, 1 percent of GHG emissions from the power plant are being double counted. Both the business and the city are correctly accounting for their emissions, yet the power plant's emissions are still being double counted. What if the power plant itself conducted a GHG inventory? These emissions could then be triple counted.

Additionally, an increasing number of cities are making reduction commitments, such as through the U.S. Conference of Mayors Climate Protection Agreement. Under this agreement, participating cities commit to strive to meet or beat the Kyoto Protocol targets. As a result, hundreds of U.S. cities are now working on baseline GHG emissions inventories to determine where their emissions stand now before they begin to figure out how to make reductions. However, how can this be done without double counting other residential, commercial, or industrial emissions?

INTRODUCTION

With the convergence of scientific consensus on climate change along with environmental indicators, rising energy costs, and increased public awareness, many U.S. municipalities are eager to work towards the common goal of combating climate change. The first step that municipalities often take is the mitigation of the six major greenhouse gases. Policy makers set reduction targets, either independently or through various voluntary programs and pledges, such as the U.S. Mayor's Climate Protection Agreement. These targets lead to the creation of community-wide GHG inventories and double counting between municipal inventories and those from residential, commercial, and industrial entities within the city limits.

BODY

The U.S. Mayor's Climate Protection Agreement calls for their member cities to make a community-wide commitment to either meet or beat the Kyoto Protocol's GHG

reduction targets of 7 percent below 1990 levels. This can be through various actions ranging from anti-sprawl policies and forest restoration projects to public awareness campaigns. This same agreement also urges its members to advocate for climate policy in state and federal government. As of April 2008, 840 mayors representing more than 25 percent of the U.S. population have committed to making GHG reductions in their communities. In order for municipalities to track GHG emissions reductions and measure their community progress towards the reduction goal, each municipality must compare against a baseline greenhouse gas inventory.

The Greenhouse Gas Protocol launched by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) is the most widely used GHG accounting methodology in the world. The basis of this protocol has been adopted by many others in the United States, such as The Climate Registry, the California Climate Action Registry, and the U.S. Environmental Protection Agency Climate Leaders program.

The WRI/WBCSD protocol splits emissions into three source categories:

- Scope 1: direct emissions from stationary combustion of fuel in boilers and furnaces, mobile combustion of fuels from transportation of vehicles, along with process and fugitive emissions.
- Scope 2: indirect emissions from purchased electricity or steam.
- Scope 3: optional indirect emissions from any other activities included in the inventory, such as upstream and downstream emissions of products and services.

Both Scope 1 and Scope 2 emissions are required to be included in a GHG inventory. Scope 3 emissions are optional to report, because these emissions would be under another entity's control.

A GHG inventory for community-wide emissions most often accounts for Scope 1 and Scope 2 emission sources from city operations, residential, commercial, and industrial energy use, as well as transportation from within the city limits. Municipalities account for GHG emissions from all these sources despite not having direct control over them. For example, city government has little or no control on the amount of GHG emitted by businesses in the community. The municipality only has direct control over city government operations, which usually account for a small percentage of community-wide emissions. In this aspect, a municipal GHG inventory is primarily made up of Scope 3 emissions, since most of the emissions are not under their control. However, as a result of city's various agreements, they have committed to a reduction from these Scope 3 sources along with city operations. This means that if a resident, business, or industry inventoried the Scope 1 and Scope 2 GHG emissions from their operations, the overall GHG emissions profile for the city would not be accurate, as the emissions would be double counted. This concept may best be explained in the following example.

- City A, a recent signatory to the U.S. Mayor's Climate Protection Agreement, has completed their 2007 baseline GHG emissions inventory. The inventory

shows that the city emitted 15 million MTCDE with 20 percent coming from commercial sources within the city limits (Table 1, Figure 1).

- Company X is a large and well known firm within city limits. The company has also completed a 2007 GHG inventory to report to a voluntary corporate-wide emissions profile. The company emits 750,000 MTCDE (Table 2, Figure 2).
- Power Plant M, also within the city limits (for the purposes of this discussion, provides electricity exclusively to city A), is completing a GHG emissions inventory to comply with mandatory regional regulations. Their 2007 baseline inventory shows their emissions to be 7.5 million tons of GHG emissions per year (Table 3, Figure 3).

When both the city and company's emissions are compared, 5 percent of the city's total emissions, or 25 percent of commercial emissions, will be double counted within the company's 2007 inventory (Figure 4). When the city and plant's emissions are compared, 7.5 million MTCDE is now being double counted between inventories (Figure 5). Additionally, 600,000 MTCDE of the company's emissions are from electricity purchased from the power plant, which is also being double counted (Figure 6). While all three examples are using the WRI/WBCSD methodology to account for their greenhouse gas emissions, they still overlap within the 2007 inventories. Double counting sector specific emissions, particularly electricity emissions purchased by the company and produced by the power plant, may be resolved with upcoming regulations which will be discussed.

Part of the issue with municipal commitments and the subsequent GHG inventories is that the municipal government does not have control over most of the emissions within the city. In the previous example, the city has direct control only over 2 percent of the emissions within their city limits yet had made a commitment to reduce emissions community wide. Both the company and power plant will be reducing emissions for their own voluntary or regulatory targets, which in turn will help the city meet its goal; however, their reductions were not as a result of community wide targets.

There are multiple regulatory initiatives that will add a new element to the issue of double counting in municipalities in the United States. The Regional Greenhouse Gas Initiative (RGGI) will be the first regulated cap-and-trade CO₂ emissions program in the United States with a goal of reducing emissions 10 percent below 2009 levels over 10 years. This program will affect electricity generation units more than 25MW in size in 10 northeastern U. S. states. The Western Climate Initiative (WCI) is a coalition of 10 states and Canadian provinces primarily in the western United States. WCI is looking at an economy-wide reduction program with a goal of 15 percent below 2005 levels by 2020. Both of these regional regulatory programs will create the need for more baseline inventories for each affected sector to be able to measure their success with new regulation. RGGI and WCI could also become a basis for future national GHG emission reduction regulations in the next administration.

CONCLUSIONS

Avoiding double counting municipal GHG inventories will become more important with upcoming regulations. In the case of a nation reduction regulation, similar to the WCI model, it may become less important for a municipality to set independent reduction goals. The key would be to ensure that in the future, sectors and cities are not both regulated with overlapping programs. The community-wide inventories could continue to be a way to compare reduction achievements with similar sized cities across the nation and foster the sharing of reduction programs to meet regulatory goals. However, until there is clear national guidance on GHG management and accounting, it is important to use caution when comparing GHG emissions inventories from municipalities to inventories from entities within city limits.

REFERENCES

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Table 1. City A's 2007 GHG emissions inventory results, broken down by sector in metric tons of carbon dioxide equivalent (MTCDE).

Sector	MTCDE	Percent of Total
Commercial	3,000,000	20%
Industrial	8,250,000	55%
Residential	2,250,000	15%
Transportation	1,200,000	8%
Municipal	300,000	2%
Total	15,000,000	100%

Figure 1. City A's percentage of GHG emissions by sector.

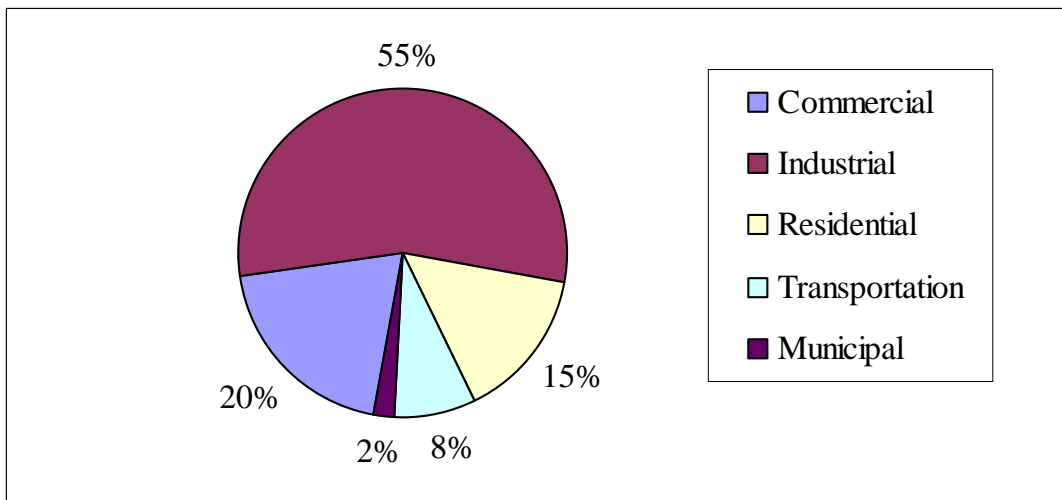


Table 2. Company X's 2007 GHG emissions inventory results, broken down by sector in metric tons of carbon dioxide equivalent (MTCDE).

Sector	MTCDE	Percent of Total
Purchased electricity	600,000	80%
Heating	112,500	15%
Fleet vehicles	37,500	5%
Total	750,000	100%

Figure 2. Company X's percentage of GHG emissions by sector.

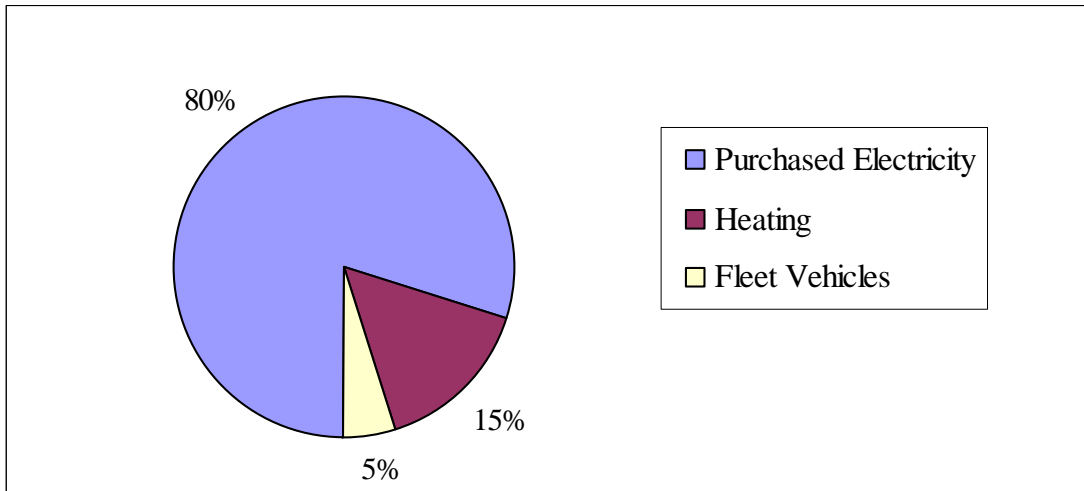


Table 3. Power Plant M’s 2007 GHG emissions inventory results, broken down by sector in metric tons of carbon dioxide equivalent (MTCDE).

Sector	MTCDE	Percent of Total
Stationary combustion	7,125,000	95%
Processes	225,000	3%
Fugitive	150,000	5%
Total	7,500,000	100%

Figure 3. Power Plant M’s percentage of GHG emissions by sector.

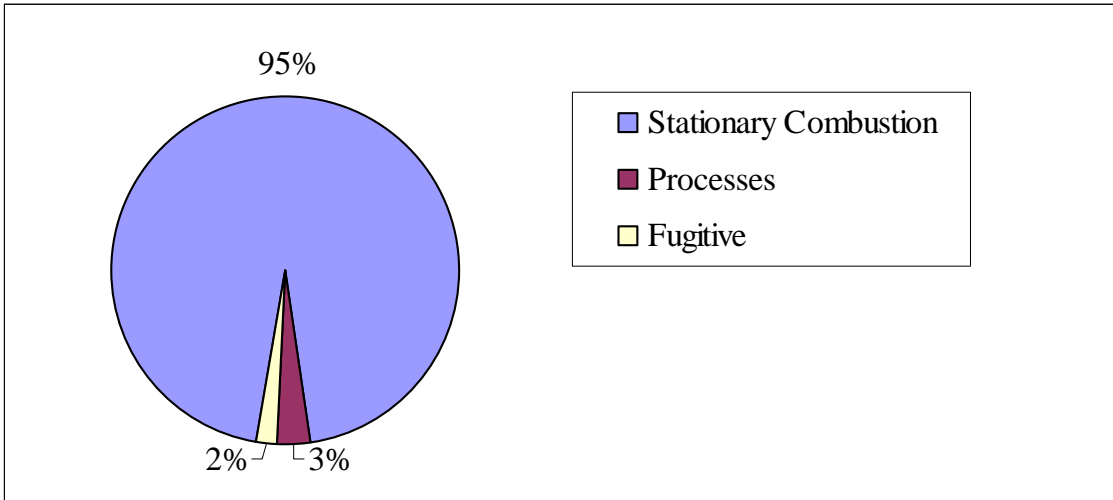


Figure 4. Double counted emissions between Company X, City A Commercial emissions, and City A total emissions. Each color represents an overlapping amount of emissions.

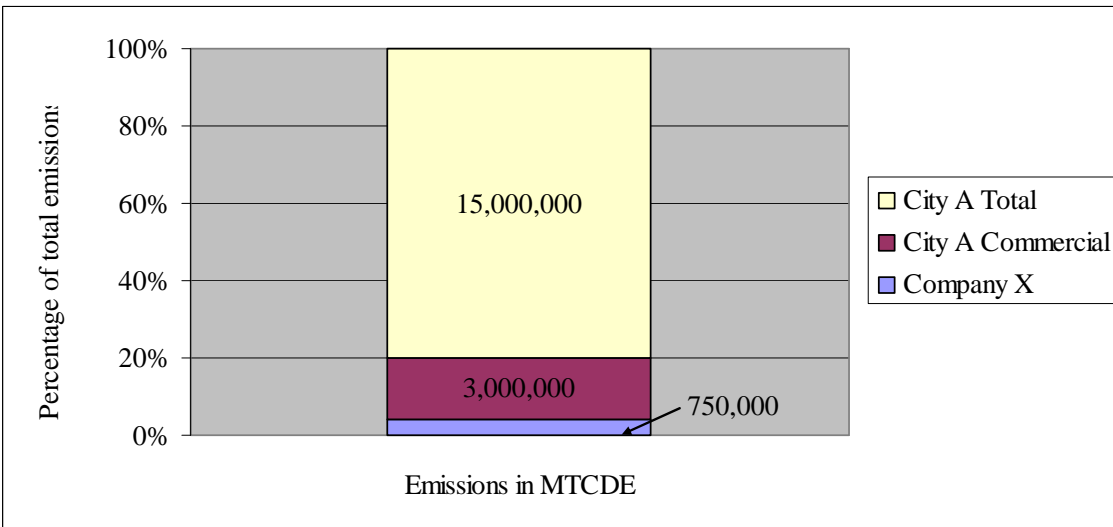


Figure 5. Double counted emissions between Power plant M, City A industrial emissions, and City A total emissions. Each color represents an overlapping amount of emissions.

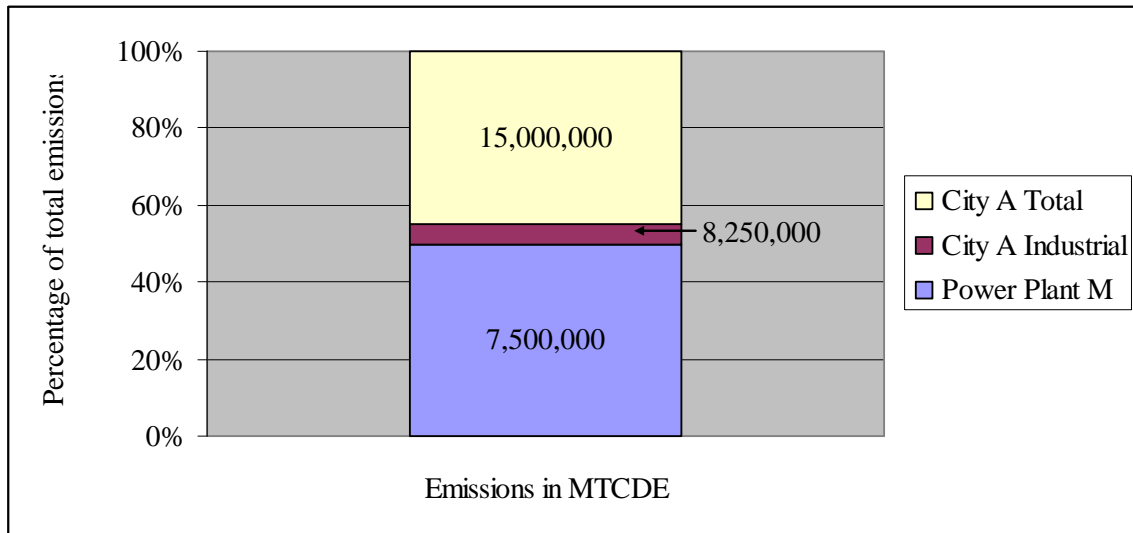
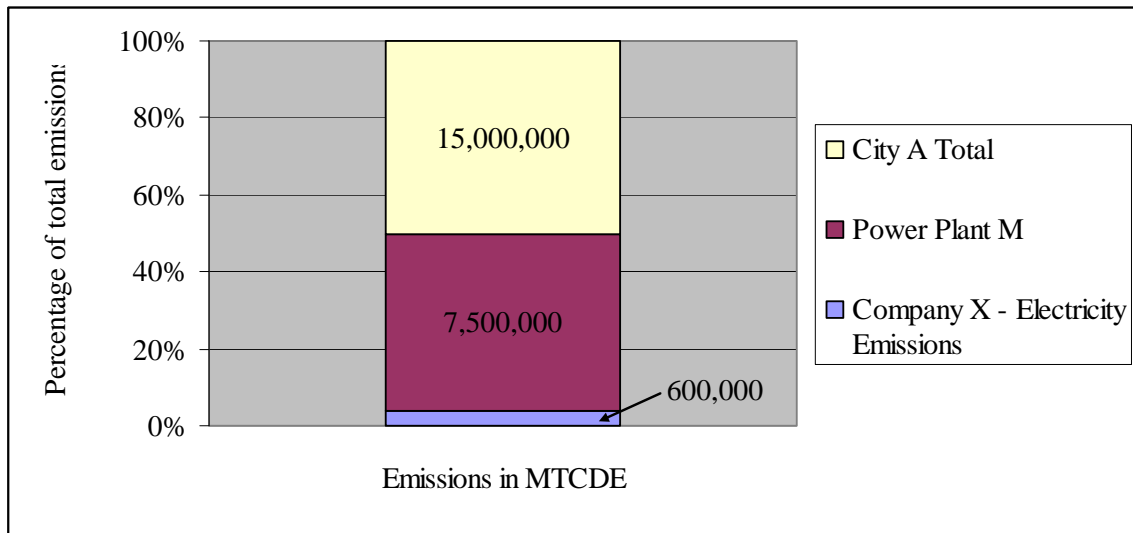


Figure 6. Double counted emissions between Company X's electricity consumption and Power Plant M's electricity production emissions compared to City A total emissions. Each color represents an overlapping amount of emissions.



KEY WORDS

Greenhouse Gas

Emission Inventories

Double Counting

Municipal Inventories