

Community Climate Action Numbers – What’s changed?

This document provides context on what has changed in the community carbon inventory since the last reported numbers (in the spring of 2016). Changes are discussed in two categories – (1) revisions to methodology in 2016 and (2) unique progress between 2016 and 2017.

Carbon accounting and forecasting is an iterative process that undergoes constant revision and improvement due to improved data, corrections, and innovation in methodology. In 2018, major revisions were made to all three branches of City carbon modeling – inventory, forecast, and projections. The changes are discussed in terms of impact to 2016’s inventory or to the 2020 “do nothing more” forecast. This document presents:

- [2016 Inventory Revisions](#)
- [Forecast and initiative Revisions – Impacts to 2020s](#)
- [Progress from 2016 to 2017](#)

Key Takeaways

- Impact of revisions on 2016 inventory: 3.9%¹ below 2005 baseline (from 11.57% and 15.4%)
- Unique 2017 inventory progress: 1.05% below 2005 baseline
- Inventory progress in 2017: 16.53% below 2005 baseline (compare: 15.4% in 2016)
- Impact of revisions on 2020 forecast: 1.9% below previously forecast for 2020
- Impact of revisions on forecasted carbon savings from climate action initiatives: varies by charter

2016 Inventory Revisions

Inventory revisions reflect improved data quality, aligned inventory with [new international protocol](#), and more comprehensively reflected local and national trends. These revisions were back-calculated to the 2005 baseline for consistency, see Figure 1.

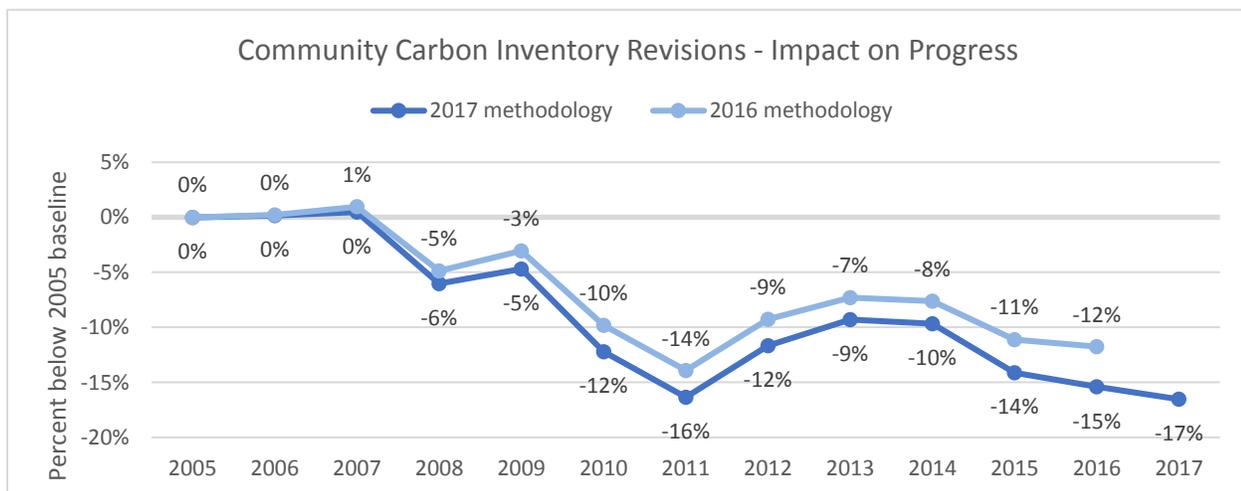


Figure 1. Impact of Community Carbon Inventory Revisions - Impact on Progress shows the progress made below the 2005 baseline before and after revisions were made. The results show that significant progress was not previously captured.

¹ All impact values are approximate due to rounding.

More specifically, the revisions include the following:

- Previously uncaptured progress, e.g., including the proportion of ethanol in gasoline,
- Addressing an error made in the 2016 inventory on vehicle distribution, and
- Aligned waste tonnage and landfill split with characterization.

The impact of these revisions on community progress is illustrated in Table 1 below, with more specific descriptions on the following pages. Impact is given in % progress below baseline, for example, without the revisions, the community was -11.57% from the 2005 baseline. The two values, -11.57% plus -1.6% for including ethanol, brings the total to -13.12%². Adding all the revisions brings the community’s progress in 2016 to -15.4% (with approximately .25% error due to rounding). Revisions impact various years, ranging from all years back to 2005 to just the past several years (see Figure 1 above).

Table 1: The types of revisions to the inventory, the years impacted by the revision, and the impact to the inventory are illustrated. Each of the revisions are further described in the text below.

Type of revision	Years impacted	Impact to 2016 (progress from baseline)
Previously uncaptured progress	Varies	-4.3%
1. Inclusion of % ethanol blended in gasoline	All years	-1.6%
2. Improved science on impact of methane	All years	-1.4%
3. Updated waste characterization	2016 & (2017)	-0.9%
4. Updated miles per gallon	2015, 2016, (2017)	-0.4%
Fixed error in vehicle distribution	Impacts 2013-(2017)	0.7%
Aligned waste tonnage and landfill split with characterization	2015, 2016, (2017)	-0.3%
Approximate total impact of revisions		-3.9%

Revision 1: Inclusion of % ethanol blended in gasoline

- Ethanol was blended into gasoline (2% - 10% by volume) for all 2005-2017 inventory years.
- As a renewable fuel, ethanol can be used in conventional vehicles up to 10-11% of total fuel volume. As blend it is already at max, additional gains are not expected in future years.
- Combusting ethanol produces biogenic (as opposed to fossil) carbon dioxide, which is not accounted for in Fort Collins’ community inventory, as it is assumed to be cycling naturally.
- National data (EIA) used, which is typical of vehicle emissions where local data is harder to find.
- Change has been vetted by the Brendle Group.

Revision 2: Improved science on the impact of methane

- Greenhouse gases reported in carbon dioxide equivalent, which is based on the amount of heat the gas traps in the atmosphere relative to the amount of heat that carbon dioxide traps.
- Previously, the Fort Collins community inventory calculated the impact of methane as being 21 times that of carbon dioxide, which reflected commonly used IPCC results.
- The [IPCC Fifth Assessment Report](#) has since increased this factor from 21 to 28.

² All impact values are approximate due to rounding.

- By adopting this value, in compliance with the new [Global Protocol for Community Scale GHG Accounting](#)³, Fort Collins saw more methane in its baseline year and an increased impact of removing it through waste reduction activities.

Revision 3: Updated waste characterization

- In 2016, Larimer County conducted a waste audit of material arriving at the Larimer County landfill. This audit updated a 2006 waste audit that had been used as the inventory’s waste characterization.
- Fort Collins leveraged this recent waste audit to get unique Fort Collins data, allowing for a more locally specific update to inventory waste characterization.
- Main changes in waste characterization include a decrease in paper and food wastes and increase in yard waste.

Revision 4: Update Miles per Gallon

- New national miles per gallon data became available that applied to previous years and 2016

Other revisions

- An error was corrected in vehicle distribution, having a moderate negative impact on progress.
- Misalignment of landfilled waste tonnage and waste characterization numbers was corrected.

Forecast and Initiative Revisions – Impacts to 2020

Each year, core variables (i.e. population, energy use) are updated to reflect newly available or recalculated data. These updates not only affect inventory forecasts, but also impact any initiative using core variable forecasts to calculate greenhouse gas reductions (which most do).

Table 2. Impact of improvements to the Climate Action Plan model forecast relative to previous 2020 forecast.

Type of revision	Years impacted	Impact to 2020 (progress below baseline)
Forecast Improvements	2018-2050	
Population		0.0%
VMT		-0.6%
Electric Use		0.4%
Electric EF		-1.7%
Approximate total impact of revisions		-1.9%

Revision details

- Several variables were updated in 2018, but of them, the latest vehicle miles traveled (VMT) and electricity emissions factor forecasts had the largest impacts on the 2020 forecast.
- The VMT forecast is provided by the [North Front Range Metropolitan Planning Organization](#) and now pulls from the same data source as inventory VMT data.

³ Fort Collins transitioned to the [Global Protocol for Community Scale GHG Accounting](#) in 2017 to fulfill its commitment to the Global Covenant of Mayors for Climate and Energy. The change in global warming potential factors is the only major change attributable to the new protocol.

- Staff revised the electricity emissions factor used in forecasts and initiative projections to improve the local accuracy of energy efficiency emissions savings projections and align forecasts and inventory outcomes.
 - o More information available upon request.
- Electricity use and population reflect normal updates based on updated data, either from the carbon inventory or from external data sources that have made revised forecasts available.

Progress from 2016 to 2017

Revising the inventory methodology and updating data, as described above, comprises the largest share of the difference between the last reported value (11.57% below baseline, reported for 2016 in 2017) and the inventory result in 2017 (16.53%). However, there was also a little over 1% of progress below the 2005 baseline made between 2016 and 2017. The drivers of that progress are detailed below.

Table 3. Drivers of 2017 community carbon inventory results.

Drivers of 2017 progress	Impact in 2017 (progress below baseline)
Emissions factor	-1.67%
Decrease in electricity use	-0.39%
Increase in VMT	0.50%
Increase in natural gas	0.37%
Decrease in landfilled tons but less methane capture	0.12%
Total impact	-1.07%

Progress details

- 2017 saw an approximate 1.67% drop in emissions from the 2005 baseline from changes in the electricity emissions factor, which positively impacted inventory progress. Due to the relationship between weather patterns and renewable and non-fossil resource performance, trends should be viewed on a larger timescale and may not be consistent from year to year.
- Electricity use decrease is likely due to a variety of factors, including City efficiency programs, behavior change, more efficient appliances, and weather patterns (e.g. mild winter).
- Vehicle miles traveled is a modeled number that has historically increased from year to year due to model parameters that reflect regional/local growth patterns.
- The increase in natural gas is likely due to a variety of factors, including population growth and weather patterns.
- In 2017, slightly more waste (adjusted to exclude recovered soils used to bury materials) was sent to landfills that do not capture methane.

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