This document was used by Mayor's Task Force on Climate Action and Adaptation Plan for setting the reduction goals proposed to City Council.

Setting Columbia's Communitywide Emissions Reduction Target

Background information for August 20 City Council meeting

Setting reduction targets allows cities to track their progress towards reducing greenhouse gas emissions and measure success of climate programs. Reduction targets can motivate action, allow for comparability among cities, and provide a framework for monitoring changes in emissions. Methods of setting emissions reduction targets vary, and can be based on a community-wide emissions baseline or per-capita emissions. This document will discuss options for setting GHG reduction targets.

Potential emission reduction targets that Columbia could consider include the following, detailed explanations below:

Overarching Target Options

- **80x50:** 80% reduction by 2050
- **Carbon neutral:** 100% reduction by 2050
- **Per-capita:** reduction to 2 $MTCO_2e$ per person by 2050
- **Annual reduction target:** 2.5% reduction per year, equivalent to 80x50

Before setting a target, however, it is important to understand the concept of **baseline year**. It is also helpful to get a general idea of targets that other **peer communities** are setting, as well as likely future emissions trends for Columbia—also called a **"business-as-usual" (BAU) forecast**.

Setting a Baseline

What do you want your baseline year to be?

Commonly used baselines are between 2000-2010. However, the most important consideration when determining a baseline year is whether or not there is complete inventory data available. The City will want to make sure all the sectors included in the baseline are included in current/future inventories so they are comparable. It is also important to ensure the methodology used in the baseline year is consistent with current inventories.

We recommend the City use 2015 as the baseline year for this reason. If you choose to use a previous year (e.g., 2010) as your baseline for target reduction, we recommend updating the inventory for that year to match the methodology used for 2015. When updating inventory methodologies in the future, it is best practice to update all previous inventories, including the baseline, with the new methodology.

Setting Target Years

Many organizations and jurisdictions set long-term emission reduction targets for the year 2050. To track progress towards meeting a long-term emissions reduction target, interim year targets are also common. We recommend that Columbia set a 2050 target with one interim target.

The City could consider setting a 2030 interim year target to track progress towards meeting its 2050 target. This can be calculated by linearly interpolating needed 2050 reduction. For example, to reduce emissions 80% by 2050, the City must reduce emissions 30% by 2030.

City staff feel that it is important to set one or more targets for year(s) between now and 2050.

Peer Cities

What peer cities do you want to look at? Knowing what other cities are aiming for can help you calibrate your target.

Here are some examples:

- St. Louis, MO[1]
  - Baseline year: 2005
  - Target: 80% reduction below baseline by 2050
- Fayetteville, AR[2]
  - Baseline year: 2010
  - Target: 80% reduction below baseline by 2050
- Cincinnati, OH[3]
  - Baseline year: 2006
  - Target: 84% reduction below baseline by 2050
- Iowa City, IA[4]
  - Baseline year: 2005
  - Target: 80% reduction below baseline by 2050

Understanding Potential Future Emissions

The **business-as-usual forecast** provides an estimate of potential future emissions in Columbia, assuming the City implements its renewable portfolio standards. The forecast presents a baseline for considering actions and highlights progress the city would need to make to meet emission reduction targets. It considers the influence of external factors on Columbia's emissions, such as population growth, changes in the regional electricity fuel mix, and energy demand.

Key assumptions for Columbia's BAU forecast are as follows:

- 1.5% annual population growth rate

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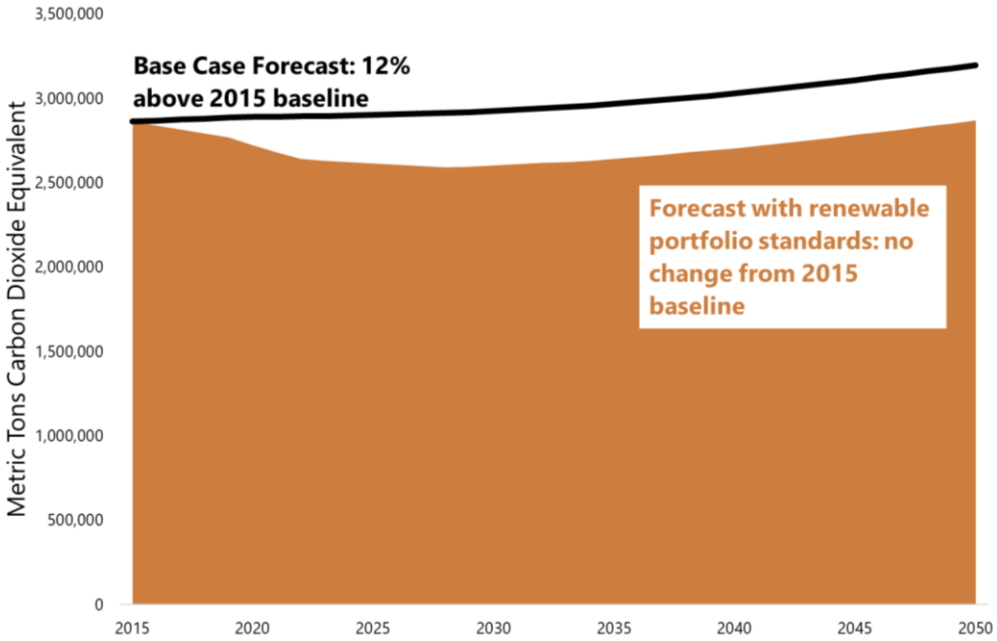
[1] "Climate and Air." *St. Louis, MO*. https://www.stlouis-mo.gov/government/departments/mayor/initiatives/sustainability/air.cfm
[2] "Energy Action Plan." *City of Fayetteville, Arkansas*. https://www.fayetteville-ar.gov/3246/Energy-Action-Plan
[3] "2015 Cincinnati Greenhouse Gas Inventory and Analysis." *City of Cincinnati*. https://www.cincinnati-oh.gov/oes/citywide-efforts/climate-protection-green-cincinnati-plan/2015-greenhouse-gas-emissions-inventory-pdf/
[4] "Iowa City Climate Action and Adaptation Plan." *Iowa City*. https://www.icgov.org/project/iowa-city-climate-action-and-adaptation-plan

- 1.3% annual employment growth rate
- Reductions in personal vehicle carbon intensity factors based on national fuel efficiency standards
- Energy demand projected linearly based on 2012-2017 electricity demand
- Renewable energy portfolio standards increase renewable energy to 25% renewable by 2022 and 30% renewable by 2028

As depicted below, if the City continues to implement its renewable portfolio standards, Columbia's overall emissions will not change significantly between 2015 and 2050. Emissions due to population and employment growth will be offset by reductions in the carbon intensity of electricity and national fuel efficiency standards. If the City did not implement its renewable portfolio standards, emissions would grow by 12%, as represented in the "Base Case Forecast" line.



Based on this forecast, to achieve substantial emissions reductions by 2050, the City will have to take action that goes beyond existing initiatives.

Options for Columbia's Communitywide Emissions Target

The sections below provide descriptions and weighs the pros and cons of various target options for Columbia.

80% Reduction by 2050 ("80x50")

The 80x50 target—an 80% reduction in greenhouse gas (GHG) emissions by 2050—is broadly accepted by cities, states, and nations. The 80x50 target aligns with the Paris Agreement and scientific understanding

of the reductions necessary to avoid catastrophic risks of climate change.[5] Cities aiming for carbon neutrality are adopting goals of at least 80x50, with some cities aiming to be carbon neutral by 2050.[6]

- The USDN, the Urban Sustainability Directors Network, has adopted the 80x50 target as the foundation of its Carbon Neutral Cities Alliance. Reducing emissions by 80% or more by 2050 is part of a strategy of deep decarbonization, which includes eliminating fossil fuel energy use, maximizing building energy efficiency, shifting transportation modes, and achieving zero waste.[7]
- St. Louis, Fayetteville, and Iowa City have all adopted the 80x50 target.
- 80x50 is also the foundation of the "Under 2 MOU", an agreement initiated in 2015 and now signed by over 200 jurisdictions from around the world to meet the intentions of the Paris Agreement.[8] The "Under 2 MOU" requires signatories to commit to "limit emissions to below 80 to 95 percent below 1990 levels, or below 2 annual metric tons per capita, by 2050—the level of emission reduction believed necessary to limit global warming to less than 2 degrees Celsius…"[9]

Either the 80x50 target, or a more ambitious target, would align the City of Columbia with international coalitions and peer cities.

City staff indicated support for an 80x50 target, though they would like more information on what it would take to get there. They think it is important to have a target that is easy to communicate, and they think that 80x50 fits the bill.

Pros	Cons
✓ Aligns with national and international action cities are taking to reduce greenhouse gas emissions ✓ Aligns with targets set by other cities	- Difficult to achieve

Carbon Neutrality by 2050

Some cities adopt goals of achieving carbon neutrality, or zero net emissions. This can be achieved by reducing emissions and purchasing carbon offsets to make up the difference. A carbon offset is a tradeable unit that promises reductions in emissions in one place to compensate for emissions released in another. Because carbon offsets would take the place of emissions produced by the City, it is important to ensure that all offsets purchased are from a trusted and verified source. Cities can also consider generating excess renewable energy to offset their fossil fuel energy use. This allows the city to offset the carbon emissions it does not reduce.

Reaching carbon neutrality by 2050 would require investment by the City, but would demonstrate ambitious climate leadership.

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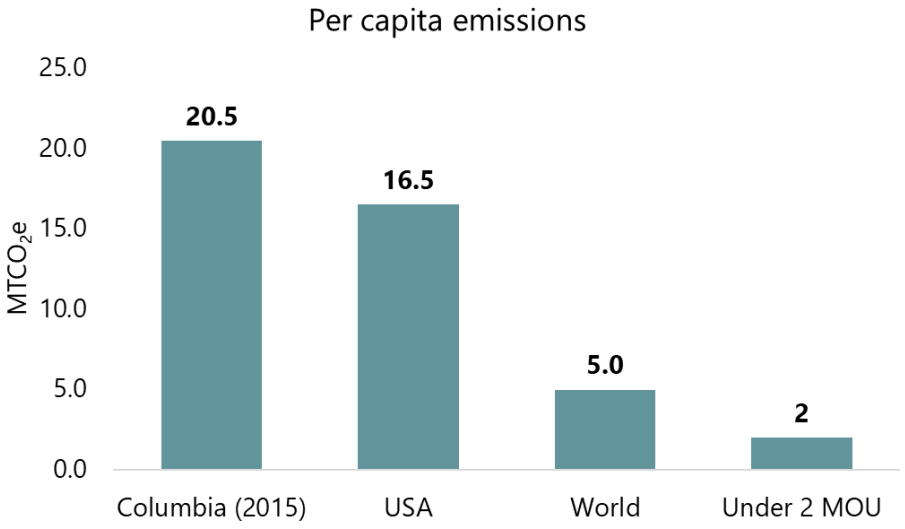
[5] "Framework for Long-Term Deep Carbon Reduction Planning." *Carbon Neutral Cities Alliance*. 2018.
[6] https://www.usdn.org/public/page/13/CNCA
[7] https://www.usdn.org/public/page/13/CNCA
[8] http://under2mou.org/coalition/
[9] http://under2mou.org/the-mou/

Pros	Cons
✓ Aligns with national and international action cities are taking to reduce greenhouse gas emissions ✓ Highly ambitious	- Difficult to achieve - Relies on credits, which could be expensive - Does not include co-benefits of climate action strategies - Could be perceived as an "easy out"

Per Capita Target

The City of Columbia expects to see population growth through 2050. Achieving community emissions targets while growing in population will be challenging. A per-capita reduction target would enable Columbia to track emission reduction achievements while accounting for expected growth. The "Under 2 MOU" recommends limiting emissions to 2 metric tons of CO_2e per capita by 2050. In 2015, Columbia's emissions were 20.5 metric tons CO_2e per capita. Achieving a per capita emissions amount of 2 metric tons per person by 2050 would require a 90% reduction in per capita emissions over the next thirty years.



Pros	Cons
✓ Aligns with national and international action cities are taking to reduce greenhouse gas emissions ✓ Allows Columbia to meet emissions reduction targets even as it experiences population and economic growth	- When not paired with an overarching target, could be seen as a cop out (e.g., not as ambitious as a target that does not adjust for population growth)

Annual Reduction Target

An annual reduction target requires sustained action to reduce emissions. While a one-time future target, like an 80% reduction by 2050, could technically demand no action until 2049, an annual reduction target incentivizes cities to act now. Columbia could consider setting an annual reduction target, in line with

scientific understandings and other cities' goals. Reducing emissions 2.5% per year from 2018-2050 would result in an 80% reduction from a 2015 emissions baseline by 2050.

Pros	Cons
✓ Aligns with national and international action cities are taking to reduce greenhouse gas emissions ✓ Requires ongoing action rather than delayed action	- Difficult to achieve - Requires frequent GHG inventories to ensure target is being met

Initial Target Setting Outcomes

A Task Force vote on May 30, 2018 resulted in the following initial communitywide target:

Baseline Year: 2015

Overarching Target (circle which one applies):

80x50: 80% reduction by 2050; and

Carbon neutral: 100% reduction by 2060

Other Target Presentations

Interim goals of:

Reduce the amount of community carbon emissions as follows:

- 35% reduction of community emissions by 2035;
- 80% reduction of community emissions by 2050; and
- 100% reduction of community emissions by 2060.

Reduce the amount of municipal carbon emissions as follows:

- 50% reduction of municipal emissions by 2035; and
- 100% reduction of municipal emissions by 2050.