



**The Climate Registry**

# Performance Metrics for Transit Agencies

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## The Climate Registry

# Performance Metrics for Transit Agencies

### **I. Introduction**

Transit agencies participating in The Climate Registry (The Registry) have the option of reporting a set of performance metrics alongside their greenhouse gas (GHG) inventory. These metrics provide transit agencies with a reliable, transparent, and clear communication tool that can be used to explain carbon efficiency to policy makers, funders, and the public. The American Public Transportation Association (APTA) was integral to the development of these metrics and the Canadian Urban Transit Association (CUTA) also provided constructive comments. The expertise of these organizations ensured that the metrics reflect the best knowledge of the transit industry.

The reporting of one, some or all of these metrics is optional. However, if you choose to report these metrics, you must follow the methodologies outlined below and the reported metrics must be reviewed<sup>1</sup> by a third-party Verification Body. To report the metrics, Members should upload the Transit Metric Reporting Template, into the supplemental information section of the Climate Registry Information System (CRIS).

This paper is divided into four sections:

- I. Introduction
- II. Benefits of Transit Agency Performance Metrics
- III. Overview of The Metrics

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<sup>1</sup> Third-party review of transit metrics will consist of verification of the GHG emissions information in the numerators of the metric and a consistency check of the transportation indicator data (e.g. passenger miles traveled) presented in the denominator of the metrics. The consistency check will ensure that the transportation indicator information used to build the metric is consistent with indicator information reported to the official regulatory source (e.g. FTA , CUTA). The consistency check will be completed by your Verification Body to a 95 percent materiality threshold.

#### IV. Methodology

## **II. Benefits of Transit Agency Performance Metrics**

These performance metrics will provide transit agencies, policy-makers and academics a clear means to quantify, compare, and analyze the carbon efficiency of transit agencies. In addition, the metrics can be used to enhance the climate action planning goals of individual transit agencies and regional planners. The following benefits are discussed in more detail below:

1. Improved climate action planning for individual transit agencies
2. Benchmarking for agencies regardless of size, service area or population served
3. Improved climate action planning for regions served by Climate Registry transit agency Members

### **1. Improved Climate Action Planning for Transit Agencies**

The majority of GHG emissions from the transit industry stem from providing transportation to transit riders. As service grows due to population increases, economic changes, regional climate action planning, etc., transit agency emissions will likely increase. However, transit agencies can use The Registry's performance metrics to monitor their carbon efficiency overtime. By comparing changes in service to changes in emissions, the performance metrics will help agencies ensure that that any growth in emissions is accompanied by a growth in service. Ideally, service will grow more rapidly than emissions and an agency's performance metric will improve over time. By monitoring trends in the carbon intensity of the service they provide, transit agencies can ensure that growth is efficient and that resources are well spent.

In addition to informing the decisions of transit agencies, The Registry's performance metrics are a powerful communication tool. Transit agencies can use this tool to communicate their carbon efficiency to policy makers, constituents, and funders.

### **2. Agency Benchmarking Regardless of Size or Service Area or Population Served**

The Registry's performance metrics normalize emissions against passenger miles, vehicle miles and revenue hours. This allows transit agencies to compare their carbon

efficiency against other agencies regardless of differences in size, service area, or population served. Accurate benchmarking will allow agencies to assess their performance and set realistic reduction goals.

3. Improved Climate Action Planning for Regions Served by Transit Agencies

Travel by public transit is often more carbon efficient than driving in single occupant vehicles. For this reason, regional climate action planning often involves increasing transit service to decrease the average carbon intensity of travel. The Registry's metrics will help regions calculate the carbon efficiency of transit and direct resources toward the most efficient modes, potentially leading to reduced regional GHG emissions. In addition, the performance metrics will help regions monitor these shifts in emissions. In short, these performance metrics will provide a valuable source of information to determine the transit industry's full impact on transportation sector GHG emissions over time.

### **III. Overview of the Metrics**

The performance metrics below can be reported for your transit agency as a whole and for each mode included in your agency's GHG emissions inventory. The reporting of any of these performance metrics is optional. The Registry recognizes the benefit of these metrics and strongly recommends reporting as completely as possible. In addition, APTA and CUTA recommend that transit agencies report the metrics for the agency as a whole and by mode where possible.

Examples of common modes are:

- Aerial tramway
- Bus
- Demand response
- Ferryboat
- Heavy rail
- Jitney
- Light rail
- Commuter Rail
- Trolleybus
- Vanpool

**Metric 1: Emissions per passenger mile travelled.** Passenger miles travelled (PMT)

represent the distance traveled by all passengers.<sup>2</sup> PMT is usually calculated using on-board checks, automated electronic passenger-counters, or sampling techniques. This performance metric measures service productivity or effectiveness, in addition to operational efficiency, and will account for the combined effects of the efficiency of the vehicle and changes in ridership or vehicle occupancy rates. Passengers travelling on a fuller vehicle will be more carbon efficient, so this metric will capture efforts to improve carbon efficiency by attracting passengers and increasing service productivity. APTA strongly encourages all of its members to report the passenger mile travelled metric.

**Metric 2: Emissions per vehicle mile.** This metric measures operational efficiency and will be sensitive to efforts to purchase lower-emission vehicles, switch to lower-carbon fuels, or improve the energy efficiency of facilities (e.g. office buildings or train stations).

**Metric 3: Emissions per revenue vehicle hour.** This is another measure of operational efficiency, but one that also captures efforts to reduce deadheading and roadway congestion. By excluding deadhead hours (the time that vehicles spend traveling while out of service, such as returning to a garage or storage facility), this metric will capture efforts to reduce inefficiencies and emissions through improvements to scheduling, routing, or other service planning changes. By accounting for the time spent in service rather than the distance traveled, this metric reflects any local congestion effects, which will depress performance on emissions per vehicle mile. This will improve comparison of the relative efficiency of agencies facing different levels of congestion.

#### **IV. Methodology**

Calculating the transit agency performance metrics is a simple four-step process:

1. Follow The Climate Registry's General Reporting Protocol (GRP) to develop a GHG inventory.

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<sup>2</sup> For example, a bus carrying nine passengers for two miles represents 18 passenger-miles.

2. If you are reporting the metrics by mode, separate the emissions data by mode (e.g. emissions from buses, emissions from heavy rail, etc.).
3. Collect indicator data for each of the metrics you choose to report:
  - i. Annual passenger miles (total and by mode)
  - ii. Annual vehicle miles (total and by mode)
  - iii. Annual revenue vehicle hours (total and by mode)
4. Calculate performance metrics using entity-wide GHG emissions and indicator data.

Each of four steps is described below:

### **Step 1. Develop a Greenhouse Gas Inventory**

Guidance on developing a GHG inventory can be found in The Registry's GRP. To improve comparability between agencies, The Registry recommends that transit agencies report using operational control.

### **Step 2. Separate the Emissions Data by Mode**

If you are going to report the metrics by mode, you need to know how many emissions to attribute for each mode. For example, what portion of your emissions is from your bus fleet? For this step, make sure that you have emissions data disaggregated by mode.

### **Step 3. Collect Indicator Data**

Many transit agencies already collect the required indicator data as a part of regulatory requirements. For example, US transit agencies report this information to the U.S. Federal Transit Administration's (FTA) National Transit Database (NTD). Canadian transit agencies report most of this information to the CUTA. Agencies must use the same data they report to the NTD, CUTA, or regulatory bodies, to calculate The Registry's performance metrics. **Indicator data must be reported by calendar year, even if it is reported to another**

**organization by fiscal year.** The guidance below describes what indicator data must be collected.<sup>3</sup>

Passenger Miles Travelled: Members who choose to report this metric must report total annual Passenger Miles Travelled (PMT). APTA and CUTA recommend that agencies report this metric because it is the best way to compare the efficiency of transit to single occupant vehicles. PMT is a measure of service consumed by transit users. This measure tracks the distance traveled by each passenger, i.e., the distance from the time he/she boards until he/she gets off the vehicle. PMT are the cumulative sum of the distances ridden by each passenger. There are two ways to calculate PMT: 1) a 100 percent count, or 2) statistical sampling. Each of these is outlined below:

100 Percent Count:

A 100 percent count involves counting passengers each time they board a vehicle and the distance traveled by each passenger. This is generally applicable to smaller systems, but is not precluded by a system's size. If 100 percent counts are available and reliable, you must report them.

Statistical Sampling

If 100 percent counts are not available and/or reliable, you must estimate and report the PMT values based on statistical sampling. The Registry requires that sampling meet a:

- Minimum confidence of 95 percent, and
- Minimum precision level of  $\pm 10$  percent.

Your transit agency may use any data sampling technique, by mode, which meets the 95 percent confidence and  $\pm 10$  percent precision levels.<sup>4</sup>

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<sup>3</sup> The guidance is derived directly from the NTD *Annual Reporting Manual* (<http://www.ntdprogram.gov/ntdprogram/annual.htm>)

<sup>4</sup> Verification Bodies are not required to verify that the accuracy of the statistical sampling meets a 95 percent confidence interval or  $\pm 10$  percent precision levels.

Transit agencies may use different sampling techniques for each mode / type of service combination.<sup>5</sup>

If sampled passenger mile data is not collected and reported on a calendar year basis, Members are advised to use the following four-step procedure to convert fiscal-year data to calendar year data:

**Step 1: Convert Unlinked Passenger Trips Based on Monthly NTD Reports**

**Step 2: Adjust Unlinked Passenger Trips to Conform to NTD Reporting**

- The aggregation of monthly UPT reports will not match official data due to the prospective adjustments. The adjustments are made based on fiscal year (FY) and can be backed out of official -reported data by dividing official data by monthly aggregations for each fiscal year. To apply these adjustments to the desired calendar year will require averaging adjustments made during the two fiscal years that include the months of the desired calendar year. For example, converting the UPT adjustment from FY2009 to calendar year 2009 will require the following formula:

$$\frac{\left[ \frac{\text{UPT}[\text{FY2009}]}{\text{UPT}[\text{MonthlySumFY2009}]} \right] + \left[ \frac{\text{FY2008}}{\text{UPT}[\text{MonthlySumFY2008}]} \right]}{2}$$

**Step 3: Estimate Average Passenger Trip Length for Calendar Year**

- When sampling occurs, this conversion will require averaging the two fiscal years that include the months of the desired calendar year. For example, converting the APTL from Fiscal Year 2009 to Calendar Year 2009 will require the following formula:

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<sup>5</sup> This is the same level of accuracy required by the US Federal Transit Administration [http://www.ntdprogram.gov/ntdprogram/pubs/ARM/2009/html/2009\\_Service\\_Module.htm#s10](http://www.ntdprogram.gov/ntdprogram/pubs/ARM/2009/html/2009_Service_Module.htm#s10).

**Step 4: Estimate Calendar Year PMT**

- For example, convert passenger miles travelled from FY2009 to calendar year 2009 based on the following formula:

| Passenger Miles Travelled   |   | UPT Based on Monthly Aggregation (or A-B+C) |   | UPT Adjustment to Match Monthly Aggregation with Official Data  |   | Estimation of APTL for Calendar Year                          |
|---|---|---|---|---|---|---|
| PMT[CY2009]   | = | UPT[CY2009]                                 | * | $(\text{UPT}[\text{FY}2009]/\text{UPT}[\text{MonthlySumFY}2009] + [\text{FY}2008]/\text{UPT}[\text{MonthlySumFY}2008])/2$ | * | $(\text{APTL}[\text{FY}2008] + \text{APTL}[\text{FY}2009])/2$ |
| NOTE: This estimation is only required when APTL calculations change. |   |   |   |   |   |   |

Vehicle Miles: Members who choose to report this metric must report actual annual vehicle miles traveled for their entire revenue fleet. This includes, revenue service, non-revenue service, and deadhead segments. Vehicle miles should be reported for the entire fleet and for each mode the agency operates. Members can also report this metric by mode.

If vehicle mile data is not collected and reported on a calendar year basis, Members are advised to either:

1. Disaggregate fiscal year data to monthly data and re-aggregate data from the calendar year corresponding to reported emission, or
2. Recombine year-to-date or quarterly data. As an example of this approach, a FY2009 beginning on July 1, 2009 could be converted to a 2010 calendar year by subtracting “six months year-to-date” (or quarters 1 and 2) from FY2009 totals, and then adding to FY2009 the “six months year-to-date” (or quarters 1 and 2) from FY2010.

Revenue Vehicle Hours: Members who choose to report this metric must report total annual revenue hours (total vehicle hours – deadhead hours). Members must report revenue vehicle hours for the entire fleet and have the option of also reporting by each mode.

Members who do not collect and report revenue vehicle hour data on a calendar year basis should follow the conversion approaches described above for vehicle mile data.

#### **Step 4. Calculate performance metrics**

Once a Member has completed their GHG inventory and collected the supplemental information they are ready to calculate the metrics. To calculate the performance metrics, Member agencies:

1. Divide their combined total<sup>6</sup> scope 1 and 2 emissions by the following supplemental information categories of their choosing:
  - Passenger miles traveled
  - Vehicle miles
  - Revenue vehicle hours.
  
2. If they choose, divide their combined total<sup>7</sup> scope 1 and 2 emissions for each mode by each of the following supplemental information categories:
  - Vehicle miles, for each mode
  - Revenue vehicle hours, for each mode
  - Passenger miles, for each mode

The metrics should be reported using The Registry's Transit Metric Reporting Template. The template must be filled out and uploaded into CRIS as supplemental information.

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<sup>6</sup> Biogenic emissions are not included within the scopes and are excluded from the development of these metrics.

<sup>7</sup> Biogenic emissions are not included within the scopes and are excluded from the development of these metrics.