

# 2013-2016 Transportation Improvement Program Greenhouse Gas Monitoring and Evaluation

## State Policy Context

The Global Warming Solutions Act (GWSA), which Governor Deval Patrick signed into law in August 2008, makes Massachusetts a leader in setting aggressive and enforceable GHG reduction targets, and implementing policies and initiatives to achieve these targets. In keeping with the law, on December 29, 2010 the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA), in consultation with other state agencies and the public, released the Massachusetts *Clean Energy and Climate Plan for 2020*. This implementation plan establishes targets for overall, statewide GHG emissions:



## GreenDOT Policy

The transportation sector is the single largest emitter of greenhouse gases, accounting for over a third of GHG emissions, and therefore the transportation sector is a key focus of the *Clean Energy and Climate Plan*. MassDOT’s approach to supporting the implementation of the plan is set forth in its GreenDOT Policy Directive, a comprehensive sustainability initiative that sets three principal objectives:

- Reduce greenhouse gas (GHG) emissions.** MassDOT will achieve this by taking GHG emissions into account in all of its responsibilities, from strategic planning to project design and construction and system operations.
- Promote the healthy transportation modes of walking, bicycling, and public transit.** MassDOT will achieve this by pursuing multi-modal, “complete streets” design standards; providing choice in transportation services; and by working with MPOs and other partners to prioritize and program a balance of projects that serve drivers, pedestrians, bicyclists, and public transit riders.
- To support smart growth development.** MassDOT will achieve this by working with MPOs and other partners to make transportation investments that enable denser, smart growth development patterns that support reduced GHG emissions.

## GreenDOT Policy and Metropolitan Planning Organizations

The Commonwealth’s thirteen metropolitan planning organizations (MPOs) are integrally involved in helping to achieve the GreenDOT goals and supporting the GHG reductions mandated under the GWSA. The MPOs are most directly involved in helping to achieve the GHG emissions reductions under the second goal – to promote healthy transportation modes through prioritizing and programming an appropriate balance of roadway, transit, bicycle and pedestrian investments – and assist in the third goal by supporting smart growth development patterns through the creation of a balanced multi-modal transportation system. This will be realized through the transportation goals and policies espoused in the RTPs, the major projects planned in the RTPs, and the mix of new transportation projects that are programmed and implemented through the TIPs.

### Regional GHG Tracking and Evaluation in RTPs

MassDOT coordinated with MPOs and regional planning agency (RPA) staffs on the implementation of GHG tracking and evaluation in development of each MPO’s 2035 RTPs, which were adopted in September 2011.

Working together, MassDOT and the MPOs have attained the following milestones:

- Modeling and long-range statewide projections for GHG emissions resulting from the transportation sector. Using the Boston MPO’s regional model and the statewide travel demand model for the remainder of the state, GHG emissions were projected for 2020 no-build and build conditions, and for 2035 no-build and build conditions.

**Massachusetts Statewide CO2 Emissions Estimates**  
(all emissions in tons per summer day)

Year	CO2 Action Emissions	CO2 Base Emissions	Difference (Action – Base)
2010	101,514.4	101,514.4	n/a
2020	105,747.5	105,856.4	-108.9
2035	115,034.1	115,028.0	6.1

- All of the MPOs included these GHG emission projections in their RTPs, along with a discussion of climate change and a statement of MPO support for reducing GHG emissions as a regional goal.

## Project-Level GHG Tracking and Evaluation in TIPs

The next step in implementation of GHG tracking and evaluation for the GWSA is evaluation of project-level GHG emissions in the MPO Transportation Improvement Programs (TIP). The principal objective of this tracking is to enable the MPOs to evaluate expected GHG impacts of different projects and to use this information as a criterion for prioritizing and programming projects in future TIPs.

MassDOT has reviewed previous TIPs and the tools available for assessing GHG impacts of projects, and has developed the following proposed protocol for identifying anticipated GHG impacts and quantifying GHG impacts of projects, when appropriate, through the TIPs. Different types of projects will have different anticipated GHG emissions impacts, and will vary in terms of how the GHG emissions can be assessed. The projects included in the TIPs and the State Transportation Improvement Program may have GHG impacts that are quantifiable, or they may have GHG impacts that cannot be readily quantified, but can be projected in terms of relative impact. The different project categories are outlined on the next two pages with the statewide project tracking starting on the fifth page.



Projects  
with  
Quantified  
Impacts

**RTP Projects** – Major capacity expansion projects (e.g. Green Line Extension, I-95 Whittier Bridge Replacement) would be expected to have a significant impact on GHG emissions. However, these projects are included in the RTPs and analyzed using the statewide model or Boston regional model, which would reflect their GHG impacts. Therefore, no independent TIP calculations are required.

**Quantified Decrease in Emissions** – Projects that would be expected to produce a measurable decrease in emissions. The approach for calculating these impacts is described below. These projects should be categorized in the following manner:

- **Quantified Decrease in Emissions from Traffic Operational Improvement** – An intersection reconstruction or signalization project that is projected to reduce delay and congestion.
- **Quantified Decrease in Emissions from Pedestrian and Bicycle Infrastructure** – A shared-use path that would enable increased walking and biking and decreased vehicle-miles traveled (VMT).
- **Quantified Decrease in Emissions from New/Additional Transit Service** – A bus or shuttle service that would enable increased transit ridership and decreased VMT.
- **Quantified Decrease in Emissions from a Park and Ride Lot** – A park-and-ride lot that would enable increased transit ridership/ increased ridesharing and decreased VMT.
- **Quantified Decrease in Emissions from Bus Replacement** – A bus replacement that would directly reduce GHG emissions generated by that bus service.
- **Quantified Decrease in Emissions from Other Improvement**

**Quantified Increase in Emissions** – Projects that would be expected to produce a measurable increase in emissions.

### Calculation of GHG Impacts for TIP Projects

The Office of Transportation Planning at MassDOT provided the spreadsheets that are used for determining Congestion Management and Air Quality Improvement (CMAQ) eligibility. These spreadsheets require the same inputs as the CMAQ calculations, and have been adapted to provide CO<sub>2</sub> impacts. The data and analysis required for these calculations is available from functional design reports that should be submitted for projects that would produce a measurable GHG impact.



Projects  
with  
Assumed  
Impacts

**No Assumed Impact/Negligible Impact on Emission** – Projects that do not change the capacity or use of a facility (e.g. a resurfacing project that restores a roadway to its previous condition, or a bridge rehabilitation/replacement that restores the bridge to its previous condition) would be assumed to have no GHG impact.

**Assumed Nominal Decrease in Emissions** – Projects that would be expected to produce a minor decrease in emissions that cannot be calculated with any precision. Examples of such projects include roadway repaving or reconstruction projects that add a new sidewalk or new bike lanes. Such a project would enable increased travel by walking or bicycling, but there may be not data or analysis to support any projections of GHG impacts. These projects should be categorized in the following manner:

- **Assumed Nominal Decrease in Emissions from Sidewalk Infrastructure**
- **Assumed Nominal Decrease in Emissions from Bicycle Infrastructure**
- **Assumed Nominal Decrease in Emissions from Sidewalk and Bicycle Infrastructure**
- **Assumed Nominal Decrease in Emissions from Intelligent Transportation Systems (ITS) and/or Traffic Operational Improvements**
- **Assumed Nominal Decrease in Emissions from Other Improvements**

**Assumed Nominal Increase in Emissions** – Projects that would be expected to produce a minor increase in emissions that cannot be calculated with any precision.

\* Projects advanced for programming into regional TIPs that are on MassDOT owned assets were not quantified except in cases where the project was included in the RTP. The projects listed on the following pages are projects that have quantified GHG impacts and were advanced for programming on municipally-owned assets. The remaining projects programmed in the STIP were qualitatively evaluated for their GHG emission impact.