

Top Ten GreenDOT Strategies

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State
Smart Transportation
Initiative

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Contents

Introduction: Refocusing GreenDOT.....	1
1. Align investments and policy goals through budgeting and project development and selection.....	3
2. Improve data sources and analysis.....	5
3. Manage demand through transportation demand management, mitigation, and pricing.....	6
4. Integrate green contracting through revised standard specifications and purchasing standards.....	7
5. Manage roadway travel speeds.....	9
6. Improve system reliability across modes.....	10
7. Systematically review the network for vulnerable-user safety and accessibility needs.....	11
8. Implement a “Communities for Sustainable Transportation” program.....	12
9. Optimize MassDOT facilities and non-transit fleet.....	14
10. Support electrification efforts.....	15
Appendix: Original GreenDOT tasks aligned with each strategy.....	16

Top Ten GreenDOT Strategies

Introduction: Refocusing GreenDOT

GreenDOT began as strategy to get MassDOT and its divisions to conceive and implement ways to improve their environmental orientation and performance. Staff responded admirably, creating what became a long list of proposed actions. Many good things came through these actions and, as the department pursued them, the GreenDOT program has evolved. Some listed actions have been completed; others have been found to be unrealistic or unimportant; while other actions not originally contemplated have been suggested.

Now there is some risk in GreenDOT simply becoming the list; in our conversations it was sometimes viewed that way by staff. In this document we hope to step back and provide a way for the department and divisions to review what they have done and proposed, in order to make sure they are effectively achieving GreenDOT's top-level goals:

1. Reduce greenhouse gas (GHG) emissions
2. Promote healthy transportation options of walking, bicycling, and public transit
3. Support smart growth development

In addition to a strategic reappraisal, we also suggest that GreenDOT must take on a greater outward focus. The original tasks relied heavily on improving MassDOT's own activities – reducing use of energy in buildings, selecting less energy-intensive construction materials, etc. The department deserves great credit for progress in these areas and such work should continue. However, to succeed in achieving GHG reductions, mode shift, and smart growth goals, strategies must not only affect internal department practice, but also travel patterns and transportation demand over which the department has less immediate control but significant influence. Use of the system simply accounts for far more GHG emissions than the department's own fleet, buildings and construction activities. According to one estimate, for example, roadway traffic uses about 18 times the energy that road construction does.¹ And of course mode choice and smart growth goals both require thinking about system users.

Moving beyond internal actions will require creative thinking and innovation, but MassDOT does have many ways of influencing transportation outcomes to achieve its goals. For example, the department plays or could play an influential role through its project development and selection process, capital and operational budgeting, tolling and other pricing mechanisms, TDM programs, developer exactions, facility design, operations, use of data and analytics, and public outreach, among other things.

To begin refocusing GreenDOT more strategically, SSTI and MassDOT partnered to develop a broad list of GHG-related metrics, delivered in a memo on Nov. 1, 2013, and a complementary list of actionable strategies, which follow in this memo. The relevant metrics from the November memo are listed with each strategy in this document. The strategies are listed roughly in order of their potential to reduce GHG gas emissions, taking into account their ease and potential extent of implementation.

¹ <http://www.pavementinteractive.org/2012/02/21/energy-and-road-construction-whats-the-mileage-of-roadway/>

This approach, while requiring some new thinking, incorporates many of the tasks outlined in the original GreenDOT Implementation Plan. For each strategy, we list relevant original tasks. This is not to suggest all of those tasks continue to be pursued. Rather, the intent of this memo is to provide department-wide strategies that can be developed as appropriate by the divisions. Some original tasks should be retained, others checked off as completed, and others discarded as unworkable – while new, more outward-looking actions are brought to the table. The result should be division- and enterprise-wide strategies that move the department efficiently toward achieving its GHG, mode shift and smart growth goals.

1. Align investments and policy goals through budgeting and project development and selection.

MassDOT expects to spend approximately \$12.4 billion on multimodal transportation projects across the Commonwealth in the next five years. MassDOT can ensure its investments have the greatest potential to achieve GreenDOT goals by aligning its budgeting and project development and selection processes with those goals.

This strategy calls for MassDOT to review capital projects currently in the planning process and evaluate for potential to reduce GHG, and to establish revised project development and selection criteria to help guide investment in ways that advance GreenDOT goals.

Implementation: MassDOT's new capital planning tool and budgeting process that reviews progress toward state of good repair might also be revised to address progress toward GreenDOT goals of reduced GHG, mode shift, or other sustainability policy goals, something it currently does not consider. This analysis would require developing or revising agency goals and performance targets to better align MassDOT's project selection criteria with GreenDOT objectives; creating a project-level review on those objectives; and using these new performance metrics to evaluate projects already on the books and those in the earlier planning stages. Policy directives in the recently issued Health Transportation Policy directive will provide assistance in re-evaluating projects currently programmed, as well as setting criteria for future project selection.

MassDOT can influence project selection at the MPO/RPO level through its involvement in those boards, and in local municipalities through adopting policies that ensure MassDOT-funded projects align with GHG-reduction goals. If the political climate permits, this approach may involve revisions to the local program, Chapter 90 formula funding, and project awards process to incentivize complete streets projects and other GHG reduction strategies. We note that at this writing a bill to incentivize complete streets via a \$50 million fund, S.68/H.3091, is pending in the Legislature.

An example of how MassDOT and MPOs could use their capital investments to achieve GreenDOT goals comes out of a recent discussion with the Highway Division. When highway projects are considered, MBTA and RTA transit routing could be reviewed in order to develop the project in a way that fosters transit use, e.g. by providing walkable connectivity, bus pullouts, shelters and/or multimodal ITS. Such work is already beginning. The Highway Division, for example, has taken steps to integrate transit routes into its planning maps. This effort will allow the Division to include transit-friendly improvements such as shelters and pedestrian ways in the highway project development process.

A venue for considering processes that can bring this kind of thinking to bear on both MassDOT and MPO projects is the Project Selection Advisory Commission.²

One place the MassDOT and the commission can look for process ideas is California's Metropolitan Transportation Commission (MTC), which provides a best practice for aligning

² <https://malegislature.gov/Laws/SessionLaws/Acts/2013/Chapter46>. Section 11.

projects with regional policy goals. The MTC serves as the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area. MTC helped to develop a set of regional policy goals, with performance targets, to evaluate both planning scenarios and individual transportation projects to be included in Plan Bay Area, the region's long-range transportation and land-use/housing strategy. The 11 policy goals included in the plan cover climate protection, adequate housing, healthy and safe communities, open space and agricultural preservation, equitable access, economic vitality, and transportation effectiveness. MTC used project-level assessments to understand how potential investments address performance targets for each of the policies. This approach determined which of the more 1,000 uncommitted projects would be approved as part of the Preferred Transportation Investment Strategy.³ MTC's approach to policy-driven, performance-based planning can be replicated—and improved upon—at the state and regional level around the country.

Note that our Jan. 10, 2014, memo on “Linking Transportation Investments to Policy Goals” lists some other tools that could be employed in this effort.

Relevant metrics:

1. Statewide transportation sector GHG; downward direction.
2. Transportation energy consumption; downward direction.
3. Statewide VMT; downward direction.
5. Non-auto accessibility; upward direction.
8. Non-auto modal use; upward direction.
9. Transit vehicle fleet energy consumption; downward direction.
12. MassDOT fleet efficiency (excluding transit vehicles); upward direction.

³ Association of Bay Area Governments and Metropolitan Transportation Commission, *Plan Bay Area Final Performance Assessment Report*, accessed January 9, 2014, http://onebayarea.org/pdf/final_supplemental_reports/FINAL_PBA_Performance_Assessment_Report.pdf.

2. Improve data sources and analysis.

For years transportation agencies have labored with cumbersome models based on inadequate data and questionable assumptions, often lacking basic information on where people and cargo is coming from and going. Now “big data” sources offer the promise of transformative improvement. With a much better idea of origins and destinations – along with more conventional highway volume and speed data and transit ridership – agencies can work to meet demand more efficiently, reducing the need for automobile travel.

Recent trends in travel behavior offer an unprecedented opportunity for MassDOT to focus its efforts and resources on achieving desired outcomes, including mode shift and GHG reductions, rather than planning for continued growth in vehicle travel. As an indicator, VMT in Massachusetts peaked in 2005. New tools and data sources will help MassDOT take advantage of these trends to provide efficient, low-carbon travel options that travelers will actually use, at the same time getting short, local trips off of the state system and improving performance.

Implementation: MassDOT can take the lead in sponsoring the development of new metrics, data management techniques, and analytic procedures. MassDOT is actively working to make new data sets available, which should be completed in a manner consistent with the goals outlined in Chapter 46 of the Acts of 2013.⁴ In addition, SSTI is working with a big data vendor to develop products that would help quantify and display daily personal travel in more robust and cost-effective ways than current travel diaries do. This data could be used to keep models up to date (e.g., by providing more frequent and accurate origin and destination tables), identify areas of latent demand for non-automobile travel, and track MassDOT progress toward meeting its goals.

Other tools are also available. The developers of WalkScore – a measure of pedestrian accessibility available for free online – are willing to work with transportation agencies to create a planning tool and SSTI has worked previously with Delaware DOT to create a scenario planning tool to evaluate the impacts of land use decisions on travel behavior. Through this work, DelDOT found that policies encouraging urban development patterns over suburban development could reduce congestion and VMT by more than 30 percent, while increasing trips by active transportation modes.

Relevant metrics:

1. Statewide transportation sector GHG; downward direction.
2. Transportation energy consumption; downward direction.
3. Statewide VMT; downward direction.
5. Non-auto accessibility; upward direction.
6. Commute travel distance and time; downward direction.
8. Non-auto modal use; upward direction.

⁴ <https://malegislature.gov/Laws/SessionLaws/Acts/2013/Chapter46>

3. Manage demand through transportation demand management, mitigation, and pricing.

By building on existing transportation demand management (TDM), road pricing, and traffic mitigation programs, MassDOT can influence mode choice and achieve GHG reduction benefits.

Implementation: MassDOT is already active in all three areas, and can build on current programs. For example, MassRIDES is a successful program sponsored by MassDOT, delivering TDM services via employers. A way to more fully leverage TDM might be to develop a standard practice of evaluating TDM options when considering capital investments in corridors. More resources in TDM might reduce the need for capacity projects, while advancing GreenDOT goals.

MassDOT's mitigation guidelines have the potential to help direct and shape development, and to reduce the need for SOV travel. SSTI recently sponsored work in this area, resulting in updates to the mitigation procedure used for permitting roadway access for new private developments. Frankly, the changes did not go as far as both SSTI and MassDOT planning staff had originally hoped. MassDOT should monitor its revised mitigation process and carefully evaluate its impacts. If the process does not noticeably incentivize reduced SOV travel, the department should reopen the rule to new improvements, including the use of incentives to encourage the achievement of MassDOT's goals. New work on this issue in California, moving the state from level-of-service-based exactions to VMT-based fees, may be useful. Especially for casinos and other very high-traffic generating developments, mitigation agreements will be essential and very visible, helping the communities and the environment as a whole.

Pricing is another option for managing travel demand – one that also generates revenue to help replace declining motor fuel tax revenues. MassDOT, perhaps in concert with other states, could establish a carbon allowance fee on motor fuels or other mechanisms, with proceeds dedicated to projects that will reduce GHG emissions and/or help adapt the transportation system to the changing climate. In addition, MassDOT should explore other pricing mechanisms that can manage demand, including VMT-based fees, additional or increased tolls and congestion pricing.

Relevant metrics:

1. Statewide transportation sector GHG; downward direction.
2. Transportation energy consumption; downward direction.
3. Statewide VMT; downward direction.
4. Highway-oriented transportation-impact mitigations; downward direction.
5. Non-auto accessibility; upward direction.
6. Commute travel distance and time; downward direction.
7. TDM program participation; upward direction.
8. Non-auto modal use; upward direction.

4. Integrate green contracting through revised standard specifications and purchasing standards.

“Contract specification is the primary method for integrating green performance contracting strategies into highway development and construction projects.”⁵ Through a comprehensive review and revision of construction specifications and purchasing standards, MassDOT will consistently deliver projects and make purchases that help achieve GreenDOT GHG emissions reductions.

Implementation: MassDOT can revise its standard specifications for construction projects as well as the proposal evaluation criteria for purchasing of goods and services. Standard specifications, sometimes referred to as contract specifications, will have the greatest impact on construction projects, while purchasing standards will have a broader impact on MassDOT purchasing of goods and professional services.

Historically, purchasing and contracting at MassDOT have been driven by least cost, as opposed to highest benefit, with the assumption that this brings the highest public good. There is opportunity to re-focus procurement to advance GreenDOT goals.

Revisions to standard specifications for infrastructure contracts have the potential to reduce GHG emissions at multiple levels, from the purchase of low emission concrete, to contract stipulations requiring contractors and sub-contractors to abide by anti-idling or low sulfur fuel requirements. As an example from another state, the Ohio DOT has employed FHWA’s INVEST tool, requiring the contractor on a major design-build project to achieve a silver rating.

The agency should also revise procurement documents and incentivize agency adoption of GreenDOT-focused purchasing. This will include providing extra points to bidders meeting specified environmental criteria, discouraging the purchase of products with high lifecycle GHG emissions, and penalizing these high emission products in the criteria weighting. States that have moved toward green performance contracting (GPC) have achieved higher environmental standards in contracting through revisions to contract specifications and/or purchasing standards.⁶

While each individual change to the specifications might bring a moderate benefit, a comprehensive re-write of the specifications will provide significant GHG reductions. Revisions might be accomplished through a committee or working group assigned to drafting revisions. As a first step, revisions could be done as an insert to the full guidelines. After approval, the committee can work to fully integrate the revisions into each larger policy document.

⁵ INNOVATIVE CONTRACTING STRATEGIES FOR COMBATING CLIMATE CHANGE. November 2011. Accessed on 15 January 2014.

http://www.si.umd.edu/Publication/1.%20Innovative%20Contracting%20Strategies%20for%20Combating%20Climate%20Change_Final%20Report.pdf

⁶ http://www.tcm-conference.org/presentations/2011/Tuesday/Controlling_Constructing_Projects_Zhu_Whitten_Cui.pdf

Having MassDOT divisions and contracting and procurement specialists work as a team to revise the standard specifications using a GreenDOT lens will have the added benefit of supporting the culture change that is essential to the long-term success of the GreenDOT initiative.

Revisions to standard specifications and purchasing policies should consider the full spectrum of materials and services that MassDOT, and local governments receiving MassDOT assistance, contract for. These revisions should focus first on changes with the biggest impact, including road construction materials and construction contractor practices. The evaluation of the carbon footprint of construction materials should include either a supply chain analysis for products or prioritize products that ship a shorter distance, or both, depending on the material.

Finally, this approach could be expanded to involve local partners. MassDOT awards funding for local transportation projects through the Chapter 90 program. Projects are funded using a formula, with money going to local governments for projects requested by municipalities. After MassDOT completes revisions to purchasing standards and standard specifications it could, if the political environment permits, fold these revisions into the Chapter 90 program guidance documents. Incorporating these materials into the Municipal Project guides⁷ will help imbed GreenDOT into the local program. Changing the local program could be challenging, as concerns over local control may surface. To successfully implement this shift, MassDOT will need to work closely with municipalities to develop stronger local GreenDOT partnerships.

Relevant metrics:

1. Statewide transportation sector GHG; downward direction.
2. Transportation energy consumption; downward direction.
9. Transit vehicle fleet energy consumption; downward direction.
12. MassDOT fleet efficiency (excluding transit vehicles); upward direction.
14. Embodied energy in pavements; downward direction.

7

5. Manage roadway travel speeds.

By managing travel speeds, MassDOT can reduce emissions from inefficient vehicle operations, improve safety, and eliminate barriers to active transportation.

New provisions under MAP-21 will require MassDOT to set congestion reduction goals, likely based on delay. To that end FHWA has supplied new traffic speed data for the entire NHS. While reducing delay can be problematic (see strategy No. 6 below) the exercise of systematically reviewing speed data offers an opportunity to also evaluate the state highway system for excessive speeds, which contribute substantially to GHG emissions. Policy goals aimed at reducing vehicle travel speeds can contribute to overall emissions reductions in multiple ways: 1) by reducing per mile vehicle emissions on highways; 2) by improving traffic flow and reliability; and 3) by improving conditions for active transportation modes. Vehicle emissions are greatest when speeds are low, due to stop-and-go traffic, or when speeds approach and exceed 65 mph, due to higher engine loads from wind resistance and friction. Higher-speed travel also presents more dangerous conditions for road users and makes travel by active transportation modes more difficult. To encourage mode shift in urban areas, drivers should be encouraged to travel at speeds below 30-35 mph,⁸ which improves comfort and safety for non-auto users.

Implementation: Data being provided for MAP-21 performance measures can be used as a starting point in crafting speed reduction and speed management plans, e.g. by targeting areas with excessive travel speeds. MassDOT can implement speed management programs that include traffic calming, coordinated signals, variable speed limits, and other ITS applications. MassDOT can also design roads for lower target speeds to encourage slower driving. MassDOT can post (or recommend) lower speed limits and work with law enforcement agencies to prevent speeding. MassDOT divisions, including RMV, can facilitate discussions and raise public awareness about the benefits of lower travel speeds and speed management at both the state and local levels. In addition MassDOT can partner with law enforcement to mitigate speeding.

Relevant metrics:

1. Statewide transportation sector GHG; downward direction.
2. Transportation energy consumption; downward direction.
3. Statewide VMT; downward direction.
5. Non-auto accessibility; upward direction.
8. Non-auto modal use; upward direction.
16. Speed-fuel optimization; direction depends on measure formulation.

⁸ <http://nacto.org/usdg/design-speed/>

6. Improve system reliability across modes.

MassDOT can improve reliability across modes through system operations and management to improve travel options, encourage mode shift, and reduce emissions.

Traffic congestion and idling vehicles add considerably to GHG emissions and worsen air quality, but the natural tendency to address congestion by increasing highway capacity may actually encourage automobile-oriented development, more driving, and additional GHG emissions. MassDOT can reduce idling and improve customer satisfaction without adding capacity by focusing on reliability rather than average delay. By working to ensure reliable travel times across modes, including both highways and transit, MassDOT can help travelers make informed decisions about when to travel and what mode to choose. Fortunately, heavily congested areas typically offer opportunities for meeting customer needs through balanced transportation options, including reliable transit; safe, comfortable active transportation modes; and compact, low-travel-footprint land development.

Implementation: It would be useful for MassDOT to take a fresh look at travel time data to identify cost-effective ways to improve reliability across modes, then focus on non-road capacity improvements for mitigating congestion and improving travel time variability. The agency could work with MPOs, local units of government, MBTA, and RTAs to develop a suite of programs and projects to improve reliability across modes. ITS and integrated corridor management (ICM) are two lower-cost options (relative to adding highway or transit capacity) for improving reliability. Some DOTs have improved highway reliability considerably by implementing traffic incident management programs to clear non-recurring congestion, identifying process improvements by examining incidents that take a long time to clear and addressing some of those causes. Dynamic tolling may also be implemented to help manage demand and influence route and mode choice decisions. MassDOT could work with the RTAs on current transit service planning efforts to develop funding requests for increased service and modernized route networks that improve transit reliability beyond the Boston metro region.⁹

Relevant metrics:

1. Statewide transportation sector GHG; downward direction.
2. Transportation energy consumption; downward direction.
5. Commute travel distance and time; downward direction.
8. Non-auto modal use; upward direction.

⁹ <http://www.massdot.state.ma.us/planning/Main/CurrentStudies/BeyondBostonTransitStudy.aspx>

7. Systematically review the network for vulnerable-user safety and accessibility needs.

MassDOT can improve safety and encourage mode shift by systematically reviewing the transportation network for vulnerable-user needs and addressing those needs.

While MassDOT's design rules laudably encourage complete streets, and the new Healthy Transportation Policy Directive requires projects to avoid degrading pedestrian LOS, MassDOT could advance its goals further by proactively and systematically identifying gaps and hazards in the system that are impeding non-SOV travel, especially travel by bicycle and pedestrian modes.

In strategy No. 2 we have suggested some planning methods that would identify latent non-SOV demand. This strategy would be to match that effort with funding for needed projects. In many places, facilities may exist but may not be safe enough, or may not create a connected network that provides vulnerable users with safe, direct access to desired destinations.

Implementation: The first step is to identify areas with high actual or latent non-automotive travel demand. Next, these areas should be overlaid on the network to assess the adequacy of bike and pedestrian facilities, using both convention LOS and more modern comfort measures, as well as crash and fatality data. Such a review then can generate a list of needs and projects.

The City of Santa Monica, Calif., recently conducted a similar study, using data on crashes and projected pedestrian demand, among other information, to direct improvements where they are likely to be most effective in spurring non-SOV travel and reducing injuries.¹⁰ MassDOT could lead a similar effort in conjunction with its local partners.

Relevant metrics:

1. Statewide transportation sector GHG; downward direction.
2. Transportation energy consumption; downward direction.
3. Statewide VMT; downward direction.
5. Non-auto accessibility; upward direction.
8. Non-auto modal use; upward direction.

¹⁰ <http://www.smgov.net/uploadedFiles/Departments/PCD/Plans/Pedestrian-Action-Plan/Workshop-1.pdf>

8. Implement a “Communities for Sustainable Transportation” program.

Using the existing successful models of the Green Communities Act, the successful Cape Cod Growth Management Audit, and the Partnership for Southeastern Massachusetts Smart Growth Audit,¹¹ MassDOT could create a similar incentive-based policy audit tool to evaluate community policies compared to a set of generally accepted smart growth “best practices” and to use the results in project selection among competing communities to ensure sound investments of precious state funding dollars.

MassDOT could develop a program – perhaps called Communities for Sustainable Transportation – to extend the work of the MPOs as a self-scoring tool for finding the best value projects in funding decision-making. Similar to the Green Communities program, priority would be given to project proposals in the cities and towns with the highest audit scores as an incentive for constant improvement in policies, programs and approaches that best lead to smart transportation and development decisions. A different self-evaluation tool could be used, but the existing Southeastern Massachusetts (SEMA) Smart Growth audit tool may be sufficient.

At this writing there is discussion, involving MassDOT and sister agencies, around legislation to improve local governments’ ability to zone for low-travel-demand land uses. This may accomplish some of the aims of this strategy.

Implementation: Without deeper partnerships with cities and towns, MassDOT could fail to reach its climate goals and invest in projects that would increase VMT and emissions or fail to offer a land use planning approach that is consistent with its mode share goals. Building on the Sustainability Principles, the criteria for the program would include goals such as:

- Encouraging growth in existing places
- Offering biking, walking and transit wherever feasible
- Mixing compatible land uses
- Building compactly
- Providing a range of housing opportunities
- Creating and enhancing a strong sense of place
- Preserving open space and critical environmental areas
- Coordinating public investment
- Making development decisions predictable, fair, and cost effective

Project funding could be supported by an increasing amount of discretionary funding starting with 30 percent and growing to 75 percent by 2025. If the political environment allows, MassDOT may also consider repurposing a portion of the Chapter 90 funds to incentivize plan development and project implementation in support of the program.

MassDOT could offer more cohesive and consistent incentives to encourage and reward actions aligned with preferred policy, and consider equally the use of taxation and finance policies. In

¹¹ <http://www.epa.gov/dced/scorecards/SEMAauditform.pdf>

similar programs, participating communities noted that filling out the audit was a very useful exercise in terms of mapping out where they are on their long-term growth strategy, planning and overall direction, and that the repeated nature of the effort gave them time to educate their boards and prepare incremental changes over time.

Using existing successful models such as the Green Communities Act, and the Partnership for Southeastern Massachusetts Smart Growth Audit,¹² MassDOT could begin with a phased system for moving towards a program that would give better-planned communities a higher priority for state transportation funds. Other places have used similar approaches to good effect.¹³ Perhaps starting with several years of self-audits (to raise the knowledge base) and then offering priority funding to those communities who score the highest will help the state to reach its mode shift and climate change goals. This would provide assurance that transportation projects programmed for funding and provide good overall value to the Commonwealth and reduce emissions.

Relevant metrics:

1. Statewide transportation sector GHG; downward direction.
2. Transportation energy consumption; downward direction.
3. Statewide VMT; downward direction.
5. Non-auto accessibility; upward direction.
6. Commute travel distance and time; downward direction.
8. Non-auto modal use; upward direction.
10. Outreach on eco-driving (and mode shift); upward direction.

¹² <http://www.epa.gov/dced/scorecards/SEMAauditform.pdf>

¹³ <http://www.epa.gov/dced/scorecards/municipal.htm#three>

9. Optimize MassDOT facilities and non-transit fleet.

By improving the environmental efficiency of its facilities and fleets, MassDOT can reduce GHG emissions caused by its own operations, while embracing a culture of sustainability and leading the state by example.

MassDOT has already taken important steps to improve the efficiency of facilities and vehicle fleet, which should continue. MassDOT divisions have made efforts to reduce energy use and water consumption and procurement policies encouraging the purchase of electric and/or hybrid electric vehicles are turning over the MassDOT fleet as purchases are made. These efforts can be replicated and expanded to cover often overlooked decisions that influence the agency's overall emissions—for example, in the site selection, leasing, and maintenance of its buildings.

Implementation: MassDOT should replicate and accelerate existing efforts to reduce water and energy use, e.g., at MBTA's bus barns. In part this can be achieved through careful revision of purchasing processes mentioned above. Note that this is an effort that could well engage the RMV, with its multiple offices around the state. With effective purchasing standards, RMV leases could be directed toward more efficient buildings at locations served well by multiple transportation modes. In addition, the MBTA's template of examining its real estate assets for renewable energy development should be expanded department-wide. Through changes to its standard specifications and purchasing standards (discussed in strategy No. 4) MassDOT can further the adoption of green building standards in the departments and agencies it touches.

While MassDOT building and fleet GHG emissions are overshadowed by highway-user emissions, reducing the environmental footprint of MassDOT's buildings and vehicles will advance GreenDOT goals and aid institutional culture change within the agency.

Relevant metrics:

- 13. MassDOT fleet miles traveled; target TBA.
- 17. MassDOT building energy; downward direction.
- 18. MassDOT water consumption; downward direction.
- 19. Renewable energy generation and use; upward direction.

10. Support electrification efforts.

Automotive electrification has considerable long-term potential to reduce GHG emissions. The Massachusetts electric grid is becoming cleaner, making the move toward transportation electrification more attractive. This includes charging stations for private electric vehicles to improve market penetration over the long term. In the short term, however, there is greater potential in the electrification of truck stops to reduce truck idling.¹⁴ According to the Department of Energy, most of the Commonwealth's truck stops currently lack this infrastructure.¹⁵ MassDOT can work with stakeholders to help expand the EV charging network and to electrify truck stops.

Implementation: MassDOT should lead an effort to support the installation of these facilities through grants or other incentives, perhaps using the traffic impact analysis and mitigation process to fund installation of charging facilities. MassDOT may need to work through the legislature or apply for RGGI funds to implement the necessary grant programs and other incentives; fortunately the dollars involved are small compared to most infrastructure projects, and truck stops and other stakeholders who stand to profit should contribute to the project. EV charging access can also help spur adoption of lower-emission vehicles. The Highway Division is currently studying locations where charging stations should be deployed.

Relevant metrics:

1. Statewide transportation sector GHG; downward direction.
2. Transportation energy consumption; downward direction.
11. Vehicle electrification support; upward direction.
15. Truck-stop electrification; upward direction.

¹⁴ http://tse.tamu.edu/pdfs/Truck_Stop_Electrification_as_a_Strategy.pdf

¹⁵ http://www.afdc.energy.gov/tse_locator

Appendix: Original GreenDOT tasks aligned with each strategy

The current GreenDOT plan lists more than 70 tasks for MassDOT divisions to undertake. Many of these tasks relate to the strategies laid out in this paper. That does not mean they should all be retained; some are completed; others may have proven to be unworkable or not significant drivers of GreenDOT goals. However, in addition to our comments above, they do help outline possible implementation methods for each of the 10 strategies. Here we list existing tasks by suggested strategy.

1. Align investments and policy goals through budgeting and project development and selection.

- Increase fuel efficiency of operating transit fleet
- Increase efficiency of transportation system operations
- Increase vehicle electrification facilities
- Increase fuel efficiency of maintenance + construction equipment
- Reduce building electricity use
- Reduce electricity use by outdoor lighting
- Reduce fuel use for heating buildings + water
- Reduce electricity consumption by subways + trolleys
- Increase delivery of Complete Streets projects
- Improve traffic controls to reduce vehicle emissions + to support walking + biking
- Improve transit system performance statewide
- Increase total miles + connectivity of bicycle + pedestrian facilities
- Increase bicycle parking + access to transit
- Establish transit first policy and mode shift goals
- Connect land use planning with transportation planning + investments
- Stabilize travel demand growth on roadways from single occupancy vehicles
- Minimize impacts + enhance wetlands + impaired waters
- Minimize impacts of ROWs + bridges on fluvial processes
- Adapt facilities for climate change resilience
- Reduce stormwater volumes & increase permeable surface areas

2. Improve data sources and analysis.

- Track progress toward statewide GHG reduction + other sustainability goals
- Connect land use planning with transportation planning + investments
- Collect data regarding factors influencing mode choices + utilize better planning tools
- Increase delivery of Complete Streets projects
- Increase total miles + connectivity of bicycle + pedestrian facilities
- Improve transit system performance statewide

3. Manage demand through transportation demand management, mitigation and pricing.

- Increase delivery of Complete Streets projects

- Increase bicycle parking + access to transit
- Increase total miles + connectivity of bicycle + pedestrian facilities
- Improve traffic controls to reduce vehicle emissions, + to support walking + biking
- Improve transit system performance statewide
- Encourage walking, biking, + transit as active transportation
- Connect land use planning with transportation planning + investments
- Stabilize travel demand growth on roadways from single occupancy vehicles
- Collect data regarding factors influencing mode choices + utilize better planning tools

4. Integrate green contracting through revised standard specifications and purchasing standards.

- Reduce emissions from maintenance + construction equipment
- Decrease total engine idling
- Increase fuel efficiency of operating transit fleet
- Increase use of alternative + renewable fuels
- Increase fuel efficiency of light duty vehicles
- Increase fuel efficiency of maintenance + construction equipment
- Reduce building electricity use
- Reduce electricity use by outdoor lighting
- Reduce fuel use for heating buildings + water
- Purchase more renewable energy
- Require intelligent use herbicides + pesticides in construction + maintenance
- Decrease outdoor light pollution
- Implement an environmentally preferred materials purchasing program
- Purchase energy efficient equipment
- Use environmentally friendly cleaning products + procedures
- Reduce hazardous chemical use in operations + maintenance
- Increase opportunities for local vendors or locally sourced products sold at facilities
- Reduce energy inputs into paving operations
- Increase % of recycled materials in paving + concrete installations
- Increase total volume of materials sourced within 200 miles of construction site
- Increase albedo factor in hardscapes, rooftops + paving
- Design for deconstruction + reuse
- Design all new facilities to green building standards
- Retrofit existing facilities to meet environmental design criteria
- Relocate offices + encourage healthy transportation options
- Promote eco-driving + programs to reduce reliance on single occupancy vehicles
- Decrease amount of waste generation during construction + maintenance
- Decrease paper use
- Comply with waste ban + eliminate on-site storage
- Increase recycling rate of hazardous materials

5. Manage roadway travel speeds.

- Increase efficiency of transportation systems operations
- Increase delivery of Complete Streets projects
- Improve traffic controls to reduce vehicle emissions, + to support walking + biking
- Encourage walking, biking, + transit as active transportation

6. Improve system reliability across modes.

- Increase efficiency of transportation systems operations
- Increase delivery of Complete Streets projects
- Increase bicycle parking + access to transit
- Increase total miles + connectivity of bicycle + pedestrian facilities
- Improve traffic controls to reduce vehicle emissions, + to support walking + biking
- Improve transit system performance statewide
- Encourage walking, biking, + transit as active transportation
- Promote eco-driving + programs to reduce reliance on single occupancy vehicles
- Expand commuter options programs
- Stabilize travel demand growth on roadways from single occupancy vehicles
- Collect data regarding factors influencing mode choices + utilize better planning tools

7. Systematically review the network for vulnerable-user safety and accessibility needs.

- Relocate offices + encourage healthy transportation options
- Increase delivery of Complete Streets projects
- Increase bicycle parking + access to transit
- Increase total miles + connectivity of bicycle + pedestrian facilities
- Improve traffic controls to reduce vehicle emissions, + to support walking + biking
- Encourage walking, biking, + transit as active transportation
- Stabilize travel demand growth on roadways from single occupancy vehicles
- Collect data regarding factors influencing mode choices + utilize better planning tools

8. Implement a “Communities for Sustainable Transportation” program.

- Increase delivery of Complete Streets projects
- Increase bicycle parking + access to transit
- Increase total miles + connectivity of bicycle + pedestrian facilities
- Improve traffic controls to reduce vehicle emissions, + to support walking + biking
- Improve transit system performance statewide
- Encourage walking, biking, + transit as active transportation
- Promote eco-driving + programs to reduce reliance on single occupancy vehicles
- Expand commuter options programs
- Utilize surplus land, parking lots + air rights for transit-oriented developments
- Connect land use planning with transportation planning + investments
- Stabilize travel demand growth on roadways from single occupancy vehicles

- Collect data regarding factors influencing mode choices + utilize better planning tools

9. Optimize MassDOT facilities and non-transit fleet.

- Increase vehicle electrification facilities
- Increase use of alternative + renewable fuels
- Increase fuel efficiency of light duty vehicles
- Increase telecommuting + meetings by web conference
- Reduce building electricity use
- Reduce electricity use by outdoor lighting
- Reduce fuel use for heating buildings + water
- Participate in MassDOT Energy Initiative
- Increase energy produced at MassDOT facilities
- Purchase more renewable energy
- Relocate offices + encourage healthy transportation options
- Consolidate office + maintenance facilities where feasible
- Implement Environmental Management System
- Comply with waste ban + eliminate on-site storage
- Decrease potable water use in buildings
- Decrease water use for irrigation
- Increase utilization of recycled water + rainwater
- Install innovative dual plumbing water systems in facilities
- Adapt facilities for climate change resilience
- Minimize impacts of ROWs + bridges on fluvial processes
- Reduce stormwater volumes + increase permeable surface areas
- Decrease non-point source pollutant discharges

10. Support electrification efforts.

- Increase vehicle electrification facilities