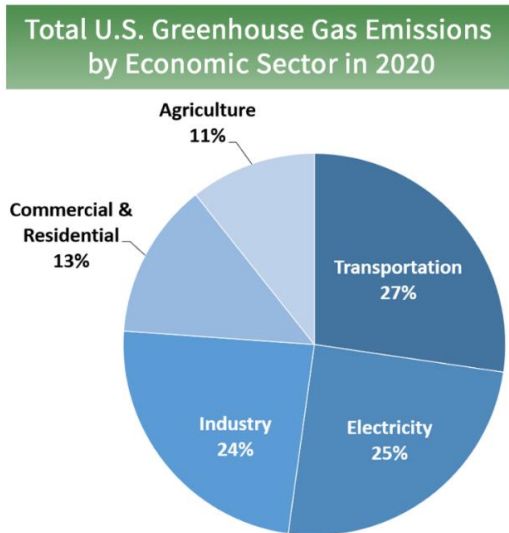


Ground Transit: Discounted/Free MBTA Passes

Authored by Student Sustainability Associate Sam Deutsch

According to the US Environmental Protection Agency (EPA), 27% of greenhouse gas emissions are from transportation, making it the largest source of carbon emissions of any sector¹.



The Intergovernmental Panel on Climate Change (IPCC) also recognizes transportation as a key sector requiring rapid decarbonization and offers a wide range of strategies to reduce carbon emissions from transportation. For my project, I chose to focus on personal ground transportation, which is one area where HBS can directly influence student behavior. The IPCC report notes that “modal shift to lower-carbon transport systems—encouraged by increasing investment in public transport, walking and cycling... offers high mitigation potential”². For my project, I am focusing on modal shifts amongst HBS students, specifically on whether HBS providing discounted or free transit passes could influence behavior amongst students.

I also wanted to get a better understanding of current ground transportation habits amongst HBS students so I conducted a survey of 77 first-year students to understand whether or not these programs could drive behavioral change. This survey collected information on a range of habits including transportation patterns for school commutes, leisure, and errands, along with broader questions about factors influencing car ownership and rideshare usage, two transit alternatives with much higher carbon emissions. Furthermore, the survey included open-ended questions to develop a broader understanding of why students choose to take (or not take) transit and what their opinion would be on a subsidized MBTA program.

¹ <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>

² IPCC, Page 603 https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter8.pdf

I also met with staff from across the school and university to understand why HBS doesn't have a transit pass similar many other Harvard Grad schools. Finally, we met with the MBTA to discuss the various options for university-sponsored MBTA passes. With this data, I assessed the various options HBS has to increase transit uptake amongst students and accordingly reduce carbon emissions.

Transportation Status Quo

We are lucky that HBS is located in such a transit-friendly location. We have a wide range of transit options nearby including direct access to four bus lines on campus (70, 64, 66, 86)³, a short walk to two Red Line stations (Harvard, Central), and a short bike ride from the Green Line and Commuter Rail network.



This is further enhanced by the campus' high walkability, transit, and bike scores (see image below)⁴. Transit, biking, and walking all work together and generate a synergistic effect of making car ownership unnecessary for most students by allowing students to rely on more sustainable ground transportation options. This was also reflected in our survey data finding that only ~20% of HBS students own a personal car.

2 Soldiers Field Road
Allston, Boston, 02163
Commute to **Downtown Cambridge**

16 min 29 min 23 min 60+ min

Favorite Map Nearby Apartments

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Walk Score
73 **Very Walkable**
Most errands can be accomplished on foot.

Transit Score
76 **Excellent Transit**
Transit is convenient for most trips.

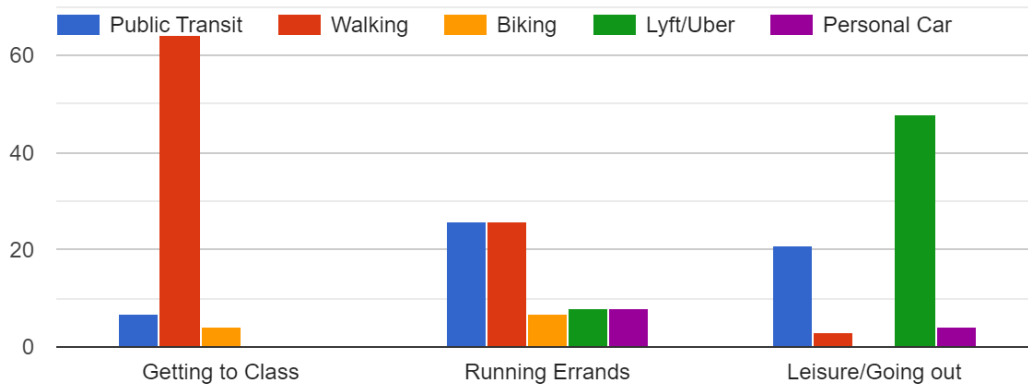
Bike Score
96 **Biker's Paradise**
Daily errands can be accomplished on a bike.

³ Map from <https://www.mbta.com/maps>

⁴ image from <https://www.walkscore.com/score/2-soldiers-field-rd-boston-ma-02163>

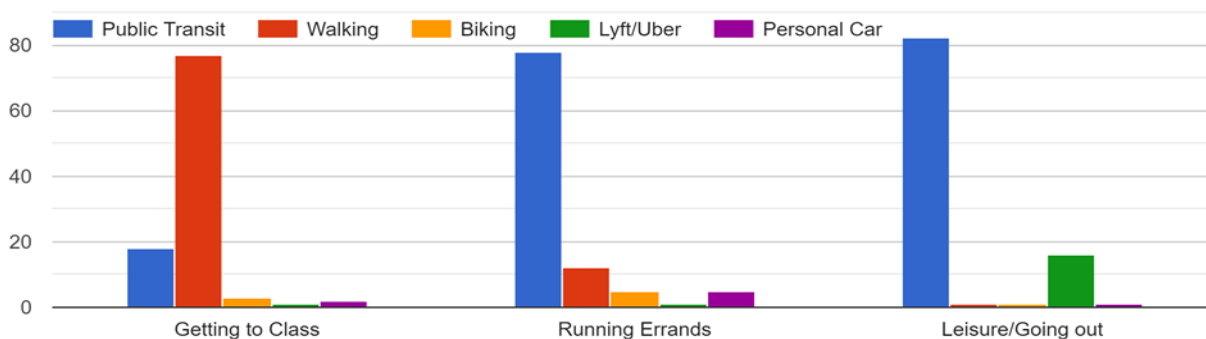
This low level of car ownership means HBS students have much lower carbon emissions associated with ground transportation than the average American, however, our survey found that the median HBS student only takes 3 trips on transit in the average week, which is lower than the average number of rideshare trips (4), and lower than could be expected at first glance. One reason for the relatively low transit use is due to good behaviors we should encourage, as 90% of students walk to class and no respondent in our survey reported driving or taking rideshare to class on a typical day.

What is your typical mode of transportation for each of the following journeys



However, our survey highlighted a key area where we can drive behavioral change: trips for leisure or going out. ~70% of respondents reported typically using rideshare for these trips, vs. only ~25% who reported typically using transit. Particularly since many leisure trips are made to transit accessible areas (e.g., Back Bay, Downtown, Fenway, etc.), a nudge or subsidy could significantly alter student behavior. This is backed up by survey responses which indicate that if HBS offered a free MBTA pass, ~80% of students would use transit for leisure trips, and the share of rideshare journeys would fall to ~20%.

If HBS offered an MBTA pass with unlimited free public transit, what would your typical mode of transportation for each of the following journeys



Evaluating Existing School Programs and Transit Pass Options

The University offers a wide range of discounted MBTA passes across the different graduate schools. In our interviews, we found out that each school is responsible for managing its own transit pass program, which explains the variation among schools regarding discount rates. Specifically, we found out that the MBTA works with each school to offer a “Semester Pass” program, which provides an 11% discount on passes, coming out to \$80/mo for a subway and bus pass, and \$48/mo for a bus pass alone, with additional discounts being sponsored by each school as a subsidy for students. While this base 11% discount is fully paid by the MBTA, we learned that each school is responsible for ordering the passes and administering the program, resulting in an administrative burden as well.

When interviewing HBS leadership about the program, the primary reason cited for not enrolling in the program is a lack of demand. This aligns with our survey responses – since 90% of students walk to class, most students would not ride transit frequently enough to benefit from a program that cost \$80/month and would therefore require ~9 train rides per week break-even on the monthly cost. In fact, fewer than 15% of survey respondents have said they spend \$80+/month on transit, further illustrating the lack of demand for an MBTA discount. Furthermore, even though some other Harvard schools supplement the MBTA 11% discount with an additional subsidy, most schools only offer a 25% discount, with the T.H. Chan school as an outlier offering a 50% discount. While this may make sense for a more commuter-oriented school, at HBS even this additional subsidy would be unlikely to be an attractive offering, as only 20% of respondents claim to spend more than \$45/month on MBTA journeys, the price that a 50% subsidized pass would cost.

However, as I was speaking to the MBTA, I was introduced to an innovative, recently announced program: The University Pass. This program allows a school to provide their entire student body with *unlimited* MBTA and bus travel, completely for free. Passes can even be loaded directly onto a student ID card. Schools would pay at the end of each month, and only for rides taken. Assuming a mode shift of 2 rideshare rides converted to transit each week (along with the existing average of 3 transit rides/student), this would be a relatively low-cost program for the school, costing \$30-\$40/student each month depending on the proportion of bus to subway rides. One additional consideration would be the number of walking or biking trips converted to transit, as this could increase the cost of implementing the program. However, even if more transit rides are taken than expected, it will still be significantly below the perceived \$90 value of the pass. Furthermore, the program comes with a \$90/student/month cap, preventing potential unforeseen cost inflation.

Climate Impact

In 2018, ridesharing services provided 81 million trips in Massachusetts⁵, leading to approximately 100,000 metric tons of carbon emissions for the entire state⁶, with each rideshare trip creating on average ~1.24 kgs of CO₂. Based on our survey data, it is reasonable to assume that the average HBS student will replace two of their four rideshare journeys with a transit journey if given a free transit pass, leading to a 2.48 kg reduction in carbon emissions per student, per week. When multiplied out across the entire HBS class of ~2,000 people across ~30 weeks of schooling (excluding breaks, holidays), this could lead to a reduction of 149 metric tons of carbon emissions across the HBS community per academic year. At the current estimate of the social cost of carbon at \$51/ton, this program would be expected to drive \$7.6K/year in benefits⁷.

Beyond the pure carbon emissions benefits, car usage has an even wider range of negative externalities due to the negative impacts of particulate emissions, higher risk of injury, and noise, with recent studies putting the estimate of the social cost of a car at ~\$2,000/year⁸. In our survey, 42% of respondents who own cars said they would consider selling their car if HBS sponsored MBTA passes, which could have even greater climate benefits than replacing ridesharing trips with transit.

Additional Synergies and Benefits

Subsidizing MBTA passes aligns closely with broader transportation initiatives that HBS is pursuing, including funding for Bluebikes docks on campus. In conversations with Harvard's transportation team, we found out that the typical cost to host a Bluebike dock (with space for 19 bikes) is \$75K for a 6-year term, and Harvard is sponsoring dozens of docks around Cambridge and Allston. Since Bluebikes stations are concentrated near transit, particularly the Red Line stops in Cambridge, an MBTA pass would likely increase Bluebike usage as well.

Furthermore, Harvard has invested in its own transportation shuttle network, recently purchasing four Proterra electric buses. These buses also converge at the Harvard Square T stop, and could help funnel students to the train.

Additionally, we believe that a school as prominent as HBS embracing this new program would generate positive press and reflect the seriousness of our commitment to reducing carbon emissions. This would send a message to students that HBS values environmentally-friendly activities like transit usage. It

⁵ Department of Public Utilities, 2018 Data Report – Rideshare in Massachusetts. <https://tnc.sites.digital.mass.gov/>

⁶ Metropolitan Area Planning Council - <https://www.mapc.org/resource-library/the-growing-carbon-footprint-of-ride-hailing-in-massachusetts/#footnotes>

⁷ <https://environment.yale.edu/news/article/social-cost-of-carbon-still-best-way-to-evaluate-climate-policy>

⁸ <https://www.sciencedirect.com/science/article/pii/S0921800921003943>

would also send a positive message to the community that HBS students are committed to the Allston and Cambridge community and choosing sustainable transit options that do not increase congestion or emissions in the neighborhood. Finally, instituting free transit for students would put pressure on other business schools to adopt similar policies, magnifying the environmental benefit.