



OVERVIEW



The new Government Center Station

The MBTA plays a vital role in shaping the greater Boston region to be part of a more environmentally sustainable future. The Sustainability Report and its

updates are our way of sharing the work we have done with all our stakeholders: our riders, the taxpayers, our neighbors, the men and women who work for the MBTA, and many others.

The Sustainability Report and the MBTA website [Sustainability page](#) is your portal to understanding the steps we are taking to create a

more environmentally responsible, socially equitable, and economically prosperous Greater Boston.

The MBTA's [Environmental Sustainability Policy](#) was adopted in 2004 and updated in the fall of 2014. The first MBTA [Sustainability Report](#), released in spring 2014, provided an overview of our program, and some key metrics we use to track our success. This Sustainability Report Update chronicles some of the programs and projects we have launched, and updates to our performance metrics to show our continued progress.

There are always opportunities to make our program bigger, better, and more effective. Our best ideas come from a variety of areas, so we are eager for more input. Please email us at sustainability@mbta.com with your feedback, ideas, suggestions and critiques. We look forward to hearing from you!

ENVIRONMENTAL

STATION RECYCLING PROGRAM

At busy Alewife Station, seven-foot tall kiosks built with 100% recycled materials offer MBTA users the space and information to recycle on the go.

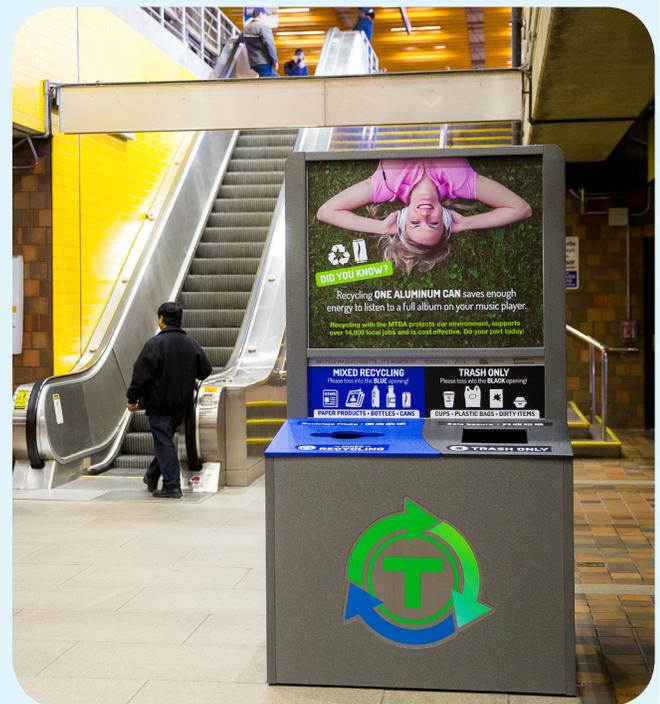
The two kiosks are part of a recycling pilot program in partnership with MassRecycles, the Massachusetts Beverage Association, and Casella Recycling, with the long-term goal of increasing recycling in MBTA subway stations.

"We take pride in the MBTA's ability to foster more sustainable lifestyles and help commuters reduce their carbon footprint," said MBTA General Manager Frank DePaola. *"Increasing the T's ability to recycle, and educating its customers on the environmental advantages of the program, is a very important step towards making the MBTA the most sustainable transit organization in the*

country. It is also a great example of public and private collaboration for the betterment of Boston and surrounding communities."

By expanding the program and adding more receptacles, the MBTA hopes to increase the amount of valuable materials added to recycling tonnages, including aluminum and PET (the material used for water bottles).

"Highly travelled public spaces like MBTA subway stations are a critical part of the waste-reduction puzzle in Massachusetts," said Edward Hsieh, Executive Director of MassRecycle.



New recycling receptacle at Alewife Station

ENVIRONMENTAL

ENVIRONMENTAL & SUSTAINABILITY MANAGEMENT SYSTEM

What is EMS or ESMS?

In 2004 the MBTA developed an Environmental Management System (EMS) which is the MBTA's series of policies, procedures and practices that prospectively reduce its potential environmental impacts and build a safe, healthy, well-informed workforce and ensure fiscal stability.

In 2014 the extra "S" in ESMS was added to incorporate the formal commitment to include Sustainability into MBTA practices, and proactively conduct operations in an environmentally sustainable and responsible manner, with a focus on energy and water conservation.

The Environmental Management & Sustainability Policy

The MBTA's formal commitment is outlined in the Environmental Management & Sustainability Policy which is displayed throughout the Authority. The guiding principles

include the commitment to:

- Minimize impacts to the environment, human health and the safety of our employees;
- Promote sustainable use of natural resources and encourage pollution prevention, water reduction, energy management, recycling, re-use, and repurposing of materials and waste-reduction opportunities;
- Meet or exceed environmental laws;
- Include environmental, social and economic considerations in design, construction, procurement and operations;
- Enlist the commitment of all employees to achieve these goals through communication, training and support of employee leadership; and
- Strive for continual improvement of our environmental performance and the implementation of our ESMS.

The ESMS has become an avenue for all MBTA employees, particularly those who work at operating and



ENVIRONMENTAL & SUSTAINABILITY MANAGEMENT SYSTEM



ESMS handbook

maintenance facilities, with the tools, training and resources necessary to perform all of our important operations in a manner that meets or exceeds environmental requirements and reduces our impact on the environment.

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KEY SUSTAINABILITY PERFORMANCE METRICS

Improvements from 2009 to 2015

Category	% Change
Water Usage ¹	-13.44 %
Greenhouse Gas Emissions	-28.23 %
Greenhouse Gas Savings	+31.01 %
Increase in Recycling	+161.87 %
Energy Use	-4.73 %
Passenger Trips	+12.69 %

¹ Water consumption is measured as gallons / vehicle length

This chart tracks some of the key performance metrics that the MBTA uses to track sustainability and resource conservation elements of our service. The MBTA uses a variety of metrics to track progress as compared to our base year of 2009. Most of these indicators track resource consumption per passenger trip (for example, greenhouse gas emissions / unlinked passenger trip) or some other relevant metric.

For most of the key indicators the MBTA has made improvements. For example,

water consumption per vehicle has gone down by 13%. Our electricity consumption per passenger trip has remained flat, but many of the energy efficiency programs under way are designed to address that indicator.

The MBTA continues to track these indicators as well as a host of others. For additional information, please contact us at sustainability@mbta.com.



ENVIRONMENTAL

ECONOMIC

VEHICLES— NEW HYBRID BUSES

In 2015 the MBTA put into service 60 new electric-hybrid buses. The buses, manufactured by New Flyer of America Inc., are some of the cleanest and most state-of-the-art hybrid buses in the country. The MBTA has purchased an additional 325 forty-foot buses (150 hybrid propulsion systems, and 175 CNG engines) and 44 sixty-foot articulated hybrid buses.

These new buses will replace the oldest buses in the fleet, thereby improving service availability and reducing maintenance costs. Since the hybrid buses use less fuel, it means less greenhouse gas emissions. One of the more unique features is the propulsion system that uses a smaller engine

which has the ability to stop and start automatically when the system permits. The hybrid buses can also be driven on battery power.



These buses also include high efficiency electrified-vehicle auxiliaries and LED lighting that have a lifespan four times greater than compact fluorescent lighting, and 30 times greater than incandescent lighting, while being mercury free. The new buses also feature a revised seating layout to allow for more standing space on the lower floor level and easier passenger maneuvering.

New hybrid bus

The new hybrid buses will incorporate the MBTA's latest security systems and will be compliant with the latest EPA standards for vehicle emissions.

The new hybrid buses and upcoming CNG buses allow the MBTA to make substantial progress toward reducing its own carbon footprint.

GREEN FACT

THE RIDE
PARATRANSIT
replaced old inefficient
vehicles with
140 Ford Fusion Hybrids.

ENVIRONMENTAL

SOCIAL

CELL PHONES FOR SOLDIERS



Since April 2012, the MBTA has been working with the charity *Cell Phones for Soldiers* to collect old cell phones to provide free phone time for soldiers stationed overseas. The Authority has collected over 5,000 phones that provide more than 56,000 minutes of free phone time for the soldiers.

Most cell phones contain precious metals that can be recycled to save energy and resources which would otherwise have to be mined or manufactured to be replaced. When placed in a landfill, these materials can pollute the air and contaminate soil and drinking water.

Through the years, the MBTA has collected phones at the State Transportation Building, North Station, and Back Bay Station.

Soldier calling home

ENVIRONMENTAL

SANITIZING BUSES WITH ENVIRONMENTALLY SAFE CLEANERS

Ryan Flynn, Superintendent of Cleaning and Maintenance for Bus and Rail Operations, oversees the cleaning and disinfecting of all vehicle interiors—a demanding job, particularly in light of the challenges he and his team deal with daily.

Recently, Ryan has been investigating ways to add an additional level of sanitized protection to vehicle interiors—a task that becomes more important during flu season—while using the most environmentally safe products.

Ryan has turned to the Toxic Use Reduction Institute (TURI) at the University of Massachusetts—Lowell for recommendations. TURI provides resources and tools that make Massachusetts a safer and more sustainable place to live and work.

The good news for Ryan and the MBTA's cleaning contractor is that today there are a number



The interior of a new hybrid bus

of very efficient cleaning products that are also environmentally safe. Not only do these products clean as effectively as, if not better than, older products, but they don't expose employees or customers to harmful toxins.

GREEN FACT

In 2015, the MBTA recycled **2.1 million lb.** of land ban items.

One technologically advanced system, which the T began testing in November, creates a sanitizer that kills bacteria and viruses on contact by combining water with salt and applying a small electrical charge. This method takes five minutes to sanitize a bus and kill contaminants on any surface or vent, with remarkable results.

The week before Thanksgiving, Ryan began testing the new process on 75 buses at the Fellsway Garage. *"So far we have completed close to 800 buses. We have 1,060 in the fleet. The hope is to add disinfecting to the cleaning process and to continue to examine products and procedures that are environmentally responsible and are also effective. Our work with TURI has made this possible."*

ENVIRONMENTAL

REGENERATIVE BRAKING ON THE BLUE LINE



Blue Line train at Airport Station

A subway train in motion requires an enormous amount of power, and every time you hit the brakes to slow down or stop, that power dissipates: wasted in the brake pads as heat. Regenerative braking allows the trains to store this energy and reuse it. The main impediment was that you need a place to store that energy until it is needed.

the energy until it is needed. With advancement in battery technology, new opportunities for regenerative braking on subway trains are emerging.

In June 2015, the MBTA launched a pilot project on the Blue Line near Airport Station. By installing a battery system along the tracks, the MBTA is capturing the energy lost as the train brakes to slow down to enter the station.

The initial results of the pilot project from this one site are highly encouraging with an estimated \$20,000 per year in avoided electricity costs. In addition, the system reduces high fluctuations in voltage which cause damage and increased wear and tear on equipment, thereby prolonging the lifespan of the propulsion system,

as well as the heating, ventilation, air conditioning, and other electrical components.

Lastly, the project allows for reduced mechanical braking, increasing the life of the brakes. We estimate that this project at Airport Station saves \$27,000 per year in maintenance costs.

The T is now looking to expand this technology to other locations; other segments of the Blue Line and certain stretches of the Green Line seem to be good candidates. The new Red Line and Orange Line vehicles currently in production provide us with opportunities to increase our savings.

This technology has the ability to provide us with much needed cost savings as well as reduce our environmental footprint.

SOCIAL

REPURPOSING BIKES FOR PEOPLE WHO NEED THEM

Each year hundreds of bicycles are abandoned on MBTA property: bikes left locked to stations and fences and their owners never come back to retrieve them. Since these bicycles become not only an eyesore but frequently safety hazards, the MBTA removes them and stores them in the event their owner returns, but frequently they never do. Instead of throwing them in the trash, the MBTA repurposes these bikes so that they are used by people who need them. The City of Boston's *Roll It Forward* Program refurbishes bicycles and distributes them to low-income residents of Boston. The program attempts to promote healthier lifestyles through increased physical activity and bike-safety awareness, particularly for children in the city. The MBTA provides approximately 50 bikes a year to the program.

Under the direction of MBTA Supervisor Wesley Fjeldheim in Engineering and

Maintenance, MBTA ironworker & bridgeworkers collect bikes and deliver them to the *Roll It Forward* Program staff. Abandoned bikes which are collected from a variety of areas (stations, parking lots, and most of all from right of ways) are stored for at least 60 days to make sure that the



Roll It Forward event at West Broadway Development in South Boston

previous owner has enough time to claim the bike if it was lost and not abandoned. The bikes are kept in a locked cage in the steel shop at the Charlestown maintenance facility, which can hold 30 bikes.

Roll It Forward refurbishes the bikes and distributes them with a helmet and lock and works with health organizations, homeless shelters, and other not-for-profit organizations to assure that they are given to people who most need them. In addition, the recipients must attend a safety education course before they can call the bike theirs.

The MBTA's role in this program helps the MBTA to not only make sure these bikes don't end up in a landfill, but also provide city residents with the chance to engage in healthy and safe transportation.

Jenny Duquette Norcott, Community Cycling Program Manager for the City of Boston, is excited about the MBTA's participation. "We are very happy to be working with the MBTA to

get more bikes for Roll It Forward. The program has distributed over 4,500 bikes; the bikes really make a difference in people's lives by providing a healthy way to get around and an outlet for exercise. We're excited to continue and grow this partnership with the MBTA."

ENVIRONMENTAL

HINGHAM INTERMODAL CENTER

By the summer of 2016 the new 8,400 square foot Hingham Intermodal Center will open its doors to the public. The facility will be the terminal for MBTA ferries that run from Hingham to downtown Boston, as well as Department of Conservation ferries that run to the Boston Harbor Islands. The center was designed to meet LEED Gold certification.

The building includes a number of environmental elements that addresses valuable resources such as water and energy. The green roof helps control storm water discharge and keeps the facility cooler in the summer. All rest rooms have low-flow plumbing and the

lighting uses economical LED fixtures. As with all new MBTA construction work, the paints, adhesives, and sealants do not contain volatile organic compounds (VOCs).



Hingham Intermodal Center green roof

One of the more environmentally friendly aspects of the project is the efficient design of a multizone HVAC system. The demand-controlled ventilation system will include a geothermal heat exchange that will help offset some of the energy required for heating and cooling. Geothermal heat exchange takes advantage of the natural subterranean temperatures that exist beneath a structure, thereby saving energy costs associated with heating and cooling the building.

The landscaping selected requires no outdoor irrigation and will be planted in late spring. The building was designed to fit into the surrounding architecture, yet incorporate open spaces allowing for natural lighting and views of the harbor.



ENVIRONMENTAL

ENERGY CONSERVATION SCORE CARD

The Energy Conservation Score Card illustrates the way the MBTA is saving energy and money on projects. These projects were initiated in 2010, and the score card reflects the accumulated results of these projects.

The projects range from upgrading energy efficient lighting, to installing new compressors to using more efficient heaters for switches and third rail heaters, as well as other improvements. The improvements have been made throughout the system: parking facilities, station platforms, maintenance facilities, administrative buildings, as well as rights of way and tunnels. To date, 81 projects were completed with many more in the pipeline.

Mike Donaghy, the MBTA's Manager of Energy Efficiency, works closely with local utilities to receive rebates to help pay for the projects and thus allow the MBTA to have a much quicker return on investment. To date, the MBTA has saved over \$3.5 million in energy costs, and the average project pays for itself in a little over a year!

GREEN FACT

Each passenger trip on the MBTA saves **14.5 lb.** of greenhouse gas from entering the environment.



	2014	2015	Since Inception
Energy Savings (kWh)	3,623,714	2,917,995	15,303,794
Energy Savings *	7,289,267	411,562	42,047,189
Power Savings (kW)	732	836	2,980
Annual Energy Cost Savings	\$313,929	\$281,484	\$1,742,661
Cost Savings *	\$620,193	\$35,043	\$3,576,112
Avoided Project Cost	\$431,300	\$697,461	\$3,866,493
Average Payback Period	1.08	2.85	1.31
Pollutant Offsets (in lb.)			
CO2	3,000,261	2,415,960	12,670,807
CH4	279	225	1,178
NO2	55	44	233

Environmental Equivalents	2014	2015	Since Inception
Gallons of Gasoline	286,630	230,808	1,210,504
Households**	336	270	1,417

Project by Property Type	
Administrative	6
Maintenance	31
Parking Gar.	10
Parking Lot	11
Station	9
Substation	10
Tunnel	2
Right of Way	2
Total	81

Notes:

* Since completion of each project

**Households average annual electrical usage of Massachusetts household

To learn more about the MBTA's Sustainability Program go to sustainability@mbta.com or use this QR Code

