DISCOVERY MUSEUM
science. nature. play.

Discovery Museum Sustainability Plan

3rd Annual Report, July 2025

978-264-4200 • 177 Main Street (Route 27) • Acton, MA 01720 • discoveryacton.org

I. Introduction

A fixture in the community since 1982, Discovery Museum has long been a source for imaginative, play-based learning experiences for children and families. Our grounding in STEM and our deep conviction that play is an essential right of childhood provide the context through which we nurture children's imaginations and enduring habits of mind. Our vision is that every child, irrespective of background and ability, will feel eager to explore their world and powerfully embrace the challenges and opportunities of the future. While we are genuine in our optimism and confidence in children's abilities, we are also acutely aware that children's futures are rife with uncertainty. We recognize that many of the values we champion—community, empathy, respect for the natural world, trust in science, and even the fundamental importance of museums to society—are being challenged. This motivates us to hold even more firmly to our purpose, to persist in inspiring joy and discovery in all we do, and to continue fostering the deep connections to nature that can spur a lifetime of environmental stewardship.

We first formally articulated our commitment to environmental sustainability back in 2007. Asserting that "we are keenly aware of the interrelationships of humans and the natural world and our obligations to be good stewards of that world," we set goals for becoming a "green" organization and for encouraging others to take responsibility for the environment. A subsequent master planning process envisioned a campus expansion that initially included a concept for building a new Environmental Discovery Museum. Unfortunately, economic recession and stagnant visitation sidelined those plans while the Museum shored up its finances and focused on facilities improvements needed to sustain audience growth. A capital campaign launched in 2013 funded a full-campus renovation culminating in the 2016 opening of Discovery Woods, an award-winning, wheels-accessible nature playscape and treehouse abutting 180 acres of town-owned conservation land. Two years later, we opened an expanded and universally accessible building, filled with new and re-imagined exhibits, which made our subsequent programmatic and audience expansion possible.

It was not until our critical facility needs were addressed that we were finally able to revisit our comprehensive vision for environmental sustainability, which led to the adoption of our first Sustainability Plan in 2021. We are pleased to present this third annual report on our progress, and we are especially proud to announce we have successfully **achieved our goal of becoming carbon neutral by 2024**. This extraordinary accomplishment, which has been confirmed through third-party certification, is just one more step in our commitment to modeling the action we seek to inspire in all our visitors, rooted in respect and appreciation for nature.

As intended, the Sustainability Plan remains a living document. We've both identified new opportunities for action and deemphasized certain strategies as our understanding has evolved, and new priorities have emerged. In implementing the plan, we continue to rely upon a cross-functional, cross-hierarchical team of staff. The group has met almost every month since 2021 to work on goals and strategies. This report covers actions occurring between late 2023 through mid-2025, a period during which the Museum also underwent a CEO transition upon Neil Gordon's retirement and developed a new Strategic Plan to guide our work through 2027. While our prior Strategic Plan had set institutional ***goals*** for sustainability and environmental stewardship, they are identified as organizational ***values*** in our 2025-27 Strategic Plan. This is an intentional shift from prioritizing this work in the short term to making it part of who we are, always.

What follows is an update on our progress. As in prior years, the report is organized around five overarching goals, each with a series of related strategies for reducing our environmental impact.

II. Goals

Goal #1: Reduce Greenhouse Gas Emissions to Achieve Carbon Neutrality by 2024

The Museum spent years laying the groundwork necessary to accomplish the landmark goal of carbon neutrality. Early progress was made in 2019 with the installation of two EV charging stations in the Museum parking lot and the completion of a solar feasibility study (see Appendix 1 for charging station usage). In spring 2020, the Museum was awarded funding from the Massachusetts Cultural Facilities Fund to carry out site work that would make possible installation of a solar array above the parking lot. Ever optimistic, we pushed forward with our plans through the COVID-19 pandemic and declared our intention to become a carbon neutral operation by the close of 2024.

In spring 2020, we conducted a baseline inventory of our greenhouse gas emissions, taking into consideration onsite electricity and energy usage, employee commuting, Traveling Science Workshop (TSW) school program instructor travel, air travel by staff to conferences, and travel by visitors between home and the Museum. Estimates were calculated using 2019 visitor zip code data and 2019 school program delivery records. Sources of greenhouse gas emissions onsite included gas burning furnaces in the main Museum building and the 183 Main Street offices (since demolished), and an oil burning furnace in the old Children's Discovery Museum, now used as administrative offices. According to this analysis, the Museum was emitting an equivalent of 2,265 tons of CO_2 annually, with visitor travel accounting for 80% of the total. Of the non-visitor sources, onsite electricity usage accounted for most of our greenhouse gas emissions, followed by staff commuting and travel by TSW instructors to schools throughout the region.

In 2022, after demolishing the dilapidated 183 Main Street office building and redesigning our parking lot for optimal sun exposure, we completed the installation of our 326kW DC solar canopy, which is now producing twice the electricity needed to meet the Museum's needs. This put us well on our way to carbon neutrality.

Status: To determine where the Museum stands in pursuit of this goal, an updated greenhouse gas inventory was conducted to measure 2024 emissions (see table below and Appendix 2). The Museum's solar canopies produced 355.55 MWh of electricity in 2024. Fifty percent of these renewable energy certificates (or 175.28 MWh of electricity) were retired on behalf of the Museum, meaning they offset the Museum's electricity use. The Museum's total electricity usage across all buildings and the EV charging station was 154.04 MWh. Thus, our Scope 2 emissions—defined as those resulting from the use of electricity purchased by an organization—were zero. The Museum produced 32.22 $MTCO_2e$ of Scope 1 emissions, defined as those resulting from activities owned or controlled by the organization. This resulted from the two sources that have not yet been mitigated: the gas-fired hot water heater in the Museum building and the oil furnace in the Administration Building (former Children's Discovery Museum). There are four significant sources of Scope 3 (indirect) emissions: business air travel, business vehicle travel, visitor commuting travel, and residual waste (primarily visitor trash like diapers) that must go to a landfill. These produced 661.74 $MTCO_2e$, for total Scope 1 and 3 emissions of 693.96 $MTCO_2e$.

In 2024, we purchased carbon offsets equivalent to 858.6 $MTCO_2e$ (described in greater detail below). From a Scope 1, 2, and limited Scope 3 perspective, the Museum was therefore carbon neutral. We intend to continue purchasing carbon offsets for Scope 1 emissions until these sources can be eliminated. Because of the indirect nature of Scope 3 emissions, we will work to decrease them but won't be able to fully eliminate all sources. We intend to continue offsetting the emissions we are unable to eliminate.

Discovery Museum is happy to declare that as of 12/31/2024, it has met its goal of achieving carbon neutrality (see Appendix 3). Our Greenhouse Gas Inventory has been affirmed by GreenerU (see Appendix 4).

Greenhouse Gas Inventory: Discovery Museum Jan. 2024-Dec 2024

Boundary: The boundary of this greenhouse gas inventory includes the operations of the museum. Does not include various Scope 3 sources which are largely N/A for the museum.

					2024	
Scope	***Source of Emissions***		***Data Source***	***Emission Factor (MTCO2e/unit)***	**Amount**	**GHG emissions (MTCO2e)**
Scope 1	*Natural Gas (therms)*		*Invoices*	*0.00545*	2,914	15.88
	Diesel (gallons)			*0.01021*	-	-
	No. 2 Fuel Oil (gallons)		*Invoices*	*0.01024*	1,473.00	15.09
	Gasoline for Company Vehicles (gallons)		*est*	*0.00878*	75.00	0.66
	Refrigerant leakage (lbs)		*est*	*0.590*	1.00	0.590
Scope 2	*Purchased Electricity (MWh)*		*Invoices*	*0.243*	154.04	37.48
Scope 3	*1. Purchased goods and services*		Not included at this time.			
	2. Capital goods		Not included at this time.			
	3. Fuel- and energy-related activities		Not included at this time.			
	4. Upstream transportation and distribution		Not included at this time.			
	5. Landfill waste (tons)		*estimates*	*0.58*	36.50	21.17
	6a. Business travel (airline miles)		*estimates*	*0.0001*	17,880.00	2.58
	6b. Business travel (vehicle miles)		*reimbursement records*	*0.0003*	53,943.00	16.51
	7. Visitor commuting travel (vehicle miles)		*Visitor data*	*0.0003*	2,101,208.00	630.36
	8. Upstream leased assets		Not included at this time.			
	9. Downstream transportation and distribution		Not included at this time.			
	10. Processing of sold products		Not included at this time.			
	11. Use of sold products		Not included at this time.			
	12. End-of-life treatment of sold products		Not included at this time.			
	13. Downstream leased assets		Not included at this time.			
	14. Franchises		Not included at this time.			
	15. Investments		Not included at this time.			
Offsets	*RECs (MWh) (offsets for Scope 2 only)*			*0.24*	175.28	41.94
	Offsets (MT CO2e)			*0.00*	858.56	858.56
	Waste Diversion	*Food donated (tons)*		*(3.656)*	-	-
		Organic Waste Composted (tons)	*est*	*0.294*	0.55	0.16
		Comingled Recycling (tons) (not an offset but worth tracking)	*est*	*2.825*	5.48	-
		Glass Recycling (tons)		*(0.28)*	-	-
		Metal & Aluminum Recycling (tons)		*(9.11)*	-	-
		Plastic Recycling (tons)		*(1.02)*	-	-
		Cardboard Recycling (tons)		*(3.12)*	-	-
		Paper Recycling (tons)		*(3.53)*	-	-
Total Scope 1						32.22
Total Scope 2 (Scope 2 emissions offset by RECs net below 0)						-
Limited Scope 3						670.62
Offsets						858.72

Net Scope 1 and 3 Emissions (155.89)

Strategies

- ***Install a 326kW DC solar canopy that will produce more than enough energy to meet 100% of the Museum's electricity needs***

  Status: This was accomplished in 2022, and the solar panels have been producing twice the electricity needed to meet the Museum's needs. In 2024, the inverter net energy produced was 350,551kWh, with avoided CO_2 emissions equivalent to the emissions of 55

gas-powered passenger vehicles driven for one year (Source: U.S. Environmental Protection Agency Greenhouse Gas Equivalencies Calculator). The solar panels produce approximately 96% of planned production. To take full advantage of the canopy, this is being reviewed, and potential interventions may take place to achieve full production.

- ***Demolish the 183 Main Street office building:*** Removing the building, which was in poor condition, was necessary to optimize the placement of the solar array.

  Status: Demolition was completed in 2022, and the gas-fired heating system was taken offline. Construction debris was sent to a recycling center in Devens, MA.

- ***Replace the oil burning furnace in the former Children's Discovery Museum with an electric heat pump and the natural gas fired hot water heaters and supplemental boilers in the Museum building with electric systems.***

  Status: This action has not yet occurred. This building is undergoing a feasibility study for a planned renovation or reconstruction consistent with sustainable building practices. At that point the building heating and cooling will be converted. The likely time frame for this is 2-4 years. The systems in the main Museum building are only seven years old. Consultation with experts has determined that considerable reconfiguration of the HVAC system will be required to eliminate natural gas. To manage our financial resources responsibly, this change will occur when the existing systems are ready for life-cycle replacement. Until these conversions can take place, offsets will be purchased as mitigation.

- ***Sell excess solar electricity through a community solar partner***

  Status: This strategy has been achieved and is ongoing. Five non-profit organizations each purchase approximately 10% of the production. The organizations are Acton Housing Authority, Green Energy Consumers Alliance (through which our energy credits benefit ten low-income households), Haley House, Benfield Farms and Coppersmith Village (both part of Neighborhood of Affordable Housing, Inc.). Electricity is sold at a 10% discount against utility prices to these organizations.

- ***Mitigate carbon emission through visitor-supported carbon offset purchases***

  Most visitors to the Museum arrive in a personal vehicle. Visitors traveled more than 2 million miles to and from the Museum in 2024, making vehicles the largest source of greenhouse gas emissions for the Museum. We recognized that efforts to reduce Scope 3 emissions from visitor automobiles would be difficult. The use of offsets, even as an imperfect long-term solution, was viewed as an approach that both achieves real carbon reduction and serves as a tool to highlight the issue for visitors. We used a multi-layer process to screen potential offset providers and to review the validation and verification of the offset projects. We consulted Environment & Cultural Partners, an organization that works at a sector-level to empower cultural organizations to implement evidence-based solutions, and to assess offset providers for reputable validation and verification procedures.

Status: Using zip code data collected from visitors, the Museum estimates the miles traveled and calculates the greenhouse gas emissions of those visits. A Museum member carbon offset program was launched June 1, 2022. Members pay a $1/year fee, which they may opt out of, when purchasing their membership. A visitor carbon offset program was implemented in 2023. A 50-cent fee is added to each visitor group's admission fee. (Museum members and families who visit through $1/person or free-access initiatives are not charged a fee). In 2024, offsets were also purchased for Museum staff travel and for the Scope 1 emissions cited above from the two remaining HVAC sources. It is the intention of the Museum to maintain its carbon neutral status by continuing to purchase offsets until it can eliminate these emissions.

The Museum's offset vendor is Native, a public benefit corporation recognized as a Certified B Corp, headquartered in Burlington, VT. Native validates its projects to one or more carbon certification standards (e.g., Gold Standard, Verified Carbon Standard, Climate Action Reserve, American Carbon Registry, Plan Vivo, and Climate, Community & Biodiversity Standards). The Museum's offsets first supported a project that provides small family farms in Uganda and Kenya with small-scale digesters that generate biofuel for cookstoves and organic fertilizer for crops. Through the end of 2025, the Museum's offsets will support a clean drinking water project in the Republic of Mozambique, selected by an all-staff vote. Led by the nonprofit Village Water, this project rehabilitates, installs and maintains borehole water infrastructure to provide communities with safe, clean drinking water. This project reduces the need to boil water for purification, which saves over 95,000 tons of firewood annually and reduces CO_2 emissions.

- ***Explore the feasibility of purchasing or leasing electric vehicles for use by Traveling Science Workshops (TSW) instructors; deliver some classroom programs virtually.***

  Status: Our team of 14 Traveling Science Workshops instructors drive in their own vehicles to and from schools throughout the region, and to the Museum's workshop materials supply facility. In 2024, they provided hands-on STEM experiences to 56,000 students in 290 schools in 119 towns. Instructors drove 53,943 miles last year to deliver these programs. We began purchasing carbon offsets for TSW instructor travel in June 2022. The offset cost for instructors is fully paid by the Museum for the next year of projected miles. Obtaining electric vehicles for instructors has not been seriously considered. We do not have experience with owning, maintaining, and loaning vehicles, nor do we have excess parking capacity for the storage of vehicles; thus, costs and staffing needs will need further study to understand feasibility. While implemented to address logistical issues, one recent operational change might bring about a small reduction in TSW instructor travel: we established a process during the 2024-25 school year for the TSW instructors who live farthest from the Acton workshop materials distribution center to store materials kits at their own residences, rather than travel daily to Acton to retrieve kits. This will significantly reduce vehicle travel for some instructors. With an ongoing geographic expansion of TSW and projected addition of new TSW instructors to the staff, we will continue to decrease per-instructor travel for materials pick-up and drop-off where possible, yet the cumulative impact of this change is likely to be small.

- ***Promote the use of public and alternative transportation to the Museum.***

  Status: A bike rack was installed in 2022 for visitor use and directions to the Museum via public transportation were added to the website. The Town of Acton also upgraded the pedestrian crosswalk and light in front of the Museum, making it safer for walkers to reach our campus. Realistically, however, neither bike travel, foot travel, nor public transportation are convenient options for most visitors, who come from nearly 300 towns and cities across the state with young children in tow. We also recognize that a lack of transportation by any means presents a barrier to Museum visitation for many families that we are working to overcome. Thus, we are mindful of the need to balance goals for sustainable transportation with goals for lowering barriers to access. To facilitate local travel for families without their own transportation, the Museum was added to the MART Boxborough Connects van route in April 2025. The 2025-27 Strategic Plan also highlights the importance of community outreach in overcoming transportation barriers. Other strategies to encourage visitors to use environmentally friendly modes of transportation will continue to be explored.

- ***Accommodate staff telework when possible.***

  Status: A remote work policy was finalized and began on May 15, 2022. Only two staff members out of 75 have remote days built into their regular schedules; however, many administrative staff members work from home periodically. Most employees have job duties that require in-person work, and we believe it is important that every employee has a significant-to-full onsite presence in keeping with our primary function as a public visitation site.

- ***Consider virtual delivery of lectures and events.***

  Status: The four *Discovery Museum Speaker Series* events held in 2024 were conducted via Zoom. Due to declining attendance and an evolution in how adults prefer to consume media, we made the decision to end the series after 13 successful years. In its place, we are launching a new series in 2025 called *Discovery Soundbites*, which will offer short, engaging video interviews shared via social media and on the Museum website. We are continuing to hold other regularly occurring events via Zoom when possible, including monthly all-staff meetings. The shift to Zoom for business meetings that took place during the pandemic has become standard practice. For example, most meetings the Development Team holds with prospective and existing foundation and corporate funders take place virtually. Meetings that are determined to benefit from an in-person environment, such as full Board meetings, have been kept on-site, while Board Committee meetings, for example, have largely remained virtual.

- ***Take steps to reduce carbon emissions in daily museum operations (additional strategy added by the Sustainability Team in 2023).***

  Status: The grounds maintenance team has almost entirely transitioned to electric-powered tools. Currently, staff utilize an electric snowblower, weedwhackers, leaf blowers,

chainsaw, and a riding lawn mower that can be used as a tractor to pull carts. The only remaining tools that are gas-powered are one snowblower (only utilized when the electric blower is unable to move heavy snow) and a trimmer; staff will replace these at the end of their useful lives. All these tools are charged with the electricity provided by the Museum's solar array and share a standard battery pack.

- ***Ensure that the building renovation in 2024 furthers our goals (additional strategy added by the Sustainability Team in 2024).***

  Status: The Museum undertook the renovation and expansion of its 25+ year-old "Birthday Party" building (renamed Community Building) in 2024. The Community Building renovation included comprehensive sustainability upgrades to the building's envelope and mechanical/electrical/plumbing systems. The renovated building uses an electric heat pump and an energy recovery ventilator to be free from fossil fuels. Significant insulation upgrades, new windows and doors, energy saving appliances, and LED light fixtures reduce energy demand. As required by the Town of Acton, the project complied with the stringent Massachusetts "Specialized" Energy Code, which was adopted locally in January 2024. For functions held in the building, including all children's birthday parties (its primary use), we provide reusable dishware, compostable paper products, and onsite recycling and composting to ensure events are carried out sustainably. The building's principal access is across existing permeable pavers that reduce stormwater run-off from the site.

Goal #2: Reduce Consumption and Waste Generation

Strategies

- ***Decrease waste generation from special events.***

  Status: All major Museum events are designed with sustainability top-of-mind. This includes choosing vendors that support our sustainability goals; reducing food waste by better estimating the amount of food needed for guests and making leftover food available to staff; consolidating print materials (e.g., save the date notices and RSVPs) and partnering with an eco-friendly printer who uses recycled paper with vegetable inks; using only reusable or compostable items (Museum-owned or rented), such as dishware, table clothes, and tables; ensuring commercial composting is available with clear signage to avoid contamination; using biodegradable decorations and purchasing carbon offsets for all vendors, staff, and guests in attendance. Other fundraising events, like the Bid for Kids online auction, rely on virtual communications. Additionally, the marketing team uses biodegradable yard signs to advertise and provide information about events.

- ***Compost the Museum waste on site (Strategy added by the Sustainability Team in 2023).***

  Status: Three composting bins were added on campus in 2023: one in the lobby and two on the patio. There are two additional compost receptacles for staff to use. Currently, we are composting food scraps from staff on site with a worm composter located behind the Museum. The organic material produced from the composters is used in the vegetable

garden. Plant scraps from facilities management are also composted. Once the renovation of the Community Building was completed in October 2024, we relaunched birthday party rentals. With the increase in visitors' food waste, we are no longer able to meet our compositing needs onsite. We retained Black Earth Compost to take compostable material offsite and allow the composting of materials that require a commercial-grade process. Staff estimate that slightly more than half a ton of waste was composted in 2024.

- ***Use environmentally friendly trash bags for 100% of the Museum's trash.***

  Status: When the Sustainability Plan was first implemented, the Museum was using 500 16-gallon trash bags and 100 45-gallon trash bags per month. Larger trash bags for outside bins were replaced with a biodegradable alternative. Staff initially searched for a source for biodegradable bags for smaller indoor bins; however, this goal was ultimately abandoned as we learned that no good option exists, as so-called biodegradable trash bags are not truly biodegradable.

- ***Eliminate single-use plastic water bottles.***

  Status: The use of single-use plastic water bottles had already been eliminated at meetings and indoor events prior to the Sustainability Plan's adoption. Plastic bottles were also removed from vending machines. Indoor water fillers were added in 2022. Staff are currently in the process of evaluating the feasibility of installing water fountains and bottle fillers outdoors. Branded reusable water bottles are sold in our gift shop.

- ***Conduct a waste audit for educational and outreach programs and exhibit operations and develop strategies to reduce waste generation.***

  Status: A waste audit of various spaces was completed in 2021/2022, but not for the whole Museum. Since then, there has been a shift in thinking about the feasibility and value of taking this approach. First, we do not have the staff capacity to conduct routine tracking of waste. Secondly, there are sources of waste, such as diapers disposed of by visitors, that will be very hard to eliminate from our waste stream. We are focusing instead on the upstream part of the product life cycle, by ensuring our purchased materials are sustainably sourced. Another effort to divert waste from landfills and support our visitor needs was launched in 2022: Bessie's Closet is a bi-annual pop-up free clothing shop that in 2024 collected and re-distributed 3,907 pounds of gently used clothing to 961 visitors. An updated waste audit is being planned for 2025.

- ***Conduct a sustainability audit of materials and supplies and explore options for purchasing more sustainability sourced and packaged products.***

  Status: In 2021/2022, staff made a comprehensive list of all materials and supplies that we purchase, including items sold in the Museum store, and selected and changed to more environmentally friendly alternatives. For example, we offer plush toys made from recycled plastic and children's books about recycling and growing food. This is an ongoing and evolving process. In 2023 and 2024, our commitment to sustainably sourced and packaged

products was extended to staff holiday gifts, prioritizing those that would have an extended re-use (recycled cotton tote bag, recycled fabric blanket).

- ***Bring some rigor and standards to waste reduction efforts (Strategy added by the Sustainability Team in 2024).***

  Status: We explored the feasibility of TRUE, a zero-waste certification program dedicated to measuring, improving, and recognizing zero waste performance. The Museum learned about TRUE through its participation in the *Caretakers of Wonder* project, a national collaboration led by the Madison Children's Museum that developed a playbook for early-childhood climate programming. Our Director of Environmental and Outdoor Education, Paul Fenton, completed the course to become certified as a TRUE Advisor. The courses covered the following topics:

  1. Overview of Zero Waste and a Zero Waste Facility
  2. TRUE Certification and the Role of the TRUE Advisor
  3. Redesign, Reduce, Reuse
  4. Bin Right Sizing
  5. Compost (Re-earth) and Recycle
  6. Zero Waste Reporting and Diversion from Landfill, Incineration (WTE) and Environment
  7. Zero Waste Metrics
  8. Zero Waste Purchasing, Leadership, Training and Zero Waste Analysis
  9. Zero Waste Audits
  10. Upstream Management, Hazardous Waste Prevention, Closed Loop and Innovation

  At this time, we have decided not to seek full certification, as not all action steps are relevant or feasible in an environment in which visitors are disposing of personal trash (diapers, snack packaging, etc.). A more likely course will be adopting incremental steps that are achievable and compatible with our operating environment. We are committed to prioritizing individual aspects of the TRUE standards system and working toward them one-by-one.

- ***Implement recycling for harder-to-recycle materials (Strategy added by the Sustainability Team in 2024).***

  Status: We started a battery collection/recycling process for staff. Battery collection takes place in the main Museum building and at the Traveling Science Workshop Distribution Center. Staff are invited to deposit used batteries from their homes. Ninety pounds of batteries were collected and recycled in the first year. A significant discussion was dedicated in 2024 to visitor battery recycling, and it was determined that visitor safety (deposited batteries being accessible to very young visitors) and the need for heavy staff intervention were significant barriers. We will continue to evaluate new ideas for how to make this possible, and the team is also considering collecting other hard-to-recycle materials such as plastic film.

- ***Reduce waste from party rentals by offering "green" parties (Strategy added by the Sustainability Team in 2024).***

Status: So far promotion of "green" parties has been casual. The Birthday Party FAQ on our website states:

> *We provide paper "draw on me" compostable placemats and small buckets of crayons. You are welcome to bring decorative tablecloths if you prefer. There are three 8' tables for your use. We also provide reusable plates, cups, utensils, and compostable napkins. You are welcome to bring themed paper products to use instead if you prefer.*

The clean-up guidance states:

> *The Museum provides containers for trash, recycling, and compost so please be ready to sort your waste into these three streams during and at the close of your event. Museum staff will manage those containers at the end of your event.*

No data exists on the usage of reusable supplies or on the amount of recycling taking place as birthday parties were only reintroduced at our museum in October 2024. We aim to better understand the impact of this effort in 2025.

Goal#3: Reduce Water Usage

Strategies

- ***Develop reduction goals***

Status: In 2022, a significant re-landscaping of the Museum property took place resulting in thousands of new plants being planted. The establishment of these plants, during what was a particularly dry summer, required considerable, non-typical irrigation. Most of the landscaping on the Museum campus consists of native plants such as bee balm, little bluestem grass, and red maples, which require less support and water because they are naturally adapted to survive in this region. Water usage data since 2021 confirms the unusual peak in 2022.

Water Usage in Gallons	Year
217,705	2021
578,129	2022
285,893	2023
305,947	2024

It is not clear that much additional reduction can take place as low flow fixtures are already installed in most locations, and irrigation is minimal, although opportunities for reducing water usage will continue to be considered as they arise. Discussion with our landscape architect in 2024 about a possible replacement for the grass lawn (which we water minimally only to keep it alive) confirmed that grass is the best option for our operating environment.

Over the last year, the Museum has also been forced to remove many diseased and dying trees from the property and is in the very early stages of planning a re-design of Discovery Woods, made necessary by severe erosion and soil compaction and an increase in heavy rainfall events. Redevelopment is not expected to take place imminently, as other building needs are being prioritized (i.e., redevelopment of the Administration Building). However, once the Museum has the resources to tackle the challenges within Discovery Woods, there will be opportunities to consider vegetation and water usage on the property.

- ***Capture storm water and redirect it to groundwater recharge.***

  Status: Stormwater runoff from the solar canopy was designed to be redirected back into the ground. During 2024, some additional drainage was installed to capture stormwater that was flowing across the parking lot and exiting onto the street. A new drywell was installed, with an overflow to the storm drain, to capture and retain the rainfall during typical rain events. Previously installed features remain, such as the rain barrel located by the Discovery Woods educational vegetable garden. The barrel is used to water the vegetable garden, the pollinator garden, and other small plant beds when needed. A new rain barrel was added this year to the Museum building, and the Director of Facilities is actively exploring additional ways to capture water runoff.

- ***Replace outdoor paved areas with pervious pavement.***

  Status: This was completed during the 2022 sitework and remains in place. This surface serves as a trike track for kids to enjoy. Its maintenance will be reviewed as it ages.

Goal#4: Education and Communicate our Actions to the Public

Strategies

- ***Expand and enhance the Museum's nature, outdoor, and environmental education programs to inspire kids to act on behalf of the environment.***

  Status: This continues to be a core component of the Museum's daily work. Discovery Museum employs a full-time Director of Environmental and Outdoor Education, hired in 2022, who designs and leads educational programs, participates in exhibit development, conducts community outreach, and represents the Museum in sustainability-focused industry collaborations.

  Programs: During 2024, staff offered 121 outdoor and environmental programs, which reached 10,163 visitors, representing 42% of the Museum's total program participation for the year. Our nature education philosophy continues to be rooted in the well-established understanding that one of the most effective ways to motivate environmental stewardship in children is to deeply connect them with nature. Recognizing that this happens progressively and dynamically, beginning in early childhood, we offer a continuum of outdoor education experiences—an approach we refer to as "In/With/For." Programming that increases children's (and their caregivers') comfort with being ***in*** nature targets the youngest visitors and those with less outdoor experience. A second set of programs

encourages visitors to learn ***with*** nature—to more deeply immerse themselves, while also drawing upon the endless opportunities for outdoor environments to build science skills and knowledge. The third category of Discovery Museum outdoor programs motivate children and their families to stand up ***for*** the natural world. These include experiences where families can take direct action, like participating in invasive plant removal in the neighboring conservation land, and programs that help children develop early civics skills. Our Director of Environmental and Outdoor Education authored an article about the Museum's outdoor education philosophy for the Nov. 2024 issue of *Hand to Hand*, a publication of the Association of Children's Museums. Titled "In/With/For: Environmental and Climate Action through Children's Programming," the article offers a detailed overview of our outdoor education approach, with its particular emphasis on the importance of connecting children with nature.

In 2024, the Museum submitted a proposal to the Institute of Museum and Library Services (IMLS) for grant funding to launch an Environmental Artist in Residence program that would have brought artists to our campus to collaborate with visitors on a project that explores an environmental theme. With the Trump Administration's proposal (currently being challenged in court) to eliminate the agency, we anticipate our request will go unanswered or will be declined.

Exhibits: In July 2025 we completed and installed a new exhibit called *Play Inside a Solar Cell*. Designed for early learners, this low-tech, self-directed, interactive exhibit takes a novel approach to exploring the complex science behind solar electricity. The exhibit invites children to launch a "photon" puck through a field of "electrons," knocking them free. The freed electrons slide back through the playfield and fill up a "lightbulb," visually demonstrating how sunlight is converted to electricity. We are also developing parallel experiences for school Field Trip participants. There are few comparable learning experiences on this topic designed for early learners. The project's novelty has garnered attention from industry associations, whose representatives have voiced support for our eventual goal of replicating the exhibit for use by other children's museums. The project was funded by a one-year $89,340 grant, with a requirement for a 1-to-1 match, from IMLS.

Although the grant was terminated prior to the project's completion, as of July 2025, the funding for this project has been reinstated, thanks to a successful preliminary injunction through *Rhode Island v. Trump*, which included the Commonwealth of Massachusetts representing all its IMLS grant recipients. As a result, we were able to draw on the full grant award and complete the *Play Inside a Solar Cell* exhibit with only modest delays to the original timeline.

Community outreach: As part of our commitment to creating inclusive learning opportunities, the Museum works with numerous community organizations to create nature-focused learning experiences for children and families that have limited outdoor access and for those who, due to their complex life circumstances, stand to particularly benefit from the mental and physical health benefits of being in nature. One model that has worked well is to "train the trainer," that is to create learning opportunities both for children and their program leaders, helping adults gain the confidence and knowledge needed to incorporate outdoor experiences into their own day-to-day programming. Three examples of

ongoing partnerships:

1. Housing Families, Medford, MA: This organization provides a wide range of services, including a therapeutic after-school program, for families who have experienced, are experiencing, or are at risk of experiencing homelessness. The Museum's Director of Environmental and Outdoor Education leads outdoor experiences offsite for Housing Families' child clients and works with program interns to increase their knowledge of and level of comfort with leading outdoor activities. Housing Families' clients also visit the Museum for Field Trips, provided at no cost.

2. Spanish American Center, Leominster, MA: This organization provides a range of social services to the city's large Hispanic population, including after-school enrichment and summer youth programs. The Museum recently provided training to summer camp counselors on leading nature-focused activities in their community.

3. Danny's Place Youth Services, Acton, MA: Serving children in grades 3-12, Danny's Place school year and summer programming focuses on mental health and wellness, self-exploration and life skills, and leadership and community building. The Museum hosts regular, no-cost nature field trips for program participants and trains group leaders on nature program delivery.

These programs provide fun outdoor experiences for children, model for adults specific activities appropriate for different age groups and help staff think creatively about exploring nature in their own communities, particularly in built environments with limited green space. The Museum also routinely provides free admission and Museum memberships to families, allowing them to visit repeatedly.

Nature Play Festival: Conceived in 2024 as a capstone to our Sustainability Plan efforts, we will hold our first Nature Play Festival at the Museum on July 11, 2025. This free event will feature a wide range of immersive outdoor experiences that connect children with nature and highlight the Museum's operational sustainability. The festival will showcase some of our most popular nature programs, like Mud Kitchen, Rock Flipping, and Bug Hunts. Our accessible Discovery Woods playscape, parking lot-sized solar array, food garden, and other onsite sustainability initiatives will provide a fitting and educational backdrop for the event. Community organizations dedicated to sustainability and outdoor education will also be on hand to share fun activities with visitors, and our state legislators will be in attendance to deliver remarks. We will also publicly debut our *Play Inside a Solar Cell* exhibit. Food and music will round out the festivities. A sensory-friendly, take-a-break-space will be provided. We expect 2,000 people to participate from throughout the region.

- ***Continue partnering with the Town of Acton to encourage access to the neighboring Great Hill conservation land via a trailhead on the Museum property.***

  Status: We regularly lead nature walks on these trails, with the enthusiastic support of the Town, and provide the support and impetus families need to get out and explore the trails on their own. "Bessie's Trail," a manageable woodland hike for young children, provides an appealing introductory experience. A kiosk at the trailhead provides families with

information and encouragement, and foul-weather gear is available to borrow at the Admissions desk. Other engagements with the Town of Acton have included partnerships with the town Office of Sustainability to deliver a program on geothermal energy and with the planning department for a program about Habitat for All, an approach to residential development that aims to maximize greenspace.

- ***Develop partnerships with environmental organizations to provide additional educational opportunities and offer concrete ways for visitors to take action to promote sustainability.***

  Status: The Museum was an active participant in the national, IMLS grant-funded collaboration, *Caretakers of Wonder*, which created a new climate educational framework for children under eight. The Museum was instrumental in the project's Climate Summit, by facilitating a session on Climate Leadership attended (virtually) by 60 museum leaders from around the country. The networking with this group was valuable, and we look forward to continued participation in this group.

  The Museum is also a member of Association of Science and Technology Center's (ASTC) *Seeding Action* effort, which aims to support informal educators in moving the public from a "culture of silent concern and fatalism" about climate change, "to one of active hope and engagement with solutions." We have participated in two years of self-assessment, the data from which is being used by ASTC to identify patterns of need in the industry.

  Our longtime participation in the Gulf of Maine Research Institute's Learning Ecosystems Northeast (LENE) project is also ongoing. This effort encourages collaboration between community organizations to provide similar educational experiences to kids through outdoor and environmental activities. We aim to provide expertise in outdoor education as well as resources to these partner organizations. Our current partners include Acton Memorial Library, First Connections, and Farrington Nature Linc.

  Museum staff were instrumental and have taken a leadership role in creating and maintaining the New England Museum Association Environmental Community of Practice (E-CoP) for practitioners focused on climate action and environmental topics. The group supports membership among museum professionals and hosts regular meetings and webinars. During 2024, it hosted eight such gatherings on a range of environmental and sustainability topics, helping to disseminate the work of the Museum and others with the goal of inspiring action in our field.

- ***Continue to foster dialogue and discussion on environmental issues through Discovery Museum Speaker Series and other means, particularly with older kids and adults.***

  Status: The Museum's YouTube channel offers recordings of two Speaker Series events on sustainability and climate: "Youth Voices in Climate Change" (2021) with Varshini Parkash, founder of the Sunrise Movement, and "Helping Kids Understand Climate Change and How to Make a Difference" (2022) with children's book authors Stacy Clark and Christy Mihaly. The Speaker Series was retired after the 2024 season. In 2025, *Discovery Soundbites*—a series of short-form video interviews with experts of all kinds, on topics of interest to our

audience—will launch. Voices representing sustainability, the benefits of outdoor education, and climate action will be invited to participate.

- ***Publicly report sustainability goals and progress and use our practices as examples for others.***

  Status: Our annual Sustainability Reports are available on the Museum's website. Prior reports were reviewed by a Sustainability Review advisory group made up of community members. With the success of the solar array, we have fielded numerous inquiries about the installation process from community members, including religious organizations, schools, and other non-profits. The Museum continues to offer whatever assistance it can to support action by other institutions. Former CEO Neil Gordon participated in a 2023 webinar about solar for nonprofits, which was conducted by Resonant Energy, our solar installation company. The recording is available for viewing on the Museum's YouTube channel. Neil and CEO Marie Beam were two of five panelists for a 2025 Association of Children's Museum conference session titled *Leading Your Museum on Climate Change Work: Lessons Learned*, during which they shared their experiences developing a vision and generating momentum to achieve sustainability goals.

- ***Create a page on our website dedicated to the Museum's sustainability efforts, including updates to this Sustainability Plan.***

  Status: A page has existed on the Museum website since 2022, which incorporates our current Strategic Plan, DEAI Framework, and each year's Sustainability Report. It includes the Board-adopted statement on Sustainability. Discovery Museum's 2025-27 Strategic Plan now includes "Stewardship" as a core value of the Museum.

- ***Include our sustainable practices in exhibits, programs, and other educational opportunities in order to model ways to better steward the environment.***

  Status: The Museum is installing a real-time display of the productivity of the new solar array. This process has been far more challenging than anticipated due to the complexities of obtaining real-time data display. We originally contracted to purchase an outdoor, weatherproof screen system and accompanying software product which would have been ideal for our needs; unfortunately, after many months the company determined that they could not deliver on their promise. We are now installing a weather-proof monitor to display the data in the format provided by the vendor who manages our solar productivity. Custom signage of our own design will aid young visitors in understanding the productivity graphs and, we hope, inspire conversations between caregivers and their children.

  This year we also drafted sustainable exhibits guidelines. They are intended to be a resource for staff working on new exhibits and for updating, repairing, or modifying existing exhibits. The document can help guide decision-making for sourcing materials or steering conversations with external developers and fabricators. While we envision a future for the Museum in which our operations are carbon negative, and all material leaving the Museum is compostable or reusable, we know that we are closer to the beginning of this journey than

the end. In the interest of getting ourselves started, we created four general categories for materials: Best, Better, Good, and Avoid if Possible.

- ***Advocate for our values as they pertain to sustainability.***

  Status: We had previously signed the We Are Still In (WASI) pledge and joined the America is All In coalition to declare our support for climate action to meet the Paris Agreement and supported the Town of Acton in formally declaring a climate emergency. We also participated in the 2023 Culture over Carbon initiative, a groundbreaking research project led by the New England Museum Association (NEMA) with funding from an Institute for Museum and Library Service (IMLS) National Leadership grant. Project leaders examined data from museums, zoos, aquariums, gardens, and historic sites across the United States to establish an energy carbon footprint for the museum sector and create "roadmaps" to help these institutions use energy more efficiently. Work with ASTC's *Seeding Action, Caretakers of Wonder,* and the LENE project continues. We are evaluating how to advocate for our values most effectively in the current political climate.

Goal #5: Prioritize Sustainability in Portfolio Analysis and Decision Making

Strategies

- ***Create a museum investment policy that maximizes investments in environmentally sustainable entities.***

  Status: The Board amended its Cash and Investment Policy to include the statement: "All investments should seek to align with the Museum's sustainability and DEAI plans." More work and review need to be done to meet this goal. In November 2023, the Board of Directors adopted the following policy statement:

  Discovery Museum is committed to environmental sustainability. We are working to:

  - *Become a more sustainable organization and share what we learn along the way*
  - *Educate and inspire to action our visiting adults and the next generation of earth's caregivers*
  - *Advocate for environmental stewardship.*

  We act on this commitment in ways that are designed to have a positive impact and urge our community to action in the short term, while preparing and motivating children to address the complex environmental challenges of the future.

V. Conclusion

For more than 40 years, Discovery Museum has sought to create a setting in which children of all ages, backgrounds, and abilities feel empowered and excited to play and explore the world around them. Our hands-on exhibits, programs, outdoor spaces, in-school programs, and dedicated staff all communicate a clear message: *play matters*. With the actions outlined in this document, we have also sought to convey the message that everyone can and should act to protect our natural world. Since the creation of the Sustainability Plan in 2021, the Museum has accomplished a great deal of what it set out to, most notably achieving carbon neutral status in 2024.

Our sustainability work over this period has also shifted in nature. Five years ago, we began executing a transformational vision, fueled by the passion and expertise of our former CEO, Neil Gordon, and several experienced advisors. We set lofty goals that called for significant operational and cultural shifts and multi-year capital investment. With those ambitions now realized, our sustainability initiatives have become more iterative and integrated with our day-to-day operations. This work is now activated and propelled by our entire staff and Board. As one example of how embedded sustainability work has become at Discovery Museum, our Board of Directors' Building Committee voted in 2024 to change its name and purview, in practice and in the Board bylaws, to the Building & Sustainability Committee to ensure permanent leadership and oversight at the Board level. Every agenda of that Committee includes discussion of both topics, and the intersection of the two results in better strategic decision making as we consider improvements to our physical plant and the allocation of our resources.

Likewise, in our 2025-27 Strategic Plan, adopted in late 2024, sustainability is no longer a separate pillar or goal—it instead appears in our updated mission statement ("…deepen relationships with the natural world…") guiding all our work, and in our core organizational value to inspire children to be good stewards of the natural world.

Discovery Museum is now adopting an annual goal-setting process, analogous to organizational planning processes already in place, that documents each year's sustainability ambitions and accomplishments. For example, in 2025 we are focusing on reducing paper usage and recycling, waste management and reduction, and the deeper articulation of our sustainability goals in educational programming for children and families. In setting goals annually, rather than as a multi-year plan, we are also acknowledging the dynamic nature of sustainability work, the evolving science of sustainability practices, and our ever-increasing understanding about impact and the experiential and educational needs of children. We believe Discovery Museum is exceedingly well-positioned to address the changing context of this work in real-time—reflecting on, understanding, committing, and responding to new opportunities to cultivate hope and action in children and families, and our museum industry.

Appendix 1: EV Charging Station Usage

The two EV charging stations were installed prior to drafting our Sustainability Plan goals. Use was minimal during the pandemic closures and subsequent solar installation project but has been growing. The users, primarily staff and Museum visitors, purchased over 24.3 MWh of electricity producing over 20.6 $MTCO_2e$ of avoided emissions, the equivalent of planting 529 trees growing for 10 years.

TOTAL SESSIONS PER YEAR	
2022	693
2023	1092
2024	1459

Appendix 2: Emissions Inventory Methodology Notes

Greenhouse Gas Emission Factors

We use Environmental Protection Agency (EPA) Global Warming Potential multipliers as our standard and they are updated every year for this calculation per the EPA website: GHG Emission Factors Hub | US EPA. This 2024 inventory used the latest 2024 factors (updated June 4, 2024) below:

Gas	100-Year GWP
CH_4	28
N_2O	265

Carbon Offset Calculations for Air and Vehicle Travel

Our inventory includes a calculation of emissions by all visitors, members, and staff in their travel by car to and from the Museum, and for our school outreach instructors' travel to and from the schools they serve.

The visitor methodology relies on the home zip code, which in 2024 was collected from each visiting group when they made a reservation or checked in at the Museum. We can assume that each family group comes in one car and so calculate the total miles driven to and from our museum and the associated carbon impact. We included all visitors traveling from very far away (those who are not residents of New England) at an average of 70 miles round trip by car. We did not assume responsibility for air travel to the area, as our museum does not draw out-of-region tourists as a primary travel destination.

For those who visit using Discovery Museum memberships, our database tracks the number of visits made per year and, as with regular visitors, we can calculate the total miles driven per visit.

We do a slightly more casual estimate for staff and regular volunteers based on work schedules and town of residence. Our school programs staff, who drive to schools all around Massachusetts, track that mileage for reimbursement, giving us a precise calculation of their emissions.

Our assumption that all of our visitors and members drive to the Museum is based on our real and anecdotal understanding of their behavior. While the Museum is ½ mile away from a Massachusetts Transportation Authority commuter rail station, that particular mode of public transportation is neither financially nor practically accessible for families with young children (it runs infrequently during our prime visiting hours and pricing is designed for those who ride daily). We offer a bike rack but, again, it is rarely used as that is not a viable option for most families. As a percentage of our visiting population, only a negligible number of families are close enough to walk to the Museum.

Airline Travel

The medium haul factor was used for all staff flights even though two of them would be classified as long haul. This keeps the calculation simpler and slightly overestimates related emissions.

Calculations

TOTALS	Total Miles	Total Emissions (mtCO2e)	Cost to Offset
Members	551,112.00	220.44	$3,416.89
Visitors	1,550,096.00	620.04	$9,610.60
Staff - Car	114,100.00	45.64	$707.42
Staff - Flight	15,000.00	5.92	$91.75
Total	**2,230,308.00**	**892.04**	**$13,826.66**

Solar Production Note

Calculations reflect that half of the RECs from solar production are retained by the Discovery Museum; the rest are sold at a discount to other nonprofits and so cannot be claimed.

Appendix 3: Discovery Museum Statement on Carbon Neutrality

To determine where the Museum stands in the pursuit of its goal to be carbon neutral by 2024, an updated greenhouse gas inventory was conducted by staff to measure 2024 emissions. The inventory revealed that the Museum successfully met its goal of achieving carbon neutrality by 2024 for its Scope 1 and 2 categories and for relevant, selected Scope 3 categories.

We are proud to be an operationally carbon-neutral company, offsetting our Scope 1 and 2 emissions through strategic carbon credits and prioritizing methods to directly reduce our carbon footprint.

The Museum met its target with a combination of activities to reduce emissions, such as the replacement of fossil fuel-burning landscape equipment with electric powered versions. Since 2022, the Museum has met its electricity requirements with the production of onsite solar electric that produced more than 100% of the Museum's electricity demand, becoming the first 100% solar electric museum of its kind. For emissions that could neither be reduced through current actions nor mitigated through solar production, the Museum balanced out the carbon produced by supporting projects that help the environment through strategically purchased carbon offsets. The selection of offsets was overseen by Environment & Culture Partners, a national nonprofit focused on climate action among cultural institutions.

To verify that the greenhouse gas inventory was done correctly and that we correctly interpreted the results, the Museum engaged GreenerU, Inc., to conduct an independent, third-party review of the Discovery Museum's 2024 greenhouse gas emissions inventory covering Scopes 1, 2, and selected Scope 3 categories. This review verified the accuracy and completeness of the inventory according to GHG Protocol guidance. Any issues identified by GreenerU during the review were addressed by the Discovery Museum.

GreenerU also verified that the Discovery Museum comprehensively and accurately measured and offset all Scope 1, 2, and selected Scope 3 categories in 2024, and supports the conclusion that the Museum attained carbon neutrality for this year. The Museum plans to continue its operations to maintain carbon neutral status and to systematically work towards eliminating remaining carbon emissions to achieve net zero emissions where possible.

Appendix 4: GreenerU Certification Letter

GREENER U

May 8, 2025

Discovery Museum
Attn: Marie Beam, Chief Executive Officer
177 Main Street (Route 27)
Acton, MA 01720

To Marie Beam, CEO:

This is a letter to confirm that GreenerU, Inc., has conducted an independent, third-party review of the Discovery Museum's 2024 greenhouse gas emissions inventory covering Scopes 1, 2, and selected Scope 3 categories. This review verified the accuracy and completeness of the inventory according to GHG Protocol guidance. Any issues identified by GreenerU during the review were addressed by the Discovery Museum.

GreenerU verifies that the Discovery Museum comprehensively and accurately measured and offset all Scope 1, 2, and selected Scope 3 categories in 2024, and supports their claim of carbon neutrality for this year.

Best regards,

Madeline Rawson

Madeline Rawson
Project Manager, Planning

307 Waverley Oaks Road, Suite 202 | Waltham, MA | 02452 | 781-209-5760 | greeneru.com