



# NET ZERO STRATEGIC PLAN

## SUMMARY

## Introduction

*Founded in 1876, the Appalachian Mountain Club is dedicated to the protection, enjoyment, and understanding of the outdoors. AMC envisions a world where natural resources are healthy, loved, and always protected, and where the outdoors occupies a place of central importance in every person's life.*

Anthropogenic climate change is the greatest threat to both natural ecosystems and human well-being. Addressing climate change will require significant and rapid changes in how society produces, transports, and uses energy. In the press release for a 2018 special report, the Intergovernmental Panel on Climate Change (IPCC), the United Nation's body for assessing the science relating to climate change, stated:

*The report finds that limiting global warming to 1.5°C would require 'rapid and far-reaching' transitions in land, energy, industry, buildings, transport, and cities. Global net human-caused emissions of carbon dioxide (CO<sub>2</sub>) would need to fall by about 45 percent from 2010 levels by 2030, reaching 'net zero' around 2050. This means that any remaining emissions would need to be balanced by removing CO<sub>2</sub> from the air.<sup>1</sup>*

Climate change has become a major focus of many AMC activities, including operation of our facilities, environmental education, public policy advocacy, research, and management of our Maine Woods lands. However, we recognize that to truly lead on this issue, we must also serve as an example by reducing our organization's greenhouse gas (GHG) emissions that are contributing to climate change. To meet this responsibility, in 2019, as part of the AMC150 strategic vision, AMC's Board of Directors adopted the IPCC goal as an organizational commitment to reduce our GHG emissions to "net zero" no later than 2050, including a 45%

reduction from 2010 levels by 2030.

Initial guidance on this commitment was developed as part of AMC's revised [Energy and Climate Policies](#) adopted by the Board of Directors in 2021. That policy committed AMC to annually track and publicly report our emissions and set forth the "carbon mitigation hierarchy" that will form the basis of AMC's approach (see below). The Net Zero Strategic Plan was developed to set forth a detailed approach to achieve this ambitious goal. The Plan starts by clarifying AMC's net zero commitment, including a set of principles to guide AMC's strategy. It provides a summary of AMC's operations and notable progress that has been made to reduce our environmental impact, a description of AMC's Scope of emissions and reporting boundary, a detailed analysis of AMC's emissions, and the various financial and technical considerations that will impact how AMC approaches this goal. The Plan is intended to be a living document that is periodically updated to reflect new information, technologies, and organizational capacity.

Finally, it lays out 12 goals and 43 strategies (pages 11 – 12) to move us toward net zero. This Summary provides a high-level overview of the Strategic Plan. For a fuller understanding of AMC's approach, including the background information that informs the Plan and the rationale behind the goals and strategies, readers are encouraged to consult [the full Plan and the accompanying Technical Appendix](#).

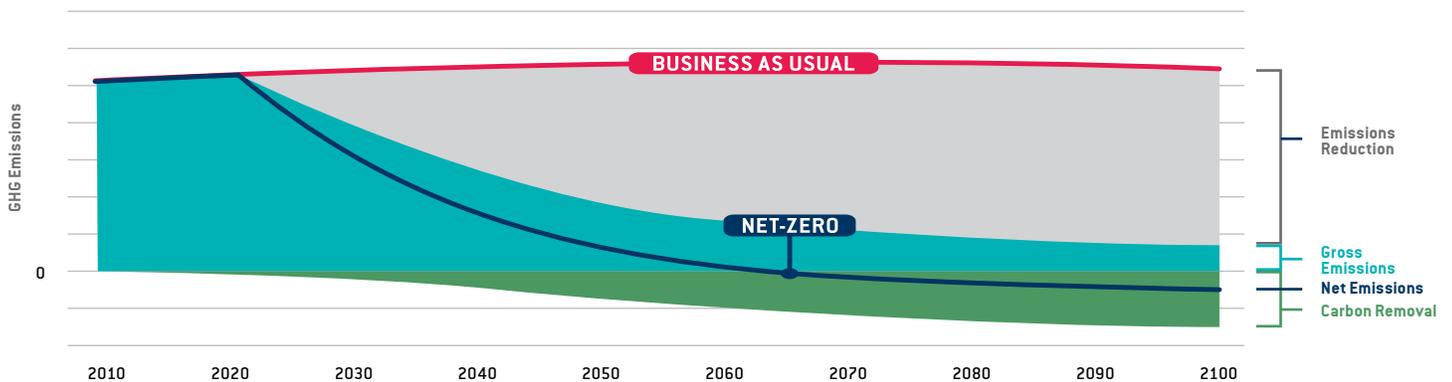
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<sup>1</sup>IPCC. 2018. Special Report: Global Warming of 1.5° C. [Global Warming of 1.5° C — \(ipcc.ch\)](#).

## What does it mean to be “net zero”?

To achieve net zero emissions, actual emissions must be reduced, and carbon will need to be removed from the atmosphere to balance out any remaining emissions (Fig. 1). Business as usual (red line) represents an approach where we do nothing to reduce our actual emission. Gross emissions (blue area) represent actual emissions prior to any offsetting. These emissions can be reduced through investments in various clean energy technologies, shown as emissions reduction (gray area), while

Figure 1. How to reach net zero<sup>2</sup>



offset investments are made in carbon removal projects or technologies (green area) to balance remaining emissions. The difference between gross emissions and carbon removal is known as net emissions (dark blue line). Ultimately, net zero (dark blue dot) is achieved when remaining gross emissions are counterbalanced with an equal amount of carbon removal (offsets), recognizing that it may never be financially or technologically possible to achieve net zero solely from emissions reductions.

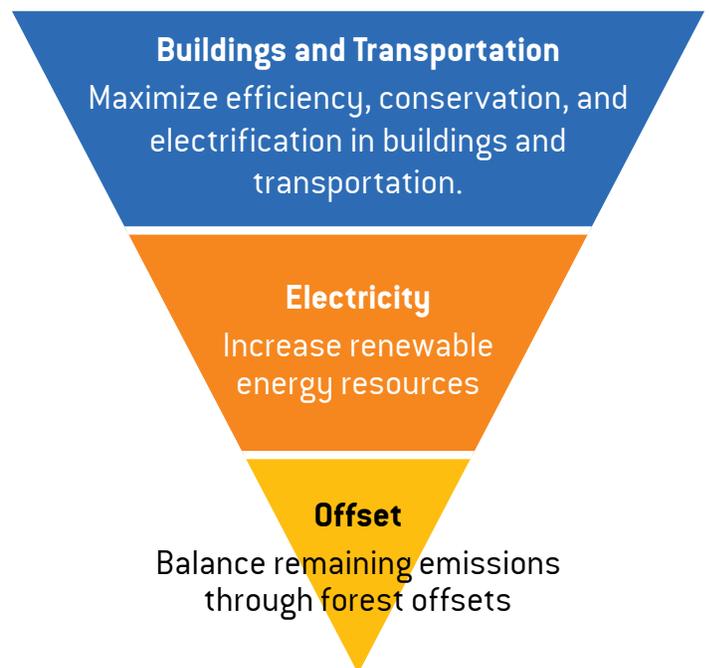
<sup>2</sup>Source: World Resources Institute (2019) What Does "Net-Zero Emissions" Mean? 8 Common Questions, Answered <https://www.wri.org/insights/net-zero-ghg-emissions-questions-answered>

## The Carbon Mitigation Hierarchy

The “carbon mitigation hierarchy” is a widely-adopted three-step strategy for moving towards net zero that prioritizes real emissions reductions (Fig. 2). It includes:

1. Avoid and reduce emissions from transportation and buildings through energy efficiency, conservation, and electrification. Efficiency and conservation are often cost-saving endeavors that should be used as first-choice solutions. However, eventually the energy supply for buildings and transportation must move away from fossil fuels to electricity through the implementation of technologies such as

Figure 2. The Carbon Mitigation Hierarchy<sup>3</sup>



heat pumps, induction stoves, and electric vehicles. Many, though not all, of these projects will result in long-term cost savings through reduced fuel costs.

2. Eliminate emissions from electricity by investing in renewable sources of energy. Renewable energy development is vital to realizing deep carbon reductions from the electrification of buildings and transportation. AMC will work to develop additional onsite renewable energy generation (primarily solar) paired with energy storage at our facilities. However, it is unlikely that AMC will be able to meet all its electrical needs through onsite renewable energy generation due to lack of available land, the sensitive environmental conditions of many facility sites, and the restrictions around sites on public land. Renewable electricity from outside sources will be secured through participation in projects such as offsite community solar and renewable energy contracts to completely decarbonize our electrical supply.
3. Offset any remaining emissions. AMC will continue to pursue all economically and physically practical steps to reduce carbon emissions from our facilities and operations. However, it is unlikely that we will be able to eliminate all emissions. AMC will use carbon offsets to annually balance our gross emissions. Offsets may be used as an interim step as we work to reduce our emissions, or as a long-term tool to balance emissions that cannot realistically be eliminated.

AMC is in the fortunate position of generating our own offsets from three verified projects on our Maine Woods Initiative lands. These projects generate more than enough credits to offset AMC's entire organizational carbon footprint if we were to retire them rather than sell them, even if no further actions were taken to reduce our emissions. However, offsets should not be used as a cheap and easy way to avoid actual emissions reductions - they balance but do not actually reduce emissions and relying entirely on offsets will not get the world's emissions down to net zero levels. AMC's *Energy and Climate Policies* make clear that the priority is to strive for continuous reduction of our gross emissions, with offsets used as a last step.

The question of what is "economically practical" is complex, and perhaps the most challenging issue AMC will face in our quest to become net zero. It involves not only cost versus emission reduction benefits but also how AMC's finite resources are allocated between the full range of our operations, programs, and activities. No simple line can be defined between when offsets should be used in lieu of further emissions reductions investments. This line will be defined by many individual financial decisions made by AMC in the coming years and decades.

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<sup>3</sup>AMC's basic strategy was adapted from Second Nature's "Carbon Management Hierarchy." Website "Carbon Management and Greenhouse Gas Mitigation," found on Sept. 16, 2020. <https://secondnature.org/signatory-handbook/carbon-management-greenhouse-gas-mitigation/>



In 2019, fuel use in buildings accounted for 59 percent of AMC’s net emissions (Fig. 4). The Highland Center was the largest source of emissions, followed by City Square and Pinkham Notch (Fig. 5). The primary source of emissions from the Highland Center is solid wood used for heating. Beginning in late 2021, emissions from electricity at City Square will be balanced by the purchase RECs, as is already done at the Highland Center and Pinkham Notch.

<sup>5</sup>Under proper management, wood is a renewable resource, but the carbon accounting for wood biomass is complex and it should not always be considered “carbon neutral.” AMC includes the full carbon emissions from purchased wood in our GHG inventory.

Figure 4. AMC annual operational GHG emission estimates, by Scope (2003 – 2021).

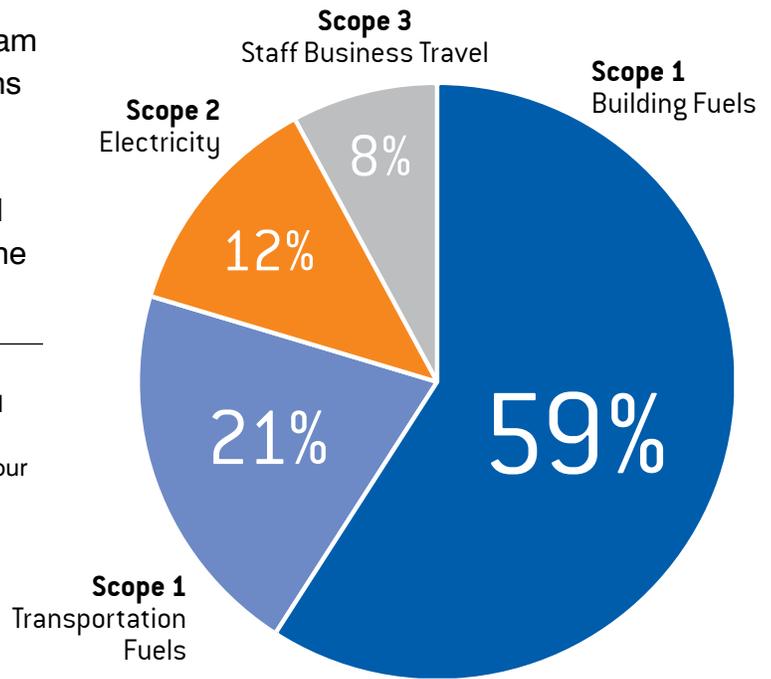
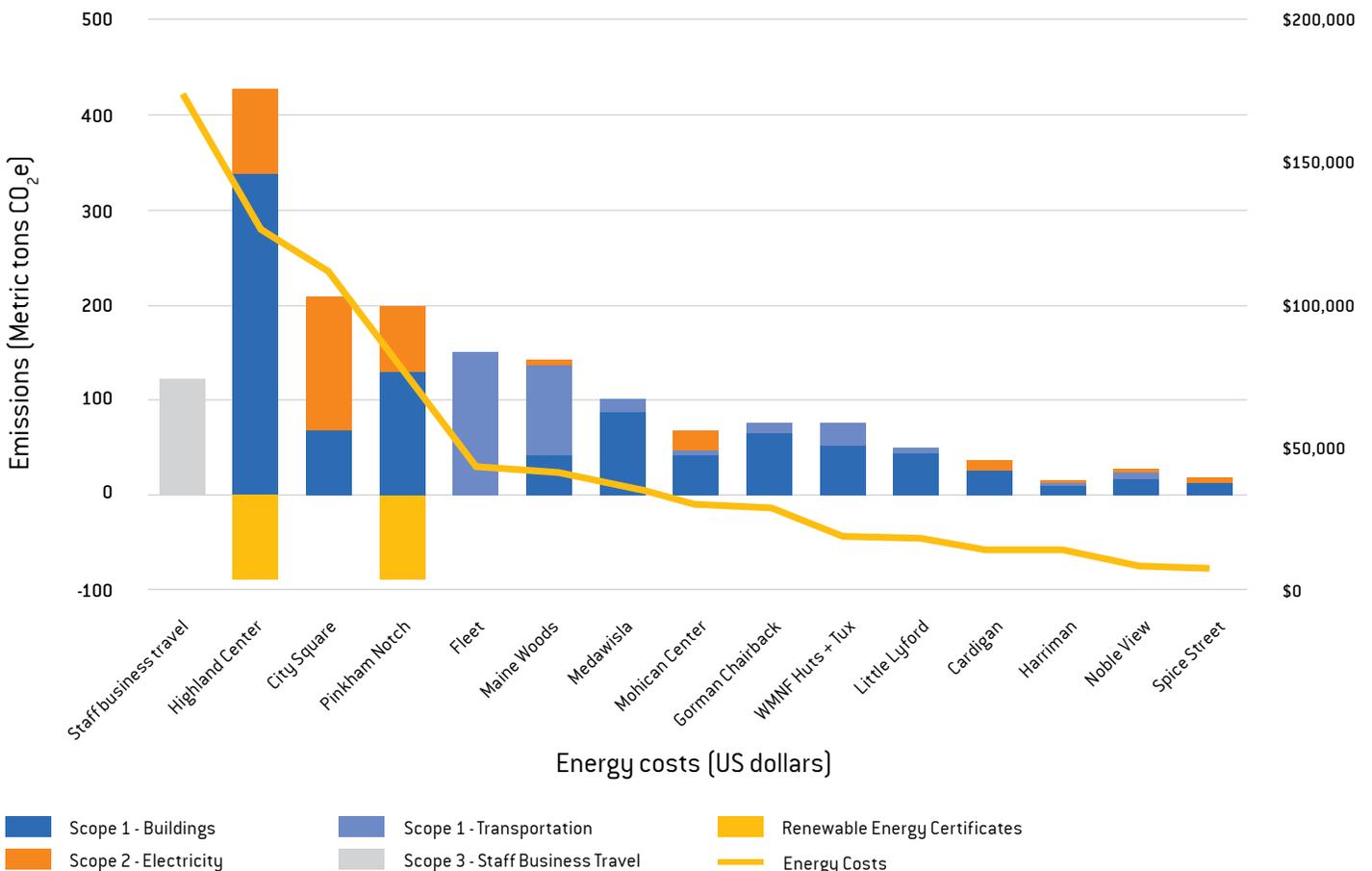


Figure 5. Estimated 2019 operational GHG emissions and energy costs, by facility.

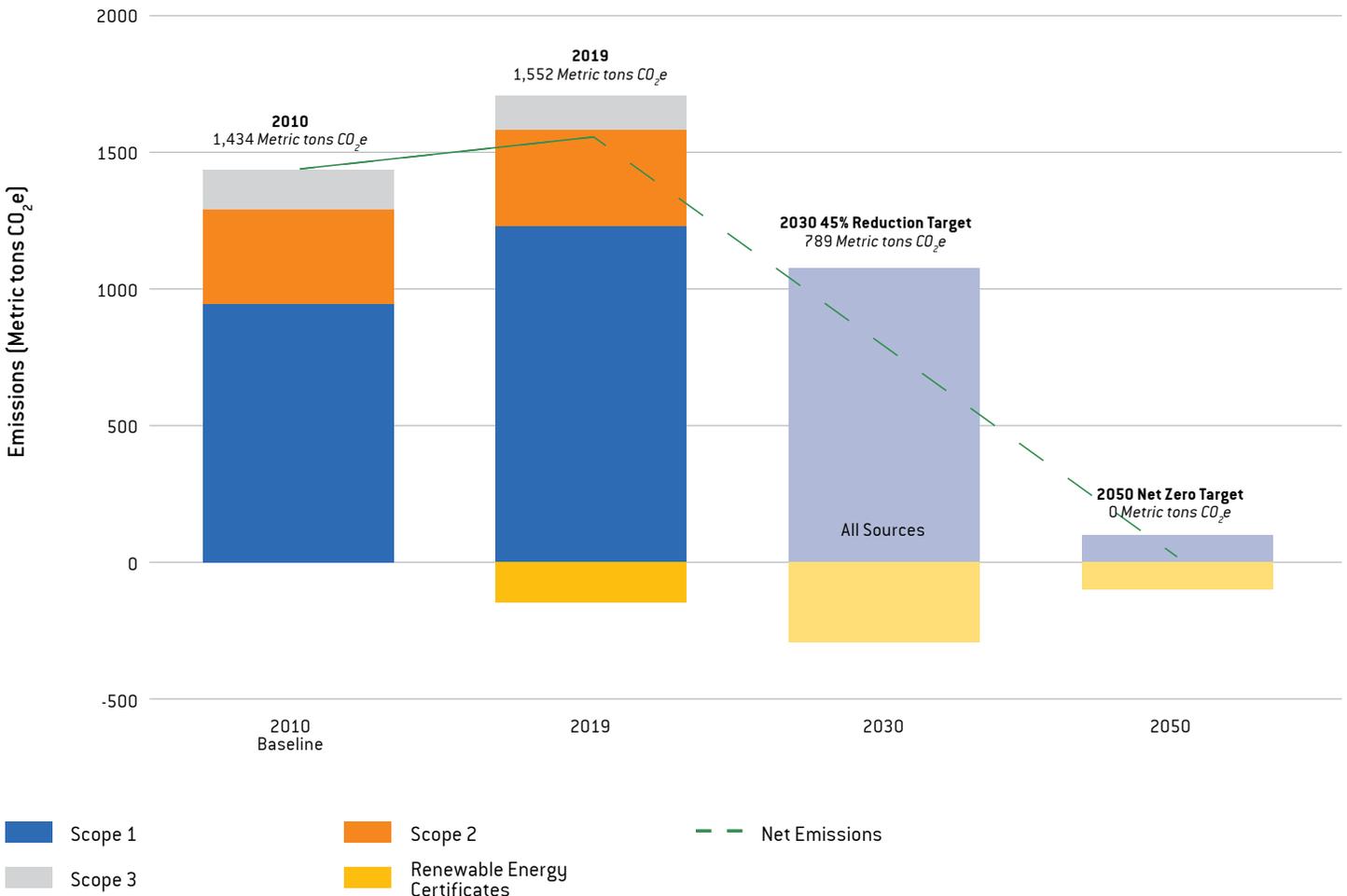


This information is critical to understanding emissions reduction opportunities, but it also illustrates the challenges. To meet our net zero goals, AMC must reduce emissions by six percent a year from 2019 levels through 2030, then five percent a year through 2050 (Fig. 6). These figures do not include the potential application of AMC’s forest offset credits, but as noted above, the priority must be on reducing AMC’s actual emissions.

To better understand emissions outside AMC’s reporting boundary, we conducted a one-time analysis of AMC’s other 2019 Scope 3 emissions. Supply chain emissions were estimated using widely-accepted online tools, though the results should only be considered a general estimate of relative magnitude. Adventure Travel was

estimated using 2022 annual averages and EPA emission factors and commuting was estimated via staff survey and EPA emission factors. We also developed a more accurate estimate of emissions from guest travel to our facilities using a tool developed by a team of University of Massachusetts graduate students (which will allow these emissions to be annually tracked in the future). These estimated other Scope 3 emissions are over 6 times our reporting boundary emissions, with two categories (upstream and downstream emissions from purchased goods and services, and guest travel to our facilities) combining for 80 percent of the total. Strategies have been developed to address many of the Scope 3 sources, though in many cases our ability to influence them is limited.

**Figure 6. Projected AMC reporting boundary GHG emission estimates to achieve net zero (2019 – 2050).**



# Considerations and Constraints

In some cases, emissions reduction technologies not only provide emissions benefits, but they can also reduce long-term costs, mitigate physical and reputational risks, enhance revenue, improve the guest experience, and attract new guests, members and donors interested in the net zero initiative. However, AMC's ability to achieve our net zero goals will be affected by many factors, including:

## **Balancing net zero with other institutional priorities**

To meet our net zero commitment, AMC must make significant capital investments in facility upgrades and lower-emissions technologies as well as staff resources to carry out this commitment. However, AMC's resources are limited, and net zero investments must be balanced against funding the many existing and new programs that are at the core of AMC's mission. Decisions about how this balance will be maintained are one of the most important yet difficult aspects of AMC's net zero commitment.

## **Net zero financial considerations**

Traditionally AMC has evaluated capital and other investments through two primary lenses – what are the financial implications, and how does the investment support and advance AMC's mission? The net zero commitment requires adding a third lens – what are the emissions reduction benefits? Some projects will be “win-win” and provide both financial and net zero benefits, others may significantly reduce emissions but be more expensive than higher-emissions options, and others (such as the move from Joy Street to City Square) may increase emissions but provide important financial or mission-related benefits.

## **Accounting for an internal cost of carbon**

AMC should incorporate the “cost of carbon”

in the analysis of investment alternatives. For example, in assessing the purchase of a fossil-fuel-powered vehicle versus an all-electric alternative, the lifetime cost of offsetting the emissions from burning fossil fuels must be included in the costs of the first vehicle, which will benefit the lower-emissions alternative.

## **Marginal costs**

Many capital purchases represent “must have” purchases to maintain operations, such as replacing a vehicle or aging facility systems. In these cases, the question regarding a lower-emissions alternative is not “what will it cost?” but rather “how much more will it cost?”

## **Cost of reducing emissions**

The carbon benefits of potential net zero investments can be quantified, both in terms of the magnitude of the reduction but also the cost per unit of reduction. Projects with a lower net cost per unit of emissions reductions represent the greatest “bang for the buck,” though investments with higher values may still be worthwhile for other reasons. This type of assessment can help inform decisions on net zero investments, in particular the major question of “when are the emissions reductions benefits worth the cost?”

## **Technical considerations**

There are many technical limitations to what AMC can accomplish in a reasonable timeframe. The infrastructure and workforce expertise to implement low-carbon solutions may be lacking, particularly in rural areas. The lack of internal capacity may limit our ability to implement more complex solutions when appropriate contractors are not available. Increased use of electricity may require electrical capacity upgrades at many facilities. Many of AMC's facilities are older and there are limits to how much emissions can be reduced without unreasonably expensive modifications.

## Environmental benefits and impacts of clean energy technology

Clean energy technologies generally have greater lifecycle benefits than conventional technologies, but some technologies may have serious adverse consequences on communities and ecosystems depending on how they are developed, sited, and implemented. While AMC may not be able to control these types of issues, we can evaluate tradeoffs between different energy resources.

## Other considerations

Other factors that will influence our progress include potential permitting limitations on what can be done at facilities on public land where there may be significant environmental and scenic constraints, and the need to maintain a safe and comfortable guest experience. For example, fireplaces used for aesthetics but not needed for space heating add to AMC's GHG footprint but offer an important ambiance for guests and reducing meat in meals would have clear environmental benefits and would reduce Scope 3 emissions from food purchases but would be contrary to guests' expectations.

## Goals and Strategies

The goals and strategies outlined in the Plan (see pages 11 – 12) were informed by internationally accepted best practice guidance, internal emissions analyses, and extensive consultation with staff throughout the AMC, as well as discussions with AMC's Board of Directors and Board of Advisors, peer organizations, leading climate organizations, and energy experts. They cover many aspects of AMC's emissions, but vary widely in their importance, effectiveness, and feasibility. The strategies are prioritized as "high" (black), "medium" (green) or "low" (red), based on organizational capacity, expected effectiveness, and practicality of implementation.

The primary focus of the high priority strategies is on those areas which can provide the greatest emissions reductions and over which we have the most control – our buildings and vehicles. The overarching strategy involves three components:

1. Increasing the energy efficiency of our buildings (through weatherization and upgrading the efficiency of heating, cooling, lighting, appliances, and other systems) and vehicles.

2. Converting from fossil fuels to electricity as the primary energy source for buildings and vehicles.
3. Securing renewable energy to power our facilities and vehicles.

This approach must be supported by a commitment to strategic long-term capital planning that takes advantage of regular capital stock turnover while remaining flexible enough to utilize the best available technology. Also critical will be ensuring sufficient staff capacity and expertise to implement the Plan, as well as securing new and diverse sources of funding. Prepared with this research and a strong organizational commitment, we are well-positioned to make significant advancement toward our climate goals.

## Conclusion

The Net Zero Strategic Plan is a living document that defines our net zero vision and priorities, provides a roadmap to achieve our climate goals, and identifies the resources, individuals, and timelines needed to carry out the Plan. It acknowledges that there are forthcoming technologies that are not yet developed and allows enough flexibility to use today's tools, but also incorporate tomorrow's advances. Strategies, emissions scopes, reporting boundaries, and data are expected to evolve over time.

The rapid transformations needed to reach net zero will require significant financial investments, technology transfer, and capacity-building. By following the strategy set out in this report, AMC has an opportunity to become a climate leader in the outdoor recreation and hospitality space.

AMC is proud of the sustainability work completed thus far and will use our net zero commitment to respond to the climate crisis with the full weight of the organization behind the implementation of this Strategic Plan. There is a lot more work to be done and we are up to the challenge. Implementing the strategies, goals and activities set out within this Plan is the first of our efforts and we will regularly communicate our progress with the AMC community and others.

## Acknowledgements

AMC acknowledges the generous support of donors to the Leadership Giving Initiative, through which the Kenneth Kimball Research Fellowship was created and which enabled the development of this Strategic Plan. We especially thank Arcadia Lee and David Publicover, who spearheaded the research and development of this Plan, as well as acknowledging the many AMC staff and Board members and outside organizations and experts who contributed their time, knowledge, and ideas. The Plan would not have been possible without their help.

# Net Zero Goals and Strategies

● Priority    ● Medium Priority    ● Low Priority

## Goal 1. Set interim targets for continual reductions toward net zero and evaluate performance periodically.

- » Strategy 1.1. Set annual targets for continually reducing actual (gross) operational emissions from each sector and review progress each year.
- » Strategy 1.2. Develop additional metrics beyond total emissions to track improvements in energy use efficiency.
- » Strategy 1.3. Evaluate the GHG management framework and the Net Zero Strategic Plan every 3-5 years.

## Goal 2. Set up internal process to track and report operational emissions progress on an annual basis.

- » Strategy 2.1. Establish a reliable GHG accounting system to demonstrate progress toward net zero and identify areas for improvement.
- » Strategy 2.2. Publicly report GHG emissions data and progress on an annual basis to demonstrate accountability and build trust with stakeholders.
- » Strategy 2.3. Collaborate with Volunteer Camps and Cabins to incorporate energy use data and share knowledge.

## Goal 3. Enhance organizational capacity to achieve climate targets.

- » Strategy 3.1. Establish a permanent Director of Sustainability position to coordinate net zero efforts and provide technical support and guidance.
- » Strategy 3.2. Build staff capacity in Finance, Marketing and Communications, and Executive teams to reliably report emissions each year.
- » Strategy 3.3. Coordinate “Sustainability Managers Roundtable” discussions to develop best management practices.
- » Strategy 3.4. Consider sustainability knowledge and experience as a qualification for hiring and promoting relevant positions.
- » Strategy 3.5. Support staff training opportunities to build in-house expertise in areas relevant to implementing net zero projects.
- » Strategy 3.6. Empower staff to become net zero leaders in their everyday roles.

## Goal 4. Prioritize net zero considerations in long-term capital, operational, and capacity planning.

- » Strategy 4.1. Incorporate net zero investments within the broader capital planning process.
- » Strategy 4.2. Extend the capital planning process to be 3-5 years out across AMC operations.
- » Strategy 4.3. Incorporate carbon accounting and cost-benefit analysis into the capital planning process.

## Goal 5. Identify internal and external resources to pay for net zero investments.

- » Strategy 5.1. Develop innovative, flexible funding sources to support net zero opportunities.
- » Strategy 5.2. Tap into government programs to support net zero projects.
- » Strategy 5.3. Increase philanthropic engagement around net zero.
- » Strategy 5.4. Cultivate corporate partnership opportunities that advance net zero.

## Goal 6. Reduce emissions in buildings through increased energy conservation, efficiency, and electrification.

- » Strategy 6.1. Develop a strategic business plan to strategically electrify existing building space.
- » Strategy 6.2. Identify vendors to conduct a comprehensive assessment of existing AMC buildings.
- » Strategy 6.3. Design new construction and large-scale renovation projects to be net zero.
- » Strategy 6.4. Reduce propane use at off-grid Maine Woods lodges, White Mountain National Forest huts, and Volunteer Camps and Cabins.

## Goal 7. Reduce emissions from transportation by transforming AMC’s vehicle fleet and machinery.

- » Strategy 7.1. Develop a vehicle (and equipment) replacement plan to accelerate the adoption of alternative fuel technologies where possible.
- » Strategy 7.2. Increase electric vehicle charging infrastructure across facilities with a preference for fast chargers where possible.
- » Strategy 7.3. Increase efficiency of White Mountain Hiker Shuttle system through strategic evaluation and conversion technology.
- » Strategy 7.4. Explore opportunities at White Mountain National Forest huts to reduce associated emissions from helicopter resupply.

**Goal 8. Eliminate emissions from electricity through increased production of renewable energy combined with storage and purchase of renewably generated electricity credits.**

- » Strategy 8.1. Develop a strategic business plan to increase renewable energy supply at AMC facilities.
- » Strategy 8.2. Purchase Renewable Energy Certificates to balance emissions from purchased electricity.
- » Strategy 8.3. Address resiliency of our energy systems through increased energy storage and demand response technologies.

**Goal 9. Reduce emissions from staff business travel by encouraging greener transportation.**

- » Strategy 9.1. Review performance and develop alternative transportation strategies to reduce emissions from official business travel.

**Goal 10. Offset residual emissions within AMC's reporting boundary through retirement of credits from AMC's forest carbon offset projects.**

- » Strategy 10.1. Start offsetting as soon as the annual emissions tracking system is set up.

**Goal 11. Use a range of approaches as appropriate to reduce emissions from other diverse sources outside the reporting boundary.**

- » Strategy 11.1. Reduce emissions from supply chains through local and sustainable sourcing policies and engagements.

- » Strategy 11.2. Offer "carbon neutral" shipping for all AMC online retail orders.
- » Strategy 11.3. Reduce GHG emissions from guest travel to AMC facilities and programs through education and coordinated effort.
- » Strategy 11.4. Reduce emissions from food service by increasing local sourcing of food supply and options for plant-based meals.
- » Strategy 11.5. Develop new policies and programs to reduce waste at AMC facilities.
- » Strategy 11.6. Support staff in reducing emissions from commuting and related activities.
- » Strategy 11.7. Enable Chapters and volunteers to cut emissions from AMC-related and everyday activities.
- » Strategy 11.8. Continue investing in environmentally and socially responsible companies.

**Goal 12. Communicate broadly and consistently with the AMC community and the public about the need to achieve net zero as well as our approach, challenges, and successes.**

- » Strategy 12.1. Develop a net zero marketing and communications plan.
- » Strategy 12.2. Update existing signage to reflect the net zero goal and identify other educational opportunities to conserve energy at AMC facilities.
- » Strategy 12.3. Advocate for policies and research that support climate change science, monitoring, and actions grounded in sound science.



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*The mission of the Appalachian Mountain Club is to foster the protection, enjoyment, and understanding of the outdoors.*

**outdoors.org**