THE DARTMOUTH SKIWAY

Master Plan
2023

Contents

Vision

Make the Dartmouth Skiway the most sustainable ski operation in the United States.

Purpose

To uphold the legacy of the Dartmouth Skiway by ensuring future ski operations in the face of a changing climate and enhancing access, recreation, and education for generations to come.

Outcomes

1. Inspire change in the ski industry by pioneering and leading in climate resilience.
2. The Skiway is the Upper Valley's winter recreation center for the next 100 years.
3. Continuous improvements to the skiing, learning, and community experiences.

Phases & What It Takes

1.
Invest in Carbon-neutral Snowmaking
$3-5 million

By overhauling the entire snowmaking system to be 100% electric, automated, and cover all skiable terrain at the Skiway.

2.
Intentionally Manage our Forest
$150-550k

By developing a forest management plan to expand the Skiway's gladed terrain and ensure the forests on the mountains are as climate resilient as possible.

3.
Upgrade On-mountain Infrastructure
$3-5 million

By building a new Learning Center that will be the hub for future generations to develop their skills.

Summary

For more than six decades, the Dartmouth Skiway has served the Upper Valley as a winter playground and refuge for hundreds of thousands of people. It's been a gathering place where young and old, experienced and novice, local and international all come together to learn skills, build friendships, and generally enjoy the great outdoors. In spite of its relatively small physical footprint, the Skiway has a rich history of incubating ski legends, from Olympians to world-renowned explorers to ski-industry innovators.

While it's wonderful to reflect on our past and our many collective achievements, it's also time to acknowledge that the Skiway is at an existential crossroads. Climate change has already had a profound impact on New England skiing and the Skiway's operations in particular. And the headwall is only getting more formidable. Our current infrastructure struggles to support the multifaceted usership that has defined the Skiway for generations. Our operational days are in peril in terms of both quantity and quality. The existing solution is unsustainable: running our outdated, diesel-fueled equipment more often and for longer periods of time, ultimately enlarging our carbon footprint.

To honor our legacy and keep people skiing for generations to come, the Skiway must take action and build its climate resilience. The best way to build that resilience is to focus on being good stewards of the mountain and our planet writ large.

What does this stewardship look like? Operationally there are three key phases:

1. Invest in Carbon-neutral Snowmaking

The clearest and most efficient path to good stewardship is through modernizing and expanding our existing snowmaking system. Snowmaking is the backbone and lifeline of New England ski areas large and small. Climate change has accelerated the need for having a robust snowmaking system that is cost effective and energy efficient.

By expanding our snowmaking footprint using modern technology and clean energy, we will vastly improve the skier experience while also working toward our goal of net zero emissions. Installing onsite solar arrays and battery storage will allow the Skiway to power the all-electric snowmaking system.

2. Intentionally Manage Our Forest

As a community of outdoor enthusiasts, our wild spaces are precious to us. We have the honor of being the stewards of a few hundred beautiful acres here in the Upper Valley. Properly managing our forests is not just an opportunity, but our duty. We plan to partner with environmental scientists to guide us in building a forest management plan. This plan will include ways to better leverage how the Skiway uses this land as a natural place beyond winter recreation. We see multi use trails as an amenity to our

community that helps us get outside, supporting our connection to the land and improving our mental wellbeing.

Good forest stewardship results in better soil management, key in helping mitigate erosion and flooding. These types of events in the Upper Valley are becoming more common due to the increase in extreme weather events. On top of that, intentionally managing our forests will improve the health of the forest ecosystem and reduce the risks of forest fires. We want the forests on these mountains to be around for generations to come, and this plan will help us get there.

3. Upgrade On-mountain Infrastructure

The beating heart of the Skiway is the community that brings these mountains to life each season. We want to ensure the longevity of the Skiway and its legacy by actively investing in infrastructure and programs that benefit future generations.

With that in mind, we plan to build a new Development Center for all types of skiers and boarders to learn and hone their skills. In years past, the Skiway has nurtured dozens of Olympians and industry leaders. We want to build on that legacy by reinvesting in our community and the next generation of skiers and boarders.

The development of the Skiway over time has led to several inefficient and disconnected outbuildings. A more thoughtful approach to consolidating the uses of these outbuildings into a single Development Center will lead to a more efficient operation, better service to our community, and additional opportunities for reducing our carbon footprint.

Pillars

In the effort to plan out the future of the Skiway, there are three core pillars guiding each step we take:

1. **Sustainability** - Being good stewards of the mountain
2. **Community** - Inclusion and fun for all levels and groups
3. **Operations** - Keeping people skiing for generations to come

While the steps to implement this plan are heavily focused on infrastructure and operations, the core reasoning behind these upgrades and expansions are centered on bringing the most value to our community and becoming industry leaders and changemakers in sustainability.

The Foundation: What We've Accomplished

These pillars have always been important to us. Since Mark Adamczyk took over as General Manager in 2020, the organization has made guest experience a top priority. The Skiway hired its first Guest Experience Manager and made dozens of operational improvements around the mountain: access for uphillers, shorter lift lines with new RFID gates, an easier renting experience, and an expanded ski school to name a few.

While many of these recent improvements have focused on community and operations, we have also been working behind the scenes on our sustainability efforts. We collaborated with Dartmouth College students at the Cook Engineering Design Center to conduct an Energy Efficiency Study of the Skiway. The insights gained from this research and report paved the way for the development of this plan. With a clear understanding of our environmental impact and where we can make the biggest leaps in energy efficiency, we can start focusing our efforts and resources to make major changes and improvements that will benefit the Skiway and the environment for decades to come.

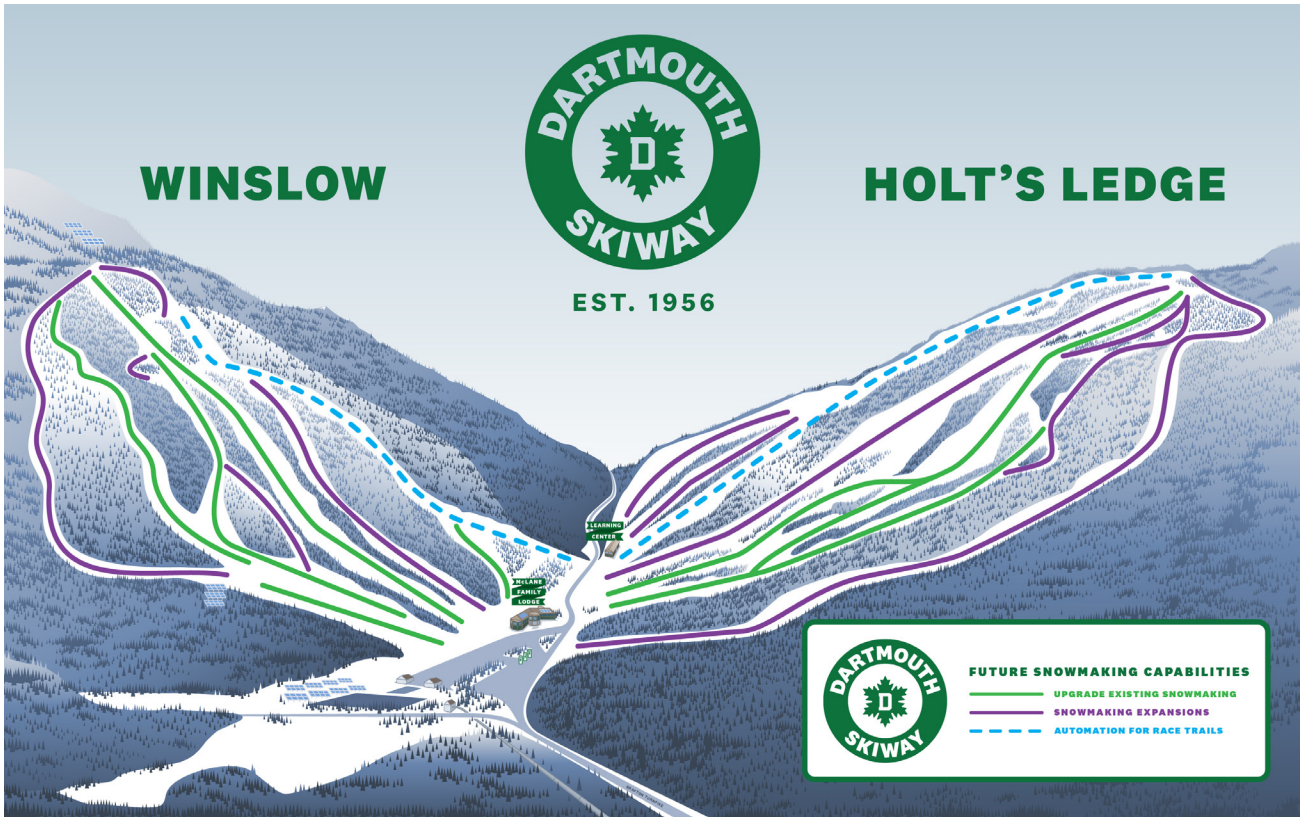
Phases

Phase 1: Invest in Carbon-neutral Snowmaking

Overview: The next chapter of the Skiway will begin with a complete overhaul of the snowmaking infrastructure. We will transition the energy source for snowmaking from diesel to electricity. While we're in the process of replacing existing systems (which cover about 60% of the skiable terrain), we will expand snowmaking to cover 100% of the mountain. In an effort to make the Skiway as climate resilient as possible, it's important that all skiable terrain has the potential to be covered with machine-made snow.

Automation plays another key role in efficiency. Investing in automation reduces downtime during cold weather windows. This technology makes better use of our snowmaking labor, allowing us to make more snow, in more places, with a smaller staff.

Lastly, electrification and automation lay the groundwork for expansion. With more capacity due to our increases in efficiency, we can make more snow, more quickly, ultimately resulting in fewer operating hours and fewer emissions. This will provide an opportunity for the Skiway to expand its terrain outside of the current boundaries.



Sustainability: Converting the snowmaking system to be fully electric gives us the opportunity to generate and store that power on site. Taking advantage of current and future roof space, a large, flat parking area, and key areas dotted around the mountain, we will have a number of solar arrays to power a majority of our operational needs. With a large bank of batteries, we will store the power generated during the day for when we need it for snowmaking during off-peak hours. Given the smaller footprint of our ski area compared to a majority of other ski hills in the industry, we have the opportunity to generate and store most of the power that we use.

With the expansion of snowmaking capabilities, we need to be conscious of the hill's watershed and capacity for more water usage. With this in mind, we are funding a flow study to research sourcing water from a local brook on the mountain. If the flow study comes back strong, we will be able to recharge our snowmaking pond in about half the time, from an existing 6–14 days down to 3–7 days, allowing us to make more snow and establish a strong base throughout the season. This will require the construction of a pump-back building that will be built at the base, where runout consolidates. This building will pump water from the runout back into our pond, refilling it more quickly than it will naturally.

Community: The core reasoning behind overhauling our snowmaking operations is to keep people skiing for generations to come. The only way this is possible is to bring this system into the 21st century. Snowmaking supports every stakeholder group within our community and is the most important investment that can be made at the Skiway.

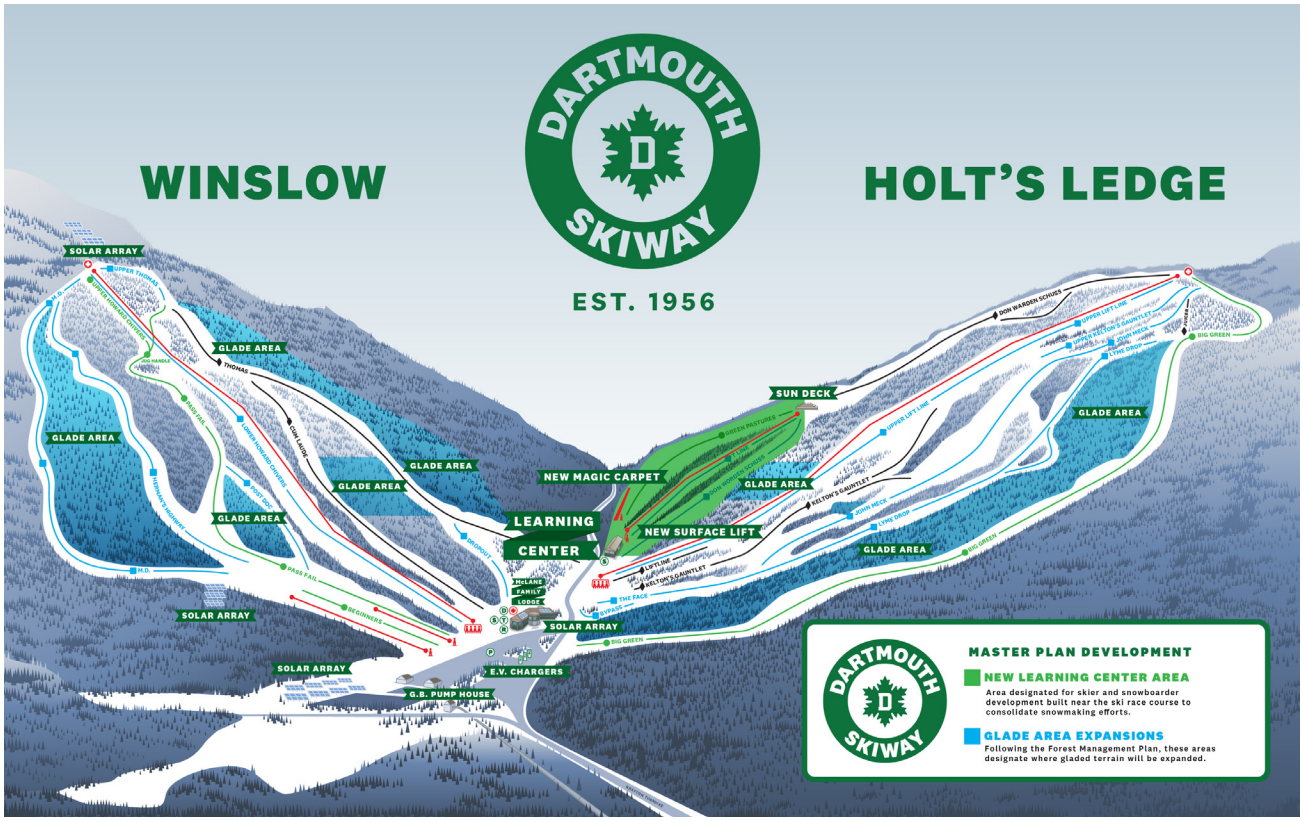
As we expand the skiable terrain that is supported by snowmaking, we are also prioritizing and consolidating early season efforts. The focus here will be on areas for beginners (like the new Development Center outlined in Phase 3) and race courses for the various race teams that train at the Skiway. We want to continue the opportunities for growth and learning that the Skiway provides, and snowmaking is integral to keeping those opportunities alive.

Operations: Not only will we expand our system to cover all terrain, but we also will automate parts of the system. We will prioritize automating race trails to ensure our racing teams always have a high-quality, consistent snow surface to ski on. Eventually, we'll expand automation to both hills. A fully automated system will allow the Skiway to reduce production time, catch tighter weather windows for snowmaking, and cover more ski terrain in a shorter amount of time.

Phase 2: Intentionally Manage our Forest

Once the snowmaking infrastructure upgrade is complete, the next phase involves forest management and creating more gladed ski areas. Bringing in the experts we need to guide us properly, the Skiway will work to ensure we have a proper plan in place to keep our forests thriving for generations to come.

In an effort to build our climate resilience, making sure our forests are more drought- and flood-tolerant while reducing the risk of fire is key. Extreme weather events are becoming more common as we venture further into a changing climate. Making sure the forests throughout and surrounding the Skiway are healthy is crucial in ensuring the ski hill's longevity.



An added benefit of forest management is opening additional skiable acreage. A thoughtful plan should allow the Skiway to expand terrain and improve the guest experience by opening a variety of glades adjacent to existing runs. When complete, this effort will increase skiable terrain by 25%, bringing skiable acreage from 104 to 130. This expansion will distribute traffic across the mountain and alleviate impact and snowmaking needs on current runs.

Sustainability: To make sure these new glades are created and maintained properly, we will be partnering with the Dartmouth Director of Forestry to provide expertise and guide the process. A Forest

Management Plan will be developed to inform how we manage the health of the forest ecosystem, properly identify the glading zones, and guide the best methods for thinning parts of the forest. This plan will also provide regenerative guidelines to ensure these glades stay strong and healthy for the foreseeable future and beyond.

Community: Proper forest management will result in more skiable acreage, more open glades, and potential for future non-ski trail expansion for summer use. These gladed areas will give advanced riders more varied terrain, provide intermediate riders with the opportunity to hone their skills, and generally offer a more differentiated product among New England ski hills.

At the end of the day, skiing and boarding through glades is fun! We want the Skiway to be home to as many gladed areas as sustainably possible. More open, gladed terrain also will expand opportunities for non-winter trail activities, such as hiking and mountain biking, allowing the Skiway to be utilized by the community year round.

Operations: More gladed terrain means more skiable acres. More skiable acres means traffic is distributed around the two hills more evenly. With skiers and boarders more spread out, our snow surface will stay in better shape for longer periods of time. A stretch goal of ours is to expand snowmaking into these newly gladed areas, allowing for great snow in the trees all season long.

Phase 3: Upgrade On-mountain Infrastructure

To continue our mission to keep people skiing, the final phase of this plan is to establish a robust Development Center in the Green Pastures area. This will include the construction of a new remote building at the base of Green Pastures near the base of Holt's lift. This building will serve as a gear-rental shop, ski and snowboard Development Center, and warming hut.

In addition to this new building, we will install a new carpet ride up the side of Green Pastures as well as a surface lift up the face of the T line. This is currently some of the most underutilized terrain on the hill; new lift access will breathe life into this part of the mountain and establish a designated learning area for beginners and intermediates away from the Skiway's more heavily trafficked trails.

To cap off this new Development Center, we will construct a sun deck at the top of the new surface lift before Green Pastures, T Line, and Don Wardens Schuss split up. This will be a place for the community to gather on a typical day to hang out and kick back. On race days, with skiers zipping by, the deck will offer a great view to spectate and cheer racers on from a safe distance.

Additionally we will upgrade our main two lifts. We have an opportunity to extend the Winslow lift as part of this effort, unlocking a little more skiable terrain above the existing terminus. As for Holt's lift, there is an opportunity to upgrade the classic two-seater to a quad as we add more terrain and skiers to the mountain.

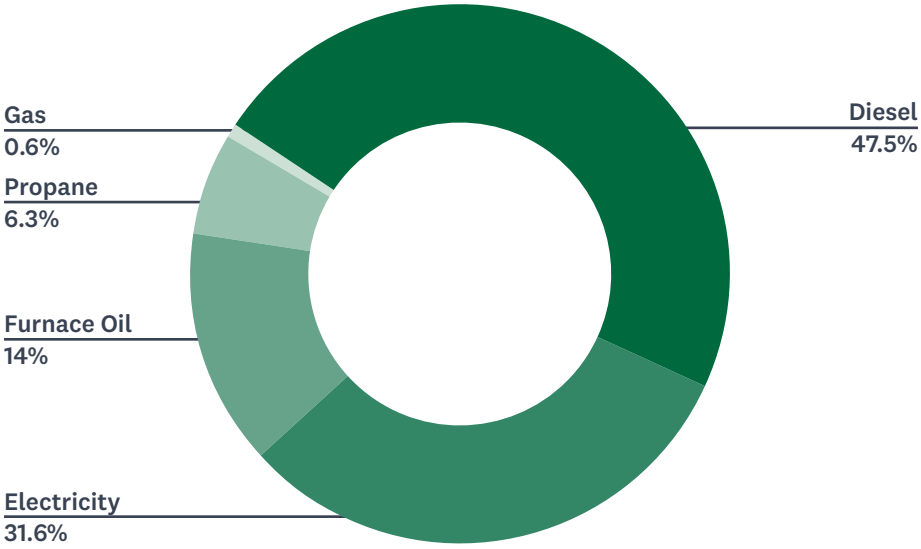
In an effort to reduce our carbon footprint and be good stewards of the mountain, we plan on installing a number of solar systems throughout the area. These solar arrays will mostly be ground mount systems dotted throughout the mountain generating power near where it is needed most. We also plan on installing solar on the McLane Family Lodge and the new Development Center to help power building operations.

In addition to capturing energy from the sun, we will take advantage of another sustainable resource available to us here in the Upper Valley, wind. By adding in a number of wind turbines in key locations where wind is more consistent and prominent, we will supplement our solar energy production, increasing our power generation and resiliency.

> **Sustainability:** By relocating the learning area from Winslow's side to Holt's side, snowmaking efforts will be consolidated in the early season. This focus will reduce resource needs both in terms of energy requirements and water demand, improving our mountain stewardship.
>
> Onsite generation will play a key role in directly reducing our impact to the environment, there are ample opportunities to create clean electricity on Skiway property. The installation of solar arrays or wind turbines will reduce our carbon footprint, helping us reach our net-zero goal. Ideally, we'll have a large battery bank on site to store excess generated power for when we need it on cloudy days and early morning/late night snowmaking operations.

Thanks to a group of Dartmouth students from the Cook Engineering Design Center, the Skiway's carbon emissions footprint was measured a few years ago. With this insight, we can see that by converting our snowmaking equipment from running on diesel to electricity, onsite sustainable power generation becomes the pathway to net zero emissions.

Total Carbon Emissions: 571.4 $MTCO_2e$



Community: This phase is core to community development at the Skiway. We imagine these hills transforming to become New England's premier place to learn to ski and ride. The Development Center will inspire and welcome newcomers into the sport — regardless of age, ability, or background — and teach the next generation how to shred.

Even as we improve chairlifts and snowmaking, and create better places to learn and advance skills, we strive to maintain our community ski-hill feel. A major part of that effort will be balancing ski-lift capacity and short lift lines. We believe upgrading the Holt's lift and adding gladed terrain will allow for an increased capacity on the hill while keeping lift lines moving. There's nothing like skiing right onto the chair lap after lap, and we will continue to ensure this experience is preserved.

Operations: With the consolidation of snowmaking efforts in the early season, there is an operational advantage beyond sustainability. The main advantage is that ski racers and beginners can have an earlier start to the season and ski more consistent snow until closing. It also improves operational staffing efficiency and costs.

The lift upgrades will help distribute skier traffic more quickly and efficiently across the two hills. This means getting in more laps, skiing a wider variety of runs, and making the most out of each day.

THE SKIWAY'S HISTORY

1955

John Meck '33 publishes his report, "Development of Adequate Skiing Facilities for Dartmouth Students in the Hanover Area," to the Dartmouth Trustee Planning Committee. They're into it.

Summer 1956

In the summer and early fall, neighbors—most of whom live within sight of the hill—turn out to transform Holt's Ledge into a real live ski area. Howard Chivers '39 serves as its first General Manager.

Fall 1956

The Skiway's first 3,776-foot-long Poma lift is installed, giving us an uphill capacity of 800 skiers an hour.

1957

The Skiway's first lodge, the Peter Brundage Lodge, is completed. Holt's Ledge is formally dedicated on January 12th.

1960-61

Long lift lines mean it's time for another lift. A 1,700-foot-long Mueller T-bar goes in at the foot of the Don Worden Schuss, and the Brundage Lodge gets a facelift.

1967

Another lift, a 3,800 foot Italian double chairlift, is installed at Winslow Hill. In just six months, the lift goes in, and four new trails are cut, graded, and groomed.

1977-78

Holt's original Poma lift is replaced with a Hall double chairlift. This means the Skiway has really arrived—it has chairlifts on both peaks.

1985

Dartmouth Trustees approve the snowmaking project, and equipment is installed by the end of December. The Dupre Family, headed up by snowmaking pioneer patriarch Herman Dupre, will contribute greatly to increasing the Skiway's snowmaking capacity over the ensuring years.

1979-80

With a depressing four operating days this season, the Skiway starts considering its snowmaking options.

1988-89

A J-bar goes in at Winslow.

1995

Winslow's double chairlift gets an upgrade: new Garaventa CTEC fixed grip quad lift.

2000

The Brundage Lodge has begun to show wear and tear, and construction on the new McLane Family Lodge begins. Built from local Vermont and New Hampshire forests, the gorgeous new 17,000-square-foot lodge wins an award for its unique architecture.

2005

The Skiway modernizes with a new Doppelmayr-CTEC overhead drive on the Holt's side, but retains its unvarnished New England feel by keeping the double chairlift in place.

2020 - Present

Mark Adamczyk came on as the new General Manager. The first few years were spent focusing on improving the guest experience and building a plan to make the mountain more sustainable in the face of climate change.

Phase 1: 2024-2026 Invest in carbon-neutral snowmaking

Snowmaking infrastructure is fully overhauled helping Skiway reach net 0. The new system is 100% electric, automated, and cover all skiable terrain at the Skiway.

Phase 2: 2025-2030 Intentionally Manage our Forest

Forest management begins to open up glades and expand up to 75 acres of new gladed terrain.

Phase 3: 2026-2028 Upgrade On-mountain Infrastructure

The Learning Center is built out. It will act as the hub for future generations to develop their skills.

What Success Looks Like

Sustainability

In 10–20 years, our aspiration is to have the Skiway's operations be 100% carbon neutral. We will achieve this goal by overhauling our snowmaking operations as outlined in Phase 1. Currently, our snowmaking system runs on old diesel-fueled machines with an annual carbon footprint of 571.4 metric tons of carbon, equivalent to the emissions generated from powering over 100 homes a year. With a fully electric system, we will have the opportunity to power everything with renewable energy. When this plan is fully implemented, we will have robust onsite energy generation to power operations across the mountain, bringing our carbon footprint down to net zero.

We strive to be good environmental stewards. Expanding our gladed terrain will be taken with great consideration and forethought. All of this will be articulated in a robust Forest Management Plan that guides our glading efforts and ensures a robust local ecosystem. These mountains are our home, and we plan on planting trees for the next generation to ski through.

Community

The local community is everything to the Skiway. Being a welcoming place for families, students, newcomers, skiing veterans, and racers is important to keeping the Skiway legacy alive for generations to come. That is why the third phase is so crucial in bringing our next chapter to life. By creating a dedicated Development Center for all types of beginners — kids and adults, skiers and snowboarders, downhillers and uphillers, and anyone else who is looking to improve their skills and be more comfortable on the slopes — we hope to inspire and develop the next generation of snowsports enthusiasts in the Upper Valley and beyond.

We also intend to provide a canvas for a robust summer trail network as part of our Forest Management Plan. This is essential for year-round use and continuing to serve the local community, including Dartmouth College students and faculty.

Operations

Our main priority at the Skiway is to keep people skiing. First and foremost, this means ensuring there is great snow all winter long. Achieving this goal in the face of a less predictable and warming climate will require a dedicated effort over many years to install state-of-the-art snowmaking equipment and generally invest in climate resiliency.

Analysis

To ensure that our plan is implemented in the best possible way for the health of the mountains and the community, there are a handful of studies that we will like to conduct and reference.

Studies to be conducted:

- **Snowmaking cost-savings analysis**
- **Environmental footprint analysis**
  - Water savings study
  - Emissions reduction study
- **Forest Management Study**

Studies already conducted:

- Dartmouth Skiway Energy Efficiency Study

Studies to reference:

- Climate change vulnerability of the US Northeast winter recreation – tourism sector
- Skier demand and behavioral adaptation to climate change in the US Northeast

How To Get Involved

This ambitious plan can only be implemented with community involvement, and we welcome you to participate in co-creating the future of the Dartmouth Skiway with us.

To help underwrite this Master Plan, please email the Skiway's General Manager Mark at: **Mark.F.Adamczyk@dartmouth.edu**

Mark would also love to hear your feedback on the plan, stories you have to share from your time at the Skiway, and your ideas for assistance in other forms.

If you are interested in helping on site during the summer to expand our gladed terrain (once there is a proper Forest Management Plan in place), please sign up here, and we'll keep you posted: XXX

Contact

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