

OUR GREEN FUTURE: THE SUSTAINABILITY ROAD MAP FOR DARTMOUTH

EXECUTIVE SUMMARY

President Hanlon has called on Dartmouth to play a leadership role in improving global sustainability and overcoming the challenges of climate change. The Sustainability Task Force has been charged with developing plans supportive of this goal. Although Dartmouth has substantially reduced campus energy use and made other significant advances over the last decade, we lag our peer institutions with respect to commitments, actions, and reporting in the sustainability domain. The best available science indicates that, in order to limit temperature rise to 2 degrees centigrade, greenhouse gas emissions must be decreased by at least 80% by 2050. Our report recommends principles, standards, and commitments in the areas of energy, waste and materials, water, food, transportation, and landscape and ecology. Energy is the largest contributor to Dartmouth's greenhouse gas emissions and is also the area where prior analysis best positions us to take action. We believe that providing 50% of campus energy from renewable sources by 2025 and 100% by 2050 is feasible. For campus operations other than energy, we recommend timelines for data gathering and goal-setting. Looking beyond campus operations, Dartmouth has opportunities to maximize our impact by initiatives involving integration of sustainability into our curriculum, out-of-classroom activities and research and scholarship. We believe that the tension between fiscal and operational constraints and sustainability imperatives is healthy. This tension focuses the tradeoffs and allows us to determine how we might gain the most benefit possible per unit of spending. Open discourse and continuous fine-tuning of our goals will allow our investments to produce the greatest possible impact, and enable us to build a model that can be sustained and replicated.

INTRODUCTION

We imagine a Dartmouth where sustainability is at the core of our identity as an institution, giving shape to our long-held traditions of resource prudence, connection to the environment, and responsible leadership.

We imagine a Dartmouth where sustainability serves our mission through scholarship, and classroom and experiential learning.

We imagine a Dartmouth where campus operations are a model for sustainability and are leveraged to make tangible progress towards a low carbon future.

Three primary actions will move us toward these goals:

- We must reaffirm our commitment to a low carbon future.

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- We must make the necessary investments to achieve a low carbon energy future for our campus.
- We must measure how we are doing and report publicly on our progress.

This document is about goals, not tactics. In pursuit of these goals Dartmouth will develop a portfolio of tactics that reflect our identity, our fiscal realities, our operational conditions, and our innovative nature. An ongoing conversation that sets priorities based on achieving the greatest carbon and sustainability benefit for the least cost is critical to Dartmouth's success in this endeavor, and it will help us find and implement the lowest cost, best solutions to drive us towards a low carbon future.

WHAT CAN WE DO?

We define sustainability as:

- The intelligent use of resources so that they are available into the future.
- The connection of environmental, social, and economic values to make a better world.
- Mindfulness of the limits of the natural world and an appreciation of our unique location.

With this definition in mind, the Sustainability Task Force was guided by the following questions:

- How can our campus become more sustainable?
- What can we do to hasten the decarbonization of the global economy, as science indicates we must?
- What are the most important actions that Dartmouth can do as an institution?

Dartmouth has a long history of scholarship and teaching associated with the environment and climate change, and our graduates are well-positioned to understand complex challenges and lead efforts to address them.

Our size, scope and culture enable us to approach systems problems, like those related to sustainability, by connecting strengths across disciplines in powerful ways. We have an obligation to act responsibly and to apply what we know, here on our campus. The goals in this document will align our operations with what science tells us we must do to enable a sustainable future, and will push us to pilot new solutions at Dartmouth.

BACKGROUND AND GUIDING PRINCIPLES

Convened by President Hanlon, the Sustainability Task Force brought together a team of faculty, students and staff to develop recommendations for Dartmouth's future. We met seven times between July 2016 and March 2017 as a group, in addition to numerous sub-group meetings. Task force membership is appended to this report. The task force had the opportunity to build from previous sustainability planning efforts and the work of Dartmouth faculty, staff and

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students. As we moved through the planning process, five guiding principles helped us organize our recommendations:

- Sustainability must be in service to Dartmouth's higher order objectives of scholarship and education.
- Dartmouth should contribute to advancing understanding of climate and energy challenges and solutions.
- In order to succeed in these two principles, we must first practice sustainability at Dartmouth. Our campus operations can be a model and a testing ground for solutions.
- Our operational goals should be based on the best available science.
- We have a responsibility to lead.

We see an opportunity to use sustainability as an organizing concept that will reveal financial efficiencies, operational optimization, and ways to improve organizational alignment. When a sustainable path requires more investment than the status quo, difficult decisions will have to be made. We have developed this plan to help chart a reasonable course that balances short-term costs with long-term savings to ensure Dartmouth has a long and prosperous future. We expect this plan will evolve and be fine-tuned in the future, as we regularly reassess our goals and respond to new developments.

GUIDANCE FROM THE BEST AVAILABLE SCIENCE

In order to limit the average global temperature rise to 2 degrees centigrade, as agreed to by 194 countries who signed the COP21 Agreement in Paris, we must decrease greenhouse gas emissions by at least 80% by 2050, achieve net zero emissions around mid-century and achieve net negative emissions in the second half of the century. If Dartmouth is to do its part in mitigating climate change, we must align our goals with these targets. If we are to lead, we must exceed these targets. Three activities account for about three quarters of both greenhouse gas emissions and environmental impact across a range of metrics. These activities are building energy use, transportation and the food system. Dartmouth should focus its attention accordingly.

A SUMMARY OF DARTMOUTH'S IMPACTS TODAY (2016)

Where are we starting from? Dartmouth has the operational impacts of a town of about 20,000 residents. Our energy system relies on 3.5 million gallons of Number 6 fuel oil. In addition, we consume 50,000 MWhs of electricity from the grid. These inputs generate about 75% of Dartmouth's greenhouse gas emissions and, because Number 6 fuel oil is a relatively dirty fuel, our greenhouse gas emissions per student are among the highest in our peer group. In addition, each year Dartmouth produces about 7 million pounds of waste. Our students consume about 30 million dollars of food and 36 million gallons of water in residence halls alone. Millions of miles are traveled on Dartmouth's behalf by employees and students. We own and manage about 30,000 acres of land. And we generate more than 65,000 metric tons of carbon dioxide per year.

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Over time, Dartmouth has invested wisely in our energy infrastructure to obtain significant energy savings. In 2010, we burned about 4.5 million gallons of number 6 fuel oil. In 2016, we burned 3.5 million gallons. These data are part of a consistent downward trend in our annual oil consumption. Our annual absolute emissions declined about 10% since 2011, even while we have added 300,000 square feet of new space.

These gains are real and they have been accomplished by passionate individuals working to meet Dartmouth’s 2008 greenhouse gas emissions goal, to improve efficiency and reduce costs. The questions remains: What gains could be achieved with new goals? How could science-based goals across campus operations improve our resiliency? We believe we have much to gain by setting ambitious but achievable targets and energizing the creative problem-solving capabilities of the Dartmouth community.

DARTMOUTH’S STANDING AMONG PEERS

Although Dartmouth has its own opportunities and challenges, and we believe that Dartmouth’s solutions must be suited to our particular identity, it is instructive to evaluate how our peers have responded to the challenge of climate change. The following table outlines the commitments of some of our peers:

	Greenhouse Gas Emissions Commitment	Waste Commitment	Water Commitment	Food Commitment	Public sustainability plan and progress reports with multiple quantitative goals and metrics
Dartmouth	30% from a 2005 baseline by 2030	No	No	No	No
Stanford	70% reduction from 2017 BAU	Yes	Yes	No	Yes
Harvard	Reduction at maximum practicable rate, aligned with 80% by 2050	Yes	Yes	Yes	Yes
Middlebury	Carbon neutral in 2016	Yes	Yes	Yes	Yes
MIT	32% from a 2014 baseline	Yes	Yes	Yes	Yes

Dartmouth lags behind our peers with respect to commitments, actions, and reporting. Looking at a comparison such as this, readily assembled based on information from the web, we fear that Dartmouth will be disadvantaged in recruiting brilliant young student and faculty candidates dedicated to address the world's sustainability challenges. We believe that this is important to rectify, and hope that our recommendations enable Dartmouth to step forward to take a leading position toward a sustainable, low carbon future.

STRUCTURE OF OUR RECOMMENDATIONS

Each section begins with an introduction that provides an overview of the operational area as relates to sustainability. We have used the following structure to organize our recommendations:

- **Principles** are overarching statements about our ambition.
- **Goals** are targets that fit under principles and enable us to achieve them.
- **Commitments** are areas where we know action is required but where we do not yet have enough information to set a goal
- **Standards** are detailed policies and procedures needed to achieve our goals and make progress towards commitments.

Our recommended goals, commitments, and standards will guide the choice of specific tactics implemented to achieve each principle.

CORE AREAS FOR ACTION

Our recommendations focus on Dartmouth's key operational impacts. These are energy, waste and materials, water, food, transportation, landscape and ecology, and the connections of each of these areas to our mission of teaching and research. Although all systems are connected, these distinctions were a sensible breakdown, along organizational lines, of our operational areas and impacts.

ENERGY

In this document, *energy* encompasses all types of energy including electricity, thermal energy, and fuels. Energy is by far the largest source of greenhouse gas emissions at Dartmouth and most energy is consumed in our buildings. Since 2005, Dartmouth has been working to improve building energy systems. We have done this through the following steps:

1. Following an organized program of improvements and investments aimed at increasing efficiency

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2. Conducting in-depth study of our supply and distribution systems with investigation into alternatives
3. Initiating a program of building renewal focused on efficient new buildings and renovations.

These steps have provided results:

- Since 2011, Dartmouth has added 300,000 square feet of building space, but has reduced campus consumption of fuel oil by close to one third.
- Dartmouth has seven LEED-certified buildings, including the Class of 1978 Life Sciences Center, which is rated as LEED platinum, the highest certification in the benchmarking system designating resource efficient “green” buildings. The Life Sciences building is three times as large as its predecessor, Gilman, but only uses one-quarter of the energy per square foot.
- We have studied the available alternatives for our energy supply, including potential fuels and delivery systems. Viable alternatives that improve sustainability, resiliency and efficiency have been identified.

Since 2008, our efficiency improvements and reductions in greenhouse gas emissions have been driven by our goals. These goals were set in 2008 by President Wright and stated that Dartmouth would reduce greenhouse gas emissions from 2005 levels by the following dates and percentages.

- By year 2015: 20% reduction from 2005 levels
- By year 2020: 25% reduction from 2005 levels
- By year 2030: 30% reduction from 2005 levels

While these targets were appropriate at the time and have motivated significant improvements, we must now look further ahead and align ourselves with the best available science as well as our peer institutions. Many of the significant reductions achieved to date have involved “low-hanging fruit”; more systemic change will be required to further curtail our emissions.

Since 2008, Dartmouth has studied nearly every possible alternative for our energy system and many viable options have been identified. Despite this, Dartmouth has not made any meaningful changes to our energy supply and distribution method since the 1920’s. Now it is time to transition Dartmouth to a more resilient, efficient and sustainable energy system.

We understand that climate change is a global challenge with global solutions. There are market solutions, many quite creative, that will help drive a truly sustainable solution set. At Dartmouth we will have opportunities to make wise decisions about our connections to the broader energy system and will have to weigh global, local, and regional impacts. The question that should guide us is “How might our actions effectively lower our carbon impact and help transition the world

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to a low carbon future?" There are many potential contributors to our energy future and the mix of solutions will likely change over time. A focus on high carbon impact per dollar invested and a willingness to continue to remain open to new technologies and market mechanisms will enable us to actively participate in the global transition.

PRINCIPLES AND GOALS: ENERGY

Energy Principle 1: Make a commitment to finding and implementing the lowest cost, best solutions to drive us towards a low carbon future.

Goals

- Pursue creative mechanisms that balance fiscal prudence with carbon and sustainability benefit.
- Identify the solution set that is best for Dartmouth, that reflects our climate, culture and strengths and that enables us to leverage these for the most impact per dollar invested.

Energy Principle 2: Maximize efficiency and minimize energy demand in buildings.

Goals

- Develop and implement building efficiency standards and require that all buildings meet these standards.
- Make building efficiency standards publically available online.
- Use space efficiently, maximizing the benefit to Dartmouth of our spaces.

Energy Principle 3: Deliver energy efficiently, using modern technology and innovation.

Goal

- Improve the efficiency of our energy distribution system by 20% by 2030.

Energy Principle 4: Develop and maintain a reliable, affordable, low carbon energy supply.

Goals

- By 2025, obtain 50% of Dartmouth's energy supply from renewables.
- By 2050, obtain 100% of Dartmouth's energy supply from renewables.
- Develop a carbon neutral, affordable energy supply by 2100.

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Energy Principle 5: Reduce Greenhouse Gas Emissions

Goals

- A 50% greenhouse gas emissions (GHG) reduction by 2025 with no offsets using a 2010 baseline
- An 80% GHG reduction by 2050 with no offsets, using a 2010 baseline
- Our aspiration is that, starting in 2051, our energy system should be carbon negative
- Adopt the 2010 baseline for all emissions calculations

Energy Principle 6: Commit adequate resources to enable our energy transition

Energy Principle 7: Measure and evaluate our progress

- Track and report our greenhouse gas emissions from Scope 1 and Scope 2 each year (See Appendix for definitions.)
- Begin to measure and track our Scope 3 emissions by 2020 with a 90% confidence interval.
- Share our progress publically on a website by 2017.

Energy Principle 8: We will use our energy system as a research and teaching tool in service to our mission.

Energy Principle 9: We will share ideas and progress made on our energy system in order to create a broader social benefit.

Energy Principle 10: Maximize efficiencies through systems integration and holistic planning.

Goal

- Over time, move from including only Scope 1 and 2 emissions to Scopes 1-3.

Energy Principle 11: Engage our students, staff and faculty in educational and behavior change programs, especially those that can produce meaningful reductions in energy demand.

Goal

- Invest in a Green Labs program that develops energy saving behavior change programs for laboratories.

STANDARDS: ENERGY

- Biomass Sourcing Standard
- New Building and Renovation Energy Performance Standards
- Solar Performance Standards
- Integrated Design Standards

COMMITMENTS: ENERGY

- Develop proposals to effectively incentivize achieving goals, such as an internal carbon tax.
- Assess and pursue opportunities for regional impact.

WASTE AND MATERIALS

Waste has a range of negative environmental effects. From a carbon perspective, waste is not Dartmouth's biggest environmental impact. Nor is it Dartmouth's largest operational expenditure. However, it is an area with significant impact on the user experience. Students, faculty, staff and community members care very much about our actual waste streams and about how they perceive Dartmouth's approach to waste. They intuitively use our waste handling programs as a barometer for Dartmouth's environmental and social responsibility. Furthermore, awareness of solid waste can be a gateway to engagement with other sustainability issues.

Dartmouth was an early adopter of recycling in 1988, thanks in part to the efforts of students in an environmental studies class who studied and then recommended recycling. In recent years, improvements to our waste system have yielded an increased percentage of waste diverted from the landfill to more than 40% of our total waste by weight. Simultaneously, however, we have steadily increased the total waste we produce. The constant flux in procurement and materials handling, and the marketability of different materials has led to waste management challenges. Finally, Changes in the internal organizational structures that oversee waste at Dartmouth have led to an absence of standardization in our approach.

Our waste system and materials handling approach are a valuable opportunity for us to improve efficiency and reduce environmental impact, and for Dartmouth to lead by example in the Upper Valley.

The total monetary expenditure and total monetary payoff in these areas are much lower than those for energy. However, because people disproportionately care about waste, we feel that these principles and goals are important.

PRINCIPLES AND GOALS: WASTE

Waste Principle 1: Dartmouth should prioritize waste handling in the following order: reduce, reuse, recycle.

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Goals

- By 2018, submit to the associate vice president of campus services a comprehensive report of our current waste system, highlighting areas of potential improvement, with specific approaches for achieving significant gains.
- Publicly publish the comprehensive waste report and actively communicate about it.
- By 2018, track and measure the quantity, type and source of waste at an appropriate resolution and timescale, reporting it publically each year.

Waste Principle 2: Reduce the total amount of waste that is produced.

Goals

- Develop and implement education and training designed to reduce the total amount of waste that is produced.
- Reduce total waste 5% per year with a target of 50% overall waste reduction (including recycling) from 2015 levels by 2025.

Waste Principle 3: Maximize the efficiency of material use by increasing the amount of waste that is diverted from the landfill and reused.

Goals

- Develop a materials handling system for reusable “hard goods” to encourage reuse within the Dartmouth community.
- Develop systems for materials handling that distribute or sell hard goods and consumables in a fair and equitable way to the community when they cannot be reused at Dartmouth.
- Institute a system that effectively diverts post-consumer food waste to the highest and best use.
- Develop plans for these three systems by the end of 2018 and implement them by the end of 2020.

Waste Principle 4: Maximize the efficiency of our waste system by increasing the fraction of waste that is diverted from landfill and recycled.

Goals

- Improve the rate of diversion of waste away from landfill to 50% of our waste stream by 2019.
- Improve the rate of diversion of waste away from landfill to 80% of our waste stream by 2025.
- Aspire to send zero waste to landfill by 2035.

Waste Principle 5: Align purchasing standards with waste reduction goals to reduce the waste stream.

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Goals

- Develop College-wide Purchasing Standards for environmentally preferred products by 2019. This purchasing standard should take full life cycle and disposal into account.

Waste Principle 6: Reduce the harm caused by our wastes as much as possible.

Goals

- Reduce use of hazardous materials, halving every 10 years the quantity by weight that we dispose of.
- Recycle or dispose of hazardous and electronic materials in a responsible and ethical manner.
- Enhance the information mechanisms to assist researchers to identify less hazardous materials for their research.
- Standardize these practices by 2019.
- Develop College-wide Green Cleaning Standard by 2019.

Waste Principle 7: Develop a waste system that is robust enough to handle rapid changes in markets and to communicate those effectively to the Dartmouth community.

Goals

- Provide regular training on our waste system to faculty, students and staff.

COMMITMENTS: WASTE

- Understand waste streams including those not captured in current waste audits and centralize information in the Sustainability Report. These areas might include hard goods, hazardous materials and construction debris.

WATER

In the Northeast, the supply of clean water is often not considered a major sustainability concern because it is relatively abundant. However, most forecasts of the impacts of climate change over time include variability in both average annual rainfall and in how water systems function. These will no doubt have impact here in Hanover and it is sensible to manage our water system with long-term sustainability and resiliency in mind.

PRINCIPLES AND GOALS: WATER

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Water Principle 1: Measure and track Dartmouth's water consumption and use patterns, assessing opportunities for increasing the efficiency of water consumption and decreasing water waste, and the extent to which these are the best use of resources.

Goal

- By the end of calendar year 2018, develop an annual water report that shows consumption and use patterns and identifies opportunities for improvement.

COMMITMENTS: WATER

- By the end of calendar year 2019, assess the impacts (financial, sustainability related, social) of goals for reducing water use (including reuse) and improving water efficiency. Determine if goals on water efficiency make sense for Dartmouth.

FOOD

Food is a foundational part of the human experience— an integral part of the economy, essential to life and critical to health. Perhaps less recognized is the profound impact of food production on the health of the ecosystems that support human life. According to the IPCC 2014 Fifth Assessment Report, agriculture accounts for about a quarter of global greenhouse gas emissions. Simultaneously, food is interwoven into the cultural, religious and ethnic fabrics of societies. Like waste, food is something we interact with on a daily basis and many people have passionate connections to their food system. Managing emissions related to food production is therefore a complicated and multifaceted challenge. It is also a powerful opportunity. How do we assess the environmental and social impacts of our food system? How will we measure progress? To date, we do not have reliable, cost effective systems in place that allow us to understand and measure the environmental, social and economic impacts of our food system

Here at Dartmouth, we can build on the improvements that our dining services team has already implemented. We have grouped these into four basic categories:

1. Understanding our food impacts at Dartmouth.
2. Shifting what we purchase towards foods that meet our sustainability criteria.
3. Changing where we buy to reduce negative impacts and, when appropriate, to support local and regional economies.
4. Educating our food consumers to make lifelong healthy food choices and to understand how food choices impact the environment.

PRINCIPLES AND GOALS: FOOD

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Food Principle 1: Develop insight into the environmental, social and economic impacts of our food system at Dartmouth and develop methods for measuring progress towards improved sustainability.

Goals

- By 2019, prepare an annual food report that summarizes the environmental, social and economic impacts of our food system.
- Adequately resource this effort beyond the existing Dartmouth Dining Services budget.

Food Principle 2: Increase the percentage of foods in our food system that are sustainable.

Goals

- Increase demand for more sustainable options by improving consumer education.
- By the end of 2019, develop a plan (working with college dieticians, Dartmouth Dining Services, Sustainability Office and the Athletic Department) to educate students on ways they can reduce negative environmental and social impacts of what they eat while maintaining a healthy diet.
- Reduce waste associated with food including packaging and food itself by including waste as a buying criterion.
- Adequately incentivize and resource Dartmouth Dining Services to improve the sustainability of our food supply and food system.

Food Principle 3: Decrease the quantities of less sustainable food that we purchase.

Goals

- Develop a plan to educate students on ways they can reduce negative environmental and social impacts of what they eat while maintaining a healthy diet.
- Develop a plan to reduce demand for high impact foods, consistent with our standard.

Food Principle 4: Reduce waste in the food system.

STANDARDS: FOOD

- Dartmouth Food Sustainability Standard

COMMITMENTS: FOOD

- Increase the percentage of foods that meet sustainability criteria (as defined by Dartmouth's standard), in sync with increases in consumer demand.
- Assess how and where our food is sourced, and set a sourcing standard that minimizes the negative impacts of our food system and maximizes benefits.

TRANSPORTATION

According to the EPA, emissions related to transportation can generate a quarter to a third of the total carbon emissions of a university. While this contribution is large, the sources for these emissions are diffuse, making the emissions difficult to track and reduce. Meanwhile, transportation to, from, and around campus has a big impact on the quality of life of the members of the Dartmouth community in terms of time, convenience and daily experience. So, while the goal of improving and streamlining transportation networks is complex, has many passionate stakeholders and can be challenging, large gains can be achieved. The first step is in understanding the transportation systems and identifying areas where changes can have the most significant impact. While there have been many excellent efforts to map parts of the Dartmouth transportation system in the past (such as the Pedestrian and Bicycle Master Plan in 2012 and the efforts of the Transportation Services and Planning Design & Construction offices), we are still assessing the impacts of our transportation system and how we might improve it. For that reason, our recommendations focus on developing insight into the transportation system and setting goals that help us begin to make progress.

PRINCIPLES AND GOALS: TRANSPORTATION

Transportation Principle 1: Develop insight into the environmental, social and economic impacts of our transportation system at Dartmouth and develop methods for measuring progress towards improved sustainability.

Goals

- Develop, by 2018, a Dartmouth transportation sustainability assessment to be completed at regular intervals thereafter and included in the annual sustainability report. Share this publically.

Transportation Principle 2: Transition to more sustainable vehicles and systems.

Goals

- Develop, by the end of 2018, a Dartmouth Transportation Sustainability Plan with goals, tactics and milestones, for how to transition the Dartmouth transportation system towards sustainability. Include financial cost/benefit analysis as well as analysis of sustainability impact.
- As a component of this plan, develop a Transportation Demand Management strategy, working with key partners in the Upper Valley such as Advanced Transit and the Transportation Management Agency.

Transportation Principle 3: Encourage the use of sustainable transportation to, from and on the Dartmouth campus.

- Increase use of sustainable transportation options already available including vanpools, car pools, public transport, biking and walking.
- Improve the effectiveness of existing incentive programs (including by improving marketing/communication, refining program design etc.)
- Focus resources on those incentives which most cost effectively increase the use of sustainable transportation.
- Improve and expand biking and walking infrastructure, and remove barriers to these transportation modes.
- Reduce single occupancy vehicle use on and to campus.

COMMITMENTS: TRANSPORTATION

- Begin tracking air travel.
- Develop a sustainability standard for the Dartmouth fleet of vehicles.

LANDSCAPE AND ECOLOGY

Dartmouth owns more than 30,000 acres in New Hampshire and also holds small land holdings in other states. How we steward our landscapes has an impact on our campus, our community and our region. From the Second College Grant to the Skiway, to Moosilauke and to our core campus, our landscapes hold an important place in the hearts of Dartmouth people and in the ecosystems of which they are a part. On and off campus, we have an opportunity and responsibility to take the long view and contribute to vibrant ecosystems, healthy water systems and strong regional economies. Natural landscapes offer ecosystem services that we will find difficult, expensive or in some cases impossible to replace.

PRINCIPLES AND GOALS: LANDSCAPE AND ECOLOGY

Landscape and Ecology Principle 1: Articulate a philosophy of long term stewardship for all Dartmouth's land holdings.

Goal

- By 2019, develop a concise set of principles that guide the management of all our lands, balancing the environmental, social and economic impacts of land management practices.

Landscape and Ecology Principle 2: Prioritize sustainability in campus landscape management.

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Goal

- Develop a plan by 2019 to move to natural, low chemical and environmentally preferred landscaping on campus.
- Develop an approach to the management of invasive species and share this publically.

COMMITMENTS: LANDSCAPE AND ECOLOGY

- Manage landscapes to beneficially control storm water and to improve water quality.
- Develop a “Green Landscape” standard for use on campus to reduce the use of harmful chemicals.

BEYOND OPERATIONS

In many ways, Dartmouth is a microcosm of the world. We at Dartmouth are limited by financial realities as well as by physical constraints and operational needs. These limits can, in fact, spur innovation. We can, therefore, use our campus as a testing ground for solutions that might be applied elsewhere.

Our influence also extends beyond the greenhouse gas emissions that we produce or the compost we avoid sending to landfill: We have leverage in the world. By carefully assessing how we might most accelerate the transition to a sustainable future, we can use that leverage to maximum benefit.

CAMPUS AS LIVING LAB

One of Dartmouth’s strengths is teaching. Sustainability is an opportunity to further enhance this strength. Additionally, co-learning and extra-curricular learning are a critical part of the Dartmouth experience. Already, the Office of Sustainability runs many programs that enable these types of learning in ways that support the academic experience and deepen its impact on students. To build off these strengths, Dartmouth can leverage campus operations as a place for experiential learning.

Living Lab Principle 1: Our campus serves as a “living lab” for our students and faculty.

Goals

- Use existing campus resources for developing and enhancing courses and teaching to increase sustainability activities in a variety of courses and to develop new courses that examine Dartmouth systems.
- Develop creative ways to connect people and projects both for people who need projects— research and experiential—and for projects that need people.
- Allow access to campus operations at reasonable scales and granularity to our students and faculty.

LEVERAGING OUR INFLUENCE

Climate Change is a problem that needs to be addressed at various scales. As an ivy-league institution proud of inspiring leadership for a better world, we should also assess how we can engage our influence to most effectively drive the transition to a low carbon future. We recognize that our research, the students we educate and reducing emission from our campus are great contributions to solving the challenges of climate change. We can increase our impact even more by using our other forms of influence to accelerate the transition to a low carbon future.

Leveraging Our Influence Principle 1: Actively seek to accelerate the transition to a low carbon future and engage our influence to shift social norms away from entrenched harms.

Goal

Assess mechanisms to exert our influence as an institution to transition to a low carbon future. Questions for assessment should include but not be limited to:

- How Dartmouth might enable and engage its employees to invest to enhance sustainability?
- What investment approaches could we use to consider climate change risks and actively consider renewable energy opportunities? What roles might investment and divestment play or not play in exerting our influence?
- What are other ways we can leverage our influence to shift social norms towards a better society and speed the transition to a low carbon future?
- How might we more effectively share our research and teaching on sustainability, climate and environment to create change?

INVESTMENT

In the long run, we must make progress on all the operational areas outlined in this report and we have laid out clear steps to do so. In the short run, our investments can allow us to make progress towards the goals laid out for energy and waste.

Recommendation: That the President and the Board of Trustees approve sufficient funding to significantly transform our energy system towards a lower carbon future at the September 2017 Board of Trustees meeting.

Recommendation: That the President and the Board of Trustees adequately resource the Sustainability Office to hold Dartmouth accountable to achieving these goals.

GOVERNANCE, ACCOUNTABILITY AND REPORTING

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In order to make progress towards our goals, we must have structures and mechanisms to govern, track and support our progress.

GOVERNANCE

This set of recommended principles and goals will require a governance structure to ensure that it is accomplished. Below we outline our recommended governance structure.

The Sustainability Office will serve as a convener, working to engage Dartmouth to move towards a more sustainable future. It will:

- be responsible for keeping Dartmouth on track towards its sustainability goals, for communicating across the campus and for reporting—both internal and external—on progress toward our goals.
- ensure progress continues to be made, challenges are identified, and alignment is maintained across Dartmouth.
- continue to report to the provost, with a dotted line report to the vice president of campus services (or similar) to ensure alignment with Dartmouth’s core mission and to keep the experience of students connected to our objectives.

The Sustainability Office will be guided by and accountable to the following bodies:

A Sustainability Implementation Task Force: This group of managers and directors from throughout the college will serve as an implementation team, working together across operational areas to ensure progress towards goals. Its objective is to identify, even in the face of constraint and challenges with a high degree of difficulty, creative and practical solutions and try them out. This group will meet monthly.

A Sustainability Board of Advisors: This group will serve to guide and provide external review and accountability to the Sustainability Office. The SBA will be made up of alumni and external partners who can, on a biannual basis, check on progress towards goals, help provide guidance and serve as a sounding board.

A Sustainability Steering Committee: This committee will include senior level administrators and faculty, for example the executive vice president, the provost, the director of the Institute for Energy and Society, senior faculty and others. This group will meet biannually to receive a progress report and to provide feedback.

The Sustainability Office will also consider creative staffing models such as having one or more floating consultants who could trouble shoot on different issues around the college, creating expertise that could be “rented” by different units.

ACCOUNTABILITY AND REPORTING

To make progress towards our goals, we must be accountable for them. To this end, the Sustainability Office will produce an annual Sustainability Action Report. This report will be made publically available. It is critical that operational units are held responsible for making progress towards sustainability goals. However, balance is required: we do not want the burden to fall too heavily onto operational units but we do want to make progress. Therefore, in the annual sustainability reporting process, the Sustainability Office will ask that divisions note progress against sustainability goals, with the intention to motivate divisions towards progress.

The Sustainability Office will oversee reporting, and will develop by the end of 2017, a reporting framework that lays out how often and to whom Dartmouth will report externally.

We know that these goals must fit into the context of Dartmouth, even as they are a strategic priority. Circumstances, financial realities, technologies and our understanding will evolve over time. For that reason, we recommend that the Sustainability Steering Committee review Dartmouth's Sustainability Action Plan and reevaluate our goals every five years to continue to drive innovation and to allow for the integration of new realities and insights.

CONCLUSION

This report summarizes the work of the Sustainability Task Force that convened from April 2016 through April 2017. The recommendations represent the collective wisdom of this task force, and all have agreed to its content.

We have assembled what we believe to be a responsible plan for seizing the opportunity that sustainability represents for Dartmouth. The predominant theme in our recommendations are that Dartmouth transform its energy infrastructure to a low carbon system. We envision this process to include continued investments in conservation and efficiency, changes to our existing oil-fired power plant and a major solar photovoltaic initiative. We also envision other operational changes that increase our sustainability, such as changes in procurement procedures and waste disposal, enhancing food system and other advances on campus.

The science on sustainability is clear and this is an opportunity to make investments that align with Dartmouth's mission. If Dartmouth is going to move boldly before 2050, this is the time. This document presents a path forward.

This document was authored by the Sustainability Task Force, appointed by President Hanlon in April 2016.

APPENDIX

TASK FORCE MEMBERSHIP

Lisa Adams, MD, Associate Professor of Medicine, Associate Dean for Global Health, GSM
Denise Anthony, Professor of Sociology and Vice-Provost of Academic Initiatives
Elena Bird '18
Abbe Bjorklund, Director of Engineering, Campus Services
Alex Derenchuk '19
Amro M. Farid, Associate Professor of Engineering, Thayer School of Engineering
Mary Flanagan, Professor of Film and Media Studies
Andy Friedland, Professor of Environmental Studies (Co-Chair)
Maanav Jalan '19
Anne Kapuscinski, Professor of Environmental Studies
Rosi Kerr '97, Director of Sustainability (Co-Chair)
Flora Krivak-Tetley '02, Ph.D. student in Ecology & Evolutionary Biology
Gabriel Lewis, PhD student in Earth Sciences
Lee Lynd, Professor of Environmental Engineering Design
Erin Mansur, Professor of Business Administration, Tuck School of Business
Merritt Partridge 'T13, Executive Director at the Center for Business & Society, Tuck School of Business
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Jay Raju '18
Meg Rauner '17
Catherine Rocchi '19
Bruce Sacerdote '90, Professor of Economics
April Salas, Executive Director of the Revers Center for Energy, Tuck School of Business
Fabian Stocck '17

USEFUL DEFINITIONS

Decarbonization: Reducing the carbon emissions intensity of a process, including electricity generation.

Renewable energy supply: An energy supply that can replenish as we consume it. Wind is a renewable energy supply. Biomass may be a renewable energy supply, if it is harvested sustainably.

Scope 1 Emissions: All direct GHG emissions (such as those produced by burning fuel oil on our campus).

Scope 2: Indirect GHG emissions from consumption of purchased electricity, heat or steam.

Scope 3: Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. transmission and distribution losses) not covered in Scope 2, outsourced activities, waste disposal, etc.

Source: World Resources Institute