



# Bowdoin

# Environmental Mission Statement

Our mission is to protect the environment and ensure a sustainable future for generations to come. We are committed to reducing our carbon footprint and promoting responsible resource use.

We will continue to invest in green technologies and sustainable practices to minimize our environmental impact. Our goal is to achieve net-zero emissions by 2030.

We are dedicated to transparency and accountability in our environmental reporting. We will regularly update our stakeholders on our progress and challenges.

- We will reduce our greenhouse gas emissions by 50% by 2025 and 100% by 2030.
- We will increase our renewable energy usage to 50% by 2025 and 100% by 2030.
- We will reduce our water consumption by 20% by 2025 and 50% by 2030.
- We will eliminate single-use plastics and promote recycling and reuse.
- We will ensure 100% of our suppliers meet our environmental standards.
- We will invest in environmental research and development to drive innovation.
- We will engage our employees and customers in our sustainability efforts.
- We will support environmental conservation and community development projects.

We are committed to continuous improvement and will regularly review and update our environmental mission statement to reflect our latest goals and initiatives.



## Bowdoin: A Blueprint for Carbon Neutrality in 2020

Bowdoin College has made a commitment to become carbon-neutral by the year 2020.

This demonstration of the College's environmental stewardship is the embodiment of one of the College's fundamental principles, as stated in the inaugural address by Joseph P. McKeen, Bowdoin's first president: "to cast a familiar acquaintance."

This ambitious effort to eradicate the College's carbon footprint reflects a heightened institutional responsibility to the growing consensus on the catastrophic effects accelerating climate change will have on the natural world and human societies if current trends are not offset by innovative and creative solutions on a global scale.

Bowdoin is not alone in realizing the key role that higher education must play in educating a new generation of citizens who are environmental stewards and capable of innovating the new solutions and technologies required to meet the pressing environmental and social challenges.

In 2007, Bowdoin President Barr. Mill signed the American College and University Presidents' Climate Commitment (ACUPCC) as a pledge by leaders of more than 640 colleges and universities to make their campuses more carbon neutral and build new academic paths for addressing sustainability issues.

As part of the ACUPCC, colleges committed to establish a date by which their institutions would achieve carbon neutrality, and to develop a public institutional action plan for doing so. After a year of intense study, the College developed a detailed implementation plan for becoming carbon neutral by 2020.

Bowdoin's Climate Neutrality Implementation Plan was developed by a team of Bowdoin staff, faculty, students, and trustees who evaluated a wide range of strategies for increased energy efficiency, transportation adaptation, renewable-energy generation, and carbon offset options that will be necessary in order to eradicate our carbon footprint.

The Bowdoin Blueprint for Carbon Neutrality is an articulation of the basic goals and strategies of the plan, with an implementation of the rationale, costs, and outcomes associated with the implementation steps.

This dynamic plan will be revised and updated every one year by the Bowdoin community members to measure the effectiveness of strategies and evaluate the financial feasibility of specific projects and incorporate new technological advances.

This is not a simple initiative. It will demand participation from all corners of campus to achieve carbon neutrality in little more than a decade. Some of the strategies will immediately reduce our carbon footprint; other options will take longer to yield results and require greater financial investment. The educational components are more difficult to quantify, but are no less important. In many ways, they are the College's most important response to the increasing challenges ahead, for they will shape the hearts and minds of those on whom the future rests.

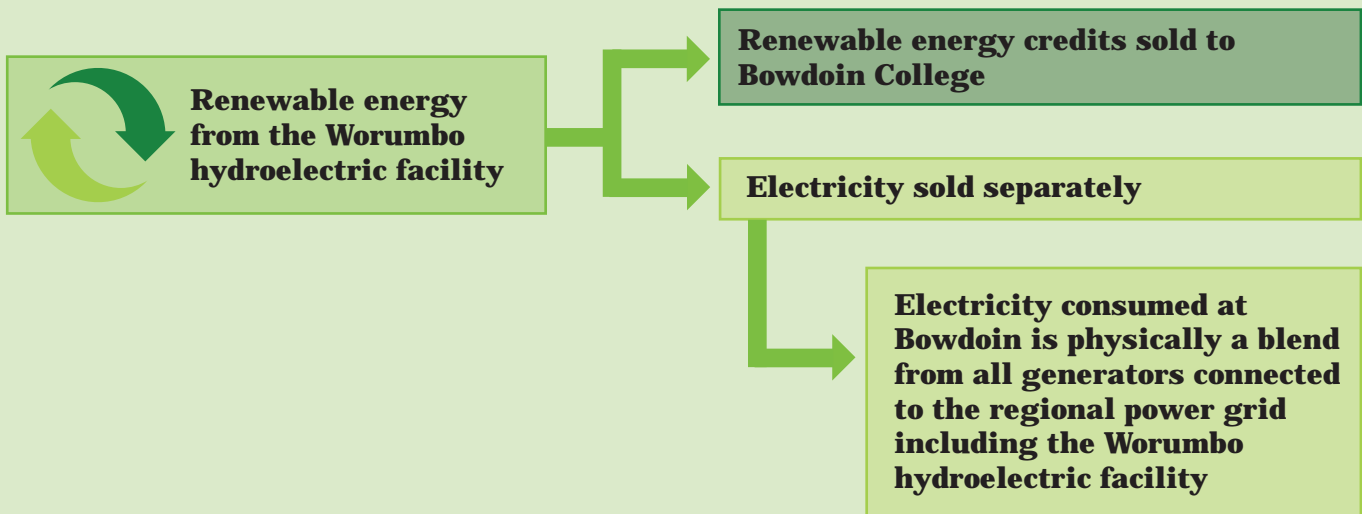
The ambitious underlying high-priority paths to carbon neutrality are not fixed, nor



### What Are Renewable Energy Credits and Carbon Offsets?

Renewable energy credits (RECs) are a unit of distinguishing renewable-based electricity from other electricity in the power grid. Renewable electricity producers produce one REC for every 1,000 kWh of electricity they generate. The environmental attributes are bundled from the electricity and are sold separately. RECs are traded in voluntary and compliance markets here by the Office of Sustainability at Bowdoin College. Effectively, the college is associated with green energy generation by purchasing the green attributes. RECs are a unit of increasing the green energy generated in the power grid and allow electricity purchasers to directly offset their greenhouse gas emissions associated with their consumption.

Carbon offsets are another form of emission reduction credits that allow a purchaser to support greenhouse gas reduction projects elsewhere by buying a unit of emission reduction. These can be used to counterbalance home emissions, or can't entirely reduce or eliminate each at home associated with heating oil. Each carbon offset is equivalent to one ton of avoided CO<sub>2</sub>e. Like REC offsets, they are traded in both compliance and voluntary markets and independent verification is required to insure that the carbon savings are real, permanent, additional, verifiable, and enforceable.





### BUSINESS AS USUAL

The business-as-usual scenario is depicted by the dashed black line across the top of Chart 2. This scenario assumes that the Board's physical capital campaign grows by 200,000 jobs by 2020. These growth estimates are based on the October 2003 Board's Master Plan.

### RENEWABLE ENERGY CREDITS

The dark green area shows the College's long-term commitment to support Maine-based renewable power projects in proportion to the campus's total electricity usage in 2008. This level of renewable energy credits purchased has been carried forward and will account for 41% of the total reduction needed in 2020.

### OWN-SOURCE CARBON REDUCTION

The light green area reflects carbon reductions that will be a direct result of energy saving and emissions-reducing projects adopted on campus. These have been organized around the following areas: electricity conservation; physical plant operations; fuel switching; development of on-site renewable energy improvements in new construction and renovated buildings; and behavioral change among faculty, staff, and students. A detailed breakdown of these projects is presented in Chart 3.

### POWER GRID IMPROVEMENTS

Board has chosen to account for certain emissions that, while not directly under its control, are directly related to its activities, such as the impact of local, regional, and national policy decisions. The blue area shows one such impact: the expected reduction in carbon intensity of the power grid. Not only in England in general, and Maine in particular, has some of the most stringent laws in the United States supporting the addition of new renewable power generation. These laws have been particularly effective at driving the expansion of new wind power facilities in Maine. A direct result is that the power grid is becoming incrementally less carbon intensive over time. The long-term average load growth in Maine is approximately 1% each year and will eventually be met entirely by new renewable resources. The result is a projected lower amount of carbon emitted for each unit of power generated in Maine. One hundred kWh of electricity consumed today has an associated impact of approximately 0.58 tons of CO<sub>2</sub>e. By 2020 this will be reduced to 0.46 tons of CO<sub>2</sub>e per hundred kWh.

### **FUEL EFFICIENCIES FOR EMPLOYEE COMMUTERS**

The red area shows the expected reduction in emissions from employee commuting,



## **Section III—What Measures Will We Take On Campus to Reduce**



reducing emissions by 156 tons of CO<sub>2</sub>e per year. As an alternative, the College will also explore construction of electric vehicle and a battery recharging facility, which would yield even greater emissions reduction.

The College also is committed to continuing experimentation with low-carbon alternative fuel sources as the use of such as biofuel, Cellulose, biomass technologies including wood pellets and wood chips are prohibited by space and transportation constraints in the central facility plan, but exploring biofuel with higher energy densities may make these technologies feasible in the future.

### **New Construction and Renovation**

There is an inherent tension between the need for physical growth of facilities on campus and the commitment to reduce greenhouse gas emissions produced by the College.

None the less, Building Sustainability Standards for renovation and new construction have resulted in a significant reduction of greenhouse gas emissions. Since 2002, despite expansion of campus facilities several historic building renovations have garnered national attention for their energy-efficient design and residence halls have earned Leadership

financial challenge. The Carbon Neutrality Implementation Plan includes an annual College engineering describing the geotechnical and operating in the Boadoin College Museum of Argonomical. These lessons learned will aid in understanding and implementing future geonomical. We will share his information in college, journals, and other inered in i j ion.

A small solar thermal system recently installed on the Scholar Outdoor Leadership Center providing a demonstration for the maintenance solar thermal installation at a Green Pool and Thorne Hall the largest of the other on campus. Those installations could avoid about 90 tons and 80 tons of CO<sub>2</sub>e per year, respectively.

While current renewable energy technologies may contribute a dramatic reduction in our carbon footprint compared to the financial investments required, they are an important part of the College's environmental mission to be a place where new renewable energy innovations can be tested and developed. They also present an opportunity to fulfill our educational mission in a new sustainable planning of our students and other who take risks and resolve problems.

Solar photovoltaic (PV) power has long been recognized as a critical source of renewable energy for the future, but costs have been prohibitive in the past.

New advances in solar photovoltaic (PV) technology have greatly increased efficiency and cut costs. This trend is expected to continue and could equalize the costs between grid-based electricity rates and solar PV production in the next 5 to 10 years, especially if electricity prices continue to increase.

Boadoin hopes to phase in solar PV installation on campus in the project about 15% of electrical use. A potential 6,300-square-foot solar array on the roof of Farley Field House is estimated to be capable of generating 128,000 kWh of electricity, offsetting 76 tons of CO<sub>2</sub>e.

## Section IV—How Can We Enrich the Academic Program to Increase Environmental Literacy?

The Board on Climate and Natural Resource Implementation Plan includes an analysis of Board findings and strengths in environmental education and begins shaping a blueprint for deepening opportunities for climate change research and innovation among faculty, staff, and alumni.

Weaving throughout these discussions are benchmarks for continuing to raise Board profile and an incubator of new technologies cutting-edge climate-change research, and capitalizing on our coastal connections to develop forward-thinking educational approaches for increasing environmental literacy.

The plan also recognizes the important role that community outreach plays in Board research, service, and academic programs. It also identifies a number of strategies for increasing opportunities to build sustainable community both locally and on a global scale.

### Environmental Literacy

Board academic programs are keenly focused on helping students develop the skills and creativity that will be required of a new generation of leaders, policymakers, entrepreneurs, and artists faced with the perilous challenges ahead. Courses designed to increase environmental literacy are in every corner throughout the curriculum, with highly multidisciplinary examinations of the physical, social, and geopolitical issues associated with climate change.

Recent courses linked directly to climate change and sustainability include Global Change Ecology; Food and Agriculture; Building Healthy Communities; Gulf of Maine and Bay of Fundy; Marine Conservation Ecology; Earth Climate History; Paleo-oceanography; Environmental Education; Sustainable Architecture; Coral Reef Biology; Saving Maine's Northern Forest; and Telling Environmental Stories.

Many courses within the arts and humanities are geared toward understanding the connections between economic growth and ecological degradation, the power of the arts to communicate about our deeper connections to the world, and the interdisciplinary approaches and present bring to bear on these issues.

The Climate and Natural Resource Implementation Plan argues several key areas of projected growth in the academic program have identified the impact of Board environmental literacy efforts and guides students' opportunities to connect their learning with real-world environmental challenges.

### Encouraging Interdisciplinary Collaboration

Because climate change is happening so rapidly, disciplines across the Academy will need to be reimagined within an environmental context. In recent years, Board has brought leading environmentalists to campus and developed several education initiatives linked to climate change and sustainability, including programs on indigenous environmental knowledge; cultural and social responses to climate change; and polar responses to a warming world.

The College is exploring several new approaches to encourage interdisciplinary collaboration among faculty and programs. The Board can help lead discussions about new frontiers in climate change scholarship and research.



Building on the success of the 2009 Climate Day, the College will continue to devote time each year to focus on climate related issues and the College's climate commitments. Other plans for the near future include development of a sustainability-focused pre-Orientation trip; expanding the reach of the Biden EcoRep program to each of the 22 residence halls on campus; participation in national climate action events such as Climate 350- and Power Shift; and increased use of videoconferencing to reduce travel to meetings and conferences.

Connections with Bowdoin alumni will be strengthened to connect Biden with future internship or employment opportunities in his or her working in emerging technologies, green buildings, scientific research, and other initiatives related to climate change.



### Bowdoin's Cluster of Climate Change Experts

Bowdoin is a leader among liberal arts colleges in the breadth of its faculty expertise in climate change, which spans boreal, atmospheric, marine, Arctic, and Antarctic environments. Bowdoin faculty research has made significant contributions to the climate change literature and continues to garner millions of dollars in external grant funding from organizations including the National Science Foundation and National Aeronautics and Space Administration (NASA).

Current primary areas of climate research include:

- ‡ Emissions of CO<sub>2</sub> in forest ecosystems
- ‡ Impact of climate warming on high-latitude ecosystems
- ‡ Analysis of global change in atmospheric CO<sub>2</sub> and O<sub>2</sub>
- ‡ Changes of marine plankton communities and productivity
- ‡ Climate policy
- ‡ Understanding relationships between climate and Inuit culture of Labrador and Greenland
- ‡ Investigating the polar ice cap as an archive of past atmospheric mercury

## SECTION V—What Is the Cost of Erasing Our Carbon Footprint?

Bo doin haecce will implemen ed and fnded a ide, arie, of energ ing and emionredfcing projec in recen ear. Primar. bjrce of fnding ha e incl ded annal opera ing btdge alloca ion, iden ified opera ing btdge ing, deb financing, fndrai ng, and gran .

Gi en he Jrmoil of he crrn economic en ironmen , he College ha elec ed, among o her mea re, o p rne major capi al projec on hold and o keep opera ing co ffla hrogh 2011. Energ ing and emionredfcing ini ia e elec ed o be comple ed in he ne eral ear. ill herefore need o genera e opera ing btdge ing, be fnded i hin e ing btdge or ha e e rnal bjrce of fnding, ch agif or gran .

### Several funding alternatives are under consideration:

#### Annual Operating Budget Savings and Allocations

A major bjrce of re nte ill be reali ed hrogh redfcion in e pen ha are a direc re l of e eral energ coner, a ion ini ia i e on camp. The annal opera ing btdge ing can be applied o ch projec a con erion of oil-fired boiler in perime er blding o na rral go. In addi ion o btdge ing alloca ion apprq ed d rring he annal btdge proce ma fnd carbon-redfcing ini ia i e. For e ample, energ coner, a ion projec are fnded i hin he deferred main enance btdge each ear.

#### Fundraising

The recen l comple ed Bo doin Campaign incl ded b an ial fnding for academic program, fden oppor nie, and ne blding con rfc ion. The College ma con der f r her a o engage al mni and friend ho are in erred in ppor ing he College commi men o achie e carbon ne rali b. 2020.

#### Grants

A gro ing n mber of fo nda ion and organi a ion are gran ing ppor for clima e change re earch and ad ance in re nable energ genera ion a college and f n i er nie. The College recen l formed a green gran s commi ee o ac i el e plore he gran fnding oppor nie for greenho e ga redfcing ini ia i e.

#### Long-term Debt

Major capi al projec ch a ne con rfc ion and gnifican renq a ion projec are icall fnded o fde he opera ing btdge hrogh gif gran and long-erm deb. Long-erm deb, i h po ble gran fnding, i being f ed o finance he boiler replacemen and cogenera ion projec a he cen ral f ili plan.

#### Pilot Projects

The College iden if ing a in i ch i co ld par ner i h man ffac r rer of ne energ ing prod fco e and e al a e ne echnolog a no co or red fced co. For e ample, he College recen l par nered i h a ligh ing compan o e ne LED echnolog a e eral loca ion on camp.





## **SECTION VI—What Do We Have to Do to Remain Carbon Neutral After 2020?**

Once carbon net rali. ha been achię ed in 2020, he Clima e Commi men Adj ior. Commi ee recogni e ha Bo doin' ork ill no be fini hed. The College ill con iņ e o gro , making carbon net rali. an ongoing challenge.

The commi ee recommend ha he long-erm goal of he College űhołd be o redjce i ű reliance on rene able energ credi ű and carbon offe ű and increa e on ű e rene able energ and efficienc o remain carbon net rali. The Carbon Net rali. Implemen a ion Plan



**Bowdoin**