

## University of Maine Survey on Campus Carbon Emission Issues

The University of Maine [Faculty Senate Environment Committee](#) is considering several motions to pursue in regard to meeting the long-standing UMaine campus goal of achieving net-zero carbon emissions by 2040. A short [whitepaper](#) has been prepared and reviewed by numerous physical, social, and climate scientists, engineers, economists, and additional UMaine faculty members. The white paper provides background information on campus progress achieving net-zero carbon emissions to date and how the long-term goal might be achieved.

To familiarize yourself with the terminology and many of the issues raised in the survey questions that follow, we recommend that you first read the whitepaper with particular attention to comments and citations in the footnotes.\*

Responses to this survey will help inform the Faculty Senate on the opinions of campus community members and help construct the motions to be included at the end of the white paper. That is, some of the following proposed actions are under consideration for incorporation into motions to be considered by the University of Maine Faculty Senate. These potential survey items are derived from the whitepaper or suggested by committee members.

Feedback comments already received to date begin on page 6.

### **(1) Supporting Campus Actions Responsive to Climate Science Findings**

It's important for the University of Maine to do its part in helping the state and nation to keep the world within 1.5 to 2°C of global warming above pre-industrial levels.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

### **(2) Building a Campus-wide Societal Problem-Solving Reputation**

The University of Maine should strive to become a destination campus for students from across the state, nation and the globe that want to “make a difference.”

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

### **(3) Building a Campus-wide Sustainability Reputation**

The University of Maine should strive to become a magnet for students, researchers, educators, and industry partners that are interested in working collaboratively and from multiple disciplinary

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\* If you are interested in suggesting edits to the white paper itself, please do so separately by sending suggested changes with your citations to Faculty Senate Environment Committee Co-Chair Harlan Onsrud, [harlan.onsrud@maine.edu](mailto:harlan.onsrud@maine.edu)

perspectives to comprehensively address the technological, social, economic, and environmental challenges of climate change and sustainability.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

**(4) Staying the Course in Achieving the UMaine Zero Carbon Emission Commitment**

The University of Maine should abide by its 2007 widely publicized and annually confirmed long-term commitment to achieve net-zero greenhouse gas (GHG) emissions by 2040.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

**(5) Ensuring Annual Progress**

The University should decrease greenhouse gas emissions each and every year at a rate consistent with the required annual minimum or greater to achieve the 2040 commitment or should expend the funds for carbon sequestering or carbon offsets to achieve yearly targets.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

**(6) No Expansion of Campus Carbon Footprint: Building Design and Cost Obligations**

New campus construction and renovation projects should not cause expansion of the campus carbon footprint.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

**(7) No Expansion of Campus Carbon Footprint: State and Federal Matching Fund Opportunities**

The University of Maine administration and the UMS Board of Trustees should ban the use of any state or federal funds for any new construction or reconstruction that expands the University of Maine carbon footprint.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

**(8) Hypothetical Deployment of Clean Energy Infrastructure for All versus a few New Clean Energy Buildings**

Hypothetically, if the campus administration and UMS Board of Trustees were to acquire major State of Maine bond funding for Orono campus capital improvements, the funding should be used primarily to upgrade as many current buildings as possible to supply them with zero carbon emission energy rather than to construct several new clean energy buildings spread across the campus colleges.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

**(9) Decreasing versus Not Enlarging the Campus Carbon Footprint**

Decreasing the carbon footprint of the campus should be made a design and funding requirement of each and every campus building and infrastructure project.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

**(10) Banning Addition of Any Fossil Fuel Connections**

Similar to the Columbia University pledge, the University of Maine should not install fossil fuel connections to any new campus construction or renovation projects.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

**(11) Regular Tracking of Campus Progress**

The Faculty Senate should create a *Climate Change Audit Committee* under the auspices of the standing *Environment Committee* to closely track and aid the campus in achieving zero greenhouse gas emissions by 2040. It should regularly communicate and coordinate with the University of Maine *President's Sustainability Council* and the *UMaine Climate Action Plan Working Group*.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

**(12) Divestment of Fossil Fuels**

Following the lead of State of Maine Legislative Bill LD99 (2021) that now bans new public investments in fossil fuels and full divestment within 5 years, the University of Maine System

should formally commit to stopping any new investments in fossil fuel companies and fully divest funds in fossil fuel companies within 5 years.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

### **Respondent Relation to the University of Maine**

**(For student version of the survey)**

(13) My primary relation to the University of Maine is best described as:

- undergraduate student
- graduate student
- other, please describe: \_\_\_\_\_

(14) I am most closely affiliated with the following college.

- College of Education and Human Development
- College of Engineering
- College of Liberal Arts and Sciences
- College of Natural Sciences, Forestry, and Agriculture
- Maine Business School
- All, none, or Other

(15) I am pursuing my academic program(s) primarily through:

- On-campus attendance
- UMaine Online

**(For faculty/staff version of the survey)**

(16) My primary relation to the University of Maine is best described as:

- faculty member
- adjunct faculty member
- administrative staff
- research staff
- academic unit head (e.g., department or school)
- research unit head (e.g., organized research unit)
- upper-level administrator (i.e., dean or above)

(17) I am most closely affiliated with the following college.

- College of Education and Human Development
- College of Engineering
- College of Liberal Arts and Sciences
- College of Natural Sciences, Forestry, and Agriculture
- Maine Business School

\_\_ All, None, or Other

(For both versions of the survey)

**General Comments**

(18) Please provide any additional comments you wish to make.  
<medium size window for text entry>

**SUBMIT**

We thank you for your time spent taking this survey. Your response has been recorded. Summary results will be made available on the FS Environment Committee website.

## APPENDIX

### Suggestions by Reviewers to Date for Consideration by the Committee Prior to Survey Deployment

Table of Contents	Page
A. Comments and Suggested Edits by Faculty Senate Environment Committee Members and Corresponding Faculty Members	6
B. Comments and Suggested Edits Received in Response to a Distribution Sent to All Faculty Senate Elected Members	9
C. Comments and Suggested Edits Received in Response to a Distribution Sent to Academic Chairs, Deans, and Research Unit Heads	16
D. Comments and Suggested Edits from a Discussion with UMaine Campus Energy Team (meeting if possible)	Forthcoming
E. Comments and Suggested Edits from a Discussion with UMaine Sustainability Council (meeting if possible)	Forthcoming
F. Comments and Suggested Edits from a Discussion with Graduate Student Government (meeting preferred with representatives)	Forthcoming
G. Comments and Suggested Edits from a Discussion with Undergraduate Student Government (meeting preferred with representatives)	Forthcoming

#### **A. Comments and Suggested Edits by Environment Committee Members and Corresponding Faculty Members**

The comments below were submitted by committee members and corresponding faculty members. This appendix is under active development with further input being solicited from additional parties for improvement of the survey.

#### **Suggested Edits to the White Paper**

Reviewer Comment: The white paper needs a short paragraph introduction stating its purpose.

Response: This edit has been made. This was added to the version of the whitepaper dated 16 Jan 2022.

Reviewer Comment: A section needs to be added summarizing the findings to date of global warming scientists. The need for urgent action should be documented.

Response: This information has been added in a new Section II in the whitepaper.

Reviewer Comment: The pros and cons of potential biofuel use in the campus steam plant needs to be added.

Response: This information is now added in a new section V and a new Appendix 2 in the whitepaper.

## Suggested Edits to Survey Items

Comment: The differences in what information is being sought from survey respondents from question to question is not clear.

Response: A heading for each survey item has been added and the previous headings for groups of questions have been dropped. Does this resolve the issue?

Comment: Remove the background information in survey items 1 and 2 and instead include that material in the whitepaper.

Response: The background information has been removed and a new section II has been added in the whitepaper incorporating the information. Previous items 1 and 2 have been combined into survey item 1 as illustrated above.

Comment: Shorten and simplify item 7.

Response: Done. Now number 6.

Comment: Shorten and simplify item 8.

Response: Done. Now number 7.

Comment: Item 9 is awkwardly worded. Rewrite.

Response: Done. Now number 8.

Comment: Shorten item 10 and reword it as a “requirement” rather than as a priority.

Response: Done. Now number 9.

Comment: Shorten and simplify item 13 and instruct UMS to adhere to the new law.

Response: Now number 12. Whether the University is included within the bounds of the legislation has not yet been confirmed. Wording is left as is for now until clarification is achieved.

## Suggested Eliminations of Survey Items

Comment: Although item 3 (now item 2 above) is included in the whitepaper discussion in section V, this survey item does not relate directly to the campus climate commitment so it should be dropped.

Response: With the addition of the headings for each survey item, is the intent of this question clearer or should it still be dropped?

## Suggested Additions of Further Survey Items

(aa) The University of Maine Machias campus should be added to the University of Maine commitment to achieve net-zero greenhouse gas (GHG) emissions by 2040.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

Response: no committee action yet taken to add or not

(bb) The President of the University of Maine should present annually an oral address open to the campus community and public at large on the *State of the University's Climate Commitment toward Achieving Net-Zero Carbon Emissions by 2040*.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

Response: no committee action yet taken to add or not

(cc) Until such time as U.S. society resolves the issue of travel carbon emissions generally, the carbon emissions for each university-funded travel trip should be computed and the cost of offsetting/sequestering the carbon emissions should be applied to the university travel costs for the trip and actually spent for this purpose.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

Response: no committee action yet taken to add or drop this item

(dd) UMaine should avoid to the greatest extent possible any conversions to burning renewable biofuels on campus and instead go straight to full electrification of buildings and facilities powered by clean solar, wind, and other near-zero carbon emission energy sources.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

Response: no committee action yet taken to add or drop this item

### **Further Item Suggestions**

(Sample wording for these items has yet to be prepared.)

(ee) A non-specific survey item suggestion was made to add questions in support of diversity, equity and inclusion.

(ff) A non-specific survey item suggestion was made to add an item about support for discouraging reliance on carbon offsets to meet carbon neutrality goals.

(gg) An item should be prepared on priority spending on long-term solutions (i.e., electrification powered by wind and solar) over stop gap solutions (i.e., dependence on the burning of biofuels that emit pollutants and greenhouse gases on campus).



## **B. Comments and Suggested Edits Received in Response to a Distribution Sent to Faculty Senate Elected Members**

### Response 1

In regard to: "**(3) Building a Campus-wide Sustainability Reputation**

The University of Maine should strive to become a magnet for students, researchers, educators, and industry partners that are interested in working collaboratively and from multiple disciplinary perspectives to comprehensively address the technological, social, economic, and environmental challenges of climate change and sustainability."

Should we expand this question to ask if the University of Maine should market itself as an energy efficient, green university? Thus, actively drawing faculty and students to UMaine (and Maine) to live and work?

### Response 2

Wood is dirty (more particulates), and it can sometimes be "net-zero", rather than near true zero as solar, wind and hydro are. As mentioned, wood is NOT net-zero unless you also take legal ownership or control of the carbon absorption capacity, and claim a certain section of forest as designated for heating of UMaine's campus. Ownership is best. Contracts are second-best. Relying on 3rd party certification is a distant third. Using uncertified land is a complete failure.

The campus must be careful about considering wood, and if we use it, it must only be temporary.

### Response 3

As noted in the paper, the burning of wood waste on campus to create steam isn't a solution exportable to the rest of the nation. It relies on antiquated steam pipe heating infrastructure.

The best way to support the forest industry in Maine through the improved energy infrastructure of the campus (if that is or should be an objective), would be to build or support a functional power plant that could utilize, demonstrate, and test the burning of biofuels. A huge market will exist for biofuels in a clean energy future since they will be needed to supplement solar, wind, and other near-zero GHG electric power sources during peak demand times and when the sun isn't shining nor the wind blowing. This functional biofuel demonstration power plant would be designed to supplement the campus's near-zero GHG electric power sources when needed. It could be designed to accommodate waste wood, wood pellets, renewable natural gas (i.e., landfill gas), and other emerging biofuels produced in Maine (e.g., waste from existing cellulose crops, new cellulose crops, etc.). This model would be exportable to the rest of the nation and could result in very high returns for Maine industry under predicted global warming futures.

The campus steam plant would be minimally maintained and refurbished as needed until such time as all buildings on campus were electrified to enable them to use clean and renewable energy sources. A new powerplant could be built away from the center of campus avoiding many of the pollution and traffic issues that would otherwise arise from burning wood waste in the current steam plant location.

Has the administration seriously considered and priced out this option? The campus might not even need to finance such a powerplant since private industry might be very interested in doing so if the campus created a long-term demand for local biofuel power. Does the administration know what it would cost to fully electrify one-by-one each major building on campus? If it has \$130 million to spend now on heating infrastructure, how far would that money go instead in fully electrifying core buildings on the campus? Would not that money be better spent in the long-run on electrification conversions?

These issues should be raised in the whitepaper and a survey item should address the campus community preference.

#### Response 4

I hesitate to send the following as they are not significant comments, I know.

(2)&(3) Someone from English probably already OK'd it but should 'that' be replaced by 'who'?

(8) Seems odd phrasing? ". . . rather than to construct several new clean energy buildings with at least one going to each college." [There are more than several campuses? Addressing only this campus or all UMS campuses?]

(11) Good choice of the word 'aid.' [. . . Committee to closely track and aid the campus. . . ]

(bb) I would add this.

(cc). The last two lines of this aren't clear to me but perhaps are clear to others.

In the Further Item Suggestions. I would approve of point 2 [discouraging reliance on carbon offsets.]

#### Response 5

My primary feedback is that this looks reasonable to me, but I do have a few "wonders".

1. I wonder if in the question that references Columbia's pledge, a link could be provided to that pledge for the user to see before rating the question.

2. I know that in an ideal world people would read the white paper but I suspect they won't, particularly if this issue is not on the front burner for them. I'd be much more inclined to look at an executive summary of one page with a link to the longer paper for those that want to engage further.

#### Response 6

Item #8 is ambiguous. Would these funds be for this university alone or the system? Colleges here at UMaine or throughout the system?

#12 does this include the University of Maine Foundation? I ask because the Foundation is not a part of this university or the system. It operates as an independent organization with its own board, etc. (<https://umainefoundation.org/about-the-foundation/>).

#14 (students) - Division of Life Long Learning?

#16 (faculty) - What is the purpose of identifying adjunct faculty? Why aren't they just faculty members? Why not just "Faculty member"? If it is important to record this information faculty should be listed as: "Full-time Faculty" and "Part-time Faculty" rather than "faculty member" contrasted with "adjunct faculty member" which creates the impression that they are not really members of the faculty.

#18 - a larger area for comments looks more inviting.

### Response 7

Thank you so much for leading on this and for allowing me a chance to comment on the survey.

1.) I would not do the survey. Questions 1-5: we can assume people are supportive and you'll see that in the results. I don't think you'll learn anything. If you want to show support, why not just ask Senate to endorse a statement? Same results, but easier. Questions 6-12: support will vary, but I want you, the experts, coming up with a plan, not respondents. Why ask these?

2.) We need a plan, but we also need to know why past plans since 2007 haven't worked. Farmington is ahead of us! Why? We were told in 2017-18 that the admin was working on a contract, then there was conflict of interest and it had to go back to bid, then covid hit and we never heard about it again. What happened?

We got this all the time with Gen Ed. People said, "we always try, it never works, why is this any different?" We had to answer that by knowing why past efforts failed and saying how we'd address those factors. What also helped was showing what other places did. We'd say, "we just want what Cal. State Chico has".

3.) It would help to know what you mean in the email above when you say that the administration might be moving in the right direction but we don't know the end game. What is the current state of administration planning (you may not know yet)?

4.) The white paper is great but senators and others need a one-pager version too (e.g.: here's where we are, what University X did, here's what we want to do, here's the barriers, here's our plan to address them).

Great start - really important and should gather momentum!

Dear Reviewer,

Thanks! We have included your comments in the growing compilation for consideration by the subcommittee.

A major reason for creating both the whitepaper and deploying a survey is the hope that at least a few more people will become informed about the details of the issues being raised by reading the whitepaper, raise the visibility of the issues, suggest and scrutinize potential solutions through exposure of the issues to a broad range of academics and solicitation of feedback, and encourage a response and rational plan by the administration.

### Response 8

Question 2: consider removing the quotes around "make a difference"

Question 13: It might be worthwhile to include a few additional categories here, such as early college students, distance learning students from DLL, or potentially students from UMS, but not

UMaine taking online courses... perhaps not all of those groups need to be included, but including one or so extra categories might reduce the number of folks who respond 'other' Question 16: Similarly, I wonder if it would be good to include a few more categories or to include an 'other' response here. For example, I'm not sure that staff working for facilities, in the student union or library, etc... would have a category to choose for this question.

### Response 9

Thank you for giving me this opportunity to respond to your survey. I understand that you want only specific suggestions to the survey itself. I cannot help but preface my suggestion with two points:

1. Renewable energy--solar and wind--seems like a win-win technology. However, its development in Maine seems to me to be based on a sort of gold rush mentality. When there are subsidies, developers rush to install these technologies wherever they can without any central planning or collective thoughtfulness. Thus, we have wind turbines haphazardly placed on mountain tops around Maine and now solar panels in every fallow field with no plan for decommissioning and no thought to biodiversity. We as Mainers cannot discover whether these facilities actually produce the power promised by the developers. We need to be careful that Maine doesn't become an energy plantation for the rest of New England.
2. I completely agree that the University should refrain from expanding its carbon footprint (through development) and that it should use any available funding to **reduce** that carbon footprint. However, I do not believe that the rest of us can continue to live as we always have lived. So what I find contradictory in your survey is the statement that we must achieve our goal of net-zero carbon emissions by 2040 but we should also be a magnet for researchers and students from around the world. You do not address travel in this survey or Scope 3 emissions. The University should be encouraging more students to live on campus. It should encourage less commuting. Perhaps more conferences should be virtual, now that we have the technology.

I suggest a question on how to address Scope 3 emissions with more than carbon offsets, which are ultimately just smoke and mirrors.

Thank you very much for focusing on this issue. I tremble to think of the trees that may be cut for the new athletic complex we'll be developing with the Alford money.

### Response 10

My comments:

Q2 is somewhat vague, though maybe that's on purpose? I don't think anyone will disagree that we want our students to 'make a difference' but if the goal is to either a) gauge whether people think making a particular difference in climate is important; or b) present evidence that a LOT of people think making that particular difference is important, more specific wording would help.

Or...reading Q3, is Q2 meant to be general and Q3 meant to be specific? If so, disregard the above.

Q6) I confess I didn't read the white paper super closely so when I came to this question, I half scoffed, half scratched my head at the concept. I expect that this will be a common reaction (and lack of reading). This might benefit from a direct reference to the White Paper in terms of what it means to be a Carbon Neutral project.

How does Q7 differ from Q6? Is the goal to proactively cut the knees out of "but the money is free!" sorts of arguments against carbon neutral building? Gift horses and mouths and all that.

Q9 similar to Q2 above. If you're interested in truly learning what people think, the question is great. If you're interested in a solid Agree/Strong agree consensus to bring to decision makers, changing "requirement" to "goal" may be more successful.

Q10 Any chance of framing this in a different term than the Columbia pledge? These sorts of things are easier to do when you're rich and easier to poo-poo if you're only seeing the rich people do it. It would be nice to reference other Endowmently-challenged universities.

I hope you find these comments entertaining, if not actually useful.

#### Response 11

All looks good to me. No additional suggestions.

#### Response 12

It's clear that a lot of time, thought, and care have gone into the creation of both documents. I don't have many notes/comments for you, but here are a couple:

— Question 8 strikes me as both too vague and too specific. Why \$500 million? Is there a specific discussion of that number in the works? I think the question would be clearer if it just read "Hypothetically, if the campus administration and UMS Board of Trustees were to acquire State of Maine bond funding for campus capital improvements, the funding should be used primarily to upgrade...." Response: This alteration has been made in the questionnaire.

— Is there any value in specifically addressing a question toward carbon footprint in relation to the plans for the new athletic facilities?

#### Response 13

The use of any type of fuel for heating and/or electricity generation requires both context and long-term analysis. While renewable energy such as wind and solar are appealing, the efficiency is quite low. Nuclear, with current low pressure reactor technology, is safe and essentially emission free. However, the disposal of nuclear waste after 30 years or so of use is problematic. Hydrothermal energy is safe, efficient and environmentally friendly although the initial costs and maintenance are high. Landfill gas produces expensive energy and the presence of Sulphur is an ongoing problem.

The University of Maine has proposed several versions of systems that use biomass as a fuel. The use and benefits of renewable biomass related fuels must be seen in the context of Life cycle analysis (LCA). Multiple careful studies show results that indicate that the carbon intensity of wood pellets and chips are significantly lower than that of fossil heating oil and natural gas. (Unnasch, S. and L. Buchan (2021). Life Cycle Analysis of Renewable Fuel Standard

Implementation for Thermal Pathways for Wood Pellets and Chips, Life Cycle Associates Report LCA.6161. 209.2021, Prepared for Technology Transition Corporation, p. 49). This indicates that wood pellets and chips are a promising alternative for heating oil and natural gas. However, such use may not be appropriate in the context of some of the wood combustion options that may be under consideration at the University of Maine.

My major concern is with Appendix 2 of the whitepaper. The US Environmental Protection Agency (EPA) Revised Renewable Fuel Standard (RFS2) does NOT currently include a pathway for the combustion of woody biomass for use as a heating fuel. (IBID, p. vii)

While such use is under consideration by the USDA (and advocated in the referenced article – see p. viii), it is not yet known if such a pathway will be approved by the EPA and, if so, when. Nor is it known what potentially stringent conditions might be imposed in the burning of biomass for heating in order to qualify under RFS2. EU standards have long accepted woody biomass, particularly, dry wood pellets for use in heating and power generation.

For other purposes (such as in the use of forest residue to produce liquid biofuels), woody biomass is included under RFS2 but only when sustainable forest practices are employed. Thus, such verifiable forest practices may be expected at a minimum as one of the qualifying conditions if and when biomass is approved as a renewable source for heating. This would encompass about 5 million acres of forestland in the United States and nearly all of the woodlands in Maine.

The university is taking a major gamble if it is seriously considering investing \$130 million on a steam plant upgrade that currently would not be accepted by the U.S. federal government as employing renewable energy. There are currently no major federal support programs for burning of woody biomass for heating such as exist for electrification using clean solar and wind energy projects. Perhaps federal programs might eventually exist for wood chip and pellet burning for electricity generating power plants (e.g., an approach used in the U.K. dependent upon residual “waste” biomass grown, harvested, and pelletized in the southeast U.S.). However, for heating operations this seems unlikely in the U.S. in the near future although carbon credit markets related to greenhouse gas production are used in the northeast and stringent monitoring is done at all biomass burning facilities that generate appreciable amounts of heat and/or electricity.

Germane Reference: The Regional Greenhouse Gas Initiative (RGGI) is the first mandatory cap-and-trade program in the United States to limit carbon dioxide from the power sector. Eleven states currently participate in RGGI: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey (withdrew in 2012, rejoined in 2020), New York, Rhode Island, Vermont, and Virginia. In 2019, Pennsylvania Gov. Tom Wolf directed the state’s Department of Environmental Protection to develop regulations for the state to join RGGI, and the state is expected to join in 2022.

#### Response 14

As many expected, the US corn-ethanol biofuel program has likely created more emissions and environmental impacts than would have occurred by simply using the gasoline it replaced.

Recent news:

<https://arstechnica.com/tech-policy/2022/02/us-biofuel-mandate-likely-increased-carbon-emissions-inflated-crop-prices-20-30/>

<https://www.pnas.org/content/119/9/e2101084119>

The University needs to be very careful and perhaps skeptical about the idea that it could use wood-based biofuels without causing a similar issue. The key metric that needs to be addressed is, of course, lifecycle greenhouse gas emissions. But when buying waste wood, the market becomes distorted, which changes the entire system, often for the worse as happened with corn ethanol.

I understand the limitations of our old heating infrastructure. However, it seems to me that a better approach would be to renovate and build buildings with ground-source geothermal heating, or other renewable electric heating systems. This might be slower, and more expensive. But the era for natural-capitalism-style win-win solutions is largely behind us. The cost to future generations is already high enough.

#### Response 15

Question 8 on the survey should be replaced with the following:

##### **Prioritization of Existing Buildings over New Buildings**

Although both should move forward, the University of Maine should prioritize investments in converting heating units in existing campus buildings to enable their use of solar, wind, and other near-zero carbon emission energy sources over investment in new buildings.

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

Question 8 on the survey should be followed up with:

##### **Arguably Renewable but Substantially Increasing Greenhouse Gas Emissions on Campus**

With the current bond funding of \$130 million available for campus heating plant improvements, it would be better to expend the funds to convert heating units in existing campus buildings to enable use of solar, wind, and other near-zero carbon emission energy sources to meet at least 25% of the campus heating load rather than to convert the steam plant to burn wood waste that would greatly increase annual greenhouse gas and particulate emissions on campus (although the fuel is arguably renewable over about a fifty year period).

- Strongly Agree
- Agree
- No Opinion
- Disagree
- Strongly Disagree

## C. Comments and Suggested Edits Received in Response to a Distribution Sent to Department Chairs, Deans, and Research Unit Heads

### Response A

Thank you for including me in the review of your survey. I applaud and support your work. This may not be possible, but if there is a way to reduce the technicality of the survey for those who are not as familiar with the terminology, you might get a better response (specifically, students). For example, many people may not know what carbon emissions are, or carbon footprint. If you could put lay terms in parentheses that may be helpful.

### Response B

I thought it would be better to be quick than comprehensive:

Here are some thoughts.

I note that the white paper specifically states:

"What **technological** approaches are being explored for achieving the campus net-zero carbon commitment"

That is fine, but from my perspective, only 1/2 of the issue, the other is behavioral. Unless I am missing something, I see nothing on: reducing travel (home-work commute, business travel, student group travel, sports travel), turning buildings off (down) during vacations - used to do this at U. of Tennessee 20 years ago!, turning off lights in buildings, etc. etc. And, perhaps, "scope 4" actions - improvements at home from the UMaine community.

Next:

"Why holding to 1.5°C to 2°C is Important: Within 1.5 to 2 degrees of warming, scientists predict that numerous abrupt ecological and climate system disruptions will occur or be put in motion"

=> My view is this is not constructive. Most technical/policy people I know think this is an unrealistic goal except as a political motivator to some segment of the population. The emissions for 1.5 - 2 C are already committed. I am done pretending to work for a goal that is not real - it is time to be honest with people. More constructive is to have realistic goals that can be measured and enforced. Also, long range planning for adaptation is probably also appropriate.

As to the survey: Questions of intent without costs are not useful. It is too easy to check the box: extremely important to keep our commitments. A better, more constructive approach would be a survey that posits choices (called [conjoint analysis](#)): 'The university has \$2 Million to spend: How much for climate mitigation efforts, how much for campus beautification, how much for parking improvements (or whatever). The point is I don't think it is particularly useful to ask people how much they care about something without bearing any of the costs (dollars, time, behavioral change). This is a well-known and documented problem in survey design (hypothetical bias).

Maybe a question:

"Would you support spending 1% of the pool of money allocated for faculty raises on proven (verifiable) GHG mitigation efforts? This will not affect your individual compensation." I am



thinking of something similar to the question on the Maine tax form: "would you support \$4 going to the clean election fund, this will not impact your refund?"

Also, the white paper should probably note that hydro power is not zero carbon. Here is some [data](#) from Hydro Quebec. Hydro is very low (5%?) varying significantly from site to site and over the life span of projects, temperature, and vegetation displaced.

### Response C

Thank you for sharing the survey and white paper with me. I'm impressed by the considerable work that has already been completed in this area and appreciate the opportunity to be brought up to speed on the initiative.

I have no new additions to the survey feedback that has already been provided; I would underscore the importance of adding these (previously suggested) items:

- (aa) The University of Maine Machias campus should be added to the University of Maine commitment to achieve net-zero greenhouse gas (GHG) emissions by 2040.
- (cc) Until such time as U.S. society resolves the issue of travel carbon emissions generally, the carbon emissions for each university-funded travel trip should be computed and the cost of offsetting/sequestering the carbon emissions should be applied to the university costs for the trip and actually spent for this purpose.

### Response D

Thanks for sharing this. My main concern is with the vagueness of some of the terms and the euphemistic nature of some of the others. For instance, what would it mean if the university were to do its part to lower the temperature (question 1)? What does a "Reputation to solve problems" mean? How do we define a carbon footprint? Without clear operational definitions, people are going to interpret these according to their own frames, and so while they might give the same answer, those answers won't mean the same thing.

In addition, it would help to be very clear about some of the ideas mentioned in the survey. For instance, what is the 2007 long-term commitment referenced in question 3? The survey should provide a brief description of this (so brief that people will read it). What are fossil fuel connections - gas lines? What about electricity? Electricity is produced by fossil fuel, so are these buildings going to be solar- or wind-powered? And how reliable is that?

Because of the lack of clear definitions or descriptions, I imagine people might interpret these survey questions as a measure of how much they care about the environment. So they'll give you socially desirable answers rather than the truth (e.g., yes, we all want a reduction in the loss of fossil fuel, but do we still want that if that means our buildings are going to be kept at 62F in the winter and AC will be banned in the summer? Just some extreme examples).

Anyway, hope that helps.

### Response E

I reviewed the concept paper and the survey. This being my first time reviewing this paper, I don't have much to add or comment on. It seems very appropriate to state wanting to take these actions. I don't have any comments on the survey. I will admit that I don't have a sense of the feasibility of achieving the goals set forward.

## Response F

Thank you for inviting comments on the survey. Here are my suggestions:

#2 is overly general. There are many ways students might envision making a difference; the question isn't specific to climate change. I think you could omit this one.

#7 could be more nuanced. Suppose new construction would increase the carbon footprint but is planned to be offset by demolition or renovation of more energy-intensive buildings. According to the question as posed, someone who agreed with this plan would have to indicate "strongly disagree." That doesn't seem right.

#8 is puzzling. What are you trying to find out? If \$90M would reduce carbon emissions equally in upgrades or new construction, does it matter what preference is expressed? If \$90M would go further in upgrades vs. new construction, shouldn't the university pick whatever approach yields the largest reduction in the carbon footprint, regardless of expressed preferences? Also, in my limited experience with this, bond funding is generally issued with specific projects in mind. An unrestricted bond for reducing emissions doesn't seem likely. I would suggest omitting this question.

#16 categories seem odd. Maybe consider:

- full-time faculty member
- part-time faculty member
- staff in a primarily research setting
- staff in a departmental or similar setting
- research unit head (e.g., organized research unit)
- unit head (e.g., department or school) or associate/assistant dean
- upper-level administrator (i.e., dean or above)

I will be interested to see the results. Thanks again.

Note: Several additional respondents indicated that their comments will be forthcoming.