

# Getting into Neutral: Climate Policy and the University

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**Abstract:** On March 11, 2008 the University of Virginia Faculty Senate voted in favor of having the university take steps to make it climate neutral. This paper examines whether such a policy is feasible, and further whether pursuing a policy of climate neutrality is likely the best way to spend university resources, if the goal is to reduce the university's carbon footprint. [ Revised version published in Virginia Policy Review (Vol. 2, No. 1) September-October 2008 ]

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On March 11, 2008 the University of Virginia Faculty Senate voted in favor of asking the president and the Board of Visitors to take steps to make U.Va. *climate neutral* and in particular *to commit resources* needed to set and meet a specific *immediate* goal to reduce greenhouse gas emissions, say by 30 percent over the next 10 years.<sup>1</sup> As part of this effort, the University should “implement a detailed energy audit and corresponding emissions inventory for greenhouse gases” and should engage in an aggressive campaign to reduce energy use. This resolution passed by a 27-5 vote and puts U.Va. in very prestigious company alongside the likes of Berkeley, Harvard, MIT and the other usual suspects.

One way to interpret such a resolution is as a symbolic gesture intended as an expression of concern about human-induced climate change with the intent of pushing the national policy debate toward some concrete action. There is a rising chorus of such expressions of support for national and international controls on greenhouse gases, and there is evidence that the increasing level of concern is starting to have an effect on the national policy dialog. However, the resolution contains some fairly specific suggestions about specific actions that should be taken by the University and a specific injunction that resources should be allocated to carry them out. While the resolution does smack of keeping up with the Jones (and Harvards, etc.), it does not read like a general statement of solidarity but more like an initial action plan. Indeed, if it were a general political statement, why address it to University officers at all, why not address it to President Bush, who has carefully avoided the subject rather than engaging in careful policy development to address the risks of climate change.

We conclude that the resolution is not intended as a symbolic gesture, but rather as an actual recommendation for concrete action. But, is it a good thing to do what the Faculty Senate suggests? This question is best broken down into parts: Should the University join the other prestigious schools in establishing a school-level policy to address climate change? Is a commitment of school resources to a goal of climate neutrality an appropriate one? Is an energy conservation campaign (as outlined) the best approach? Finally, should President Casteen sign U.Va. up for the American College & University Presidents Climate Commitment (ACUPCC) as suggested in the resolution? Another way to approach these issues is to ask whether the program outlined by the Faculty Senate is the best one if we have limited resources to spend on reducing our contribution to climate change?

In what follows we will make a start at addressing these questions.

### **Climate footprint defined?**

Concentrating just on carbon dioxide, the most important of the greenhouse gasses, what does it mean for the University of Virginia (U.Va.) to be carbon neutral? Does it mean that we want to make sure that no net carbon is emitted from University properties, or

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<sup>1</sup> Resolution on Climate Commitment, 3/11/08  
<http://www.virginia.edu/facultysenate/documents/ResolutiononClimateCommitment.pdf> (Last accessed 4/24/08)

does it mean that no net carbon should be emitted as a result of University activities?<sup>2</sup> This difference may seem arcane but is actually very important. If we use the former approach, which is the one enshrined in the Kyoto Protocol, it would be trivial to dramatically reduce U.Va. carbon emissions by closing the main heating plant, which is coal-fired, and having the steam generated by someone off grounds or just using electricity purchased from off-grounds to generate steam on grounds as needed. This would go a long way toward meeting the 30 percent reduction goal for U.Va. but, of course, would probably increase net carbon emissions. Only counting emissions generated on grounds makes it considerably easier to minimize our carbon footprint, just outsource the offending activity. In fact, capping emissions under such an accounting framework would give cost-conscious managers around grounds considerable incentive to ‘off-source’ carbon intensive activities. After all, how can one justify using scarce research funds on more expensive, on-grounds energy, when off-grounds, cheaper energy is readily available?

One way around this problem is to take the second accounting approach and account for the carbon that is emitted due to University activities. In this case, the process steam would be associated with its carbon emissions no matter where it was generated. This same accounting rule would also have to be applied to electricity used at U.Va., most of which is generated at coal-fired power plants (except the part that comes from nuclear plants). Now that we are accounting for the carbon emissions associated with University activities, we can’t limit ourselves just to steam and electricity. We now need to account for the carbon emitted by anything used at University facilities; after all, it takes energy to cook food whether it is cooked on grounds or not. And paper, and computers, and transportation to and from University-related activities and business. Friends and family come for visits. Who takes responsibility for the resulting emissions?

Unfortunately, this accounting quickly gets very messy because you have to ask what would have happened if the University weren’t here. People who now work for U.Va. would be doing other things if they weren’t working here, things that cause carbon emissions. A sick person who comes to U.Va. hospital would go to some other hospital if U.Va. weren’t here. First-year students at U.Va. have restricted access to cars; they might drive much more elsewhere. These emissions must be subtracted from emissions due to U.Va. activities for the **net** carbon emissions. It is possible that the very existence of the University is taking some economic activity away from high greenhouse intensity and moving that activity to lower greenhouse intensity, in which case, the University’s very existence would cause a reduction in climate changing emissions.

It is impossible to know the relevant counterfactuals. If we try to reduce emission on grounds, how much of our carbon footprint will simply walk elsewhere. Alternatively, if we account for carbon emissions resulting from University activity, we need to know what would happen if the University weren’t around. So, in the least, the Faculty Senate needs to set aside lots of money for advances in energy accounting far beyond anything

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<sup>2</sup> The former approach is the one used in the Kyoto protocol for controlling country-level emissions.

possible today.

### **Climate neutrality**

The Faculty Senate specifically calls for "...a vision for moving the University towards climate neutrality...". How might a billion dollar enterprise like U.Va. ever achieve climate neutrality? As long as we use fossil fuels for generating energy, and as long as we eat plants or animals raised on farms, which are big sources of methane, a powerful greenhouse gas, then activity at U.Va. will be associated with greenhouse emissions. To achieve climate neutrality under this circumstance means somehow offsetting the emissions that remain, however low we have been able to drive them. We could capture greenhouse gasses from the atmosphere and destroy or sequester them. This is not an option for the foreseeable future. Period.

Another option is for U.Va. to buy carbon 'offsets'. Many readers may have seen advertisements for carbon offsets when making travel reservations. They are certified and traded through firms such as the Chicago Climate Exchange and others. Unfortunately, in general, these offsets do not represent the reductions in greenhouse gas emissions claimed. On the contrary, the use of emission offsets will frequently result in increased emissions. To see how, consider how an offset is generated. A person involved in some activity that generates greenhouse emissions can make an investment in some technology that will reduce the emissions for each unit of that activity, sealing a leaky steam pipe or retrofitting an old building with insulation. Or, someone could build a wind turbine, which generates energy without generating carbon emissions. On the face of it, these investments result in an emission reduction compared to what emissions otherwise would have been. As a result, the investor can claim a greenhouse gas emission credit for that reduction and can sell this credit to someone who would like to continue emitting but wants or needs to cover emissions with reductions elsewhere. This can have benefits because the ability to sell reduction credits creates a financial incentive to increase investment in emission reductions and in renewable energy.

Emission credit aggregators such as the Chicago Climate Exchange certify the credits to ensure that they do, in fact, exist and do reduce emissions of greenhouse gasses. This gives the credits a patina of respectability. It is, however, only a patina. The problem once again is with the counterfactual; there is no way of knowing that the reduction in emissions (or some fraction of it) would not have happened anyway, in response to normal economic incentives. For those reductions that would have happened anyway any credits created will actually result in *an increase in carbon emissions* compared to what would have happened without the credit system, assuming that the buyer of the credits does use them to cover emissions that would not have happened otherwise.

Credited reductions that would have happened even without the credits are often referred to as 'anyway' emissions. While it may be true that the incentive to reduce emissions will be increased by the opportunity to sell credits, it is very plainly true that a great deal of emission reduction activity would have occurred anyway. Between 1970 and 2006, the amount of CO<sub>2</sub> generated per unit of gross domestic product in the U.S. has fallen by

50%. As the economy has expanded, producers have always had to pay for their energy use. This incentive has led to investments in new technologies that allow us to produce much more output from a given amount of fossil fuel input. These are exactly the sorts of investments that could earn an emission credit today but they occurred without the incentive created by credits.

To see how hard it is to separate out anyway reductions from actual reductions due emission credits, consider that emission credits are being given for the same types of activities today as was the case one year ago. During that time, the spot price of crude oil has risen by about 50%. The effect of the change in oil prices on the value of energy conservation completely swamps any incentive from potential credit sales. So we can expect much greater efforts to save energy and reduce emissions based on oil prices alone. Crediting these emission reductions allows emissions to increase somewhere else even though the reductions would have happened anyway. Bingo, an increase in emissions resulting from the credit sale.

The Faculty Senate recommends that U.Va. join in the American College & University Presidents Climate Commitment. The College of the Atlantic has signed on and recently claimed to have met its climate commitment. It earned headlines for going “net-zero” for carbon emissions. According to the Associated Press, “...to become carbon neutral, the college is buying carbon offsets for about \$25,000 through The Climate Trust of Oregon. The trust is reducing carbon dioxide emissions by optimizing traffic signals and managing traffic flow in Portland, Ore., which shortens the amount of time cars spend idling at traffic lights. The entire project is expected to reduce carbon dioxide emissions by nearly 190,000 tons over five years.”<sup>3</sup> In the future, any city planning on improving traffic flow can claim that it is doing so to reduce greenhouse gases and can earn credits. Plus, the estimate of fuel savings is based on vehicle mix and driving habits at fuel prices we can only dream about now; they are grossly inflated.

There *is* one type of offsetting purchase that has a reasonable certainty of reducing carbon emissions by something close to the face value of the purchase. If a country or region places a hard cap on its carbon emissions and then allows emitters to trade emission ‘allowances’ under that cap, then each purchase of an emission allowance means one fewer is available to other sources. A carbon dioxide cap and trade program now exists in Europe, one will start up in 2009 in 9 northeastern states in the U.S., and one is planned for California and several other western states. Assuming the cap is enforced, still something of an open question, then buying allowances under these programs could reduce emissions. As of this writing, a ton of European CO<sub>2</sub> may be purchased for \$40 and rising. Naturally, the purchase of European allowances by several U.S. universities would only add to upward pressure on prices. Going zero, if we really mean it, won’t be cheap.

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<sup>3</sup> <http://www.seacoastonline.com/apps/pbcs.dll/article?AID=/20071219/NEWS/71219021>

## Doing it ourselves

Suppose we don't want to pay for these expensive offsetting reductions, but would prefer to reduce the University's own carbon footprint. The Faculty Senate recommends that "[n]o-cost, common-sense changes in behavior to reduce energy consumption should be adopted throughout the community. Unit supervisors should instruct staff members to turn off lights and turn back thermostats wherever possible." If the members of the faculty truly believe that there are no cost reductions in energy consumption, then there is an easy way to make sure it happens. The Faculty Senate should contract with the University to see that these savings happen and then the saving could be shared with half going to increased salaries and half in savings to University operations. Since these are no cost changes, then there should be considerable savings to share.

In fact, there are no "no cost" reductions. This is made plain in the Senate's own language when it proposes achieving "no cost" reductions by including energy efficiency in job descriptions to be "rewarded through performance evaluations". To assert that this can be done at no cost is self-contradictory.

Even after squeezing every no cost reduction from University operations, U.Va. will still have a rather large carbon footprint, however measured. We will need to make substantial modifications to the University's capital infrastructure to achieve greater reductions. Unfortunately, now we face a major conundrum. Should we act with great urgency to use today's best energy efficient technologies, or should we hold out for newer better options? This is one of the worst of the many difficult tradeoffs inherent in choosing among climate change options. To see why this tradeoff is important, suppose U.Va. wants to improve the efficiency of its transportation fleet. It could start by immediately retiring its current fleet and replacing it with the most efficient new option for each type of vehicle. The problem is that by acting quickly, we may actually get less reductions in emissions than if we wait a bit. Since energy efficiency in vehicles is likely to improve considerably as new technologies are introduced, buying now will mean forgoing the greater improvements we could get by waiting until next year, or the next, etc. That is, unless will intend to greatly increase the rate of fleet turnover which will increase emissions from auto manufacturing. Ouch.

With its much longer life span, the building stock presents an even harder tradeoff. Shall we retrofit (or even rebuild) buildings now to promote climate neutrality or shall we wait a few years until new, improved lighting and heating options are available? If we do so now, then there is little chance that we will have the resources to do it all over again in 20 years and again in 40 years, and so on.

Numerous economic modeling exercises have shown that by delaying the replacement of our current capital stock, we may find ourselves able to make much greater cumulative emission reductions by the end of the century, than we could accomplish if we were to act quickly. This means lowering our short-term targets in favor of much more aggressive longer term targets. This choice is hard because it means delaying the actions that produce the obvious, feel-good results in favor of much more short run research in

new knowledge to be followed later by steeper reductions. Universities themselves would play a much more central role in the latter approach than in the former. This is especially true because these early investments in new knowledge will have their greatest impact in the fastest growing economies with the fastest growing emissions, China and India among others.

### **Your money or your carbon**

Finally we need to address the issue of who is going to pay for implementation of the Faculty Senate's proposal. Taken literally, the proposal doesn't cost much. The five elements of the proposal and ballpark cost estimates are:

1. Issue a strong statement, set a goal, and publish a plan - \$10,000  
Actual emission reductions: 0
2. Emission inventory and energy audit - \$150,000 (top quality)  
Actual emission reductions: 0
3. Implement all changes that can be achieved at no cost - \$0 (by definition)  
Actual emission reductions: minimal to none (see text)
4. Consolidate conservation efforts under a cabinet-level individual - \$120,000  
Actual emission reductions: hard to say but definitely some
5. Endorse the ACUPCC - \$0  
Actual emission reductions: 0

Adding it all up, we get a very modest reduction in emissions for \$160,000 up front and \$120,000 per year. At least some of the cost will be made up in energy costs saved.

These calculations honor only the letter of the resolution. To honor the faculty's intent, we will need to implement a plan of emission reductions and allowance purchases that would make the University climate neutral by some reasonably *immediate* date. Note, the purchase of the cheaper *offsets* rather than *allowances* is not considered because we are assuming that the faculty did not pass this resolution as an empty symbolic gesture. Without seeing the plan, it is not possible to estimate the cost of achieving it. However, no conceivable plan could cost less than say \$10 million per year. After all, that amount would only purchase 250,000 tons of carbon per year on the European exchange. To reduce the U.Va. greenhouse footprint to that low a level would require enormous additional expenditures.

The benefits to U.Va. students, staff, and faculty and to the people of Virginia of this investment in climate neutrality are essentially nil. To see this, you only need ask what difference will the expenditure make in damages to the University community and the state from climate change. A fair assessment must conclude that there would be no discernable difference in damage; whatever would have happened without the plan would happen with the plan. This is because the change is too small to matter and because, whatever the benefits are, they are spread out across the entire planet. This is true for any single school, any group of schools, any single state, or even group of states. Only a national policy can change emissions enough to matter. Even that is not sufficient but is probably necessary to induce cooperation from other countries.

Students, faculty, and staff will all pay a price for the climate neutrality expenditures. That statement is true even if someone outside the University can be induced to pay the cost, because those funds have an opportunity cost. Some combination of lower pay, higher tuition, less support for research, smaller offices and classrooms, and reduced services must result. Unless every college and university engages in a similar effort, each of these costs makes U.Va. a little less competitive with other schools when trying to attract faculty, students, or research funding.

### **Spending wisely**

It is unimaginable that President Casteen or the Board of Visitors would act to implement the Faculty Senate resolution. It would require large expenditures, and disruptive changes without producing any benefits except good feelings and knowing that U.Va. is right up there with other prestigious universities that have made self-destructive choices. There is not even any assurance that a U.Va. climate neutrality policy would reduce the University's greenhouse emissions by much. Besides, this would be the best way to spend \$10 million a year even if we had it and it couldn't be used for anything but reducing anthropogenic climate change.

It is almost certainly true that, if we are to reduce the risks from human-induced climate change, we must act. But how we act is of great importance. It is certainly **not** true that a panicky effort to make *immediate* reductions in greenhouse gas emissions is the best approach. To do so would be wasteful and most probably counterproductive since it would waste the very resources we need to address the risk.

There is an immediate need for investment, but not in hybrid cars, not in attic insulation, no not even in compact fluorescent light bulbs. If we had \$10 million to spend, we should spend it on research. Research in science, technology, social systems, management, cultural norms. Research right here at our own university. The knowledge we have today is not up to the task. Every panicky investment we make with today's technology will have to be torn down, thrown away, and replaced with new and improved products and processes. Spending that money on new knowledge makes our next investment more productive in achieving our goals, and, better yet, makes it possible for the billions of poor people on the planet to achieve a higher standard of living without doing the same damage that we did to our life support system obtaining our standard of living. This self-investment would have the added benefit of supporting one of the core activities that give the University its fine reputation, that make it a desirable place to work and study, and that justify the spending of public funds on its operations.

Our resources are limited. Every effort must be made to spend them in a way that maximizes our expected gains. If we are willing to spend \$10 million a year, we could still spend it right here at U.Va. on our own faculty, graduate students and undergraduates. Instead of creating \$10 million worth of reductions in greenhouse emissions, research results would be leveraged into all future investments and would produce many times those reductions, giving future generations a chance to solve the problem once and for all.