Campus Climate Action*

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Introduction

According to the Intergovernmental Panel on Climate Change, there is strong evidence that most of the warming over the past fifty years is attributable to human activities. Changes in sea level, snow cover, ice extent, and precipitation are consistent with a warming climate near the Earth's surface. The probability that these observed changes could occur by chance alone is negligible. Detection and attribution studies consistently find evidence for an anthropogenic signal in the climate record of the last 35 to 50 years. Projections using the IPCC's Special Report on Emissions Scenarios in a range of climate models result in an increase in globally arranged surface temperature of 1.4 to 5.8 C over the period 1990-2100. This is about 2-10 times larger than the central value of observed warming over the 20th century, and the projected rate of warming is very likely to be without precedent during at least the last 10,000 years. During this same period, global mean sea level is projected to rise by 0.09 m to 0.88 m. Globally averaged annual precipitation is projected to increase, while glaciers are expected to continue their widespread retreat during the 21st century. Climate change is projected to increase threats to human health, particularly in lower income populations, predominantly within tropical/subtropical countries. (IPCC, 2001)

State Action

Given these dire projections, the world needs to take major steps to reduce anthropogenic contributions to global warming. Many believe these steps should begin with the United States. According to the Pew Center on Global Climate Change, the United States is responsible for 25 percent of global greenhouse gas (GHG) emissions to date, and its emissions continue to increase. As the world's largest economy, and the world's largest emitter of greenhouse gases, the United States is central to any long-term strategy to address global climate change. (Pew, 2006) However, the U.S. Federal Government has proven to be largely inept at implementing any kind of federal legislation on this matter. Subsequently, many states have taken to enacting their own policies on reduction of GHGs. According to Barry Rabe in his recent article "Power to the States", States have quietly begun to fill the "policy gap" created by federal inaction, with an increasingly diverse set of policies that address every sector of activity which generates greenhouse gases. He notes this is a relevant issue given the recent Resources for the Future study which states "a basic tenet of correct thinking about current environmental policy is the desirability of decentralization from the federal government." This focus on local control is supported by E.F. Schumacher in his work Small is Beautiful, David Orr's Nature of Design, and Wendell Berry in Another Turn of the Crank. This movement towards decentralization is already occurring, as states collectively issue more than 90% of all environmental permits and complete more than 75% of all environmental enforcement actions. Efforts have been made in analyzing this activity through ranking schemes to determine which states are most effective and innovative. The consistent finding is that certain states tend to take the lead in most areas of policy innovation, followed by an uneven pattern of innovation diffusion across state and regional boundaries. From these studies comes evidence from select states suggesting that a number of state innovations offer worthy alternatives to prevailing approaches. An

example is the California State Treasurer's success in convincing their two largest public pension funds to direct much of their investments towards "cutting-edge clean technologies and environmentally-responsible companies." Sarah Hammond Creighton calls for universities to make similar investment decisions in her book Greening the Ivory Tower, which focuses on the GHG reduction efforts of Tufts University. Furthermore, states such as California have been particularly active in carbon regulation via efforts such as 2002 legislation which established the first carbon emissions standards for motor vehicles in North America or Europe (see the Nature article "Power Struggle" for more on this). Rabe notes that once California has taken such steps, other states are free to embrace its policies, creating the potential for a competitive "race to the top" among states.

Limitations to State Action

There are, however, several limitations to increasing state action. First is uneven state performance. Many efforts to rank states according to their environmental regulatory rigor, institutional capacity, or general innovativeness finds the same subset at the top of the list every year. By contrast, a significant number of states consistently tend to fall much further down the list, raising questions as to their overall regulatory capacity and commitment. Despite considerable economic growth in formerly poor regions such as the Southeast, substantial variation endures among state governments in their rates of public expenditure, with no demonstrable change in the amount of interstate expenditure variation since 1970. Second, states have received between 1/4 to 1/3 of their total environmental program funding from federal grants in recent years. As an example, the most successful efforts to coordinate environmental protection on a multistate, regional basis have received a great deal of federal input and support. Third, out-of-state export of waste and pollution has become an increasingly common pattern, with wastes often shipped to facilities opened before concern over waste and facility siting became widespread. (Rabe, 2006)

Need for Focus on Campus Action

Of particular concern here is uneven state performance. Subsequently, there is a need to explore ways of enhancing state action on GHG reduction. An appropriate starting point may be campus climate change action. There are at least four main reasons for this. First, such action is directed at the local level, which is where much state action is derived from. This is supported by Barlett and Chase's Sustainability on Campus: Stories and Strategies for Change, which states that colleges and universities are inextricably woven into the communities in which they exist, and their programs, commitments, and connections provide opportunities to make significant differences on- and off-campus. The more this local action is influenced by sustainability initiatives, the more state action will reflect such initiatives. Second, campus climate action itself will directly impact anthropogenic contributions to climate change. According to Sarah Hammond Creighton's Greening the Ivory Tower, university energy usage is often the largest of its region, and they're subsequently the biggest waste producers. As an example, a medium-sized university such as Tufts is cited as producing 56 million tons of

CO2 and 2000 tons of solid waste annually. Third, these actions are key in educating our future leaders to take a more sustainable path, as institutions of higher education teach young people professional and intellectual skills. In doing so, universities can both teach and demonstrate environmental and stewardship principles for present and future generations by taking action to understand and reduce the environmental impacts that result from their own activities. Barlett & Chase note that universities teach approximately 14.5 million students each year, and these future leaders will play a critical role in helping move the world to a more sustainable future. Julie Newman, in her work Reaching Beyond Compliance states that today's graduates will be challenged to stabilize many environmental issues facing us. One way in which college graduates will become exposed to these global complexities is if their university is prepared and willing to make difficult decisions. Universities also conduct basic research that is instrumental in understanding the natural world and our effect on it. Fourth, many of these actions involve the reduction of waste, and reducing waste represents opportunities to save. This can serve as an attractive model for state action efforts at financial savings.

Furthermore, according to the recent Energy Action and Apollo Alliance "New Energy for Campuses" report, college and university campuses are uniquely placed to affect America's energy future. The higher education sector is a $317 billion industry that educates and employs millions of people, maintains thousands of buildings and owns millions of acres of land. It spends billions of dollars on fuel, energy and infrastructure. And the footprint of higher education is widening — enrollment between 2000 and 2013 is expected to increase by 23%. If every one of the 4000 campuses in the U.S. used 100% clean energy, it would nearly quadruple the current renewable electricity demand in the U.S. Campuses can set an example for their communities and the nation by implementing alternative energy, energy efficiency and environmental sustainability projects on campus to demonstrate their feasibility and cost effectiveness. They are centers of intellectual power, capable of leading experiments on new technologies, and using these projects as teaching tools and research opportunities to better the education of the next generation of voters, consumers, politicians, and business leaders — people who will be making energy decisions for years to come. Academia has traditionally been at the forefront of cultural and technological change, and campuses once again can be the catalyst that drives this county into sustainable energy independence. As David Orr says, "No institutions in modern society are better equipped to catalyze the necessary transition to a sustainable world than universities. They have access to the leaders of tomorrow and today. They have buying and investment power. They are widely respected. Consequentially what they do matters to the wider public." (Orr, 2004) And yet, few campuses have taken real, concrete steps to move toward a cleaner energy future. Only 80 campuses in America purchase clean energy and most of these have implemented only small scale, if worthy, clean energy projects. Furthermore, only a handful of campuses have developed comprehensive plans, with targets and timetables, for substantially reducing greenhouse gas emissions and achieving energy independence. (New Energy for Campuses Report, 2005)

In short, just as states function as a "laboratory for federal action", universities may act in some ways as a "laboratory for state action". For example, according to the Nature article, "Searching for Energy Efficiency on Campus: Clark University's 30-Year Quest", the experience of Clark University demonstrates that although international

progress on implementing Kyoto has been slow and halting, a grassroots campaign by small, manageable institutions such as universities could provide a significant, albeit incremental approach to the global warming problem.

Given the importance of university climate action, a relevant area of future research may focus on ways to increase the efficiency and scope of such actions. The editors of Sustainability on Campus: Stories and Strategies for Change, Peggy Barlett and Geoffrey Chase, cite Redclift's belief that the journey toward sustainable development has two main parts. The first is research on "current social processes". The second is the establishment of intervention of these processes. To facilitate the latter, we need to know more about existing experiences of positive environmental action to help establish conditions necessary for their success.

There is a need to build upon Barlett and Chase's work, which provides case studies of several campus sustainability initiatives. While this is an excellent resource, it does not provide a specific method of categorization or analysis of these initiatives. In general, there appears to be a lack of resources regarding such actions. A Lexis/Nexis search conducted on April 21, 2006 yielded a large number of newspaper articles regarding campus sustainability but scant research published in peer-reviewed articles.

CORE

To build on Barlett and Chase, this proposal will list findings on campus climate action as categorized within the four "CORE" principles. CORE is used by the University of New Hampshire's Office of Sustainability to organize institutional thinking about how to incorporate sustainability principles into all facets of campus activity. These CORE principles are defined as:

· Curriculum – what is taught
· Operations – how UNH is run, from dining services to transportation to landscaping to building construction, renovation, and maintenance to public art
· Research – what is studied in depth and integrated throughout many fields and disciplines at UNH
· Engagement – how UNH works with others in the Durham, New Hampshire, regional, national, and international communities

Curriculum

Sarah Hammond Creighton notes that institutions of higher education teach young people professional and intellectual skills. In doing so, universities can both teach and demonstrate environmental and stewardship principles for present and future generations by taking action to understand and reduce the environmental impacts that result from their own activities. According to Barlett and Chase, they teach approximately 14.5 million students each year, and these future leaders will play a critical role in helping the world move to a more sustainable future. In their article "Making Climate Hot: Communicating the Urgency and Challenge of Global Climate Change", Lisa Dilling and Susi Moser note that the global nature of climate change makes it a difficult issue to explain succinctly. They believe it's important to note that to reduce the complexity of

this problem to a manageable size, listeners will attempt to understand the complex concept of global warming through a preexisting framework of information. There's also an issue of geographic separation, as the noticeable effects are occurring away from the point of most GHG release. For all of these reasons, incorporating sustainability into university curriculums is highly important. Examples of sustainability principles incorporated into the curriculum from UC-Berkeley's Energy and Resources Group, the Green Campus Program, and the University of British Columbia are cited later on.

Operations

Many universities are increasingly engaging in sustainable operations because of the demonstrated financial benefits. According to Creighton, most comprehensive projects will pay back in 3-5 years (such as the recently activated UNH co-generator). Furthermore, smaller-scale efforts such as improving the efficiency of lighting and motors can have payback periods of as little as three months. An interesting note she makes is that electric companies will often support efforts with rebates. This is because electricity savings on campuses will open capacity for new users elsewhere, which saves the electric company money by reducing the need for additional generating capacity. Notable campus operations are currently occurring in the California State University System, Cornell University, Yale, and a number of other institutions.

Research

Universities conduct basic research that is instrumental in understanding the natural world and our effect on it. (Creighton) According to the aforementioned "New Energy for Campuses: Energy-Saving Policies for Colleges and Universities" report, universities are centers of intellectual power, capable of leading experiments on new technologies, and using these projects as teaching tools and research opportunities to better the education of the next generation of voters, consumers, politicians, and business leaders — people who will be making energy decisions for years to come. Academia has traditionally been at the forefront of cultural and technological change, and campuses once again can be the catalyst that drives this county into sustainable energy independence. Such research is exemplified by the efforts of Portland State University.

Engage

Poor and minority communities bear a disproportionate environmental burden. A recent study of the distribution of hazardous sites and polluting facilities around Massachusetts found that communities of color and working-class communities are home to significantly more hazardous sites and facilities than wealthier communities and those with a small minority population. (Massey & Ackerman, 2003) A major contributor to this is the ability of industry to locate their negative externalities in communities that cannot oppose them. Industry will continue unsustainable practices because this is more economically beneficial to them than alternative sustainable practices. These unsustainable practices will be halted when the costs of production for industries cause them to adopt sustainable production methods. This change will come about only if these

communities are able to strengthen themselves in order to fight off the locating of these externalities in their areas.

A solution offered is the notion that the most direct path to ensuring effective and equal environmental protection for all is through a focus on civic environmentalism. This is defined as the idea that stakeholders of a particular geographic and political community (residents, businesses, government agencies, and non-profits) should engage in planning and organizing activities to ensure a future that is environmentally healthy and economically and socially vibrant at the local and regional levels. Thus, civic environmentalism is about empowering a diverse set of stakeholders to work to improve our natural resources while simultaneously promoting sustainable economic development. (Shutkin, 2001) In order to establish higher levels of civic environmentalism, universities will need to model these concepts more to their students, who will then take these learned concepts and philosophies into their adult lives. Examples of engagement between institutions of higher education and with the greater community include the Campus Climate Challenge, the Sustainable Campuses Project, and the Talloires Declaration.

Examples of CORE Activities

The following table of examples of campus action are compiled from a recent request for information sent to the GEP-ED listserve, the aforementioned Energy Action and Apollo Alliance "New Energy for Campuses" report, Sarah Creighton Hammond's Greening the Ivory Tower, Barlett and Chase's Sustainability on Campus: Stories and Strategies for Change, and discussions with the University of New Hampshire's Office of Sustainability.

Curriculum	The **Energy and Resources Group (ERG) at the University of California at Berkeley** is an interdisciplinary graduate program. ERG was initiated through a process of shared learning among scholars of multiple disciplines, and this evolved into a central sustaining characteristic. Being centered on shared learning rather than a particular approach to environmental synthesis has kept ERG among the leaders of innovative, interdisciplinary thinking for three decades. Their approach proved successful for a number of reasons. After two years of interacting with faculty and students in the program, their master's alumni with prior training in engineering were able to pose questions in economic terminology that numb a conventionally trained neoclassical economist at the public utilities commission, opening up possibilities for energy efficiency to be treated on a par with energy supply in the regulatory process. Graduates with prior training in economics were able to ask sophisticated environmental questions, and graduates with prior training in environmental science were able to dumbfound engineers. Using deeper questions to keep those with conventional training in the disciplines and professions off-guard offered possibilities for pursuing new solutions that addressed the interconnected nature of the problems. The benefits of this approach are further demonstrated by the University's establishment of an institute to fund energy research, much of which initially went to ERG. California established an

	Energy Commission to scope out alternative futures, and ERG graduates assumed key positions early. The Public Utilities Commission responded with new policy initiatives and procedures to promote energy efficiency and renewable energy technologies, and ERG alumni were the ideal job applicants to shoulder these new efforts. In short, this is a prime example of a university and home state acting in concert to improve the environment. The Alliance to Save Energy's **Green Campus Program** is leading the way towards campus sustainability by bridging the divide between students and institutional energy costs. Through Green Campus, students are working to save energy on campuses by building general campus awareness, incorporating energy conservation and efficiency into course curricula, and implementing projects targeting energy use, student purchasing decisions, and operational changes. The Green Campus Program currently supports students on nine University of California (UC) and California State University (CSU) campuses. The **University of British Columbia** offers more than 300 sustainability-related courses.
Operations	The **California State University (CSU) System,** the largest four year university system in the world, has committed to meeting 20% of its energy demand with renewable power by 2010. CSU will begin by purchasing 34,000 MWh worth of Renewable Energy Credits (RECS) from 86% wind energy and 14% landfill gas. This significant quantity has established CSU as a leader in clean energy procurement. CSU's renewable energy mandate is one component of a larger set of activities. The CSU system plans to reduce demand by 15% by 2010 and to complete 50 MW of self generation capacity, substantially circumventing market instability. This capacity will tap clean technologies such as solar and combined heat and power. Collectively, the CSU policies will avoid 80,000 tons of CO2 release by 2010, effectively pushing emissions 17% below their 2004 levels. To manage growing campus traffic, **Cornell University** instituted a package of incentives and disincentives. Higher parking fees were coupled with a redrawn parking system which favors carpooling. Additionally, Cornell worked with surrounding municipalities to integrate their transit systems into a seamless design. Now Cornell students, faculty and staff who forego a parking pass can use unlimited, free public transportation anywhere in Tompkins County. Overall, the school's efforts have been successful. In addition to reduced tailpipe emissions, Cornell saves 417,000 gallons of fuel and 10,000,000 vehicle miles traveled each year. Over 12 years, Cornell's transportation programs have saved over $36 million in construction, infrastructure maintenance, and transportation costs. **Eastern Illinois University** had accumulated a backlog of cost effective efficiency opportunities. The school contracted with an Energy Service Company to audit its facilities. The ESCO found inefficient lighting in 30 buildings. Ultimately, the audit led to installation of more than 10,000 high efficiency

lighting ballasts, 300 occupancy detectors and 200 high efficiency LED exit signs. Each year the school saves 3.7 million kWh in electricity consumption. The project cost just over $1 million but saves between $250,000 and $300,000 annually — a 30% return on investment.

Nine Pennsylvania colleges and universities have recently increased prior commitments to the purchase of wind power. These new commitments added to wind purchases previously made by 25 other Pennsylvania schools, continue to make Pennsylvania higher education the leader in wind purchases in the United States. The schools purchasing wind are members of the **Pennsylvania Consortium for Interdisciplinary Environmental Policy (PCIEP)**. Several years ago PCIEP created a partnership with Community Energy, Inc. (CEI), a marketer of wind power, to pool purchases of wind by Pennsylvania schools. Combined PCIEP member wind energy purchases now total 92,200 megawatt hours (MWh) or the equivalent of 23 wind turbines, constituting the largest non-governmental aggregated commitment to wind power in the U.S. PCIEP's member institutions' decision to purchase pollution-free wind power mix in Pennsylvania reduces the amount of carbon dioxide is approximately equivalent to planting nearly 7.5 million trees, not driving 96 million miles, or taking 15,121 cars off the road each year. By making commitments to wind energy, Pennsylvania colleges and universities are leading by example on important public policy questions. Because the United States urgently needs to move toward greater use of renewable energy not only to reduce the threat of climate change but also to achieve energy independence, higher education in Pennsylvania is creating a path for others to follow on a matter of great national importance.

In 2001, students at **Stanford University** worked together to make their university's $12 billion endowment the first in the United States to implement climate change shareholder voting guidelines. Students proposed the initial guidelines, which were refined by the university's Advisory Panel on Investment Responsibility. Recommendations by this panel were adoption by the Stanford University Board of Trustees and the guidelines will be applied when voting on future climate action shareholder resolutions.

In the mid 1990s the **University of Maryland** conducted an energy audit revealing significant potential savings through a combined heat and power system. Unfortunately, servicing the school's energy requirements demanded a 27 MW plant with equally large capital commitments. At a cost of $70 million, the system could not access sufficient state funding. Instead, UM worked with the Maryland Economic Development Corporation and issued $73 million in bonds. The school expects a 32% reduction in primary energy use. The energy cost savings will service the bonds over a 20 year term. Because the plant is financed through efficiency gains, the project appears off the university system's balance sheet.

A **Western Washington University** initiative demonstrates how student fees can leverage significant support for the renewables industry. On June 10, 2005,

	WWU's board of trustees voted on a student fee to fund campus clean energy procurement. At $1.05 per credit per quarter, the fee will provide enough revenue to supply 100% (35 million kWh hours — enough to power 3,200 homes) of the school's 2005-06 electricity supply with clean energy. This purchase sends a strong market signal to power producers, nearly doubling Puget Sound Energy's green power sales. **Yale's** Berkeley College procures nearly half of its food from local farmers with sustainable practices, substantially reducing the amount of fuel used to transport produce. Additionally, sustainable agriculture offsets the need for energy intensive fertilizers and fossil fuel-intensive machinery. By rewarding these responsible businesses, Yale University creates a significant market for sustainable agriculture in the area. The shift to fresh, local ingredients has also raised the quality and popularity of campus dining. The dining hall has become so popular that it attracts lines of students from other dorms.
Research	**Portland State University** is developing core multidisciplinary research competencies in key areas related to sustainability: -Intelligent Transportation Systems -Integrated Water Resource Management -Sustainable Urban Design -Sustainable Business Processes and Practices -Environmental Science and Green Technology Development
Engage	The **Clean Air-Cool Planet** on-line Campus Climate Action Toolkit (CCAT) aims to make available to anyone who is interested in making his/her educational institution more "climate friendly" - college or university students, staff, faculty, administrators, trustees, alumni, community members - a comprehensive guide to and resource for doing so. It is intended both: (1) to model what an actual "published" Campus Climate Action Plan might look like; (2) while consisting of short bits of guidance for every aspect of "campus climate action" along with hyperlinks to technical resources and examples/case studies that will help people understand, plan, and execute or implement the CCAP's various elements. **Energy Action** is a coalition of 30 organizations working to support and strengthen the student and youth clean energy movement in North America. Currently Energy Action is working heavily on The **Campus Climate Challenge**, a grassroots effort to organize and win hundreds of clean energy victories on college campuses throughout the US and Canada. The Campus Climate Challenge is a project of 30 leading environmental and social justice organizations throughout the U.S. and Canada. Founded and led by leaders of the growing youth energy movement the scale of this collaboration is unparalleled in the history of the modern youth environmental movement. By coordinating our efforts and sharing our ideas we have the potential to produce aggregate outcomes that are greater than any of our organizations could achieve working independently. The

	challenge leverages the unique attributes of the partner organizations to empower youth organizers and bring highly specialized experience – from running student referenda or endowment campaigns to state level advocacy – to the entire campus climate movement. The **Sustainable Campuses Project** is a national initiative that inspires, informs, trains, and supports Canadian students working toward social equity, ecological integrity and economic prosperity on their campuses. These changes are achieved through changing institutional operations, improving curricula and mobilizing campus community members' support. Since 1998, the Sustainable Campuses project has worked with thousands of students from across Canada in order to: (1) Change environmental and social practices on Canadian campuses and (2) Empower youth to influence decision makers Composed in 1990 at an international conference in Talloires, France, the **Talloires Declaration** is the first official statement made by university administrators of a commitment to environmental sustainability in higher education. It is a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities. It has been signed by over 300 university presidents and chancellors in over 40 countries.

Further Research

There are a number of questions resulting from a focus on campus climate action. The most pressing is a lack of knowledge regarding the extent of how well campus climate action is tied into state policy. Answering this will entail considerable research. To begin, there is a lack of peer-reviewed literature regarding campus climate action. While a Lexis/Nexis search turned up numerous newspaper and magazine articles on this issue, there was almost a total lack of journal publication works regarding this. In order to better understand what needs to be done to assist these university efforts, it will be necessary to create some type of organizing and measuring system for the efforts occurring around the country. An example of how this will be helpful is that research for this proposal turned up a good deal of literature on the "Operations" side of campus climate action, but relatively little on "Curriculum", "Research", and "Engagement". In brief, it appears that a good deal of campus action is occurring, but there is no single data set or standard available for measuring these activities. There's a subsequent need to find ways in which to organize and categorize such actions.

Also of interest would be further research on how universities are working together. Barlett and Chase note coalitions are deemed beneficial for several reasons. One advantage is positive attention from lawmakers (who determine state school budgets) and other state officials. This compares with Rabe's Statehouse and Greenhouse, which discusses the role state policy plays in environmental efforts. Most important is the boost that information-sharing gives to each of the schools by letting each school know what

the other is doing, assisting faculty in finding allies either within their school or at others, and bringing like-minded people together for workshops and meetings. It would appear that the Talloires Declaration and the Campus Climate Action are two of the leading consortiums for encompassing multiple institutions of higher education under a single agreement and/or mission. Yet, the research indicates that only 182 universities out of 4000 in the U.S. have signed onto Talloires. It is vital to know what efforts have been made to entice university leaders to sign onto this, as well as what the main reasons may be for the lack of a higher number of signatories.

A comparative analysis of these multilateral organizations may be instructive as well. According to Wendell Berry, it's highly important that we educate ourselves on past and current environmental successes when formulating future action. Thus, research on instances of past multi-university collaboration may be helpful as models for formulating current multiple campus climate action agreements. A preliminary step towards this could include interviews with the key stakeholders of such groups on how to: 1.) Engage more universities on these efforts; 2.) Effectively connect these institutions to one another; and 3.) Articulate what the true, measurable benefits of such alliances are, in order to hopefully stimulate future action by new members and sustained action by the current ones.

Conclusion: Why Should We Care?

Campus climate action can greatly impact sustainable development efforts both at home and abroad, and thus greater attention should be given to these activities. There are five main reasons for this. First, many universities are leading by example. Second, they are educating the future leaders of the world. Third, they've made significant progress in GHG reductions on their own. Fourth, they may be considered as "laboratories" for future state policy, just as states are considered to be laboratories for federal policy (Rabe). Fifth, there is a possibility that campus climate initiatives may be tied into state-level policymaking.

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