New Energy for Campuses

Energy-Saving Policies for Colleges and Universities

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Introduction

Our country is dependent on an old, outmoded, fossil-fuel energy system that is simultaneously speeding environmental degradation and making us less secure. There is a better way. The Apollo Alliance has a plan to improve national security by reducing dependence on oil from unstable and undemocratic governments through investments in a resilient energy system, and by supporting new renewable distributed generation. The Apollo Alliance plan will also revitalize the economy, expanding markets for American technology, investing in workers, and improving competitiveness and productivity, even as it protects consumers and the environment.

College and university campuses are uniquely placed to affect America's energy future. The higher education sector is a $317 billion industry[1] 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%.[2] 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.[3]

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.

And yet, few campuses have taken real, concrete steps to move toward a cleaner energy future. Only about 80 campuses in America purchase clean energy and most campuses have only implemented small scale, if worthy, clean energy projects. Only a handful of campuses have developed comprehensive plans, with targets and timetables, for substantially reducing greenhouse gas emissions and achieving energy independence. To strengthen existing campus plans and initiate them on the thousands of relatively disengaged campuses, a coalition of 30 leading environmental and social justice organizations has launched the Campus Climate Challenge (www.campusclimatechallenge.org). The Challenge is a U.S. and Canada-wide, long-term project aimed at making campuses energy independent and dramatically cutting their global warming pollution. By consolidating hundreds of initiatives into a unified structure, the Challenge allows campuses to share ideas, best practices and resources to collaborate in ways never before possible.

The Apollo Alliance and the Campus Climate Challenge recommend that all campuses institute six basic reforms, the details of which are outlined in this document. These reforms are:

- **Upgrade to Efficiency**: Replace inefficient appliances and upgrade inefficient buildings.
- **Build Better**: All new buildings should be high performance and energy efficient.
- **Move to Clean Power**: Buy or generate electricity from renewable resources.
- **Expand Transportation Alternatives**: Make it easy to get around on less fuel.
- **Implement Green Purchasing**: Buy products that use less energy, last longer, and are better for the environment.
- **Institutionalize Conservation**: Create a culture of conservation on campus.

Beyond just setting an example in efficiency, conservation, and renewable energy, colleges and universities should also make their efforts models of job creation and innovative financing. Most colleges and universities have existing standards for labor quality; however, campuses should review their labor polices to ensure that campus work is done by responsible employers.

The efforts to make colleges and universities models of a new energy policy should be carried out with an eye to the future. The reforms that will have the greatest impact are those that can be institutionalized — not short term or one-time projects. Instead of building one demonstration green building, campuses should institute a high performance building policy or establish a revolving loan fund that couples projects that save money (like energy efficiency retrofits) with those that have a longer payback time (like alternative energy generation). Institutionalizing good energy policy ensures that the impact will persist long after any individual student, faculty or staff person has left campus.

While achieving energy independence may at first seem daunting, this publication aims to make it a reality by highlighting the incredible number of ways to begin. 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 the leaders of today. They have buying and investment power. They are widely respected. Consequentially what they do matters to the wider public."[4]

1 Comprehensive Energy Planning

The largest and longest term energy impact on any campus will come from a comprehensive strategy that examines all campus energy use, the associated costs (both financial and environmental), and comes up with strategies that reduce energy use across the board. Such strategies should look at all sectors of energy use (buildings, transportation, etc.) and be both innovative and comprehensive. They will likely include many of the policies discussed below, and should take advantage of synergies. For example, land use planning should take into account the availability of (or plan for) campus transit systems, and savings from efficiency measures should be used to fund green energy purchasing.

What Campuses Are Doing Now

The University of California's new **Merced** campus, currently under construction, is a unique example of sustainable planning. While older campuses retroactively incorporate sustainable design, UC Merced has the advantage of being planned around an integrated set of sustainable principles. It is able to proactively identify and plan for the major environmental pressures exerted by universities. As a result, Merced uses a wide range of strategies. Its comprehensive plan includes elements of high performance building, water conservation, recycling and transportation. All of Merced's buildings, for instance, will meet or exceed the LEED Silver standard. The buildings will incorporate recycling in both construction and ongoing waste minimization. Storm water collectors will provide irrigation and the Merced transportation system is designed to promote multimodal travel. Demonstrating foresight, the campus planning process calls for increasingly stringent efficiency measures as the campus grows.[5] Merced's comprehensive approach can be a model for campuses undergoing major renovations, additions and long-term campus planning.

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College of the Atlantic is implementing an Environmental Management System that will improve every aspect of campus operations, including electricity, efficiency, liquid transportation fuels and ongoing education. COA will use 100% renewable energy for a 20 year period.[6] This is an unusual level of commitment, even among the nation's most sustainable schools. COA's considerable energy demand facilitates market development in the renewables sector. Each year, the college consumes electricity equivalent to 167 homes. By linking this long term demand to clean energy, the school justifies private sector investment in clean generating capacity. COA's green tag procurement from NativeEnergy, for instance, supports construction of the first Native American wind farm. Additionally, the school designs its buildings for efficient performance, utilizing passive solar heating and efficient lighting. To mitigate transportation emissions, the school fuels the tractors at its research facility with biodiesel.[7] Ultimately, the school hopes that its combined efforts will achieve a 30% greenhouse gas reduction.[8]

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Comprehensive Energy Planning

The **University of British Columbia's** comprehensive planning provides considerable improvements in university operations. All of the school's new buildings, for example, will be constructed to the LEED Silver rating.[9] Energy consumption within its green buildings is offset through Renewable Energy Credits. Moreover, UBC has created a program of sustainability coordinators to influence behavior. The coordinators promote conservation within the schools residencies. Annually, this program saves the school $78,000. UBC also recently launched its Universal Transportation Pass, a program which provides unlimited, universal access to different public transportation services. By offering this convenience to students, the school will reduce congestion and emissions on campus. To date, these programs have been successful. While UBC's student population has grown by 19%, its building energy use has declined by 8%. The campus goal is to reduce energy consumption in academic buildings by 30% and reduce CO_2 emissions by 30,000 tonnes annually.[10]

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Comprehensive Energy Planning Resources

The Apollo Alliance (www.apolloalliance.org/) aims to improve America's security, technological leadership, economic strength, and shared prosperity by achieving sustainable American energy independence through efforts at the national, state and local level.

The Campus Climate Challenge (www.campusclimatechallenge.org) website contains profiles on most existing student-led campus climate initiatives and is a clearinghouse for resources, best practices, case studies, speakers and job opportunities.

The Student PIRGS (www.studentPIRGS.org) are a network of student-directed and funded organizations working to solve some of society's biggest problems. Based at 100 universities around the country, the student PIRGS engage thousands of students each year in meaningful social change work.

University Leaders for a Sustainable Future (www.ulsf.org/) assists colleges and universities in making sustainability an integral part of curriculum, research, operations and outreach. ULSF is also the secretariat for signatories of the Talloires Declaration (1990), which has been signed by more than 300 university presidents and chancellors around the world.

Clean Air —Cool Planet's **Campuses for Climate Action** (www.cleanair-coolplanet.org/for_campuses.php) program aims to enlist and support institutions of higher education in demonstrating that solutions are available, affordable (even profitable), have numerous benefits, and can be successfully implemented today.

The Alliance to Save Energy's new **Green Campus Pilot Program** (www.ase.org/section/program/greencampus) empowers students to stimulate energy savings in campus buildings and educate the campus community about the reasons and methods for saving energy.

The **Education for Sustainability Western Network** (www.efswest.org/) is a professional association of individuals and institutions working to make sustainability a central focus of higher education in the western U.S. and Canada.

Second Nature (www.secondnature.org/) helps campuses move from good intentions to strategic action.

National Wildlife Federation's **Campus Ecology Program** (www.nwf.org/campusEcology/index.cfm) supports and promotes positive and practical conservation projects on campus and beyond to protect wildlife by restoring habitat and slowing global warming.

Since 1988, the **Student Environmental Action Coalition** (www.seac.org/) has been empowering students and youth to fight for environmental and social justice in our schools and communities.

1 Clean Power on Campus

Installing renewable generating capacity on campus is a great way to reduce energy bills while educating the campus community about renewable energy. Depending on their location, campuses can take advantage of solar, wind, biomass and/or geothermal resources. Renewable energy generation can reduce the need to purchase energy (heating water with solar power, for example, means burning less fuel), can directly supply electricity to buildings, or can produce electricity to sell back to utilities (if the state has a net metering law.) These projects save on energy costs, help develop a market for renewable technologies, and display a visible public commitment to a sustainable energy future.

University buildings spend at least 22% of their energy budgets on electricity.[11] Solar electric options include photovoltaic arrays or parabolic troughs to produce electricity. Campuses can also generate electricity from wind, either by installing a wind turbine on or near campus, or by contracting with a wind developer to fund the construction of (and receive the electricity from) a turbine at an existing wind farm. Campuses with existing coal fired electric plants can replace some of the coal they use with biomass from agricultural, forestry or paper waste. On average, a university building spends 24% of its energy budget on heating water.[12] Solar water heaters can reduce the need for conventional water heating by about two-thirds. By providing hot water for buildings or pools, solar water heating minimizes the use of electricity or fossil fuel.[13]

Another way to reduce energy use and save money is to install geothermal heating systems on new construction projects or renovations. These systems can employ either a direct-use or heat pump design. Geothermal heat pumps are designed to reduce the energy demands on buildings' HVAC systems in both hot and cold weather. The heat pump transfers heat from the soil to the building in winter and from the building to the soil in summer, using an environmentally friendly heat exchange fluid similar to antifreeze. This process is very efficient, reducing electricity consumption by 25% to 50%;[14] moreover, operating and maintenance costs are quite low. Natural resources for geothermal heat pumps exist across the entire United States. By contrast, direct-use systems tap hot subterranean water for space heating. Direct use resources are most prevalent in the Western United States.

Since 1984, more than 30 campuses have installed over 11 MW of clean energy, including solar in California and Georgia, and wind in Minnesota and Rhode Island.

What Campuses Are Doing Now

St. Olaf College is constructing a 1.6 MW wind turbine to power its campus. The turbine's total cost will be $1.9 million but $1.5 million will be funded through grant money from Xcel Energy. Generating 6 million kilowatt hours annually, the turbine will supply one third of St. Olaf's energy requirements. The associated emissions offsets are expected to bring the college into compliance with the Kyoto Protocol.[15]

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In 2004, the **University of Colorado** installed its first photovoltaic system. At 7.5 kW of installed capacity, the system generates enough energy to meet one and a half times the UC Environmental Center's requirements. The PV system is connected to a kiosk that allows students to monitor the system's real-time output. The system was funded by Xcel Energy's Renewable Energy Trust Fund, University of Colorado Student Union's Finance Board, and money from the previous year's energy pledge card campaign.[16]

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The **Oregon Institute of Technology** has been tapping geothermal energy since 1964. This alone demonstrates geothermal energy's long term reliability. OIT's direct-use system uses three geothermal wells between 1,300 feet and 1,800 feet deep. These wells supply all heating needs for the 11 building, 600,000 square foot campus. Additionally, the wells meet some of the campus's cooling requirements. OIT's geothermal system costs $35,000 to operate each year.[17] This is considerably better than the operational cost of a natural gas fired boiler at $250,000 to $300,000 per year.[18]

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The University of Iowa is shifting its energy sources from coal to biomass. The UI power facility, which supplies 100% of campus heat and 30% of campus electricity, historically operated on coal. More recently, the plant has added oat hulls — the outer shell of an oat grain — to its fuel mix. Each year, oat hulls replace between 25,000 and 30,000 tons of coal, saving the school over $500,000 in fuel costs. The switch resulted in large reductions in NO_x, SO_2, CO_2, particulate matter, and volatile organic compounds. These environmental improvements allow UI to sell emissions offsets on the Chicago Climate Exchange, strengthening the system's financial value.[19]

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Renewable and Efficient Power

2 Efficient Generation through Combined Heat and Power

Campuses can significantly improve the efficiency of their electrical and heating systems through the use of combined heat and power (CHP or cogeneration) technology. CHP systems use the same fuel combustion to produce both thermal energy for heating (usually in the form of steam) and electricity (often via a steam-driven turbine). These efficient systems recover heat that normally would be wasted in an electric plant, and save the fuel that would otherwise be used to produce heat or steam in a separate unit. CHP fuel savings are typically 35% compared to standard power stations and heat only boilers,[20] and CHP plants are 70–90% efficient, compared to efficiencies of 33–60% for standard power plants.[21] This increase in efficiency and decrease in fuel use translates into cost savings and emissions reductions.

What Campuses Are Doing Now

Colby College's CHP system significantly boosts the school's operational performance. Steam piped for space heating concurrently powers a conventional turbine for electricity production. The recuperated energy produces 1,700,000 kWh of electricity each year, saving $150,000 in energy costs.[22]

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University of North Carolina–Chapel Hill's CHP plant provides the University with one-third of the electricity and all of the heat it needs annually. The plant relies on an advanced technology called circulating fluidized bed, which combusts fuel components that are often allowed up the stack at older coal-fired generators. The thousands of tons of fly ash produced annually are reused for sewage treatment and structural fill. The facility has won multiple awards from the US EPA.

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3 Buying Renewable Power

Campuses can and should purchase some or all of their electricity from renewable sources. Buying renewable energy not only leads to reductions in NO_x, SO_2, and greenhouse gases, it also creates good, environmentally friendly jobs and reduces our reliance on foreign resources. It's important to be sure that a clean energy purchase causes the utility to increase its renewable generating capacity, rather than just buying existing capacity. To date, more than 80 educational institutions in the U.S. are buying renewable energy — on the order of 500,000 MWH per year — and at least five campuses are powered by 100% clean energy.

There are three ways to purchase green power: green pricing, green power marketing, and Renewable Energy Certificates (RECs). Some utilities offer customers "green pricing," where customers can choose to purchase (often at a premium) renewable energy. In some states, green power marketing — the direct purchase of renewable energy from generators — is available. RECs, also known as green certificates, green tags, or tradable renewable certificates, represent the environmental attributes of the power produced from renewable energy projects and are sold separate from commodity electricity. Customers can buy green certificates whether or not they have access to green power through their local utility or a competitive electricity marketer.

What Campuses Are Doing Now

Each year, **Concordia University** purchases 5.5 million kilowatt hours of renewable power through Austin Energy's "Green Choice®" Renewable Energy Program. This volume allows Concordia University to operate entirely on renewable energy. The environmental benefits are significant, eliminating roughly 8 million pounds of annual CO_2 emissions. This has comparable benefits to planting 1,000 acres of trees or cutting the tailpipe emissions of 700 vehicles. As the first school to be 100% renewable, Concordia has earned the EPA's "Green Power Leadership Club" award.[23]

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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.[24] 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[25] 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.[26] Collectively, the CSU policies will avoid 80,000 tons of CO_2 release by 2010, effectively pushing emissions 17% below their 2004 levels.[27]

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Energy Efficiency and Conservation

1 Efficiency

Making the energy your campus uses go further saves both natural resources and money by decreasing fossil fuel use and its environmental consequences. Energy efficiency upgrades also create more jobs than energy generation technologies. Effective campaigns can generate savings that could be reinvested in clean energy generation or additional efficiency projects on campus. Improving energy efficiency on your campus means upgrading buildings and technology. Lighting, appliances, computers, heating and cooling are just some of the places that more efficient equipment can have an impact. For example, "Vending Misers," a product designed to save energy in vending machines by adjusting the compressor cycle and turning off machine lighting, can be installed in most cold drink machines.[28] An estimated 22% of university buildings' energy budgets are for lighting.[29] Occupancy sensors designed to turn off lights when an area is not in use can be installed in classrooms, offices, and bathrooms. The lights themselves can be upgraded to high efficiency bulbs, which use less electricity and last longer than conventional bulbs.

What Campuses Are Doing Now

Over a six year period, the **University of Michigan** completed energy efficiency projects in 123 campus buildings. The measures included lighting upgrades, efficient appliance procurement, adjustments to mechanical systems, and environmental control systems. Beginning 2005, the school expects the improvements to produce $9.7 million in yearly energy cost savings. In 2004, the EPA named the school an Energy Star Partner of the Year.[30]

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Renewable and Efficient Power Resources

The **Database of State Incentives for Renewable Energy** (www.dsireusa.org/) provides a compressive list of renewable energy incentives that can bring down investment costs for educational project developers.

The **Union of Concerned Scientists** (www.ucsusa.org/clean_energy/) offers extensive information on renewable energy and **buying green power** (www.ucsusa.org/clean_energy/renewable_energy_basics/buy-green-power.html).

The **U.S. Combined Heat and Power Association** (uschpa.admgt.com/) brings together diverse market interests to promote the growth of clean, efficient CHP in the United States.

The US DOE's **Energy Information Portal** (www.eere.energy.gov/) is a gateway to hundreds of Web sites and thousands of online documents on energy efficiency and renewable energy.

Energy Efficiency and Conservation Resources

ENERGY STAR for Higher Education (www.energystar.gov/index.cfm?c=higher_ed.bus_highereducation) is a government-backed program helping campuses protect the environment through superior energy efficiency.

Through **Rebuild America**, (www.rebuild.org/lawson/energyefficiency.asp) the U.S. Department of Energy provides an excellent gathering of links, useful for institutional energy efficiency.

The **American Council for an Energy Efficient Economy** (www.aceee.org/progpage.htm) has programs covering buildings, equipment and transportation.

Tufts University has provided their calculations for **estimating overall computer energy use.** These calculations may be duplicated at other universities. (www.tufts.edu/tie/tci/pdf/Computer%20calculations.PDF).

Energy Efficiency and Conservation

2 Information Technology

One of the hidden costs of new technology is increased energy consumption. A typical personal computer left in continuous operation costs about $120 per year. However, when systems power down during hours of nonuse, the operating cost drops to $20 annually.[31] Campuses can do several things to reduce the energy footprint of their technology. They can purchase efficient, Energy Star computers, printers, and other equipment. They can make sure that all units power down, or "sleep," when not in use, and they can encourage energy saving behavior in computer users.

What Campuses Are Doing Now

Owning 4,300 computers, **Tufts University** has a keen interest in efficient performance. While most employees power down their computers at night, during the day many use screen savers which limit power savings. The university is implementing power management software which shuts down the monitor during nonuse. Additionally, the school is attempting to teach its employees to shut down computers during extended periods of inactivity.[32] Tufts estimates that faculty and students powering down their computers down between one and five hours per day would avoid 590 tons of annual carbon emissions and save up to $90,000 in electricity costs.[33]

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3 Conservation

One of the most cost-effective ways to reduce energy use on your campus is through conservation and efficiency. Conservation requires behavioral changes, but doesn't mean sacrificing comfort. It can be as simple as turning out the lights when you leave the room. Many campuses have come up with public awareness programs or friendly competitions between dorms to encourage energy conservation.

What Campuses Are Doing Now

Since August 2004, **University of Victoria** has reduced campus energy consumption through its Energy Conservation Awareness campaign. The campaign employs a number of campus specific initiatives to mitigate energy use. In April 2004, for instance, the school formed the Green Residence team. The 32-student contingent streamlines campus energy use through a number of behavioral activities such as powering down devices and turning off lights during nonuse hours. In addition, UVic hosts an energy savings competition among dorms to reduce energy use relative to baseline consumption.

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The **Harvard** Resource Efficiency Program (REP) is a peer education program where students exchange sustainability strategies. Under the program, each dorm is assigned a student environmental liaison who disseminates environmentally sound habits. The dormitory focus is sensible given that 98% of Harvard undergraduates live in dorms. The Harvard Green Cup competition is a key example of how REP advocates and monitors energy consumption. The Green Cup awards a cash prize to the residence with the largest energy reductions relative to the building's three year average consumption. This flexible approach allows students to adopt a variety of energy saving measures which integrate with their lifestyles. The process teaches students valuable behaviors such as shutting off computers and lights, air drying laundry, recycling, and purchasing Energy Star appliances.[34]

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- Harvard Green Campus Initiative
- www.greencampus.harvard.edu/rep/index.php

Buildings, Operations, and Purchasing

1 Energy Audits and Retrofits

Buildings are the leading energy users in America, accounting for over $280 billion in annual energy costs.[35] Colleges and universities control a remarkable number of buildings — from office space to housing to classrooms to athletic facilities— and must pay for energy use in all of them. The mean age of university buildings is 35.5 years,[36] so many buildings are using more energy than they need to. Simple retrofits to windows, insulation, and electrical, lighting, or heating systems can yield large energy cost savings. Such retrofits not only save money, they also lead to increased productivity by students and workers who use the buildings. Campuses should establish a 10-year schedule for a comprehensive energy audit and retrofit of their buildings.

What Campuses Are Doing Now

Built in the 1960s, **Eastern Illinois University** had accumulated a backlog of cost effective efficiency opportunities. The school contracted with an Energy Service Company (ESCO, described in our financial strategies section) 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.[37]

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Working through an Energy Service Company, **Allegheny College** identified significant inefficiencies in ten different buildings. The audit revealed a variety of potential projects including lighting upgrades, HVAC retrofits, and synchronizing boiler and radiator heats to periods of high and low use. Each year, these improvements prevent 2,940 pounds of NO_x, 4,887 pounds of SO_2, and 935 tons of CO_2 emissions. They also save $64,000 in annual energy costs. The school uses these savings to purchase wind energy for 7.5% of its electrical demand.[38]

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An energy audit at **Alamo Community College** revealed numerous inefficiencies, and improvements were made to campus lighting systems, HVAC, and cooling towers. The college also instituted a process called "Continuous Commissioning," where the facility's major components are periodically checked and optimized. The audit identified $2.7 million in possible efficiency upgrades. The upgrades, however, would save $511,364 in annual energy costs, enabling cost recovery in 5.4 years.[39]

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Buildings, Operations, and Purchasing

2 Operations

Building operations — how a building is run day-to-day —have a large impact on energy use and the environment. Heating and cooling, for example, is critical to the comfort of occupants and can also have a substantial financial impact. SUNY Buffalo estimates that each degree of overheating or overcooling costs $100,000 per year in unnecessary energy use.[40] The U.S. Green Building Council has developed sustainable building-operations guidelines[41] that capture both a building's physical systems (equipment, design, land use, etc.) and also the way the building is occupied and operated by its managers (waste management, temperature monitoring, commuting programs, etc.). Campuses can seek LEED-EB certification for their buildings.

What Campuses Are Doing Now

The **University of Vermont** uses a centralized environmental control system to operate many of its large buildings. The system adjusts both lighting and temperature for periods of high and low occupancy. This ensures consistent efficiency by removing the possibility of human error. Buildings that are not integrated into the central control system have been retrofitted with programmable thermostats that adjust temperature during low occupancy periods.[42]

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3 High Performance Buildings

In 2002 alone, building construction on college campuses totaled $11 billion, of which 64% was dedicated to new buildings.[43] High-performance building uses a comprehensive approach to create environmentally sustainable, healthy and productive, and economical buildings. These techniques have been shown to reduce building energy costs by 20–50%[44] and water usage by at least 50% outdoors and 30% indoors.[45] The increased energy efficiency of these buildings pays for itself in lower heating and electric bills, reduced water and waste, lower operations and maintenance costs, and enhanced occupant productivity and health.[46] Many high performance buildings include renewable energy generation such as photvoltaic power or solar troughs, as well. Employees in high performance buildings are more productive and the environmental benefits are shared throughout the campus community. The Leadership in Energy and Environmental Design (LEED) system is becoming the industry standard in sustainable design. LEED provides a point based system, where developers gain credits for integrating green design features into their buildings. When a certain number of credits are reached, the building earns LEED certification.

What Campuses Are Doing Now

With 1.1 million square feet of LEED qualified building stock, **Emory University** is a pioneer in building efficiency. Emory's accomplishments extend beyond volume to quality. In 2005, the US Green Building Council awarded Emory's Goizueta Business School LEED Gold certification- a difficult accomplishment by any measure. The Goizueta School joins ranks with Emory's Whitehead Biomedical Research Building, which became the first LEED certified facility in the Southeast.[47]

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The Donald Bren School of Environmental Science and Management at the **University of California, Santa Barbara** is one of the first buildings to achieve the LEED Platinum rating — a standard reserved for the most sustainable buildings. To achieve its rating, the building included a set of creative features in areas including efficiency, landscaping and renewables. For example, the building's design maximizes natural airflow, reducing the reliance on mechanical ventilation. Motion detectors control high efficiency lights to reduce unnecessary electricity use. The system also monitors lighting conditions and adjusts its output accordingly. Efficient landscaping provides shade to reduce the building's cooling requirements. Together, these features push the building's energy consumption 30% below California's model building code. The building procures a large portion of the remaining energy from renewable resources. Twenty five percent of building electricity comes from landfill gas and an additional 7% from roof mounted solar panels.[48]

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4 Purchasing Policies

In addition to owning and regulating large amounts of real estate, buildings, and transportation infrastructure, campuses also purchase an immense number of products — everything from paper to paint, motor oil to heating, ventilating, and air-conditioning (HVAC) systems. These goods all require energy and resources to produce, package, transport, use, and/or dispose. This has led campuses across the country to implement purchasing policies that favor local, energy efficient, recycled, and/or durable products. Choosing products whose life-cycle impacts are minimal can save energy, reduce emissions, increase the market for high performance products and even save money.

Another aspect of campus purchasing is food service. There are many energy implications in the purchase, preparation and disposal of food, including transportation, packaging, and disposal of waste. Campuses have instituted recycling programs, started composting, and implemented purchasing preferences for products with recycled content (like napkins) or with minimal (or more environmentally-friendly) packaging. Some are even committing to buy a certain percentage of their food from local farmers, which infuses money back into the local economy as well as saving on transportation costs. Food service can also be a source of waste vegetable oil to produce biodiesel or for direct use in vehicles converted to run on fryer grease.

Buildings, Operations, and Purchasing Resources

The U.S. Green Building Council (www.usgbc.org/) formulates and codifies LEED criteria. Their site hosts a collection of useful materials related to **LEED certification**. The LEED for Existing Buildings (www.usgbc.org/DisplayPage.aspx?CMSPageID=221&) standard provides a recognized, performance-based benchmark for building owners and operators to measure **operations**, improvements and maintenance on a consistent scale.

Twenty-Five Simple Things Universities Can Do To Create **High Performance Buildings** (www.efswest.org/working/25things.doc)

University of Minnesota's sustainable building guidelines (www.sustainabledesignguide.umn.edu/MSDG/guide2.html)

Stanford University's sustainable building guidelines (cpm.stanford.edu/process_new/Sustainable_Guidelines.pdf)

Buying For The Future: Contract Management and the Environmental Challenge by Kevin Lyons demonstrates how to make environmentally sound purchasing decisions. (www.press.umich.edu/titleDetailDesc.do?id=115287)

Getting an 'A' at Lunch: Smart Strategies to Reduce Waste in Campus Dining (David Saphire, 1998) describes simple strategies that have been successfully employed on campuses around the country to prevent this waste though more efficient materials use. (www.informinc.org/getatlunch.php)

What Campuses Are Doing Now

Rutgers, a recognized leader in Environmentally Preferable Purchasing, exercises sustainable procurement at each practicable opportunity. In addition to purchasing energy efficient appliances and devices, RU also incorporates recycled materials and sustainable landscaping. The school has negotiated an agreement with Kinkos to price copying jobs on recycled paper at or below the virgin paper price.

For more information Contact:
- Priscilla Hayes, Environmental Coordinator
- 732.932.9155 ext 233
- hayes@aesop.rutgers.edu

Duke University's green purchasing guidelines include energy efficiency provisions governing a number of appliances. The school includes heating and cooling systems under its procurement policies, giving preference to state of the art efficiency technology. Duke also calls for Energy Star equipment whenever practicable. If Energy Star equipment is unavailable, the school gives preference to products in the upper 25% efficiency bracket, as documented by the Federal Energy Management Program.[49]

For more information Contact:
- Sam Hummel, Environmental Sustainability Coordinator
- 919.475.8136
- sam.hummel@duke.edu

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.[50]

For more information Contact:
- Melina Shannon-DiPietro, Associate Director, Yale Sustainable Food Project
- 203.432.2084
- Melina.shannon-dipietro@yale.edu

Transportation

1 Efficient Fleets

Colleges and universities own large numbers of vehicles for use by their employees. Historically, efficiency and environmental impact have not been large considerations in these vehicles' purchase; however, some campuses have begun taking steps to ensure that these vehicles operate more efficiently and cleanly. Reducing the size of fleets or reducing vehicle use through changes in driving behavior are ways to save energy, but upgrading fleet vehicles is more likely to have a lasting impact. There are several options to clean up campus fleets, the easiest of which is simply altering purchasing guidelines to favor the most fuel efficient vehicles available. Such vehicles reduce fuel costs without sacrificing performance. Other options include purchasing alternative fuel vehicles like regular plug-in hybrids, and vehicles that run on ethanol, biodiesel or compressed natural gas. Existing diesel vehicles can easily be converted to run on biodiesel, either a mix or 100%, and some fleets may already include flex-fuel vehicles which can run on up to 85% ethanol.

What Campuses Are Doing Now

In 2000 and 2003, the **University of Minnesota** added E85 (a 15% gasoline/85% ethanol blend) fueling stations at two of its campuses. Between 60 and 70 university vehicles will be able to refuel at the outlets. The additions earned Bill Roberts, Fleet Services Director, the American Lung Association's Extra Mile Award.[51]

For more information Contact:
- Bill Roberts, University of Minnesota Fleet Services Director
- 612.625.8020
- rober029@umn.edu

In 2003, diesel emissions spurred widespread air quality concerns among **Duke University**'s student population. In response, Duke's Environmental Alliance published a biodiesel cost benefit analysis which secured a $28,000 grant from the Triangle Clean Cities Coalition. The grant funded a pilot program to investigate fueling campus buses with a 20% biodiesel blend. B20 has considerable environmental advantages, releasing at least 15% fewer particulate emissions than conventional diesel.[52] The program was successful; Duke's entire bus fleet and several maintenance vehicles presently use biodiesel.

For more information Contact:
- Sam Hummel, Environmental Sustainability Coordinator
- 919.475.8136
- sam.hummel@duke.edu

In early 2005, **The University of Wisconsin** started using a 20% biodiesel/80% ultra low sulfur diesel mix in its diesel fleet. The blend is expected to reduce particulate emissions by 15%, CO_2 emissions by 16%, and cut hydrocarbon use by 13%.[53]

For more information Contact:
- Rob Kennedy, Senior Transportation Planner
- 608.263.3027
- rkennedy@fpm.wisc.edu

2 Improving Mass Transit

Mass transit in the form of buses or rail can save energy, reduce pollution, reduce the need for parking, alleviate congestion, and provide economical transportation alternatives for faculty, staff and students. Campuses, depending on their size and location, may have their own mass transit systems, or may partner with cities and counties to provide this service. Existing campus bus systems should consider integrating with city and county systems to improve service and increase ridership. Campuses should also offer low- or no-cost fare passes for students, staff and faculty to encourage transit use.

What Campuses Are Doing Now

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.[54]

For more information Contact:
- David Lieb, Communications and Marketing Manager
- 607.255.5592
- djl5@cornell.edu

The **University of North Carolina** is committed to reducing single occupancy vehicle traffic in Chapel Hill through the encouragement of alternative transportation options. UNC's Commuter Alternatives Program (CAP) discourages UNC students, faculty, and staff from driving single occupancy vehicles to campus. In January 2001, UNC became a fare-free transit partner with Chapel Hill Transit. UNC has met the National Standards of Excellence established by the EPA and the DOT for the designation of Best Workplace for Commuters in the Triangle Region for CAP and fare-free transit.[55]

For more information Contact:
- Claire Kane, UNC's Transportation Demand Coordinator
- 919.843.4414
- claire@unc.edu

Transportation Resources

Greenfleets (www.energyaction.net/documents/greenfleetskit.doc) is a campaign to jumpstart new production of fuel efficient cars and trucks.

The **Surface Transportation Policy Project** (www.transact.org/issues.asp) offers a series of fact sheets on transportation issues.

The **University of Colorado's Environmental Center** provides links to their **transportation master plan** and related resources. (ecenter.colorado.edu/transportation/policy.html).

The **Cornell Sustainable Campus site** outlines their innovative **transportation plan.** (www.sustainablecampus.cornell.edu/transport.htm)

Zipcar's car share program for colleges and universities. (www.zipcar.com/universities/)

Transportation

3 Increasing Transportation Options

Parking, traffic and air quality are becoming serious concerns at many colleges and universities around the county. There are many ways colleges and universities can provide transportation options and choices to their faculty, staff and students, including mass transit, shuttle buses, carpooling and vanpooling systems, bicycle and pedestrian infrastructure, and incentives related to all of the above. Programs that make it easier and safer to walk, bike and use mass transit include land use planning that sites housing near campus; adequate lighting; dedicated bike paths; adequate bike racks; and free or low cost transit passes, to name a few. Programs that promote less car use include selling parking permits that are only valid certain days of the week to encourage commuters to weigh the costs and benefits of car travel for each trip; preferential parking for carpools and low emission or alternative fuel vehicles; and carsharing services. Colleges and universities can and should also provide incentives to use alternative transportation, including financial incentives (discounts on bike maintenance or coupons to campus eateries, for example), choice based programs (faculty and staff may choose a parking permit or a free bus pass but not both, for example), and preferential treatment (premium parking spots for carpools, for example).

What Campuses Are Doing Now

The University of Oregon in Eugene uses a multi-pronged strategy to encourage bicycling. The program is built on an interlocking network of bike paths which provide safety and convenience. The school complements its infrastructure with innovative ideas such as a tandem bike taxi service and an incentive program that awards credits to students and faculty who bicycle or walk to campus. Credits can be exchanged for product discounts.

For more information Contact:
- Betty Artman, Parking Support Specialist
- 541.346.2915
- bartman@dpsnet.uoregon.edu

Tufts University hosts Zipcar's carshare program on campus. The program reduces the need for vehicle ownership by providing community automobiles for errands and short commutes. As an added incentive, Zipcar has waived its $300 security deposit for Tufts students. By providing community vehicles on campus, the university will reduce its population of personal vehicles, improve air quality and offset traffic congestion.

For more information Contact:
- Tufts Climate Initiative
- 617.627.5517
- tci@tufts.edu

The University of Nevada, Reno offers compelling carpool incentives to address traffic congestion. Registered carpoolers are able to share the cost of parking permits among all the commuters in the pool. Additionally, carpools enjoy reserved parking spaces. Because single occupancy is occasionally unavoidable, the university offers each registered carpooler a limited number of free parking passes. On Fridays, carpoolers can bring their own vehicles to campus.[56] Together, these incentives make carpooling an attractive and inexpensive option.

For more information Contact:
- Melody Bayfield, Director of the Parking and Transportation
- 775.784.4654
- bayfield@unr.edu

In addition to incentives to reduce car use, some universities also attempt to increase the use of efficient vehicles and thus improve air quality. In 2005, for example, the **University of Miami** began offering a 50% parking discount for hybrid vehicles. Students, staff and faculty are all eligible, and the savings can be as high as $352 per year.[57]

For more information Contact:
- David Voorhees, Supervisor, Customer Service
- 305.284.3096 option 1
- dlv@miami.edu

Financing Strategies

1 Energy Savings Performance Contracts

Campuses can contract with Energy Service Companies (ESCOs), which specialize in conducting large energy efficiency retrofits. This work is organized by an "energy savings performance contract" (ESPC), in which the ESCO typically guarantees a minimum energy savings and then shoulders all of the investment costs and labor expenses. The ESCO recovers its cost by sharing the energy cost savings. After the ESCO has recouped its fees, the school enjoys a net financial gain, without ever having to make an investment. As ESPCs minimize capital demands, they can be an attractive option for financially constrained administrators. Moreover, the presence of experienced efficiency experts lowers the time and resources required to identify, understand, and implement savings measures.

What Campuses Are Doing Now

Progress at the **University of Utah** demonstrates the advantages of performance contracting. With a student population of 26,000, the university has amassed a large built environment. Many of its 294 buildings are between 30 and 40 years old, and many project opportunities have accumulated in that time.[58] Working with an ESCO, the school instituted a multi-year campaign of lighting retrofits, space heating/cooling improvements and energy management upgrades. Between the end of year 2000 and the beginning of 2004, the projects saved $6.6 million in energy costs.[59] Annual savings will likely grow as more projects reach completion.

For more information Contact:

- Orfeo Kostrencich, Associate Director, Plant Operations
- 801.581.5503
- Okostrencich@campplan.utah.edu

2 Accessing State Dollars

Public universities, which enroll 80% of college students, may be able to access state funding to support some of the projects suggested here. Possible sources are Public Benefits Funds and bonding initiatives. Public Benefit Funds (PBFs) — also known as System Benefit Funds, Public Purpose Charges, or Public Good Charges — are state-controlled funds generated by levying a small surcharge on consumer electricity usage. States that authorize and administer this surcharge typically set aside the money collected in a fund used to support a range of end-use energy programs, including weatherization efforts, renewable energy research and development, and retrofit incentive programs.

Revenue bonds are public bonds that incorporate a specific payback mechanism into their design. They are paid off through fees or income (including savings) generated by the project funded. Renewable energy and energy efficiency projects fit this bonding scheme particularly well because the revenue needed to repay the bonds can be recouped through long-term energy cost savings. The most common energy bond strategy is to couple efficiency retrofits, which yield quick and sizable cost savings, with renewable projects that, though they take longer to pay off, work toward the long-term goal of weaning America off fossil fuel. Combining these projects under one bond allows cities to meet two goals — decreased energy use and a stronger renewable energy infrastructure — and still enjoy a relatively short payback period.

What Campuses Are Doing Now

In 2002, **Syracuse University** invested $1.8 million into energy efficiency. The New York State Energy Research and Development Authority (NYSERDA), which distributes funds collected through a system benefits charge, contributed over $522,000 of the total funding. The grant will purchase a new, energy efficient chiller which will reduce the school's annual energy cost by $150,000 and avoid 1.8 million kWh of electricity consumption per year — enough energy to power 300 homes.[60]

For more information Contact:

- Nate Prior, Energy Conservation Manager
- 315.443.1535
- nrprior@syr.edu

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.[61]

For more information Contact:

- Frank Brewer, Associate Vice President for Facilities Management, University of Maryland College Park
- 301.405.5445
- jb80@umail.umd.edu

Financing Strategies

3 Clean Energy Funds

Another way to finance clean energy projects is to establish a revolving loan fund. Startup money would have to come from existing funding, grants or gifts, but given the long-term financial benefits of reduced energy use, the fund would most likely be self-sustaining, and could even repay the initial investment. Current experience with such funds suggests that the risks are low and the returns are high.

What Campuses Are Doing Now

One of the most successful examples of a revolving loan fund to date comes from **Harvard University**. Many projects under the $3 million revolving loan fund have generated blistering rates of return on investment (ROI). Lighting retrofits, for example, generated a 27% annual ROI, while efficient climate control and ventilation exceeded 30%. ROI for certain behavioral programs exceeded 70%. Spread over all projects, the average return on investment was 27.9%.[62] These savings rates produce considerable monetary benefits. In FY 2003, the funded projects saved $550,000, and in FY 2004, the savings increased to $820,000. Because efficiency measures typically endure, these saving will accrue well into the future.

For more information Contact:

- Michael Crowley, HPBS Program Manager
- 617.496.0971
- Michael_Crowley@harvard.edu

4 Student Fees

Campuses can tap a significant source of project capital by dedicating a portion of student fees to clean energy projects. This may be a portion of existing fees or a student-approved increase. With a large student population, seemingly modest increments can add up. Across the country, student bodies have voted to raise their fees to support clean energy and mass transit.

What Campuses Are Doing Now

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.[63]

For more information Contact:

- Tim Wynn- Director, WWU Facilities Management
- 360.650.3496
- Tim.Wynn@wwu.edu

In 2000, **University of Colorado-Boulder** students voted by a five to one margin to increase student fees by $1 per semester for four years to purchase wind power from Public Service Company of Colorado's Ponnequin wind farm. This initial commitment lowered campus emissions by 2.8 million pounds every year and raised enough money to purchase the entire output of a 2 million kWh/year wind turbine. In Spring 2004, the student government voted to extend and expand the wind purchase to 8.8 million kWh/year, which reduces campus carbon dioxide emissions by about 12 million pounds every year.[64]

For more information Contact:

- UC Environmental Center
- 303.492.8308
- ecenter@colorado.edu

5 Responsible Endowments

Endowments, largely funded by alumni contributions, help pay for the operating budgets of campuses and universities. They have soared in value in recent years, sometimes surpassing tuition as a source of income. In 2004, college and university endowment assets totaled over $267 billion dollars.[65] A growing number of schools are exploring the possibility of aligning substantial endowment portfolio assets with campus environmental values through innovative new approaches that engage campus stakeholders in the process. Efforts include student government resolutions calling for transparency and socially responsible investing, and shareholder engagement via proxy voting. Every year, dozens of large corporations are required to ask all their shareholders whether climate change is important to the health and profitability of the company. Through active proxy voting, filing shareholder resolutions and initiating dialog with companies, schools can help transform corporate policies on climate change while strengthening the long-term performance of their endowments. Other approaches seek to establish separate, dedicated funds whose investment is guided by environmental or sustainable principals. Portions of investments could also be "invested" in efficiency upgrades or Clean Energy Funds.

What Campuses Are Doing Now

In 2004, **Carleton College** used $1.8 million from its endowment fund to build a 1.65 MW wind turbine. The college has entered a 20 year power purchase agreement with Xcel energy at 3.3 cents per kilowatt hour. With state financial incentives, the wind turbine will realize payback within 10 to 12 years. The turbine's useful life is 25 years, providing 15 years of earnings on the investment.[66]

For more information Contact:

- Richard Strong, Director of Facilities Management and Planning
- 507.646.4271
- rstrong@acs.carleton.edu

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.

For more information Contact:

- Linda Kimball, Director of Investment Responsibility at the Stanford Management Company
- 650.926.0251
- kimby@stanford.edu

Financing Strategies

6 Gifts and Grants

One source of funds, for smaller energy projects or startup costs, is gifts from senior classes or alumni. These can be particularly useful in jump-starting projects that don't have institutional support, or need a small investment to prove their worth. They can also be used as matching funds, or to generate other contributions. Colleges and Universities may also apply to foundations to finance specific projects.

What Campuses Are Doing Now

Macalester College installed a wind turbine on campus to increase awareness of renewable energy and energy conservation in the student body. A local utility offered to purchase the turbine, if the campus would pay to install it. The $15,000 installation cost was initially covered by Physical Plant, and then repaid from funds raised for the Senior Class gift.[67]

For more information Contact:
- Mark Dickinson, Macalester College Campus Environmental Issues Committee
- dickinsonm@macalester.edu

In 2004, **College of the Atlantic** received a $1 million gift to fund sustainability initiatives. The gift makes another $250,000 available if COA can match the additional amount by December 2006. The funds will be used to hire a Director of Sustainability who will integrate best environmental practices into the COA's administrative activities and to fund education programs that instill an environmental ethic into emerging and present business leaders.[68]

For more information Contact:
- Donna Gold, Director of Public Relations
- 207.288.5015 ext 291
- dgold@coa.edu

In July 2004, **St. Olaf University** received a $98,000 grant from the Kresge Foundation to make its new science complex environmentally friendly. The school is taking a holistic approach, examining siting, daylighting, renewable energy and sound water sustainable water management. The school hopes to earn LEED accreditation.[69]

For more information Contact:
- Perry Kruse, Assistant Director of Facilities
- 507.646.3280
- kruse@stolaf.edu

Financing Strategies Resources

The **Apollo Alliance** offers a collection of **financing strategies** for sustainable energy projects, some of which may be appropriate for campuses (www.apolloalliance.org/strategy_center/model_financing_strategies/index.cfm).

The **Energy Service Coalition** maintains a database of **Energy Service Companies** (www.energyservicescoalition.org/members/index.asp).

The **National Association of Energy Service Companies** (www.naesco.org/providers/default.asp) maintains a database of Energy Service Companies.

The **Responsible Endowments Coalition** (www.sriendowment.org/) is a diverse network of students and alumni from across the country dedicated to advancing socially and environmentally responsible investing (SRI) in relation to college and university endowments.

The **Sustainable Endowments Institute** (http:www.EndowmentInstitute.org), a special project of Rockefeller Philanthropy Advisors, is dedicated to empowering colleges and universities to become engaged investors.

The **University of California Santa Cruz** Measure 9 ballot initiative (elections.ucsc.edu/electionsSpring03/measures.html) successfully established, and Measure 14 (elections.ucsc.edu/elections05/ballot.html) successfully increased, a **campus sustainability fee**.

Labor Strategies

1 Apprenticeship Utilization

Campuses, particularly public universities, should consider adding requirements or incentives for employing workers trained through state-approved apprenticeship programs. These programs offer worker recruitment, classroom instruction, on-the-job training and job placement. Project Labor Agreements (PLA), or the agreements between units of government and contractors carrying out publicly funded projects, can be used to support apprenticeship programs. Universities can establish PLAs that require contractors to use apprentices for a specified percentage of all hours worked.

2 Prevailing Wage

Campuses, particularly public universities, should insure that their investment in clean energy is also an investment in good jobs by asking their contractors to meet certain standards. One way to do this is to establish market-based wage standards. Under these standards, employers must pay the going market rate to employees. The rate can be tied to the state or regional median or average wage, or to the prevailing wage in a particular industry. This can be modified to require that only a certain percentage of employees are paid according to these standards; to exempt welfare-to-work participants, students, interns, and other categories of workers from the standards; or to make distinctions between large and small employers, or younger and more established employers.

Labor Strategies Resources

The **Apollo Alliance** page on **Apprenticeship Utilization** provides information and links about these programs. (www.apolloalliance.org/strategy_center/model_legislation/aur.cfm)

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About the Authors

The Apollo Alliance for Good Jobs and Clean Energy

The Apollo Alliance aims to improve America's security, technological leadership, economic strength, and shared prosperity by achieving sustainable American energy independence through efforts at the national, state and local level. Named after President Kennedy's challenge in the 1960s to land a man on the moon within a decade, our new Apollo Alliance has a bold strategy to direct $300 billion in targeted investments towards achieving sustainable energy independence within a decade.

Apollo's 10-point plan to achieve energy independence includes many of the strategies discussed in this document:

- Promoting advanced technology and hybrid cars
- Encouraging high performance building
- Increasing the use of energy efficient appliances
- Expanding renewable energy development
- Improving transportation options

Our plan is supported by key national leaders in the labor, environmental, and business sectors, as well as by communities of color who are traditionally most harmed by existing energy policies.

The real work of the Alliance takes place at the state and local level, where Apollo brings together labor, environmentalists, business, civil rights activists, elected officials and their constituents to implement high-performance policies. These state and local Apollo groups work on specific job-generating policies and projects to increase energy efficiency and renewable energy use, and build the transportation, utility, and other infrastructure needed to support sustainable efficient energy practice. Over the past year, state and local Apollo Alliances have been built in cities from Los Angeles to New York and states from Hawaii to Massachusetts. These state and local alliances pursue specific legislative and administrative reforms to increase investment in energy efficiency, renewable power, and other clean energy strategies.

Investment at all levels of our economy creates high quality jobs and increased income, as well as improving the environment and public health. It also more than pays for itself, offering fiscally strapped states, cities, and for-profit investors a better than competitive real rate of return (often as high as 15-20 percent annually). To learn more about how your city can start an Apollo project, and to find information on existing coalitions and projects, visit State and Local Apollo at www.apolloalliance.org/state_and_local/.

Energy Action

Founded on June 6th, 2004, Energy Action is a coalition of 25 leading student environmental and social justice organizations in the U.S. and Canada created to unify and support the student global warming movement. Together, we have some of the most experienced campus organizers on the continent, a large and growing base of committed volunteers on over 1,500 college campuses and a plan to catalyze a larger and more effective movement on this critical issue.

The Campus Climate Challenge (www.campusclimatechallenge.org) is our coalition's most ambitious campaign yet. The Challenge is a US and Canada-wide, long-term initiative aimed at making campuses energy independent and dramatically cutting their global warming pollution. By consolidating these initiatives into a unified structure, the Challenge allows campuses to share ideas, best practices, resources and network in ways never before possible.

Our coalition partners include: Black Mesa Water Coalition, California Student Sustainability Coalition, Chesapeake Climate Action Network, Climate Campaign, Dakota Resource Council, Education for Sustainability Western Network, Energy Justice Network, Envirocitizen, Environmental Justice and Climate Change Initiative, Free The Planet!, Global Exchange, Greenpeace, Indigenous Environmental Network, League of Conservation Voters Education Fund: Project Democracy, National Association of Environmental Law Societies, National Wildlife Federation's Campus Ecology Program, the student PIRGS, Rainforest Action Network, Sierra Student Coalition, Sierra Youth Coalition, Southern Alliance for Clean Energy, Southern Energy Network, Student Environmental Action Coalition, Students United for a Responsible Global Environment, Sustainable Endowments Institute, and Youth Environmental Network.