

**Washington University in St. Louis  
Strategic Plan for Environmentally Sustainable Operations**

April 22, 2010

# **Sustainable Operations Leadership Council**

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Chairs: Gregg Evans, formerly Director of Facilities Administration, School of Medicine, and Alan Kuebler, Assistant Vice Chancellor for Resource Management

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Andrew Frangos	Jan Muraski	Don Strom
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### **Introduction**

In September 2008, Washington University in St. Louis began developing a plan to make our university a model of environmentally sustainable operations. Leadership for this effort was charged to the Sustainable Operations Leadership Council (SOLC). The Council worked through five subcommittees: Energy & Emissions, Buildings & Grounds, Dining Services, Materials Management & Purchasing, and Transportation.

The chairs as well as other members of these subcommittees met with students at two public forums in April 2009 to explain the issues they were exploring and their preliminary findings. The forums also provided an opportunity for students to share their issues and concerns. In January 2010, a community review draft of the report was released. The draft was shared with the community at over 15 public forums, and feedback was solicited at these forums, other presentations and meetings as well as through an online survey. Over 250 members of the community contributed feedback through these methods.

One common thread that emerged from our discussions was the importance of the impact of all our operations on [greenhouse gas emissions](#). Global climate change, the most serious environmental challenge of our time, is primarily caused by man-made greenhouse gas emissions. The United Nations Framework Convention on Climate Change (UNFCCC) Intergovernmental Panel on Climate Change (IPCC) [Fourth Assessment Report](#), among many other sources, shows clear evidence that our climate system is changing at an increasing rate; that the changes are likely caused by man-made emissions of greenhouse gases; and that not reducing greenhouse gas emissions will result in significant economic, environmental and social harm. Our impact on greenhouse gases was not the only concern of our committees, and this report addresses other sustainability issues as well. The theme of directly and indirectly reducing our greenhouse gas emissions, however, is primary in this report

The SOLC believes Washington University must be a leader and act decisively to reduce our impact on climate change. This is a significant challenge because, as our 2009 greenhouse gas emissions inventory shows, the university's increased greenhouse gas emissions are largely due to our [physical growth](#). Since 1990, the square footage of buildings on the Washington University campuses has increased by 87%. During almost that same time period, our greenhouse gas emissions have grown by around 27%. We have and will continue to grow to meet our mission of being a preeminent institution of teaching, research and patient care. Therefore, as we move forward, significantly reducing the energy consumption and resulting greenhouse gas emissions of our existing and future buildings will be crucial and will require substantial investments.

In evaluating these investments, the university policy is to invest in buildings and operating systems for the long term. We believe in the principle of greater initial investments for long-term savings. Especially in this time of economic constraints, it is critical that the investments we make in reducing greenhouse gas emissions also result in long-term operational savings to the university through reduced energy cost.

### **Aspirations**

Our aspirations are that Washington University will:

- Become a leader in resource conservation and support sustainable production of energy, food and materials.
- Use the campus as an environment to test and demonstrate innovative sustainability ideas.
- Educate our community to be responsible stewards of limited resources.
- Involve our community of staff, students, faculty, alumni and regional contacts in our sustainable operations efforts with continuing education.
- Partner with regional and national groups to expand knowledge of and access to best practices for building systems, transit and sustainable materials.
- Consider and, when prudent, utilize certifications and sustainable endorsements to add independent validation to our endeavors.
- Continually measure our progress to ensure that we are meeting the goals of this report and that such goals remain appropriate.

### **Achievements**

Washington University has made impressive progress toward becoming a model of sustainable operations in recent years.

#### ***Achievements That Have Helped or Will Help Us Reduce Our Greenhouse Gas Emissions through Energy, Building and Transportation Measures***

- Switched from [coal](#) to [natural gas](#) for [steam generation](#) in 1992 on the Danforth Campus and 2001 on the Medical Campus, resulting in an immediate reduction in the [emission of harmful pollutants](#).
- Reduced [energy usage per square foot](#) by 31.3% for the Danforth Campus and by 51.0% for the Medical Campus over the past 16 years.
- [Decentralized steam plants](#) on the Danforth Campus to more effectively and efficiently fulfill the heating and cooling needs of each building.
- Improved centralized steam and chilled water systems at the Medical Campus.
- Completed a [Greenhouse Gas Emissions Inventory](#) in 2009 for all of our campuses that traces our energy usage from 1990 to the present.
- Constructed the [Living Learning Center](#) at Tyson Research Center, one of the first buildings in the world to be completed under the [Cascadia Green Building Council's Living Building Challenge](#), an environmental design model that requires buildings to provide their energy and water needs on-site, to source a majority of their building materials locally, and to have a [zero-carbon](#) construction footprint.
- Worked with the [U.S. Green Building Council's Leadership in Energy and Environmental Design green building program \(LEED\)](#) to ensure that we are considering the most current sustainable building initiatives. Below are our LEED and living-building projects, with those in italics awaiting completion or certification.

LEED Certified	LEED Silver	LEED Gold	Living Building Challenge
<a href="#">Earth &amp; Planetary Sciences</a>	<a href="#">Village East House</a>	<a href="#">Danforth University Center</a>	<a href="#">Living Learning Center at Tyson</a>
Seigle Hall	<i>S40 House</i>	Genome Data Sequencing Center	
	<i>Umrath House</i>	<i>Brauer Hall</i>	
	<i>Busch Hall</i>	<a href="#">BJC Institute of Health</a>	
	<i>Child Care Center</i>		

- Provided at no cost to faculty, students and staff access to the entire local public transportation system, [Metro](#). Metro service includes two stops at the Danforth Campus, one each at the Medical, West and North campuses, and campus circulator and bus service to all campus locations.
- Participated as the first partner with [Enterprise Rent-A-Car's WeCar](#) car-sharing program for students, staff and faculty.
- Offered [employer-assisted housing program](#) to encourage employees to move to nearby neighborhoods.
- Purchased [ENERGY STAR](#) electronic equipment whenever possible.
- Implemented a ["no idling" policy](#) for trucks and cars.

#### ***Achievements That Have Lessened Our Impact on the Food System***

- Purchased [fair trade coffee](#) from local purveyors.
- Offered options for [ecologically sound](#) foods as well as other sustainable choices.
- Reduced food waste before it is created by using strict portion and purchasing controls for food and menu planning. For more examples please visit: [Solid waste reduction](#)
- Donated all unused, edible food to community organizations through [student groups](#).
- Purchased local food from over 20 local farms and the on-campus, [student-run farm](#).

#### ***Achievements That Have Lessened Our Impact on the Waste System***

- Joined the [Responsible Purchasing Network](#), an organization dedicated to environmentally responsible procurement.
- Established an office supply substitution program so that greener alternatives of a product are automatically selected.
- Implemented a ["green-cleaning"](#) program on all of the campuses.
- Integrated recycling program for toner cartridges and electronics.
- Eliminated the sale of bottled water on the Danforth, North and West campuses.
- Provided used vegetable oil to be converted to [biodiesel](#) fuel by a [third-party company](#).
- Implemented Single-stream [recycling](#) program on the Danforth, North and West campuses and comprehensive recycling at the Medical Campus.

### *Achievements That Have Lessened Our Impact on the Natural Environment*

- Reduced [potable water](#) consumption per square foot by using storm and ground water for irrigation.
- Reduced potable water consumption inside buildings using [Water Sense](#) equipment.
- Installed [native](#) landscape on the Danforth Campus.

## **CHALLENGES**

Despite our achievements, the university faces many challenges in achieving our aspirations. Some of these are within our control, some are dictated by governmental policies, and others by issues of economics and the limits of technology. As we tackle our goals for sustainable operations, an awareness of these challenges is essential in our efforts to set realistic but aggressive goals. Key challenges include the need for campus growth to meet our mission, the lack of viable renewable energy sources, weaknesses in the regional public transportation system, limitations in food delivery systems and an inconsistent market for recycled materials.

### *Campus Growth*

Since 1990, the university has grown from 5.7 million square feet to over 10.6 million square feet of space, an 87% increase. Meeting our core research mission requires that much of this ever-expanding space is dedicated to laboratories, which are inherently more energy-intensive than office or classroom space. On a per square foot basis, we have reduced energy utilization by 31.3% on the Danforth Campus and 51.0% on the Medical Campus (To see graphs illustrating our reduction in energy needs per square foot, visit:

<http://www.wustl.edu/initiatives/sustain/strategicplan-final/energyusesqft.html>). Despite this increase in efficiency, our growth in square feet has led to a total increase in energy use of approximately 10.4% and in greenhouse gas emissions of 27.2% from 1990 to 2009. Our next challenge is to reduce our greenhouse gas emissions and our overall energy needs as we continue to grow. To achieve a reduction in energy usage, we must employ a combination of strategies, including the avoidance of new emissions, reduction of current usage, and exploration of cleaner energy sources.

### *Lack of Renewable Energy Sources*

The Midwest region is highly dependent on [fossil fuels](#) for energy. [Renewable energy](#) sources such as [hydroelectric](#), [solar](#) and [wind](#) are neither readily available nor as highly efficient in the St. Louis region, which ranks slightly below average among the nation's largest 25 cities for the potential for utilization of solar energy, and it is in the lowest category for use of wind power. This makes rapid deployment of these technologies unlikely. Additionally, we live in an area where electricity produced by fossil fuels, especially [coal](#) and [natural gas](#), is inexpensively available: Missouri has the [seventh least expensive electricity](#) in the country for commercial users. This low cost of energy makes it economically less advantageous to utilize renewable energy sources or to take certain energy-efficiency measures. The majority of our energy is also directly supplied by [AmerenUE](#) and the [Laclede Gas Company](#), so we are dependent on their production methods.

### *Weaknesses in the St. Louis Regional Public Transportation System*

Although our campuses are highly accessible by [Metro](#), St. Louis' regional public transit system, with five light-rail stops, a campus circulator and multiple nearby bus lines, the system faces challenges with infrastructure development and operations. In addition, St. Louis is a relatively low-density region, making higher utilization of public transportation challenging.

### *Limitations in our Food System*

Although we live in a fertile agricultural region where [66% of the land](#) in Missouri is dedicated to farms, we are dependent on national food suppliers to provide us with the majority of our food products. The current national food system is designed to provide all varieties of produce and food at all times of the year, importing crops from far away, regardless of the inputs necessary to produce and transport these products. Our regional growing season limits the options we have for locally produced food during much of the academic year. Our desire to serve more [local, seasonal, fair](#) and [ecologically sound food](#) is, therefore, challenged by a lack of availability of such food products from our major purveyors.

### *Weak Market for Recycled Materials*

In dealing with our waste reduction and diversion, we face infrastructural challenges on campus as well as systemic market challenges beyond our control. Many of our buildings, designed without the intention of supporting comprehensive [recycling](#), lack convenient locations for bins or docks for pick-up. In the current economy, reduced demand for recycled materials has impacted what we can recycle affordably.

## **GOALS**

The primary purpose of our strategic plan for sustainable operations is to create an infrastructure that leads to a significant reduction of our greenhouse gas emissions. We must do this by changing the way we do business and improving all aspects of our operations. [Carbon dioxide](#) and other greenhouse gases are emitted from a variety of sources, including [fossil fuels](#), which power normal university functions such as construction, transportation, and heating and cooling operations. Our consumption of food, water, and materials also contributes to the greenhouse gases that are released from landfills, agricultural and industrial processes. In addition to reducing greenhouse gases, we have also set goals that are crucial to Washington University's sustainability vision in the areas of food, waste, and preservation of the natural environment.

### **A. Reducing greenhouse gas emissions to 1990 greenhouse gas emissions level by 2020 without purchasing [carbon offsets](#).**

Global climate change is caused largely by the world's increased emissions of greenhouse gases. Research suggests that [global warming of 1°C over the global average temperature in the year 2000 is likely to be dangerous \(pdf\)](#), potentially triggering the melting of Antarctic and Arctic sea ice, which could in turn lead to rapid and wild fluctuations in climate. Our goal requires that we manage our campus growth and increase energy efficiency in virtually every building on all of our campuses. We are also assuming that our third-party energy suppliers will use more renewable energy in accordance with a Missouri ballot initiative that was passed in 2008, an initiative that required that 15% of all energy produced by Missouri utilities be from renewable sources.

### **B. Reduce our greenhouse gas emissions and build more sustainably by achieving standards equivalent to or exceeding LEED Silver for all new construction and major renovations of existing buildings, and pursuing LEED Gold or Platinum when appropriate.**

One way to significantly reduce our greenhouse gas emissions while continuing to grow is by radically increasing the efficiency of our buildings. Since 1988, Washington University has more than [doubled total square footage on and off-campus](#). To limit the impact of new buildings and the renovation of existing buildings, we already use [LEED standards](#) that establish a holistic set of criteria covering sustainable sites, water efficiency, energy and atmosphere, materials and

resources, indoor environmental quality, and innovation and design process. The LEED certification levels from lowest to highest are Certified, Silver, Gold and Platinum.

**C. Reduce our greenhouse gas emissions by decreasing solo-occupant automobiles coming to campus by 10% by the year 2012.**

Another way we will reduce our carbon footprint is by discouraging solo-occupant commuting to campus. The United States Department of Transportation estimates that 28% of our country's greenhouse gas emissions are attributable to transportation; 63% of those emissions come from passenger cars and small trucks. Increasing the use of walking, public transportation, and bicycling is not only environmentally preferable, but it also has economic benefits to the university. Underground parking is virtually the only option for expanding parking on the Danforth Campus. At an estimated initial cost of \$45,000 per space, underground parking is an option we would like to avoid.

**D. Reduce our impact on the food system by working with our dining service partners to develop a system for measuring and purchasing more food that is produced and distributed locally, humanely, fairly and in an ecologically sound manner.**

A significant portion of greenhouse gas emissions throughout the world are caused by food and agriculture production, so changing the amount and types of food we purchase can contribute to reducing our greenhouse gas emissions. We cannot feasibly limit our food purchasing selection to local food only, because in Missouri we would severely lack variety in options during the off-season, so we must focus on purchasing the most sustainable options and encouraging sustainable local production.

**E. Lower our landfill impact by reducing our solid waste by 20% on the Medical Campus and 35% on the Danforth Campus by 2012. This can be achieved by decreasing waste before its arrival on campus and through increased diversion and recycling efforts across campuses.**

Despite progress made in utilizing gases emitted from landfills, burying garbage still results in the release of more greenhouse gases than recycling and reduction of waste. In addition, landfills contaminate our groundwater. We must, therefore, not only recycle more but reduce the total waste we produce in the first place. We need to become more efficient in our purchasing and encourage our suppliers to reduce packaging. This goal requires cooperation with our suppliers of materials in a variety of areas, improved infrastructure as well as comprehensive campaigns to encourage our community to reduce, reuse and recycle in offices, labs and dorms.

**F. Work toward a natural environment that recognizes the benefits of native plants and minimizes the need to use potable water and herbicides and pesticides on our campuses**

We must continually examine whether new plantings on campus can be composed of native plants. Native plants are better able to handle the climate, soils and rainfalls of our region. They will not invade new habitats as alien plants tend to and should increase the biodiversity of our campus by attracting other native species. An economic benefit is that native plants often require significantly less maintenance than introduced species.

**G. Foster a culture of responsible use of natural resources and environmental sustainability on campus among staff, faculty and students.**

## **Achieving Our Goals**

The following steps will be necessary in order to achieve our ambitions of reducing greenhouse gas emissions, lessening our impact on the food and waste systems, and improving the quality of our environment.

### ***Next steps to reduce greenhouse gas emissions through energy, building and transportation measures***

#### ***A. Energy efficiency***

Washington University will achieve the most dramatic reduction in its greenhouse gas emissions through energy-efficiency measures. Over the past six months, the university has conducted two detailed studies of energy efficiency using a sample of buildings on the Danforth and Medical campuses. The analysis identified approximately \$46.6 million in energy efficiency projects, which will both reduce long-term cost to the university and reduce greenhouse gases. If fully implemented, this energy-efficiency program will result annually in a 23% reduction in energy costs, a 16% reduction in electricity use, a 33% reduction in fuel use, and a 27% reduction in greenhouse gas emissions from our 2009 usage. A detailed analysis of this energy efficiency work may be requested by emailing [sustainability@wustl.edu](mailto:sustainability@wustl.edu). Specific proposed steps on the campuses include the improvement of our [lighting equipment and design](#), replacement or modification of our existing [fume hoods](#) and installation of [heat recovery chillers](#).

The energy-efficiency measures we will undertake on the Danforth and Medical campuses are exemplified by a current garage lighting retrofit on the Danforth Campus, in which the labor is being performed in-house and the cost of materials reduced from \$122,875 to \$76,430 by an [Ameren incentive rebate](#). This project will result in annual kilowatt savings of 928,888 kWhrs. At the current commercial rate for electricity, our cost savings will exceed our expenditures in less than two years.

Additional key steps are to continue to purchase whenever possible [ENERGY STAR](#) equipment and work towards reducing [phantom loads](#) from appliances and IT equipment.

#### ***B. Energy awareness***

The energy-efficiency measures of the campuses will be greatly aided if our students, faculty and staff are actively engaged in energy-reduction efforts. Since March 2009, the Medical Campus has had an [Energy Awareness Committee](#) that is working to empower its community members to work on ways to reduce consumption of energy at the end-user level. The Danforth Campus started an Energy Awareness Committee in October 2009 largely for its faculty and staff and is exploring with student leaders how to best expand awareness throughout our student population.

Members of the committees have created subcommittees to address the particular concerns of labs, IT and public awareness. An initiative of the lab subcommittee is one that will have significant impact on energy usage. This subcommittee has conducted a detailed energy audit of a lab to calculate the effect of altering the timing of tests, the turning off of equipment, including fume hoods, when not in use, and eliminating unnecessary equipment. The intention of the lab subcommittee is to make other labs aware of these energy-efficiency measures.

*Steps we can take as individuals:*

- *Conserve energy resources by turning off lights and unplugging appliances such as TVs that draw power when not in use. To measure this “phantom power” drain and learn more tips for reducing it, contact [sustainability@wustl.edu](mailto:sustainability@wustl.edu).*
- *Check with your office manager to see if you can shut down your computer at the end of the day and turn off the power strip.*
- *At home, unplug appliances when not in use or when out of town. Turn off your dishwasher’s drying cycle for added energy reduction.*

### *C. Metering and economy incentives*

Metering is a complex undertaking that measures the electric, water and gas consumption in buildings. Washington University currently has very limited metering of its utilities. Metering is essential to alert building managers as to when an energy device or the building is not operating properly and informs the users of a building’s energy usage. This information can then be used to track conservation efforts and charge users of energy by consumption. The university will over the next several years proceed with the metering of all our campuses as a means to not only increase awareness and the efficiency of the delivery of energy, but also so that we can move toward charging users for their actual energy consumption and thus encourage the undertaking of measures that avoid and reduce energy usage.

*Steps we can take as individuals:*

- *Once your building is metered, keep track of its energy usage and encourage others in your building to take measures to decrease energy usage.*

### *D. [Renewable energy](#)*

As new technologies develop, Washington University must seek economically feasible ways to utilize renewable energy. Preliminary evidence suggests that the best candidate for cost-effective use of renewable energy is the use of [solar](#) power for electricity and hot water in off-campus residential properties.

*Steps we can take as individuals:*

- *Tax incentives and higher per unit energy costs may make renewable energy options viable for your home, especially using solar energy to heat your hot water.*

### *E. Improving our buildings and our campus design*

Energy consumption is not the only sustainability issue with our buildings. We must address the materials that are used, the [indoor air quality](#), [water efficiency](#) as well as the aesthetics of what we are building.

- *Develop sustainable design principles to be applied to all construction and existing buildings for both campuses and existing university holdings.*
- *Build at least to the minimum standards of [LEED Silver certified](#).*
- *Aim for 20% greater energy efficiency than required by building codes.*
- *As we renovate existing buildings, update those to at least the minimum standards of LEED Silver certified.*
- *Establish [building performance requirements](#) for all buildings on campus.*
- *Incorporate our sustainability goals for energy management, building design and transportation access into any campus planning.*

- Evaluate each project under life-cycle cost analysis and include 30-year operating costs into project budget.

*Steps we can take as individuals:*

- *Try to understand the building you work in so that you do not inadvertently disable design features that are meant to improve the sustainability of the building.*
- *Utilize facilities specially designed for LEED standards such as showers for cyclists.*

#### *F. Improving our Transportation Choices*

Washington University must encourage our community to come to our campuses through other means than solo-occupant cars and avoid unnecessary professional travel.

- Increase walking and bicycling to campus. We are completing a bicycle master plan to guide planning, design and construction of on-campus bicycle infrastructure, and will adopt corresponding on-campus bicycle procedures and etiquette in the next few years. We are also involved in a regional bicycle plan that will create safe and attractive bicycle paths throughout the St. Louis region. Washington University is considering partnerships with student-operated bicycle programs such as [Bears Bikes](#) to further encourage bicycling as an alternative to cars. We also want to address pedestrian access to campus to improve the safety and ease of walking.
- Increase use of mass transit by increasing promotion of the U-Pass program and continually working with [Metro](#) to review routes, schedules and service.
- Increase use of the [WeCar program](#) by expanding options, decreasing cost and increasing promotion to the university community, especially to incoming students.
- Reduce GHG emissions from fleet vehicles by switching some vehicles to [biodiesel](#), [low emissions](#) or other alternative fuels.
- Increase the [employer-assisted housing program](#) in order to encourage more employees to live closer to campus.
- Implement policies to encourage carpooling, such as providing parking subsidies for carpools and improved parking locations.
- Provide improved parking locations for [low-emission vehicles](#).
- Reduce GHG emissions from air travel by influencing travel choices of staff and faculty and providing feasible alternatives.

*Steps we can take as individuals:*

- *Consider carpooling to work with the [Bearly Drivers program](#).*
- *Consider walking or biking for short trips on home or around campus, or utilize [public transportation](#) where possible.*
- *Improve your gas mileage by keeping your tires inflated properly.*
- *Avoid travel when possible by using videoconferencing.*
- *Plan and combine errands to minimize your travel distance.*

#### *Next steps to lessen our impact on the food system and reduce greenhouse gases*

We must work with local and national food providers so that the foods we eat are healthier for us and for the environment.

- Work with our partners toward purchasing more food that is [local](#), [ecologically sound](#), [fair](#) and [humane](#).

- Local food is grown within 200 miles, is seasonally and regionally appropriate, and overall uses less energy to produce than a comparable non-local food.
- Ecologically sound food is produced in a way that minimizes environmental impact throughout the production process.
- Fair food is grown and produced in conditions that are just and humane to the employees, as defined by fair food standards.
- Humane food is a certification geared to improving animal welfare from birth through slaughter.
- Investigate systems to measure the sustainability of our food, such as the [Real Food Challenge](#).
- Increase education and awareness by providing proactive communication of food and beverage choices, culinary practices, and university policy.

*Steps we can take as individuals:*

- Choose [seasonal produce](#) when possible. For example, choose tomatoes in the summer and fall and root vegetables in the winter.
- Shop at one of our many [local farmers' markets](#).

***Next steps to reduce greenhouse gases and our impact on landfills by lessening our waste and purchasing more responsibly***

Washington University must strive toward bringing fewer materials onto campus and recycling more of our waste.

- Reduce solid waste in dining services.
- Seek a viable option for composting our organic food waste. Composting in the St. Louis region is in its infancy, and we hope to find a suitable vendor to collect and use our waste, including our organic waste.
- Work with vendors to reduce packaging and ensure that it is reusable and recyclable.
- Define state-of-the-art environmentally preferable purchasing, benchmarking against our peers with Responsible Purchasing Network assistance.
- Create a sustainability code of conduct for our vendors.
- Develop internal system for redistributing surplus and unused equipment and donating to other entities as needed.
- Review and improve campus recycling infrastructure and operations.
- Recycle more than 75% of [construction and demolition waste](#).

*Steps we can take as individuals:*

- *Limit packaging and disposables whenever possible. Bring your own bags, try to purchase in larger quantities or bulk, and bring your own reusable silverware and dishware.*
- *In general, a smaller number on a recyclable plastic is more desirable than a larger one. We can recycle plastics #1 through 7, but #6 (polystyrene) is still not as easy to recycle. When possible, avoid using polystyrene or Styrofoam containers.*

***Next steps to reduce impact on the natural environment***

Washington University must landscape more sustainably.

- Improve grounds maintenance by developing an [integrated pest management program](#) and eliminating non-USDA certified herbicides and pesticides by 2012.

- Reduce the [heat island effect](#) using shading and [green roofs](#).
- Reduce [potable water](#) used for irrigation by increasing our use of [native](#) and [adaptive](#) plants, programmed irrigation, and [mulching](#) and high-quality soil preparation.
- Further lessen our need for potable water by the establishment of [water-quality basins](#) and water collection and reuse from [cisterns](#).

*Steps we can take as individuals:*

- Use more [plants native](#) to Missouri in your home garden.
- Consider [installing a rainwater collection system](#) with a cistern for irrigating your lawn or garden.

### ***Next steps to foster a culture of sustainability***

Washington University will encourage a culture of sustainability throughout the campus community. Many of the ways that this will be addressed have already been identified in the previous goals, but a few examples are also provided here.

- Outreach from the [Energy Awareness and Sustainability Awareness](#) committees to schools, departments and groups within the university community.
- After metering is installed in buildings throughout campus, develop methods to share information with community members in specific buildings, including the possibility of competitions aimed at reducing energy usage.
- Educate the campus community about recycling opportunities on campus.
- Increase education and outreach to undergraduate students to encourage transportation options other than personal automobiles, including [WeCar](#), [public transit](#) and bicycling.
- Upon implementation of the [Real Food Challenge](#), develop marketing and education tools for students, staff and faculty to understand the consequences of our food decisions.
- Support of student, staff, and faculty initiatives to implement sustainability initiatives on campus, including student initiatives through the recently approved Student Sustainability Fund.

### **Measurements of Our Success**

Washington University intends for this Strategic Plan for Environmentally Sustainable Operations to be a living document that facilitates continual investigation and improvement. The quality of this plan will ultimately be measured by our ability to improve the sustainability of our campus. In order to know that we are moving in the right direction, we must measure our improvement.

To keep this process vital, we must measure our progress and report it in a clear and effective way on our sustainability website ([wustl.edu/sustain](http://wustl.edu/sustain)). We have listed examples of metrics that we will use in each of our areas of focus.

In 2013 and 2017, Washington University will also formally evaluate its progress in achieving the goals set forth in this strategic plan, and set new goals, when appropriate.

### ***Measurements Indicating a Reduction in Greenhouse Gas Emissions Relating to Energy Usage, Buildings and Transportation***

- Annually gather and report our greenhouse gas (GHG) emissions and evaluate against our GHG inventory to understand how we are progressing in our efforts to achieve our goal of reducing to our 1990 GHG levels by 2020.
- Achievement of LEED certifications for new construction and existing buildings.
- For buildings where we do not seek formal LEED certification, internal certification that the LEED standards have been met for the building.
- Reduction in parking permits sold each semester.

***Measurements Indicating Reduced Impact on Food System and Greenhouse Gas Emissions***

- Track the quantity of food purchased by our dining service partners in each sustainable food priority on a regular basis.
- Annual awareness/education surveys on dining services issues.

***Measurements Indicating Reduced Greenhouse Gas Emissions and Impact on Landfills by Lessening Our Waste and Purchasing More Responsibly***

- Conduct regular [waste stream audits](#) on campuses.
- Increase in the percentage of materials purchased that meet the environmentally preferable purchasing guidelines
- Reduction in total waste generated.

***Measurements Indicating Reduced Impact on the Ecosystem***

- Reduction in the use of [potable water](#) per square foot.
- Minimization of construction footprints.