

# Campus Conversation: Climate Change

## and the Campus



# The Process:

## Public Deliberation

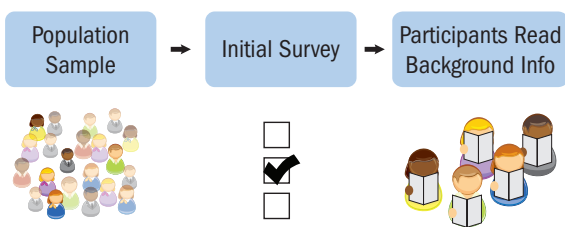
### Four discussion guidelines

- Please explain your own perspective.
- Please listen to other people's views; don't interrupt when someone is speaking.
- Please focus on sharing your reasons, your experiences, and relevant facts.
- Please treat your group members with respect at all times.

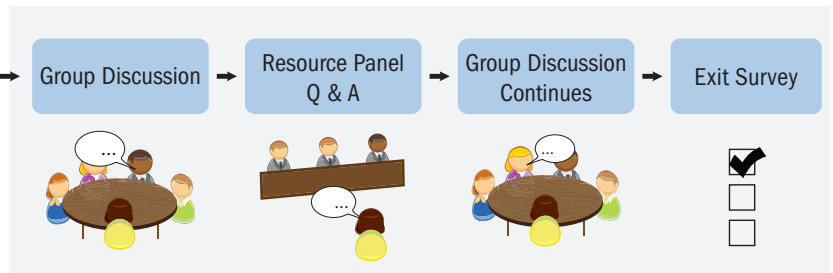
Through deliberation, people develop a fuller understanding of issues and come to appreciate how these issues are experienced differently by different people. Public deliberation also helps citizens to develop a shared resource of expanded knowledge, which emerges as people express their own perspectives and learn from the perspective of others. Drawing on this enriched understanding and the shared resource of knowledge enabled by deliberation, people can develop informed opinions. These informed opinions can, in turn, provide guidance to those who have the responsibility of devising policy or implementing programs.

The event to which you have been invited seeks to capitalize on the value of public deliberation and to do so in structured way. By providing a mixed group of students with balanced background information, the opportunity for small-group deliberation, and access to a resource panel of experts, we seek to provide you with a unique opportunity to work together as you develop the informed opinions that will serve as a resource for campus officials and organizations.

### Pre-Poll Steps



### The Day of Deliberation



# The Issue:

## Climate Change

"...scientists publishing in the peer-reviewed literature agree with [the intergovernmental Panel on Climate Change], the National Academy of Sciences, and the public statements of their professional societies. Politicians, economists, journalists and others may have the impression of confusion, disagreement, or discord among climate scientists, but that impression is incorrect." (Naomi Oreskes, *Science* 2004)

### Climate Change

Over the course of the 21st century, in every region of the globe, the climate on which humans rely — the climate to which they have adapted their lives — will be changing. Climate change is a global phenomenon, but its impacts will be local; these impacts will vary by region, even within nations. For some regions these impacts may be positive. For example, warmer temperatures and increased rainfall may open up new areas for agriculture or extend growing seasons. For other regions, these impacts may be catastrophic. Already dry areas may experience more frequent periods of drought, increased precipitation in already wet areas may cause more flooding, or rising sea levels may make islands and some coastal areas uninhabitable. Whether the impacts are positive or negative, as a result of climate change humans will face the challenge of adapting or altering established ways of providing the resources they need to live: growing food, attaining fresh water, and supplying energy.

There appears to be a gross misunderstanding of the nature of climate change science among those that have attempted to discredit it. They convey the idea that the science in question behaves like a house of cards: if you remove just one of them, the whole structure falls apart. However, this is certainly not the way the science of complex systems has evolved. A much better analogy is a jigsaw puzzle: many pieces are missing, and some might even be in the wrong place, but there is little doubt that the overall image is clear,

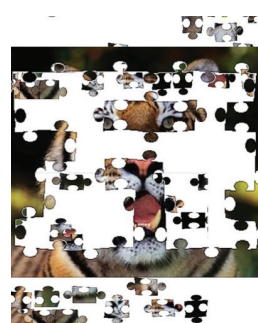
—Mario Molina, a Nobel laureate in chemistry, uses the following image representing a partially completed jigsaw puzzle to convey the state of understanding of human-driven climate change.

### The Science of Climate Change

The concerns noted above arise out of the scientific consensus that has emerged from peer-reviewed journals. This consensus holds that the climate is changing and that human activity is the cause of such change.

There is, however, disagreement within the scientific community regarding how certain we can be about predicting the near and long-term impacts of climate change. Detailed discussions about the potential impacts of climate change must acknowledge a degree of uncertainty.

Furthermore, public policy decisions regarding what to do in light of climate change and its causes will involve consideration of a variety of competing and respectable positions.



## Mitigation and Adaptation Strategies

Climate change is a global concern. Any serious effort to address climate change will require international cooperation and coordination. However, greenhouse gases are emitted from local sources (household heating and cooking, automobiles, power plants). Thus, to address climate change, people will need to take action that promotes changes at a number of levels: personal, local (campus, city, and state), regional, national, and international.

Strategies for addressing climate change are generally separated into two categories: mitigation and adaptation.

*Mitigation strategies* are actions people take to decrease greenhouse gas emissions. They include energy conservation, energy efficiency, and use of energy sources that emit either no greenhouse gases, such as solar or nuclear power, or reduced greenhouse gases, such as the use of natural gas turbines for generating electricity. When thinking of mitigation strategies, it may be useful to consider that each individual, institution, and community creates a 'carbon footprint' from their use of fossil fuels. Mitigation strategies are designed to decrease the size of that footprint.

### Natural Gas Turbine

In 2011 General Electric announced a new natural-gas turbine it says is designed to be used in conjunction with wind or solar energy-generation gear by kicking in quickly on still or cloudy days.

"By rapidly ramping up and down in response to fluctuations in wind and solar power, the technology will enable integration of more renewable resources into the power grid," GE said in a statement.

—Dow Jones Newswire, 5/25/11

*Adaptation strategies* are actions people take to manage the effects of a changing climate. Climate change will affect where people are able to live, it will affect people's health, and it will affect agriculture, food supplies, and the availability of fresh water. And while the effects of climate change will differ in various regions, all regions of the globe will face the challenge of adapting to climate change.

Examples of adaptation strategies include the use of new types of lighter color, porous asphalt (the former quality reflects sunlight and reduces ground temperatures; the latter slows runoff from more intense down-pours). Dykes around the city of Venice and higher levies around New Orleans that address raising sea levels and storm surges are also examples of adaptation strategies.

Addressing climate change will require planning that coordinates strategies. Choosing the appropriate combination of strategies will be challenging. Each will cost money, pose problems, and offer benefits.

### Chicago tree planting

Chicago spends over \$10 million a year planting roughly 2,200 trees.

The problem is that for trees to reach their expected lifespan — up to 90 years — they have to be able to endure hotter conditions. Chicago has already changed from one growing zone to another in the last 30 years, and it expects to change several times again by 2070.

Knowing this, planners asked experts at the city's botanical garden and Morton Arboretum to evaluate their planting list. They were told to remove six of the most common tree species.

Off came the ash trees that account for 17 percent of Chicago tree cover, or more than any other tree. Gone, too, are the enormous Norway maples, which provide the most amount of shade.

A warming climate will make them more susceptible to plagues like emerald ash disease.

—NYT May 22, 2011

## The Context:

# Climate Change and the Campus

A university and its students, faculty, staff, and alumni can respond to climate change by adapting or altering everyday practices in order to decrease their carbon footprint and become a more sustainable community. In addition, universities can address climate change by focusing research, education, and community outreach in ways that promote innovation and develop knowledge about the challenges of climate change and the strategies that can be used to address it.

### **Policies**

Institutional policies are an effective means for reducing energy consumption. For example, campus policies can include setting university owned computers to go into a lower power state when not in use, installing motion sensors to control lighting, replacing inefficient windows, adjusting heating and air conditioning settings, and purchasing more efficient appliances.

### **Buildings**

Campuses manage a significant number of buildings and support infrastructure that affect energy use. The energy required to support buildings is typically a large fraction of the greenhouse gas emissions from a campus. In addition to addressing climate change, efficiency and conservation strategies can also save money by reducing utility expenses. Thus, universities

receive several benefits when they take measures to reduce the greenhouse gas emissions associated with building energy consumption.

Some campuses pursue conservation by holding competitions to see which dorm can reduce the most energy consumption. However, conservation, which achieves energy reduction through behavior changes, often demonstrates a limited energy reduction potential. Many campuses prefer to pursue aggressive energy efficiency alternatives to achieve significant emissions reductions that do not depend solely on individuals changing their behavior.

### **Transportation**

Universities can mitigate greenhouse gas emissions through strategies aimed at the campus' fleet of vehicles; student, faculty and staff commuting; and business air travel. There are many incentives that a university can create to accommodate commuters, including facilitating and offering incentives for carpooling, subsidizing public transportation for campus community members and providing safe and efficient bike and walking paths. Air travel can also be a large contributor to a campus' carbon footprint. Providing easy access to teleconferencing could reduce greenhouse gas emissions from travel while also making it easier and far cheaper for faculty and staff to connect with colleagues electronically.

### **Life Cycle Consumption**

Each university purchases food, as well as other products and services for the benefit of the campus community. Considering the life cycle of these products prior to making purchasing decisions may allow universities to make more sustainable choices. For instance, buying locally grown fruits and vegetables and encouraging less carbon-intensive eating practices (for example, having “meatless Mondays” on campus) may help to reduce the campus’ carbon footprint.

### **Outreach and Education**

Campuses are especially well equipped to provide faculty, staff, and students, as well as the local community, with information to promote efficiency and conservation efforts. This can be achieved both in formal classrooms and as informal activities around campus. For example, Indiana University and Harvard recently instituted a dormitory energy conservation competition. This competition, which reduced dormitory energy consumption also acted as a vehicle for students and staff to become more informed about energy consumption and conservation. Larger impacts may also be gained when campuses pursue research in and offer courses or majors related to green design, energy engineering systems and environmental policy.

### **Generating Low-Carbon Energy on Campus**

If a university has the space and infrastructure, it may be able to generate its own energy. Institutions that already generate their own electricity may be able to install technologies for combined heat and power, using the waste heat from electricity generation to heat the campus. Universities that own agricultural land could invest in wind turbines. Building new infrastructure requires an initial cost to the university. However, the university may recoup some of this cost over time from generating its own energy.

### **Buying Low-Carbon Electricity**

Most universities will only be able to reduce carbon emissions on the supply side through indirect means. Some utility companies offer programs through which universities can buy electricity generated in part from low-carbon sources, such as wind and solar.



## The Topic:

# Our Conversation

“Choosing new technology over old, a University of Pittsburgh study recommends that Pittsburgh replace its 40,000 streetlights with LED lighting.

The 72-page study, “Life Cycle Assessment of Streetlight Technologies,” by Pitt’s Mascaro Center for Sustainable Innovation, says electricity savings from light-emitting-diode — or LED — lighting would offset negative environmental impacts of the LED manufacturing process by a factor of 10.

That means the city, which spends \$4.2 million annually on electricity and streetlight maintenance, could save \$1 million each year in energy costs and \$700,000 in maintenance costs with LED lighting.”

—Pittsburgh Post-Gazette  
March 13th, 2012

The city of Pittsburgh and its urban core recognize the dangers that will inevitably arise due to climate changing conditions and, in an attempt to counteract or postpone some of the outcomes, developed the Pittsburgh Climate Action Plan. Several ways in which global climate change will have direct impact on the city include “higher prices and shortages of basic goods, higher susceptibility to flooding, increased public expenditures from increased responses to extreme weather events, and higher rates of infectious diseases and heat-related illnesses.” The plan focuses on four key areas: government, business, Pittsburgh residents, and higher education institutions.

According to the Pittsburgh Climate Action Plan, the Higher Education Climate Consortium (HECC) is chartered to “actively engage all Pittsburgh region colleges and universities to collaborate, share information, and set goals regarding research agenda, education curricula, operations, outreach activities, and commitments that reduce greenhouse gas emissions so that the organizations comprising the Higher Education Climate Consortium align with the city of Pittsburgh’s overall greenhouse gas reduction goal.” The committee involves 11 institutions: the Art Institute of Pittsburgh, Community College of Allegheny County, Carlow University, Chatham University, Carnegie Mellon University, Duquesne University,

LaRoche College, The Pennsylvania State University Metro Center, University of Pittsburgh, Point Park University, and Robert Morris University. In many ways, this Campus Conversation aligns with their mission.

The following four topics were chosen from options currently being planned or implemented among our local colleges and universities. They have been part of a number of planning processes, from campus committees to regional organizations like the Pittsburgh Climate Initiative.

- “Lights Out” Campaign
- Campus Conservation Nationals
- Community Garden
- Careers in Sustainability, Green Technologies

### CONNECT

The Congress of Neighboring Communities, an organization that promotes cooperation and collaboration between the City of Pittsburgh and the 36 neighboring municipalities that comprise our region’s urban core, has brought together the City of Pittsburgh and the surrounding municipalities to address issues related to climate change.

Through the CONNECT framework, governmental leaders for the City and surrounding jurisdictions are actively engaged in finding sustainable solutions to environmental issues that municipalities face.

While such campus efforts may seem marginal, they are in sync with larger, more comprehensive initiatives, such as the Empire State Building Sustainability Project: "The Empire State Building is an icon of 1930s architecture. Now it will also be a leading example of innovative building management, as it undergoes a retrofit to improve energy efficiency and financial performance. The project could reduce the building's energy use by 38 percent and energy bills by \$4.4 million a year, while also preventing 105,000 metric tons of greenhouse gas emissions over the next 15 years."

[www.clintonfoundation.org/what-we-do/clinton-climate-initiative/1/cci-empire-state-building](http://www.clintonfoundation.org/what-we-do/clinton-climate-initiative/1/cci-empire-state-building)

## What can we do for our campus?

### "Lights Out" Campaign

The "Lights Out" Campaign was proposed by the Pittsburgh Climate Initiative in response to a study done in England which found that, if business owners turned their lights off after hours, the city could reduce its greenhouse gas emissions by as much as 15%. In Pittsburgh, a similar 15% reduction would reduce carbon emissions by over 1 million tons.

It is proposed that a Lights Out initiative be adopted by local campuses, even if for only an hour a semester. This would allow students to not only see their energy usage in real time but also remind students that electricity is a commodity we take for granted that not all people are able to access. If campuses could actually calculate how much electricity was saved during the hour of "Lights Out", it would prove to both students and faculty that they can truly make a difference and encourage them to consider their energy consumption more frequently. A collaboration with all the HECC schools would result in even greater reductions of energy usage and carbon emissions thereby advancing Pittsburgh's goals of becoming a greener city.

### Campus Conservation Nationals

This past semester, several single-purpose residence halls participated in Campus Conservation Nationals, a nationwide competition which seeks to curb emissions on college campuses by showing energy consumption in real-time and challenging students to reduce their share of consumption. At CMU nine residence halls competed, and there were very positive results showing significant decreases in consumption. However, many residence halls were not included in the competition because of logistical issues with regard to multi-purpose buildings (those with campus dining, fitness centers, and other facilities) and accounting for different meters and levels of consumption. Some residence halls are simply not equipped with the technology necessary for students to measure their energy consumption in real time. If CMU, for example, can employ these technologies in more locations, students will become more aware of their carbon footprints and be encouraged to reduce their consumption.

It is also important to have all buildings metered for electricity consumption so that Facilities Management Services can discover possible issues with the system as well as monitor energy usage on a regular basis. Additionally, while a pizza party (which was the prize for this year's Campus Conservation Nationals winner) is somewhat of an incentive, participation could be increased, and students would presumably be incentivized more by benefits like, for example, a discount on their student activity fee or coupons for discounted merchandise from the campus bookstore.



## Grow Pittsburgh

Grow Pittsburgh envisions the day when growing and eating healthy, local food is commonplace. We are committed to:

### *Growing Food*

- Increasing the amount of affordable healthy food in the Pittsburgh region
- Increasing the amount of land dedicated to sustainable food production
- Increasing food security in low income communities

### *Growing Farmers*

- Providing hands-on, experiential agriculture training to community residents
- Promoting urban agriculture as an attractive, viable career option

### *Growing Community*

- Promoting awareness of fresh local food, nutrition and sustainable living
- Involving community residents in the development of urban farm enterprises
- Developing partnerships with community stakeholders and organizations

### *Growing Capacity*

- Developing projects that attract and maintain diverse interests
- Maintaining a supportive environment for the local growing community

## What can we do for our community?

### Community Garden

Another initiative which could be better publicized and expanded upon at CMU and established at other schools in Pittsburgh is the community garden. Located next to the Solar Decathlon House in Donner Ditch, CMU's community garden is a small (a little less than 300 sq. ft) organic vegetable garden that is tended to twice weekly by a Garden Team of CMU students. Ideally, the Garden Team would like to acquire more land on campus so that interested students can have their own plot of land on which to grow, tend to, and then pick their own organic produce. The Garden Team also hopes to explore the idea of donating, selling, and distributing their produce to campus vendors. Getting students excited about local produce would help not only our campus but local farmers all over the city and give momentum to a movement that seeks to understand the effects of climate change on our food sources and how our food sources can affect climate change.

The City of Pittsburgh also sees community gardens as a way to reduce urban blight by replacing overgrown vacant and abandoned lots with community gardens. In doing so, the "Green Up Pittsburgh Program" aims to reduce blight and public safety hazards, inspire community pride, and promote environmental values. Campus and Community garden initiatives can now represent a new kind of 'town and gown' relationship.

### The carbon footprint of a hamburger

According to a 2006 report by the United Nations Food and Agriculture Organization... current production levels of meat contribute between 14 and 22 percent of the 36 billion tons of "CO<sub>2</sub>-equivalent" greenhouse gases the world produces every year. It turns out that producing half a pound of hamburger for someone's lunch a patty of meat the size of two decks of cards releases as much greenhouse gas into the atmosphere as driving a 3,000-pound car nearly 10 miles.

– Scientific American Magazine, February 2009

### Municipalities as Communities

Community can be defined in various ways. One perspective recognizes that the community should encompass an area that includes not only where people live, but also areas in which people spend a considerable amount of time (such as work, educational institutions, and recreation facilities). These activities extend beyond a series of block groups that comprise a neighborhood. Yet, they also concentrate within a geographic area comprised of contiguous municipalities.

Researchers at the Graduate School of Public and International Affairs' Center for Metropolitan Studies (University of Pittsburgh) have developed a framework for community that explicitly acknowledges the role of inter-municipal cooperation in addressing relevant policy issues, such as climate change. The "urban core" definition - an area that comprises the center city and all of the municipalities that share a common border with the center city - provides an opportunity for policy solutions to occur at these kinds of regional levels.

### Urban Core Connections

Efforts through the Green Initiatives working group include a U.S. Department of Energy SunShot Rooftop Solar Challenge Grant for the Pittsburgh region to unify coding, zoning and permitting processes for solar power installations. Additionally, CONNECT has established a partnership with Duquesne Light to provide energy efficient street lighting options.

*Mission*

Pittsburgh Green Innovators is a non-profit organization committed to growing a vibrant green economy and community by collaboratively leveraging regional strengths through innovation, education, workforce development, and cultivation of sustainable business opportunities.

*Vision*

By 2020, Southwest Pennsylvania is a clean, green, vibrant, innovative and hardworking region that is a global leader in sustainability. With the Pittsburgh Green Innovators as a catalyst, the Pittsburgh Region is now the epicenter for the tools and talents needed to meet the challenges of achieving a more sustainable economy by combining the best of our legendary work ethic and skilled labor, along with our emerging strengths in higher education and revolutionary technologies.

## What can we do for ourselves?

Provide courses ranging from Environmental Engineering and Public Policy to Green Chemistry to Sustainability Management. Prepare students for career opportunity opportunities in professional areas such as sustainability and in technical areas such as advanced energy technologies.

### Careers in Sustainability

Between stressful classes and anxiety about post-graduation plans, many students simply don't see climate change and campus sustainability as a priority in their lives. This reality is unfortunate, since the economic benefits of sustainability and the professional career paths of, for example, corporate sustainability officers is an attractive and growing field. Possible majors in sustainability practice and/or career paths in sustainability would allow students to direct their hard work and passion into issues that they otherwise might have little incentive to care about. Since Pittsburgh in particular is becoming increasingly technology-oriented and environmentally conscious, its firms and large companies are beginning to respond to agendas concerning lower emissions and more sustainable business practices.

Today there exists an opening market for environmentally friendly, sustainable practices in the corporate world. In Pittsburgh branches of Google, Westinghouse, Bayer, and PNC have all created Sustainability Offices in response to the issue of climate change. As a result, creating for students the ability to enter fields of sustainability and green practices will allow them to not only bring useful skills and knowledge to possible employers, but will also allow them to join the growing movement toward more sustainable living.

### Venture Capital for Smart Grid Batteries

One of Pittsburgh's strengths lies in the job producing spin-off activities of its institutions of higher education. Aquion Energy, which grew out of a research project at CMU, is an example. The company raised \$30 million in venture capital funding last year. Investors include Foundation Capital, TriplePoint Capital, Advanced Technology Ventures, and Kleiner, Perkins, Caufield & Byers.

Quoting from an article on CNET: The company has been developing grid-scale energy storage without the use of "hazardous materials, corrosive acids, or noxious fumes".

It's no secret why so many big names in investment would be interested in such a start-up.

Smart-grid storage is expected to take off as smart grids themselves become prevalent. The smart-grid storage industry is expected to grow to a \$15.8 billion industry by 2015, with the energy storage market in general growing to \$44.4 billion by 2015, according to a recent report from Lux Research.

Preparing for a career in these kinds of advanced technology fields is a timely option for anyone interested in the sciences.

# Questions

Because universities are hubs of research and innovation and comprise a significant sector of society, it is important that we capitalize on the opportunities for sustainable practices created by the campus community. Here are a number of questions that you may wish to consider as you think through these challenges and opportunities.

1. What is your considered opinion on the Science of Climate Change? Be sure to include a discussion of the current state and future impacts of climate change as well as some discussion of mitigation and/or adaptation strategies.
2. What do you think of 'lights out' campaigns and conservation competitions? Are there other activities on campus that you are aware of? Can you think of some other ideas for what we can do for our campuses?
3. What do you think about the idea of community gardens and the role they might play in the overlap of campus and community? What other campus/community activities and programs might be relevant to local responses to climate change and related issues?
4. What kind of career opportunities do you see for yourself or others in a 'green economy'? What role do you think the campus can play in preparing students for these new jobs and careers?

# Acknowledgements

## Sponsors



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