



## ENVIRONMENTAL HEALTH & ENGINEERING



**STRIVING FOR CLIMATE  
NEUTRALITY ON CAMPUS:**  
*7 STEPS TO DEVELOPING A CLIMATE ACTION PLAN  
FOR A REDUCED CARBON FOOTPRINT*



# **STRIVING FOR CLIMATE NEUTRALITY ON CAMPUS: 7 Steps to Developing A Climate Action Plan for a Reduced Carbon Footprint**

## **EXECUTIVE SUMMARY**

In the absence of nationwide greenhouse gas (GHG) reduction regulations, many colleges and universities have been taking the initiative to mitigate GHG emissions in an effort to address climate change. A climate action plan (CAP) is a university-sanctioned planning document that provides a roadmap for achieving a GHG reduction target that leads to a reduced carbon footprint. It provides the decision-making framework to prioritize GHG mitigation efforts, and can form the basis of new sustainability committees tasked with implementing specific GHG reduction efforts.

Key attributes of a CAP include:

- ▶ A GHG inventory that complies with the generally accepted protocols.
- ▶ Distinct GHG mitigation categories that match GHG inventory scopes.
- ▶ An accounting framework to prioritize actions based upon the financial metrics and forecasted reductions in GHG emissions.

The steps to develop a CAP should be flexible enough to allow institutions to address their specific needs with respect to mission, culture, management infrastructure, and financial resources, yet be consistent enough in their approach to allow institutions to learn from each other's best practices. These steps are:

- Step 1: Assemble a stakeholder-based committee to approach sustainability
- Step 2: Develop a GHG inventory and conduct an energy analysis
- Step 3: Prioritize GHG mitigation opportunities



Step 4: Set GHG reduction targets and develop a climate neutral strategy

Step 5: Conduct educational, research, and community outreach efforts

Step 6: Identify and implement financing strategies

Step 7: Track progress and course-correct

## **BACKGROUND**

In the absence of nationwide GHG reduction regulations, many colleges and universities have taken the initiative to mitigate GHG emissions in an effort to address climate change. Several schools have paved the way, including the University of Florida, Oberlin College, and Middlebury College. Due to the diversity of campus operations and strategic drivers, it is expected that there will be some variation in the methods that institutions use to create their GHG inventories and to develop their CAPs.

While the World Resources Institute (WRI) Protocol establishes the core principles and The Climate Registry's (TCR) General Reporting Protocol provides specific methodologies for conducting GHG inventories, the process is technical, and there are many opportunities for accounting errors. Additionally, since the GHG inventory is based on information gathered across campus departments and operations, a lack of infrastructure and/or readily available data can result in omissions or assumptions which increase the uncertainty in the resulting GHG inventory. As a result, the quality and completeness of GHG inventories can vary, making it difficult to compare emissions across institutions. If schools do not invest in an accurate GHG inventory methodology and management system up-front, it can be difficult to develop meaningful GHG reduction targets and mitigation strategies.

Even with accurate GHG inventories, many schools are finding it difficult to prioritize GHG mitigation efforts and track progress over time. New accounting metrics, such as net present value (NPV) per metric tons of carbon dioxide equivalent (MTCDE) reduced, are increasingly being used to inform CAPs and



evaluate progress. However, many institutions are not yet equipped to develop these metrics. Further, new accounting practices such as the “triple bottom line” approach, which evaluates the economic, social, and environmental impacts of institutional decisions, provide a comprehensive planning framework. Yet it can be difficult to know where to start if you’ve never evaluated decisions using this method.

Uncertainties exist regarding the definition of “carbon neutrality.” What does it mean to neutralize an institution’s carbon footprint if completely eliminating fossil fuels is not an option for the short, medium, or even long term? Is purchasing carbon offsets a legitimate means to claim carbon neutrality? If so, how can universities be confident that their carbon offset purchases result in real, additional, and permanent reductions in GHG emissions?

The purpose of this paper is to outline the steps that should be taken during the development of a climate action plan, and to illustrate the variations possible that allow institutions to customize the plan to their own needs and limitations.

## **THE 7 STEPS TO WRITING A CLIMATE ACTION PLAN**

### ***Step 1: Assemble a Stakeholder-based Committee to Approach Sustainability***

The process of reducing greenhouse gas emissions requires direct participation from every corner of the university. The first step in creating a CAP is to identify key players (finance, facilities, academics, student life, dining, etc.) and invite them to participate in a GHG reduction committee. The function of the committee is to facilitate the creation, adoption, and implementation of a CAP. The committee should provide an open forum for inter-departmental collaboration on GHG mitigation strategies. For instance, used vegetable oil from the dining halls could supplement diesel fuel in the transportation fleet, or student life could host dorm energy conservation competitions using data provided by the facilities department.



A critical component to the formation of the committee is a strong endorsement and ongoing support by the president. Involvement of senior leadership ensures that staff members' initiatives are encouraged, recognized, and rewarded, and that resources are allocated to support the mission of the committee.

***Step 2: Develop a GHG Inventory and Conduct an Energy Analysis***

A GHG inventory is a measurement of an institution's GHG emissions. It provides a baseline from which to start to develop a GHG reduction strategy, and a means to measure progress over time. It is vital to develop a GHG inventory that is accurate, verifiable, and that follows internationally-recognized standards and methodologies.

The WRI Protocol is the most widely accepted GHG inventory accounting and reporting standard used throughout the world. It provides principles and guidance for determining organizational and operational boundaries, calculating, tracking, and reporting emissions over time, and managing the quality of a GHG inventory.

TCR, a North American program aimed at unifying the methods for GHG inventorying and providing a transparent platform for public GHG reporting, based its methodologies on the principles and framework provided in the WRI Protocol, and made them specific to North America. TCR's General Reporting Protocol provides emission factors customized to regional fuel compositions and electricity grids, making it the most accurate standardized method available. Clean Air Cool Planet is another program used by many educational institutions for development of GHG inventories.

In general, these protocols organize GHG inventories into three "scopes."

- ▶ **Scope 1** includes all emissions that result from direct combustion of fuel from sources owned by the university. This includes sources such as steam plants or small boilers.



- ▶ **Scope 2** includes all emissions that result from the generation of purchased energy such as electricity.
- ▶ **Scope 3** (optional) includes all emissions that result from university activities but arise from sources not owned or controlled by the university. Activities which result in scope 3 emissions include commuting to and from campus, solid waste production, and the use of sold products and services. Methods to determine emissions resulting from scope 3 are not as well developed, in part because it is much more difficult to track scope 3 activities.

GHG inventories include the six GHG gases covered by the Kyoto Protocol. These are: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), sulfur hexafluoride (SF<sub>6</sub>), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). To make the accounting easier, these gases are converted to consistent units called metric tons of carbon dioxide equivalent (MTCDE), based on their relative global warming potential in comparison to CO<sub>2</sub>.

Good utility data records are required to develop an accurate GHG inventory. However, data can span several years (depending on your base year) and most often it will not be 100% complete. Also, other emission source activity data may not be readily available, such as records of refrigerant losses or total distance traveled by commuters. It is therefore necessary to keep detailed data collection records. This provides a level of transparency that will begin to form the basis of an “institutional memory” of the process used. The more transparent these records are, the easier it will be for future inventories to be produced. Some universities are beginning to utilize online project management applications designed for this purpose. These tools act as a central repository for data and analytical methods and these can be shared with appropriate parties on campus. EH&E has designed many of these applications using a standard Microsoft platform.

Once you’ve established a GHG inventory, it is recommended that you have it



verified by a third party. Verifying your GHG inventory will ensure that accounting errors have been avoided and that a solid foundation exists upon which to base your mitigation efforts. Using the ISO 14064 and 14065 standards for GHG management and verification, the American National Standards Institute (ANSI) has established an accreditation of third-party GHG inventory verifiers. Institutions should seek these credentials when pursuing verification services.

It is strongly suggested that a historical analysis of GHG emissions be undertaken. If the GHG inventory contains complete records for more than a single year, trends may be identified in GHG emissions over time. A simple analysis such as a linear regression can then be used to predict a “business as usual” (BAU) emissions trajectory. A BAU trajectory anticipates future emissions increases (assuming no GHG mitigation), thus guiding the selection of a GHG reduction target and assessment of progress against the GHG target over time. Most importantly, it provides information on avoided emissions as the CAP is implemented.

### ***Step 3: Prioritize GHG Mitigation Opportunities***

A GHG inventory will identify all emissions resulting from a university’s activities. It becomes a powerful tool in identifying and prioritizing GHG mitigation strategies. There are five major categories of GHG reduction activities:

1. Energy Efficient Operations
2. Fleet Fuel Management
3. Occupant Behavior / Cultural Change Incentives
4. On-Campus Renewable Energy Production
5. Carbon Offsets



### ***Energy Efficient Operations***

For most universities, 80 - 90% of the GHG emissions will result from energy use in buildings. The CAP should focus on efforts to reduce excess energy consumption in facilities. Fortunately, there are many opportunities to save energy in buildings, and most investments can pay for themselves in five years or less. Because of the attractive savings, there is a tendency to immediately start investing in “low hanging fruit” projects, such as efficient motors and fans, and energy efficient lighting. While these projects have an important role to play, if implemented piecemeal without addressing overall building *performance*, they may not generate the anticipated savings and in some cases can actually do more harm than good.

Past experience with energy reduction efforts may not have had positive results. These experiences are usually the result of efforts that led to increased complaints and maintenance issues arising from unintended consequences of the actions taken. Energy reduction efforts initiated for the sole purpose of energy savings can frequently have negative long-term consequences due to the limited focus of the effort. Without a detailed understanding of the building operational design, these efforts often upset the mechanical balance of the building, resulting in increased pressure on the operational staff. This is especially true when underlying performance deficiencies are already putting stress on existing equipment to maintain a satisfactory indoor environment.

A more effective means for implementing these energy-saving efforts is through the use of retro-commissioning. This is the process of optimizing an existing building’s systems performance to meet the original design intent or current operational needs. It’s a “tune up” of the heating, ventilation and cooling (HVAC) systems that are often performing inefficiently even though they may be operating adequately to meet air quality and comfort requirements. The gap in efficiency between operation and performance contributes to wasted energy, increased maintenance, and reduced equipment life throughout the life of the



building. By closing this gap, the building will improve energy utilization while maintaining satisfactory indoor environmental conditions, and those “low hanging fruit” projects will begin to show their true benefits. In some cases, the retro-commissioning process can even eliminate the need for equipment upgrades.

When developing a GHG mitigation strategy for buildings, it makes sense to utilize the retro-commissioning model of prioritization. The first step is to rank buildings on campus that have the greatest energy savings potential. Analyzing energy use per square foot for different building types (e.g., classrooms, laboratories, dorms) will identify which buildings are “energy hogs” and which ones are performing well. If individual building metered data does not exist, another method would be to analyze complaint logs and maintenance records. Often it is the mixed-use and high-energy buildings, such as auditoriums and buildings containing laboratories and other “critical” spaces that present the most opportunity for energy conservation.

Once a group of buildings are identified as high energy users, the next step is to compare their original design parameters to current use. Key factors such as maintaining temperature set points and schedule of operations are evaluated to create a list of “system deficiencies” with suggested improvements. Frequently, these improvements involve no-cost measures such as changing equipment run times or even moving the location of thermostats. No-cost measures often result in energy savings of 10% or more. The retro-commissioning process will also identify measures that do involve capital costs, such as upgrading inefficient equipment. It will then compare the up-front costs versus energy savings of each measure. Typically these measures can add up to savings of 20% or more with a payback period of between 1 to 5 years.



### ***Fleet Fuel Management***

On-campus vehicle fleets typically represent another 5 - 10% of a campus' GHG emissions. Most mid-size to large universities own diesel bus fleets that remain in operation for 20 hours per day or more. Other vehicles include police cruisers, maintenance trucks, and landscape management equipment such as lawnmowers and sidewalk pavers. Good preventative maintenance should always be the first strategy to reduce the amount of fuel these fleets consume. Yet many universities are taking efficiency a step further by using alternative fuel vehicles to help reduce GHG emissions.

GHG emissions are a direct result of burning carbon-based fuels. Yet, not all carbon-based fuels are equal in their release of GHG emissions per unit.

Emissions from oil, for example, are up to 45% higher than emissions from natural gas. To take advantage of this fact, many schools are switching from oil to natural gas in their central heating and cogeneration plants as part of their CAP.

For transportation fleets, biodiesel in particular has become a popular fuel to partially replace traditional diesel (most often 20% biodiesel is mixed with 80% regular diesel to form what's referred to as B20). However, the total emissions from biodiesel are still difficult to quantify. The GHG emissions that leave the exhaust pipe are only slightly less than the GHG emissions from fossil fuel-based diesel. Some argue that because biodiesel comes from so called "rapidly renewable" resources such as corn or soybeans that any actual emissions have a "carbon neutral" life cycle. That is, the amount of carbon dioxide that is emitted from burning biodiesel is absorbed by new plant material used to create more biodiesel. While investments in biodiesel certainly have a positive effect on emissions reductions, universities should be cautious about writing off all emissions from biodiesel; the science of carbon neutrality is far from exact. TCR, for instance, currently accounts for biodiesel emissions in a special "4th scope" category until the science can be better resolved.



### ***Occupant Behavior / Cultural Change Incentives***

The most efficiently designed and maintained campuses are still subject to the behavior of their occupants. Quite simply, if a campus does not engender a culture of energy conservation, students, faculty, and staff will be more likely to leave lights and computers on, turn thermostats to extremes, or throw recyclables in the trash.

A key element of a CAP is to provide incentives for students, faculty, and staff to conserve resources. Perhaps the most effective and immediate strategy is to foster energy saving competitions, sometimes referred to as “EcoOlympics” among dormitories, administrative buildings, and even between competing universities. Prize incentives ranging from pizza parties to renewable energy certificates (RECs) have a surprising effect on building occupants. By encouraging peers to conserve energy, EcoOlympics competitions have been known to reduce energy consumption by as much as 20%. Other programs such as paper and waste reduction campaigns, environmental lecture series, and campus sustainability-related student research projects are all effective means of raising the level of environmental awareness on campus and fostering a culture of sustainability.

For commuter-based schools, transportation-related emissions can represent a sizable portion of campus emissions. These schools should prioritize the establishment of incentives for using public transportation (e.g., subway pass discount programs, parking discounts for carpool vehicles), creating information sharing tools to promote carpooling and ridesharing, participate in car and bicycle-sharing programs, and offering bicycle racks and shower facilities for those living near campus.

### ***On-Campus Renewable Energy Production***

Perhaps the most visible way to show a commitment to sustainability is to install on-campus renewable energy systems. Common on-campus renewable systems



include wind turbines, photovoltaic (electricity-producing solar) panels, and solar thermal (hot water-producing) panels. While these systems make a clear statement about sustainability on campus, their actual reductions in GHG emissions vary and they may require analysis for proper siting, permitting, and other considerations.

Typically, photovoltaic (PV) panels involve a significant investment with a payback period of 15 to 20 years. Unfortunately, energy production resulting from PV panels on a typical building accounts for only a small fraction of the building's energy load. The same goes for new building-mounted wind turbines. Solar thermal systems, on the other hand, can produce anywhere between 15 to 75% of domestic water heating loads, with a substantially shorter payback period.

Large, stand-alone wind turbines can account for a much larger percentage of energy consumption on campus, but the upfront capital costs can be significant and the campus must be situated in an area with significant wind resources. There are creative ways to finance these systems however, such as power purchasing agreements and grants (see Step 6). Due to their up-front costs, on-campus renewable energy systems should only be made after energy conservation programs have been fully implemented. In many cases, monetary gains from retro-commissioning projects, which can reduce energy consumption up to 30%, may be sufficient to fund the installation of renewable energy systems (see section on "Creating a Carbon Reduction Investment Plan").

Similar to using biodiesel in transportation fleets, some universities have been building "biomass" systems to heat their buildings. Typically, biomass systems include the use of leftover woodchips from forestry operations as the primary fuel. While this may be a good option for a university, life cycle analysis of biomass, like biofuels, is not a perfect science, and the school must evaluate issues such as securing a consistent local supply of woodchips, as well as setting



aside the storage space for the large quantity of woodchips required.

### ***Carbon Offsets***

A carbon offset represents an investment in an off-site project that either reduces, avoids, or sequesters GHG emissions. Carbon offset projects range from methane recapture, to reforestation, and renewable energy systems.

Most universities that have committed to achieving climate neutrality are depending on purchased carbon offsets to meet their goal. This is simply because energy efficiency, behavior change, and onsite renewables may not be enough to completely neutralize all of a university's GHG emissions. Therefore it is essential for the university to understand the carbon offset market to ensure that carbon offset purchases result in real, permanent, additional (i.e., the emissions reductions would not have occurred in the absence of the GHG project), and verifiable GHG reductions. Since this is an evolving market, there are concerns over GHG offset quality and double-counting (i.e., two parties claim the same GHG reductions from a given project).

There are two basic types of carbon offsets:

1. Compliance offsets which arise from a regulatory program (such as the Kyoto Protocol or the Regional Greenhouse Gas Initiative, "RGGI")
2. Voluntary offsets sold on the voluntary market.

Universities should be aware of the dynamics and pitfalls of the carbon offset market before making any purchases. The safest approach is to seek offsets that are certified to one of the above-mentioned programs and standards, such as Kyoto-sanctioned commodities [European Union Allowances (EUA), Certified Emissions Reductions (CER), and Emission Reduction Units (ERU)] or voluntary offsets approved by Gold Standard, V-C-S, or other body using ISO 14065 standards. Working with a reputable carbon broker may be a first good step.



Once knowledgeable in this area, the university may choose to do an over-the-counter market trade but this involves a much higher level of risk.

Aside from carbon offsets, some universities are purchasing Renewable Energy Certificates (RECs) as a way increase the demand for renewable energy suppliers to the electrical grid. RECs are a subsidy supporting renewable energy suppliers and are sold by the megawatt hour (MWh) of electricity produced.

Much like carbon offsets, there are two types of RECs: 1.) RECs that are sold to meet a mandatory quota of renewable energy supply, and 2.) RECs that are sold on the voluntary market. Mandatory RECs are sold as part of state-mandated Renewable Portfolio Standards (RPS), which requires retail electricity providers to purchase a minimum percentage of renewable energy in their power mix. Voluntary RECs are not associated with an RPS and are a means of subsidizing renewable energy suppliers by selling the “environmental attributes” of their power.

There has been some confusion regarding claims that can be made by purchasing voluntary RECs. Some universities, as well as groups such as the American College and University Presidents Climate Commitment (ACUPCC), claim that purchasing RECs is the same as purchasing a carbon offset, and can be counted toward achieving carbon neutrality. These claims may be premature as there are still uncertainties regarding the additionality of RECs. Because RECs are not subject to the same additionality tests as carbon offsets there is a debate regarding whether REC purchases are directly responsible for the addition of new sources of renewable electricity, or if they simply subsidize renewable sources that would have existed regardless of REC sales. Indeed, many new sources of renewable energy supply were made possible by government tax benefits, rather than REC sales. Until RECs are subject to the same additionality tests as carbon offsets are, universities should delay claiming emission reductions arising from RECs.



### ***Creating a Carbon Reduction Investment Plan***

During the process of creating a CAP, each mitigation measure, from retro-commissioning, to behavior incentives, on-site renewables, and carbon offsets, should be evaluated based on considerations of up-front cost, expected GHG reductions, and expected monetary return on investment. To simplify the evaluation, many universities are using the new accounting metric of net present value NPV per metric tons of carbon dioxide equivalent (MTCDE) reduced. This analysis allows for viewing of the cost / benefit (adjusted for discounting and energy escalation) of each mitigation measure, along with the expected reductions in GHG emissions, rolled up into one metric. For instance, if a retro-commissioning project for a laboratory building were to cost \$80,000, yield \$20,000 in energy savings, and reduce GHG emissions by 10 MTCDE per year, over a 10 year period, the project will have a NPV of \$139,905 (assuming a 9% discount rate and a 3.5% escalation rate) and will save 100 MTCDE. Therefore, its NPV per MTCDE reduced is \$1,399. The higher the number associated with a mitigation measure, the better its ranking should be. This project is considered to have saved money while reducing emissions. Combining other mitigation measures in a carbon balance sheet will provide the foundation for making strategic investment decisions that maximize your bottom line for both GHG reductions and program costs.

#### ***Step 4: Set GHG Reduction Targets and Develop a Climate Neutrality Strategy***

The Intergovernmental Panel on Climate Change (IPCC), was established by the United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO) to "provide decision-makers and others interested in climate change with an objective source of information about climate change." The IPCC is the largest association of climate scientists and is considered to be the authoritative body for climate change research. According to the IPCC, in order for the global atmospheric effects of climate change to be stabilized, the



world must reduce its emissions by 50 - 80% below year 2000 emissions by the year 2050.

Those setting a GHG reduction target at a university should strive to meet this target for the long-term. For the short and medium-term, however, a university should evaluate emissions reductions scenarios to determine intermediate targets, such as incremental reductions per year. These scenarios should be based on identified GHG mitigation strategies that are summarized on a carbon reduction investment plan. This allows for an informed target-setting process that is based on engineering and cost estimates rather than on best guesses. The carbon reduction investment plan will also allow for financial reinvestment strategies that will leverage high return projects to bolster low return projects. Armed with this information, GHG teams can conduct sensitivity analyses that illuminate the right path forward from a technical and financial point of view.

Setting emissions targets can be difficult if the institution is planning to significantly grow its physical infrastructure. While investments in retro-commissioning could offset some of the GHG impacts of that growth, it can be difficult to stay on track with reduction targets when new emission sources are added. Many universities are addressing this issue by adopting the United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) standard. This standard has led developers to achieve energy efficiencies of up to 50% better than code with substantial returns on investment. Of course, unless LEED certified buildings are powered by 100% renewable energy, new growth will always make achieving a reduction target more difficult.

Yale University is a good example of a campus that has set and tracked a GHG reduction target. Consistent with the Kyoto Protocol and the Regional Greenhouse Gas Initiative in the Northeast United States, Yale has pledged to reduce their GHG emissions by 10% below 1990 levels by 2020 (or a 43%



reduction from 2005 levels). Each year, Yale releases a report that summarizes progress that they've made toward their goal. In 2008, Yale had achieved a reduction of 7.0% below 2005 levels, largely through existing building retro-commissioning projects and upgrades to their central power plants. While they still have a way to go, Yale has demonstrated a payback on their investments ranging from 2 to 9 years, which has largely helped to sustain their program.

***Step 5: Conduct Educational, Research, Community Outreach Efforts***

The process of writing and implementing a CAP provides countless “teaching moments” that can add a new level of relevance to a university’s teaching and research mission. Many universities are including elements of the CAP, such as developing a GHG inventory, creating a carbon balance sheet, or researching the issues surrounding carbon offsets and RECs, as part of the curricula of their courses. Perhaps more importantly, these new curricula, together with behavioral change campaigns, are beginning to forge new “ecological identities” associated with universities that are proving to be just as powerful as pride in sports teams. Furthermore, students, faculty, and staff who learn to be more responsible environmental citizens often take that responsibility forward in their careers and research, contributing in new and important ways to the global GHG reduction effort.

This educational and promotional campaign of the program can be an all-consuming task for members of the GHG reduction committee, but it is a critical component that contributes to the core mission of any institution: education. It is this focus on education and outreach that often provides the argument for hiring a sustainability professional. This new position is usually tasked with facilitating communication and cooperation within the GHG reduction committee (and/or broader sustainability committee), as well as performing a myriad of tasks associated with student and community involvement.



### ***Step 6: Identify and Implement Financing Strategies***

A large portion of the mitigation measures identified in the CAP can be self-financed through reinvestment of energy savings from retro-commissioning projects. Traditional financing and accounting structures do not allow for these savings to be set aside directly for re-investment, and in fact, institutional budgetary processes may actually create disincentives for energy efficiency, such as cutting an operations and maintenance budget when capital investments lead to reduced energy consumption and lower utility costs.

To support CAP efforts, many financing strategies are available, including:

- ▶ Revolving loan funds
- ▶ Utility and local, state, and federal incentives
- ▶ Third-party financing

#### ***Revolving Loan Funds***

Revolving loan funds are an effective way to provide capital for conservation projects, if funds are not immediately available through capital or operating budgets. Managers of these funds will loan interest-free capital to a school entity to implement a project that has projected energy savings. The loan is then repaid through the resulting energy savings over time. Revolving loan funds provide a low-risk means for schools to invest in projects that are identified to have a good return without have to go through a formal budgeting process.

#### ***Utility and Local, State, and Federal Incentives***

There are a number of local, state, and federal incentives available to universities to pursue conservation or renewable energy projects. For instance, most regulated utilities companies will charge a very small line item on utility bills that is used to create a conservation rebate fund. Utility customers can access those funds to help subsidize conservation projects. Often these incentives will



substantially increase or decrease a project's payback period, making them more likely to be pursued.

For a list of all available utility rebates and local, state, and federal grants, visit the Interstate Renewable Energy Council (IREC) DESIRE program website at <http://www.dsireusa.org>.

### ***Third-party Financing***

Two common challenges associated with implementing GHG mitigation strategies are: 1.) up-front capital may not be available, and 2.) staffing resources are not available to manage the project's implementation. Third-party financing offers an attractive solution to these issues. There are two major types of third-party financing, energy service companies and power purchasing agreements. Energy service companies (ESCOs) are engineering firms that provide the up-front capital to implement energy conservation measures, then share in the energy cost savings resulting from those projects. Power purchasing agreements involve a company providing on-campus renewable energy systems for free in exchange for a contract to purchase the energy from those systems over the long term. These contracts and the long-term outcomes can be unclear in many cases, and we recommend a third party review prior to implementation. Nothing in this case is "free" and you should have a clear understanding of your position.

### ***Step 7: Track Progress and Course Correct***

The final step in a CAP is to implement the GHG mitigation plan and track progress over time. This allows the GHG team to monitor actual GHG reductions versus predicted reductions and to track performance in meeting their reduction targets. As new technologies emerge, and energy prices fluctuate, a GHG team should build flexibility into their mitigation strategy and course correct as necessary. Changes in mandatory GHG regulations, improvements in renewable and energy efficient technology, and maturation of the carbon offset market will all effect how a GHG target is pursued over time.



Instituting an effective information management system early in the program is crucial to its short-term effectiveness and long-term success. Without timely metrics to gauge the effectiveness of individual efforts, time will be wasted pursuing initiatives that don't offer significant ROIs and prioritization of initiatives will be extremely difficult. Several open-platform systems are available, and a primary consideration should be a product's flexibility to adapt to change. Concurrently, an information management system is only as good as the data entered into it. It is crucial to provide regular input of data that is traceable. Traceability refers to the ability to track data sources and any calculations used. This has been the source of recurring problems in sustainability programs—students assigned to collect the initial data do not contribute to the “institutional memory” of the process and subsequent efforts to reproduce their data are unsuccessful. An open accounting system, even if erroneous, can be adjusted without losing the integrity of the initial data.

## CONCLUSIONS

CAPs represent the cornerstone of GHG reduction commitments. While CAPs must be tailored to the specific needs and opportunities of individual campuses (commuting schools will have a very different plan from residential schools), there are some basic elements that unify the efforts of all institutions. The best advice is to evaluate the various options for the campus within each of these CAP elements using the experiences of other institutions as a guide, and to integrate the creativity and energy of the faculty, staff, and students into the process of striving for climate neutrality on campus. Also, get a knowledgeable third party involved when evaluating or negotiating large projects. Having an owner's representative can often save many times their fee in contract costs or ineffective efforts.



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