REPUBLIC OF THE PHILIPPINES
TARLAC AGRICULTURAL UNIVERSITY
CAMILING, TARLAC

Growing Green

Becoming A Carbon Neutral Campus

Tarlac Agricultural University
Climate Action Plan

INTRODUCTION

BACKGROUND AND RATIONALE

Climate change is one of the most critical issues facing today's society. The evidence and science are clear – climate change is a direct result of human activity and poses a significant threat to generations to come. The Intergovernmental Panel on Climate Change (IPCC) scientists believe that it is very likely (greater than 90 percent chance) that most of the warming experienced since the 1950s is due to the increase in greenhouse gas emissions from human activities.

Since the industrial revolution, the burning of fossil fuels, such as coal and oil, and deforestation have caused the concentrations of heat-trapping "greenhouse gases" to increase significantly in the atmosphere. These gases create a warming effect, somewhat like a blanket surround the earth. The greenhouse effect is a natural occurrence that helps regulate the earth's temperature. This phenomenon is necessary to life as humans know it because greenhouse gases keep the planet's surface warmer than it otherwise would be. But, as the concentrations of these gases continue to increase in the atmosphere, the Earth's temperature is climbing above past levels. According to NOAA and NASA data, the Earth's average surface temperature has increased by about 1.2 to 1.4°F in the last 100 years. The eight warmest years on record (since 1850) have all occurred since 1998. Other aspects of the climate are also changing such as rainfall patterns, snow and ice cover, and sea level.

If greenhouse gases continue to increase at or above the current pace, climate models predict that the average temperature at the Earth's surface could increase from 3 to 7°F above 1990 levels by the end of this century. Scientists are certain that human activities are changing the composition of the atmosphere, and that increasing the concentration of greenhouse gases will change the planet's climate, but they are not sure by how much, at what rate, or what the exact effects will be.

The potential effects of climate change could have significant and irreversible impacts to human health and the planet. Freshwater shortages, sea-level rise, droughts, floods, severe hurricanes, reduced agricultural production, and the spread of insect-borne and waterborne diseases are just a few of the predicted results of rising global temperatures. The consensus among climate scientists is that to avoid the most severe consequences of global warming, global emissions of greenhouse gases need to peak no later than 2025 and decline rapidly thereafter to a level between 50 and 85 percent below 2000 levels by 2050. The leadership and effort necessary to adapt to unavoidable climate change while simultaneously reducing emissions to these levels are major challenges that require unprecedented cooperation and participation across the world.

LEGAL MANDATE

Section 16, Article II of the 1987 Philippine Constitution states that, "The State shall protect and advance the rights of the people to a balanced and healthful ecology in accord with the rhythm and harmony of nature".

In response to the urgency for action on climate change, the Philippines passed Republic Act 9729, also known as the "Climate Change Act of 2009". Section 2 states that "it is the policy of the State to afford full protection and the advancement of the right of the people to a balances and healthful ecology… to fulfill human needs while maintaining the quality of the natural environment for current and future generation."

The NCCAP outlines a set of strategic actions to be employed for climate change adaptation and mitigation and sustainable development within the Philippines. Broken down into seven priority areas, the NCCAP provides a comprehensive overview of key areas for adaptation and mitigation, these are: Food Security; Water Sufficiency; Ecological and Environmental Stability; Human Security; Climate Smart Industries and Services; Knowledge and Capacity Development.

PHASE I

INVENTORY

Methodology

The TAU GHG will conduct an inventory to update the previous campus inventory and provide the baseline for TAU's overall Climate Action Plan. the Clean-Air Cool-Planet software will be used for the basis of analysis. The boundaries of the inventory included "TAU proper" The boundaries were decided by the Campus Sustainability Committee based on the ability to affect areas of campus and the level of control the central administration had over these units.

Sources of Emissions Inventoried

Consistent with GHG Protocol standards, signatories of the ACUPCC are expected to track and report emissions of the six greenhouse gases covered under the Kyoto Protocol: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and Sulphur hexafluoride (SF6). Signatories are expected to calculate the emissions of each gas separately, and aggregate them into units of carbon dioxide equivalents (CO2-e) on the basis of each gas' global warming potential (GWP). To help delineate emission sources, improve transparency, and provide utility for different types of organizations and different climate policies and goals, the GHG Protocol defines three "scopes" for GHG accounting and reporting purposes. The accepted designation categories include:

- Scope 1 - direct GHG emissions occurring from sources that are owned or controlled by the institution. Ex. campus steam plant, fleet vehicles, and "fugitive emissions" such as leakage of HFCs from refrigeration equipment

- Scope 2 – indirect emissions generated in the production of electricity consumed by the institution. Ex. TAU Energy usage

- Scope 3 – refers to all other indirect emissions that are a consequence of the activities of the institution, but occur from sources not owned or controlled by the institution. The ACUPCC requires institutions to include scope 3 emissions from commuting and from air travel paid for by or through the institution. Commuting is defined as travel to and from campus on a day to day basis by students, faculty, and staff. It does not include student travel to and from campus at the beginning and end of term or during break periods.

Under the strictest definition, TAU's GHG inventory would only include Scope 1 emissions or emissions directly owned or controlled by the University. However, in order to get a better sense of TAU's entire GHG impact and to meet the guidelines of the ACUPCC, Scope 1, Scope 2and particular Scope 3 emissions have been included in the campus inventory.

Scope 1 emissions		
		Sources of data
Campus steam plant fuel		Coal, natural gas and fuel oil consumption
Fleet vehicle fuel		
	Gasoline	University BP gas cards, Facilities purchases, University Police purchases, West Campus Grounds purchases
	Diesel	Gallons sold at Transit fueling station
Refrigerants		Estimated from Facilities and Engineering & Operations purchasing data minus current inventory
Fertilizer		Usage data from Facilities, and TAU Gardens; nitrogen content averaged across all four sources
Scope 2 emissions		
TAU Power electricity usage		Used TAU Power accounts, counts for 95% of the electricity usage
Scope 3 emissions		
Employee air travel		Used Duke's American airlines data for FY06 and FY07 to get an average price per mile; Took Employee Travel and Reimbursement financial data on air travel purchases / avg. price per mile
Employee commuting		Used 2023 and 2024 Triangle Transit Authority (TTA) survey data for mode share; Used a straight-line analysis of employee address data to estimate an average daily commute distance

Student athletic team travel		Data from Athletics on team flights
Solid Waste		
	Landfilled solid waste	Data from the Grounds department
	Incinerated medical waste	Data from Occupational and Environmental Safety Office
Other sources included		
TAU Calao Forest reservation		Data from Sequestration
Composting		Data from the Grounds department
REC purchases		Data from professional schools that purchased wind RECs

PHASE II

PLANNING

To facilitate the planning process, the Campus Sustainability Committee (CSC) formed working groups around five specific focus areas – transportation, energy, offsets, education and communication. The expectation and objectives of these subcommittees include:

1) Energy & Transportation Subcommittees
    a. Update existing campus GHG inventory including review of past data, verify boundaries and what to include
    b. Develop potential reduction options to evaluate, reporting back to CSC as they go through evaluation progress
    c. Develop recommendations for climate neutral target dates and reduction strategies to achieve targets

2) Offset Subcommittee
    a. Research opportunities for offset investment in the Triangle region and NC
    b. Develop recommendations on the feasibility and opportunities for local offset projects
    c. Develop recommendations on the source and quantity of offsets to meet Duke GHG reduction targets

3) Education Subcommittee
    a. Research existing curricular and co-curricular opportunities for environmental education at Duke
    b. Develop recommendations to make climate neutrality part of the educational experience for all students
    c. Develop recommendations to expand research and community outreach on sustainability

4) Communications Subcommittee
    a. Develop a communication strategy to educate internal and external audiences about Duke's efforts to address climate change
    b. Create an expert list for media, take advantage of existing relationships with media and trade publication contacts, and further develop opportunities to illustrate Duke as a sustainability leader
    c. Develop recommendations on strategies to engage Duke students, faculty and staff in campus sustainability efforts

PHASE III

PREPARATORY

To facilitate the Climate Action Plan (CAP) planning process, working groups will be formed around five specific focus areas – transportation, energy, offsets, education, and communication. After extensive analysis and scenario planning, each subcommittee develops key recommendations. The focus of TAU's plan revolves around aggressive on-campus reductions in energy and transportation GHG emissions. The University hopes to encourage innovation and regional efforts to reduce emissions by providing successful examples of technologies such as solar PV, solar thermal, biomass and biogas steam production, and hybrid fleet vehicles. TAU's efforts to tackle the harder emissions to control such as employee air travel could also spur other universities and businesses to adopt similar initiatives. The following recommendations that make up TAU's CAP not only set the path for a climate-neutral campus; they will also hopefully serve as an example to many others of how an institution can develop the path to achieving this ambitious goal.

Transportation

The following are near-term recommendations advanced by the Transportation Subcommittee of the Campus Sustainability Committee (CSC) to set TAU on the right course to reduce transportation GHG emissions as presented in this report. These recommendations are separated by their respective principal transportation mode.

Commuter travel

- TAU should develop a comprehensive Transportation Demand Management program that utilizes the following tactics: carpool incentives; park and ride sites; and marketing, data collection, and analysis on commuter patterns

- TAU should study whether an affiliated housing program is feasible to incent commuters to choose the location based on individual carbon footprint reductions

- TAU should engage on regional transportation issues such as regional transit, lightrail/bus rapid transit (BRT) service, and regional bike routes

Air travel

- TAU should create a mechanism for better tracking of annual employee air travel, and develop air travel policies and guidelines using tactics such as: tracking air travel by distance and department, developing carbon awareness invoices for air travel by the department to make individuals more aware of their air travel footprint, increasing use of alternative technology options such as web meetings or teleconferencing facilities, and educating employees about alternative travel arrangements such as carpooling, train, and bus

Campus fleet

- TAU should replace 10 buses to take advantage of efficiency gains of sixty-foot articulating, hybrid buses.

- TAU should encourage the utilization of local/regional transit through tactics such as: transit pass subsidy, advocating for improved local transit service and eliminating redundant service

- TAU should establish a "Green Policy" for fleet replacement to achieve vehicle efficiency/emissions improvements and right-size the TAU fleet with the goal to achieve 50% emissions reductions (factoring fuel efficiency gains)

Energy

The following are near-term recommendations advanced by the Energy Subcommittee of the CSC to address GHG emissions related to purchased electricity and steam production at TAU:

- TAU should push beyond the current LEED□ building policy to establish green building energy consumption standards and an approval protocol for building energy consumption review. Duke should implement, measure and report on energy use targets by Building Tech Rating
- TAU should implement, beginning in 2030, energy conservation measures (ECMs) in existing buildings with the goal to realize a 15% reduction in energy use over a 20-year period (2030 – 2050)

- TAU should discontinue the use of coal as soon as possible. TAU should complete the gas-fired East Plant steam plant construction and start-up in 2030 and initiate the West Campus steam plant conversion from coal in 2035

- TAU should continue to urge, monitor and review TAU Energy's progress towards emissions reductions while exploring on-campus electricity generation options. Additionally, TAU should install a 4MW solar PV array by 2035

- TAU should leverage research into alternative technologies and explore and implement conversion to biogas, solar PV, solar thermal, combined heat and power or other technologies by 2030

- TAU should pursue plant efficiency improvements with tactics such as: distribution system upgrades, thermal storage, chilled water expansion and upgrade, and boiler plant heat recovery

Carbon Offsets

With respect to the purchase and/or development of carbon offsets, the Offsets Subcommittee of the CSC advanced the following recommendations to mitigate the remaining emissions following the implementation of aggressive on-campus reduction strategies:

- TAU should establish a Carbon Offsets Initiative that will investigate the potential to develop an aggregating entity that could generate high quality, local offsets to meet TAU's and other university's neutrality goals

- TAU should balance fiscal risks and offset goals through a portfolio approach that considers: potential compliance obligations under a federal cap-and-trade or tax; credibility and measurability; cost; community and environmental co-benefits; links to education, research, and service (especially in environment, engineering, business, policy, and law); and mitigation of risk through a diversity of project types, suppliers and locations

- TAU University's offset portfolio should leverage its resources by:
    - Catalyzing offsets opportunities from local and southeastern US sources including partnerships with other NC and SC universities with similar climate neutrality commitments
    - Capitalizing on TAU's reach in the international research community and emphasizing global carbon offsets options
    - Maintaining an active role in project development, as opposed to a passive role as a purchaser
    - Engaging the full range of institutions and schools within its campus. In this capacity, the University should inventory the research, education, and initiatives across its schools and institutes that represent existing or potential engagement in the offsets 'value chain'. It should also identify win-win opportunities that reduce its footprint and further its educational, research and service mission

- TAU University's near-term strategy should catalyze pilot offset projects and accelerate preliminary research in NC in at least the following categories:

    - **Swine Waste**—TAU should explore investment in reducing GHG emissions at three hog farms using the methane capture and waste conversion technologies

    - **Forest Management and Afforestation**—TAU should combine its research with practical application with forest managers, including TAU Calao Forest reserve, and land trusts

Energy Efficiency—Energy efficiency could make a significant contribution to the community and towards greenhouse gas commitments. TAU should suggest promoting energy efficiency in the community or amongst its employees at their homes, resulting in indirect emission reductions and significant energy cost savings

Education, Research and Community Outreach

The following are recommendations advanced by the Education Subcommittee of the CSC to describe plans to make sustainability and climate neutrality part of the educational experience

for all students; and plans to expand research and community outreach on sustainability throughout the institution.

- TAU should charge a campus committee to consider incorporating sustainability into the depth and breadth of the student experience. This group could consider tactics such as a "mode of inquiry" focused on environmental citizenship, literacy and sustainability or expanding existing efforts to integrate sustainability priorities into recruitment and orientation materials

- TAU should consider expanding programs to support two particular subsets of students: (a) students with a passion/interest in the environment, and (b) students with a professional interest in the environment and sustainability.

    - For students in group (a), tactics could include: expanding the peer-to-peer program, Students for Sustainable Living, or exploring new academic and service programs with sustainability themes, including FOCUS, seminars, TAU Engage, or study abroad

    - For group (b): tactics could include: exploring how existing or new certificate programs could provide evidence of knowledge of climate change and sustainability to potential employers and preparing students both for careers that are primarily in the area of climate change and sustainability, and for those where these concepts are infused or integrated into a job with other primary responsibilities

- TAU should continue to foster new and existing research efforts in sustainability and climate change. Tactics might include: establishing a conversation among researchers involved with sustainability and climate change, to determine the areas in which they see a need for increases in research and potential options to incentivize these endeavors

- TAU should continue to foster knowledge in service to society through creative partnerships in the local community

Communication

The following recommendations were advanced by the Communications Subcommittee of the CSC with the goal of moving beyond simply distributing information to promote changes in behavior among students, faculty and staff in ways that directly impact the reduction of greenhouse gas emissions at TAU.

- TAU should build community for grassroots engagement, through existing and new sustainability networks, to enhance awareness of campus sustainability efforts among internal audiences and the impact of their decisions on greenhouse gas emissions

- TAU should foster changes in behavior among internal audiences that reduce greenhouse gas emissions at Duke through tactics such as issuing campus challenges to change individual behavior and engaging community members at points of access

- TAU should set goals, measure and report on progress through tactics such as making climate change personal to the campus community with the development of a TAU specific carbon calculator and telling stories through the eyes of others

- TAU should enhance perception of the University internally and externally as a sustainability leader in higher education through tactics such as development of a sustainability media kit, branding the Climate Action Plan and developing an email engine to communicate sustainability initiatives

- TAU should leverage the University's unique attributes through research, sharing and implementing change in the local community

If TAU implements the recommended measures outlined above it will significantly reduce GHG emissions over time and be on track to meet its carbon neutrality goals.