VIRGINIA TECH™

2020 VIRGINIA TECH

Climate Action Commitment

IMPLEMENTATION GUIDELINES

BACKGROUND

In November of 2019, President Tim Sands called for the renewal of and revisions to the existing Virginia Tech Climate Action Commitment to ensure the most stringent climate and sustainability standards are implemented as Virginia Tech grows and seeks to be a leader in environmental stewardship. The Working Group, subcommittees and ad hoc groups formed to develop what has become the Virginia Tech 2020 Climate Action Commitment approved by the Board of Visitors in March 2021.

The vision of the 2020 commitment is in the spirit of *Ut Prosim,* Virginia Tech will be a leader in climate action in service to our community, the commonwealth, and the world.

The mission of the 2020 Virginia Tech Climate Action Commitment is to achieve carbon neutrality by changing the university's physical infrastructure, collective and individual behaviors, and educational mission; to engage everyone in creating a culture of sustainability; and to achieve these goals through just and equitable means.

The 2020 Climate Action Commitment has the following 15 goals:

Goal 1. Carbon Neutrality: Achieve a carbon neutral Virginia Tech campus by 2030.

Goal 2. 100 Percent Renewable Electricity: Achieve 100 percent renewable electricity by 2030.

Goal 3. Energy System Efficiency and Total Steam Plant Conversion to Natural Gas: Continue to improve efficiency of campus energy systems, complete the total conversion of steam plant fuel to natural gas by 2025, and plan for full transition to renewable steam plant fuel after 2025.

Goal 4. Existing Building Energy Efficiency: Reduce existing building energy consumption to enable carbon neutrality by 2030.

- By the end of 2022 reduce electricity consumption (kWh) by 10 percent and electricity intensity (kWh/gsf) by 20 percent below 2006 levels.

- By 2030 employ energy management retrofit to reduce total energy consumption in buildings by 10 percent and energy use intensity (Btu+kWh/gsf) by 20 percent below 2020.

Goal 5. New Building Energy Efficiency: New buildings initiated by 2030 will operate carbon neutral.

- New building efficiency will conform to latest adopted LEED-Silver standards and ASHRAE 90.1 energy performance standards + 10 percent.
- By 2022, reduce total energy use intensity (EUI) in newly initiated buildings by 20 percent compared to 2020 existing buildings.
- By 2026, build a signature zero-net-energy (ZNE) building on campus as a showcase and learning model for the Living Learning Laboratory.
- By 2028, newly initiated buildings' efficiency improvements will reduce total energy use intensity (EUI) in new buildings by 40 percent compared to 2020 existing buildings.

Goal 6. Agricultural, Forestry, and Land Use Operations will be Carbon Neutral by 2030.

Goal 7. Zero-Waste Campus: Virginia Tech to become a Zero-Waste Campus by 2030.

- Increase landfill waste diversion rate to 85 percent by 2025.
- Increase waste recycling rate to 55 percent by 2025.
- Reduce waste to landfill per capita by 25 percent by 2025.

Goal 8. Establish the Sustainable Procurement Policy and Procedures by 2022.

Goal 9. Transportation GHG Emission Reduction: Reduce single-occupancy-vehicle commuting to campus by 20 percent by 2025 and reduce transportation-related GHG emissions by 40 percent by 2030.

Goal 10. Climate Action Living Laboratory (CALL): Integrate the Climate Action Commitment into Virginia Tech's educational mission through the Climate Action Living Laboratory beginning in 2021.

Goal 11. Climate Justice: Establish climate justice as a core value of the Virginia Tech Climate Action Commitment.

Goal 12. Sustainable Choices and Behavior: Diminish barriers to sustainable behaviors through institutional change, education and social marketing.

Goal 13. Climate Action Commitment Implementation and Engagement: Implement the Virginia Tech Climate Action Commitment at a high level of university administration and governance; by integrating goals for facilities, education, and campus culture; and with stakeholder engagement for evaluation of goals and progress.

Goal 14. Innovative Financing: Develop innovative budgeting and financing mechanisms to generate funding and staffing to achieve Climate Action Commitment goals.

Goal 15. Toward 2050 Fossil Fuel Free: Develop Pathways after 2030 to eliminate fossil fuels and carbon offsets by 2050.

The following Implementation Guidelines are intended to be used to realize the 15 Climate Action Commitment goals. The guidelines are meant to be flexible and can be revised as needed to promote the most efficient and effective methods for achieving the university's Climate Action Commitment.

INITIATIVES AND IMPLEMENTATION GUIDELINES

GOAL 1

Carbon Neutral Campus by 2030

I. PURPOSE

The primary goal of the 2020 Virginia Tech Climate Action Commitment as approved by the Board of Visitors is to become a carbon neutral campus by 2030. Carbon neutral is defined as net-zero emissions of CO_2, CH_4, and N_2O by Virginia Tech operations on the Blacksburg campus based on the geographic and GHG scope of the 2020 Climate Action Commitment.

II. APPLICABILITY

The initial geographic scope of the Climate Action Commitment includes all Virginia Tech owned lands and buildings on the main campus, buildings leased by university departments in Blacksburg, and agricultural/forestry operations and lands in the Blacksburg region.

The GHG scope includes:

- Scope 1 emissions from campus fuel use and fugitive sources.
- Scope 2 emissions related to purchased electricity (generation CO_2 and N_2O, transmission/distribution losses), and
- Some Scope 3 emissions related to campus behavior (commuter driving, transit bus fuel, waste/recycling/compost, water/wastewater, aviation fuel, and commercial business travel).

III. IMPLEMENTATION

- **Goals 1-9 of the Climate Action Commitment guide the university through strategies to accomplish this goal:**
  - 100 percent renewable electricity by 2030 can reduce emissions by about 50 percent below 2019 levels.
  - Total conversion of steam plant to natural gas by 2025 can reduce GHG by about 10 percent below 2019.
  - Reduction of energy use in existing and new buildings can result in further emissions reductions of about 10 percent, despite campus growth.
  - Reduction of GHG from waste/recycling, transportation, and agriculture, forestry, and land use can reduce emissions by about 10 percent.
  - In 2030, remaining emissions can be negated by carbon offsets.
- **Conduct annual GHG emission inventory to monitor emission reduction progress**

  The GHG inventory will include the GHG scope given above. The emissions will be reduced by at least 3 percent per year. Other Scope 3 emissions are not included in the 2030 carbon neutral goal but will be monitored as part of the annual GHG inventory: upstream leakage from natural gas extraction/distribution, upstream emissions from the production/transport of dining hall food, and possibly emissions from other Virginia Tech locations. The 2025 Climate Action Commitment update may establish reduction targets for these additional emissions as data sources are improved.
- **Explore options for local carbon offsets and carbon sequestration to reduce need for purchased carbon offsets in 2030.**

IV. RESPONSIBILITY

Entire campus community, coordinated through the Division of Campus Planning, Infrastructure, and Facilities; the Energy and Sustainability Committee (E&SC)/Climate Action, Sustainability, and Energy Committee (CASE); and other facets of university governance and operations, under the leadership of a campus sustainability officer and the university senior administration and Virginia Tech Board of Visitors.

GOAL 2
100 Percent Renewable Electricity

I. PURPOSE

A carbon free electricity supply will support Goal 1 of the Climate Action Commitment. Virginia Tech can achieve 100 percent renewable electricity through a combination of:

- Solar energy projects on campus building rooftops and Virginia Tech lands. These can be Virginia Tech-owned or third party-owned with a Virginia Tech power purchase agreement.
- Power purchase agreements (PPA) with utility or third party-owned projects in Southwest Virginia.
- Other PPAs or virtual PPAs.

- Appalachian Power increasing renewable portfolio, which is now 10 percent and by new state law must be 14 percent by 2025 and 30 percent by 2030.
- Renewable energy certificates (RECs) or purchased MWh credits from utility or third parties.

II. APPLICABILITY

This goal applies to the aggregate consumers within the geographical scope being all Virginia Tech owned lands and buildings on the main campus, buildings leased by university departments in Blacksburg, and agricultural/forestry operations and lands in the Blacksburg region.

III. IMPLEMENTATION

The following potential pathways to implement 100 percent renewable energy will be further defined and considered for implementation:

- 2020-21: achieve 30 percent renewable electricity via purchase 20 percent renewable energy certificates (RECs) from APCO + APCO 10 percent renewable portfolio.
- 2021-22: 2.35 MWac on Virginia Tech buildings/land including “showcase” solar array
  - Option 1: Virginia Tech finance and own: 2.3 MWac @ $2/W=$4.6 million.
  - Option 2: Third party PPA: no upfront cost, pay per kWh; 25-year contract, 6-year buyback option.
  - Option 3: Sterrett 0.33 MW and second building 0.67 MW through third party PPA, learn from experience then Virginia Tech finance and own remaining 1.3 MW.
- Beginning 2022: Incorporate campus and region Virginia Tech renewable electricity development by Virginia Tech Electric Service into Virginia Tech educational mission through Climate Action Living Laboratory with faculty, student, and staff instructional, research, and outreach opportunities.

- 2021-22: assess Virginia Tech Fishburn Forest atop Price Mountain and other sites for cost-effective wind energy; engage students/faculty and partner with James Madison University wind program to conduct a wind study.
- 2022-27: Continue to work with APCO to be a primary customer of their renewable capacity as they develop it to meet state requirements. APCO has completed an RFP solicitation for 250 MW of renewables in March of 2020 and as this capacity is developed, Virginia Tech Electric Service could contract for the output. Under the Virginia Clean Economy Act, APCO is required to achieve a 14 percent renewable portfolio by 2025, 20 percent by 2027, 30 percent by 2030, 65 percent by 2049, and 100 percent by 2050.
- 2022: Virginia Tech Electric Service solarize program to add 0.25 MW net-metered solar for town customers, doubling electric service current distributed capacity. Customers cover cost but Virginia Tech Electric Service could facilitate/incentivize customers. RECs owned by customer, but the electric service could buy their RECs.
- 2023: 0.5-1.0 MW community solar for Virginia Tech Electric Service customers, possibly located on airport land off Hubbard Drive. Virginia Tech Electric Service would own the Cs. For example:
  - Customers buy shares in 100 kWh blocks for $10/block (10¢/kWh) for 20 years.
  - Production 500 kW = 500 kW*1,342 kWh/yr/kW = 671,000 kWh/yr (6,700 shares).
  - Revenue = $67,100/yr * 20 yr = $1.34 million (present value = $1 million, 20 yr, 3 percent).
  - Capital cost: 500 kW * $2/W = $1 million.
- 2025: add 10 MW solar capacity on campus and on Virginia Tech land in region in cooperation with APCO (still within 2027 contract). Use solar installations at Kentland Farm and Catawba Sustainability Center to study “agrivoltaics,” or agricultural production on solar farms. 10 MW @ 6 ac/MW= 60 ac.
  - Option 1: Virginia Tech finance and own: 10 MW@ $1.50/W = $15 million.
  - Option 2: Third party PPA: no upfront cost, pay per kWh; 25-yr contract, 6-year buyback option.
- By 2027 or earlier, add 10 MW energy storage to campus renewable capacity and use Virginia Tech Electric Service as a testbed and highlight for innovative Virginia Tech Smart Grid reliability and resilience research through a partnership between Virginia Tech Electric Service and the Virginia Tech ECE Power and Energy Center (PEC) using shared SCADA data and in collaboration with APCO for research and testing in real-life scenarios.
- By 2028 (APCO contract expires 2027), 50 percent renewable electricity via campus and Virginia Tech land capacity (12 MW), APCO power purchase agreements (PPA) in southwest Virginia (including reclaimed mine land) (35 MW), APCO renewable portfolio (20 percent), and virtual PPA (VPPA) and/or RECs (10 percent) (e.g., 20 percent production (47 MW)) + 20 percent APCO portfolio + 10 percent purchased PPA/VPPA/RECs).
- By 2029 add 100 MW solar capacity via campus and Virginia Tech land capacity (+3 MW, total 15 MW) and PPA with APCO and/or third party in southwest Virginia (+65 MW, total 100 MW, grand total 115 MW).

- By 2030, 100 percent renewable electricity with e.g., 60 percent renewable production (Virginia Tech solar (15 MW) and APC) + third party PPA in southwest Virginia (100 MW), total 115 MW to serve campus, 30 percent APCO renewable portfolio, and 10 percent VPPA and/or RECs.
- As with all components of this commitment, full lifecycle analysis should include the environmental and social justice costs and benefits of procured systems, including sources, and decommissioning of photovoltaic systems, requiring end-of-life recycling.
- Siting renewable energy systems should employ best practices of public engagement to identify most appropriate sites considering compatible uses and economic, environmental and social effects.
- Virginia Tech should work closely with Virginia Department of Mines, Minerals, and Energy (VDMME) to take advantage of state and federal grant programs and compliance for agencies and universities in response to the Governor's Executive Order 43, 2020 state legislation, and federal funding programs.

IV. RESPONSIBILITY

Division of Campus Planning, Infrastructure, and Facilities, Virginia Tech Electric Service, Office of Budget and Financial Planning

GOAL 3

Energy System Efficiency and Total Steam Plant Conversion to Natural Gas

I. PURPOSE

Completing the total conversion of steam plant fuel from coal to natural gas by 2025, planning for a full transition to renewable steam plant fuel after 2025, and continuing to improve the efficiency of campus energy systems would reduce GHG emissions and increase reliability and resilience. A more efficient energy system means less renewable energy and carbon offsets must be purchased. The 2022 Utilities Master Plan will help guide decision making.

II. APPLICABILITY

This goal applies to the systems that generate and distribute steam, domestic hot water and chilled water systems as well as the existing steam turbine operation.

III. IMPLEMENTATION

The university will implement the following strategies to accomplish this goal:

- Creation of a Utilities Master Plan in FY22 to direct further decisions such as:
  - For reliability and resilience in total conversion to natural gas, the steam plant will need:
    - Having a backup fuel (such as liquefied natural gas (LNG), biochar, or other fuel) when natural gas is unavailable, or the market is tight.
    - Ensuring boiler redundancy (so-called "n+1") in case of a boiler outage at a critical time. Converting a coal boiler to biochar or natural gas could provide this.

    - Scheduling upgrades to the steam plant to provide resilience and reliability will incur necessary costs of doing business. Total conversion to natural gas reducing GHG emissions will be incorporated into those plans with limited increases in net costs.
  - Upgrade central and stand-alone chillers and chilled water distribution.
  - Planning options after 2025 for transitioning to renewable steam plant fuel and non-fossil-fuel options for heating new districts of campus.
  - Electric utility upgrades necessary to accommodate and integrate solar PV systems on campus.
- As part of the Climate Action Living Laboratory, engage faculty, students, and Division of Campus Planning, Infrastructure, and Facilities staff in developing an **online Energy Dashboard** for users to obtain and analyze energy data from campus buildings, facilities, and energy systems (see Goal 10).
- Sufficient staffing will be needed to help achieve these objectives.

IV. RESPONSIBILITY

Division of Campus Planning, Infrastructure, and Facilities, Office of Budget and Financial Planning

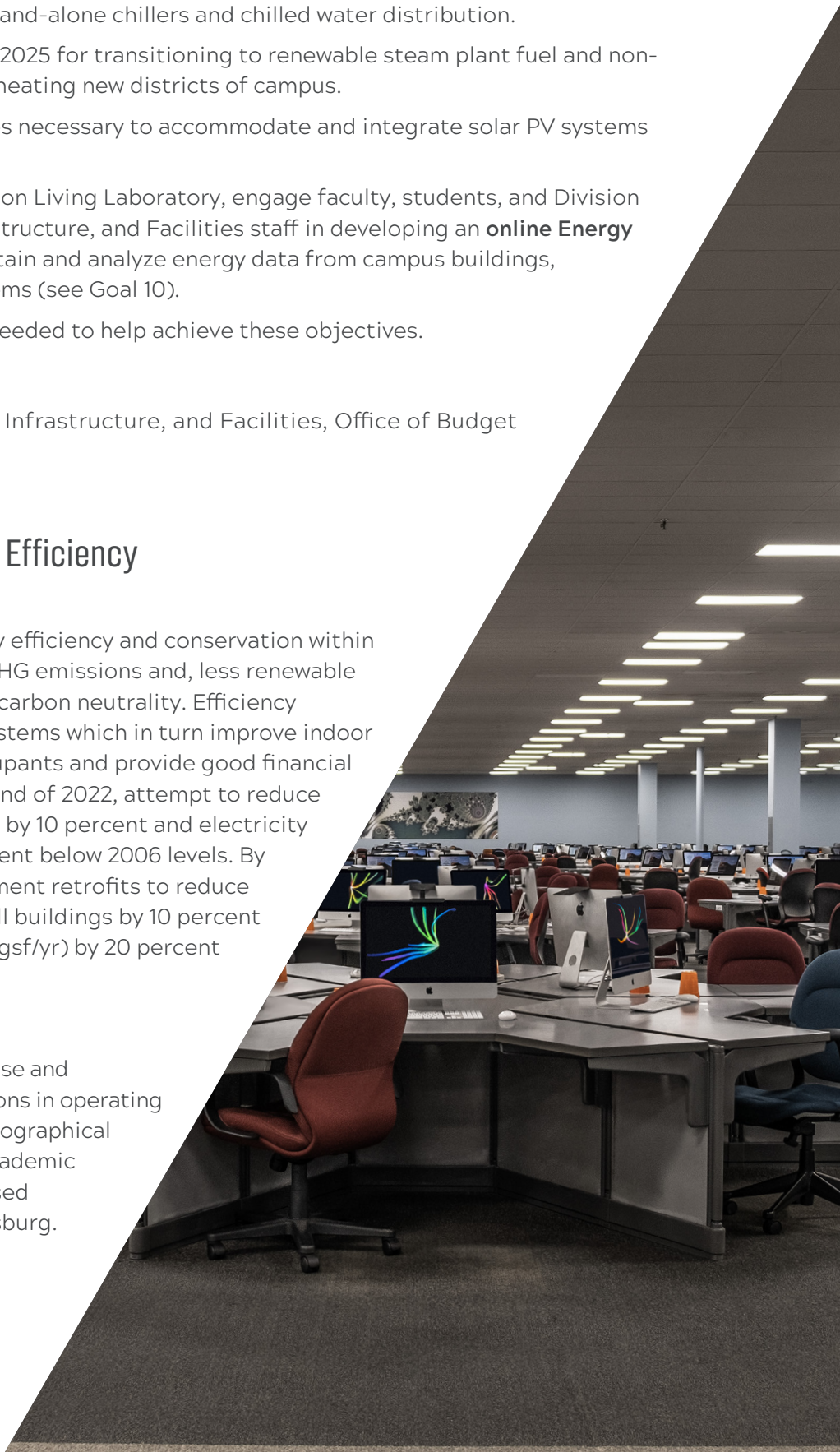
GOAL 4
Existing Building Energy Efficiency

I. PURPOSE

Goal 4 aims to increase energy efficiency and conservation within existing buildings to reduce GHG emissions and, less renewable energy and offsets to achieve carbon neutrality. Efficiency measures upgrade building systems which in turn improve indoor environmental quality for occupants and provide good financial return on investment. By the end of 2022, attempt to reduce electricity consumption (kWh) by 10 percent and electricity intensity (kWh/gsf) by 20 percent below 2006 levels. By 2030, employ energy management retrofits to reduce total energy consumption in all buildings by 10 percent and energy use intensity (Btu/gsf/yr) by 20 percent below 2019 levels.

II. APPLICABILITY

This goal applies to all energy use and related greenhouse gas emissions in operating buildings within the defined geographical scope, including on-campus academic and auxiliary buildings and leased off-campus buildings in Blacksburg. Outdoor lighting systems are included.



III. IMPLEMENTATION

- Implement an aggressive 2022-31 10-year energy management plan updated annually to reduce by 2030 total energy consumption by 10 percent and energy use intensity (EUI: Btu+kWh/ft^2) by 20 percent in all buildings including auxiliary buildings compared to 2019 levels.
- Create better performing buildings by reducing building energy usage and GHG emissions by upgrading HVAC system controls to fully optimized digital controls, fault detection diagnostics/continuous automated commissioning, comprehensive retro commissioning, energy awareness programming, and innovative/automated space temperature set-point scheduling.
- Modernize energy metering program by revising metering standards.
- Begin a LEED O+M certification pilot project in 2021. Once certification is achieved, develop a program in 2022 to re-certify all LEED BD+C buildings using the LEED O+M standard. This type of post-occupancy evaluation and occupant engagement should become standard practice to fine-tune building operations and the indoor environmental quality.
- For leased buildings owned by the Virginia Tech Foundation, work with the Foundation to develop financial arrangements to improve efficiency and reduce emissions.
- By 2022, develop a campus-wide Climate Action Living Laboratory Green Lab program based on a pilot test-bed Green Lab to reduce energy, emissions, and materials in our most energy intensive facilities (see also Goal 12).
- Sufficient staffing is needed to help achieve these objectives.

IV. RESPONSIBILITY

Division of Campus Planning, Infrastructure, and Facilities, Office of Budget and Financial Planning

GOAL 5
New Building Energy Efficiency

I. PURPOSE

Designing for high energy efficiency in new buildings is necessary to achieve and maintain carbon neutrality and sustainable operations. As a benchmark for new building stock:

- By 2022, reduce total energy use intensity (EUI) in newly initiated buildings by 20 percent compared to 2019 existing building types.
- By 2028, newly initiated buildings' efficiency improvements will reduce total energy use intensity (EUI) in new buildings by 40 percent compared to 2019 existing building types.
- Operations of new buildings initiated after 2030 will be carbon neutral.

II. APPLICABILITY

This goal applies to new construction and major renovation projects initiated after 2021.

III. IMPLEMENTATION

- New building efficiency will conform to latest adopted LEED-Silver standards including 10 percent less energy than ASHRAE 90.1 energy performance standard
- In 2022, identify candidate new buildings for a showcase zero-net-energy (ZNE) building and begin fundraising to attract donors to help fund the project to be completed by 2026.
- By 2026, build a signature zero-net-energy (ZNE) building on campus as a showcase and learning model for the Climate Action Living Laboratory.
- Electricity currently contributes 50 percent of total GHG emissions. 100 percent renewable electricity by 2030 will reduce building GHG emissions by more than 50 percent.
- After 2030, all newly initiated building design will have carbon neutral operations through 100 percent renewable electricity, improved energy efficiency, and carbon offsets.
- The built environment offers opportunities for campus Climate Action Living Laboratory research and instruction by faculty, staff and students through field testing and use of emerging technologies, monitoring energy use, air quality, and occupant perceptions, and other projects.
- Sufficient staffing is needed to help achieve these objectives. Achieving these goals will also require sufficient operations, engineering and design staffing.
- Appropriate financing plans and capital budgets, such as a Carbon Neutral Building Fund, are needed to achieve these objectives.

IV. RESPONSIBILITY

Division of Campus Planning, Infrastructure, and Facilities, Office of Budget and Financial Planning, Capital Finance and Asset Management

GOAL 6

Agricultural, Forestry, and Land Use Carbon Neutrality by 2030

I. PURPOSE

The university did not pursue goals related to agricultural, forestry, and land use in the original 2009 Climate Action Commitment and including Virginia Tech-managed lands in the 2020 Climate Action Commitment honors our mission as a land grant university. In the Blacksburg area, Virginia Tech holds 3,500 acres of agriculture land and 1,300 acres of forest land that support operations that contributed 3.3 percent of net campus 2019 GHG emissions (net 8,046 $MTCO_2e$). These lands can be further utilized for carbon sequestration, alternative energy sites, and student learning opportunities as part of the Climate Action Living Laboratory.

II. APPLICABILITY

This initiative covers the main Blacksburg campus as well as the surrounding agriculture and forestry lands totaling over 4,800 acres, including Kentland Farm, Fishburn Forest, and Catawba Sustainability Center as well as the livestock, facilities, and equipment involved in operations.

III. IMPLEMENTATION

The university will implement the following strategies to accomplish this goal:

- **Develop a university compost facility at Kentland Farm.** Representatives from the Division of Campus Planning, Infrastructure, and Facilities will work with the College of Agriculture and Life Sciences to assess the Coker Composting and Consulting feasibility study conducted in 2018 and create a plan to move forward based on that information. The addition of a compost facility will manage animal waste and fills a critical hole in Virginia Tech's waste management infrastructure (see Goal 7).
- **Create guidelines for reduced GHG emissions and improved efficiency on agricultural lands.** Representatives from the College of Agriculture and Life Sciences and the Division of Campus Planning, Infrastructure, and Facilities will work with farm and livestock managers to reduce animal related methane emissions, reduce operational GHG emissions, and increase energy efficiency in on-site facilities. College of Agriculture and Life Sciences staff, students, and researchers can assist with monitoring and tracking GHG reductions in order to produce best practices guidelines for other Virginia Tech agriculture facilities to adopt.
    - **Dairy herd related GHG emissions -** animal enteric fermentation emissions represent one of the greatest sources of GHG emissions in this sector and College of Agriculture and Life Sciences representatives can conduct research to identify best practices to reduce these emissions.

- **Reduce operational GHG emissions -** College of Agriculture and Life Sciences staff will research and identify opportunities to alter land management practices to reduce GHG emissions. This could include exploring more efficient farm equipment, anaerobic digestion, or adopting improved soil management practices. College staff, students, and researchers can assist with monitoring and tracking GHG reductions to produce best practice guidelines for other Virginia Tech agricultural facilities to adopt.
- **Increase energy efficiency of onsite facilities -** College of Agriculture and Life Sciences staff will work with division staff to audit and identify energy efficiency projects that can be implemented in the next 5 years with an acceptable return on investment. Emergency Management staff will be responsible for tracking the energy efficiency gains from these projects.

- **Create a working group to explore renewable energy and other carbon offsets/ sequestration -** A working group of division staff, College of Agriculture and Life Sciences staff, renewable energy researchers, and students will explore opportunities to develop an agrivoltaic project on Virginia Tech lands and other carbon offset and sequestration projects.
- I**ncrease campus carbon sequestration through campus tree master plan -** The Campus Arborist will work with Division of Campus Planning, Infrastructure, and Facilities staff to adopt a campus tree master plan committing the university to increase canopy cover from 16 to 25 percent. The university arborist and the Arboretum Committee will be responsible for tracking and reporting progress towards this goal.

IV. RESPONSIBILITY

- College of Agriculture and Life Sciences, College of Natural Resources and Environment, Division of Campus Planning, Infrastructure, and Facilities, Office of Budget and Financial Planning

GOAL 7

Zero Waste Campus by 2030

I. PURPOSE

Many campuses around the nation are adopting zero waste plans, which commit to diverting 90 percent of waste from landfills. Virginia Tech has committed to be a zero-waste campus by 2030 with intermediate goals for 2025, including: 85 percent waste diversion rate, 55 percent recycling rate, and a 25 percent reduction in per capita landfill waste. The university sends 4,000 tons of municipal solid waste to the landfill in Dublin, Va. each year. This represents a significant cost to the university and potential environmental impact. In order to meet this goal, the university must evaluate and improve its waste management system, including infrastructure, operations, and education.

II. APPLICABILITY

This initiative covers every facility on the main campus in Blacksburg and therefore applies to the occupants and operators of every facility on campus including colleges/schools, auxiliary services, and state-support entities ("units"). Similarly, this applies to construction or renovation projects and their associated contractors.

III. IMPLEMENTATION

The university will implement the following strategies to accomplish this goal:

- **Assess current Comprehensive Waste Management Plan.** Division of Campus Planning, Infrastructure, and Facilities staff will assess the current Comprehensive Waste Management Plan and make recommendations for revision to better meet the new commitment goals. This could include organizational, structural, or contractual changes.
- **Conduct a campus waste audit.** Division staff will identify waste consultants and develop a zero-waste campus audit RFP. This will include a budget for the audit and a review of competitive bids. An implementation team or committee should be formed to act on the recommendations of the audit, which may include Dining Services, Housing and Residence Life, Athletics, College of Agriculture and Life Sciences, Division of Campus Planning, Infrastructure, and Facilities, University Relations, Procurement, and others as needed (see next point below).
- **Establish a waste management committee to improve education, outreach, and engagement opportunities on-campus.** This committee could be responsible for the above waste audit implementation tasks as well as expanding outreach to engage the entire campus community on 3R's principles (reduce, reuse, recycle). The committee will engage faculty, researchers, and students interested in the study of recycling/waste behavior change. The committee will also be responsible for monitoring progress towards the 2025 and 2030 goals. Engage in social marketing efforts to facilitate behavior change throughout the campus community.

- **Develop a university compost facility at Kentland Farm.** As discussed in Goal 6, representatives from Division of Campus Planning, Infrastructure, and Facilities will work with the College of Agriculture and Life Sciences to assess the Coker Composting and Consulting feasibility study conducted in 2018 and create a plan to move forward based on that information. The addition of a compost facility fills a critical hole in Virginia Tech's waste management infrastructure and directly supports operations for multiple units (College of Agriculture and Life Sciences, Dining Services, Athletics, Division of Campus Planning, Infrastructure, and Facilities).

IV. RESPONSIBILITY

Division of Campus Planning, Infrastructure, and Facilities, College of Agriculture and Life Sciences, Office of Budget and Financial Planning

GOAL 8
Establish Sustainable Procurement Policies and Procedures by 2022

I. PURPOSE

The Climate Action Commitment recognizes that the procurement process is a critical time to consider the life cycle of the products the university purchases. There are social, environmental, and economic considerations that must be carefully weighed in order to purchase sustainably. The Virginia Tech Procurement Department developed and published a sustainable purchasing policy in early 2020 as the working group was developing the new Climate Action Commitment. Now that the commitment has been approved, this represents an opportune time to evaluate the sustainable purchasing policy in relation to the new goals of the commitment and state-wide directives, such as Executive Order 77 Virginia Leading by Example to Reduce Plastic Pollution and Solid Waste.

II. APPLICABILITY

Purchasing at Virginia Tech is decentralized, so this initiative covers every unit that engages in purchasing on the main Blacksburg campus.

III. IMPLEMENTATION

The university will implement the following strategies to accomplish this goal:

- **Assess current sustainable procurement policy.** Procurement staff will adopt and pilot the sustainable procurement policy (SPP) during the upcoming 2021-22 fiscal year. Procurement will work with the E&SC/CASE to evaluate the success of the policy. This could also include faculty and student researchers in the form of a study group to help with evaluation as part of the CALL.
- **The E&SC/CASE will work with Procurement to create SPP version 2.** A working group of the E&SC/CASE will engage with the procurement office to revise the procurement policy during the 2022-23 fiscal year. The group will also engage with vendors to explore more sustainable products.

IV. RESPONSIBILITY

Procurement Department, Division of Campus Planning, Infrastructure, and Facilities, E&SC/CASE.

GOAL 9

Reduce Transportation Related GHG Emissions by 2030

I. PURPOSE

Transportation represents a significant portion of Virginia Tech's annual GHG emissions at 12.4 percent (34,600 $MTCO_2e$) with 6.3 percent from non-transit commuting. Transportation is another area that expanded in scope from the original 2009 Climate Action Commitment with the tracking and inclusion of additional fuel sources from Blacksburg Transit buses and business air travel. The Climate Action Commitment recognizes that there is much work to be done in this sector to improve sustainable mobility infrastructure, technology, safety, equity, and access while decreasing reliance on traditional single-occupancy vehicles.

II. APPLICABILITY

This initiative covers all faculty, staff, and students who engage in commuting, business travel or air travel for university activities. Organizations such as Blacksburg Transit and Virginia Tech Fleet Services are also impacted by this goal.

III. IMPLEMENTATION

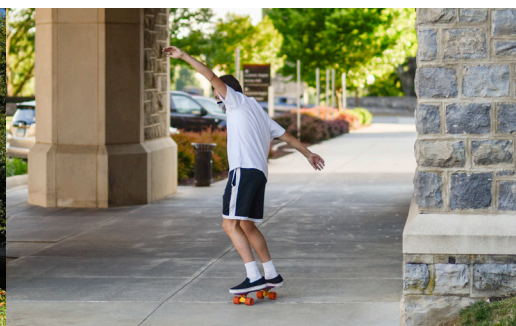
The university will implement the following strategies to accomplish this goal:

- **Assess the current Transportation Master Plan to budget for and prioritize sustainable mobility projects.** Division staff will work with Transportation Services to prioritize and implement sustainable mobility projects and infrastructure improvements.
- **Establish an Alternative Mobility subcommittee of the Transportation and Parking Committee.**
- **Establish a Climate Action Commitment Transportation working group.** This working group composed of (faculty, staff, students, TBD) will recommend strategies for reducing single occupancy vehicles, incentivizing mass transit, incentivizing remote work options through HR, improving access to alternative transportation, improving safety, and enhancing equity for parking/transportation. Other priority tasks include:
  - Tracking and monitoring progress - this group will monitor progress towards goal 9 and pass information up through the Transportation and Parking Committee to the rest of campus.
  - Mobility study groups - work with students and faculty interested in studying policies and behavior change impacts on campus mobility.
  - Research carbon offsets for business air travel - research better mechanisms for tracking business air travel miles and explore carbon offset options.
- **Develop a 5-year Alternative Transportation Master Plan.** Transportation Services and Division of Campus Planning, Infrastructure, and Facilities staff will develop an alternative transportation master plan that runs through 2027. This effort will also include the following:
  - **Coordination with Blacksburg Transit -** develop a 5-year plan to improve ridership and vehicle upgrades.
  - **Fleet Vehicle Acquisition -** assess current fleet vehicles and plan for future transition to more energy efficient vehicles.

IV. RESPONSIBILITY

Transportation Services, Division of Campus Planning, Infrastructure, and Facilities, Office of Budget and Financial Planning





GOAL 10

Integrate the Climate Action Commitment into Virginia Tech's Educational Mission through the Climate Action Living Laboratory (CALL)

I. PURPOSE

The vision of the Climate Action Commitment is for Virginia Tech to be a leader in climate action in service to our community, the commonwealth, and the world. This requires that the university not only reduce campus emissions, but also develop knowledge, engage in outreach, and educate students so that they can make a difference beyond the campus. Goal 10 aims to integrate the commitment into the fabric of the university and especially its educational mission. The main vehicle for this goal is the **Climate Action Living Laboratory (CALL),** a consortium of collaborating colleges, departments, faculty, staff, and students, committed to:

- Enhancing the university curriculum on climate change and climate action;
- Integrating the campus physical climate action into instruction, research, and outreach; and
- Utilizing academic expertise to help formulate the most effective and efficient Virginia Tech climate action projects and programs.

II. APPLICABILITY

The Climate Action Living Laboratory is the Climate Action Commitment's educational mission engaging the entire enterprise from the Provost's Office to relevant colleges, departments, and research institutes, and individual faculty and students. CALL aims to bridge the university's academic and facilities programs to use the commitment physical projects to enhance teaching and research and to use faculty and student expertise to enhance commitment projects. It will also engage Student Affairs, student life, and the shared governance system to help create a culture of sustainability.

III. IMPLEMENTATION

Implementation of Goal 10 will evolve during academic year 2021-22 as Climate Action Commitment college, department, and faculty collaborators are identified and form study groups to implement CALL. The implementation steps or milestones will include:

- **CALL leadership**
- **Develop phased plan for development of the Climate Action Living Laboratory.** Identify faculty, staff, college, department, student commitment collaborators to form a CALL Core working group to develop a plan for CALL to be phased in over 3-4 years.
  - The plan should be shaped around and **take advantage of existing programs,** including instructional degrees, majors, and courses; research institutes and centers; and college and departmental programs.
  - Conduct a survey **inventory** of faculty, departments, colleges, and student groups; degrees, majors, and courses; and research and outreach programs.
  - Identify creative ways to **build on existing Pathways Minors and other existing transdisciplinary curricular initiatives** to develop, promote and nurture further undergraduate minors and other academic offerings.

- Support the implementation of and secure resources through Virginia Tech's **Bridge Experience Program,** which aims to have every Virginia Tech student engage in at least one experiential learning activity before graduating, to enhance and expand the Sustainability Internship and similar programs.
- Take advantage of Provost Office initiatives for Destination Areas and other inter- and transdisciplinary programs.
- Work with related **research institutes** to tailor their faculty RFPs to CALL-related projects.
- Consider a cluster hire of 4-to-6 faculty positions in 2024-25 to complement existing expertise and form a first-class climate action faculty.
- Secure **funding to support CALL-**related curriculum development, and course and program offerings.

- **Form selected work groups of faculty, student and staff expertise to assist in developing Climate Action Commitment project strategies.** These include working groups for:
  - **Physical aspects of Goals 1-9** (carbon neutrality and offsets, renewable electricity and integration into Virginia Tech Electric Service network, efficiency and renewable energy opportunities for campus energy systems, existing building energy management, new green building design, agricultural land emissions and sequestration, waste management, procurement, and transportation), and
  - **Non-physical aspects of Goals 7-9 and especially 10-14** (CALL initiatives for instruction, research, and outreach including external funding; behavioral aspects of waste and recycling, commuting and travel choices, and procurement; climate justice and social equity; campus engagement; and innovative financing).
- As part of the Climate Action Living Laboratory engage faculty, students, and Division of Campus Planning, Infrastructure, and Facilities staff in developing an **online Energy Dashboard** for users to obtain and analyze energy data from campus buildings, facilities, and energy systems (see Goal 3).

IV. RESPONSIBILITY

Senior Fellow, Provost Office, CALL faculty, Colleges, Academic Departments, E&SC/ CASE, Office of Sustainability, Division of Campus Planning, Infrastructure, and Facilities, institutes, Commission on Undergraduate Studies and Policies (CUSP).

GOAL 11

Establish Climate Justice as a Core Value of the Climate Action Commitment

I. PURPOSE

Increasingly climate action and the transition to clean energy have recognized the need for fairness and the opportunity to address social equity and justice. Our fossil fuel history is plagued by exploitation of disadvantaged people and nature to the benefit of the well positioned. Climate justice aims to take account of the social impacts of our climate actions and assist vulnerable communities to benefit from the emerging clean energy economy. Therefore, climate justice became an important concern of Virginia Tech students calling for action and a core value of the Climate Action Commitment. The mission of the Climate Action Commitment is to achieve its goals through just and equitable means, to not only achieve a carbon neutral campus but also to do it right.

II. APPLICABILITY

Promoting climate justice involves assessing social impacts of our climate action projects and programs and using our climate action to promote social equity. These efforts apply to Division of Campus Planning, Infrastructure, and Facilities projects, CALL instruction and research, and extension and outreach programs.

III. IMPLEMENTATION

- **Recognize climate justice in academic programs and university governance**
  - Establish a Climate Justice Subcommittee of the newly restructured Energy & Sustainability Committee (Climate Action, Sustainability, & Energy (CASE) Committee.
  - Form faculty, staff, student work group to develop recommended climate justice initiatives.
  - Utilize the Pathways Minors to address Environmental & Climate Justice in the curriculum.
- **Consider lifecycle impacts in developing solar projects on campus and in Southwest Virginia**
  - In planning campus solar development projects, consider full lifecycle analysis including environmental and social justice costs and benefits of procured systems and decommissioning of photovoltaic systems, requiring end-of-life recycling.
  - Siting renewable energy systems should employ best practices of public engagement to identify most appropriate sites considering compatible uses and economic, environmental and social effects.
  - Consider appropriate Virginia coalfield sites for solar farm development for Virginia Tech renewable electricity obtained through power purchase agreements.
- **Engage Cooperative Extension and Virginia Tech Outreach through CALL to formulate strategies for Virginia vulnerable coastal, coalfield, and other communities to help them adapt to climate change and the emerging clean energy economy.**

IV. RESPONSIBILITY

Senior Fellow, CALL faculty, E&SC/CASE, Division of Campus Planning, Infrastructure, and Facilities, Procurement, Cooperative Extension, Office of Inclusion & Diversity

GOAL 12
Diminish Barriers to Sustainable Behaviors and Promote Sustainable Choices

I. PURPOSE

Achieving carbon neutrality depends largely on physical systems to improve energy efficiency, expand renewable energy, and reduce emissions. It also depends on choices people make. Although one person or institution cannot save the world, the world cannot be saved without their collective action. Part of the mission of the Climate Action Commitment is to engage everyone to achieve a culture of sustainability at Virginia Tech.

II. APPLICABILITY

As stated above, this goal involves everyone on campus. The intent is not to force behavioral change on anyone. Rather, it is to assess and eliminate barriers to sustainable behavior

to make sustainable choices easier and to develop creative and fun social marketing to educate and incentivize such behavior.

Specifically, personal and departmental choices about energy conservation, waste management and recycling, travel and commuting, and procurement and consumption all affect behavioral culture and resulting emissions reduction. This applies to the Office of Sustainability, all departmental units, and Student Affairs (Student Engagement and Campus Life, Corps of Cadets, Dining Services, Housing and Residence Life, VT Engage).

III. IMPLEMENTATION

- **Form faculty/staff/student Sustainable Choices (SC) work group,** including representatives from Student Affairs departments, the Office of Sustainability, and the Student Sustainability Forum.
- Office of Sustainability promote and expand existing **Green Office Certification Program**
- Environmental Health & Safety, Energy Management, and Office of Sustainability coordinate implementation of campus-wide **Green Lab Certification Program.**
- Initiate a **Green Residence Hall Certification Program** through Housing and Residence Life
- SC work group develop recommended initiatives to facilitate meeting of commitment goals, including through:
  - **Inventory of existing institutional and systemic barriers** to sustainable behavior,
  - **Measures to reduce these barriers,** and
  - Creative and fun **social marketing to nudge behavioral change, educate, and incentivize sustainable choices,** including through hiring of a social marketing expert to develop and implement effective programs to meet the various goals of the Climate Action Commitment.

IV. RESPONSIBILITY

Senior Fellow, Division of Student Affairs, Office of Sustainability, Sustainability Internship Program, Student Sustainability Forum of environmental organizations, CALL faculty, Athletics, Transportation Services

GOAL 13

Implement the Virginia Tech Climate Action Commitment at a high level of university operations and governance; by integrating Climate Action Commitment goals for facilities, education, and campus culture; with ongoing stakeholder engagement for evaluation of goals and progress.

I. PURPOSE

To integrate the Climate Action Commitment into the fabric of the university, it is important to elevate oversight of Climate Action Commitment operations and governance to a high level of the university especially because of its intent to integrate Climate Action Commitment facilities upgrades into academic programs and campus culture. The Climate Action Commitment aims to engage the university in monitoring and evaluating progress.

II. APPLICABILITY

This overarching goal applies campus-wide from operational leadership; governance; integrating facilities, academics, and culture; and engaging the entire campus community.

III. IMPLEMENTATION

- **Maintain Virginia Tech STARS rating at Gold or above through 2030.**
- **Operations Oversight and Governance**
  - **Reorganize Division of Campus Planning, Infrastructure, and Facilities energy, utilities, and sustainability offices** and appoint a **chief sustainability officer** to improve commitment implementation efficiency and effectiveness.
  - **Appoint an interim climate action director or senior fellow** to work with the division in initial implementation of the commitment, focusing on non-physical commitment initiatives including CALL.
  - Rename the Energy & Sustainability Committee (E&SC) to the **Climate Action, Sustainability, and Energy (CASE) Committee** and revise its charge, reporting lines, and subcommittee structure in accordance with the commitment Goal 13 recommendations.
  - Appoint a faculty member as **CALL Director** to initiate and support programs, and bridge Division of Campus Planning, Infrastructure, and Facilities and academic and other non-physical commitment initiatives.
- **Coordinate working groups of faculty, staff, and students formed under Goals 1-12.**
- **Assess annual Climate Action Commitment progress and issue an annual report** as part of the annual Sustainability report.
- **Form a Climate Action Commitment Working Group in 2025 to conduct the 5-year Climate Action Commitment evaluation,** update, and revision as needed including review of options for 2030-40 timeframe.
- **Form a Climate Action Commitment Working Group in 2030 to conduct the 5-year commitment evaluation,** update, and revision as needed including review of options for 2040-50 timeframe.

IV. RESPONSIBILITY

Campus governance institutions, coordinated through the E&SC/CASE committee and other facets of university governance and operations, under the leadership of a Campus Sustainability Officer and the university senior administration and Virginia Tech Board of Visitors.

GOAL 14
Innovative Financing

I. PURPOSE

Achieving the Climate Action Commitment will require financial and staffing resources. With limited resources especially as a result of the COVID-19 pandemic, commitment financial needs will be in competition with other needs and priorities of the university, including safety and security, academic excellence, quality student experience, affordable tuition and fees, and competitive faculty salaries.

- Academic (E&G) funds may be used to fund projects to improve existing academic building efficiency.
- More creative funding mechanisms can address energy efficiency needs in auxiliary buildings not included in E&G funded efficiency improvements. Energy Performance Contracting through Virginia DMME may be an effective financing vehicle for these buildings. Also, these auxiliaries may have some bonding authority to generate investment funds for efficiency improvements.
- Savings in utility bills can repay capital and financing costs.
- New building energy efficiency continues to be challenged by the separation of capital design/construction budgets and operating budgets. To advance life cycle cost analysis, future operating costs need to be considered to justify upfront investment in efficiency.
- Many Virginia Tech operations are located in leased space in Blacksburg owned by the Virginia Tech Foundation or others. Most of this space (1.45 million ft^2 in 45 properties, 13 percent of total Virginia Tech space, about 70 percent Foundation owned) in the GHG emissions calculations. The university cannot directly reduce these emissions because it does not own the buildings. But the Foundation can improve the efficiency of its buildings that house Virginia Tech operations. Financing costs of these improvement can be included in lease agreements so that these projects would be revenue neutral for the Foundation. The university pays the utility bills so that resulting utility bill savings would counter increased lease cost.

II. APPLICABILITY

Innovative financing applies to all investments and annual expenditures required to implement the 2020 Climate Action Commitment.

III. IMPLEMENTATION

- Strategically invest university E&G and Auxiliary funds to implement the **10-year Energy Management Plan** at a level of $5 million/year in energy efficiency projects with a cumulative 8- year financial payback or 12 percent return on investment.

- Major investment is needed to implement the pathways for **renewable electricity** both on Virginia Tech buildings/lands and in the Southwest Virginia region, including the following options:
  - Virginia Tech owned and developed projects on Virginia Tech buildings/land, and
  - Utility or third party-owned and developed projects on Virginia Tech buildings/land and in Southwest Virginia with Virginia Tech power purchase agreement (PPA).
  - The first option requires major Virginia Tech capital investment but provides greater long-term return and control, while the second requires no Virginia Tech capital but provides less long-term financial return. A combination of the two options may be used to meet the commitment renewable goal.
- As a unique power utility, **Virginia Tech Electric Service has opportunities for investment** in renewable energy serving both campus and its town customers.
- The **Virginia Tech Foundation** helps the university achieve its goals and may be a valuable partner in implementing the commitment:
  - As owner of most of the leased academic space off-campus, the Foundation has already agreed to provide funding for an energy efficiency retrofit pilot project in Corporate Research Center buildings on a revenue neutral basis.
  - Campus solar development provides another opportunity for Foundation investment with appropriate return on that investment.
- Additional sources of funds to implement the Climate Action Commitment include: federal and state **grants, research funding** in connection with the Living Laboratory, **advancement donations, philanthropic organizations** and foundations, and low interest **revenue bonds** by Virginia Tech Electric Service and auxiliaries.
- In addition to project funding, implementation of the Climate Action Commitment will require **upgrading the staff** to rise to the needs of the commitment, especially in energy management, energy and utility systems, building analysis and design, waste management, university compost facility operation, and campus sustainability.

IV. RESPONSIBILITY

Office of Budget and Financial Planning, Division of Campus Planning, Infrastructure, and Facilities, Virginia Tech Foundation, Virginia Tech Advancement, Office of the Vice President of Research and Innovation

GOAL 15

Develop Pathway to Eliminate Offsets and Fossil Fuels by 2050

I. PURPOSE

Currently, the Climate Action Commitment working group estimates that roughly 50 percent of Virginia Tech's GHG emissions will need to be offset by 2030. The university recognizes that the future is rapidly changing in terms of energy technologies, public policy, economics, and climate research. It is difficult to evaluate the impacts of future advancements or policy shifts on Virginia Tech's GHG emissions or reliance on fossil fuels for energy. This initiative commits the university to facilitating periodic reviews of the commitment to incorporate revisions that will allow for further elimination of offsets and fossil fuels by 2050.

II. APPLICABILITY

This initiative covers the main Blacksburg campus facilities, and anyone involved in university, local, and regional policy making. This could also include companies such as AEP or other energy providers.

III. IMPLEMENTATION

The university will implement the following strategies to accomplish this goal:

- Annual review of emerging renewable energy technologies or other opportunities in preparation for the 5-year commitment revision in 2025.
  - △ Continue to tighten estimates and tracking of GHG emissions - this may include estimates of upstream methane leakage from natural gas.
- Develop a long-term Utilities Master Plan which fully incorporates the Climate Action Commitment goals.
- 5-year review of the commitment in 2025. Begin planning for 2030-40 timeframe. Develop a plan for full transition of campus heating systems to renewable energy.
- 5-year review of the commitment in 2030. Begin planning for 2030-50 timeframe.

IV. RESPONSIBILITY

E&SC/CASE, Division of Campus Planning, Infrastructure, and Facilities

REVISION AND OVERSIGHT OF THE IMPLEMENTATION GUIDELINES

The Climate Action, Sustainability and Energy Office (CASE) will update this document as needed to incorporate changes in applicable codes and standards, State requirements, technology advancements, and other developments affecting the current guidelines for physical CAC projects. In addition, representatives from other divisions, including the academic community, student affairs, and others, will update this guidelines document as needed for non-physical CAC projects. The campus community will have the opportunity to review and suggest changes prior to the updates being approved.

The CASE Team will create and lead a CAC Implementation Team that will meet regularly and coordinate implementation of the CAC goals with key stakeholder groups developed on campus. The core team will track progress and provide an annual report on progress to the University.