CLIMATE ACTION PLAN
A VISION FOR CLIMATE NEUTRALITY

Overview

Appalachian State University's Climate Action Planning Writing Group is pleased to present *AppCAP 1.0: A Vision for Climate Neutrality.* Created as a living document and process, the *AppCAP 1.0* serves as both a road map to guide Appalachian State University towards climate neutrality and a billboard to celebrate our achievements along the way

This plan and the process outlined within, will thoroughly analyze climate action solutions and scenarios based on carbon reduction, social and environmental impacts, implementation and maintenance costs, and their effect on university resilience efforts. In addition, the plan outlines contributions to the United Nations Sustainable Development Goals with a clear directive to support our local, regional, and statewide communities.

While the primary focus of the *AppCAP 1.0* is on campus operations and the associated administrative authority, the strength of the plan is the assertion that the entire campus community has a responsibility for carbon neutrality. *AppCAP 1.0* also places a strong emphasis on faculty research, student-centered experiential learning opportunities, and community engagement. Its successful implementation will rely on faculty, staff, and students as active participants and stakeholders. Students will especially benefit from their involvement in the *AppCAP 1.0* implementation. Through experiential engagement, they will gain valuable problem-solving and leadership skills as they tackle the complex, interconnected issues involved in climate action planning, implementation, and education.

App State has a strong regional and national reputation as a leader in sustainability efforts. The university is especially known for the integration of sustainability and climate education into the curriculum. Since the implementation of the 2010 climate action plan, Towards Climate Neutrality, App State has made significant progress in reducing greenhouse gas emissions and developing programs to promote campus sustainability and climate action efforts. The *AppCAP 1.0* builds on these years of campus sustainability efforts. This plan takes on the difficult task of analyzing what is needed to achieve climate neutrality as soon as possible given the technical, financial, and legislative realities that confine the university.

AppCAP 1.0 identifies the opportunities that each constituent of the App State community has to engage in the climate action process. The university acknowledges this work will require dedication, commitment, and creativity, and we hope to achieve the goals outlined in this plan through our persistence, resilience, and an inclusive and collaborative commitment to the process outlined below. This process ensures no one is excluded from the benefits of a healthy, resilient, and thriving community.

App State is a certified Bee Campus USA site. The university's Center for Analytics Research and Education (CARE) has launched agloba! initiative to count the world's bee and other pollinator population - to raise awareness of the critical role various insects and other pollinators play in food systems.

From the Chancellor

Dr. Sheri Everts

I am proud to support Appalachian State University's new climate action plan, *AppCAP 1.0: A Vision for Climate Neutrality.* App State remains firmly committed to its role and responsibility as a leader in the global effort to help mitigate effects of the ongoing climate crisis. We continue to work with a great sense of urgency through the use of an inclusive and collaborative climate action process. The *AppCAP 1.0* serves as a climate action blueprint that will provide an in-depth analysis of what it will take for App State to reach carbon neutrality as soon as practicable with an ultimate goal of climate neutrality.

We appreciate and rely on the passion, expertise, and engagement of our faculty, staff, and students. This is difficult and critically important work. It requires us to combine diverse perspectives and innovative opportunities with fiscal responsibility in an effort to identify mutually beneficial solutions to climate change. We also understand and value the importance of ensuring our climate action efforts help strengthen essential community lifelines to people traditionally marginalized by climate change. I want to thank everyone who contributed to this plan, and I look forward to our continued support of this effort.

Dr. Sheri Everts, Chancellor
Appalachian State University

Green Workplace certification, an initiative piloted by the Chancellor's Office, recognizes campus work spaces that have taken extra steps to ensure they are contributing to the sustainability goals of App State by greening their space, and lowering their daily impact.

App State was awarded Tree Campus USA status in 2014 and has retained that designation. In 2019, App State joined the foundation's Time for Trees initiative, in which 5 million tree planters commit to plant 100 million trees in forests and communities worldwide by 2022 - the 150th anniversary of Arbor Day.

Chancellor Everts has committed university support of and resources to App State's solar vehicle team, Team Sunergy. The team uses the platform of solar-powered racing to drive innovation in renewable energy technology for sustainable transportation.

The Office of Sustainability employs students as Sustainability Ambassadors to serve as peer educators to the campus community, bringing the concepts of sustainable living to their lives. They posed here with App State's Chancellor Everts to bring attention to the compost and recycling efforts on campus.

The PV system on the roof of Leon Levine Hall is comprised of 214 panels, with 57.8kW of capacity.

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Reference this page for definitions to unfamiliar terms and acronyms.

"The bottom line is that unless human society limits the amount of CO_2 in the atmosphere, we can expect to see increasing changes in the global climate system that are largely deleterious to our society, economy, and health."

For more from Dr. Marland, see "The Science Behind Atmospheric Carbon"

- DR. GREGG MARLAND
  RESEARCH INSTITUTE FOR ENVIRONMENT,
  ENERGY AND ECONOMICS,
  AND PROFESSOR OF GEOLOGY,
  APPALACHIAN STATE UNIVERSITY

Accelerating Climate Action

There is overwhelming consensus with the vast majority of the world's leading climate scientists that the current climate crisis cannot be ignored. The *AppCAP 1.0* is a catalyst to accelerate App State's ongoing climate action work and directs the university to reach climate neutrality as soon as possible.

The institutional drivers guiding the *AppCAP 1.0* are *The University of North Carolina Sustainability Policy (600.6.1)* and *NC Executive Order 80: North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy.* These policies define the timeline to which the *AppCAP 1.0* ascribes for achieving carbon neutrality. In accordance with The University of North Carolina Sustainability Policy, the university must develop a plan to become carbon neutral as soon as practicable or by 2050 at the latest.

Reducing energy consumption in state-owned buildings is a goal of NC Executive Order 80. Among the renovations made to Sanford Hall are 464 energy-efficient replacement windows.

NC Executive Order 80 identifies the following goals for the state to strive to accomplish by 2025: (1) reduce statewide greenhouse gas emissions to 40% below 2005 levels, (2) increase the statewide number of registered, zero-emission vehicles (ZEVs) to at least 80,000, and (3) reduce energy consumption per square foot in state-owned buildings by at least 40% from fiscal year 2002-2003 levels.

In 2008, App State became a signatory of the American College & University Presidents' Climate Commitment (ACUPCC) committing the university to the pursuit of carbon neutrality. Rebranded in 2016 as the Second Nature Climate Commitment, the goal remains the same with the added integration of carbon neutrality with climate resilience planning.

App State is also a signatory of the We Are Still In pledge, which is an open letter to the international community and parties to the Paris Agreement. It states the following: "We, the undersigned mayors, county executives, governors, tribal leaders, college and university leaders, businesses, faith groups, cultural institutions, healthcare organizations, and investors are joining forces for the first time to declare that we will continue to support climate action to meet the Paris Agreement target of cutting overall greenhouse gas emissions by 26 to 28 percent below 2005 levels by 2025."

Although these commitments and guiding principles are well defined and admirable, they do not suggest how to achieve this monumental accomplishment. The *AppCAP 1.0* defines 81 climate action solutions that, taken together, will end with the university's justified claim of carbon neutrality. A reasonable and responsible timeline will emerge from this work as the university realizes what it will take to establish climate neutrality given the limitations. Along the way, in concert with the core mission of the university, *AppCAP 1.0* will identify opportunities for integrating climate action solutions into the university's outreach, research, curriculum, and scholarly activities.

In recent years, concern has grown exponentially due to the magnitude of the social, environmental, and economic impacts from climate change. The science is clear: global climate change is no longer a distant problem, it is a modern and imminent global crisis.

"Climate change is no longer a long-term problem.
We are confronted now with a global climate crisis.
The point of no-return is no longer over the horizon.
It is in sight and hurtling towards us."

- ANTONIO GUTERRES, SECRETARY GENERAL OF THE UNITED NATIONS

App State faculty, staff and students are agents of change for sustainability on the university's campus and beyond. This photo was taken during an event held to create awareness about climate change.

"Warming ... will persist for centuries to millennia and will continue to cause further long-term changes in the climate system" (IPCC, 2018).

The *AppCAP 1.0* process acknowledges the vulnerability of frontline communities who have historically shouldered a disproportionate share of society's collective environmental burden, without the benefits of the standard of living afforded by their sacrifice. The plan ensures that university climate action efforts champion people and communities marginalized by climate change. The *AppCAP 1.0* will also work towards correcting these inequities by helping to create safe, strong, resilient communities. In addition, as an anchor institution, App State

will continue to collaborate with local and regional organizations on mutually beneficial climate action and resiliency initiatives.

Finally, the *AppCAP 1.0* is a living document and process supported by a robust dashboard and communication plan. The goal of the dashboard is to provide transparency to the campus community by providing access to as much campus climate data and as many resources as possible. The communication plan will include progress reports, updates on solution strategies, and results of analysis and research. In addition, progress will be regularly communicated through the *AppCAP 1.0* website, social media platforms, and other outreach strategies.
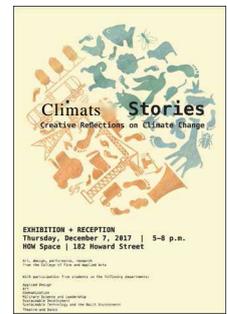
App State strives to learn more and do better in the areas of climate and social justice. Inviting speakers such as (left) urban revitalization strategist Majora Carter, hosting sustainability- and justice-focused film screenings (above), and answering the call for more transdisciplinary approaches to climate change communication through the Climate Stories collaborative (above right) educates and informs about these ethical and political topics.

"Environmental justice [means that] no community should be saddled with more environmental burdens and less environmental benefits than any other."

- MAJORA CARTER,
  URBAN REVITALIZATION STRATEGIST

Workflow for *AppCAP* 1.0

In 2007, Appalachian State University established a Sustainability Council. The original council had multiple working groups in various areas that were later focused into: Curriculum, Climate Action Planning, Resiliency, Zero Waste, Natural Environment, Transportation, Food Systems, Energy, and Sustainability in the Arts. These subcommittees provided technical expertise to the Office of Sustainability and reviewed the climate action planning efforts in 2010 and 2015.

A more holistic and community-centered approach was taken for the development of the *AppCAP 1.0.* Interdisciplinary teams of faculty, staff, students, and community members were organized into three sets of working groups that specifically support climate action planning: Source groups, Principle groups and a single Writing Group, charged with overseeing the climate action planning process and drafting the *AppCAP 1.0.*

The Source working groups were divided into Campus Heating, Campus Electricity, and University Transportation, which represent the major sources of the university's carbon emissions. Members of these three groups were mainly derived from a redistribution of Sustainability Council members with the addition of campus experts who have specific knowledge in each source category. Each group was tasked with evaluating the feasibility of suggested carbon mitigation strategies, assessing their cost and carbon savings, and identifying a timeframe for implementation. In addition to informing the climate action planning process, these groups will help with the implementation of the individual strategies, either by direct action or through delegation to those under their organizational responsibility. The Source groups will eventually include Embodied Carbon (the carbon impacts of purchased goods and construction materials) and University Food Systems (carbon associated with Campus Dining services) as carbon accounting becomes increasingly comprehensive.

A series of public input sessions and open forms solicited ideas and strategies from the App State community. The AppCAP's working groups took these into account when writing the plan.

The Principle groups focus on the externalized impact of the proposed mitigation strategies. Climate Justice, Natural Environment, and Climate Resiliency working groups will develop metrics to evaluate and rate each solution strategy through the lens of their focus.

The university will use these ratings as decision-making support tools to identify which strategies are recommended for campus implementation. For example, a low cost mitigation strategy may lead to significant carbon reductions but may also cause unintended negative effects on the environment and/or communities. The purpose of the Principle groups is to ensure that the climate action planning and implementation process is conducted in a holistic and just manner. As a result, the *AppCAP 1.0* commits to a living process designed for transparency and flexibility.

There are four additional working groups contributing to the climate action planning process: University Purchasing, Zero Waste, Education and Outreach, and Academic Integration. In addition to identifying new strategies, these groups will help implement the mitigation and education strategies within the *AppCAP 1.0.*

"Without increased and urgent mitigation ambition in the coming years, leading to a sharp decline in greenhouse gas emissions by 2030, global warming will surpass 1.5°C in the following decades, leading to irreversible loss of the most fragile ecosystems, and crisis after crisis for the most vulnerable people and societies."

-1PCC SPECIAL REPORT

A Brief History of Campus Sustainability

The land that surrounds us is integral to our history. We honor and acknowledge the traditional Indigenous people of this region, and we respect their historical and ongoing connection to this territory on which we gather and learn together. This history is important to recognize and learn from in our ongoing sustainability efforts.

App State has a long tradition of supporting sustainability initiatives. It is a direct result of the resiliency and long-standing culture of the region's inhabitants. The university also attracts people who are drawn to the area's natural beauty and recreational opportunities. As a result, many residents are committed stewards of the environment. The following is a brief survey of App State's historical efforts to support the environment, sustainability, social justice, and climate action.

Appalachian State University began as Watauga Academy, founded in 1899 by Dr. B.B. Dougherty, his brother D.D. Dougherty, and D.D.'s wife, Lillie Shull Dougherty. They shared the dream of helping children in North Carolina's "lost provinces" discover educational opportunity to match the splendor of the mountains in which they lived. This tiny academy quickly evolved into a school preparing quality teachers to serve our state and beyond.

From the very beginning, the university founders built a foundation to support education in the region. Their commitment to the people whom they served and the place in which they lived is evidenced by many of their early actions. In the first few decades of the 1900s, the Doughertys fed the students, staff, and faculty with products from a full working farm that was eventually referred to as the "State Farm". In addition, Lillie Shull Dougherty was an avid gardener and maintained vegetable and herb gardens on campus.

*Lillie Shull & Dauphin Disco Dougherty*

The Dougherty family's commitment to education, especially teacher education, was unyielding. Beginning in the 1910s, courses were added in geography, zoology, botany, chemistry, astronomy, sociology, gardening, plants and propagation, soils and fertilizers, and animal husbandry. This strengthened their commitment to people and the places where they live.

Perhaps one of the more innovative and impactful legacies of the Dougherty family is the creation of New River Light & Power (NRLP). Utilizing the power of the New River, the newly formed utility provided the community's first electric power. While the infrastructure for this carbon-free electricity no longer exists, NRLP's commitment to serving the community remains strong.

The commitment to educating students about people, places, and service continued to strengthen through the decades. This is evident from the purpose statement found in *The Rhododendron* yearbook from the 1940s: "The purpose of the school is to develop: A sense of justice, The power of initiative, Independence of character, Correct civic and social habits, The ability to cooperate toward the common good". In addition, the school supported numerous outings and opportunities to explore the splendor of the local natural environment throughout its early years.
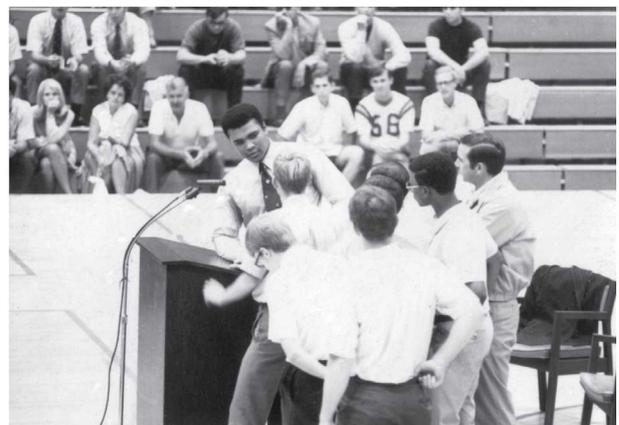
Muhammad Ali and Jane Fonda both spoke at App State about social issues in the late 1960s and 70s.

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Diversified Activities,
All united in a common goal -
to save the earth.

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ARTICIPATE IN NATIONAL EARTH DAY

1970s spreads from The Appalachian illustrate the ingrained importance of environmental sustainability at App State.

Appalachian earns No. 1 ranking from AASHE for sustainability among master's institutions

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Archives
Appalachian Today is an online publication of Appalachian State University. This website consolidates university news, feature stories, events, photo galleries, videos and podcasts.
The migration of materials from other sites is still incomplete, so if you cannot find what you're looking for here, please refer to the following sources:

CLIMATE LEADERSHIP AWARDS WINNER 2015
Second Nature THE CENTER FOR GREEN SCHOOLS

TREE CAMPUS USA
Carolina® Recycling" Association^

Making the World Safer for Pollinators
Bee Campus USA
One Campus at a Time
earthexec*

Recognized nationally as a leader in sustainability by AASHE, Second Nature, and others, App State has a strong will to combat the climate crisis.

The 1970s and 1980s ushered in a wave of curricular offerings focused on social justice, environmental science, and sustainability.

By the early 2000s, App State was considered one of the leading higher education institutions for sustainability education. This legacy has expanded today with campuswide support for climate education and the strengthening of education for diversity, equity, and inclusion.

One of App State's strongest regional contributions is the ongoing Appalachian Energy Summit (AES). Since 2012, the AES has gathered faculty, staff and students, along with energy managers, government officials, and industry leaders to share best practices in support of a clean energy economy across the University of North Carolina System, the state and beyond. After nine years of work, in the fall of 2020 it was reported at the AES that UNC System institutions avoided more than $1 billion in energy costs between 2002-19.

In 2020, one of the original NRLP dams on the Payne Branch was removed in support of stream restoration and conservation efforts taking place within the headwaters of the New River.

Appalachian Energy Summit

In the nine years of the Appalachian Energy Summit, world-renowned speakers in the areas of energy, policy, and social justice have addressed the attendees. (Left) Current White House National Climate Advisor Gina McCarthy and current EPA Head Michael Regan were both speakers in 2017. (Right) The 2018 Summit included an armchair discussion between 350.org's Bill McKibben and RMI's Amory Lovins. Other notable speakers over the years include Oberlin's David Orr; urban revitalization strategist Majora Carter, and NC General Assembly Representative John Szoka.

Guiding Principles

App State's rich mountain heritage has informed a long-standing commitment to sustainability and resilience in the region. The environment offers a living laboratory for exploration and research and provides myriad outdoor recreation opportunities.

Sustainability

Sustainability at Appalachian State University is a tradition instilled by its founders. Inspired by a distinctive mountain environment and culture, we are thoughtful stewards of the region's many interconnected financial, cultural, and natural resources. Through collaboration and engaged scholarship, we balance critical, creative, and global thinking in a living laboratory, transforming theory into agency that fosters responsible citizenship. We understand the importance of addressing the current climate crisis and acknowledge the university's responsibility to contribute to a just and sustainable future.

University Resilience

University Resilience focuses on supporting the capability to continue the institution's primary mission despite potentially disruptive events. University resilience efforts also help to ensure the health and safety of faculty, staff, and students in the face of potentially catastrophic events and disasters by maintaining continuity of operations and/or to resume operations quickly after such events.

Climate Justice

Appalachian State University strongly believes that sustainability efforts must focus on supporting social justice. We recognize that not all people are affected equally by climate change, that not all contributed equally to creating climate change, and that not all benefit equally from the economic developments that have contributed to climate change. We also recognize that those people who are traditionally marginalized by society contributed to climate change the least and are often affected the most. The university's climate action efforts aim to mitigate the effects of the climate crisis by providing support and lifelines to marginalized communities.

For over a century, App State has attracted students who love the mountains and share strong environmental ethics, as evidenced in these photos from the 1970s.

"The climate crisis is one of the most important causes of our time. We must urgently work together, regardless of our differences, to identify and implement climate action solutions. There is no better time in history to rally around this common cause that connects all life on earth."

- DR. LEE BALL,
  CHIEF SUSTAINABILITY OFFICER,
  APPALACHIAN STATE UNIVERSITY

Campus Emissions

In accordance with App State's Second Nature Carbon Commitment, the university uses the University of New Hampshire Sustainability Institute's web-based Sustainability Indicator Management and Analysis Platform (SIMAP) as its data tool for assessing its carbon footprint. The full list of emission factors used for the preparation of the fiscal year (FY) 2020 greenhouse gas (GHG) inventory is here: https://unhsimap.org/2019table

SIMAP assesses the global warming potential (GWP), which is a measure of each gas's contribution to climate change relative to that of carbon dioxide, for all six greenhouse gases (GHGs) specified by the Kyoto Protocol:

- carbon dioxide (CO_2)   · methane CH_4
- nitrous oxide (N_2O)   · hydrofluorocarbons HFC
- perfluorocarbons PFC · sulfur hexafluoride SF_6

The Intergovernmental Panel on Climate Change (IPCC) determined the GWP of these gasses based on the length of time molecules stay within the atmosphere and the amount of infrared radiation, or heat the molecules can contain. In order to account for the differences in GWP of the various gases, all are related to carbon dioxide, which is said to have a global warming potential of one. The annual amount of GHGs is presented as metric tons of carbon dioxide equivalents, or MT eCO_2. This is the standard unit of measure for emissions as reported herein.

For the purposes of this document, a fiscal year (FY) consists of the period from July 1st to June 30th of the following year. The designation is derived from the year that ends in this time period; for example, FY2020 represents the time frame of July 1st 2019 - June 30th 2020.

SIMAP® is an industry-standard carbon- and nitrogen-accounting platform that tracks, analyzes, and helps improve campus sustainability efforts.

The Kyoto Protocol (1997) is an international treaty that commits state parties to reduce greenhouse gas emissions. There are currently 192 members.
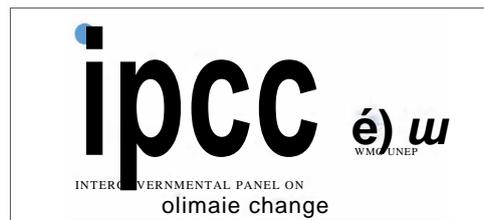
The Intergovernmental Panel on Climate Change (IPCC) is a body of the United Nations dedicated to providing the world with objective, scientific information relevant to understanding the risk of anthropogenic climate change, its natural, political', and economic impacts and risks, and response options.

BASELINE

On October 29, 2018, North Carolina Governor Roy Cooper signed *NC Executive Order 80,* which stated North Carolina's plan to address climate change and transition its economy to clean energy. One of the plan's goals is to "reduce statewide greenhouse gas emissions to 40% below 2005 levels" by the year 2025. In accordance with NC Executive *Order 80,* Appalachian State University has set FY2005 as its baseline in the Space Heating and Purchased Electricity categories.

The institution's data set for the vast majority of both Transportation and Other categories prior to FY2009 is incomplete and cannot match NC Executive *Order 80*'s timeline. Therefore, a baseline of 2009 is utilized for these categories, as well as for the university's total emissions. FY2009 marks the first year in which all emission sources can be reported with high confidence.

Oct. 29, 2018, Gov. Roy Cooper signed into law Executive Order 80. With him are Jerry Williams, left, of SAS, and Michael Regan, right, who was at that time with the NCDEQ and is currently head of the EPA.

GREENHOUSE GAS INVENTORY BOUNDARIES

Organizational boundaries define the university's emissions responsibilities according to the amount of operational control it has over a given asset. App State's GHG inventory includes all scopes (see next page) of university emissions for its main campus, leased spaces, public private partnerships (P3), and most other campus holdings and activities. It does not include tangential emissions associated with more complex relationships.

For example, App State provides significant funding to the regional transportation authority, AppalCART, which operates as a separate 501(c)(3) entity. An organizational boundary is drawn between the two with App State only accounting for emissions that are directly attributable to university commuting, not the entirety of AppalCART's operations. Similarly, App State owns and operates New River Light & Power (NRLP), a non-profit electric utility serving 8,500 customers. App State's GHG inventory does not include emissions attributable to those 8,500 customers, it does however include NRLP's operational emissions, as well as the emissions associated with the energy used by the university. Even though these entities are referenced in this plan, they are examples of organizations that operate outside the boundaries of traditional greenhouse gas reporting and climate action planning.

(Right) Emissions from all campus heating and cooling systems are accounted for in App State's greenhouse gas inventory.

The 100 kW Broyhill turbine was the largest wind turbine in the state of North Carolina when it was installed on campus in 2009. Ten years later, it reached the milestone of 1 million kWh of emissions-free energy.

SCOPES

Scopes are operational boundaries used to categorize emission sources according to the ability of the reporting entity to control and affect their production. Traditionally there are three scopes: Scope 1 for direct emissions from sources owned or controlled by the university, Scope 2 for indirect emissions from sources neither owned nor operated by the university, and Scope 3 for other emissions attributed to the university.

Scope 1: Fuel for heating spaces and hot water, back-up generators, fleet vehicles, chemicals/refrigerants, and agriculture

These emission sources are directly owned and controlled by the institution. For App State, this includes all emissions from on-campus fuel combustion, emissions associated with university-owned fleet vehicles, emissions from lost refrigerants and other chemicals, and emissions from agriculture-related activities (fertilizers and farm animals).

The steam plant is located at the base of the bell tower and is the single largest Scope 1 emissions source on campus.

Scope 2: Purchased utilities

Indirect emissions associated with purchased energy such as electricity, steam, and chilled water are included in Scope 2. App State does not currently generate the majority of electricity it uses, but rather receives it from New River Light & Power via the electric utility grid from Blue Ridge Energy, which is supplied by Duke Energy Carolinas. A portion of the emissions generated from the production of electricity is directly related to the amount of energy consumption on campus and is therefore included in App State's carbon footprint. App State does not purchase any steam or chilled water directly but generates both with either natural gas or electricity.

Scope 3: Commuting, university-financed travel, study abroad, solid waste and wastewater, paper, and electricity transmission and distribution losses

Information collected under Scope 3 pertains to emissions from sources which are neither owned nor operated by the university, but are either directly financed or are otherwise linked to the campus via influence or encouragement. Scope 3 emissions include student, faculty, and staff commuting,

Carbon Neutral Commuter is a voluntary program initiated in 2014 as a way to offset Scope 3 emissions which App State cannot directly regulate.

university-financed travel, study abroad air travel, solid waste, wastewater, paper purchasing, and electricity transmission and distribution losses.

Reasonable Scopes

While the traditional scopes recognize the subtleties of implied responsibility for emissions, they blend human activities in odd ways. In this system, emissions attributed to fleet vehicles are counted as Scope 1 emissions, while the majority of transportation emissions are counted in Scope 3. To ease the discussion, the climate action plan's working groups emission sources are broken into four categories:

- Heating Emissions: emissions from burning fuels for heating spaces and producing hot water (predominantly from the central steam plant) and for running back-up generators.
- Purchased Electricity Emissions: emissions associated with the production of electricity.
- Transportation Emissions: those emissions attributable to the university's fleet vehicles, faculty/staff commuting, student commuting, directly financed air travel, directly financed ground travel and study abroad. Also included are travel offsets.
- Other Emissions: emissions in the form of refrigerants and other chemicals or those stemming from agriculture, solid waste, waste water or purchased paper. Some carbon offsets are inventoried in this category.

The shape of the photovoltaic array in front of Peacock Hall reflects our location in the Blue Ridge and our Mountaineer spirit. At 3,333 feet above sea level, App State is the highest elevation of any university east of the Mississippi River.

App State's Greenhouse Gas Data

App State's net greenhouse gas emissions are 47,013 MT eCO_2 for FY2020. This figure is the sum of the calculated value of 15 of the emission sources in the SIMAP report platform that are applicable to App State, minus the university's purchased third-party certified carbon offsets and a sequestration credit attributable to university composting. These 15 sources are organized into the four broad categories shown on the graph below.

FY2020 Emission Categories in MT eCO_2
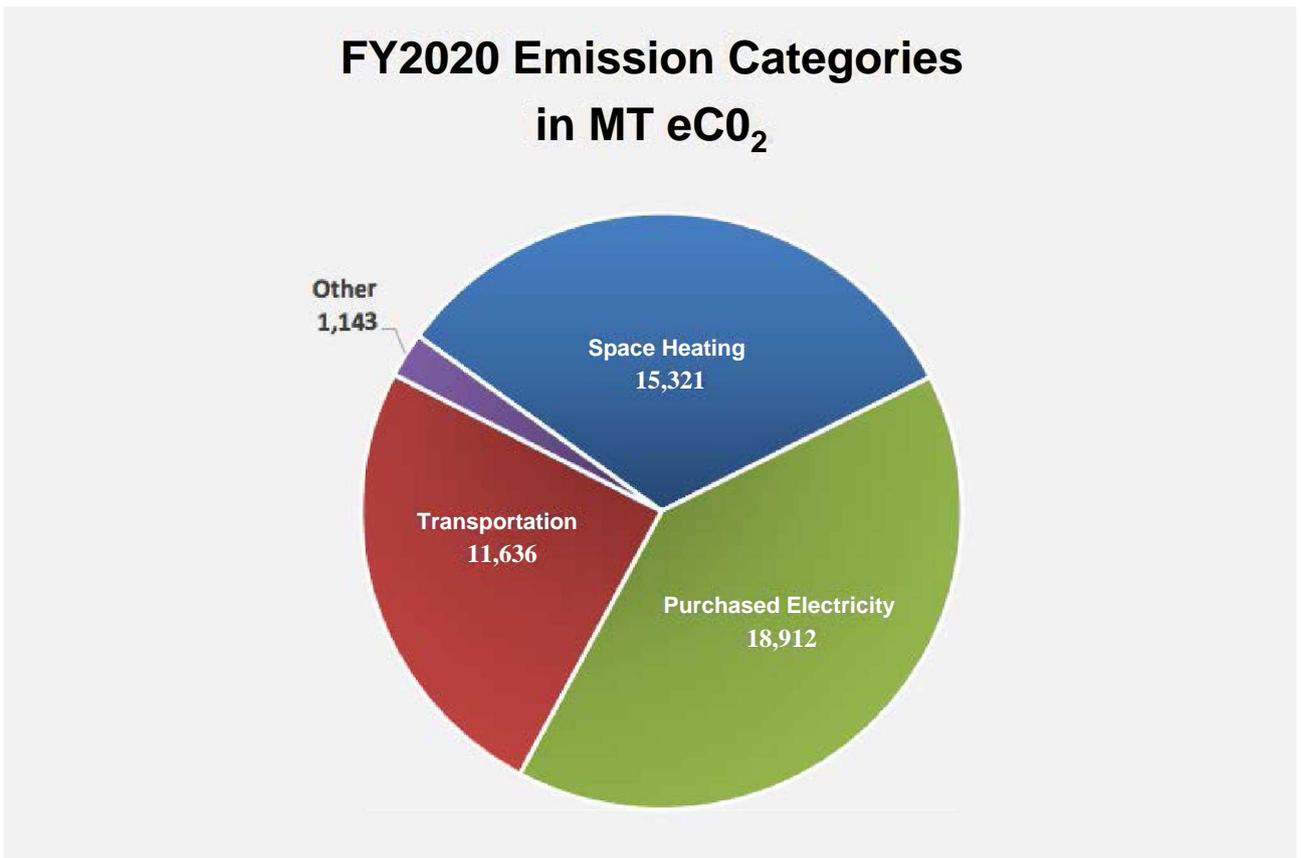
Table 1: Emission Tonnage and percent of total per category for FY2020:

Categories	MT eCO$_2$	Percent of total
Space Heating	15,321	33%
Purchased Electricity	18,912	40%
Transportation	11,636	25%
Other	1,143	2%

App State uses the FY2009 GHG emission total of 69,850 MT eCO_2 as a baseline for net emission against which progress toward carbon neutrality can be gauged. The 2020 data shows App State's net emissions have dropped from the FY2009 baseline by 22,837 MT eCO_2 (32.7%).

Total Emissions by Fiscal Year
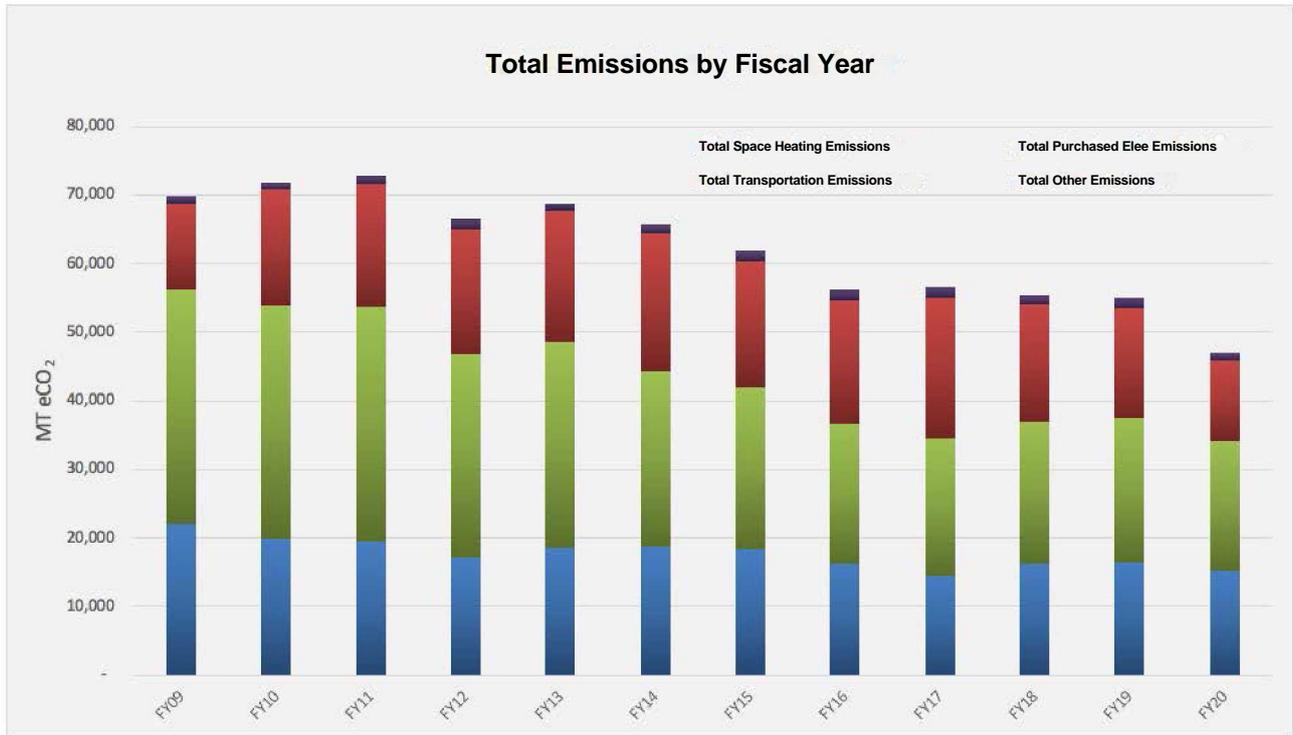
Looking at the university's progress towards the *NC Executive Order 80* emissions targets, the data (for purchased electricity and heating emissions) shows App State's 2020 emissions down 21,384 MT eCO_2 over that 15-year time period. This puts the university's GHG reduction at 38.4%, just under 2% away from the 40% target.

Two significant factors that bear on the university's carbon footprint are its physical size (square footage of maintained build space) and campus population. Current data reflects a 21.8% increase in square footage and a 21.3% increase in population in the time frame from 2009 baseline to FY2020.

Another significant influence on FY2020 data is the impact of the COVID-19 pandemic. The university enacted emergency management protocols and operational modifications on March 8th 2020. With the fiscal year running to the end of June, roughly four months of irregular data are included in the FY2020 data set. Because the university was not fully occupied during this time, reductions seen in emissions from energy consumption and transportation are temporary and not attributable to climate actions taken by the university. The full impact of COVID-19 is expected to manifest in the FY2021 data set.

App State students gather to form the traditional "Block A" at Kidd Brewer Stadium at the beginning of each school year. Fall 2020 saw the largest enrollment in university history - 20,023 students. (Photo taken pre-COVID)

Appalachian has major construction projects underway or being planned over the next three to five years that will enhance the Appalachian Experience and support the university's strategic plan. Each project also supports Appalachian's goals and metrics associated with the University of North Carolina System's strategic plan, titled "Higher Expectations."

**Table 2 :** Annual Emissions by Reasonable Scopes

Scope	Emission Source	FY 2005 MT eC0₂	FY 2006 MTeCO_r	FY 2007 MTeCO_r	FY 2008 MTeCOr	FY 2009 MT eC0₂	FY 2010 MT eCO_r	FY 2011 MTeC0₂	FY 2012 MTeCOj	FY 2013 MTeC0₂	FY 2014 MTeCOr	FY 2015 MTeCOr	FY 2016 MTeCOr	FY 2017 MT eCOj	FY 2018 MT eCO₂	FY 2019 MTeCOr	FY 2020 MTeCOr	FY20 Percent Change from Baseline*
Space Heating	Steam and Backup Generators	19,996	21,797	23,071	22,013	21,990	19,910	19,541	17,268	18,584	18,851	18,383	16,178	14,479	16,198	16,449	15,321	-23%
Purchased Electricity	Purchased Electricity	32,415	34,364	34,889	35,752	31,090	31,913	32,123	26,950	27,295	24,170	22,465	19,542	19,180	19,719	19,928	17,989	-45%
	T&D Losses	3,206	3,399	3,451	3,536	3,075	1,976	1,989	2,721	2,755	1,264	1,175	919	901	1,012	1,023	923	-71%
Transportation	Fleet Vehicles					557	598	576	535	481	522	557	504	471	399	393	334	-40%
	Faculty/Staff Commuting					3,102	3,131	3,207	4,425	4,466	4,048	3,679	3,319	3,857	4,511	4,753	3,522	14%
	Student Commuting					4,132	4,186	4,254	4,971	4,992	7,126	7,444	6,961	7,893	6,063	6,164	4,394	6%
	Directly Financed Air Travel					2,883	4,636	5,415	4,428	5,259	4,710	5,211	6,433	6,432	3,259	3,990	1,707	-41%
	Directly Financed Ground Travel					792	1,539	1,567	1,191	1,061	1,202	1,084	854	1,058	2,745	1,375	1,617	104%
	Study Abroad					1,150	3,024	2,947	2,489	2,847	2,450	2,681	2,312	2,450	2,316	2,321	1,261	10%
	Travel Offsets											(2,322)	(2,376)	(1,734)	(2,062)	(2,833)	(1,200)	-
Other	Refrigerants/ Chemicals					222	114	336	605	301	799	799	902	813	562	700	489	121%
	Agriculture					S	5	7	51	37	53	59	7	37	35	17	8	9%
	Solid Waste					651	565	582	668	568	538	532	539	574	573	604	546	-16%
	Wastewater					46	40	38	39	38	36	36	36	37	36	37	29	-36%
	Paper					198	192	233	190	183	185	183	170	216	152	164	108	-46%
	Other Offsets					(44)	(43)	(32)	(55)	(79)	(90)	(65)	(51)	(53)	(57)	(25)	(38)	
Total Space Heating Emissions		19,996	21,797	23,071	22,013	21,990	19,910	19,541	17,268	18,584	18,851	18,383	16,178	14,479	16,198	16,449	15,321	-23%
Total Purchased Elec. Emissions		35,621	37,763	38,340	39,287	34,165	33,889	34,112	29,671	30,050	25,434	23,639	20,460	20,082	20,730	20,951	18,912	-47%
Total Transportation Emissions						12,615	17,113	17,967	18,039	19,107	20,059	18,334	18,006	20,427	17,231	16,163	11,636	-66%
Total Other Emissions						1,080	873	1,164	1,498	1,048	1,523	1,544	1,603	1,625	1,301	1,498	1,143	-91%
Gross Emissions						69,894	71,827	72,816	66,532	68,868	65,957	64,288	58,674	58,399	57,580	57,918	48,250	-31%
Net Emissions		69,850	71,784	72,784	66,477	68,789	65,867	61,901	56,247	56,612	55,461	55,060	47,013					
% Change From FY 2009						BASELINE	2.8%	4.2%	-4.8%	-1.5%	-5.7%	-11.4%	-19.5%	-19.0%	-20.6%	-21.2%	-32.7% 1	

· 2005 for Space Heating and Purchased Electricity

* 2009 for Transportation and Other

PURCHASED ELECTRICITY

App State's single largest contributor to its emission profile includes those activities associated with the university's purchased electricity. In FY2020, the fossil fuels burned by Duke Energy to produce the 48,859,861 kWh of electricity consumed on the campus and the transmission and distribution losses in the delivery of that power accounted for 18,912 MT eCO_2 of emission released into the atmosphere. The data shows App State with an overall downward trend (toward neutrality) since 2008. This sector is also where the university has experienced its greatest gains toward the goal of net neutrality. The decrease in emissions during the 15-year span between the *NC Executive Order 80* baseline of 2005 and 2020 for App State is 45%, or 14,426 MT eCO_2.

FY2020 Emission Categories: Purchased Electricity

- Other 2%
- Transportation 25%
- Space Heating 33%
- Purchased Electricity 18,912 MT eCO_2 40%
- Electricity 38%
- T8iD Losses 2%
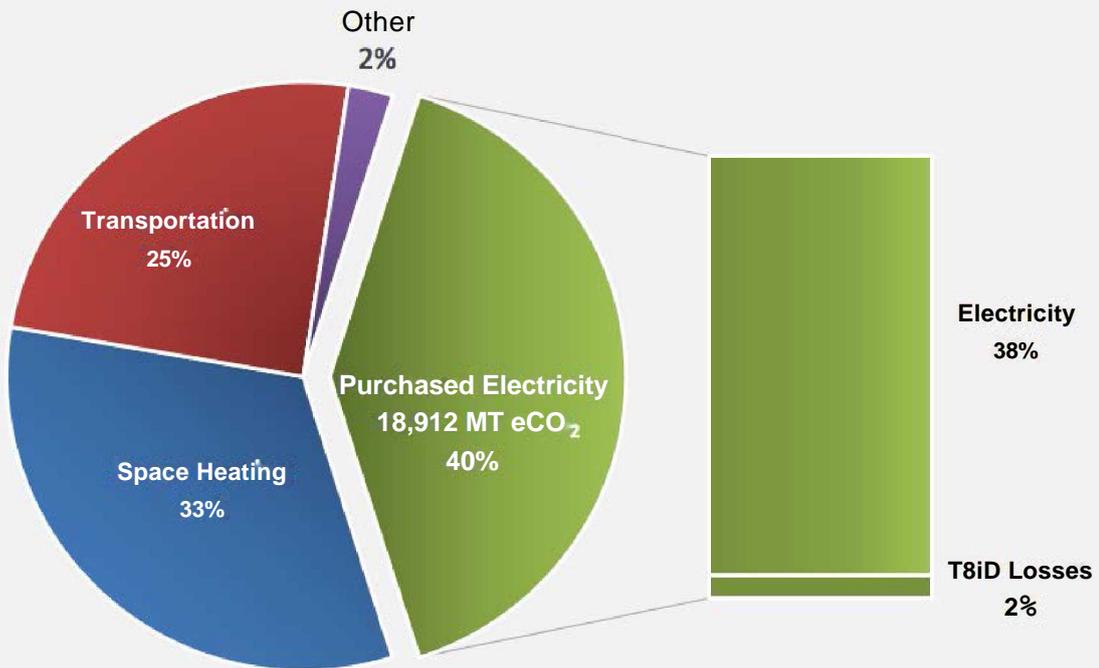
Purchased Electricity Emissions by Fiscal Year
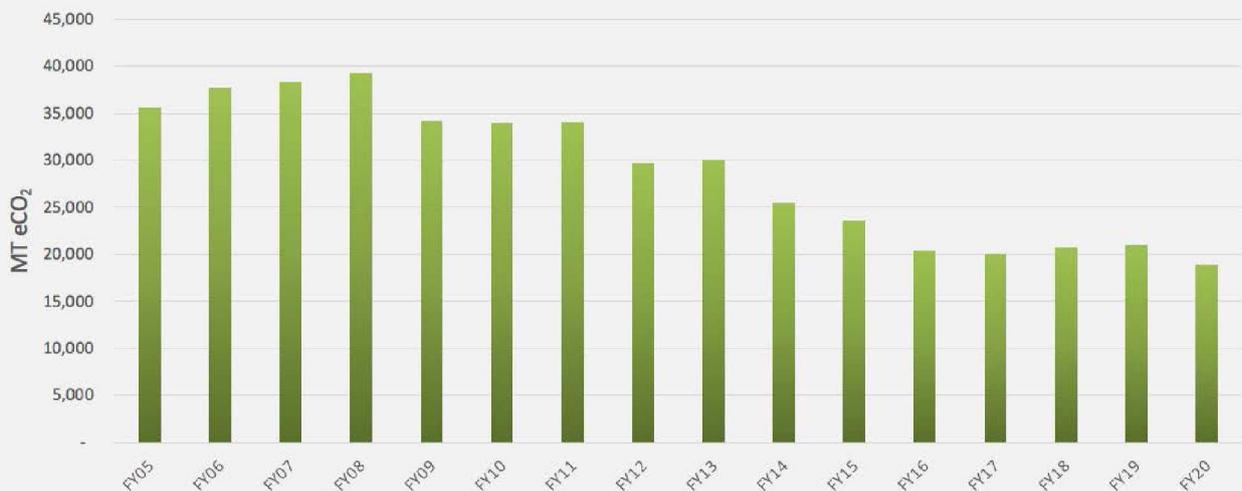
HEATING

The vast majority (99.5%) of the emissions in the heating category are generated by burning natural gas in the university's steam plant for the production of steam for heating campus buildings and making domestic hot water. The remaining 0.5% is from the use of propane and distillate oil in various campus applications. The emission total for FY2020 in the heating scope was 15,321 MT eCO_2.

Since the baseline year of FY2005, heating emissions at App State have trended downward, dropping 4,675 MT eCO_2 by FY2020. This is a 23.4% decrease with five years remaining to reach the 40% reduction target for 2025.

FY2020 Emission Categories: Space Heating

Pie chart showing:
- Other 2%
- Transportation 25%
- Space Heating 15,321 MT eCO_2 33%
- Purchased Electricity 40%
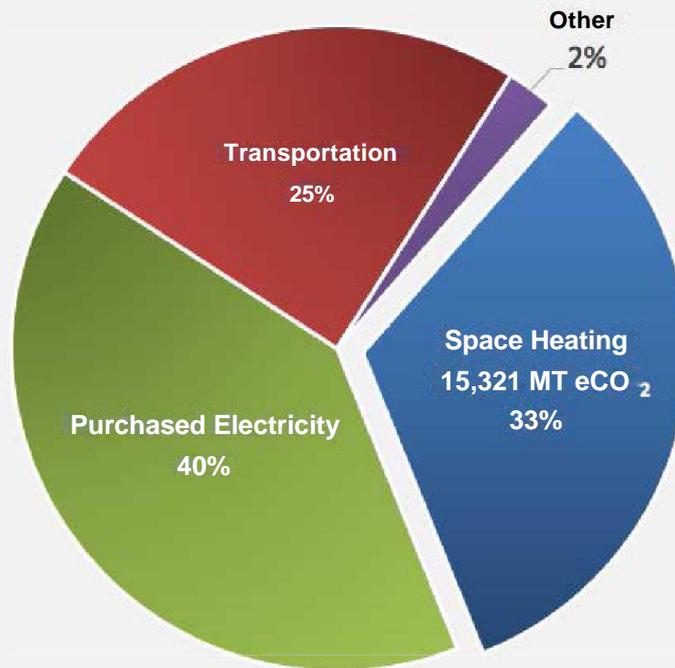
Space Heating Emissions by Fiscal Year

Bar chart of MT eCO_2 by fiscal year (FY05 through FY20).
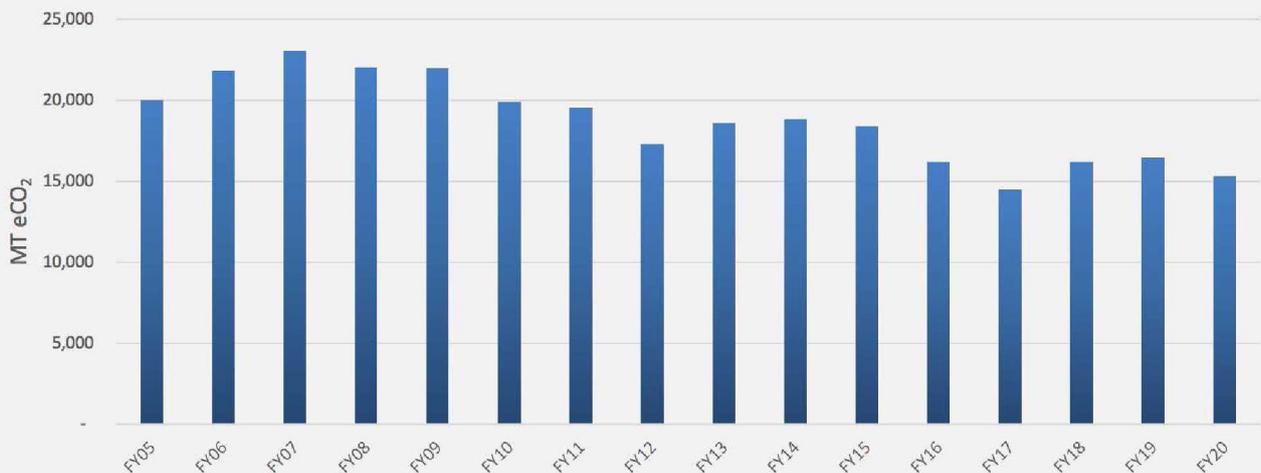
TRANSPORTATION

App State's transportation-related emissions for FY2020 are 11,636 MT eCO_2. This is the third largest contributor to the greenhouse gas profile and encompasses the following university activities:

- Fleet Vehicles
- Student Commuting
- University Funded Ground Travel
- Purchased Travel Offset
- Faculty and Staff Commuting
- University Funded Air Travel
- Study Abroad

Purchased travel offsets are unique in this category in that they are not actually greenhouse gas emissions generated by travel but are third party verified offsets applied specifically to negate transportation emissions. Offsets purchased for FY2020 effectively removed 1,200 MT eCO_2 from the university's transportation emission profile.

Since the FY2009 baseline, transportation-related emissions experienced a six-year period of growth, followed by a six-year period of overall decline. As a result, the volume trend of these emissions appears relatively flat. However, population is one of the multipliers in the calculations of transportation emissions, and population increased by 21.3% from FY2009 to FY2020. This would indicate that App State's travel emissions have decreased on a per capita basis over this period of time.

FY2020 Emission Categories: Transportation

Other 2%

Purchased Electricity 40%

Transportation 11,636 MT eCO_2 28.41%

Space Heating 33%

Fleet Vehicles, 0.7%

Faculty/Staff Commuting 7.5%

Student Commuting, 9.3%

Directly Financed Air Travel, 3.6%

Directly Financed Ground Travel, 3.4%

Study Abroad, 2.7%

Travel Offsets, -2.6%
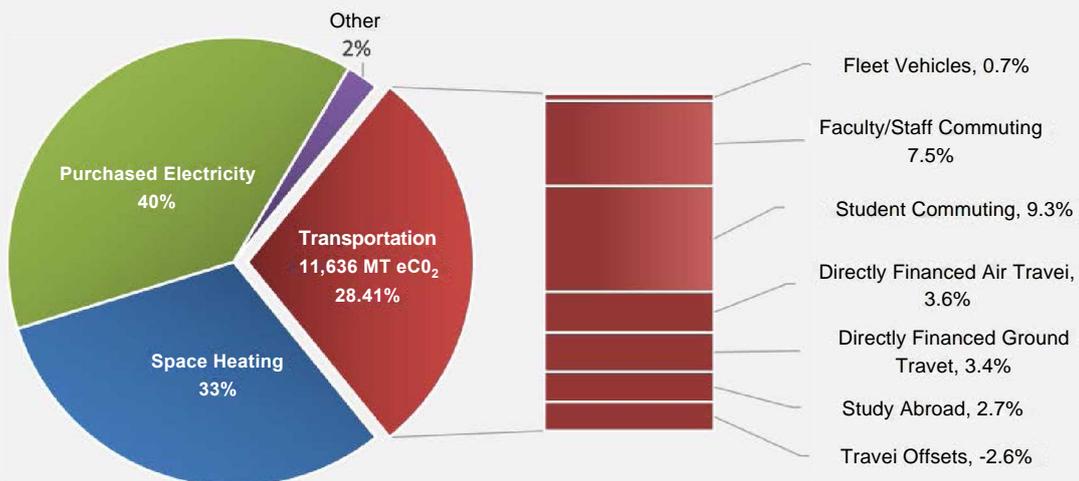
Transportation Emissions by Fiscal Year

MT eCO_2
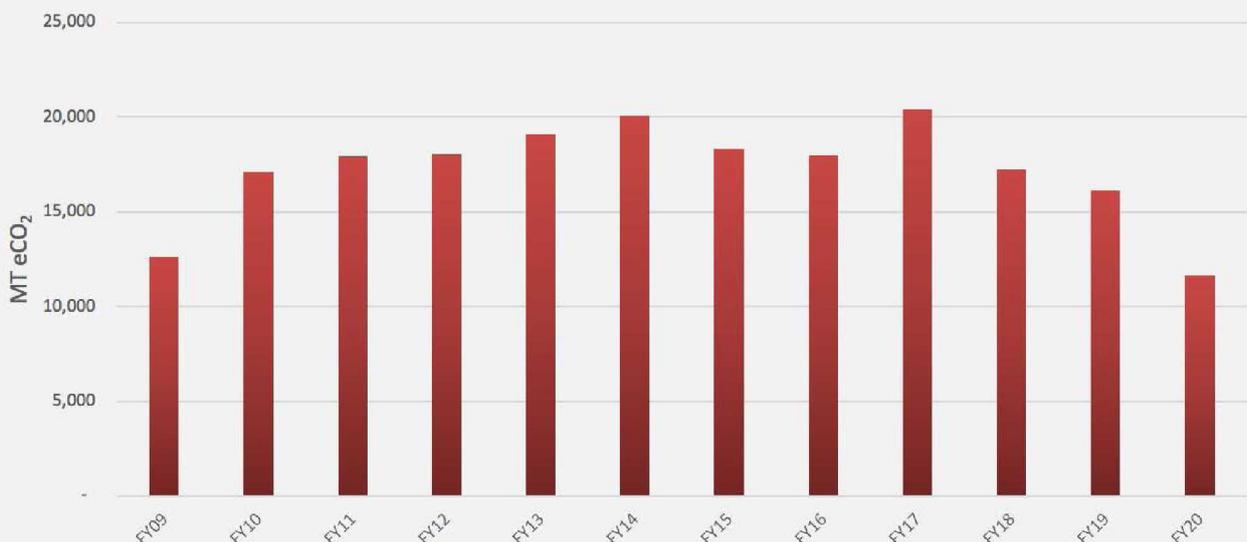
There are five remaining emission sources tracked by the university:

- Refrigerants and Other Chemicals
- Agriculture (Fertilizer and Animals)
- Solid Waste
- Wastewater
- Paper Purchasing

Emissions from these activities for FY2020 were 1,143 MT eC0$_2$ and represent just two percent of the total footprint. While these areas are important to the university's sustainability efforts, they do not offer significant carbon reduction for climate action planning.

FY2020 Emission Categories: Other

- Transportation 25%
- Purchased Electricity 40%
- Space Heating 33%
- Other 1Д43.0Э MT eCO$_2$ 2%
- Refrigerants/ Chemicals, 1.04%
- Agriculture 0.02%
- Solid Waste, 1.16%
- Wastewater, 0.06%
- Paper, 0.23%
- Other Offsets, -0.08%
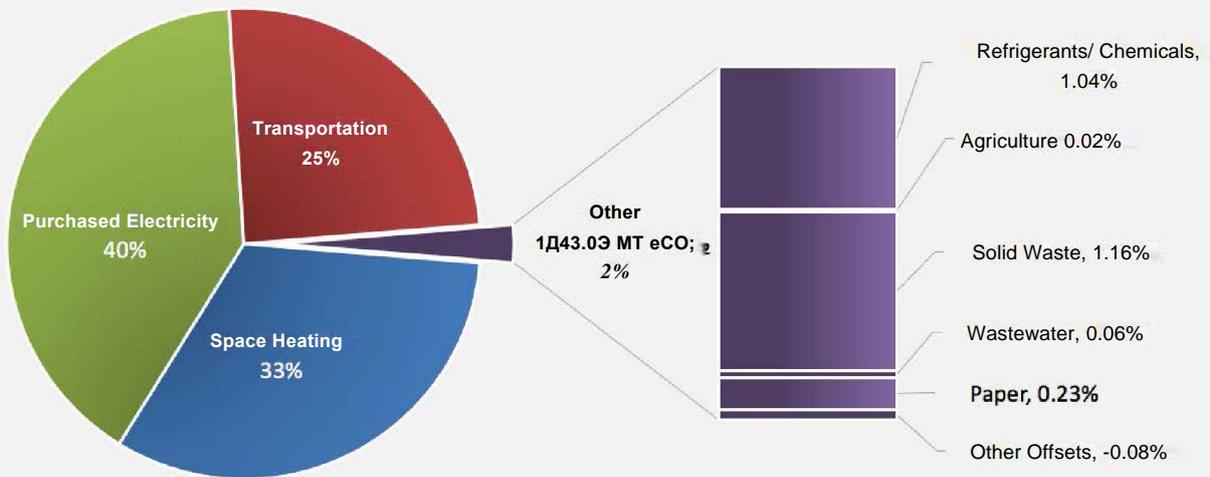
Other Emissions by Fiscal Year
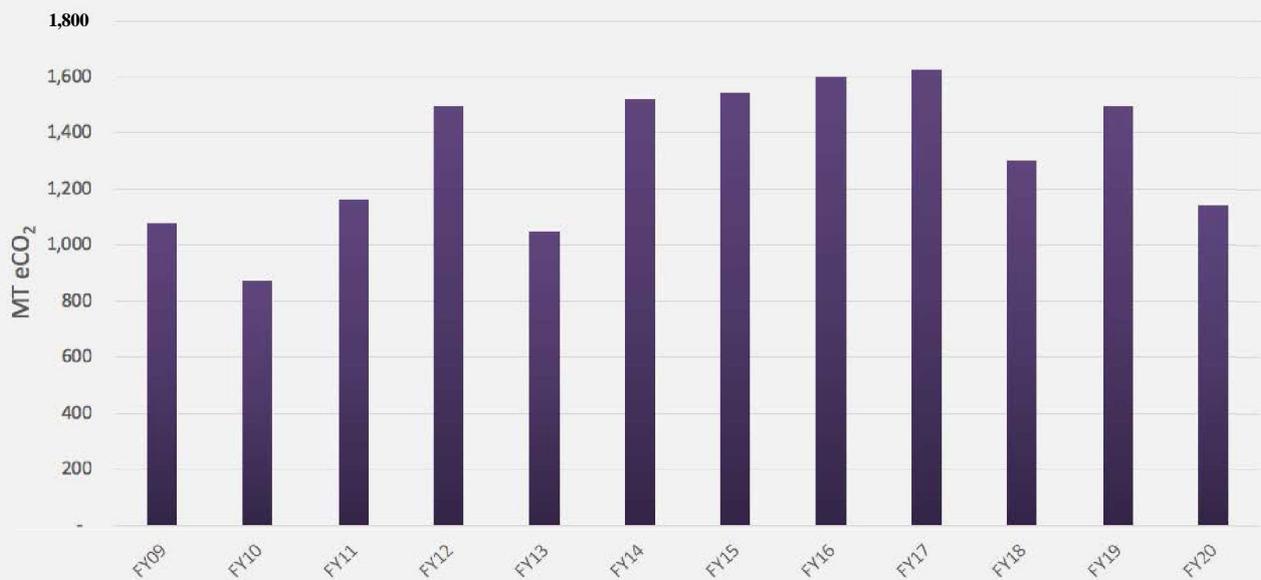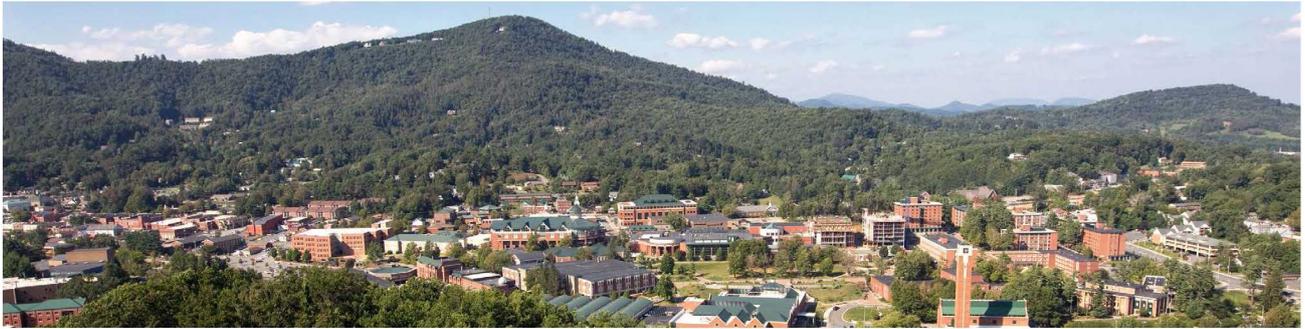
App State is a charter member in the Sustainability Tracking, Assessment & Rating System (STARS), a transparent, self-reporting framework for colleges and universities to measure their sustainability performance.

App State Solutions

The following solutions define App State's response to the climate crisis. Like many climate action plans, the solutions outlined in the *AppCAP 1.0* seek to avoid technologies that contribute to greenhouse gas emissions, reduce current greenhouse gas emissions, replace campus systems that contribute to greenhouse gas emissions, and offset the rest. The proposed policies, processes, and programs will plot the university's course to carbon neutrality. Due to the complex and interwoven nature of the emission-producing activities on a college campus, particularly with purchased electricity and space heating, the presentation of the solutions depart from the organizational structure of the emission conversation and instead are classified by the type of human response needed to address the issues. The solution categories include Sourcing, Efficiency, and Behavior and Institutional Change.

The solutions outlined within this plan are action items needed to reach both carbon and climate neutrality. Some of the solutions are identified as immediate or short-term solutions **(0-3 years** - "S"), while others are identified as medium-term solutions **(3-5 years - "M").** The long-term solutions **(5+ years - "L")** will require either further research and analysis, technological advances, or fundraising strategies. The time frame indicator **(S/M/L)** appears below each proposed solution referenced below as mitigation strategies.

In addition, many of the proposed solutions include the associated United Nations Sustainable Development Goals (SDGs). The SDGs, also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs are integrated in a way that recognizes that action in one area will affect outcomes in others, and that development must balance social, economic, and environmental sustainability. The SDG most closely associated with a particular strategy appears after the timeframe indicator. The majority of the mitigation strategies listed in this plan align with SDG *11: Sustainable Cities and Communities* and SDG *13: Climate Action.*

S = **short-term (0-3 yrs.)**
M = medium-term (3-5 yrs.)
L = long-term (5 + years)
SDG = *Sustainable Development Goals*

SUSTAINABLE DEVELOPMENT GOALS(SDGS)

SDG *1: No Poverty*
SDG 2: Zero Hunger
*SDG 3: Good Health and
    Well-being*
SDG 4: Quality Education
SDG 5: Gender Equality
*SDG 6: Clean Water and
    Sanitation*
*SDG 7: Affordable and Clean
    Energy*
*SDG 8: Decent Work and
    Economic Growth*
*SDG 9: Industry, Innovation, and
    Infrastructure*

SDG 10: Reduce Inequalities
*SDG 11: Sustainable Cities
    and Communities*
*SDG 12: Responsible Consumption
    and Production*
SDG 13: Climate Action
SDG 14: Life Below Water
SDG 15: Life on Land
*SDG 16: Peace, Justice, and
    Strong Institutions*
*SDG 17: Partnership for the
    Goals*

Sourcing Mitigation Strategies

This section of the *AppCAP 1.0* focuses on App State's relationship with the processes that create carbon emissions. These solutions propose ways the university can maintain the same level of comfort and service without the negative carbon consequences. The primary sources targeted are Campus Energy Systems (purchased electricity and campus heating) and the Campus fleet.

CAMPUS ENERGY SYSTEMS

These solutions target campus energy systems such as purchased electricity and campus heating. They also support the research and development of a detailed analysis to determine what it will take to decarbonize campus energy systems. The university will charge a Campus Energy Council to provide an integrated process for decision-making, solution identification, fundraising, and implementation. In addition, a newly created Steam Transmission Efficiency Task Force will identify and oversee the incorporation of efficiency strategies for the central steam plant and its infrastructure. The following mitigation strategies support climate action efforts for campus energy systems:

1. Create a Campus Energy Council (Supports 2 -11)
   S *SDG: 7,9,12*

2. Support or facilitate clean energy opportunities with Carolina Power Partners (CPP)
   S *SDG: 7,9,12*

3. Create cost analysis and timetable for multiple transition scenarios to carbon-free electricity purchase options
   S *SDG: 7,9,12*

4. Identify funding mechanisms to pay for the increase in utility costs associated with the purchase of carbon-free energy
   S *SDG: 7,9,12*

5. Secure funding for on-campus renewables
   SM *SDG: 5,7,9,10,12*

6. Develop on-campus renewable target percentages for 2025 and 2035
   SML *SDG: 7,9,12*

7. Create Steam Transmission Efficiency Task Force for the support of steam plant efficiency efforts, solicit engineering studies, and recommend further analysis, including:
   • Decentralization · Solar thermal
   • Conversion to hot water · Thermal storage
   • Central boiler electrification · Cogeneration
   S *SDG: 7,9,12*

8. Conduct renewable natural gas study
   S *SDG: 7,9,12*

9. Explore carbon offset opportunities
   M SDG: *7,9,12*

10. Support implementation of campuswide energy policies
    S *SDG: 7,9,12*

11. Research innovative solutions including, but not limited to:
    • Energy storage
    • Thermal energy
    • Peak shaving
    • DC power systems
    • Microgrid technology
    • Alternative funding models
    SM *SDG: 7,9,12*

The original campus steam plant smokestack was demolished in 1973.

The university's steam plant provides both heating and hot water for much of campus through an approximately three-mile steam loop. The majority of App State's heating requirements are provided through the production of steam via the plant's four boilers.

CAMPUS FLEET

The campus fleet consists of all of the vehicles the university owns and operates. The *AppCAP 1.0* supports efforts to identify efficiencies and decarbonize the university's fleet through a variety of solutions. A primary goal is to help strengthen efforts to transition to electric vehicles (EVs). The following mitigation strategies support climate action efforts for the campus fleet:

12. Establish a fleet EV planning document
    S *SDG: 7,9,12*
13. Add EVs to motor pool fleet
    SM *SDG: 7,9,12*
14. Develop long-term EV fleet replacement strategy
    S *SDG: 7,9,12*
15. Strengthen fuel efficiency standards
    S *SDG: 7,9,12*
16. Revisit campus vehicle idling policy
    S *SDG: 7,9,12*
17. Establish an EV to fossil fuel vehicle ratio on par with or above state average
    L *SDG: 7,9,12*
18. Create a university-operated EV car-share program
    S *SDG: 7,9,12*
19. Develop landscaping equipment electrification plan
    S *SDG: 7,9,12*
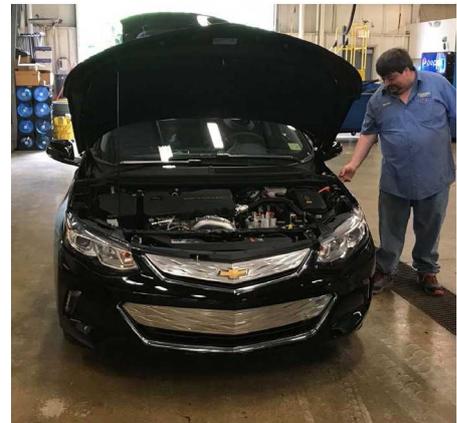
Clockwise from top left, App State Motor Pool's all-electric Chevrolet Bolts, an electric-hybrid Chevrolet Bolt and the charging station in Legends Parking Lot are part of the university's expanding commitment to electric vehicles (EV) on campus. Currently, five EV charging stations are available on campus, four of which are solar powered (grid tied).

Efficiency Mitigation Strategies

This section is dedicated to reducing the volume of university-wide emissions by curbing carbon demand through the adoption of new technologies, techniques, and governance. These solutions are designed to highlight and augment the university Energy Manager's efforts by institutionalizing a support system involving the greater campus community. This system of support involves groups tasked with implementing and tracking building efficiency measures and policies. This effort serves as the institutional apparatus responsible for bringing climate neutrality into the energy management decision-making process. The following mitigation strategies support climate action efforts for efficiency:

EFFICIENCY MITIGATION STRATEGIES

20. Create a Sustainable Building Task Force for new construction
    S *SDG: 3,7,9,12*
21. Review design and construction guidelines
    S *SDG: 3,5,7,9,10,12*
22. Adopt and implement aggressive sustainable building standards
    M *SDG: 3,7,9,12*
23. Create Energy Efficiency Task Force (recommissioning team for existing and new buildings)
    SM *SDG: 7,9*
24. Implement Strategic Energy and Water Management Plan
    S *SDG: 6,7,9*
25. Enforce and manage energy policy
    • Campus space heaters
    • Campus thermostats and set points
    S *SDG: 7,9*
26. Expand advanced room scheduling
    • Align with design and construction guidelines
    • Align with the campus GreenSuite program
    • Align with Conference & Camp Services
    • Align with University Events
    • Expand use of Events2HVAC software
    S *SDG: 7,9,12*
27. Continue campus LED Replacement Plan
    S *SDG: 9,12*
28. Strengthen steam trap maintenance program
    S *SDG: 7*
29. Initiate campus insulation review
    • Chilled water system
    • Steam heat exchanger
    • Building insulation
    ML *SDG: 7*

Funded by NRLP, ASUREI, and the Office of Sustainability, the LED Cart is a mobile light replacement cart the university uses to educate employees about LED light bulbs.

30. Investigate economizer for boiler #4
    M *SDG: 7*
31. Support campuswide alternative workweek schedule and telecommuting
    S *SDG: 3,8,9,11,12*
32. Research innovative solutions
    • Super-insulated building envelope
    • Window film applications
    • Daylight enhancement systems, such as Helio stats, light tubes, fiber optics, internal or external light shelves, and/or refractive films
    ML *SDG: 9,12*
33. Create Green Laboratory program to promote the following core strategies into the design or redesign of all major laboratory spaces:
    • Reduce air supply rates to the minimum allowed
    • Install auto-closing sashes and vertical and horizontal sash restrictors on large hoods
    • Enable sash-interlocked, constant face velocity fume hood control
    • Install heat/energy recovery on exhaust
    • Optimize HVAC zoning between wet labs, dry labs, and office spaces.
    SM *SDG: 4,9,12*
34. Maximize energy savings funding opportunities (1292 Carry Forward Fund Opportunities)
    SML *SDG 7,9*

Events2HVAC acts as a bridge between room and HVAC schedules. Automated synchronization produces significant energy and labor savings.

Behavior and Institutional Change Mitigation Strategies

This section discusses options for reducing the university's emissions through behavior modification. The *AppCAP 1.0* projects that roughly one fifth of the university's emissions could be avoided by altering personal interactions with the built environment and by redefining traditional social patterns that are intrinsically carbon-intensive. Solutions in this category provide App State the opportunity to embrace the financial responsibility of climate change and create the institutional space for systemic changes to occur. They align into three areas: energy end-user interaction, purchasing, and transportation.

Solutions in this category are also deeply connected to operational opportunities to reduce emissions. An example of this is the creation of the GreenSuite program. GreenSuite is a collection of seven programs designed to engage the campus community in efforts to incorporate more sustainable practices into their workplace and personal lives. These are designed to offer behavioral and operational solutions in support of climate action and climate justice.

GREENSUITE
appal/events/labs/living/purchasing/travel/workplace
PROGRAMS FROM THE OFFICE OF SUSTAINABILITY

Campus stakeholders are encouraged to collaborate with the Office of Sustainability to take part in the various programs in order to meet campus sustainability and climate action goals. Students are encouraged to reference the GreenLiving Guide and certify their residence hall rooms through GreenAppal, gaining recognition for their efforts.

ENERGY END USER INTERACTION

The solutions outlined below are designed to target daily campus users. The primary goal is to reduce campus energy consumption. The majority of campus users have daily opportunities to support energy reduction. The cumulative effect of this effort can have a significant impact. These mitigation strategies also promote energy education and a culture of campuswide energy conservation:

35. Introduce GreenSuite Program
   • Green Appal
   · Green Purchasing
   • Green Events
   · Green Travel
   • Green Lab
   · Green Workplace
   • Green Living Guide
   S *SDG: All*
36. Promote campus energy policies and recommendations
   S *SDG: 3,7,12*
37. Create personal appliance policies and recommendations
   M *SDG: 3,7,12*
38. Expand paperless processing with digital signatures/DocuSign
   S *SDG: 12*

The Green Events Guide is a program within GreenSuite that educates users about how to host low-carbon and zero waste events, such as this one in Plemmons Student Union.

39. Expand campuswide copier and printing policy
   • Eliminating personal copiers/printers
   • Draft quality
   • Limited color printing
   • Ink- and paper-saving fonts
   • Printing preferences
   • Double-sided policy
   S *SDG: 12*
40. Create computer sleep mode policy
   S *SDG: 12*
41. Implement energy efficiency continuing ed/ professional development program for staff
   • For on-campus energy professionals in BA and SA (pre-existing accredited programs)
   • Advanced Integrated Project Delivery
   • Energy positive building design
   S *SDG: 3,4*
42. Conduct energy efficiency outreach and education campaign
   • Target campus units that receive an energy bill
   • Finance and Administration update meetings and office managers training
   • New faculty orientation
   • New staff orientation
   • Students: Sustainability Ambassadors, Eco reps, SGA, green clubs, Residential Learning Communities/Living Green (RLCs), Ambassadors, Student Orientation Undergraduate Leaders (SOULS), Greek organizations
   SM *SDG: 3,4*

PURCHASING

These solutions are designed to educate campus decision makers about purchasing and procurement opportunities that support carbon reduction while choosing environmentally preferred and socially responsible products and services. The following mitigation strategies focus on reductions, durability, energy efficiency, supply chain efficiencies, and climate justice opportunities:

43. Promote sustainable purchasing within GreenSuite
    S *SDG: 3,7,9,12,17*
44. Create a policy for energy efficient appliances
    SM SDG: *7,12*
45. Conduct campus sustainable purchasing guideline outreach and education campaign
    SM *SDG: 3,7,9,12,17*
46. Create campuswide sustainable purchasing policy
    M *SDG: 3,7,9,12,17*
47. Develop embodied carbon purchasing recommendations and metrics
    SM *SDG: 3,7,9,12,17*
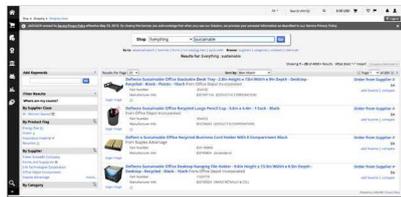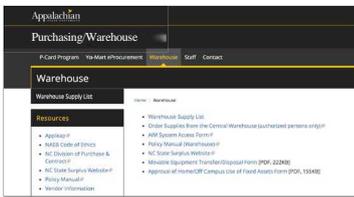
GREENPURCHASING GUIDE 3МйЖШ

The Office of Sustainability guides and supports the university in its sustainability commitment by developing strategic goals that prioritize institutional commitment to sustainability, catalyzing campus community around a shared vision for a sustainable world.
The goal of this green purchasing guide seeks to increase and streamline procurement of environmentally preferred and socially responsible products, specifically office supplies, within the university's departments and offices.

WHAT IS SUSTAINABLE PURCHASING?
Sustainable purchasing is the practice of purchasing goods that serve the same functional purpose as traditional products but mitigate negative effects on human health and the environment. This includes evaluating products throughout their entire life-cycle, known as a life-cycle assessment, from extraction, production, use, and disposal, re-use or recycling. Sustainable products often share some or all of the following characteristics:
• Low-emitting volatile organic compounds (VOCs)
• Made from some or all recycled content
• Reduced energy and water usage
• Minimized waste and pollution
• Produced using renewable energies
• Locally sourced
• Socially responsible

WHY DOES PURCHASING SUSTAINABLE PRODUCTS MATTER?
Earth has a finite amount of resources. From a material perspective, purchasing sustainable products can reduce the extraction of raw materials. Sustainable goods, especially cleaning products, may improve human health by increasing indoor air quality and reducing human exposure to toxic chemicals.
Often, green products use less electricity, are made more efficiently, or are made using renewable energy sources, all of which reduce carbon emissions. Financially, these products are often less costly than traditional goods when considering the product's entire life cycle.

APPSTATE'S SUSTAINABLE PURCHASING GOAL
Sustainable Purchasing is one of many initiatives the Office of Sustainability is pursuing to support the university's sustainability goals. Every purchase should consider sustainably sourced products over traditional products. As a general rule: if a sustainable product has equivalent functionality compared to a traditional product and is the same price or cheaper, always choose the sustainable option.

ZERO WASTE
Through thoughtful purchasing decisions, reducing consumption and increasing recycling we can reduce what we send to the landfill. Using this purchasing guide helps reduce unnecessary and wasteful purchasing.

CLIMATE NEUTRALITY
App State is striving to be a climate neutral campus. To help us reach these goals, we must practice responsible, sustainable purchasing in the products that we use on campus every day. Responsible purchasing includes considering the life cycle of each product.

HOW TO PARTICIPATE:
Anyone can participate, it's easy! Whether you are buying goods for the office, or even your home or a friend, finding sustainably sourced products is usually just a keyword and click away. The following guide denotes how to find these products and what to look for when shopping from your favorite suppliers.

Green purchasing guidelines are part of GreenSuite, a collection of seven programs designed to engage the campus community in efforts to incorporate more sustainable practices into their workplace and personal lives.

App State's online marketplace is one of several tools used to optimize sustainable purchasing options.

TRANSPORTATION

The strategies listed as numbers 48-69 focus on reducing emissions through campus transportation opportunities. These mitigation strategies focus on a wide range of carbon reduction initiatives designed to support climate-friendly choices:

48. Promote Green Travel program
    S *SDG: 3,7,9,12,17*
49. Create offset program for all ground and air travel
    S *SDG: 9,12*
50. Add carbon tracking and offset option to travel authorization form
    S *SDG: 9,12*
51. Create campus carbon tracking and accounting support tools
    S *SDG: 9,12*
52. Create electric vehicle (EV) parking incentives
    S *SDG: 7,9*
53. Expand campus charging infrastructure
    • Install EV fast charge unit
    • Conduct campus parking lot EV needs assessment
    S *SDG: 9,12*
54. Conduct survey for campus EV users
    S *SDG: 9,12*
55. Promote Motor Fleet EVs to campus users
    S *SDG: 7,9,12*

Promoting the use of Motor Fleet EVs to campus users is one strategy to decrease emissions as long as electricity is renewably sourced. This campus parking lot charger is powered by photovoltaic panels.

COMMUTING

The following mitigation strategies promote reducing and/or eliminating the carbon footprint associated with commuting to and from campus for faculty, students, and staff:

56. Expand and support teleworking
    S *SDG: 3,8,9,10,12*
57. Expand online learning
    SM *SDG: 4,9,10,12*
58. Develop compressed course scheduling
    SM *SDG: 4,9,12*
59. Increase <u>Carbon Neutral Commuter</u> program participation rate
    • Improve point of sale process
    • Increase participation to 50%
    • Increase participation to 75%
    S *SDG: 12*
60. Identify AppalCART opportunities
    • Develop park and ride program
    • Increase commuting ridership
    • Support AppalCART EV program and infrastructure
    SML *SDG: 9,12*

DIRECTLY FINANCED AIR AND GROUND TRAVEL

The following mitigation strategies promote reducing and/or eliminating the carbon footprint associated with all non-commuting university-sponsored travel:

61. Support teleconferencing by developing university recommendations and guidelines
    S *SDG: 3,8,9,10,12*
62. Create voluntary offset program via GreenTravel program
    • Set an initial participation target of 20%
    • Increase participation to 50%
    • Increase participation to 75%
    SM *SDG: 9,12*

STUDY ABROAD

The following mitigation strategies promote reducing and/or eliminating the carbon footprint associated with study abroad programs and university-sponsored international travel:

63. Increase online global opportunities
    S *SDG: 4,10,12,16,17*
64. Create voluntary offset program via GreenTravel program
    • Set an initial participation target of 20%
    • Increase participation to 50%
    • Increase participation to 75%
    SM *SDG: 9,12*

A voluntary offset program for global travel aims to reduce or eliminate emissions involved with students traveling overseas, such as with the Solar Vehicle Team in Australia (above, top) and an Ecological Building and Design course in Peru, (above, bottom).

CAMPUS RIDESHARE

The mitigation strategies below focus on the improvement of infrastructure and opportunities to utilize human-powered transportation as a strategy to reduce carbon emissions:

65. Submit campus bicycle and/or scooter program request for proposals (RFP)
    S *SDG: 12*
66. Pilot rideshare
    S *SDG: 12*
67. Conduct rideshare impact report and user survey after first year
    S *SDG: 12*
68. Support town/campus infrastructure - bike lanes, racks, etc.
    L *SDG: 3,10,12*
69. Improve and expand campus infrastructure and planning for human-powered transportation
    SML *SDG: 9,10,11*

REFRIGERANTS

Refrigerants have an exponentially greater capacity to warm the atmosphere than carbon dioxide. Reducing hydrofluorocarbon (HFC) losses from cooling appliances is a very important step to lessening harmful greenhouse gas emissions. The following mitigation strategies support climate action efforts that focus on refrigerants:

70. Review refrigerant capture policy and practice
    S *SDG: 12*
71. Update campus refrigerant inventory
    S *SDG: 12*
72. Create campus refrigerant guidelines and/or policy around repair protocol/best practices
    M *SDG: 9,12*
73. Align with GreenLabs program
    M *SDG: 9,12*

Disposal *of refrigerants, such as those in the Holmes Center, is an important component in reducing emissions.*

CARBON SEQUESTRATION

The *AppCAP 1.0* outlines a variety of carbon sequestration strategies, such as composting, long-term land holdings, and biochar. Composting is the process of converting food waste into soil or mulch. These products are then used for landscaping, gardens, and crop soil. When food is disposed of and sent to a landfill to decompose, it emits methane gas, which traps heat in the atmosphere at a rate 25 times higher than carbon dioxide. Compost offsets GHG emissions while creating a multitude of co-benefits.

App State currently maintains 970 acres of forest that are protected in long-term conservation easements, which ensure these forests sequester carbon out of the atmosphere for decades. Additional research is needed to measure the specific impact of App State's land holdings.

Biochar is a charcoal-like substance made by burning organic material from agricultural and forestry wastes (also called biomass) in a controlled process called pyrolysis. Although it looks a lot like common charcoal, biochar is produced using a specific process to reduce contamination and safely store carbon. Additional research is needed to identify campus biochar opportunities.

Ongoing research in App State's "Nexus" facility includes field trials with anaerobic digestion and inoculated biochar.

The following mitigation strategies support climate action efforts focusing on carbon sequestration:

74. Improve compost infrastructure
    S *SDG: 1,2,3,4,9,12,15*
75. Continue on-campus expansion of composting drop-off locations
    S *SDG: 1,2,3,4,9,12,15*
lb. Improve waste data tracking and reporting
    S *SDG: 1,2,3,4,9,12,15*
77. Expand university-owned properties suitable for conservation easements
    SM *SDG: 4,14,15*

78. Evaluate potential to acquire additional deed-protected land holdings
    ML *SDG: 4,14,15*
79. Develop plan to maximize carbon sequestration for current and future land holdings
    ML *SDG: 4,14,15*
80. Use biochar strategies in campus gardens
    SM *SDG: 9*
81. Support campus biochar research projects
    SM *SDG: 4,9*

Additional Strategies

Many of the solutions outlined below are either strategies to support campus climate action efforts, or require further research and/or development.

ZERO WASTE

Zero waste efforts reduce climate impacts. The U.S. EPA has estimated roughly 42% of all greenhouse gas emissions are caused by the production and use of goods, including food, products, and packaging. Reducing, reusing, and recycling conserve energy, resulting in reduced carbon emissions. The following mitigation strategies support climate action efforts that focus on zero waste:

a. Strengthen zero waste efforts to support campus zero waste plan
   SM *SDG: 6,9,11,12*
b. Decrease overall waste stream
   SM *SDG: 6,9,11,12*
c. Increase diversion rates
   SM *SDG: 6,9,11,12*
d. Increase compost throughout campus
   SM *SDG: 6,9,11,12*

App State has a long history of supporting zero waste initiatives, including Zero Waste Stadium (top) and composting programs (bottom). Visit here for more information.

FOOD

Food has numerous negative environmental impacts and accounts for over a quarter of global greenhouse gas emissions. These emissions are a result of production, post-farm processing, and distribution. The *AppCAP 1.0* strategies focused on food will attempt to limit the production range, reduce food waste, and support more advanced tracking methodologies. The following mitigation strategies support climate action efforts that focus on campus food opportunities:

Terra Verde is popular for plant-based dining.

a. Improve tracking structure for campus dining inventory
   S *SDG: 12*
b. Establish 30%-35% as a local and low-carbon foods target for 2025
   M *SDG: 12*
c. Establish 40%-45% as a local and low-carbon foods target for 2035
   L *SDG: 12*
d. Broaden impacts of campus gardens and the university's Sustainable Development Farm and other local farms
   S *SDG: 8,9,10,11,12*
e. Identify carbon sequestration opportunities via agricultural solutions
   S *SDG: 12*
f. Expand food waste diversion
   S *SDG: 12*
g. Create a full-time sustainability position in Campus Dining
   M *SDG: 8,9,12*
h. Increase education and outreach to promote climate-friendly dining options
   S *SDG: 4,12*

Campus Dining at App State is self-operated and employs local staff for food preparation, service and catering. Locally sourced food benefits the local economy.

EMBODIED CARBON

The impacts of embodied carbon are a significant contributor to the climate crisis. Embodied carbon is the sum of all the greenhouse gas emissions resulting from the mining, harvesting, processing, manufacturing, transportation, and installation of building materials. Embodied carbon emissions are released during the construction process beginning with sourcing materials and ending with the completion of construction. Architecture 2030, a non-profit organization focused on improving the carbon footprint of the built environment, estimates that 80% of global greenhouse gas emissions will come from embodied emissions, which highlights the urgency to make smart choices during design and construction. The *AppCAP 1.0* outlines efforts to analyze the potential impacts of embodied emissions, as detailed in the following mitigation strategies:

a. Strengthen Embodied Carbon Working Group efforts
   S *SDG: 9,11,12*
b. Identify and support research opportunities to investigate embodied carbon impacts and solutions
   S *SDG: 9,11,12*
c. Strengthen involvement in the Carbon Leadership Forum
   S *SDG: 9,11,12*
d. Pursue and develop additional learning opportunities focusing on embodied carbon
   S *SDG: 9,11,12*

Global CO$_2$ Emissions by Sector
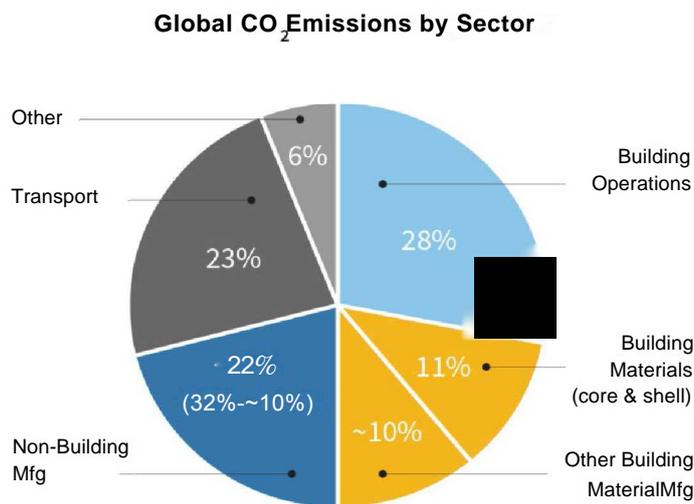
Adapted from 2019 Global Status Report, Global Alliance for Building and Construction (GABC) and Architecture 2030.

Total Carbon Emissions of Global New Construction from 2020-2050

Business as Usual Projection
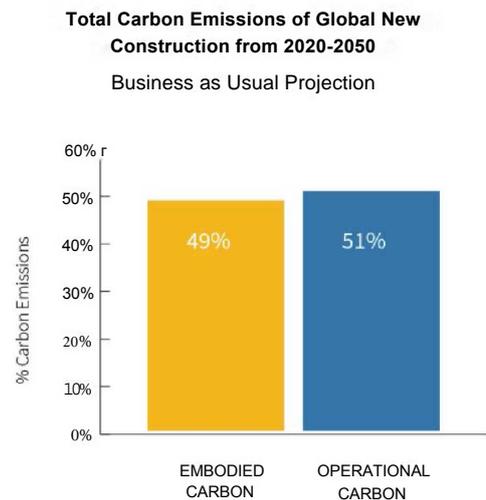
©B 201s 2030.Inc/Architecture 2030.All Rights Reserved. Data Sources: UN Environment Global Status Report 2017; EIA International Energy Outlook 2017
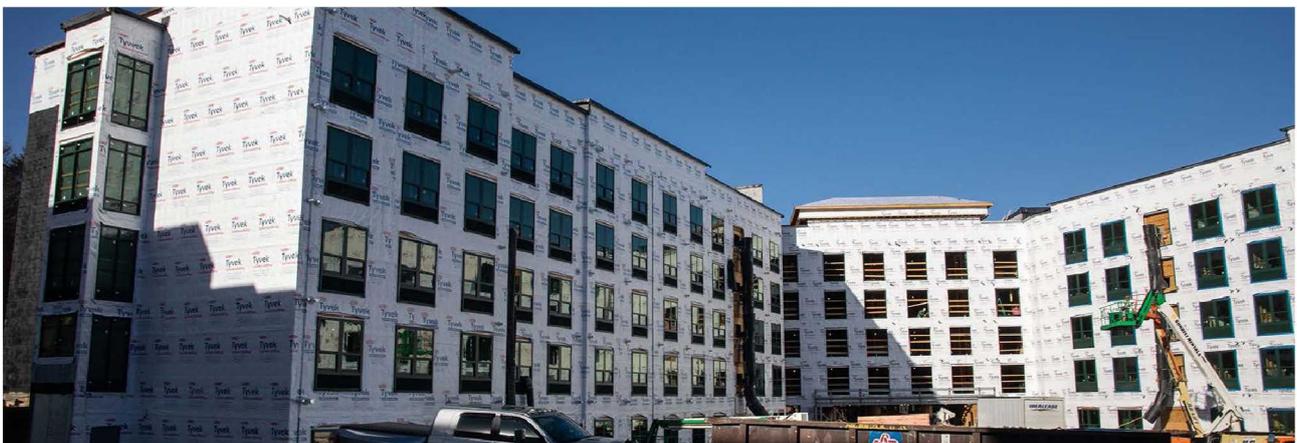
Laurel Creek Residence Hall in January of 2021, as seen from Raven Rocks Residence Hall. The university's Planning, Design, and Construction team works closely with architects, engineers, and builders throughout the design and construction of new buildings to ensure sustainable design guidelines are followed.

ACADEMIC INTEGRATION

Building on the university's long-standing tradition of sustainability education and its more recent focus on climate education and climate justice, App State has the opportunity to support these efforts through curriculum, research, and faculty engagement. This enhances student learning by providing them with opportunities to participate in hands-on applied research, co-curricular activities, and community engagement experiences that support climate education, climate action, and climate justice. The following recommendations are designed to support excellence and innovation in curriculum design, teaching, research, scholarship, and creative activities:

a. Create a campuswide climate education coordinator
   S *SDG: 4*

b. Create a campuswide climate education learning community
   S *SDG: 4*

c. Continue the campuswide climate education faculty reading program
   S *SDG: 4*

d. Support efforts to include climate education in campus General Education curriculum
   S *SDG: 4*

e. Create a searchable database of faculty engaged in scholarly activities that support sustainability, climate research, and climate justice
   SM *SDG: 4*

f. Map existing climate literacy efforts on campus
   S *SDG: 4*

g. Create a climate research collective
   S *SDG: 4*

h. Identify and support courses that conduct climate action research
   SM *SDG: 4*

i. Conduct climate literacy assessment for faculty, staff, and students
   S *SDG: 4*

j. Expand scholarships opportunities for students interested in sustainability and climate issues
   SM *SDG: 4*

k. Continue to strengthen the intersectionality between climate justice and social justice
   S SDG: *3,4,5,8,10,11,16*

l. Host a multidisciplinary climate education summit
   S *SDG: 4*

m. Enhance "Campus as a Living Laboratory" opportunities for climate education and research
   SM *SDG: 4*

n. Increase faculty development for climate education
   S *SDG: 4*

o. Search for climate expertise in new hires for faculty
   SM *SDG: 4*

p. Expand *Bending the Curve* curriculum initiative
   SM *SDG: 4*
   • Utilize TA support
   • Add App State-generated content to reflect local/regional issues
   • Involve additional departments
   • Explore General Education integration

q. Offer a climate literacy course in the beginning of the semester at a large campus venue
   SM *SDG: 4*

r. Identify and create additional co-curricular climate education opportunities (build tracking and cohesion across multiple campus entities)
   SM *SDG: 4*

s. Expand community engagement opportunities for sustainability and climate action
   SM *SDG: 4,11*

t. Strengthen Appalachian Energy Summit climate education efforts
   SM *SDG: 4,9*
   • Academic Integration Working Group climate education support
   • Climate action poster competition
   • Support local government climate action efforts
   • Support climate smart agriculture

The Impact Clinic pairs teams of faculty and students with local businesses to evaluate the economic, ecological and equity impacts of the businesses' operations. In this case, a local hair salon owner benefits from the advice of one of the clinic's teams.

## RESEARCH AND SCHOLARLY ACTIVITIES

App State has a long-standing history of supporting climate research and other scholarly and creative activities. These activities are critical to the advancement of innovative climate solutions. These efforts also provide students with campus engagement opportunities in a "Living Laboratory." The following list of research and scholarly activities further the goals of the *AppCAP 1.0*:

a. Conduct return on investment analysis of *AppCAP 1.0* solutions
b. Conduct carbon reduction on investment analysis of *AppCAP 1.0* solutions
c. Perform *AppCAP 1.0* UN Sustainable Development Goals analysis
d. Conduct campuswide UN Global Sustainable Development Goals analysis
e. Conduct *AppCAP 1.0* Project Drawdown analysis
f. Conduct climate action planning dashboard case study
g. Research campus microgrid opportunities
h. Research campus battery storage opportunities
i. Conduct advanced HVAC/ controls research
j. Continue campus photo-voltaic research
k. Support EV grid interaction research
l. Explore peak-shaving with EV batteries
m. Research climate-smart agriculture
n. Explore the use of data analytics for energy reduction
o. Create embodied carbon and supply chain metrics and accounting
p. Create ecosystem services design tool for the built environment
q. Explore energy positive and generous design techniques for the built environment
r. Explore campus applications for biochar
s. Research climate impacts on regional public health

NEW RIVER LIGHT 8 POWER

For more than 100 years, Appalachian State University's New River Light & Power (NRLP), a regulated electric utility operated by App State's Division of Business Affairs, has provided power to Western North Carolina residents. Today, NRLP serves nearly 8,500 residential and commercial customers who reside in and near the town of Boone. In January 2022, the utility will begin purchasing its electricity from Carolina Power Partners. This partnership will significantly expand renewable energy opportunities for campus and the surrounding NRLP service area. The following are mitigation strategies through which NRLP will contribute to campus and community climate action efforts:

a. Drive growth in clean energy to support the grid
   SM *SDG: 7,9,11,12*
b. Research the development of renewable energy incentives that benefit the utility and the customer
   SM *SDG: 7,9,11,12*
c. Pursue purchased clean energy opportunities for campus
   SM *SDG: 7,9,11,12*
d. Pursue purchased clean energy opportunities for NRLP's customers
   SM *SDG: 9,11,12*
e. Develop climate action plan for NRLP
   S *SDG: 7,9,11,12*
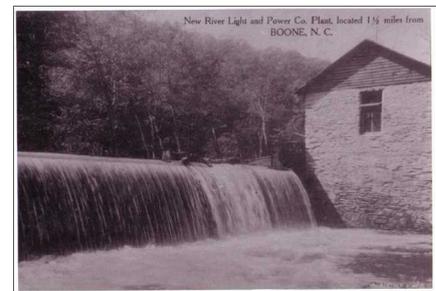
Since 1915, NRLP has provided electricity to AppState.

UNIVERSITY RESILIENCE

University resilience focuses on the capability of a higher education institution to continue the primary missions of education, research, and community engagement despite potentially disruptive events. The ongoing climate crisis is currently contributing to disruptive events all around the world. In order to prepare for this, the following is a list of strategies that support the campus and its surrounding communities:

a. Create Campus and Community Resiliency Working Group
b. Map university and community resilience attributes
c. Conduct Campus and Community Resilience Assessment
d. Identify campus and community research that supports resilience efforts
e. Develop a campuswide resiliency plan

AppalCART was recently awarded more, than $1 million in grants toward the purchase of an electric bus and charging station. Expanding EV options contributes to resiliency efforts.

FUNDING STRATEGIES

Most climate action strategies require financial resources. Many of these resources are acquired through the development of partnerships and creative fundraising strategies. The following is a list of the funding strategies for the solutions outlined in the *AppCAP 1.0:*

a. Increase grant writing capacity
b. Continue collaboration with University Advancement to secure external funding
c. Identify organizational efficiencies
d. Create green revolving loan program
e. Maximize energy savings funding opportunities (1292 Carry Forward Fund)
f. Continue partnership with ASUREI to maximize carbon reductions
g. Create internal offset program for travel
h. Strengthen industry partnerships

The student-led App State Renewable Energy Initiative (ASUREI) uses student funds to install and maintain renewable energy projects.

COMMUNITY PARTNERSHIPS

As an anchor institution, App State has the opportunity and responsibility to support local, regional, and global climate action efforts. Climate change is a global issue, but many of the solutions begin at the community level. An important aspect of the *AppCAP 1.0* is to help integrate community-based climate action efforts. App State seeks to strengthen these local and regional collaborations through the identification of solutions that provide mutual benefits for all. The following are some of App State's local and regional partners:

a. Town of Boone
   • Sustainability Committee
   • Sustainability Coordinator
b. Watauga County
c. AppalCART
d. Watauga Food Council
e. Appalachian Regional Healthcare System
f. High Country Council of Governments (HCCOG)
g. Boone Area Chamber of Commerce
h. Watauga, Avery, and Ashe Cooperative Extensions
i. Appalachian Regional Commission

AppalCART is the transportation authority serving Watauga County with fare-free bus routes. Pictured is the Belk Library traffic circle's solar array, which powers the schedule board and lights in the shelter.

COMMUNICATION PLAN

The success of the *AppCAP 1.0* relies on a well-designed and executed communication plan. The intent of this communication plan is to raise awareness, provide access to data, and foster a deeper understanding of the challenges and opportunities associated with the plan's climate mitigation efforts. The following are the primary communication strategies for the *AppCAP 1.0:*

a. Develop *AppCAP 1.0* website
b. Develop *AppCAP 1.0* dashboard
c. Develop solution progress tracking tools
d. Continue social media support (Facebook, Instagram, Twitter, LinkedIn)
e. Continue campuswide website integration to support climate action efforts
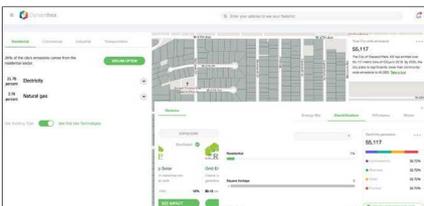
In development is the AppCAP 1.0 accounting dashboard, similar to the one shown here of Roeland Park, K.S., from Dynam hex. The dashboard will allow building-by-building data analytics to specifically address where App State's greenhouse gases are generated.

The most current information about App State's climate action plans is available on the Sustain Appalachian website.

An Institutional Priority

Achieving carbon neutrality for any university is a matter of institutional prioritization, financial possibility, and human will. In order for Appalachian State University to achieve carbon neutrality, the action items of *AppCAP 1.0* must become core tenets of the university decision-making process. In addition, this plan strongly encourages the university to pursue the following strategies:

- **Procure** carbon-free energy for electricity and heating needs
- **Engage** in deep efficiency and institutional modification to lower demand and cost
- **Transfer** the transportation workload to the electricity sector
- **Negate** any remaining emissions with the purchase of carbon offsets

Starting in January 2022, NRLP's contract with Carolina Power Partners provides the university the ability to **procure** renewable electricity. If the university sourced 100% of its electricity in this manner, then campuswide emissions would reduce by approximately 40%. Preliminary estimates indicate the cost for renewable electricity would increase the university's utility budget by roughly $1 million annually. However, wholesale electricity rates are highly vulnerable to market fluctuations.

The decarbonization of the heating sector has the potential to reduce roughly another 30% of the university's footprint. If this were to occur through electrification of the central steam plant, the electric utility budget is estimated to increase by $2.3 to $2.8 million annually with the additional cost of $800,000 to secure renewable electricity for this increased demand. Further research and analysis is needed to determine how to appropriately decarbonize these campus energy systems.

Campuswide carbon neutrality efforts also require stringent efficiency measures that **engage** all sectors of campus activities. Institutional modifications ranging from complex building automation systems to the empowerment of community members to simply turn off lights are examples of strategies in this plan that can help lower the university's demand on the local electricity grid. The financial benefit of avoided energy costs can help cover the increase to utility costs until renewable energy reaches the same price point as fossil fuel energy.

The **transfer** of energy sources for the transportation sector from fossil fuels to the electric grid is much more difficult to evaluate and will require further analysis. The majority of the carbon footprint in transportation is dependent on the availability and adoption rates of zero emission vehicles within private or commercial markets. The adoption rate of electric vehicles into these markets is not something the *AppCAP 1.0* can determine. However, campus investment in electrification can reduce emissions and maintenance costs. The EV market is still developing in the region, but the market signals are clear. Preparing for the anticipated increase in EV adoption will strengthen App State's leadership, modernize the university, and help meet the goals of *NC Executive Order 80.*

If all the mitigation strategies suggested in the *AppCAP 1.0* are achieved, then the cost to **negate** the remainder of App State's footprint, using current carbon pricing, is estimated to range from $50,000 to $75,000 annually. The cost of negating emissions through offsetting is expected to change as the national carbon markets evolve and market competition increases.

This *AppCAP 1.0* outlines a broad spectrum of the work needed to accelerate campus climate action initiatives. However, the plan is not without its challenges. Successful implementation of the climate mitigation strategies outlined in this document will require patience, tenacity, additional research, collaboration, and creative financing. Appalachian State University is committed to this process and will continue its climate action efforts with a great sense of urgency.
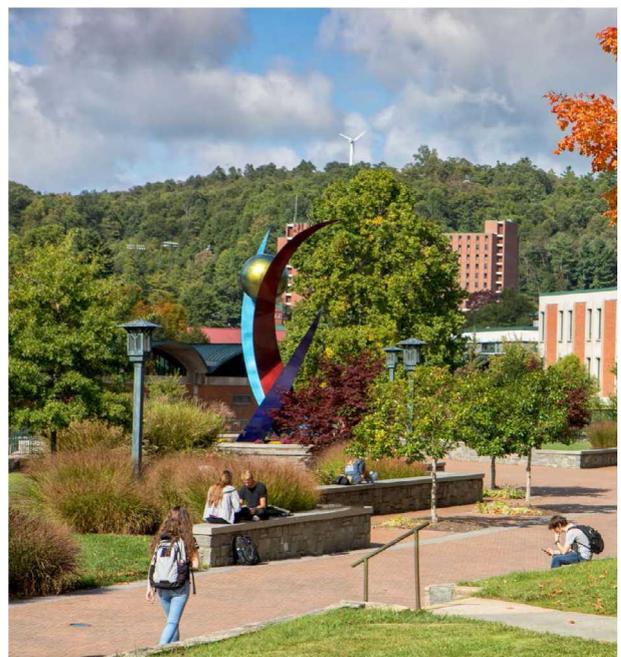
App State aspires to achieve carbon neutrality and recognizes the AppCAP 1.0 as a critical university-wide decision-making support tool.

Appendix

Terms

Climate Action Plan (CAP): a road map that outlines the specific actions necessary to reach carbon reduction goals

Climate Neutrality: the state of existence where an entity's net greenhouse gas (GHG) emissions is zero

Executive Order No. 80: North Carolina's commitment to address climate change and transition to a clean energy economy, signed into effect by Governor Roy Cooper on October 29, 2018

Full Time Equivalent (FTE): used to report number of students, faculty, and staff based on full-time work status or course load requirements

Greenhouse Gas (GHG): atmospheric gases that contribute to the greenhouse effect, including water vapor, carbon dioxide, methane, and nitrous oxide

Global Warming Potential (GWP): the heat absorbed by any greenhouse gas in the atmosphere over a particular timeframe. The GWP of all gases is reported relative to carbon dioxide, which has a GWP of 1

Market-Based Reporting: a method of reporting greenhouse gas emissions that considers emission factors dependent on market variables in which the generation and sales transactions occur. For more information, visit this link

Metric Tons of Carbon Dioxide Equivalent (MT eCO$_2$): a metric used to quantify emissions from six greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) as established by the Kyoto Protocol. Carbon dioxide is the reference gas for global warming potential

Paris Agreement: an international treaty sponsored by the United Nations Framework on Climate Change in 2016 that sets a global framework to reduce greenhouse gas emissions. For more information, visit this link

Second Nature: the reporting platform App State uses to exhibit campus emissions from 2007 to present. For more information, visit this link

SIMAP: the carbon-accounting platform used by App State to record, track, and analyze campuswide emissions. For more information, visit this link.

The 35-panel Plemmons Student Union solar-thermal system, pictured in foreground, was the first large-scale system installed on campus in 2009. This system preheats water used in restrooms, fitness center locker rooms and the building's food service areas. The most recent solar-thermal system installed on campus, pictured on the right, is located on the Reich College of Education (RCOE). This system uses four panels for preheating water for RCOE restrooms.

Supporting Resources

UNC System Sustainability Policy
https://www.northcarolina.edu/apps/policy/index.
php?section=600.6.1

North Carolina - Executive Order 80
https://files.nc.gov/ncdeq/climate-change/EO80-
NC-s-Commitment-to-Address-Climate-Change—
Transition-to-a-Clean-Energy-Economy.pdf

Second Nature Climate Commitment
https://secondnature.org/signatory-handbook/
the-commitments/

"We Are Still In" Declaration
https://www.wearestiHin.com/we-are-stiH-declara-
tion

UN's Sustainable Development Goals
https://sdgs.un.org/goals

Paris Agreement background information
https://unfccc.int/process-and-meetings/the-par-
is-agreement/the-paris-agreement

IPCC Reports
https://www.ipcc.ch/reports/

Carbon Leadership Forum
https://carbonleadershipforum.org/

EPA - Global Greenhouse Gas Emissions Data
https://www.epa.gov/ghgemissions

1292 Carry Forward Fund Opportunities
https://files.nc.gov/ncdeq/Environmental%20Assis-
tance%20and%20Customer%20Service/Utility%20
Savings%20Initiative/General%20Statutes/Universi-
ty%20Carry%20forward.pdf

EPA - Understanding Global Warming Potentials
https://www.epa.gov/ghgemissions/understand-
ing-global-warming-potentials

Sustainability Tracking, Assessment & Rating System™ (STARS)
https://stars.aashe.org/

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Office of International Education and Development
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Looking east into the sunrise from the Blue Ridge Parkway in Watauga County.