

# Current Status and Potential Solutions for a Carbon Neutral, Climate Resilient Rutgers

*Phase 2 Report of the President's Task Force on Carbon Neutrality and Climate Resilience*



**RUTGERS**

Office of the President  
TASK FORCE ON CARBON NEUTRALITY  
AND CLIMATE RESILIENCE

January 2021

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# A CALL TO ACTION

The science is clear: climate change is real, humans are responsible for it, and its impacts are increasingly severe throughout the world, including here in New Jersey. Sea-level rise associated with global warming is responsible for about 70% of tidal flooding along the Jersey Shore, and in the absence of global sea-level rise, Hurricane Sandy would have flooded about 38,000 fewer New Jerseyans. A warmer atmosphere is increasing the frequency of intense rainfall events, such as those New Jersey experienced during Hurricanes Floyd and Irene. Heat waves are becoming more intense and frequent, causing deleterious impacts on human health.

The only way to stabilize the global climate is to bring net human-caused carbon dioxide emissions to zero – meaning every amount of carbon dioxide emitted into the atmosphere must be balanced by the deliberate removal of an equal amount – and to reduce sharply emissions of other greenhouse gases. According to the Intergovernmental Panel on Climate Change, achieving the Paris Climate Agreement’s most ambitious goal, that of limiting warming to 1.5°C, requires global net-zero carbon dioxide emissions by about 2050. And yet even 1.5°C of warming leaves significant residual risk to which individuals, businesses, universities, governments – and, indeed, all of society – must adapt.

It is in the context of these challenges that then President Barchi established Rutgers’ **President’s Task Force on Carbon Neutrality and Climate Resilience** in September 2019. The purpose of this Task Force is to develop Rutgers’ strategies for contributing to achieving global net-zero carbon dioxide emissions (‘carbon neutrality’) and for enhancing the capacity of the University and the State of New Jersey to manage the risks of a changing climate (‘climate resilience’).

Today, amidst the COVID-19 crisis, the Task Force continues its work under the leadership of President Holloway. Over the last year, national and local situations have changed dramatically as a result of the COVID-19 pandemic. This immediate emergency does not reduce the importance of developing a robust, cutting-edge Climate Action Plan for the University. Unlike the economy, the climate crisis is not on pause; the planet’s geophysical constraints do not stop for pandemics. Indeed, in some ways the present emergency has made the work of this Task Force more urgent.

## TASK FORCE GOALS

Develop Rutgers’ strategies for

1. **Carbon Neutrality:** contributing to achieving global net-zero carbon dioxide emissions
2. **Climate Resilience:** Enhancing the capacity of the University and the State of New Jersey to manage the risks of a changing climate

# DEVELOPING A CLIMATE ACTION PLAN

Despite the challenges posed by the COVID-19 emergency, the Task Force remains committed to its original goal of delivering a Climate Action Plan to President Holloway and the Boards of Governors and Trustees in summer 2021. This plan will identify an ambitious, yet achievable and feasible, timeframe and pathway for achieving carbon neutrality, and will also identify key metrics for assessing the University's vulnerability to the physical impacts of climate change and a strategic approach for reducing these vulnerabilities. It will also identify supportive educational, research, and engagement efforts, as well as mechanisms for financing and tracking progress. The Task Force has recently completed Phase 2, which is summarized in this report.

In this phase, the Task Force has operated through seven working groups, examining (1) energy and buildings, (2) transportation, (3) food and water, (4) supply chain, (5) land use and offsets, (6) climate preparedness, and (7) climate-positive, equitable economic development. Following the work plans they developed for the Interim Report, the working groups engaged in three categories of activities:

1. Establishing a baseline inventory of University greenhouse gas emissions, climate vulnerabilities, and ongoing climate-related activities.
2. Identifying potential climate solutions for investigation.
3. Assessing potential climate solutions, which will serve as the building blocks for the Climate Action Plan.

As outlined in the working group charges, potential solutions were assessed along a number of different dimensions such as anticipated outcomes, implementation, evaluation, accountability, and equity. Detailed charges for each working group are available on the Climate Task Force website ([climatetaskforce.rutgers.edu/about/working-groups](https://climatetaskforce.rutgers.edu/about/working-groups)).

## Next Steps

Based on the Task Force's experience during Phase 2, we are modifying our work plan for the remaining period between now and our expected delivery of the University Climate Action Plan to the President and governing boards in summer 2021.

The Phase 2 analysis has successfully identified a set of technical solutions with the potential to advance Rutgers toward carbon neutrality and enhanced resilience. In Phase 3, which will last through April, the Task Force will focus on three goals:

1. Identifying ambitious but achievable medium-term and long-term goals to provide an overarching framework for the Climate Action Plan.
2. Fleshing out financing, implementation, and management plans for high-value solutions, so that their execution can begin soon after the Plan is delivered, as well as elaborating ways in which potential solutions can be tied to academic initiatives.
3. Detailing a plan for the establishment of a unit with responsibility for Climate Action Plan governance, so that the University will be able to hit the ground running once the Plan is adopted.

In January and early February, the existing sectoral working groups will focus on goal 2. An eighth Working Group, on governance and financing, will focus on the description of the oversight unit in January-early February and will critique and refine the financing, implementation, and management plans developed by the sectoral working groups in late February and early March. The plans will be used to refine the overarching goals. We intend to release a Phase 3 report and have a third round of Town Halls in April. Feedback received on the Phase 3 report and through the Town Halls will be used to finalize the University Climate Action Plan.

The Working Group on climate-positive, equitable economic development has also identified three additional analyses that could be conducted by Rutgers experts during this semester:

1. A rapid Health Impact Assessment of proposed solutions to demonstrate the value of using health and health equity as a factor in selecting final actions.
2. An economic impact analysis of Rutgers purchasing, building requirements, HR changes (possibly IMPLAN analysis), which would also include social and environmental co-benefits. This analysis could explore job creation outcomes as a result of Rutgers adoption of climate positive practices, e.g. prioritizing hiring of employees from local community.
3. The Heldrich Center for Workforce Development and the School of Management and Labor Relations could assist in identifying the extent to which any proposed action has the potential to offer specific workforce development opportunities as part of the state's clean energy workforce policies/programs. These efforts could be communicated by the university to the Governor's office to identify opportunities for collaboration during the implementation of the Climate Action Plan.

## PHASE 2 STATUS UPDATE

The current emergency has had implications for the process of developing the Climate Action Plan. The Interim Report, released in July 2020, identified a few near-term activities that have been delayed. The status of those delays remains the same. Despite these challenges, the Task Force and its seven working groups have continued their work.

Since the Interim Report, the Task Force has:

- Assembled a Student Advisory Panel comprised of students from all four chancellor's units and co-chaired by the 5 student Task Force members.
- Opened and maintained social media accounts on Instagram, Facebook, Twitter, and LinkedIn.
- Conducted a University-wide survey of faculty, staff, and students to assess the greenhouse gas producing practices of the Rutgers community (See p. 6 for details).
- Held a workshop for all working group members, including over 100 faculty, staff, and students, to identify cross-cutting solutions and themes.
- Established an eighth working group to address governance and financing of the Climate Action Plan.
- Held another round of town hall meetings to present key working group findings to the Rutgers community and enlist their help envisioning a carbon neutral, more climate resilient Rutgers (See pp. 7-10 for details).

## PRINCIPLES GUIDING PHASE 2

Early in Phase 2, the Working Group on climate-positive, equitable economic development (Working Group 7) generated a guidance document to assist all of the working groups as they undertook their sectoral analyses. The document included considerations that each working group should keep in mind in order to promote climate-positive equitable economic development. Working Group 7 defines the concept of climate-positive equitable economic development:

*In pursuit of climate-positive, equitable economic development, Rutgers University will implement policies, programs, and projects that accelerate the socially equitable and inclusive transformation of New Jersey's economy to one that is powered by clean, renewable energy, produces net-negative carbon emissions, and is resilient to climate and related impacts and shocks.*

- **Climate-positive**, because it absorbs more carbon than it emits.
- **Equitable**, because everyone gets a fair share of benefits, costs, risks and the opportunity to have a say in making decisions.
- **Sustainable**, because it promotes economic development while sustaining natural resources and the environment for future generations.

Throughout the planning process, working groups have identified potential solutions with low financial costs and institutional barriers, with the intention of implementing some of these before the completion of the Climate Action Plan. The status of these actions is summarized below.

### Early Wins Achieved

- **Expand Eco-mow Practices:** A review of campus grounds maintenance on the New Brunswick-Piscataway campus was undertaken and several areas were put under eco-mow practices.
- **Submit Afforestation Proposal:** An inventory of Rutgers University-owned forest properties was undertaken and several locations for possible afforestation projects were identified. A proposal to an outside funder to underwrite 10 acres of afforestation was submitted.

### Early Wins In Progress

- **Conduct Building-Level Energy Audits & Efficiency Upgrades:** Facilities, in partnership with NJ Clean Energy Direct programs, is analyzing buildings with 200 KW demand or less to determine opportunities for efficiency upgrades. Once a building audit is complete, the building will be upgraded with a minimum of 15% energy reduction.
- **Evaluate Metering, Monitoring & Control Systems:** Facilities is evaluating monitoring and controls for buildings and central energy systems. They are assessing installation of electricity, heating hot water, and chilled water metering in individual buildings served by district energy systems to maximize efficiency.
- **Enhance Micro-Mobility:** During Fall of 2020, an E-Scooter share program was introduced in New Brunswick. Ridership has been high and shows that there was a latent demand for this type of transportation mode. This program came at no cost to Rutgers and is being provided by a private vendor.
- **Maximize Efficiency of the Bus Routes in New Brunswick:** For Fall of 2020 a brand-new bus system with fewer stops was introduced. Since in-person classes were suspended, the routes were only in place for one month because of lack of riders. The goal of the routes and reduction in stops is to encourage walking trips where appropriate and for users only to use the buses to get between campuses and not around a single campus. This change was at no cost to the University and could potentially save money in fuel costs while lowering emissions.
- **Include Plant-rich Recipes:** Rutgers Dining is evaluating its recipes to enhance plant forward/plant-rich options, and reduce chicken and beef in recipes by 20%.
- **Create and Share Maps with Sustainability Information:** The Working Group on food and water systems is creating maps with the locations of food service operations, hydration stations, and vending machines. These maps will include information about the sustainability of each element and will be posted on the Rutgers Sustainability website.
- **Eliminate Single-Use Plastic Bags for Meal Plans:** Dining services is eliminating single use plastic bags for takeout in campus facilities for all students on meal plans.

### Opportunities for Immediate Action

- **Analyze Fossil Fuel Elimination or Sequestration:** Hire a consultant to formulate plans to eliminate usage of fossil fuels or sequestration of fossil fuels.
- **Assess Building Standards:** Assess current building standards to identify opportunities

for increased energy efficiencies and more sustainable practices.

- **Installation of more EV charging stations:** This would encourage electric vehicle use and come at a reasonable cost overall to the University.
- **Promote Stop Food Waste Day in April 21, 2021.**
- **Participate in Virtual Rutgers Day, April 24, 2021.**
- **Manage Students’ Refrigeration Units:** Work with Housing and Student Affairs to ensure proper management, maintenance, and disposal of refrigeration units brought to campus by students.
- **Create an Awareness Campaign:** Create an awareness campaign for sustainability, waste reduction, and recycling for all students, faculty and staff.
- **Develop a Sustainability Orientation:** Reach out to incoming students early by making sustainability (recycling) information at orientation available and/or as a topic for 1-hr courses (For Freshman).
- **Implement a Reduce & Reuse Policy and Program:** Implement a comprehensive University source reduction & reuse policy and program. Connect with Surplus Equipment Management Program.
- **Contract with Sustainable Suppliers:** Contract with suppliers that offer end-of-life reuse, recycling, and/or takeback programs. (i.e. pipette’s and vials in lab).

## SURVEY OF THE RUTGERS COMMUNITY

The Task Force conducted a survey of Rutgers faculty, staff, and students from August 17, 2020 through September 11, 2020 to inventory the greenhouse gas producing practices of the Rutgers community. The data collected from this survey were used by the working groups to inform the calculation of the baseline level of greenhouse gases produced by the University and evaluate the potential of specific climate solutions to achieve carbon neutrality. Responses to specific questions and how those responses were used can be seen in the individual working group reports.

The survey instrument was developed by the Task Force and administered by the Rutgers Office Institutional Research and Academic Planning (OIRAP). OIRAP used student rolls from Fall 2019 and included institutional data in the deidentified dataset provided to the Task Force to supplement information collected in the survey. These data points include: chancellor’s area, campus, status (faculty, staff, or student), zip code from permanent address, gender, race/ethnicity, age, residency (students only), county for NJ residents (students only), state for out-of-state residents (students only), country of citizenship (international students only), student level (students only), and class level (students only). Survey response rates are below.

| Population   | Number of Responses | Response Rate |
|--------------|---------------------|---------------|
| Faculty      | 782                 | 12.8%         |
| Staff        | 1,954               | 14.6%         |
| Students     | 7,653               | 8.9%          |
| <b>Total</b> | <b>7,653</b>        | <b>10.3%</b>  |

The Task Force hosted virtual town hall meetings on November 11 and 12 via Zoom. Both meetings were well-attended with approximately 240 participants the first night and 160 the second night. Participants included faculty, staff, students, and alumni from all three campuses and all four Chancellor's units. The theme for the meetings was *Envisioning Rutgers' Climate Future*, where the first meeting focused on carbon neutrality and the second meeting focused on climate resilience. There were two primary goals for the town hall meetings.

1. Provide an update on the sectoral analyses of the working groups.
2. Solicit input in developing visions of a carbon-neutral, more climate-resilient Rutgers.

To achieve these goals, each night began with brief presentations on key findings from Phase 2 analyses from a panel of working group co-chairs, followed by a question and answer session. The last half of the meetings were spent in breakout rooms where facilitators led visioning sessions based on the theme of that evening. Summaries of each night are below.

### Night 1: Envisioning a Carbon Neutral Rutgers

During the visioning session, participants were asked to imagine a carbon neutral Rutgers. They were prompted to think about what would make them proud about this achievement and how it would impact their lives and the communities in which Rutgers resides. Comments coalesced around four major themes.

**Leading by example:** The most common theme that emerged from the visioning sessions was the idea of Rutgers as a leader. Participants saw climate action at Rutgers as a chance to give people hope by demonstrating that carbon neutrality can be achieved quickly. Rutgers would serve as a model for New Jersey and beyond, motivating others to follow Rutgers' example. The possibility that Rutgers could be a leader in climate action gave people a sense of pride.

**Building community:** Town hall participants envisioned reaching carbon neutrality as a process of building community within Rutgers and the communities in which we reside. The notion of building community was expressed broadly and included the feeling that we would all be working together toward a common goal, sharing ideas, and regularly communicating about sustainability. Becoming carbon neutral was also imagined as a way to strengthen ties to surrounding communities through engagement, sourcing local vendors, and creating local jobs. Many participants expressed feeling like they were a part of something important and that what they were doing made an impact. In a carbon neutral Rutgers, everyone has a part to play.

**Creating a lifestyle:** Many of the discussions included the idea that achieving carbon neutrality would lead to lifestyle changes and cultural shifts. These changes ranged from very mundane things like not using plastic straws to large structural issues such as addressing a culture of consumption. The underlying theme was that carbon neutrality at Rutgers would mean weaving sustainability into every aspect of life from coursework, to new employee orientation, to how we use paper. Many of these lifestyle changes were inspired by our response to COVID-19, with the most emphasis placed on remote work. People are rethinking what needs to be done in



## Night 2: Envisioning a More Climate Resilient Rutgers

On Night 2, town hall participants were asked to imagine a more climate resilient Rutgers. Recognizing that building climate resilience is an ongoing process, they were prompted to consider how their experiences during extreme events and under normal conditions might change. They were also asked about their role and the role of surrounding communities in creating climate resilience at Rutgers. The responses fall into five categories.

**Learning from the past:** Many participants cited experiences from Superstorm Sandy and the current COVID-19 crisis as learning opportunities. With regard to Superstorm Sandy, most people talked about the disruption of services as a result of losing electricity and the fact that power is central to most daily activities. Without power, people were not able to operate pumps to combat flooding, did not have access to wifi networks, could not cook because there were no fans, etc. Several participants suggested Rutgers establish microgrids as protection against such disruptions in the future. Another common response was how unsafe campus feels without power. Many people also brought up how flooding in and around campus made transportation difficult during Sandy. Lessons that participants mentioned from the current COVID-19 crisis were far more positive. Most people mentioned learning to work from home or meet remotely as a useful skill that they will use beyond the current situation. However, there was not consensus on the merits of remote instruction, with some wanting to do more in the future and others concerned about diminished learning outcomes. All of these comments highlight the impact of personal experiences in shaping perceptions of resilience.

**Strengthening communication:** Nearly all breakout sessions mentioned the importance of communication. There were several comments about improving communication before, during, and after an extreme event as a way to relieve anxiety, make people feel safer, and keep people informed. Again, participants felt that this was not done well during Superstorm Sandy, but has been very good during the COVID-19 response. Beyond extreme events, many people cited the importance of constant communication about resilience measures at Rutgers. There was a strong feeling that everyone can contribute to the processes of increasing resilience and that student and faculty voices should be part of the decision-making process at every step. Finally, several of the discussion groups mentioned that part of the value of Task Force town hall meetings has been the opportunity to have casual conversations with faculty, staff, and students from different campuses about issues of climate and resilience. Many supported continuing such meetings on a regular basis.

**Supporting communities:** Nearly every group referenced Rutgers' responsibility to increase the resilience of the communities in which Rutgers resides. Several participants noted the interconnectedness of Rutgers and its surrounding communities and that resilience for those communities is resilience for Rutgers. Additionally, the imagined division of Rutgers from local communities may be artificial as many students are from those communities and/or stay after graduation. Many participants advocated for Rutgers becoming a resource for local communities through activities such as knowledge sharing programs, emergency shelter during extreme events, and becoming an electricity power hub during service interruptions.

**Looking beyond extreme events:** Participants mentioned the importance of looking beyond extreme events when thinking about resilience at Rutgers. Ongoing environmental phenomena

such as sea level rise and extreme heat were brought up as important to consider. Many people, citing environmental justice concerns, pointed out that underlying social conditions greatly impact how individuals fare during extreme events and even during normal operating conditions. In particular, food insecurity came up in many discussion groups, with one group pointing out that some communities where Rutgers campuses are located are food deserts. Various proposed interventions included increasing food pantries, more support for local farmers markets, and using campus grounds to produce more food.

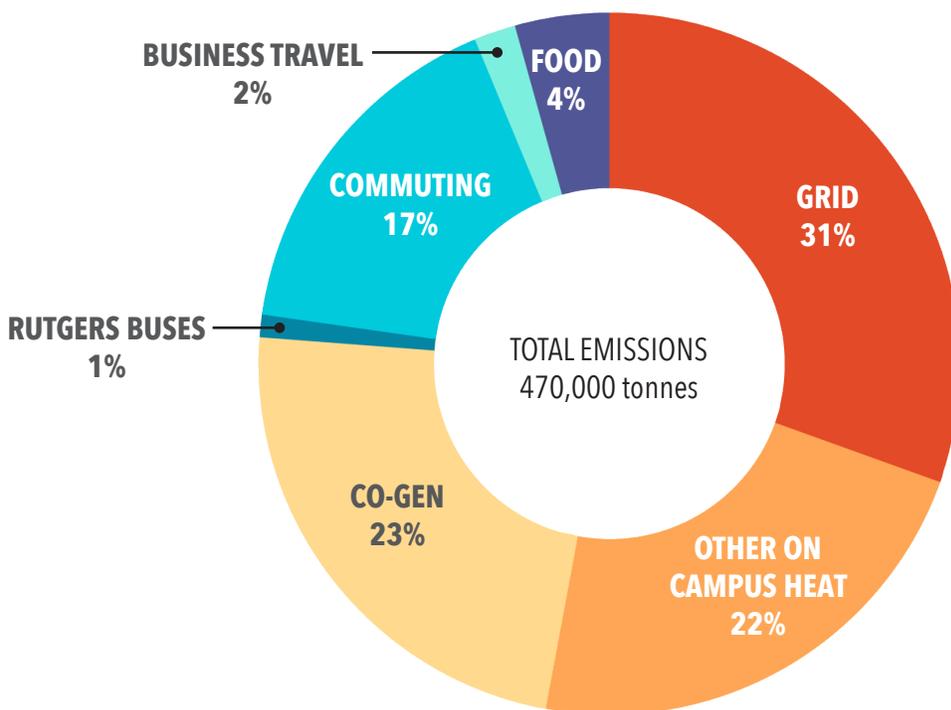
**Cultivating Living Laboratories:** Many participants pointed out opportunities to integrate learning about resilience at Rutgers with the curriculum and creating an active learning community. Acknowledging that increasing resilience is an ongoing process that may require testing solutions, participants advocated for campuses as Living Laboratories.

Responses to the question: What word comes to mind when you imagine a more climate resilient Rutgers?



\* Word cloud generated using Mentimeter

# RUTGERS GREENHOUSE GAS EMISSIONS



Based on the Phase 2 analysis of the working groups, Rutgers' annual greenhouse gas (GHG) emissions are approximately 470,000 tonnes. For comparison, in 2018, New Jersey's net emissions were 97 million tonnes<sup>1</sup>.

The Task Force began its analysis of baseline GHG emissions in October 2019. The goal was to undertake GHG emission data collection for the New Brunswick, Newark, Camden, and RBHS campuses. This preliminary analysis was updated by working groups during Phase 2. The inventory is based on FY 2019 and does not account for the temporary changes to University operations in response to COVID-19.

The Task Force has selected SIMAP (Sustainability Indicator Management and Analysis Platform) to track emissions. SIMAP is a carbon and nitrogen accounting platform that can track, analyze, and improve campus sustainability. This system has been used extensively by universities for meeting greenhouse gas emissions goals. The program's algorithms, calculations, and assumptions are transparently documented and built on peer-reviewed published literature. SIMAP is utilized by Second Nature members to track greenhouse gas emissions. SIMAP assisted the Task Force in creating a baseline during this phase of work. In the future, SIMAP can be used to benchmark our performance, create reports, set goals, and analyze progress year to year.

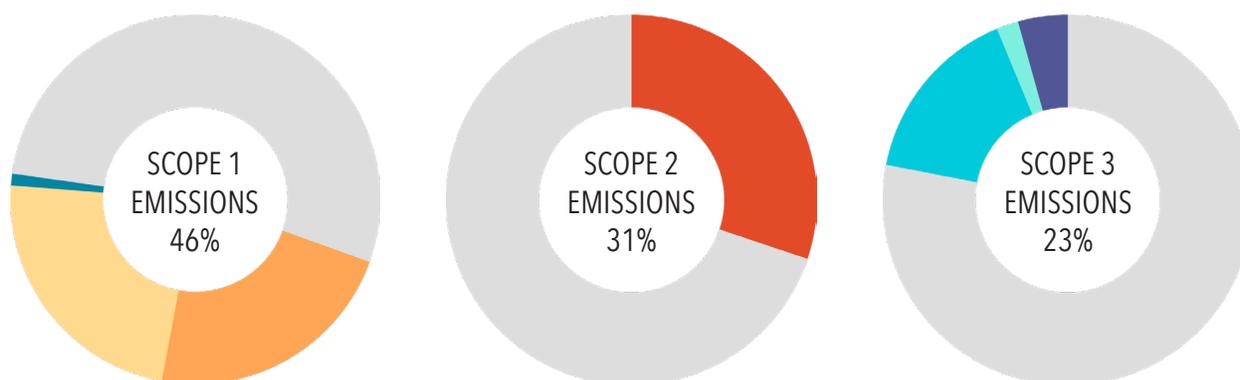
<sup>1</sup> New Jersey Department of Environmental Protection. 2020. New Jersey Scientific Report on Climate Change, Version 1.0. (Eds. R. Hill, M.M. Rutkowski, L.A. Lester, H. Genievich, N.A. Procopio). Trenton, NJ.

## GREENHOUSE GAS EMISSIONS BY SCOPE

SIMAP uses a standard greenhouse gas accounting concept, called scopes, that helps entities understand and structure decisions about the boundaries of its emissions. The scopes framework also helps address the problem of “double counting” in greenhouse gas accounting. There are three scopes or level of responsibilities for emissions. Scope 1 emissions are most directly within the University’s control and decision-making, while Scope 3 emissions are indirect consequences of the University’s decisions. Scope 1 emissions are direct emissions from sources that are owned and/or controlled by Rutgers. This includes combustion of fossil fuels in college-owned facilities or vehicles, fugitive emissions from refrigeration, and emissions from on-campus agriculture or livestock husbandry. Scope 2 emissions arise from purchased electricity. These are direct emissions from sources that are not owned nor operated by Rutgers, but whose production are directly linked to on-campus energy consumption. Finally, Scope 3 emissions come from sources that are not owned nor operated by Rutgers, but are either directly financed (e.g., food and product supply chain emissions, commercial air travel paid for by the institution) or are otherwise linked to the campus via influence or encouragement (e.g., air travel for study abroad programs, regular faculty, staff, and student commuting). Since Scope 1 and 2 emissions are easy to both measure and reduce, many institutions with carbon neutrality target have chosen to set an earlier target date for Scopes 1 and 2 than for Scope 3.

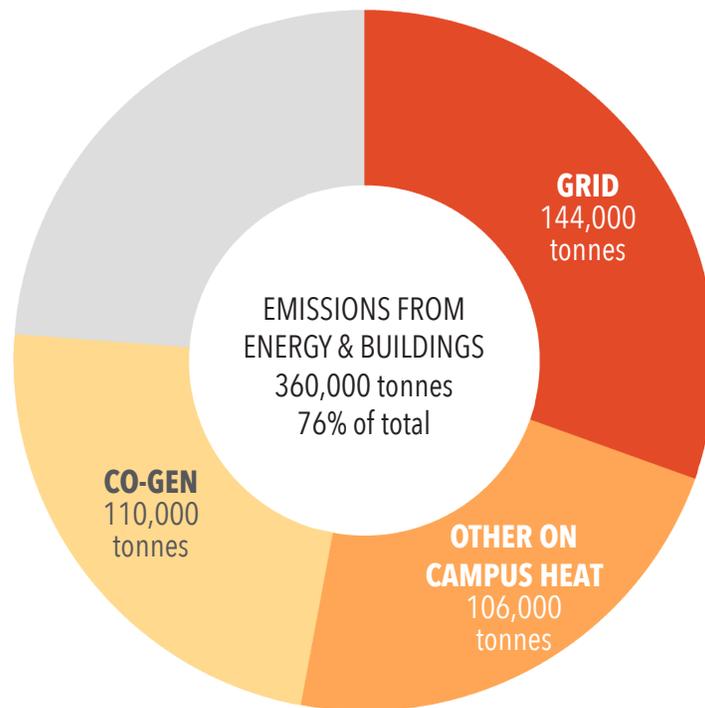
The distribution of Rutgers GHG emissions by scope is shown below. Scope 1 emissions come from heat, on-campus electric, and Rutgers buses<sup>1</sup>. Energy purchased from the grid comprises Scope 2 emissions. Sources of Scope 3 emissions shown here include commuting, food, and business travel. Notably, the analysis of Scope 3 emissions does not include the non-food supply chain as there was not enough information to calculate those emissions<sup>2</sup>. See the Supply Chain and Waste Management Working Group report for details.

The following sections of the report discuss Rutgers GHG emissions by sector and highlight potential solutions assessed by each working groups.



<sup>1</sup> Rutgers maintains over 5,000 acres of “green space.” This maintenance produces approximately 540 tonnes of Scope 1 emissions, or 0.1% of Rutgers annual total, and is too small to be visible on these charts. See the Working Group 5 report for details.

<sup>2</sup> Scope 3 emissions shown here do not include endowment emissions, though per the GHG Protocol, investments are part of Scope 3. See ‘Fossil Fuel Divestment’ in this report for details.



### Potential Energy and Buildings Solutions

#### Decarbonize Production Source: Thermal energy

- Small-scale carbon capture and sequestration
- Purchase offsets
- Purchase biogas
- Transition to geothermal energy
- Electrification of heating

#### Decarbonize Production Source: Electricity

- Purchase of renewable energy credits or offsets
- University built and owned solar
- Power purchasing agreement for solar onsite
- Power purchasing agreement for solar offsite
- Power purchasing agreement for wind offsite

#### Reduce consumption: Existing Buildings

- Electrical efficiency upgrades
- Mechanical efficiency upgrades
- Envelope efficiency upgrades
- Behavioral energy conservation measures

#### Reduce consumption: New Buildings

- New construction standards like Above ASHRAE 90.1, a specific energy intensity, or alternative standard

## Executive Summary from Energy and Buildings Report

Rutgers University is a large energy consumer, with a varied portfolio of 700+ buildings covering 28 million square feet. The New Brunswick campuses together have the largest amount of occupiable square feet, followed by RBHS, Newark, and Camden. Most of the building stock was built between 1970 and 1987, although some buildings are much newer and others date back more than 200 years. The Busch and Livingston campuses, which include RBHS Piscataway, together have the highest energy utilization index at 161 kBtu/sqft-year, followed by Newark (which includes RBHS Newark) at 155 kBtu/sqft-year. The non-science campuses are much less energy intensive. The University-wide energy utilization index is 126 kBtu/sqft-year, lower than the median for U.S. colleges and universities (180 kBtu/sqft-year).

Rutgers' baseline greenhouse gas emissions associated with the building sector total 359,541 tonnes CO<sub>2e</sub>. A plurality comes from purchased electricity. Also important are the electricity and heat produced through cogeneration fueled by natural gas at the Busch/Livingston campus and the Newark RBHS campus. Almost every campus has some amount of central heating and cooling production using natural gas that serves multi-building networks. The Livingston campus hosts just under 10 MW of solar electric capacity.

This working group focused on identifying options for reducing the University's Scope 1 and Scope 2 emissions associated with building energy supply and consumption. A challenging related problem is Scope 3 emissions associated with building energy demand, such as those associated with off-campus housing. This report makes a first attempt to quantify these emissions, but identifying solutions requires further work.

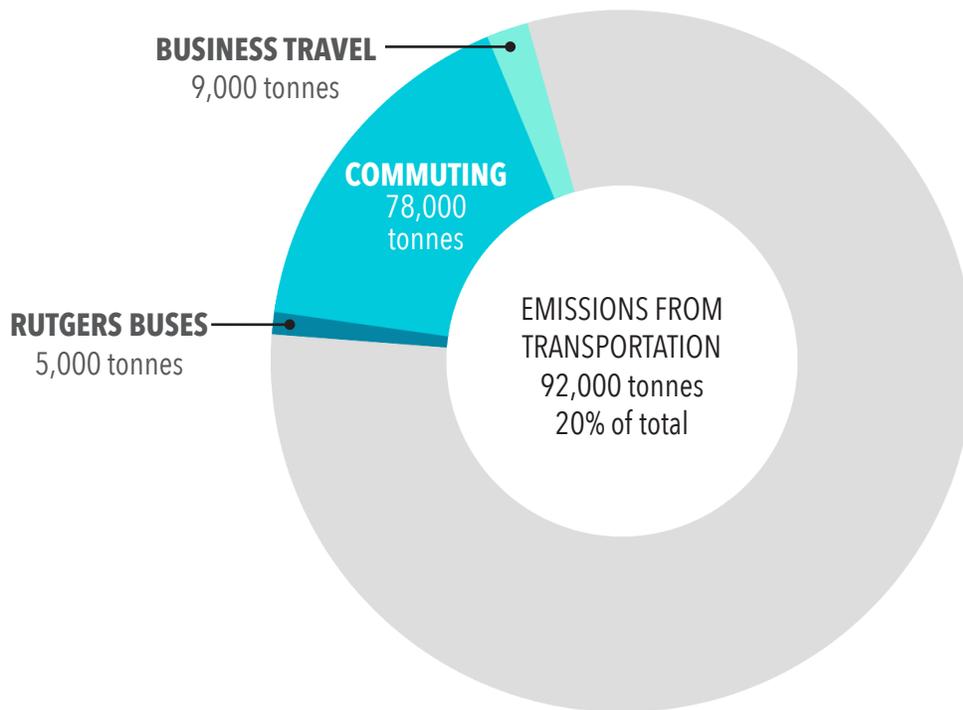
There are three key questions related to the reducing and eliminating greenhouse gases emissions associated with the University's physical plant.

1. What is the current status of the University greenhouse gas emissions from buildings? To address this, we developed an analysis of our carbon footprint using the SIMAP tool.
2. How do we measure emissions reductions? This will require active measurement, monitoring, and control of campus energy usage, production, and emissions.
3. How can the University eliminate fossil fuel use associated with the physical plants? Ultimately, this must rest on a combination of energy efficiency investments and renewable energy investments, including the purchase or production of renewable energy and the renovation of existing thermal and electric producing equipment with equipment that works reliably with renewable energy.

Currently the University is focused on reducing energy consumption in its buildings with 200 KW demand or less. This is being done with support from the NJ Clean Energy Direct Install Program. Contractors will perform energy audits of the buildings and will come up with customized solutions for each building. NJ Clean Energy will cover 70% of the construction cost along with the free audits. Thereafter the university will formulate a plan to audit the larger buildings. It will be looking at energy usage and cost along with building age and size to determine priority.

A study is being done on where metering is needed at a building level for electric, chilled water, high and medium temperature water, and domestic water. An in-depth study and plan will be required to find the best solutions for installing controls and monitoring for the central plants and individual buildings. The University is lacking in monitoring and controls that are needed to regulate energy usage during part-load operations, which is most of the time. Without real time monitoring and controls we cannot supply in time load needs to load demand. This results in oversupplying the load and a waste of energy.

On the supply side of the energy equation, while looking at renewable energy, the University will also look at methods for degasification, that is, removing carbon from flue gases. The goal is to compare the relative cost-effectiveness of (a) substituting non-fossil fuels for fossil fuels, (b) capturing and storing carbon as it is emitted, and (c) sequestering carbon independently in order to offset continued emissions. We cannot be 100% carbon neutral if we cannot account for our fossil fuel usage through sequestration or elimination using some other type of energy. A Request for Information will go out to various consultants to find which are best suited. The next step will be to send out a request for proposals to the consultants that are qualified and choose one to help formulate a reduction plan for natural gas.



**Potential Transportation Solutions**

**Expand telecommuting (working at home and remote instruction)**

- Emissions associated with commuting could be reduced by up to 25%.

**Incentivize purchasing battery-electric vehicles (EVs)**

- Research is needed to determine possible emission reduction, but this measure would reduce other air pollutants and allow the University to market itself as an EV campus.

**Reduce business travel and/or purchase carbon off-sets**

- Based on an off-set price of \$25/tonne of emissions, the total cost is about \$9 million.

**Create safe bicycle and pedestrian infrastructure**

- This will make the campuses more attractive to potential students boosting the competitiveness of the university and possibly leading to increased tuition revenue.

**Enhance public transit discount programs or free transit**

- Some fraction of the Rutgers community will shift to transit and this will result in emissions reductions, potentially up to 5,145 metric tonnes.

**Electrify the University’s bus fleet and other Rutgers-owned or operated vehicles**

- If the technology is feasible, there could be substantial cost savings as EVs tend to have 3-5 year payback periods. Electricity is more efficient and cheaper than diesel or gasoline. However, for the bus fleet, there may be added costs to build dedicated recharging stations and to obtain the most advanced technology when available.

**Implement parking cash-out**

- Less parking would allow for removal of impervious surfaces that can lead to flooding. Emissions reductions are possible if employees opt not to drive and park.

## Executive Summary from Transportation Report

This report summarizes our analysis of transportation CO<sub>2</sub> emissions from all three Rutgers campuses and includes an analysis of various policies to reduce those emissions. The analysis is mainly derived from a survey that was sent to all faculty, staff, and students in late August, closing out in early September after classes began. Baseline CO<sub>2</sub> emissions were estimated for commute travel to campus, University fleets including buses, emissions associated with business travel, undergraduate study abroad trips, and athletic travel. Fleet data was only available for the New Brunswick campus and for business travel we did not have a breakdown by campus. Athletics travel data was likewise only available for the New Brunswick campus.

Our estimate of total annual baseline emissions is 91,974 metric tonnes of CO<sub>2</sub>. This comes to a per capita rate of 1.23 metric tonnes per person. The bulk of these emissions are attributable to commute travel to campus, which accounts for 77,831 metric tonnes of CO<sub>2</sub> or 1.04 metric tonnes per capita. This value is low compared to peer institutions that have produced similar estimates and generally find that per capita emissions are about 3.5 metric tonnes<sup>1</sup>. We are uncertain why Rutgers performs better and it could be that other universities did not account for the frequency of traveling to campus (which our estimates do). Staff per capita emissions (at least on the New Brunswick campus) are 3.23 per capita; staff generally travel most days of the week suggesting our estimates are reasonable. For further comparison, total transportation emissions in New Jersey are 80 million metric tonnes,<sup>2</sup> thus Rutgers accounts for 0.11% of this statewide total, while representing 0.89% of the population. Commute travel is typically only about 25% of all travel, so this suggests our estimates are reasonable.

Other transportation emissions at Rutgers include university fleets (4,889 metric tonnes), business travel (9,057 metric tonnes), undergraduate study abroad travel (7.19 metric tonnes), and athletics travel (10.00 metric tonnes).

We list a variety of policies for reducing emissions, but only analyzed three potential policy approaches for reducing commute emissions, given that this is the largest share of total transportation emissions. These were an increase in working at home and remote instruction (reduction of 21,191 metric tonnes); parking fee reductions of 25% and 50% to encourage the purchase of electric vehicles (reduction of 3,678 metric tonnes for a 25% fee reduction, and 10,378 metric tonnes for a 50% fee reduction); and, subsidizing free public transit for commuters (reduction of 5,145 metric tonnes).

We also estimated the cost of purchasing carbon off-sets for all business travel. Assuming an off-set price of \$25/tonne of emissions this comes to about \$9 million. We have not estimated the costs of the policies to reduce commuter emissions.

All the estimates are subject to limitations and assumptions which are described in detail in the report.

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<sup>1</sup> Based on estimates derived from: <https://reporting.secondnature.org/>

<sup>2</sup> New Jersey Department of Environmental Protection, 2020, New Jersey's Global Warming Response Act, 80x50 Report, <https://www.nj.gov/dep/climatechange/mitigation.html>



### Potential Food and Water Systems Solutions

#### **Shift to a more “Plant Forward” (Plant Rich) Diet**

- Evaluate and change recipes and menus to reduce GHGs 25% by 2030
- Lead with taste
- Leverage Menus of Change University Research Collaborative (MCURC)
- Co-benefits: health, environmental health, landscapes

#### **Adopt a climate-friendly food labeling system**

#### **Develop consumer education and awareness campaigns**

- On campus: for students on meal plans
- Off-campus: for students, faculty, staff and alumni

#### **Reduce food waste**

- Targets to be established to reduce food waste
- Explore with the local communities anaerobic digestion and/or commercial composting

#### **Reduce single use plastic (post-COVID)**

- Replace single use plastic bags with reusable bags

#### **Reduction of consumable goods especially those associated with food takeout/ convenience or catering**

#### **Increase use of re-useable water bottles and hydration stations**

- Tap water has 1/300th to 1/1000th carbon footprint compared to a single use plastic bottle of water

#### **Continue supporting locally sourced fresh products when in season**

#### **Enhance outreach and explore incentives for better farming systems, food production systems, delivery methods, and sustainable products.**

#### **Highlight climate friendly refrigeration management**

#### **Upgrade snack and beverage vending machines to Energy Star Ratings.**

## Executive Summary from Food and Water Systems Report

Climate solutions associated with food will need to come from a number of different areas within the food system. Reducing food GHG emissions is a major focus for campus food service companies as well as for the food service industry in general. While Rutgers Dining Services, which serves over 6 million meals per year, has been working on sustainability issues for a long time, focusing on GHG emissions is relatively new.

WG3 estimates that Rutgers Dining Services contributes only a small part of Rutgers' overall GHG emissions (about 20,500 tonnes in FY19, about 4% of overall emissions quantified). WG3 has discovered through data collected from Rutgers Dining Services and calculated using SIMAP that the greatest contributors to food-related GHG emissions are the consumption of beef (37%) and chicken (28%) in the dining halls. Some of our GHG emissions are still unknown, especially with respect to beverages, vending machines as well as dining at Newark and Camden which is managed by Gourmet Dining, LLC. We have not estimated off-campus GHG produced by our students.

Food waste also contributes to our GHG emissions. Some preliminary calculations have been made and show that more can be done to reduce food waste and to capture the food waste we generate. We have not attempted to estimate food waste created by other campus food service groups nor estimated the contributions of off-campus households to food waste related GHG emissions. Future food waste reduction initiatives supported by Rutgers will also support the USDA, EPA and State of New Jersey's new food waste reduction plan to achieve a 50% reduction in food waste by 2030. This reduction will help to curtail methane production in landfills and reduce waste throughout the system.

There is much more that can be done to further reduce Rutgers food systems' impact on climate change. WG3 has identified solutions to reduce campus-based GHG emissions, and in some cases off-campus GHG emissions, and recommend that these be considered as part of the Climate Action Plan. These solutions/interventions are listed on the previous page.

Some of these solutions could be implemented in 2021-2023. WG3 estimates that investments and changes to our food system, diets, and food waste habits will be able to reduce GHG emissions from food by at least 20% over the next 10 years, with further gains possible depending on the types of changes implemented. This number includes a 2019 commitment as part of Menus of Change University Research Collaboration (MCURC) to a 25% reduction in protein associated GHG emissions by 2030. In implementing any recommendations, food justice, food security, and food equity issues should be considered throughout the supply chain.

WG3 also considered some other solutions such as purchasing of imperfect delicious produce, but Rutgers Dining has already tried this and found it to be difficult to implement since it needs to define the specifications for bidding for our food purchases. Revisiting this solution is still an option.

## SUPPLY CHAIN AND WASTE MANAGEMENT

At its core, Rutgers Procurement Services has four primary objectives: 1) work with the University Community and Suppliers to reduce the overall cost of goods and services we procure, 2) enhance the speed and responsiveness of delivery to our Campuses, 3) enhance the quality of goods and services we procure, and 4) manage the uncertainty of major disruptions. Not including climate impacts in our decision-making makes our University goods and services more vulnerable to disruption by climate risks:

- Physical climate risks from acute weather events and chronic climate patterns are disrupting the availability of raw material and energy supply, supplier operations, and local communities along the supply chain.
- The transition to a low-carbon economy also presents policy and legal risks that result from several trends: the pricing of greenhouse gas (GHGs) emissions, disruptions from new technologies like blockchain, market risks from growing customer demand for low-carbon and climate-resilient goods and services, and reputational risks to a company's brand equity and future business.

While the ultimate goal should be for full environmentally responsible supply chain-to-waste reduction and resilience as an institution, this is neither fiscally nor logistically feasible on an immediate timescale. Instead, a sequential timeline for GHG identification certification of individual supply chains, waste flows, facilities, buildings, and programs should be approved and implemented. In addition to clear feasibility benefits, an advantage of this approach is that certification of individual supply chains, waste flows and sites will spur movement toward programs such as circular carbon systems or circular economy goals across the University system.

### Potential Supply Chain and Waste Management Solutions

#### **Promote sustainable construction**

Attain LEED Gold Certification for all major new construction and renovation projects on campuses, while diverting at least 90% of construction waste from landfills. This goal is regularly achieved on LEED projects at Rutgers.

#### **Maximize sustainability around consumable and durable goods**

Work with current and future suppliers to enhance the sustainability characteristics of current and future consumable products. Develop awareness and engagement programs for employees to manage demand.

#### **Enhance current sustainable food practices**

Build on strong current efforts on food, including reducing post-consumer waste and increasing sustainability

#### **Adopt a Zero Waste goal**

Establish a goal of "Zero Waste" (90% diversion of non-hazardous waste from incinerators and landfills)

## Executive Summary from Supply Chain and Waste Management Report

Emissions from the supply chain, waste and food are categorized as Scope 3 emissions. According to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard of the GHG Protocol, Scope 3 is comprised of 15 categories. For the purposes of the Supply Chain and Waste Stream, for Working Group 4, the three most important categories we are considering are:

- Category 1: Purchased goods and services (which includes food)
- Category 2: Capital goods (construction and other real estate assets)
- Category 5: Waste generated in operations.

Given the depth, complexity, and absence of data required to determine GHG emissions from the supply chain and waste stream, the working group devised recommendations based on environmental or sustainability goals that are in the interest of the University to achieve in both the long-term and short-term (less than one year).

The working group identified the following short-list of solutions that could be implemented in the short-term :

1. Create an awareness campaign for sustainability, waste reduction and recycling for all students, faculty and staff.
2. Reach out to incoming students early by making sustainability (recycling) information at orientation available and/or as a topic for 1-hr courses (For Freshman).
3. Implement a comprehensive University source reduction & reuse policy and program. Connect with Surplus Equipment Management Program.
4. Contract with suppliers that offer end-of-life reuse, recycling, and/or takeback programs. (e.g. pipettes and vials in labs)
5. Eliminate plastic bags in all retail and foodservice establishments in campus facilities.

As it relates to waste management emissions, using EPA formulas, we were able to determine our waste management/recycling emission data. During the last five fiscal years, Rutgers has recycled (on average) over 65% of our waste stream: over 102,147.59 tons of recyclables, and 52,445.48 tons of municipal solid waste. Based on our five-year data, Rutgers saved 321,764.91 metric tons CO<sub>2</sub> equivalent by recycling 102,147.59 tons of recyclables. Additional statistics are included in the report.

In collaboration with Working Group 3, we share a concern as it relates to organic food waste. Rutgers University's dining halls create approx. 2,000 tons of organic waste per year. Presently, some food service operations aerobically digest the food waste before disposal into the wastewater system. Some portion of the organic food waste is being picked up by a local pig and cattle farmer and utilized as feed for the animals. Rutgers Dining Services has concern that the pig farmer may not continue to receive the waste and this underlines the importance of a sustainable need for a holistic solution to utilize food waste to generate low carbon electricity and produce low- carbon organic fertilizer. This may require the investment in state-of-the-art anaerobic digestion technology.

The total annual emissions for the New Jersey Agricultural Experiment Station (NJAES) on-campus farms (which were surveyed) and the University Golf Course combined is approximately 541 tonnes. The fuel consumption for on-campus grounds maintenance is not included in this calculation because it is not specifically tracked. Additionally, emissions from off-campus farms is not currently available.

### Potential Land Use and Offsets Solutions

#### **Identify Carbon Defense and Carbon Offense strategies**

Reduce greenhouse gas emissions of grounds maintenance and to increase carbon dioxide storage by increased carbon sequestration in soils and woody vegetation. More broadly, identify “carbon defense” strategies designed to maintain the existing stores of carbon in the soils, above- & below-ground plant biomass, and “carbon offense” strategies designed to promote enhanced carbon capture potential (i.e., additional amounts above and beyond baseline conditions).

#### **Enhance management practices at NJAES farms and research stations**

Reduce greenhouse gas emissions of ongoing farming and livestock raising activities and to increase carbon dioxide storage by increased carbon sequestration in soils and vegetation by the adoption of enhanced management practices.

#### **Maximize carbon sequestration on Rutgers University forested lands**

Afforest “vacant” University-owned land and increase carbon dioxide storage on existing forest lands by increased carbon sequestration in soils and woody vegetation by adoption of enhanced management practices. More proactive management of the University’s forest lands is recommended to maintain the existing stores of carbon in the above- & below-ground plant biomass and soil (i.e., “carbon defense” strategies).

#### **Leverage campus master planning**

In planning for future land use development and/or redevelopment, the University should follow the planning principles and sustainability framework embodied in the University Physical Master Plan - Rutgers 2030 to minimize energy demands and maximize carbon capture potential of campus green spaces (i.e., build up, not out, and return unused space to green space). Adoption of low carbon cement and concrete products in new campus construction projects would help to reduce their carbon footprint.

#### **Offset University emissions**

We define a carbon offset as an additional reduction to already existing mechanisms in emissions of carbon dioxide or other greenhouse gases made in order to compensate for emissions made as part of University-related activities. We have investigated the feasibility of existing off-site carbon offset programs as an additional means of achieving carbon neutrality. Simultaneously, we have examined policies and mechanisms for campus departments and organizations to purchase carbon offsets that are being applied elsewhere. We also assess the feasibility of the establishment of new off-site carbon offset programs here in the State of New Jersey in collaboration with other state and local partners.

## Executive Summary from Land Use and Offsets Report

As the State University and as a Land Grant Institution, Rutgers University has facilities spanning the state that include 91 discrete locations over 6,600 acres. While many of these locations are quite urban in character (i.e., many of the office buildings and health care facilities associated with Rutgers Biomedical and Health Sciences), Rutgers manages nearly 1,500 acres of farm land, 2,500 acres of forest land and over 600 acres of wetlands. Within the three main campuses of Camden, Newark and New Brunswick are lawns, treed areas and landscaped spaces covering over 500 acres. These 5,100 acres (or nearly 8 sq. miles) of “green space” land should be factored into any plan for the University to reach carbon neutrality. Accordingly, we propose possible avenues for the University to reduce greenhouse gas emissions associated with University land use and maintenance, increase carbon storage and reduce methane emission on University land, and reduce the University’s energy demand through enhanced design of future land use development. More specifically, we propose a number of “carbon defense” strategies to maintain the existing stores of carbon in the soils, above- & below-ground plant biomass, and “carbon offense” strategies to promote enhanced carbon capture potential (i.e., additional amounts above and beyond baseline conditions). Our research suggests that there are existing off-site carbon offset policies and programs that could be adopted as an additional means of achieving carbon neutrality.

The inventory of present on-campus grounds and on-campus New Jersey Agricultural Experiment Station (NJAES) farm operations and maintenance practices was undertaken. Information about baseline greenhouse gas emissions were compiled and input to SIMAP to estimate the amount of carbon and equivalent CO<sub>2</sub> emitted. The total annual CO<sub>2</sub> equivalent emissions for the NJAES On-Campus Farms and the University Golf Course (the only component of campus ground maintenance where sufficient records were kept) is approximately 541 metric tonnes/year. These data are incomplete and enhanced record keeping is vital if we are to establish our baseline and chart our progress in reducing our emissions. To initiate this campus green space sustainability effort, approximately 25 acres of the New Brunswick-Piscataway campus lawns were converted to no/eco-mow zones. Replacement of a traditional lawn with what are termed eco- or low mow zones greatly reduced the frequency of mowing to one annually thereby reducing gasoline combustion emissions, as well as decreasing the amount of fertilizer, herbicide, and irrigation expended. Potential afforestation (tree planting) projects on campus and outlying properties were identified with a sum total CO<sub>2</sub> equivalent storage of 14,680 metric tonnes.

Current prices for voluntary carbon offsets have been cited to range from <\$1 to >\$50 per credit for one metric ton of CO<sub>2e</sub>. Prices of voluntary offsets vary widely based on the type of project, its location, its co-benefits, and the year in which the carbon emissions reductions occur. A collaboration of higher educational institutions has developed the Offset Network to provide educational and research opportunities that can result in novel offset protocols as well as cost reductions through implementation of a peer verification pathway. This voluntary approach provides an alternative pathway for institutions of higher education to realize voluntary offsets for up to 30% of their Scope 3 emissions through peer-verified offset projects. As a member of the University Climate Change Coalition (UC3), Rutgers is under no obligation to follow Offset Network protocols or standards or to become a network member; however, Rutgers can benefit from engagement with the Offset Network.

# CLIMATE PREPAREDNESS

Over the past several decades, Rutgers' campuses have experienced numerous extreme climate events. The diversity of Rutgers' properties, from large campuses to coastal field facilities to experimental farms and forests throughout the state, makes the University and its people vulnerable to multiple climate risks including extreme heat events, coastal and inland flooding, damaging winds, snowstorms, floods, and tropical and extratropical storms.

The sectoral impacts identified in this scoping report suggest that the University's energy and infrastructure systems, buildings, facilities, and land resources face significant and growing climate risks. The examination of group vulnerabilities indicate that climate impacts have uneven effects among students, staff, and faculty, and members of surrounding communities. Individuals who are already experiencing housing, food, and income insecurities, as well those with mental and physical health challenges, are generally more at risk.

Climate change will affect the teaching, research, and service missions of Rutgers University. Results of this initial scope report suggest that there is a critical need for a comprehensive climate impact and vulnerability assessment for all four Rutgers campuses (New Brunswick, Newark, Camden and RBHS), outlying facilities and surrounding communities. In terms of next steps, a number of recommendations emerged from this assessment:

- Monitor changing climate risks (e.g., flooding, sea level rise, heat) in New Jersey and for each campus.
- Assess climate vulnerability of critical infrastructure (roads, transit, buildings, utilities) and develop climate-resilience design standards and guidelines for new and existing buildings and critical infrastructure.
- Coordinate with local, state and federal partners to address critical infrastructure and increase climate resilience on and adjacent to Rutgers facilities (e.g., land restoration, green infrastructure, stormwater management).
- Identify stable funding mechanisms to implement climate resilient building, infrastructure, and operations on and adjacent to Rutgers facilities.
- Enhance climate/weather risk communication, especially for undergraduate students.
- Develop all climate hazards mitigation plans for each Rutgers campus (in conjunction with each county) to ensure continuity of teaching, research and service during extreme events.
- Develop plans to address vulnerability of groups, particularly students.
- Develop adaptation plans by campus-community region.
- Develop adaptation plans at off-campus research sites.
- Develop adaptation plans by sector and function.

Carbon neutrality planning across all sectors — from energy to water supply to housing and dining — also needs to incorporate projected climate risks and to plan for climate change adaptation. There are also many areas where adaptation planning and action at Rutgers, such as tree planting to reduce localized heat island effects, can contribute to carbon neutrality goals.

There are also many opportunities where carbon neutrality efforts can enhance climate resilience.

For example, expanded solar-based electrification can enhance the resiliency of energy systems to long-term outages. Identifying opportunities to combine adaptation and mitigation efforts is a critical next step toward achieving climate resilient carbon neutrality at Rutgers University.

# CLIMATE-POSITIVE, EQUITABLE ECONOMIC DEVELOPMENT

Rutgers has many established programs and initiatives that are relevant to developing a climate-positive, socially equitable set of institutional policies and actions. These resources vary in scale and scope. Better integration of these efforts is needed. Of the 50+ programs included in our assessment, there are less than a dozen that cross-over/cover two or more topics (such as social equity and economic development or climate change and economic development).

There are initiatives at the local-level in our host communities that are working towards the broad goals of climate-positive equitable economic development. The organizations leading these initiatives are potential partners and resources to the Task Force. Due to challenges associated with COVID, we were unable to engage with these local organizations. Pursuit of in-depth engagement with host-community programs is needed.

There are significant opportunities to link Rutgers' efforts to larger state policy goals, and effect transformation towards a climate-positive equitable economy. The Task Force should engage in the development and implementation of such state policies.

Climate-positive actions at selected universities (nationally and internationally), cities, and states were identified and evaluated for their successes and failures. Useful examples of solutions are found among the APLU Innovation & Economic Prosperity award winners and within localities that pursue climate change goals through an equity lens and in partnership with academic institutions, such as the Resilient Los Angeles program.

Based on extensive research, we proposed three areas of potential climate solutions for the Task Force to explore. Resiliency (encompassing environmental justice and public health); Business/Economic Development; and Integration/Coalition Building.

- *Resiliency*: Undertake collaborative climate change planning and implementation in partnership with the urban communities that host our three primary campuses, that (a) advances the University's plan on carbon neutrality and climate resilience; (b) advances the state Energy Master Plan to support Community Energy Planning and Action in Underserved Communities; and (c) results in improved health equity outcomes, particularly for goals associated with Healthy New Jersey 2030.
- *Business/Economic Development*: Specifically relating to our role as an anchor institution: Rutgers can build on and extend its initiatives to serve as an anchor institution in New Brunswick, Camden and Newark, including research and investment to house, fund and/or conduct collaborative research that enables/expands climate-positive equitable economic development.
- *Integration/Coalition Building*: A Sustainability Office could play a role in bringing together existing Rutgers programs that are focused on climate change, social equity, inclusion and diversity, and economic development, and foster greater disciplinary cross-over that broadens program scope to include climate-positive equitable economic development considerations.

# GOVERNANCE

## POTENTIAL GOVERNANCE OPTIONS

A key task in Phase 3 will be to recommend a structure for Climate Action Plan governance, such as a Sustainability Office or Institute. Based on preliminary analysis, we offer the following observations, which will be refined and turned into recommendations in Phase 3.

While we can examine sustainability offices and institutes at different universities for insights into the challenges of different organizational structures, the urgency of the climate crisis and the diffuseness of the concept of sustainability leads us to the suggestion, to be explored in Phase 3, that the unit be framed around the concept of climate mobilization. While climate mobilization necessarily involves many of the tasks a sustainability unit would undertake, this framing puts a clear focus on the goal of mobilizing the University's academic, operational, and economic capacities to advance carbon neutrality and climate resilience, both inside and outside the University.

In order to mobilize a whole-of-University climate effort, the office/institute will need to act by (1) convening key players and stakeholders, both internal and external to the University, (2) seeding key initiatives, (3) monitoring the progress of University units against the objectives of the Climate Action Plan, and (4) communicating University efforts both internally and externally.

In addition to launching key climate solutions identified in the Climate Action Plan, an early policy activity could be a thorough review of University policies and procedures for opportunities to integrate climate mitigation and adaptation considerations into routine decision-making. Some specific examples of academic initiatives the office could undertake are presented below, under 'Linking Operational and Academic Efforts.'

The office/institute will need to be structured in a manner that allows it to have both an operational and an academic role. Thus, it likely will need report either directly to President Holloway or jointly to the Executive Vice President for Academic Affairs and the Chief Operating Officer; the details and tradeoffs of these two options will need to be examined in Phase 3.

Given the need to mobilize a whole-of-University effort, the climate mobilization office will need to work closely with a variety of units, including not just academic units and Institutional Planning & Operations, but also (*intra alia*) Finance, University Communications and Marketing, and the Rutgers University Foundation. In Phase 3, we will examine options for making these linkages successful, including the possibility of making key staff report dually to the new office/institute and their existing offices. Another element worthy of consideration is the Sustainability Council and Chair system at Penn State, under which all units have a council tasked with leading efforts on sustainability and coordinating with a University-wide Sustainability Institute.

Much like the development of the Climate Action Plan, effective climate action requires a whole-of-University effort, bringing together academics, University operations, and both University and external policy. It is not just about facilities upgrades, nor is it just about academic research, education, extension and engagement. The Climate Action Plan will seek to leverage operational and policy changes to advance academic efforts, and academic efforts to advance operational and policy changes.

Some specific opportunities the Climate Action Plan governance unit could undertake to realize these linkages include:

**Facilitating the development and implementation of courses or course modules that use the University as a living lab for climate actions.** These may range from modules familiarizing students with the University's climate footprint to studio courses that substantively advance operational or policy changes. These efforts could be encouraged through seed grants to faculty developing such modules or courses, as well as (when funding permits) supporting a cohort of teaching faculty specifically focused on bringing University and/or community climate action into the classroom. Among other benefits, the development of such a cohort of boundary-working teaching faculty would allow the knowledge of University operational staff to be brought into the classroom without placing excessive, unfunded demands on their time.

**Facilitating an expansion of use-inspired, publicly engaged, interdisciplinary climate scholarship.** As New Jersey's land-grant university, Rutgers has a leg-up on many academic institutions in that it has long had models of faculty, such as tenure-track Extension faculty, who both have long-term, tenured lines and work with stakeholders on the boundary between scientific understand and public need. It also has small but well-developed efforts in this area focused specifically on use-inspired, publicly engaged climate scholarship, as represented (for example) by the New Jersey Climate Change Resource Center. However, stakeholder engagement in the climate area has not benefited from the long-term, institutional relationship that the commitment of a cohort of dedicated, tenured faculty (like Extension faculty) brings. The University could encourage use-inspired, publicly engaged, interdisciplinary climate scholarship across schools by (1) working to ensure the conditions exist in all schools for tenure-track scholars who focus on publicly engaged climate scholarship to meet promotion and tenure criteria, and (2) when funding permits, supporting a cross-University cluster hire in publicly engaged climate scholarship.

**Facilitating integration of existing Rutgers programs:** Per Working Group 7's assessment, one task for the office could be organizing a forum that brings together existing Rutgers programs that are focused on climate change, social equity, and economic development, in order to identify opportunities for coordination and collaboration that foster greater disciplinary cross-over and broaden programs' scope to include considerations related to climate-positive, equitable economic development.

# FOSSIL FUEL DIVESTMENT

Though not within the main scope of the Task Force’s analysis, students and faculty have repeatedly raised in Task Force events the question of whether the University endowment should divest from fossil fuels. The Task Force recognizes that the dialogue about Rutgers climate action will naturally include feedback about divestment, and we are committed to including this feedback within the documentary record so that it is available for the appropriate decision-making bodies. We also include in this Phase 2 report some observations to situate discussions of fossil fuel divestment within the discussion about University Climate Action.

Management of the endowment is the responsibility of the Joint Committee on Investments (JCOI) of the Board of Governors and Board of Trustees. The JCOI received a formal divestment request under the University’s divestment policy in spring 2020, and has established an ad hoc committee to examine that request, which began meeting in November 2020.

## **Emissions Reductions and Resilience Improvements**

As noted in the Task Force’s Interim Report, under the GHG Protocol<sup>1</sup>, the University’s Scope 3 emissions include equity, debt, and project finance emissions, in proportion to the investor’s share of the overall investment. As of June 2020, fossil fuel assets constituted about \$80 million of the endowment<sup>2</sup>. Based on the ratio of ExxonMobil’s total shareholder equity to the greenhouse gas emissions associated with its activities<sup>3</sup>, we estimate the associated emissions to be about 240,000 tonnes, and thus to represent a substantial fraction’ of Rutgers overall emissions. Divestment from direct fossil fuel plays, combined with either divestment from fossil fuel companies or successful advocacy for the decarbonization of these companies’ activities, would substantially reduce these Scope 3 emissions. However, we lack the data to evaluate more specifically.

## **Financial Costs and Savings**

The financial impacts of divestment are probably limited, as diversified divested portfolios generally perform comparably to diversified portfolios with fossil fuels<sup>4</sup>. However, we lack the data or expertise to evaluate more specifically.

## **Benefits to the University’s Educational and Research mission and to Campus Culture**

Divestment is strongly supported by vocal climate activists on campus, and would symbolically indicate Rutgers’ support for decarbonization. In September, the Rutgers University Student Assembly held a referendum on divestment, which passed with over 90% of the votes supporting divestment from fossil fuels and investment in clean energy by 2030.

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1 Martin Barrow et al., “Technical Guidance for Calculating Scope 3 Emissions (Version 1.0): Supplement to the Corporate Value Chain (Scope 3) Accounting & Reporting Standard” (Greenhouse Gas Protocol, 2013), <https://ghgprotocol.org/scope-3-technical-calculation-guidance>

2 <https://www.rutgers.edu/news/rutgers-moves-toward-climate-action-plan>

3 Emissions of about 600 Mt; <https://www.climateaccountability.org/pdf/ExxonMobil%201882-2018%205p.pdf>. Share holder equity cap of about \$200 billion; <https://www.macrotrends.net/stocks/charts/XOM/exxon/balance-sheet>.

4 Plantinga, A., & Scholtens, B. (2020). The financial impact of fossil fuel divestment. *Climate Policy*. <https://doi.org/10.1080/14693062.2020.1806020>