# Sustainability Strategic Plan: Short-term goals by 2022, Mid-term goals by 2028, Long-term goals by 2050

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| --- | --- | --- | --- | --- |
| Topic | Strategy | Goal | Milestones | Plan(s) |
| Energy | Electricity: See 5 Year Energy Intensity Target | Reduce Electricity normalized GSF by 7.5% by 2021 from 2016 levelsUD meets its ESA renewable energy generation cap by the end of the contract period.  | * Qlik / BlueHenergy public data resource website completed
* UD (re/retro)commissions 2-4 buildings per year so long as resources support
* UD pursues renewable energy, CHP or other technologies to reduce GHG emissions
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|  |  | **Summary - 5 year target vs. FY16** |  |
|  | **FY16** | **FY21** | **Reduction** | **% Reduction** |
| **Electric Target Consumption [kWh] 1, 2, 5** | 163,562,402 | 151,295,222 | 12,267,180 | 7.5% |
| **Natural Gas Target Consumption [MCF] 1, 2, 5** | 624,123 | 599,158 | 24,965 | 4% |
| **Gross Square Footage** 2 | 8,400,000 | 8,400,000 | 0 | 0% |
| **Electric EUI [kWh/ft2]** | 19.5 | 18 | 1.5 | 7.5% |
| **Gas EUI [MCF/ft2]** | 0.074 | 0.071 | .003 | 4% |
| **CO2e Reduction** 3, 4 | 113,304 | 106,000 | 7,304 | 7% |

**Metrics:**

|  |  |
| --- | --- |
| **Net Co2e****Per GSF****Per FTE** | **Net KWh****Per GSF****Per FTE** |

**Ideally per month and per building beginning from 2008 or as far back as accurate data is available.** |
| Natural Gas:See 5 Year Energy Intensity Target | Reduce Natural Gas normalized GSF by 4% by 2021 from 2016 levels | * Qlik / BlueHenergy public data resource website completed
* UD (re/retro)commissions 2-4 buildings per year so long as resources support
* UD investigates opportunities to leverage food, agricultural, yard wastes for biogas generation (research study) by 2022
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**Metrics:**

|  |  |
| --- | --- |
| **Net Co2e****Per GSF****Per FTE** | **Net MCF or BTU****Per GSF****Per FTE** |

**Ideally per month and per building beginning from 2008 or as far back as accurate data is available.** |
|  | Increase the lifetime performance of buildings by including LEED or other high-performance 3rd party standards into the design and construction process. Plan and design campus infrastructure that will carry the university into the 22nd century | All new buildings built to LEED Silver standard or betterConsider trial of Living Buildings Challenge certifications for a small high-performing building | * By 2028 at least one building on campus LEED Silver or better certified
* Internal Evaluation, Measurement & Verification (EMV) processes improved by 2020 to help identify and correct O&M issues that could result in increasing costs, decreasing efficiency
 | * All new buildings are internally or 3rd party verified as built to a LEED standardIdentify and renovate at least one building to LEED Gold or better and secure LEED Certification
	+ Use as a marketing / communication tool.
* If necessary, identify new contractors, suppliers, etc. to keep costs down. Multiple universities are building new buildings to LEED Gold and Platinum standards ***at no additional cost*.**
	+ Student interns research and investigate these projects and processes to see how UD can similarly benefit.
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| Buildings are designed, built and maintained to be flexible, useful and structurally resilient for 100+ years. | * By 2028 building standards are reviewed and confirmed or updated to support this goal.
* Design guidelines state that new buildings should incorporate flexibility and soundness to maintain their usefulness in the unknowns of the future.
 | * Develop standards and process with Project Manager, Engineers and M&O to verify that all new and renovated buildings meet the LEED Standards to which they were designed. Contractors are required to provide all applicable documentation, testing, verification, etc.
	+ This will require secure funding – in the past this step has been “value engineered” out.
	+ Integrate into campus community / landscaping / “sense of place” plans to solidify support.
	+ Option to leverage interns to perform additional labor
	+ It is not hard to get LEED Silver due to public transit and other local amenities.

**Metric:** **# Buildings E&V to LEED \_\_\_\_\_\_ standard****# SQ Ft E&V to LEED \_\_\_\_\_ standard** |
| All new building designs use LCA to control M&O costs | * By 2022 design / build standards require Life Cycle Analyses incorporated into new buildings
 | * Determine whether existing LCA methods are adequate, or if UD should improve LCA methodology for new buildings on campus.
	+ Determine to what level of detail
	+ Maintenance costs should be part of initial design
 |
| Extend the lifespan and improve the long term performance and resiliency of existing buildings  | All major renewal projects upgrade existing buildings to at least \_\_\_\_\_\_\_\_\_\_\_ standard | * A 3rd party standard (EG LEED, BREEAM) is identified and applied to major renewal projects by 2020
* At least one major renewal project verified to meet the identified standard by 2028
 | * Ensure standards align w sustainability goals and all projects / upgrades meet standards
	+ As standards are reviewed, engineers ensure all standards support sustainability goals
* Seek opportunities for intern teams to complete evaluation or verification work on appropriate projects.
* Solar One House renovated to Zero Net Energy standard or better. Consider Living Building Challenge as certifying organization.
 |
| Renovated buildings will support energy and water intensity goals | * Review of sustainability opportunities are
* incorporated into early project planning process
 | Engineers include Lifecycle Cost Analysis (LCA) and upfront cost, with preference for resource efficiency, human health and productivity **Metric:** **# Buildings, E&V, to meet \_\_\_\_\_\_ standard****# SQ Ft, E&V, to meet \_\_\_\_\_ standard** |
| Design and launch a Green Labs and user outreach / education program | Build a “Green Labs” program to address energy, water, waste issues as well as reinforce health and safety training in UD laboratories | * UD Intern teams generate a report detailing other similar campus initiatives and make recommendations for a UD program by 2028
* UD designs and launches a Green Labs program by 2022

**Metric:** **# Labs participating in base level program.** **# Labs Volunteering for additional actions, measures.**  | * Form a committee among lab managers and academics to ensure the program fits a variety of needs and will create champions to promote the program within the lab community.
* Secure storage space for a “UDon’t Need It” style equipment swap center, to be managed by student interns.
	+ Modest payments by participating labs can be used to pay for the space and interns.
* Consider contracting out certain services. Some companies are beginning to offer full-service education / outreach / monitoring / reporting / assessment / and improvement services.
	+ As new labs come online or buildings are renovated and labs begin to move around campus, opportunities will arise to engage with labs and get rid of old, unused equipment or upgrade existing equipment to Energy Star models (e.g. mini-fridges). That will require a lot of relationship building among academics and researchers because they literally own the equipment. Grant monies can also complicate the process, so a lot more man-hours will go into a program like this than we might initially predict.
	+ We already contract out some hazardous waste handling, lab supplies, etc. These companies may offer additional services, and they already have a presence / relationship with labs across campus.
* Work with EHS and seek amendments or additions to their lab safety program that include or impact energy, waste, water. Update lab safety documentation to include stats on resource waste, costs, etc. Increase motivation to follow safety protocols and save resources.
 |
| Leverage Res Life to improve Green Dorms competition | Provide more / better information to Res Life for annual Green Dorms program | * Perform cost / benefit analysis of informational displays in each dorm to compare performance across residence halls by 2022
* Trial new technologies to improve user awareness, behavior and/or energy consumption habits by 2028
 | * Work with MJ, Zach and Res Life to identify wants and needs for current and future program.
* Assess infrastructure and technological options for impacting energy consumption in buildings, especially as pertains to user awareness and behavior.
* Support Res Life efforts for education / outreach for general energy use and competition engagement.
* Consider grant opportunities for informational displays in dorms, that can also be used in competition messaging
 |
| Water | Building on ongoing efforts to improve water metering infrastructure, begin the process of tracking water consumption patterns and identifying opportunities for reductions though maintenance, upgrades or innovative projects.  | Reduce Water consumption by \_\_% by 2028 from 2008 levelsReduce Water consumption by \_\_% by 2050 from 2008 levelsWork with Engineers, Plumbing shop to identify reasonable goals | * SEE Group creates a Water Plan by 2022

**Metrics:****Net gallons** **Per GSF****Per FTE**Determine # and stats on building water pumps for electricity estimates | * Work with plumbing shop, project managers and engineers to identify maintenance and deferred maintenance priorities that impact water consumption and create a water plan.
	+ Create a small water conservation committee to identify projects (similar to energy committee)
	+ Prioritize projects that also have energy or other overlapping impacts (e.g. Steam Traps) to increase value to investment
* Invest $XX,000.00 over 10 years into water conservation projects (timeline aligned to additional funding for FCI work)
	+ Identify investment thresholds (e.g. ROI < 7-11yrs) to ensure best use of funding. Water is notoriously affordable in the USA and UD is not currently experiencing a drought, so investments must be carefully managed and justified.
	+ Identify CO2 impacts (water has a very high CO2 footprint, but difficult to calculate)
* Identify at least one ‘aspirational’ project that uses innovative technologies to conserve, reuse or otherwise wisely manage water resources.
	+ Potential example: gray water system for an academic building (would require a new building or major renovation)
	+ Wastewater reclamation at the farm or in the central plant (central plant already recaptures and reuses a large quantity of water, can we expand this?)
	+ Capture local springs and/or rainwater and redirect to gray-water-appropriate uses (e.g. flushing toilets, irrigation, etc.). Will require large capture basins to store water.
 |
| Fuel Oil and Diesel Fuel Consumption  | Improve local air quality and reduce CO2 emissions by continuing to invest in fuel-switching and increased energy efficiency | Reduce Generator and Bus Service-related Fuel Emissions by 15% by 2028 from 2008 levels.Reduce Generator and Bus Service-related Fuel Emissions by 50% by 2050 from 2008 levels. | * Identify opportunities to reduce total fuel consumption or switch to a fuel with a smaller carbon footprint
* Apply for grants or otherwise secure funding for feasible fuel switching opportunities by 2028
 | * Fuel switching to natural gas would require new permits, which may not be possible or would be prohibitively expensive.
* Investigate opportunities for expanding electric or fuel cell bus service.

**Metric:** **Net gallons of diesel fuel (or alternative fuel)****Net Co2e** |
| * Back-up generators meet campus needs by 2028
* All appropriate back-up generators can optionally use less carbon-intensive fuels
* Identify local sources of appropriate alternate fuels, if any by 2028
 | * In recognition of need to diversity fuel types in back-up generators, analyze campus needs, existing fuel reliance trends, and best practice.
* Assess opportunities to incorporate EE projects for the building(s) served into / alongside generator replacements / upgrades
* Continue to upgrade or replace back-up generators with less carbon-intensive fuel requirements (e.g. avoid fuel oil #2).
* Question: is it appropriate to include back-up generation capacity in college fee algorithms? How is this currently funded?
* Question: is it appropriate to require a building to meet energy intensity goals, based on building end use, to ensure backup generator coverage?
 |
| Waste and Recycling | Basic infrastructure (both on- and off-campus) and education are major contributors to landfill diversion. Improve community education and engagement while ensuring infrastructure meets best standards, especially in strategic locations. In 2015 UD recycled 1.62 million lbs of total waste, and took 4.46 million lbs to landfill. Our total diversion rate was 36.27%. Total waste includes construction waste, where UD routinely achieves +95% recycling rates. Municipal-only rates are significantly lower. If/ when construction projects finish on campus, our total waste diversion rate is expected to fall. | Divert 60% of total waste, by weight, from landfill by 2020 to align with State of Delaware goalsDivert 80% of waste from landfill by 2028Divert 98% of waste from landfill by 2050 | * Roll out a comprehensive signage and communication program across UD campus by 2022
* Improve Data Collection Systems by 2022
* Leverage Interns to improve data collection, complete analyses and inform decision-making (ongoing)
* Measure improvements in municipal recycling rates (ongoing)

**Metrics:** **Net lbs non-food waste****Net lbs recycling****Miles driven by waste collection trucks and other affiliated vehicles**Preferably by dumpster and/or building, depending on infrastructure and information systems | Intern Team: * Collect University Community Member KABS (knowledge, attitudes, behaviors, skills)
	+ At least 400 survey results, including knowledge quizzes, per semester
* Observations of contamination Rates in outdoor bins
	+ At least 200 “Peek and Pie Chart” tracking of both standard and randomly selected bins
	+ Waste Audit of a large outdoor win each semester for detailed analysis
* Engage in education / outreach of UD community
	+ Develop metric for this goal, # of presentations or audience members?
	+ Develop metric for this goal, e.g. 4-6 “Green Monday”, sidewalk chalk, other outreach events
* Contribute to grant opportunities and research innovative trials of products or services that may improve University performance.
	+ Develop metric for this goal, e.g. 2 product / service trials per semester or 1 successful trial per year. Idea is for students to do legwork to investigate new ideas and report feasibility, cost / benefit to staff.

FREAS: * Improve information system to record and track waste stream weights and operations (Grounds)
	+ Load all records into “data warehouse” and make reportable in Qlick or other software
* Sustainability Manager (S.M.) establishes Sustainability website as a reference source of information
	+ Develop metric for this goal, page views?
* Report successes and information via social media (S.M. / Interns)
	+ Develop a metric for this goal, clicks or “likes”?
* Collaborate with Dining Services, Custodial, Grounds and Res Life to improve operations with a net benefit or net $0 increase to operating budgets (S.M. and Departments)
 |
| Reduce Food Waste by 10% by 2022 from 2008 levelsReduce Food Waste by 50% by 2028 from 2008 levelsReduce Food Waste by 100% by 2050**Metrics:** **Net lbs food waste, preferably per dining location****Miles driven by waste collection trucks and other affiliated vehicles** | * Improve “Food Only” data point collection to make tracking of food waste more accurate by 2022
 | FREAS:* S.M. to work with Dining Services to identify existing “Food Only” metrics and identify opportunities to improve or expand metrics.
	+ Food waste is already captured with a high degree of detail by proprietary ARAMARK technology in some of our dining halls. Prioritize rolling technology out to more Dining Halls as they are updated / renovated.
	+ Identify gaps in data collection / reporting and worth with Dining Services to expand or improve.
* S.M. to recruit and manage all intern teams, and to liaise or support RSOs as necessary to ensure successful completion of trials.
 |
| * Launch a successful Food Waste Recovery and Donation program by 2018
 | * Dining Services to provide adequate training to Food Recovery Network members to ensure records and food safety standards are kept
* Food recovered and delivered to food banks is recorded in Data Warehouse so that it is reportable in Qlick or similar program.

Student RSOs: * Food Recovery Network RSO partners with Dining Services to donate appropriate food waste to local food banks in a safe manner, with no significant impact to Dining operations. Successful program will:
	+ Zero missed deliveries, as pre-arranged with Dining Services. If students cannot make a regular delivery, this is communicated to Dining Services ahead of time.
	+ 99% of records are correctly recorded and shared with Dining Services to ensure food safety standards are met. Incomplete records are identified and corrected.
 |
| * Launch a successful Zero Waste Event Trial by 2018
* Determine feasibility of installing additional Food Digesters in appropriate Dining Locations by 2022
 | Interns: * Zero Waste Events Coordinator (ZWEC) is a paid position supplied via grant funding. Grant requires a progress report after one calendar year of program launch (February 2018 deadline). ZWEC will research “zero waste events” and develop a definition to meet the standard, work with operational stakeholders to develop an SOP, will recruit volunteers to perform any additional tasks during the event, and will develop documentation to guide future Zero Waste Event efforts.
	+ No additional cost to event hosts or operations for the Zero Waste Event Trial
	+ Successful Trial is completed and documentation developed to guide future events
* Recycling or other intern teams to investigate feasibility of additional Food Digesters in Dining Facilities. Will also search for grant and other funding mechanisms for equipment procurement and install.
	+ All Dining facilities either identified as candidates or ruled out
	+ Feasibility and challenges of candidates assessed and cost estimates for installation compiled
	+ At least 3 eligible grants identified.
 |
| * Determine feasibility of sending food waste to industrial composting / bio-digesting / biogas facilities in region by 2022
* Determine feasibility of partnership with academic community for a food waste facility on campus, if even small-scale.
 | * S.M. to coordinate with Grounds, City of Newark, DSWA and Academic community to identify opportunities to capture and divert food waste from landfill
	+ New food waste recovery center is opening on the eastern shore of MD in ~2020, but it is 1.5 hours drive. S.M. to investigate whether 3rd party haulers serving the Wilmington region have capacity to serve part or all of UD.
	+ Cost / benefit analysis including Scope 3 GHG emissions and budget impact on current landfill tipping fees
	+ With Intern team(s), complete waste audits to identify portion of food waste in typical UD waste stream.
* Academic community via Michael Chajes is already investigating research opportunities with City of Newark and DSWA to trial aerobic digestion technologies and set up a trial facility on UD campus. S.M. to support this effort.
 |
| Transportation | Increase the average fuel economy of campus fleet while still meeting University needsImprove vehicle operation through incentivizing voluntary driver training\*For diesel bus goals, see “Fuel Oil and Diesel Consumption: section.  | Reduce Campus Fleet Emissions by 5% by 2022 from 2008 levels.Reduce Campus Fleet Emissions by \_\_% by 2028 from 2008 levels.Reduce Campus Fleet Emissions by \_\_% by 2050 from 2008 levels. | * Create a fuel reduction plan with Motor Pool by 2028
* Work with Motor Pool to ensure goals are achievable without impacting standards and needs
 | * S.M. to perform a baseline fleet fuel economy analysis and use to develop a fuel reduction plan.

Identify opportunities for fuel savings: * Incentivize voluntary training for staff who frequently use fleet vehicles to travel between campuses (especially Lewes).
* Set standards for all replacement vehicles to meet fuel efficiency standards based on their intended use.
* Apply incentives for departments (FREAS and Academic) to invest in electric vehicles when replacing vehicles.
* Consider expanding ZIP Car fleet and allowing Motor Pool vehicles to age out of the fleet without replacement.
 |
| * Use survey data to roll out EVSE infrastructure across campus.

**Metrics:****Miles driven per vehicle per month****Vehicle make / model / EPA fuel standard** | Secure funding to implement EV Charging Station proposal* Submit an RFP to secure a campus vendor that meets campus needs (see proposal for details)
* Ensure EVSEs are available to all parking permits including visitors.
* Install one or more EVSEs based on results of Transportation Survey, aim for a **1:10** ratio of service for EVs requiring charging services on campus.
	+ Refine this ratio based on actual usage patterns
* Charging is free until 2021 per agreement w Dr. Kempton and his Dean
	+ By 2020 use usage data to build and test an economic model for charging rates
* Metered usage data is available in the data warehouse
 |
| Incentivize commuters to live closer to campus, take public transit or choose vehicles with high fuel economy / electric motors | Reduce Transportation Emissions by 5% by 2022 from 2008 levelsReduce Transportation Emissions by \_\_% by 2028 from 2008 levelsReduce Transportation Emissions by \_\_% by 2050 from 2008 levels | * Launch updated version of UD Transportation Survey, improve data & analyses by 2018
* Transportation survey launched ever 3-5 years.
 | Incentivize Consumer uptake of high-efficiency and electric vehicles: * Incentivize high fuel economy / electric vehicles on campus through free charging until ~2020
* Place charging stations in most parking lots, and across all parking permit price ranges.
* Place chargers in desirable areas to encourage electric vehicle investment.
 |
| * Develop metrics to track the impact of commuting on UD campus by 2020
* Very likely that we will rely on market forces / transformations to meet these goals, but we will also need to encourage better user behaviors
 | Improve or reinforce existing initiatives that impact commuter behavior* Expand Carpooling Program (discuss metric with Parking Services).
* Roll out, promote and expand the bike share program
* Promote existing UD employee benefits that encourage local home buying, rental options, etc. to enable new or moving employees to live closer to campus.

**Metrics:** * **Results of transportation survey(s)**
* **Vehicle make / model / EPA fuel standard**
* **# miles driven from (near-campus) home**
* **# times coming to campus each week**
* **Seasonal vs. year-long commute**
* **EVSE metrics**
 |
| Incentivize academic and administrative departments to voluntarily report travel activity and consider voluntary carbon offsetting through a reputable vendor.  | Reduce or offset Transportation Emissions by 15% by 2022 from 2008 levelsReduce or offset Transportation Emissions by 45% by 2028 from 2008 levelsReduce or offset Transportation Emissions by 100% by 2050 from 2008 levels | * Design an easy-to-use online form to capture travel details.
* Meet with College Deans to introduce plan and garner support.
* Roll out information and education platform, including optional education sessions.
* Consider a policy of required offsets for airline travel, perhaps only for trips larger than \_\_\_\_ miles.
 | Metrics: * all applicable airport codes (including layovers)
* flight class,
* round trip vs. 1-way
* # of trips.

Use <http://www.icao.int/environmental-protection/CarbonOffset/Pages/default.aspx> to calculate, uses industry data (like flight path, airplane info) and best-practice methodology for CO2 emissions estimates.  |
| Landscape Management | Work with Grounds Staff to identify appropriate areas where SEE group may support ongoing sustainability efforts.  | Develop Specific GoalsWork with grounds to identify appropriate sustainability metrics and tracking | * Support improving sustainability standards, projects, trials, etc. with driving input from Grounds Staff
* Have goals and plan by 2028, with funding
 | * Continue to work with engaged student groups to educate and communicate about UD lawn care practices.
* SEE recognizes that fertilizer and pesticide will always be part of UD’s Grounds Management, and that the high demand for iconic aesthetics on our outdoor spaces means that Grounds must be able to choose the products and techniques that will maintain what the community demands.
	+ Complete Organic Lawn Care trial and produce a report with detailed results (launched Fall 2016, scheduled for 5 year trial).
	+ Student interns investigate low-carbon fertilizer options.
 |
| Work with Grounds Staff to identify appropriate areas of influence and support | Develop Specific GoalsCreate a biodiversity plan for flora and fauna on UD campus | * Tree inventory updated and informs a broad assessment of biological assets on campus
* UD identifies targets and goals for biodiversity by 2028
 | * Support completion of major tree inventory and assessment on campus.
* Support education efforts for campus community about existing and ongoing efforts to use local or naturalized plant species
* Support improving sustainability standards, projects, trials, etc. with driving input from Grounds Staff, who are the subject matter experts.
* UD North and Central Campus become “Bee Friendly” Certified
	+ Currently UD already performs most of the activities required for this certification. A modest budget ($300-$500) for a webpage and annual education event would be necessary.
	+ Grounds may need additional funding to purchase and maintain native plants.
	+ Coordination with the UD Botanical Garden may make seed exchanges or other low-cost procurements activities possible for annuals or other appropriate plants.
 |