President's Sustainability Advisory Committee

Minutes

January 15, 2019
1:00 p.m.
Room 330C of the Gatton Student Center

- Welcome and Introductions
  - Present
    - Bob Jewell
    - Krista Jacobsen
    - Helen Turner
    - Barry Swanson
    - Joanna Ashford
    - Bob Kjelland
    - Tiana The
    - Shane Tedder
    - Rachel Cook
    - Kelly Pennell
    - Britney Ragland
    - Megan Combs
    - Esther Moberly
    - Jennifer Taylor
- Presentation of Materials Management Protocols – *Joanna Ashford and Esther Moberly*
  - See attachments:
    - Protocol for Collection Recycling
    - Protocol for Collection Organics Pallets and Nontreated Wood
    - Protocol for Collection of Universal Waste
    - Protocol for Collection Organics Trees and Leaves
  - Potential for including hazardous waste info in sustainability module
  - New UK composting program, material taken to Woodford County. Hopefully starting March 1
- Presentation and discussion of Emissions Reductions for 2017-2018 – *Shane*
  - Emission reduction target, 25% reduction versus a 2010 baseline by 2025.
  - Emission totals under a half million mtCO2
  - See attached (pending approval):
    - 2017-2018 Emissions Reduction Progress Report DRAFT
- STARS reporting update – *Shane*
  - Not submitted yet. Report expired in October. Goal is to be resubmitted in February.
- Other updates:
  - Fair Trade Resolution – *Shane*
    - No concerns from Procurement

        - Meeting with Barnes and Noble, Wednesday Jan 15, 2019
    - Sustainability and the Endowment – *Shane*
        - Met with student group Divest UK with goal to make endowment accessible to UK students and community. Focus on making vocabulary more accessible.
        - Meeting with PR on Friday, January 18th
    - Faculty Sustainability Council – *Krista*
        - Last meeting was December 6th
        - Working on graduate certificate
        - Undergraduate curriculum will launch in Fall 2019; unsure about graduate certificate
    - On Campus Food Insecurity – *Krista*
        - Lexington Herald Leader article on food insecurity on college campuses
        - GAO did site visit to UK and listed UK in report
        - As a result of that research and report, Campus Kitchens received $5,000 for free meals for students on Wednesdays. 207 Funkhouser.
        - STOP Hunger and UK Dining distributed free meal sweeps
        - Big Blue Pantry also a contributor
        - Basic Needs Center being developed by Dean of Students and working group
            - <u>Letter of support to the Basic Needs Center to be discussed in February.</u>
- Discussion of EHS items and sustainability
    - Often times safety and sustainability can be at odds
    - <u>Add time to agenda for February for discussion</u>
- Adjourn

Protocol for collection, handling and weight tracking for Recycling

Materials	Collected by	Vehicle of collection	Staging area at UK	Delivered to	Weight recording	Notes
General Recycling includes paper, cardboard, aluminum & steel cans, plastic bottles and jugs, glass bottles & jars.						
Campus General Recycling	Campus PPD	Tilter carts/golf carts	Recycling Dumpster/Compactors	LFUCG Recycling Center	Facility scale report	With current markets, UK Recycling pays to process general recycling at LFUCG Recycling Center. In good markets, UK Recycling receives a shared profit with LFUCG and other city/ county affiliates.
Medical Center General Recycling	Medical Center PPD	Tilter carts	Recycling Dumpster/Compactors	LFUCG Recycling Center	Facility scale report	With current markets, UK Recycling pays to process general recycling at LFUCG Recycling Center. In good markets, UK Recycling receives a shared profit with LFUCG and other city/ county affiliates.
UK Hospital and Clinics General Recycling	UK Recycling and Trucking Staff	Canvas Carts, Box Trucks, Mini-Packer Truck	Recycling Dumpster/ Compactors	LFUCG Recycling Center	Facility scale report	With current markets, UK Recycling pays to process general recycling at LFUCG Recycling Center. In good markets, UK Recycling receives a shared profit with LFUCG and other city/ county affiliates.
University Loading docks/Outdoor Roll Carts – General Recycling	UK Recycling and Trucking Staff	Mini-Packer & Box Truck	Mini-Packer	LFUCG Recycling Center	Facility scale report	UK Recycling's Mini-Packer is dumped at the LFUCG Recycling center at least twice a week.
Off Campus Building Locations	UK Recycling and Trucking Staff	Mini-Packer & Box Truck	Mini-Packer Some locations have a recycling dumpster	LFUCG Recycling Center	Facility Scale Report	Off campus locations are serviced once a week.
Outdoor Containers	Ground Staff	Grounds trucks or golf carts	Recycling dumpster/compactors	LFUCG Recycling Center	Facility Scale Report	These containers receive service daily and are standardized throughout campus.
Event Recycling Containers	Ground Staff, Custodial Staff & UK	Tilter carts & golf carts	Recycling dumpster/compactors	LFUCG Recycling Center	Facility Scale Report	Recycling containers are automatically give to any event that requests landfill containers for an event. This has been standardized in the EMS.

	Recycling and Trucking Staff					
Confidential Paper Recycling includes paper containing personal information or patient health information (PHI)						
Confidential Paper Recycling	Shred-It	96 gallon roll carts & Box Truck	Loading Docks	Shred-It Warehouse	Facility Scale Report	UK Recycling pays for confidential paper by the pound. Weights are reported to UK Recycling each week.
Confidential Mixed Media includes hard drives, CDs, DVDs, VHS, memory sticks, and portable data storage devices						
Confidential Mixed Media Containers – 40" Consoles	Shred-It	Box Truck	Specific Offices on Campus	Hard drives are destroyed on campus and sent to Cleanlites for recycling. All other Mixed Media is sent to Shred It facility for destruction by incineration.	Facility Scale Report	UK Recycling pays a set amount per hard drive and per pound for all other items.
Tires						
Tires	Central KY Hauling	Rear Load Truck	Peterson Service Building - 12 cu. yard container Main Chance Farm – 40 cu. yard container	SMS Tires – Crab Orchard Ky	Central KY Hauling weighs container using Transfer Station Scale	In order to stay within Kentucky Regulations, no more than 100 tires are permitted to accumulate at one location on campus. UK Recycling pays per tire for recycling. Tires sent to SMS are either ground and used as crumb rubber or incinerated for waste to energy.
Tires	UK Recycling Staff	Recycling Truck	Peterson Service Building- 12 cu yard container	SMS Tires – Crab Orchard KY	Central KY Hauling weighs container using Transfer Station Scale	UK Recycling staff is responsible for servicing UK Motor Pool Garage located on campus. Tires collected are placed in container at Peterson Service Building.
Used Oil						
Used Oil	Kentucky Petroleum	Kentucky Petroleum Truck	UK Garage and PPD Greenhouse	Kentucky Petroleum	Facility Scale Report	UK Recycling receives payment for used oil based on current market values
Used Oil Filters	Advanced Technology	Advanced Technology Truck	UK Garage and PPD Greenhouse	Advanced Technology	Facility Scale Report	UK Recycling pays $85.00 per 55 gallon drum.

Scrap Metal						
Scrap Metal – 40 cu. yard containers	Central KY Hauling	Rear Load truck	PPD Greenhouse – 40 cu. yard container	Cohen Baker Iron & Metal	Facility Scale Report	UK Recycling receives payment from Baker Iron and metal based on current markets. Baker Iron and Metal reports weights on a monthly basis
Scrap Metal- cubes	UK Recycling	Box Truck	Located in multiple mechanical rooms in each of the 4 Areas on campus.	Cohen Baker Iron & Metal	Facility Scale Report	Area Managers have placed scrap metal cubes in each building mechanical room for collection. Cubes are serviced by UK Recycling Staff on an as-requested basis.
Hardbound Books						
Hardbound books	UK Recycling	Box Truck	96 gallon containers with four (4) wheels are provided on an as-requested basis.	Woodford Count Recycling Center	Facility Scale Report	UK Recycling does not pay to recycle hardbound books nor receives payment.
Cardboard						
Cardboard	Central KY Hauling	Rear Load truck	Good Samaritan Hospital – Cardboard Compactor Medical Center Storage – Cardboard Compactor	Central Kentucky Fiber	Facility Scale Report	UK receives payment from Central KY Fiber per ton of cardboard. Price is based on current market values.
Cardboard	Central KY Hauling	Rear Load Truck	40 cu. yard open top containers	Central Kentucky Fiber	Facility Scale Report	UK Recycling uses 40 cu. yard containers for special events – including Move it - to collect cardboard.
#5 Plastics includes certain lab plastics, pipette holders and containers.						
#5 Plastics	UK Recycling	Box Truck	Blue Square containers located in labs throughout campus	Shred-It Warehouse	Facility Scale Report	UK Recycling pays to recycling #5 plastics on a per ton basis.
Styrofoam includes clean Styrofoam coolers and packaging						
Styrofoam Coolers	UK Recycling	Recycling Truck	Central Pharmacy at Patient Care Facility (Pavilion A)	Creative Packaging – Shelbyville KY	UK Recycling records volume (actual count) of coolers	UK Recycling does not receive payment, nor pays to recycle Styrofoam. Creative Packaging picks up pallets of coolers at no cost.

Other Items Recycled at UK – will be included in other Protocols
• Blue Wrap • # 4 Plastic Ultrasound Gel Bottlers • #5 “Christmas Tree Adapters” • Clear Plastic Wrap • #2 HDPE Rigid Plastic Bag • X-Ray Film • Lead Vests • Hard Plastic Trays • Personal Fans (UKHC) • Metal Canisters • CDs/DVDs/VHS

Prepared Jan 2019

Protocol for collection, handling and weight tracking for waste streams: Organics (Pallets and non-treated wood items)

Materials	Collected by	Vehicle of collection	Staging area at UK	Delivered to	Weight recording	Notes
Pallets	Central Kentucky Pallets	Box Truck	Loading Docks	Central Kentucky Pallets	Monthly count	Central Kentucky Pallets will resell pallets and refurbish/reuse pallets. Any pallets not good enough for resell and reuse are sent to Con Robinson to be mulched. Central Kentucky Pallets collects pallets on campus at no cost to UK Recycling. UK Recycling pay Con Robinson per truck load of material sent.
Pallets	UK Recycling Staff	Flatbed truck & Dump Truck	Loading Docks/Dumpster areas	Reynolds Warehouse	Monthly Count	UK Recycling is responsible for collecting pallets on campus as requested. Any collected pallets are staged at Reynolds Warehouse for collection by Central KY Pallets.
Non-treated (non-painted) wood	UK Recycling Staff	Flatbed truck & Dump Truck	Reynolds Warehouse	Con Robinson	Estimation	Weight is an estimation based on items collected. If items are small enough, UK Recycling staff will weigh items for specific weight.

Prepared Jan 2019

Protocol for collection, handling and weight tracking for waste streams: Universal Waste (Lightbulbs and Batteries)

Materials	Collected by	Collection Container	Staging area at UK	Delivered to	Weight recording	Notes
Lightbulbs	Building Operators, Recycling Staff	Fiber drums for 4' and 8' fluorescent, boxes for other types	Reynolds 1, placed in pallets	CleanLites	CleanLites provides weights of each category of material they receive	
Batteries: Alkaline	Recycling Staff	Battery Container	Reynolds 1, placed in metal drum	CleanLites	Same as Above	Placed in metal barrel, loose, no taping needed
Batteries: Dry Cell, 9 Volt and Under	Recycling Staff	Battery Container	Reynolds 1, placed in metal drum	CleanLites	Same as Above	Placed in metal barrel, loose and mixed, no taping needed
Batteries: Dry Cell over 9V	Recycling Staff	No container	Reynolds 1, placed in metal drum	CleanLites	Same as Above	Placed in metal barrel, loose and mixed, no taping needed
Batteries: Lithium from Laptops *	Recycling Staff, Surplus Staff	No container	Reynolds 1, placed in metal drum	CleanLites	Same as Above	Placed in metal barrel, loose, no taping needed
Batteries: Other Lithium	Recycling Staff	Battery Container	Reynolds 1, placed in metal drum	CleanLites	Same as Above	Place in metal barrel, not mixed, taking needed of each battery
Batteries: lead acid *	Recycling Staff	No container	Reynolds 1 or Peterson, placed in pallet	CleanLites	Same as Above	3 layers on pallet, separated with cardboard, spray battery's terminals
Batteries: gel	Recycling Staff	No container	Reynolds 1, placed on pallet	CleanLites	Same as Above	3 layers on pallet, separated with cardboard, spray battery's terminals
Batteries: Ballasts *	Building Operators, Recycling Staff	No container	Reynolds 1, placed in metal drum	CleanLites	Same as Above	Placed in metal barrel, loose, no taping needed

CleanLites is the company that recycles our Universal Waste and Electronic Waste, located in Cincinnati, OH. They send a truck weekly to pick up our material.

*We receive payment for this material.

Prepared Jan 2019

Protocol for collection, handling and weight tracking for waste streams: Organics (leaves, tree branches and stumps)

Materials	Collected by	Vehicle of collection	Staging area at UK	Delivered to	Weight recording	Notes
Currently, as of November 2018						
Chipped wood and leaves	Grounds staff	Grounds trucks		Haley Pike Composting Facility **	Facility scale report	Composting Facility provide weight report
Leaves	Grounds staff	Grounds trucks		Woodford Co UK farm	Grounds staff record weight	Grounds staff provides weight report to UK Recycling
Trees (large pieces)	Ground staff	Grounds trucks	Greenhouse area	Lumber Facility	To be determined	Still working on details. This is for tree that will be used to create lumber
Trees (pieces larger than 8” diameter)	Ground Staff	Grounds trucks/chipped		Haley Pike Composting Facility **	Facility Scale Report	Composting facility will provide weight report
To be started in 2019						
Small Trimmings and Weeding Waste	Ground Staff	Grounds trucks or golf carts	Open top containers at PPD Greenhouse, Arboretum, Ag Greehouse area and Peterson Bldg.*	Haley Pike Composting Facility **	Facility Scale Report	These containers can also be used for some chipped wood and leaves disposal
Chipped wood and leaves	Ground Staff	Grounds trucks		Woodford Co UK Farm	Ground staff record weigh	This material will be sent to Woodford Co UK Farm only. Grounds staff will provide UK Recycling weight report.
Trees (pieces larger than 8” diameter)	Ground Staff	Grounds trucks/chipped		Haley Pike Composting Facility **	Facility Scale Report	Composting facility will provide weight report. This material will need to continue to be sent to this facility, until UKPPD grounds department acquires a tub grinder, to chip it.

*20 to 30 cy containers

** The Haley Pike Composting Facility, owned by LFUCG, charges a fee for material accepted into their facility.

Prepared Nov 2018

Protocol for collection, handling and weight tracking for waste streams: Organics (food waste)

Materials	Collected by	Mechanism of collection	Vehicle of collection	Staging area at UK	Delivered to	Weight recording	Notes
Food waste from The 90 and Champions Kitchen	Dining Staff	50 gallon green toters	UK trucking Perkins dumper	Facilities docks	Woodford Co UK Farm	UK Trucking staff record weight	UK trucking staff will provide weight records. Program to start January 2018.
Food waste from other locations	Dining staff	50 gallon green toters or 5 gallon buckets	UK trucking Perkins dumper	TBD	Woodford Co UK farm	UK Trucking staff record weight	UK trucking staff will provide weight records. This program still under consideration, not to be started until Fall 2019.

University of Kentucky
2017-2018 Greenhouse Gas Emissions Reduction Report

January 4, 2019

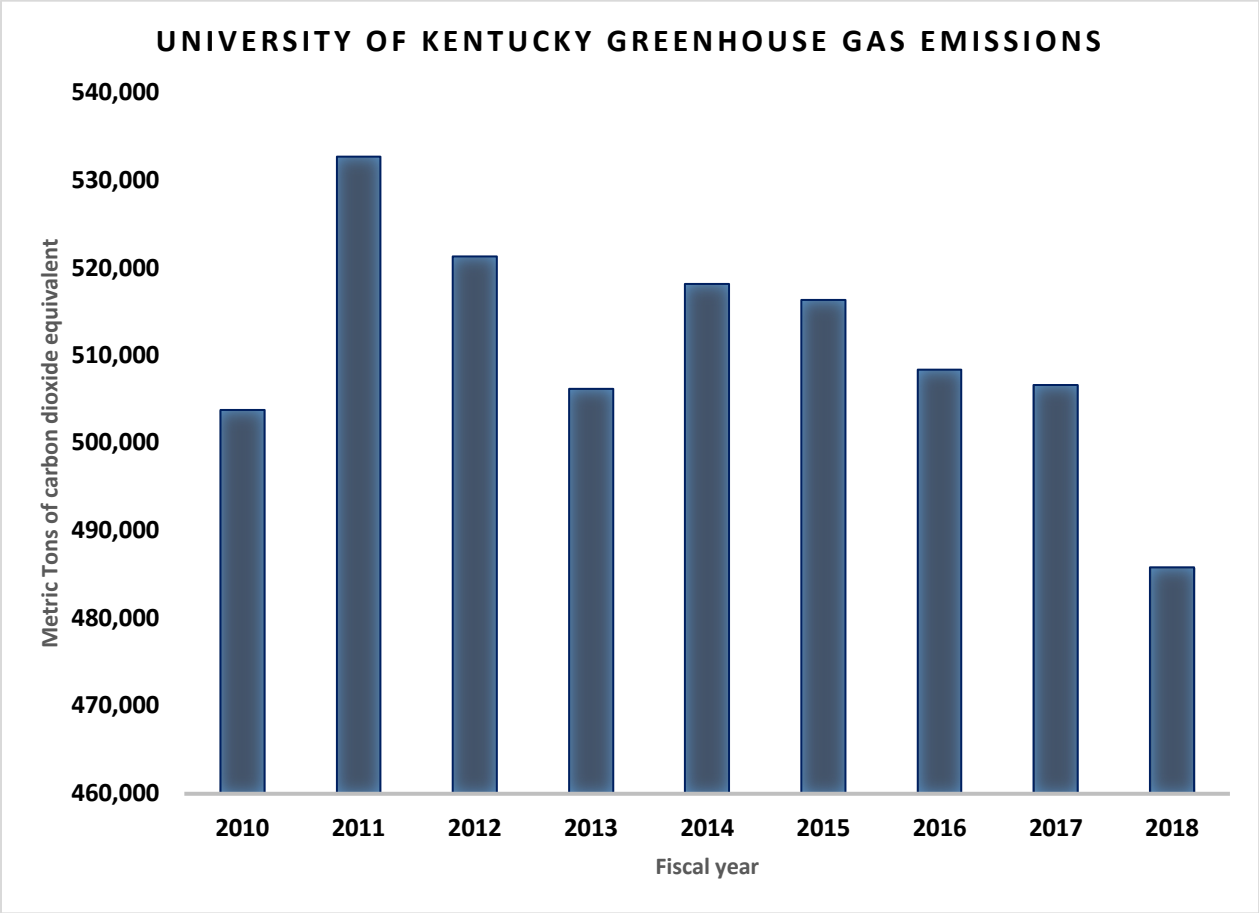
Prepared by the Office of Sustainability and Utilities and Energy Management

Executive Summary

In December of 2016, the University of Kentucky made a commitment to reduce its greenhouse gas emissions by 25% versus a 2010 baseline by 2025. An Emissions Reduction Plan was created in early 2017 to guide our progress toward this goal. Campus emissions for fiscal year (FY) 2010 totaled 505,736 metric tons of carbon dioxide equivalent ($mtCO_2e$) based on the sources and methodologies included in this plan. Achieving an annual emissions total that is 25% below FY2010 total requires that the University reduce annual emissions to 379,302 $mtCO_2e$ or less by FY2025.

2017-2018 was the first full year of implementation for UK's plan and significant reductions were achieved. Greenhouse gas emissions for the campus totaled 485,818 $mtCO_2e$, a reduction of more than 18,000 $mtCO_2e$ compared to the FY2010 baseline.

Energy conservation and gains in chilled water production efficiency accounted for the majority of these reductions. Lighting upgrades and steam distribution systems improvements also yielded significant reductions. This report provides details on our progress toward our emissions reduction target.



Scope of this Report

This report includes annual emissions from eight distinct sources of campus emissions. These sources are listed below and **Appendix A** provides the emissions quantification methodology for each source. These eight sources do not include every source of campus emissions; however, they do represent the vast majority of campus carbon footprint. **Table 1** provides the University's inventory of emissions from these sources for fiscal years 2010 through 2018.

This plan uses the emission categories, known as scopes, established by the International Greenhouse Protocol Standard (http://www.ghgprotocol.org/). These standards organize emission sources into three levels based on the degree of control and influence an entity has over the source and quantity of the emissions.

Scope 1 - Entity controls the amount and source of the processes and products producing the emissions

- Coal and natural gas burned in equipment owned and operated by UK and partners in housing and dining
- Fuel used in campus-owned vehicles

- Scope 2 - Entity controls the amount but not the source of the processes and products producing the emissions
  - Purchased electricity
- Scope 3 - Entity controls neither the amount nor the source of the processes and products producing the emissions
  - Commuting activities of students, staff, and faculty
  - Student air travel for Education Abroad
  - Directly financed air travel
  - Solid waste sent to landfills
  - Wastewater treatment

This report includes emissions from the sources listed above that originate from the main campus in downtown Lexington, Kentucky. This includes the operations of UK HealthCare, UK Athletics, and the facilities operated by UK's partners in student housing and campus dining services.

	Table 1: Campus Emissions Inventory by fiscal year								
Calculated Emissions ($mtCO_2e$)	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018
Emissions for Scope 1: Direct Emissions									
Coal for UK Heating Plants	77,373	82,627	61,996	39,152	24,694	25,306	21,858	21,125	13,777
Natural Gas for UK Campus	38,807	44,440	48,927	68,916	79,802	79,343	72,314	70,518	77,665
Gasoline for Fleet Transportation	1,783	1,811	1,772	1,781	1,777	1,773	1,693	1,791	1,871
Diesel for Fleet Transportation	733	739	762	790	777	727	656	564	477
Emissions for Scope 2: Purchased Utilities									
Electricity for UK Campus	323,494	338,369	348,210	337,400	352,147	348,743	362,387	372,538	349,297
Emissions for Scope 3: Indirect Emissions									
Air Travel: Business	3,549	3,809	3,837	4,080	4,323	4,566	4,781	5,534	5,959
Air Travel: Education Abroad	485	987	1,373	1,341	1,704	1,811	1,762	1,973	2,076
Campus Commuting: Employees	21,800	23,064	22,978	23,348	23,479	24,587	23,591	25,681	26,983
Campus Commuting: Students	5,154	5,318	4,887	4,921	4,838	4,417	3,951	4,116	4,504
Landfill Waste	30,430	31,388	26,387	24,276	24,475	24,881	15,200.08	2,582	3,015
Wastewater	235	245	222	230	231	214	215	225	194
Total Scope 1	118,696	129,616	113,457	110,639	107,049	107,149	96,521	93,999	93,790
Total Scope 2	323,494	338,369	348,210	337,400	352,147	348,743	362,387	372,538	349,297
Total Scope 3	61,653	64,810	59,683	58,196	59,051	60,477	49,500	40,111	42,730
Total Emissions	**503,843**	**532,796**	**521,350**	**506,235**	**518,247**	**516,368**	**508,408**	**506,647**	**485,818**

Summary of FY2018 Greenhouse Gas Emissions by Scope versus baseline and previous year

vs Baseline	vs FY2017	
		Direct Emissions/On Campus Combustion (Scope 1) – 19.3% of total emissions
↓	↓	**Coal for heating plants** – Emissions from the combustion of coal in campus boilers were calculated to be 13,777 $mtCO_2e$ in 2017-2018 or 2.8% of total emissions. This represents an 82% decrease versus the baseline and a 35% reduction versus FY2017. Decreases driven by increased reliance on natural gas.
↑	↑	**Natural gas for heating plants –** Emissions from burning natural gas on campus were calculated to be 77,665 $mtCO_2e$ in 2017-2018 or 16% of total emissions. This represents a 100% increase versus the baseline and a 10% increase versus FY2017. Increases driven by increased reliance on natural gas.
↓	↓	**Gasoline for fleet vehicles –** Emissions from gasoline burned in university-owned vehicles were calculated to be 1,871 $mtCO_2e$ or 0.1% of total emissions. This represents a 35% decrease versus the baseline and a 15% decrease versus FY2017.
↑	↑	**Diesel for fleet vehicles–** Emissions from diesel burned in university- owned vehicles were calculated to be 478 $mtCO_2e$ or 0.4% of total emissions. This represents a 5% increase versus the baseline and a 4% increase versus FY2017.
		Purchased utilities (Scope 2) – 71.9% of total emissions
↑	↓	**Electricity –** The emissions from the electricity purchased from Kentucky Utilities to power the campus were calculated to be 349,297 $mtCO_2e$ or 72% of total emissions. This represents an 8% increase versus the baseline **but a 4% decrease** versus FY2017. Increase over baseline driven by growth of campus. Decrease versus previous year driven by conservation and efficiency efforts and investments.
		Indirect Emissions (Scope 3) – 8.8% of total emissions
↑	↑	**Business Air Travel –** Emissions from employee air travel were calculated to be 5,959 $mtCO_2e$ in 2017-2018 or 1.2% of total emissions. This represents a 68% increase versus the baseline and an 8% increase versus FY2017.
↑	↑	**Education Abroad Air Travel –** Emissions from student education abroad air travel were calculated to be 2,076 $mtCO_2e$ in 2017-2018 or 0.4 % of total emissions. This represents a 328% increase versus the baseline and a 5% increase versus FY2017.
↑	↑	**Employee Commuting –** Emissions from employee commuting were calculated to be 26,983 $mtCO_2e$ in 2017-2018 or 5.6% of total emissions. This represents a 24% increase versus the baseline and a 5% increase versus FY2017.
↓	↑	**Student Commuting –** Emissions from student commuting were calculated to be 4,504 $mtCO_2e$ in 2017-2018 or 0.9% of total emissions. This represents a 13% decrease versus the baseline **but a 9% increase** versus FY2017.
↓	↑	**Landfilled Waste –** Emissions from landfilled waste were calculated to be 3,015 $mtCO_2e$ in 2017-2018 or 0.6% of total emissions. This represents a 90% decrease versus the baseline **but a 17% increase** versus FY2017.
↓	↓	**Wastewater Treatment –** Emissions from wastewater treatment were calculated to be 194 $mtCO_2e$ in 2017-2018 or 0.04 % of total emissions. This represents an 18% decrease versus the baseline and a 14% decrease versus FY2017.

Emissions Reduction Strategies

The University will pursue the 25 percent reduction target with a two-phased approach that includes nine reduction strategies for Phase 1 (FY2018-FY2021). These nine strategies, listed below, focus on energy conservation and efficiency, waste reduction, and transportation. **Table 2** details the progress made in year one in each of these areas.

Phase 1 Strategies (FY2018-2021)

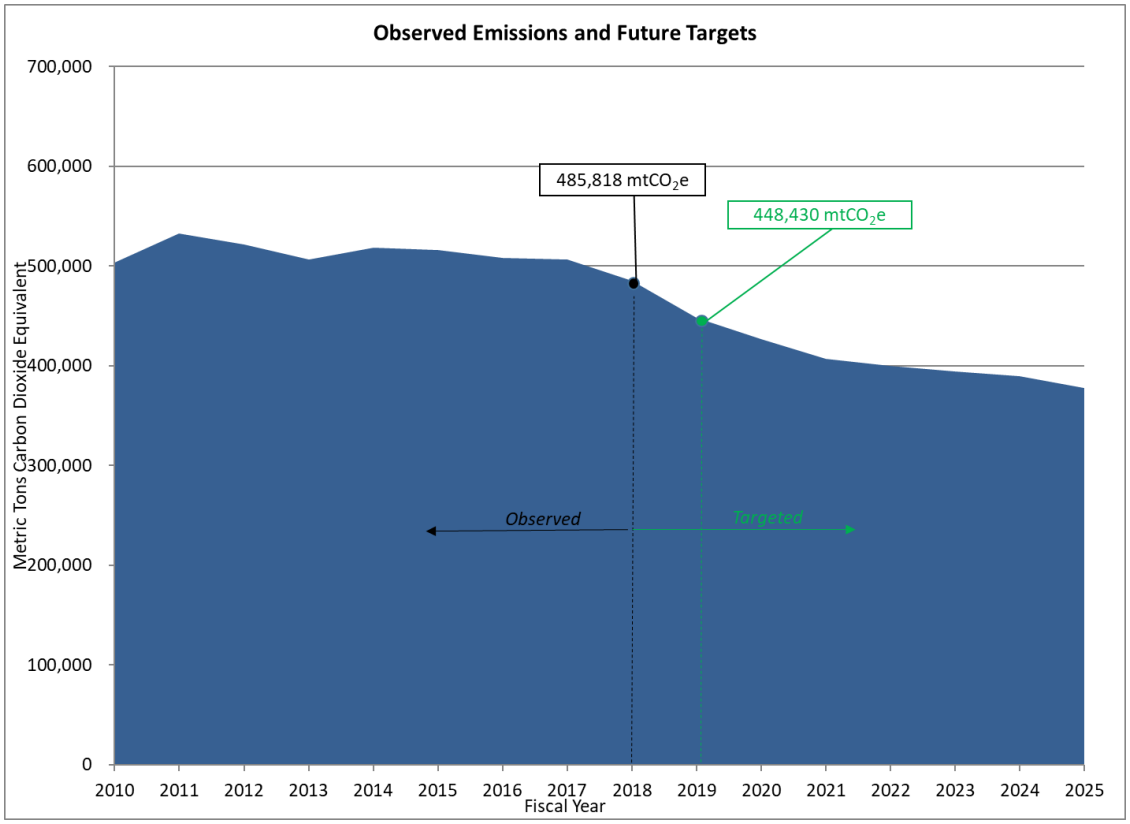
1. **Energy Conservation and Efficiency**
   - 1.1 Optimize building performance for energy efficiency
   - 1.2 Renovate and upgrade buildings for energy efficiency
   - 1.3 Optimize electricity used for lighting through equipment upgrades
   - 1.4 Improve the efficiency of baseload chilled water production
   - 1.5 Optimize steam distribution systems
2. **Waste Reduction**
   - 2.1 Increase campus waste diversion rate to 50 percent
3. **Transportation**
   - 3.1 Launch and promote alternative transportation programs and policies
   - 3.2 Work with campus and community partners to develop a service learning-focused effort to offset 50 percent of the annual emissions associated with Education Abroad air miles by 2025
   - 3.3 Work with campus and community partners to develop a service learning-focused effort to offset 25 percent of the annual emissions associated with University business air miles by 2025

Table 2 - Emissions Reductions by strategy

Reduction Strategies	FY2018 Emissions Reductions ($mtCO_2e$)
Optimize buildings for energy efficiency and conservation	13,250
Renovate and upgrade buildings for efficiency	0
Indoor and outdoor lighting equipment upgrades	314
Increase efficiency of baseload chilled water production	7,064
Optimize steam distribution systems	201
Increase campus waste diversion rate to 50%	No documented reductions versus previous year
Reduce commuter miles traveled	No documented reductions versus previous year
Education Abroad air miles emissions offset	Not yet implemented
Business air miles emissions offset	Not yet implemented
Employee Commuter Emissions Offset	Not yet implemented

Next Steps

The greenhouse gas emissions target for FY2019 is 448,430 $mtCO_2e$. We are pursuing this target through expanded energy conservation efforts, renovating and upgrading for energy efficiency, additional improvements to baseload chilled water production, lighting upgrades, optimization of steam distribution, and reducing the vehicle miles traveled by campus commuter.



Appendix A: Methodology for calculating campus emissions

There are several heat-trapping gases that are by-products of the activities of the University included in this plan. Each of these has been converted to a carbon dioxide equivalent for the purposes of this report. Metric tons of carbon dioxide equivalent ($mtCO_2e$) is the standard unit of measure for campus emissions.

Stationary Combustion for Steam Production

The University owns and operates 14 primary boilers that produce the steam needed to heat campus facilities and meet campus hot water needs. Ten of the boilers are fueled by natural gas and four are fueled by coal. The University operates these 14 boilers in compliance with regulations and permits provided by the Kentucky Division of Air Quality and the United States Environmental Protection Agency (USEPA). The emissions factors for these two fuels are:

- Coal combustion is tracked by the number of short tons (2000 lbs.) burned. Each short ton of coal burned releases 2.47664 $mtCO_2e$.
- Natural gas combustion is tracked by British thermal units (Btu) and one million BTUS (MMBtu) releases .054431643 $mtCO_2e$.

University-Owned Vehicles

The University owns and operates a large fleet of automobiles, service vehicles, buses, heavy equipment, and golf service carts. These vehicles run on a variety of fuels including gasoline, diesel, bio-diesel, and electric batteries. The emissions factors provided by the University of New Hampshire's Sustainability Indicator Management and Analysis Platform (SIMAP) are used to convert the fuel use of these vehicles to $mtCO_2e$.

Purchased Electricity

Purchased electricity is the largest single source of UK's GHG emissions. UK purchases all of its electricity from Kentucky Utilities (KU). The resulting emissions are considered Scope 2 because UK has control over the amount consumed, but not over the method used to produce the electricity.

KU has a current grid mix composed of 94.62 percent coal, 5.01 percent natural gas, and 0.37 percent renewable sources. The average heat rate is approximately 10,270 British thermal units (Btu) per kilowatt hour (kWh) for Kentucky power generation and grid loss is approximately 5.82 percent. The USEPA has established CO_2e emission rates of 210 pounds of CO_2e per million Btu (MMBtu) produced for coal and 120 lb./MMBtu for natural gas. Based on those rates and using the calculations below, the emissions factor for the electricity purchased by UK is 0.001007 $mtCO_2e$/kWh.

- Coal: 10,270 Btu/kWh x 210 lb./MMBtu x 0.9462 ÷ 1,000,000 = 2.04 lb. CO_2e/kWh plus
- Natural gas: 10,270 Btu/kWh x 120 lb./MMBtu x 0.0501 ÷ 1,000,000 = 0.06 lb. CO_2e/kWh
- Subtotal: 2.10 lb. CO_2e/kWh or 0.00095255 $mtCO_2e$ /kWh
- Grid loss: 5.82 percent of 2.10 lb. CO_2e/kWh = 0.12 lb./kWh
- Total: 2.10 lb./kWh + 0.12 lb./kWh = 2.22 lb. CO_2e/kWh or 0.001007 $mtCO_2e$ /kWh

Directly Financed Air Travel and Education Abroad Travel

The total air miles traveled by the UK community for business and Education Abroad purposes is tracked by two offices. The UK Education Abroad Office tracks the student air miles traveled for education abroad opportunities and UK Travel Services tracks all university-funded travel for staff and faculty. This report uses the emissions factors developed by the USEPA for short-, medium- and long-haul flights to convert the air miles traveled into emissions equivalents (https://www.epa.gov/sites/production/files/2015-07/documents/emission-factors_2014.pdf).

Commuting Activities of Students, Faculty, and Staff

Travel to, from, and around campus for daily activities generates a tremendous number of vehicle miles traveled (VMT) with corresponding emissions impacts, congestion, air quality issues, and safety concerns. Calculating the emissions that result from the vehicles driven to, from and around campus by employees and students is challenging due to the number of variables at play.

Employee commuter emissions are calculated using these figures, assumptions, and estimates:

- The number of employee permits sold for a given fiscal year
- The average employee makes five, round-trip commutes between home and campus per week
- The average employee works 48 weeks per year
- The average round-trip commute distance is estimated to be 15.9 miles based on survey data collected by UK Transportation Services from 2,604 employees
- All of these trips are made in vehicles that use unleaded gasoline and that the average fuel economy for these vehicles is 20.79 miles per gallon based on National Highway Traffic Safety Administration (NHTSA) data
- An emissions factor of 0.009795 $mtCO_2e$ /gallon of gasoline from USEPA data (https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references).

Employee emissions calculation ($mtCO_2e$) = {[Permits sold x 5 (trips) x 48 (weeks) x 15.9 (miles)]/20.79 (mpg)} x .009795 ($mtCO_2e$ per gallon)

Student commuter emissions are calculated using the following figures, assumptions, and estimates:

- The number of commuter permits (C permit) sold for a given fiscal year
- The assumption that the average student makes four round trip commutes between home and campus per week
- The assumption that the average student is on campus 34 weeks per year
- The average round-trip commute distance is estimated to be 7.66 miles based survey data collected by UK Transportation Services from 1,010 students
- The assumption that all of these trips are made in vehicles that use unleaded gasoline and that the average fuel economy for these vehicles is 20.79 miles per gallon based on NHTSA data for model years 1982-2011
- An emissions factor of 0.009795 $mtCO_2e$ /gallon of gasoline from USEPA data (https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references).

Student commute emissions calculation: {[Permits sold x 4 (trips) x 34 (weeks) x 7.66 (miles)]/20.79 (mpg)} x .009795 (mtCO_2e per gallon) = mtCO_2e per year.

Landfilled Waste

When placed in a landfill municipal solid waste (MSW) generates methane, a very potent greenhouse gas. There are also greenhouse gas emissions associated with the transport of the waste. This report uses the methodology developed for the University of New Hampshire's Sustainability Indicator Management and Analysis Platform (SIMAP) to convert tons of landfilled waste to carbon dioxide equivalent. Emissions factors for landfilled MSW vary widely depending on the presence and/or type of landfill gas recovery system in use at the landfill in question.

The landfill receiving the University's solid waste had very limited, if any, methane recovery or flaring until late 2015. In late 2015, a system for recovering landfill gas for power generation was activated in partnership with Toyota Motor Manufacturing of Kentucky. This significantly impacted the emissions associated with the University's solid waste. For FY2010-FY2015, this document uses the emissions factor of 3.1 mtCO2e /short ton of MSW based on the SIMAP emissions factor for solid waste with no methane recovery or flaring. For FY2016, this document uses the factor above for half the year and the SIMAP emissions factor for solid waste with methane recovery and flaring of 0.31 mtCO2e /short ton of MSW for the other half. Starting in FY2017 and projecting forward, this document uses the 0.31 mtCO2e/short ton of MSW. Additional information is available at https://sustainableunh.unh.edu/calculator.

Wastewater

Lexington's wastewater treatment process generates methane as a by-product. Due to methane capture and storage technologies installed at the treatment plant, the emissions from wastewater are quite low relative to the volume of water processed. The methodology from the University of New Hampshire's Sustainability Indicator Management and Analysis Platform (SIMAP) is used to convert the gallons of wastewater to carbon dioxide equivalent.

FW: PSAC Update

Tedder, Shane

Wed 1/16/2019 10:43 AM

To: Taylor, Jennifer <jenniferdai14@uky.edu>;

Cc: Jacobsen, Krista <krista.jacobsen@uky.edu>;

For the PSAC minutes

From: Hege, Amanda <amanda.hege@uky.edu>
Sent: Monday, January 14, 2019 3:57 PM
To: Tedder, Shane <shane.tedder@uky.edu>; Jacobsen, Krista <krista.jacobsen@uky.edu>
Subject: PSAC Update

Shane and Krista,

Would you be willing to share an update about on-campus food insecurity with the PSAC team tomorrow (see below)? Since food insecurity is part of the sustainability strategic plan, I thought the group may be interested in hearing the details. My apologies that I am not able to make the meeting. I teach until 2 PM. If the meeting goes beyond 2, you are welcome to “call me-in” at 859-218-4912.

*You may have seen in the Lexington Herald Leader an article on Sunday about food insecurity among UK students, **'A constant struggle.' Survey finds many UK students face hunger, food insecurity**. This article was on the heels of a report released last Wednesday by the U.S. Government Accountability Office (GAO). The GAO conducted site visits in 2018 to learn more about hunger and food insecurity at two and four-year colleges and universities. Upon meeting with them last February, UK was one of the universities included in the report.*

As a result of this research, students involved with the Campus Kitchen at the University of Kentucky received $5,000 from the Food Connection at UK to offer a free, locally sourced meal for students on Wednesdays called Farm-to-Fork. Serving a healthy meal to more than 100 students a week. These meals will begin next Wednesday, January 23rd from 11 AM – 1 PM in 207 Funkhouser and is open to anyone at UK.

Additionally, students involved with SSTOP Hunger partnered with UK Dining to offer free meal swipes to students who qualified. In Fall 2018, they distributed 2,000 swipes over the course of 1 week - reaching 128 students. UK has an on-campus food pantry, as well.

Recognizing that we cannot solve the problem with food alone, the Food and Housing Security Working Group led by the Dean of Students is looking at ways to work toward a Basic Needs Center (virtual and physical) dedicated to ensuring all students have food and housing to be successful. Models from the Wisconsin HOPE Lap, Temple University, University of California system and University of Georgia are our guide.

Feel free to reach out with any questions. Thanks for your time. Hope you are well!

Amanda

Amanda S. Hege, MPH, RDN, LD
Director of Community Outreach
Department of Dietetics and Human Nutrition
University of Kentucky
222 Funkhouser Building, Lexington, KY 40506-0054
(859) 218-4912
amanda.hege@uky.edu

I check email communications twice daily. If you require a time-sensitive response, please do not hesitate to call.

Study agriculture, food and health in West Africa this summer! Go to: https://bit.ly/2e5a4WF.

"It's always the right time to help somebody in need." – Clyde Fitzgerald, Jr.