Latest Updates

SIMAP

SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Allison Leach, Ben Robinson,
Bailey Jones, Cassidy Yates, &
Jenn Andrews

University of New Hampshire

October 6, 2021

Outline

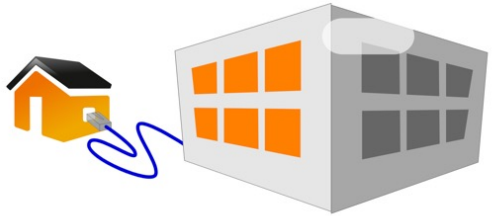
Introduction and background

New methods in development

- Telecommuting
- Electric vehicles
- Scope 3 upstream energy emissions

Next version of emission factors

- General updates
- Wastewater methods



Commuting working group recommendations

Q&A

The SIMAP Team

Alley Leach

Postdoctoral Researcher

Jenn Andrews

Project Director

Ben Robinson

Technical Program Assistant

Cassidy Yates

Graduate student, SIMAP intern

Bailey Jones

Undergraduate student, SIMAP intern

UNH Sustainability Institute

SIMAP

SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

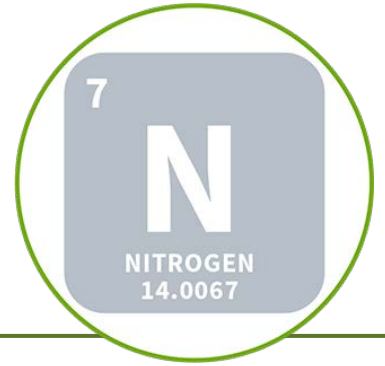
What is SIMAP?

A carbon and nitrogen accounting platform that can track, analyze, and improve your campus-wide sustainability

SIMAP combines two tools:

UNH Sustainability Institute

- Developed in 2001 at UNH
- Excel and web version
- Used by thousands of institutions

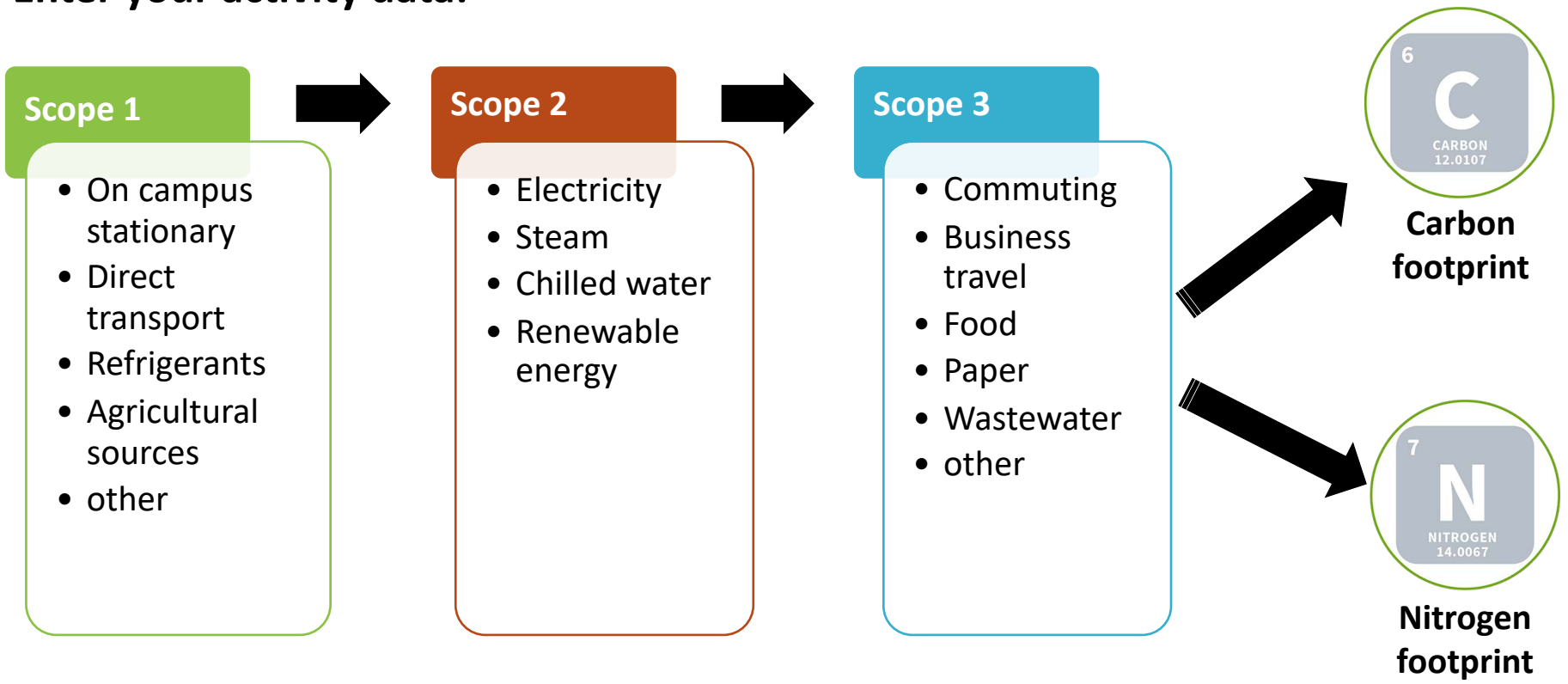


N Print

- Developed in 2009 at UVA
- Excel-based
- Used by 20 institutions
- Completed pilot testing

How does SIMAP work?

Enter your activity data:



stars
a program of aashe

STARS credit for GHG inventory, N footprint (exemplary practice), air quality (NOx emissions), purchased goods (food), third party GHG inventory review (Data Review)

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

SIMPLIFYING SUSTAINABILITY DECISIONS

SIMAP® is a carbon and nitrogen-accounting platform that can track, analyze, and improve your campus-wide sustainability. Our proven algorithms, based on nearly two decades of work supporting campus inventories with the Campus Carbon Calculator, CarbonMAP and Nitrogen Footprint Tool, will help you:

- Create a baseline
- Benchmark your performance
- Create reports
- Set goals
- Analyze your progress year over year

GET STARTED!

YOUR CAMPUS FOOTPRINT

CARBON

CO2 emissions from generating power, treating waste, daily commuting, and even the use of paper, contribute to a campus' carbon footprint. Reducing these greenhouse gas emissions will help slow the effects of climate change and global warming.

NITROGEN

Reactive nitrogen can result from everyday activities like food service, energy use, transportation, and ground fertilizer. Reducing your nitrogen footprint can provide benefits to air quality, water quality, and climate change.

NEWSFEED

Register for our upcoming SIMAP webinar on October 6th at 2pm ET! We will share our latest updates and plans, including the next version of emission factors and new scope 3 calculations.

Check out our September 2021 newsletter

We launched a Carbon Footprinting Certificate Program through UNH Professional Development & Training! Register for our first two courses this fall: Introduction to Carbon Footprinting on 10/28 and Carbon Footprinting: Data Collection and Calculations on 12/9.

The degree day factors were updated for several states in August 2021. This was a correction and an update. See the degree days page for more information.

New electricity emission factors are available! They will not be in SIMAP until early 2022, but you can enter them as custom emission factors now.

Scheduled downtime: SIMAP will be down for routine maintenace on Tuesday June 29th from about 8am to 10am ET.

Interested in learning more about nitrogen? Register for free for the virtual International Nitrogen Initiative Conference, to be held May 31 - June 3. There will be two nitrogen footprint sessions on Thursday June 3rd at 7:15am and 8:05 am ET.

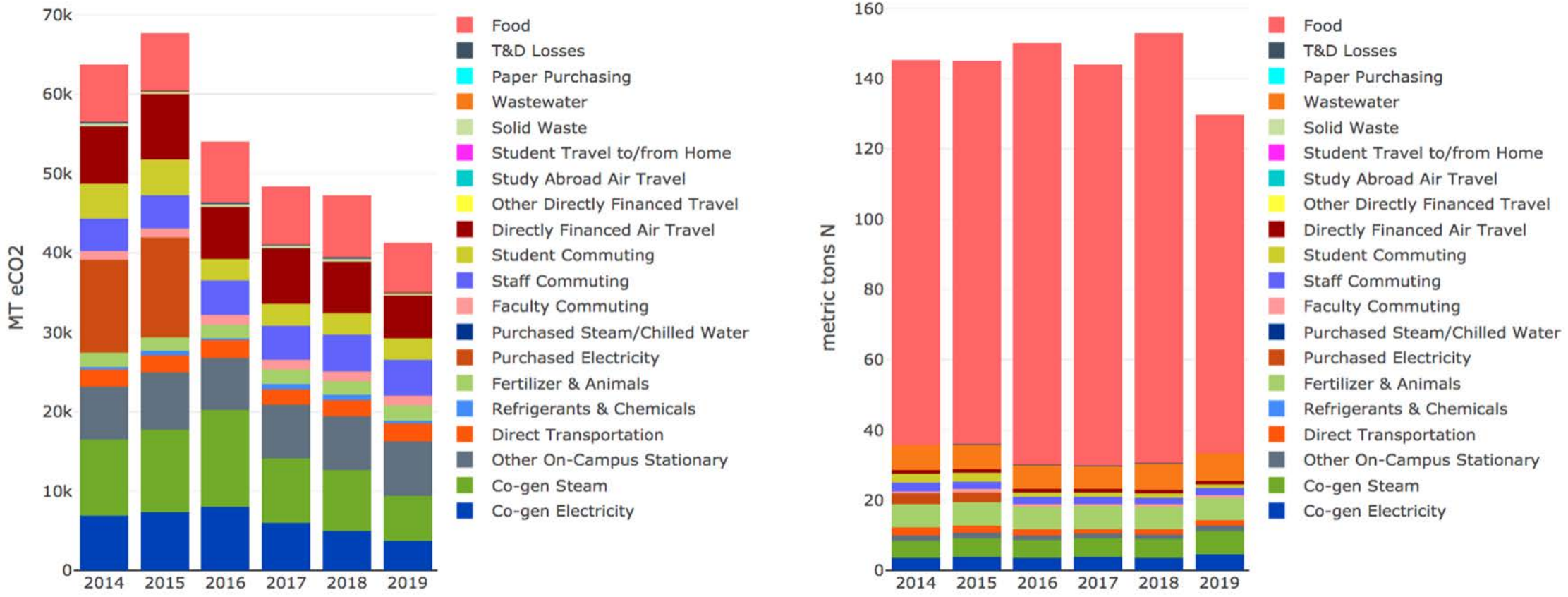
SIMAP

My account Log out

SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

HOME | 1. ACCOUNT | 2. DATA ENTRY | 3. RESULTS | REPORTS | DATA MGMT | ABOUT | RESOURCES

The Categories graph shows your gross emissions organized by category (e.g., stationary fuels). Sinks are not included.



Carbon footprint

Nitrogen footprint

SIMAP

My account Log out

SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

HOME | 1. ACCOUNT | 2. DATA ENTRY | 3. RESULTS | REPORTS | DATA MGMT | ABOUT | RESOURCES

Reports

Report

- ✓ Annual Report
- Food Report
- Commuting Report
- Second Nature
- GRITS Report
- Biogenic Emissions
- Campus Comparison Report

Footprint *

◉ Carbon ○ Nitrogen

Year *

2019

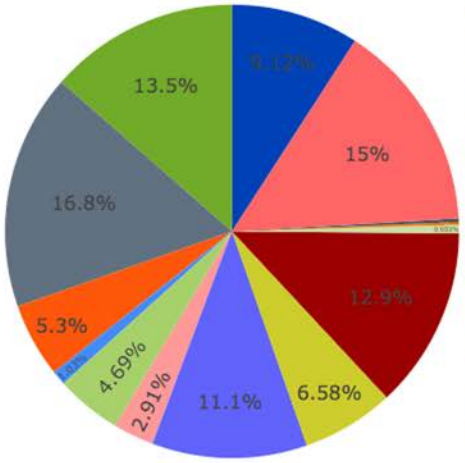
Campus ⓘ *****

☑ Main Campus
☐ UNH Law

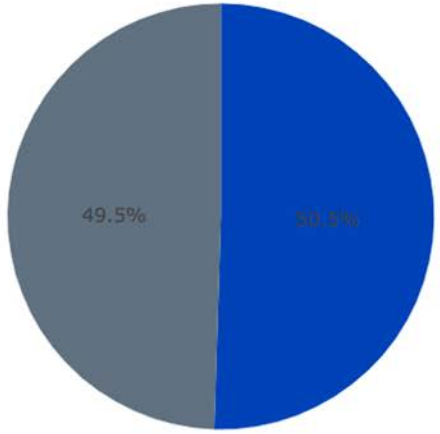
Filter by tags

- All -
Physical Spaces
Athletic
Dining
Healthcare/hospital

DISPLAY | EXPORT



- Co-gen Electricity
- Co-gen Steam
- Other On-Campus Stationary
- Direct Transportation
- Refrigerants & Chemicals
- Fertilizer & Animals
- Purchased Electricity
- Purchased Steam/Chilled Water
- Faculty Commuting
- Staff Commuting
- Student Commuting
- Directly Financed Air Travel
- Other Directly Financed Travel
- Study Abroad Air Travel
- Student Travel to/from Home
- Solid Waste
- Wastewater
- Paper Purchasing
- T&D Losses
- Food



- Scope 1
- Scope 2
- Scope 3

View reports that package your results by specific topics.

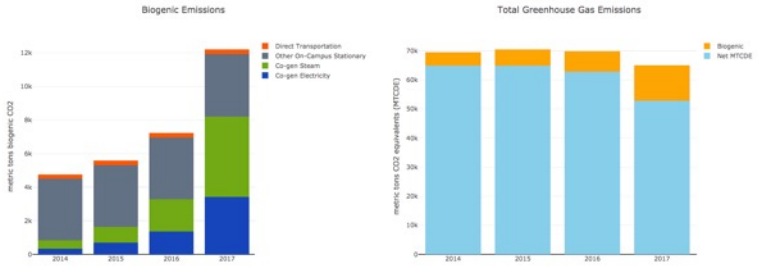
Working groups

Commuting Working Group

Co-facilitated with Second Nature

Bioenergy Working Group

Co-facilitated with Second Nature



Nitrogen Working Group

Co-facilitated with University of Virginia

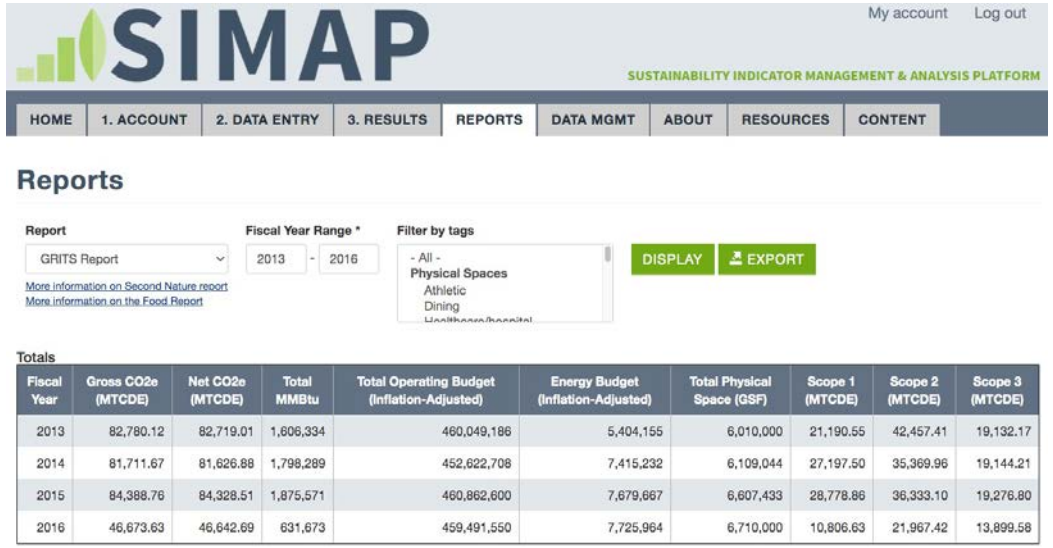
7
N
NITROGEN
14.0067

NITROGEN WORKING GROUP

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Partnership with GRITS

New sync feature: You can transfer your data from SIMAP to GRITS!



Fiscal Year	Gross CO2e (MTCDE)	Net CO2e (MTCDE)	Total MMBtu	Total Operating Budget (Inflation-Adjusted)	Energy Budget (Inflation-Adjusted)	Total Physical Space (GSF)	Scope 1 (MTCDE)	Scope 2 (MTCDE)	Scope 3 (MTCDE)
2013	82,780.12	82,719.01	1,606,334	460,049,186	5,404,155	6,010,000	21,190.55	42,457.41	19,132.17
2014	81,711.67	81,626.88	1,798,289	452,622,708	7,415,232	6,109,044	27,197.50	35,369.96	19,144.21
2015	84,388.76	84,328.51	1,875,571	460,862,600	7,679,667	6,607,433	28,778.86	36,333.10	19,276.80
2016	46,673.63	46,642.69	631,673	459,491,550	7,725,964	6,710,000	10,806.63	21,967.42	13,899.58

Promotion: GRITS is offering a complimentary SIMAP Tier 1 subscription for any institution that subscribes (or renews an existing subscription) to GRITS Unlimited!

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Carbon Footprinting Certificate Program

We are launching a new 4-course Carbon Footprinting Certificate Program through UNH Professional Development and Training!

- **Introduction to Carbon Footprinting** on October 28th from 1 - 5pm ET
- **Carbon Footprinting: Data Collection and Calculations** on December 9th from 1 - 5pm ET

Courses can be taken individually, or as part of the 4-course certificate program

https://training.unh.edu/carbon-footprinting-certificate

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

New methods in development

Telecommuting, electric vehicles, Scope 3 upstream energy emissions

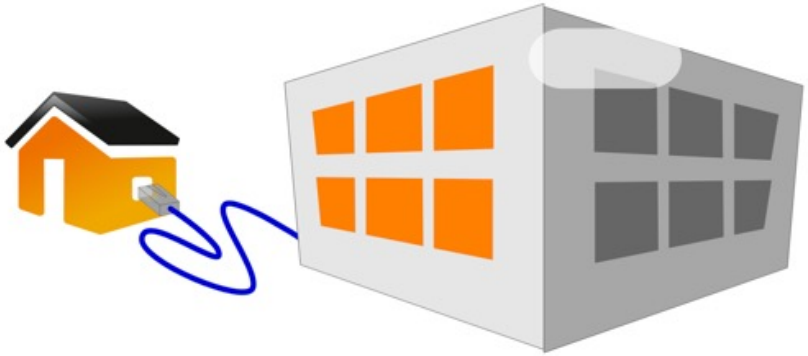
SIMAP

SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Telecommuting

Telecommuting generates emissions from:

- Primary effects:
  - Energy use from at-home workstation
  - Added at-home electricity and heating
  - Added server space and IT support
- Secondary effects:
  - Many! Living further from work, etc.



Identifying the system bounds is key!

We have decided to start with a narrow focus.

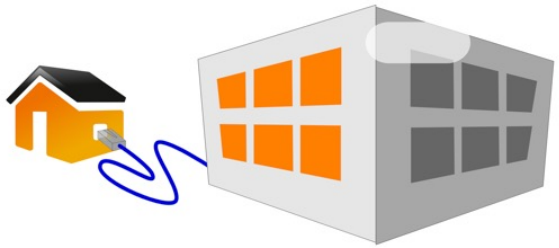
SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Telecommuting

Example calculation for added electricity from computer station ONLY

5 kwh/week/person * 48 weeks * 0.43 kg CO_2/kwh = **103 kg CO_2/telecommuter/year**

Varies by eGrid region:
28 to 183 kg CO_2/telecommuter/year



How does this compare to SOV travel?

Assumptions: SOV, 3 miles per one-way trip, 48 weeks per year

513 kg CO_2/commuter/year

This update will be included in the commuting methods updates

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

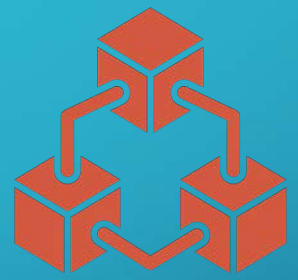
ELECTRIC VEHICLES

By Bailey Jones

UNDERGRADUATE RESEARCH CONFERENCE - ELECTRIC VEHICLES

Electric Vehicles (EVs)

Lower Emissions ✓
Less On-Campus Pollution ✓
Cheaper Fuel ✓
Conspicuous ✓



Scope of Project

- Replace Entire UNH Fleet in FY19
- Fully Electric Alternatives (Including Busses)
- Including Upcoming EV Models

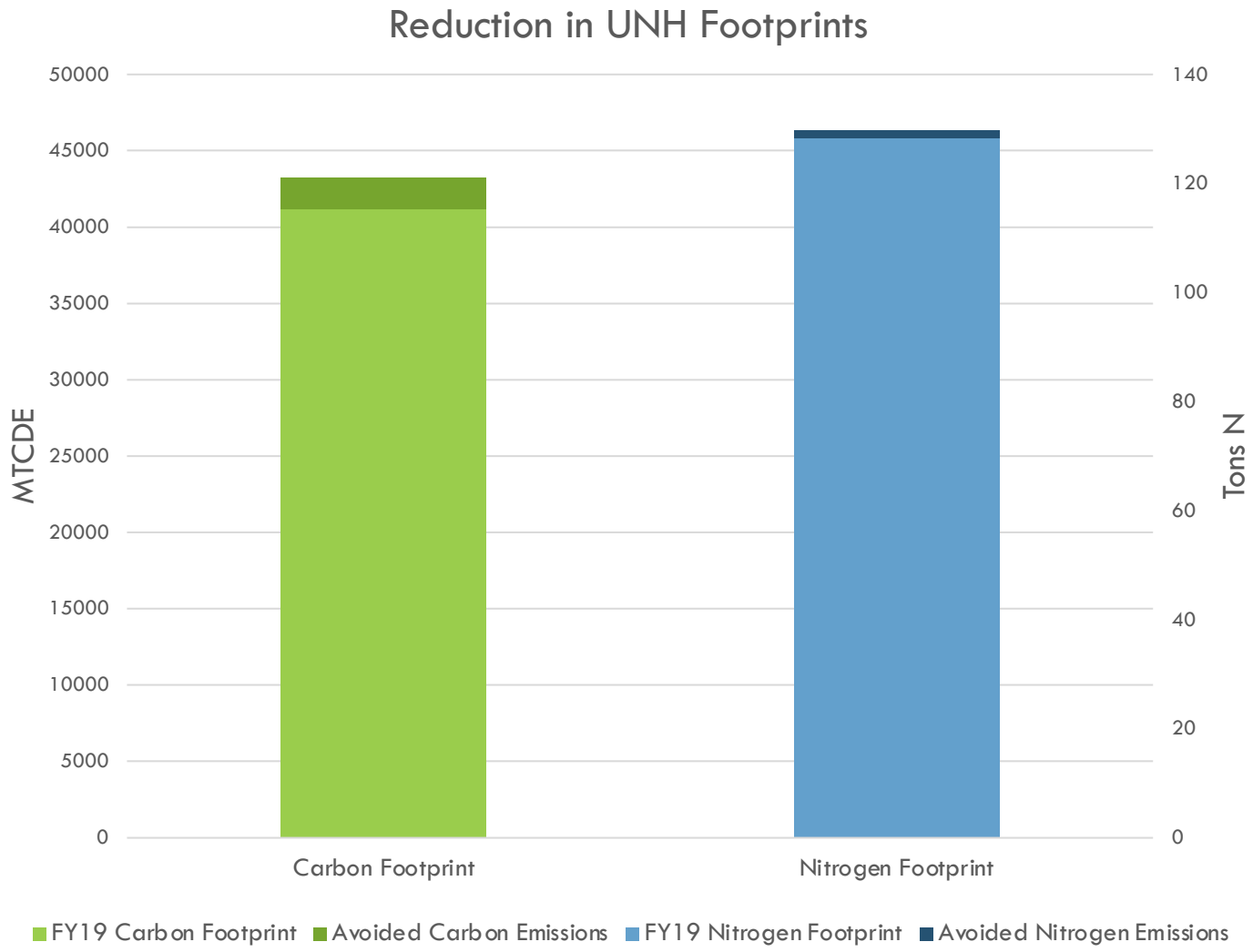
METHOD

eGRID2019 Emission Factors (kg CO2-eq / kWh) × EV Efficiency Factors for Each Vehicle Type (kWh / Mile) = EV Emission Factors for Each Vehicle Type (kg CO2-eq/ Mile)

EV Emission Factors for Each Vehicle Type (kg CO2-eq/ Mile) × Total Miles Driven by Each Vehicle Type in FY19 = Total Emissions From an EV Fleet in FY19 (kg CO2-eq)

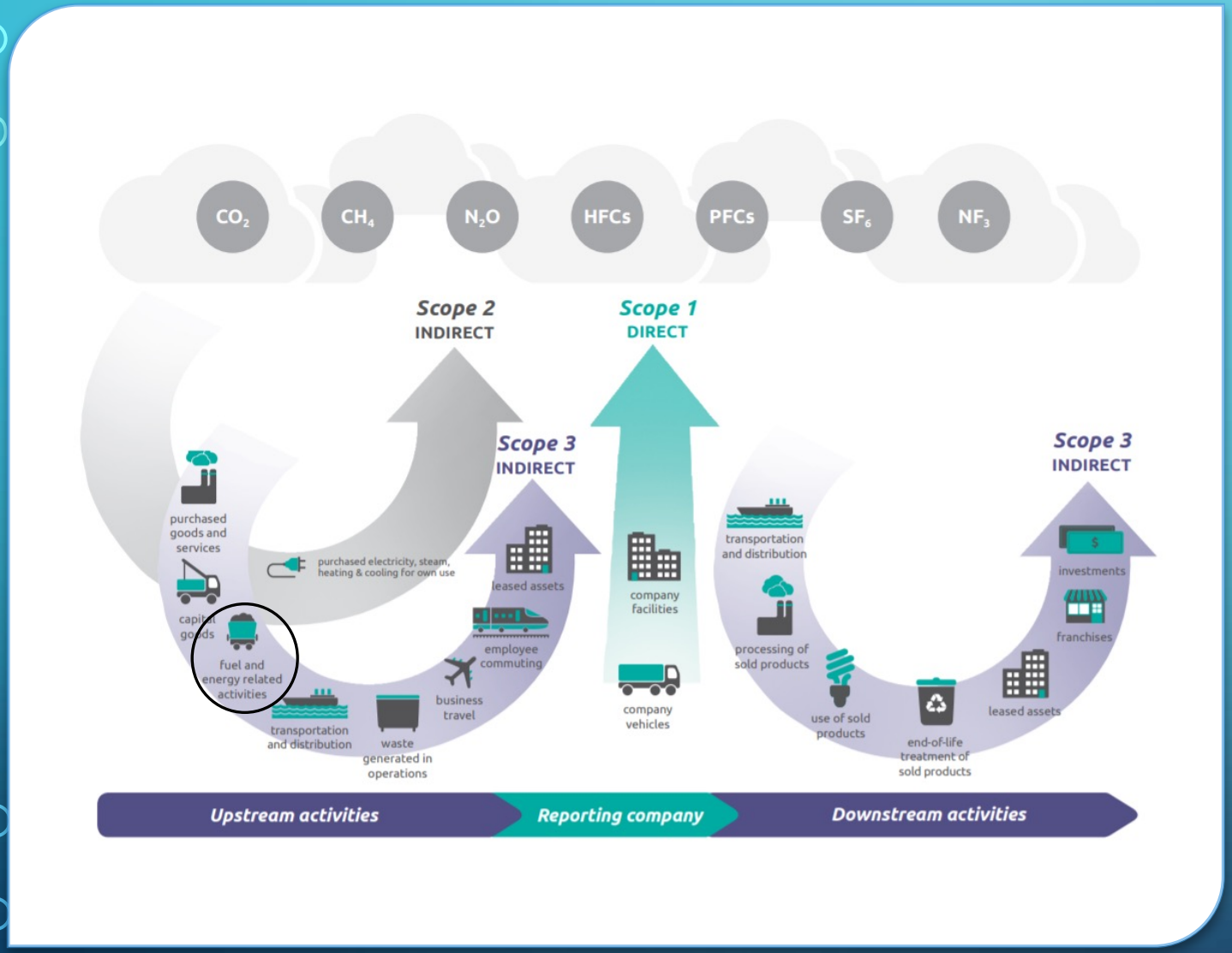
KEY TAKEAWAYS

- 5% Reduction in UNH Carbon Footprint
- Zero Emissions for Scope 1: Transport Fuels
- Next Step: Assessing Feasibility & Waiting for Better EVs to be Developed



UPSTREAM ENERGY EMISSIONS

By Bailey Jones

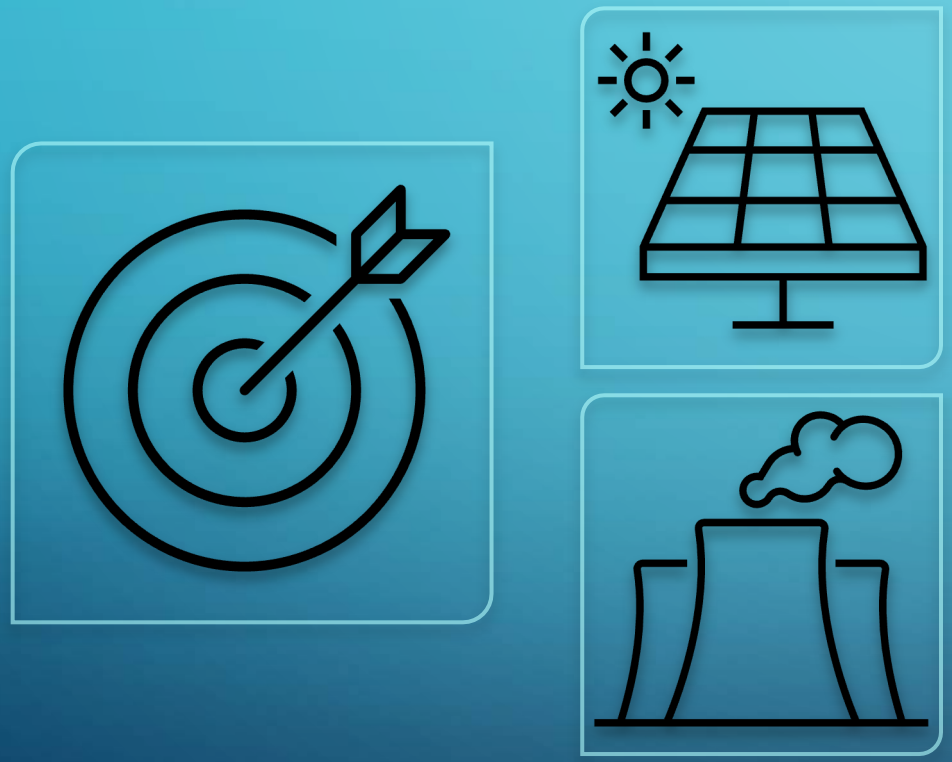


Source: https://ghgprotocol.org/sites/default/files/standards_supporting/Intro_GHGP_Tech.pdf

WHAT ARE UPSTREAM EMISSIONS?

- Upstream Emissions are emissions generated from the production and transportation of a product.
- Examples
  - Energy needed to operate manufacturing equipment.
  - Fuel needed to move a product to/from each stage of development.

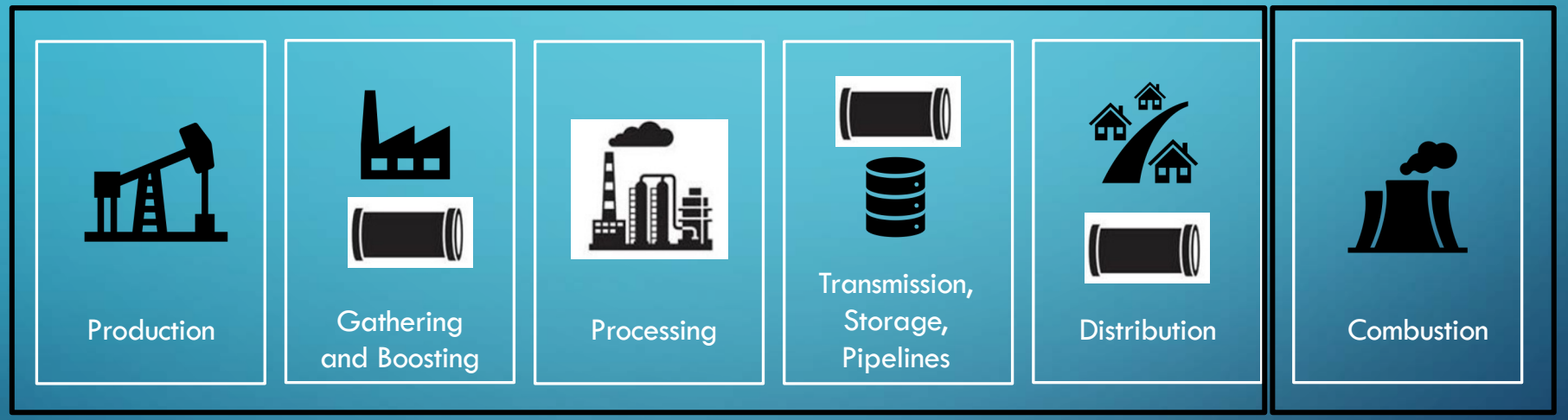
WHY ARE UPSTREAM EMISSIONS IMPORTANT?



- Facilitates a Better Understanding of Campus Emissions
  - Upstream Stationary Fuels Increase Recorded Emissions ~ 25%
- Zero Emissions Goal Will not Truly be Attained Without Accounting for Upstream Emissions
  - Know Where Your Target Lies

SCOPE 3 UPSTREAM EMISSIONS - NATURAL GAS

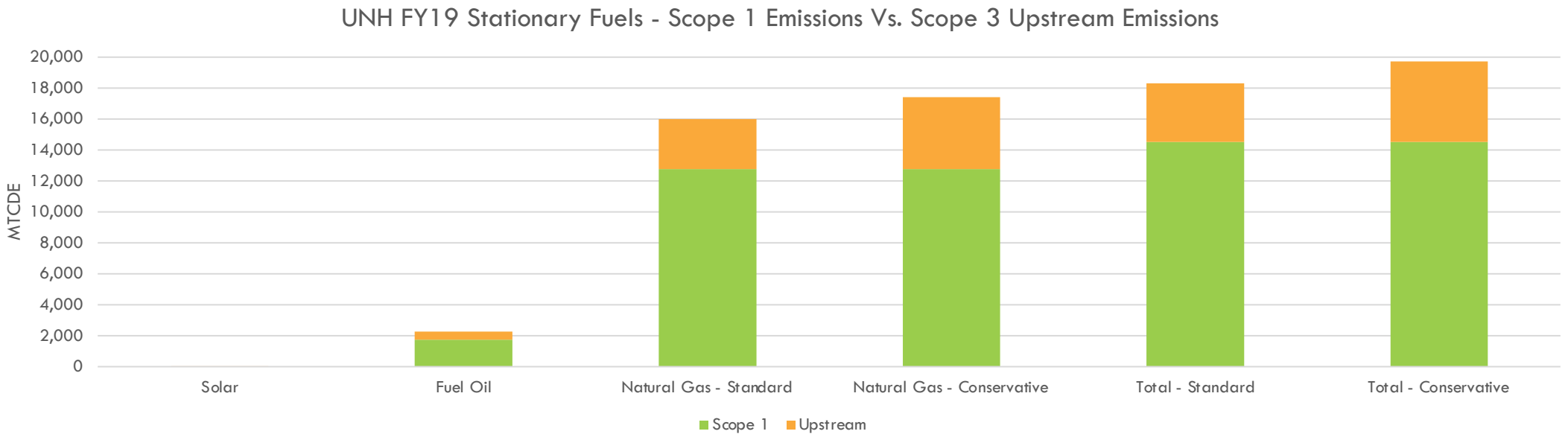
Supply Chain Boundaries



Source: Complete Scope 3 Webinar SIMAP (8/12/20).

Scope 3
Not Present in SIMAP

Scope 1
Currently in SIMAP



Source	Unit	Scope 1 Emissions Factor	Scope 3 Upstream Emissions Factor
Solar	kg CO2-eq/kWh	0.00	0.02
Fuel Oil	kg CO2-eq/gallon	10.23	3.05
Natural Gas - Standard	kg CO2-eq/MMBtu	53.09	13.43
Natural Gas - Conservative	kg CO2-eq/MMBtu	53.09	19.35

SCOPE 3 UPSTREAM: FUEL AND ENERGY RELATED ACTIVITIES

WHAT'S NEXT FOR UPSTREAM EMISSIONS

Biogenic Fuel Sources

- Landfill Gas
- Woodchips

Scope 1: Stationary Fuels

- Coal
- Cogen Fuels

Entering Values into SIMAP

Next version of emission factors

To be released January 2022

SIMAP

SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

2021 version of emission factors

Key updates to emission factors:

- Updating across all relevant categories:
  - 2020 carbon contents, 2020 heating values, 2017-2020 MPGs

- Scope 1:
  - No major changes, evaluating AR6 GWP updates

- Scope 2:
  - Updating residual emission factors to 2019 data (released 2021)
  - eGRID2019 factors to latest release (released 2021)
  - Electricity 2019 page in SIMAP

- Scope 3:
  - Wastewater methodology update
  - Food emission factor update

Corrections:

- None at this time

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

2021 version of emission factors: Scope 1

Version	2021 (Recommended)
To be released	January 2022
Scope 1	
Stationary combustion	Updated to most recent year (Carbon Contents: 2020, Heating values: 2020)
Transport fuels	Updated data to most recent year (Carbon Contents: 2020, Heating values: 2020)
Fertilizer	No changes
Animals	Updated data to the most recent year (2019/2018)
Refrigerants & chemicals	Evaluating need for GWP updates following AR6

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

2021 version of emission factors: Scope 2

Version	2021 (Recommended)
Date released	January 2022
Scope 2	
Utility consumption	eGRID2019 report for location-based emission factors (released 2021)
	Residual emission factors for market-based approach updated through 2019

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

2021 version of emission factors: Scope 3

Version	2021 (Recommended)
Date released	January 2022
Scope 3	
Commuting	Updated data to most recent year (Carbon Contents: 2020, Heating values: 2020, Average MPGs: 2017-2020)
Business travel & study abroad	Updated data to most recent year (Carbon Contents: 2020, Heating values: 2020, Average MPGs: 2017-2020)
Student travel to/from home	Updated data to most recent year (Carbon Contents: 2020, Heating values: 2020, Average MPGs: 2017-2020)
Food	Identifying data source for updated production emissions factors
Paper	No changes
Waste & wastewater	Updated wastewater methodology for greater flexibility and alignment with US GHG Inventory methods.

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

More information about EF versions

SIMAP

My account Log out

SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

HOME | 1. ACCOUNT | 2. DATA ENTRY | 3. RESULTS | REPORTS | DATA MGMT | ABOUT | RESOURCES

RESOURCES

- Tools
- Users' Guide
- Training
- Changes in SIMAP
- FAQ
- Support
- Our Team
- Glossary
- Links
- Carbon References
- Nitrogen References
- Graphs Instructions

Emissions factors version information

Emissions factors are released each year as versions. Each year's version includes the most up to date emissions factors available. You can select which version you would like to use on the calculation sources and methods form. And remember, Tier 1 users can always customize their emissions factors on the Data Entry tab.

List of references used in the recommended version of emission factors (2019)

Table summarizing all emission factors, with links to detailed reference pages (2019)

Version	2017	2018	2019	2020 (Recommended)
Date released	November 2017	April 2019	February 2020	January 2021
Scope 1				
Stationary combustion	On-campus stationary changes, new NOx emissions factors	Unchanged from 2017 version	Updated data to most recent year (Carbon Contents: 2017, Heating values: 2019) Updated methodology for CH4 from Wood Chips, Wood pellets, and Grass Pellets Error corrected for Incinerated Waste (reducing CO2 EF by around 70%)	Updated data to most recent year (Carbon Contents: 2018, Heating values: 2019) Separated out biogenic emission factors Corrected biogenic % for residual and distillate heating (from 100% to 20%)
Transport fuels	Unchanged from CCC, new NOx emissions factors	Unchanged from 2017 version	Updated data to most recent year (Carbon Contents: 2017, Heating values: 2019, Average MPGs: 2016) CH4 and N2O update for gasoline and diesel vehicles (emission factors and fuel efficiency)	Updated data to most recent year (Carbon Contents: 2018, Heating values: 2019, Average MPGs: 2017) Updated biogenic % for E85 (from 85% to 74%)

https://unhsimap.org/cmap/resources/EFVersions

Which emission factor version should I use?

Which version should you use for your current and historic calculations?

- The recommended practice is to use the current recommended emission factor version (2020 version) for ALL years of your footprint calculation
- Every version of emission factors extends back to 1990 in SIMAP
- Historic emission factors can change in new emission factor versions for two reasons:
  - New data sets become available
  - New methodologies are recommended

Why should you update?

- More accurate results
- Comparisons across time reflect real changes – not changes in accounting methods

EF versions in SIMAP:

2020 version (currently recommended)

2019 version

2018 version

2017 version

Select on Data Mgmt tab

https://unhsimap.org/cmap/resources/recommendedEFversion

Recommended methods and alerts

Calculation Sources and Methods

Emission Factors Version

2020 (recommended)

More information on EF versions

Global Warming Potential Version

AR4 100-year
✓ AR5 100-year (recommended)
AR4 20-year
AR5 20-year

Air Travel Cost Version *

BTS (recommended)

Radiative Forcing Factor

2.7 (recommended)

SIMAP

My account Log out

SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

HOME | 1. ACCOUNT | 2. DATA ENTRY | 3. RESULTS | REPORTS | DATA MGMT | ABOUT | RESOURCES | CONTENT

3. Results

- You are not using the recommended EF version (2020). To change it, visit the calculation sources and methods form.
- You are not using the recommended GWP version (AR5 100-year). To change it, visit the calculation sources and methods form.
- You are not using the recommended radiative forcing factor (2.7). To change it, visit the calculation sources and methods form.
- The following years are not marked as complete for the selected campus(es) on the Status form: 2018, 2019, 2020

- MISSING FACTORS: Food scaling factor not set for the "Main" campus and year 2019. Set food scaling factor
- MISSING FACTORS: Custom emission factors must be entered for On-Campus Stationary Sources: Other (2020)

Wastewater Methods Update

EPA United States Environmental Protection Agency

ipcc INTERGOVERNMENTAL PANEL ON climate change

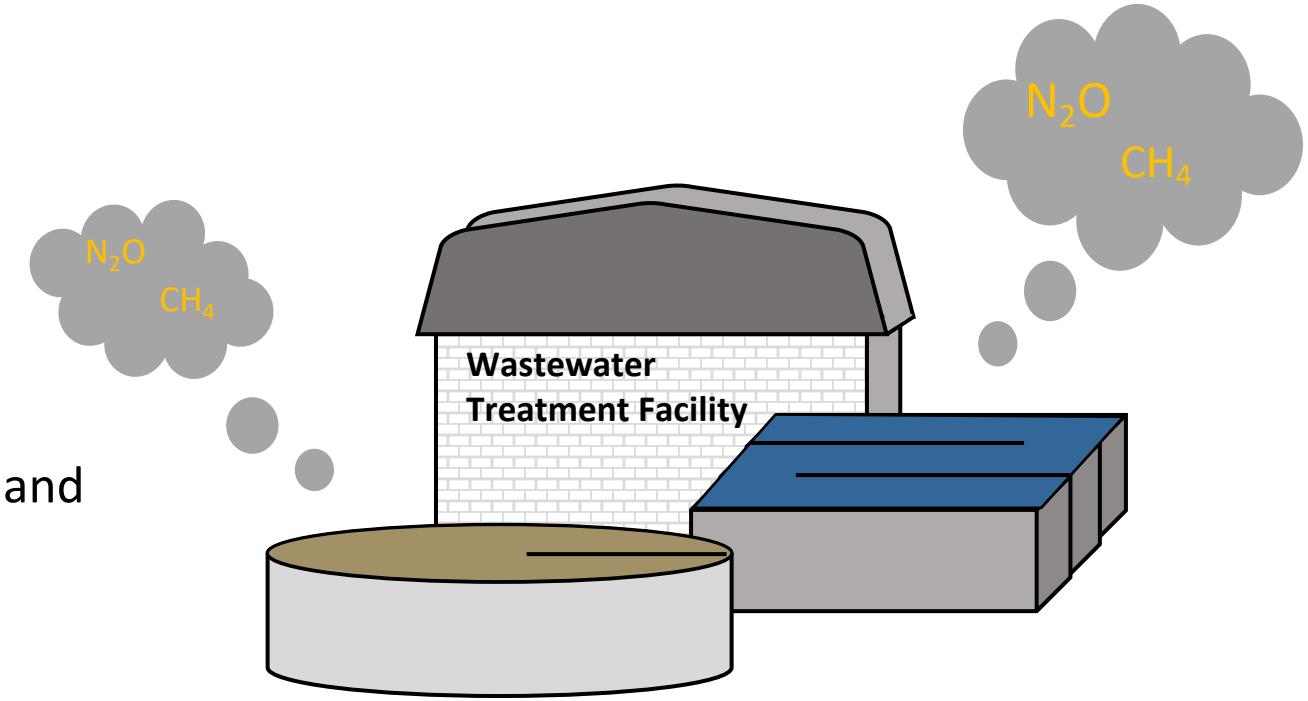
SIMAP SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Wastewater Methods Update

Methane and nitrous oxide are produced from wastewater treatment

Currently categorized as:

- Septic
- Aerobic
- Anaerobic
- Anaerobic digestion



Updates are expected to include more options and guidance on which option best fits the systems treating your campus' wastewater

Additional categories:

- Aerobic + Anaerobic digestion
- Anaerobic + Anaerobic digestion

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Commuting Working Group Recommendations

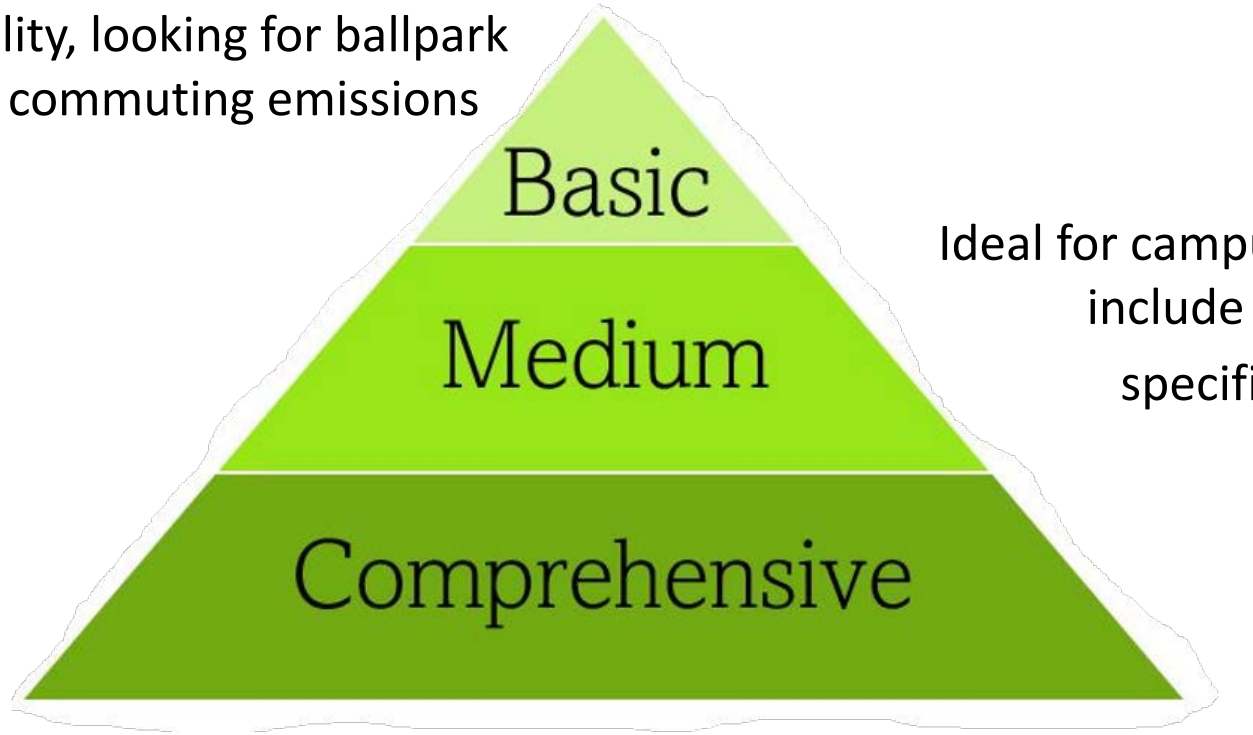
Standardize and improve commuting data collection and entry

Second Nature

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Commuting Levels

Ideal for campuses with limited data availability, looking for ballpark estimates of commuting emissions



Ideal for campuses looking to include campus specific data

Ideal for campuses looking to incorporate all possible commuting modes

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Commuting Materials

Commuting Survey

Data Collection Template

Guidance Manual

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Data Collection Templates

Basic Level

Required Data Points: Enter data for your campus in the green cells	Optional Data Points: Enter data for your campus in the yellow cells or use the provided the default values							
	Calculated Data Points: Please do not make changes to grey cells							
	FY	Number of "Commutes"*					Average % of Total "Commutes"* by SOV**		Average Distance
	FY	# FTEs (from IPEDS)	% of students residing on campus	# Days per week taking classes or working	# Weeks taking classes or working per year	% Commutes by SOV**	Adjusted % Commutes by SOV** (excluding residential students)	STARS: % of the commutes in column H undertaken by "Sustainable" SOVs***	Average **ONE-WAY** distance from campus for those traveling by SOV
	2020	3,900	18%	4	32	61%	50.02%		11
	2019	4,000	80%	4	32	100%	20.00%		11
	2018	15,000	50%	4	32	45%	22.50%		11
	2017	15,642	47%	4	32	61%	32.33%		11
	2016	6,700	53%	4	32	61%	28.67%		11

Comprehensive Level

FY		Number o/Commutes																	
Required data points						Student only		FTEs	days working/ taking classes per week	work/class weeks per year	Private Transport (alone)								
Optional detail		Part-Time	Full-time	Live on campus	Distance /Remote	Under-grad	Grad				Conventional SOV		TNCs (e.g. Uber, Lyft)		Moped, motorcycle		EV	
Unit	Fiscal Year	#	#	%	%	%	%	#	#	#	%	miles	%	miles	%	miles	%	miles
Students	2019	2,786	14,056	43	12	86	14	15,456	4	32	37%	11.00	1%	7.00	4%	6.00	1%	8.00
	2018																	
	2017																	
	2016																	

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Surveys & Guidance Documents

Survey Templates

- Questions directly aligned with data entry fields
- Medium & comprehensive levels
- Based on percentage of trips to account for commuters using multiple modes

Guidance Documents

- Key commuting concepts & definitions
- Required vs optional data
- Where to find data
- Examples

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Next Steps

- Refining materials
- Developing emissions factors
- Integration with SIMAP

Interested in getting involved?
We are looking for campuses to test commuting materials.
Email simap@unh.edu to learn more!

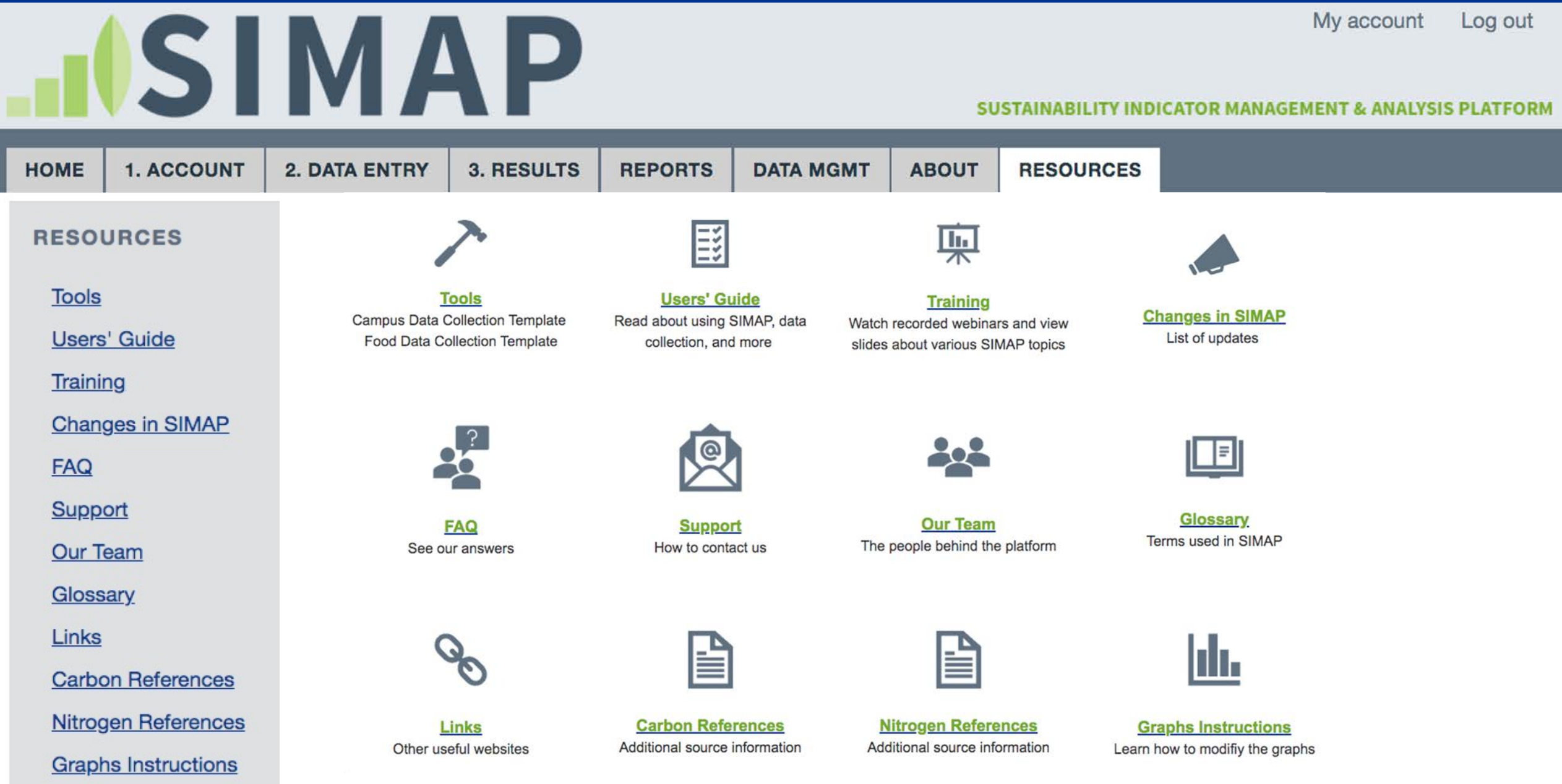
SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

How SIMAP can help

SIMAP

SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Resources tab



Request a Data Review

Why do a Data Review with the SIMAP team?

- Structured and systemic evaluation of your data in SIMAP, your results, and any imported files
- Identifies outliers, gaps, inconsistencies, and errors
- Includes a 1-hour video call to discuss your inventory
- Earn 0.625 AASHE STARS points as an independent validation/verification of your institution's GHG inventory!

Check out a 5-minute video about Data Reviews, which can be found on the Data Review page and the Training page

Summary

In development

- Telecommuting
- Electric vehicles
- Upstream energy emissions
- New version of emission factors
- New commuting methods

Second Nature

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

Announcements

- Carbon Footprinting Certificate
- GRITS data sync
- … and stay tuned for an exciting announcement later this month!

Contact: simap@unh.edu
www.unhsimap.org

Questions?

SIMAP

SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

www.unhsimap.org

Contact: simap@unh.edu