



**Verified Carbon
Standard**

UNIVERSITY OF ILLINOIS URBANA- CHAMPAIGN CAMPUS WIDE CLEAN ENERGY & ENERGY EFFICIENCY PROJECT

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Energy, and Environment

Project Title	University of Illinois Urbana-Champaign Campus Wide Clean Energy & Energy Efficiency
Version	1
Report ID	5
Date of Issue	10-Feb-2022
Project ID	1407
Monitoring Period	01-Jan-2018 to 30-June-2019
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CONTENTS

1	PROJECT DETAILS.....	4
1.1	Summary Description of the Implementation Status of the Project	4
1.2	Sectoral Scope and Project Type	4
1.3	Project Proponent	5
1.4	Other Entities Involved in the Project	5
1.5	Project Start Date	5
1.6	Project Crediting Period	5
1.7	Project Location	5
1.8	Title and Reference of Methodology	5
1.9	Participation under other GHG Programs	6
1.10	Other Forms of Credit.....	6
1.11	Sustainable Development Contributions	6
2	SAFEGUARDS	9
2.1	No Net Harm	9
2.2	Local Stakeholder Consultation	9
2.3	AFOLU-Specific Safeguards	9
3	IMPLEMENTATION STATUS	9
3.1	Implementation Status of the Project Activity	9
3.2	Deviations	9
3.3	Grouped Projects	9
4	DATA AND PARAMETERS.....	9
4.1	Data and Parameters Available at Validation	9
4.2	Data and Parameters Monitored.....	11
4.3	Monitoring Plan.....	18
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	20
5.1	Baseline Emissions	21
5.2	Project Emissions	22
5.3	Leakage.....	26
5.4	Net GHG Emission Reductions and Removals	26
	APPENDIX A: DETAILED DESCRIPTION OF PROJECT ACTIVITIES	28

APPENDIX B: EVIDENCE OF SD CONTRIBUTIONS..... 30

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

This Project's activities include:

- Behavior Change Campaign/Communications
- CoGen & Fuelswitch
- Lighting Retrofits
- On-Site Renewables
- Boiler Retrofits/Central Heating/Cooling Upgrades
- Building System Retro-Commissioning & Upgrades Including Automation
- Weatherization Improvements
- LEED Certification/Green Buildings
- Innovative Strategies

Two of the measures undertaken include:

Measure 1)

Since signing the Illinois Climate Action Plan in 2010, our campus has embraced a fuel optimization strategy: where feasible, we have elected to utilize lower CO₂ purchased electricity from MISO and to back off on our use of on-site existing coal and gas cogeneration facilities. This strategy, combined with the other measures described here, has led to a significant decrease in our CO₂ emissions; for at least 1-3 months each year since FY2012, campus has been able to avoid burning coal at its co-gen plant.

Measure 2)

Multi-disciplinary teams work through high energy-use buildings to re-commission the buildings, with an emphasis on HVAC systems and Controls and temperature setbacks (often referred to as "scheduling"). Since the program began in FY08, RCx teams have updated and upgraded systems in 70+ campus buildings, reducing energy consumption by an average of 27% and avoiding \$47M in utility costs for over 10 million gross square feet of facilities.

Additional Measures as applicable are included in the detailed description of all activities is presented in Appendix A.

The total emission reductions for this monitoring period of January 1, 2018 – June 30, 2019 is 128,100 tCO₂e.

1.2 Sectoral Scope and Project Type

Project Category: Sectoral Scope 1 (Energy) and Sectoral Scope 3 (Energy Demand)

Project Type: Individual project

1.3 Project Proponent

Organization name	University of Illinois at Urbana-Champaign; Institute for Sustainability, Energy, and Environment
Contact person	Meredith Moore
Title	Sustainability Programs Coordinator
Address	1101 W. Peabody, Urbana IL 61801
Telephone	217-333-0119
Email	Mkm0078@illinois.edu

1.4 Other Entities Involved in the Project

There are no other entities involved in the Project.

1.5 Project Start Date

The project start date is June 1, 2011.

1.6 Project Crediting Period

The Project's current 10-year crediting period is July 1, 2011 – June 30, 2021.

1.7 Project Location

The address of the campus is:

601 E. John St., Champaign, IL 61820

Geodetic coordinates:

40.108927 N, -88.2300837 E (GPS WGS84)

See Attachment A for Campus Map

1.8 Title and Reference of Methodology

The Methodology used for the Project is VM0025: "Campus Clean Energy and Energy Efficiency Methodology" (version 1.0)

The tools applied by the Project are:

VMD0038: "Campus Clean Energy Efficiency Module" (version 1.0)

1.9 Participation under other GHG Programs

The Project does not reduce GHG emissions that are included in any other emissions trading program or any other mechanism that includes GHG allowance trading. The Project is not registered under any other GHG program than the Verified Carbon Standard (VCS Standard, v4.2, 20 January 2022).

1.10 Other Forms of Credit

This Project is not included in any other emissions trading program or any other mechanism that includes GHG allowance trading.

This Project has received another form of GHG-related environmental credit during this monitoring period: ACUPCC and STARS. However, the campus has ensured that project reductions have not been double reported to this entity for project years in which the reductions have been sold.

1.11 Sustainable Development Contributions

This project contributes to the sustainable development of the United States and specifically to the UN Sustainable Development Goals 7) Affordable and Clean Energy, 9) Industry, Innovation, and Infrastructure, 11) Sustainable Cities and Communities, and 13) Climate Action.

Through research and investments in clean energy on campus, this project drives progress towards affordable and clean energy for the students, faculty, and staff at UIUC. Student engagement on campus also drives innovation, and the University's leadership creates a model for clean energy infrastructure.

UIUC is a signatory of the Presidents Climate Commitment, which commits the school to increasing climate resilience with the local community and achieving carbon neutrality on campus. In this way the University is driving action on climate change, both in terms of mitigation and preparedness with its community.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	7.0	7.1.2 Proportion of population with primary reliance on clean fuels and technology	Under this project condition, the implementation of energy efficiency activities results in increased usage of clean fuels and technology	By implementing energy efficiency activities such as electing to utilize lower CO ₂ purchased electricity, retrofitting energy efficient lighting fixtures, and retrofitting boilers, heating, and upgraders at the University of Illinois Urbana-Champaign campus, the campus runs partly on clean fuels and technology	The project has increased the use of lower CO ₂ purchased electricity on campus, retrofitted old systems, as well as retrofitted 118, 567 energy efficient lighting fixtures (saving 19,425,042 kWh/year), updated and upgraded HVAC systems in 70+ campus buildings, reducing energy consumption by an average of 27% - increasing overall campus usage of clean fuels and technology.
2)	9.0	Furthers technological innovation	Under this project condition, the implementation of energy efficiency activities has increased the use of innovative technologies required to reduce greenhouse gas emissions	By implementing energy efficiency activities such as installing rooftop solar panels at the University of Illinois Urbana-Champaign campus, the campus has utilized innovative energy efficiency technology	The project has installed a 33kw rooftop solar panel on the Business Instructional Facility, as well as additional solar pv panels at the Building Research Council building and solar thermal panels on the Activities and Recreation Center - increasing the use of innovative energy efficiency technology, and further increasing the demand for this type of innovation in industry

3)	11.0	Supports the goal of achieving a more environmentally sustainable community	Under this project condition, the implementation of energy efficiency activities has helped make the community of Illinois more environmentally sustainable	By implementing energy efficiency activities at the University of Illinois Urbana-Champaign campus, the campus has improved and manages its energy usage in a more sustainable way. Currently, more than sixteen projects are active in the LEED certification process.	The project has eleven LEED certified facilities on campus, with more than sixteen projects active in the certification process - increasing the overall environmental sustainability of the Illinois campus community
4)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Under this project condition, the implementation of energy efficiency activities results in measurable greenhouse gas emission reductions	By implementing energy efficiency activities at the University of Illinois Urbana-Champaign campus, the Project has prevented the release of 128,100 tonnes of carbon dioxide equivalent into the atmosphere during the monitoring period	Prevented the release of 421,375 tonnes of carbon dioxide equivalent into the atmosphere

2 SAFEGUARDS

2.1 No Net Harm

There are no known negative environmental or socio-economic impacts of this project.

2.2 Local Stakeholder Consultation

Not applicable to this project.

2.3 AFOLU-Specific Safeguards

Not applicable to this project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The Project was fully operational during the monitoring period. There were no changes to the operations at the facility/campus that impacted the quantification.

3.2 Deviations

3.2.1 Methodology Deviations

There are no methodology deviations applied during this monitoring period.

3.2.2 Project Description Deviations

There are no project description deviations applied during this monitoring period.

3.3 Grouped Projects

This section is not applicable as this is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	PBS _c
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Data unit	Percent
Description	Stationary combustion additionality performance benchmark for Carnegie class c. The level of the additionality benchmark is set at the annual percent reduction in campus-wide stationary combustion emissions achieved by campuses of equivalent Carnegie class which also achieve annual average reductions in total energy-based emissions.
Source of data	ACUPCC
Value applied	5.68%
Justification of choice of data or description of measurement methods and procedures applied	Justification for the benchmark is provided in Appendix 1 VMD00038
Purpose of Data	Determination of additionality
Comments	n/a

Data / Parameter	B
Data unit	Number
Description	Baseline period
Source of data	2, 12 and 23, VMD00038
Value applied	5
Justification of choice of data or description of measurement methods and procedures applied	The baseline period must meet the following conditions: - The baseline period must include project year 0 and three to five consecutive years prior to the project start date. - For at least one of the baseline years, data must be publicly-available through ACUPCC or a third-party GHG reporting program. The baseline period must be justified relative to the data that most accurately reflects historical emissions that are comparable to the campus conditions during project crediting period (eg, similar square footage and attendance). The baseline period must be calculated by subtracting the calendar year for the first year of the baseline period from the calendar year of project year 1.
Purpose of Data	Calculation of baseline emissions
Comments	n/a

Data / Parameter	SCAP
Data unit	Number
Description	Stationary combustion additionality eligibility period
Source of data	
Value applied	3
Justification of choice of data or description of measurement methods and procedures applied	This period must include project year 0 and one to five consecutive years prior to the project start date. This period must be calculated by subtracting the calendar year for the additionality testing year, used for stationary combustion additionality benchmark testing, from the calendar year for project year 1.
Purpose of Data	Determination of additionality
Comments	In some cases, the additionality eligibility period is not the same as the baseline period or the scope 2 electricity additionality eligibility period.

4.2 Data and Parameters Monitored

Data / Parameter	$SF_{b=x}$, $SF_{p=y}$
Data unit	ft ²
Description	Total campus-wide square footage in the applicable year
Source of data	The campus' historical GHG inventory reporting to relevant third-party GHG reporting program (eg, ACUPCC). Primary data from internal financial and facilities operational reviews.
Description of measurement methods and procedures to be applied	Measured according to the reporting framework of the relevant third-party GHG reporting program.
Frequency of monitoring/recording	Annual
Value monitored	The values for each year are provided in section 2.1 above
Monitoring equipment	The data is calculated using common area calculations
QA/QC procedures to be applied	The primary data is checked during internal financial and facilities operational reviews. The primary data is used to calculate the project and ACUPCC reports and is checked during the calculation review and report preparations.

Purpose of the data	Determination of additionality Calculation of baseline emissions Calculation of project emissions
Calculation method	Follows the protocols set out in the relevant third party reporting program
Comments	Campus square footage data is typically reported to ACUPCC

Data / Parameter	$F_{b=x,i}$, $F_{p=y,i}$
Data unit	tCO ₂ e
Description	Stationary combustion emissions in the applicable year from fuel type i, in the applicable year
Source of data	GHG reports submitted to third-party GHG reporting programs such as ACUPCC, as generated through credible GHG reporting tools such as the CAPC calculator or The Climate Registry reporting protocols. Primary data from internal financial and facilities operational reviews.
Description of measurement methods and procedures to be applied	GHG emissions must be calculated by multiplying the quantity of fuel type i used campus-wide by the appropriate emissions factor for fuel type i, for the applicable year. Emissions factors for fuels must be consistent with those permitted under the third-party GHG reporting program.
Frequency of monitoring/recording	Annual
Value monitored	The values for each year are provided in section 4 below
Monitoring equipment	The underlying primary data for fuel consumption is measured using standard industrial measures and equipment. The natural gas, for example, is measured using an industrial standardized dry gas meter provided by the utility.
QA/QC procedures to be applied	The primary data is checked during internal financial and facilities operational reviews. The primary data is used to calculate the project and ACUPCC reports and is checked during the calculation review and report preparations.
Purpose of the data	Determination of additionality Calculation of baseline emissions Calculation of project emissions

Calculation method	Follows the protocols set out in the relevant third party reporting program
Comments	The parameter $F_{b=1,i}$ is referenced in both Section section 7, VMD00038 where it applies to the additionality testing year and Section 8, VMD00038, where it applies to the first year of the baseline period. In some cases, the additionality testing year is not the same as the first year of the baseline period.

Data / Parameter	$E_{b=x}$ or $E_{p=y}$
Data unit	tCO ₂ e
Description	Scope 2 electricity emissions in the applicable year
Source of data	GHG reports submitted to third-party GHG reporting programs such as ACUPCC, or generated through credible GHG reporting tools such as the CAPC calculator or The Climate Registry reporting protocols. Primary data from internal financial and facilities operational reviews.
Description of measurement methods and procedures to be applied	$E_{b=1}$ must be calculated by multiplying the total electricity consumed campus-wide by the appropriate grid emissions factor, for the applicable baseline year. Emission factors must be consistent with those permitted under the third-party GHG reporting program, preferably consistent with those permitted under the CACP calculator. The default emissions factor is the regional eGRID combined margin. Other GHG emission factors should only be used if justification is provided that they are reasonable and conservative (eg, factors tailored to the specific utilities from which campuses' electricity is sourced). In such cases, the factors must have been published by the utilities in year y or, if published previously, must be used for no more than three years of emission reductions (ie, years y, y+1 and y+2, where y can be either a project year or a baseline year).
Frequency of monitoring/recording	Annual
Value monitored	The values for each year are provided in section 4 below
Monitoring equipment	The underlying primary data for fuel consumption is measured using standard industrial measures and equipment. Electricity, for example, is measured using a standard electric meter measuring current (kWh) provided by the utility.

QA/QC procedures to be applied	The primary data is checked during internal financial and facilities operational reviews. The primary data is used to calculate the project and ACUPCC reports and is checked during the calculation review and report preparations.
Purpose of the data	Determination of additionality Calculation of baseline emissions Calculation of project emissions
Calculation method	Follows the protocols set out in the relevant third party reporting program
Comments	The parameter $E_{b=1}$ is referenced in both Section 7 VMD00038 where it applies to the additionality testing year and Section 8 VMD0038 where it applies to the first year of the baseline period. In some cases, the additionality testing year is not the same as the first year of the baseline period.

Data / Parameter	y
Data unit	number
Description	Project year
Source of data	Primary data from internal financial and facilities operational reviews.
Description of measurement methods and procedures to be applied	y is the project year determined by counting the number of years since the project start date (ie, the first project year = 1, the second project year = 2, etc.)
Frequency of monitoring/recording	Annually
Value monitored	FY 2018 (2nd ½), FY 2019
Monitoring equipment	Calendar
QA/QC procedures to be applied	Project year y takes values 7 (2nd ½) and 8 in this verification. Consistency between ACUPCC annual reporting periods and project annual reports periods were assured (e.g. fiscal or calendar years applied consistently throughout)
Purpose of the data	Calculation of baseline emissions
Calculation method	Follows the protocols set out in the relevant third party reporting program

Comments	n/a
Data / Parameter	ΔE_y
Data unit	tCO ₂ e
Description	Incremental scope 2 electricity emissions and scope 2 heat emissions, scope 2 cooling emissions and/or scope 2 steam emissions in project year y due to stationary combustion adjustment technologies
Source of data	GHG reports submitted to third-party GHG reporting programs such as ACUPCC, or generated through credible GHG reporting tools such as the CAPC calculator or The Climate Registry reporting protocols. Primary data from internal financial and facilities operational reviews, from which this parameter is calculated.
Description of measurement methods and procedures to be applied	Credible estimation approaches are allowed and sub-metering is not required. ΔE_y must be calculated consistent with calculations above for $E_p=y$ ΔE_y must be calculated by multiplying the incremental electricity consumed due to stationary combustion adjustment technologies in project year y by the appropriate grid emissions factor in project year y, then adding the incremental units of purchased heat, cooling and/or steam consumed due to stationary combustion adjustment technologies in project year y multiplied by an appropriate emissions factor. Emission factors must be consistent with those permitted under the third-party GHG reporting program, preferably consistent with those permitted under the CACP calculator. The default emissions factor is the regional eGRID combined margin. Other GHG emission factors should only be used if justification is provided that they are reasonable and conservative (eg, factors tailored to the specific utilities from which campuses' electricity is sourced). In such cases, the factors must have been published by the utilities in year y or, if published previously, must be used for no more than three years of emission reductions (ie, years y, y+1 and y+2, where y can be either a project year or a baseline year). Emissions factors for fuels must be consistent with those permitted under the third-party GHG reporting program.
Frequency of monitoring/recording	Annually

Value monitored	The values for each year are provided in the calculations of $PE_{\Delta y}$ found in section 4.2 below and whose calculation basis is detailed in the excel project template
Monitoring equipment	Calculated value derived from Ey consistent with estimations and sub-metering allowed under VMD0038. See excel template.
QA/QC procedures to be applied	Calculated value derived from Ey consistent with estimations and sub-metering allowed under VMD0038. See excel template.
Purpose of the data	Calculation of project emissions
Calculation method	Follows the protocols set out in VMD0038
Comments	n/a

Data / Parameter	$PSH_{b=x}$, $PSH_{p=y}$
Data unit	tCO ₂ e
Description	Scope 2 emissions from purchased steam and/or heat emissions in the applicable year
Source of data	GHG reports submitted to third-party GHG reporting programs such as ACUPCC, or generated through credible GHG reporting tools such as the CAPC calculator or The Climate Registry reporting protocols. Primary data from financial and facilities operational reviews.
Description of measurement methods and procedures to be applied	$PSH_{b=x}$ or $PSH_{p=y}$ must be calculated by multiplying scope 2 emissions from purchased steam and/or heat in the relevant year by an appropriate grid emissions factor or emission factor for fuels used. Emission factors must be consistent with those permitted under the third-party GHG reporting program, preferably consistent with those permitted under the CACP calculator.
Frequency of monitoring/recording	Once per project crediting period
Value monitored	The values for each year are provided in the calculations of $PE_{\Delta y}$ found in section 4.2 below and whose calculation basis is detailed in the excel project template
Monitoring equipment	The underlying primary data for purchased heat and/or steam consumption is measured using standard industrial measures

	and equipment applied at the source of generation (offsite) consistent with supplied and invoiced energy services.
QA/QC procedures to be applied	The primary data is checked during financial and facilities operational reviews. The primary data is used to calculate the project and ACUPCC reports and is checked during the calculation review and report preparations.
Purpose of the data	Calculation of project emissions
Calculation method	Follows the protocols set out in the relevant third party reporting program
Comments	n/a

Data / Parameter	$PC_{b=x}$, $PC_{p=y}$
Data unit	tCO ₂ e
Description	Scope 2 emissions from purchased cooling in the applicable year
Source of data	GHG reports submitted to third-party GHG reporting programs such as ACUPCC, or generated through credible GHG reporting tools such as the CAPC calculator or The Climate Registry reporting protocols. Primary data from financial and facilities operational reviews.
Description of measurement methods and procedures to be applied	$PC_{b=x}$, or $PC_{p=y}$ must be calculated by multiplying scope 2 emissions from purchased cooling in the relevant year by an appropriate grid emissions factor. Emission factors must be consistent with those permitted under the third-party GHG reporting program, preferably consistent with those permitted under the CACP calculator.
Frequency of monitoring/recording	Once per project crediting period
Value monitored	The values for each year are provided in the calculations of $PE_{\Delta y}$ found in section 4.2 below and whose calculation basis is detailed in the excel project template
Monitoring equipment	The underlying primary data for purchased cooling consumption is measured using standard industrial measures and equipment applied at the source of generation (offsite) consistent with supplied and invoiced energy services.
QA/QC procedures to be applied	The primary data is checked during internal financial and facilities operational reviews. The primary data is used to

	calculate the project and ACUPCC reports and is checked during the calculation review and report preparations.
Purpose of the data	Calculation of project emissions
Calculation method	Follows the protocols set out in the relevant third party reporting program
Comments	n/a

4.3 Monitoring Plan

Organizational structure, responsibilities and competencies of the personnel that carried out the monitoring activities

Monitoring activities will be primarily performed by the two personnel described below. Oversight and accountability of monitoring activities is achieved both through normal reporting channels as described below, and also through cross-checks between these personnel / other internal reviewers directly associated with the Illinois Climate Action Plan.

Meredith Moore, Sustainability Programs Coordinator of the Institute for Sustainability, Energy, and Environment (iSEE). Moore is responsible for taking input data compiled by Facilities & Services (F&S) for energy and other entities on campus (e.g., Animal Sciences for numbers of cattle on our South Farms), and computing our campus greenhouse gas emissions using the Clean Air Cool Planet calculator (now called SIMAP). She is responsible for submitting our official reports to ACUPCC/Second Nature and STARS. She reports to the Director of iSEE (Dr. Evan DeLucia), who reports to the Vice Chancellor of Research (Dr. Susan Martinis), who is a direct report to the Chancellor.

Methods used for generating/measuring, recording, storing, aggregating, collating and reporting the data on monitored parameters

Drawing on information from original invoices, monthly data on import of electricity and combustion of coal and natural gas are collected by Facilities and Services (F&S) and collated into a spreadsheet that contains all monthly data back to before Fiscal 2007 (the beginning of the baseline period for this project). This spreadsheet (called Utility Summary_FY) sums the monthly data to yield a fiscal year total for electricity imported for the campus boundary (Column IV), coal burned at Abbott Power Plant (Column F), and natural gas burned (Column JA). This process is undertaken independently of this project and has been performed routinely for several years in order to inform management decisions about the utilization of energy on our campus. For project verification purposes, the team will provide annotations to selected entries in this spreadsheet to indicate relevant invoices.

These fiscal year totals are then entered into SIMAP, the online replacement for the Campus Carbon Calculator (CCC; previously called the Clean Air Cool Planet calculator), as consistent with the methodology and Second Nature (formerly ACUPCC) guidance. The appropriate eGRID subregion (SRMW) is used in SIMAP to facilitate the conversion of kWh to eCO₂. Onsite

generation of solar power from our Solar Farm is also included in the value of total on-site electric output.

SIMAP then generates greenhouse gas emissions outputs; these are directly entered into the VCS project template to enable the calculation of the amount of carbon credits. The SIMAP outputs are also reported publicly to the Climate Leadership Commitment (formerly ACUPCC) and STARS. Because the same input data (the output of the SIMAP) is used for both Climate Leadership Commitment/STARS reporting and the VCS project template, we can ensure that the public data correspond to VCS project data. Credits sold to third parties will be referenced in these public reports. In the case of the Climate Leadership Commitment, this will be entered as negative offsets purchased, which will appropriately adjust the net greenhouse gas emissions total.

The Project Emission Adjustment is calculated in the VCS project template by subtracting the five-year average baseline of purchased electricity (FY07-11) from the inferred electricity that would have been purchased in a given fiscal year in the absence of the National Petascale Computing Facility (NPCF). The contribution of NPCF is excluded because the startup of this national facility in FY13 was completely independent from the fuel optimization strategy that necessitates the project emission adjustment, and it would be inappropriate to count the increased purchased electricity due to NPCF as being a result of the fuel optimization.

The inferred fiscal year electricity purchase in the absence of NPCF (row 145 of the PE ADJS SIMPLE tab of the project template) is calculated by taking the actual purchased electricity for that fiscal year and subtracting an “NPCF Adjustment.” The NPCF Adjustment represents how much lower the campus’s purchased electricity would have been if NPCF had not been switched on. We calculate this NPCF Adjustment by taking the actual electricity usage of NPCF (which is tracked in our campus energy billing system) and subtracting the increase in total electricity consumed on campus between the baseline year (FY2012) and the fiscal year in question. Note that the FY2012 baseline year will be fixed throughout the duration of the project, as it represents the period before NPCF was commissioned.

This procedure is best explained using FY2013 as an example. In FY2013, the total campus purchased electricity was roughly 192 GWh. In that year, the campus as a whole used 38 GWh more electricity than in the baseline year (FY2012), but NPCF consumed 76 GWh. Thus, if NPCF had not been switched on, the campus purchased electricity would have gone down by 38 GWh (76-38; this is the NPCF Adjustment) instead of going up by 38 GWh, so that the purchased electricity would have been 153 GWh instead of the actual 192 GWh. The inferred purchased electricity without NPCF (153 GWh) is the figure used in the Project Emission Adjustment. Note that the anchoring of the NPCF Adjustment to the purchased electricity (instead of onsite generation) is based on the fact that our onsite generation is driven by our steam load, not by electricity demand.

All records for the project will be retained for a minimum of ten years; that is, for a period to exceed the project duration.

In order to calculate credits for the second half of year 7 (01-01-2018 – 06-30-2019), SIMAP as well as the FY18 and FY19 version Excel template and supercomputer exclusion file were used to compute the total carbon credits for FY18 and FY19; the credits previously issued for the first half

of FY18 (project year 7) were then subtracted from the fiscal year total to compute the appropriate remaining credits for the second half of the project year.

Transactions of VCU's will be executed in such a way that the credit sale would be registered in a credible carbon registry.

Procedures used for handling any internal auditing (and QA/QC) performed and any non-conformities identified

The following quality assurance and internal auditing processes will be performed on an annual basis:

- 1) Our greenhouse gas emission figures are publicly reported to Second Nature, which has a stakeholder peer review process; any challenges to or comments about figures reported to Second Nature must be responded to by the campus.
- 2) Informal consultation process with potential buyers to discuss project parameters.
- 3) Internal reviewers affiliated with the implementation of the Illinois Climate Action Plan and Moore will cross-check entries in the Campus Carbon Calculator and resulting greenhouse gas emission results.
- 4) Figures for coal combustion are reported as part of the campus's obligations under Title V of the Clean Air Act.
- 5) The campus conducts regular financial audits, and our energy accounting systems are subject to that audit process.
- 6) AASHE now requires third-party review of all submitted STARS reports from individuals at other universities. As a result, external reviewers selected in consultation with AASHE will be responsible for evaluation of this data through the lens of the STARS process.

Implementation of sampling approaches, including target precision levels, sample sizes, sample site locations, stratification, frequency of measurement and QA/QC procedures

The project itself does not involve sampling, as all necessary input data (purchased electricity and coal/gas combustion) represents a complete set.

The campus will provide all supporting documentation requested by validator/verifiers, including the supporting purchase/invoice data, consistent with their selected sampling procedures.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

5.1.1 Stationary Combustion Baseline Emissions

Baseline emissions for stationary combustion are calculated with the following equations:

$$BE = \frac{\sum_x \sum_i F_{b=x,i}}{B}$$

Where,

BE = Baseline emissions (tCO₂e)

F_{b=x,i} = Stationary combustion emissions in year x of the baseline period from fuel type i (tCO₂e)

B = Baseline period (years)

To adjust for business as usual energy efficiency gains, BE must be adjusted each project Year y to take account of an assumed US average 1.3 percent efficiency improvement factor, using the following equation:

$$BE_y = BE * (1 - 0.013)^{(y - 1)}$$

Where,

BE_y = Baseline emissions for year y (tCO₂e)

y = Project year (number)

BE = Baseline emissions (tCO₂e)

For FY2018 (2nd half) and FY2019 using the version of SIMAP calculator and equation(s) described above, BE_y = 484,222 tCO₂e

5.1.2 Scope 2 Electricity Baseline Emissions

Baseline emissions for scope 2 electricity are calculated with the following equations:

$$BE = \frac{\sum_x E_{b=x}}{B}$$

Where,

BE = Baseline emissions (tCO₂e)

E_{b=x} = Scope 2 electricity emissions in year x of the baseline period (tCO₂e)

B = Baseline period (years)

To adjust for business as usual energy efficiency gains, BE must be adjusted each project year y to take account of an assumed US average 1.3 percent efficiency improvement factor using the following equation:

$$BE_y = BE * (1 - 0.013)^{(y - 1)}$$

Where,

BE_y = Baseline emissions for year y (tCO₂e)

y = Project year (number)

BE = Baseline emissions (tCO₂e)

For scope 2 electricity, BE_y is not applicable

5.2 Project Emissions

5.2.1 Stationary Combustion Project Emissions

Project emissions for stationary combustion are calculated with the following equations:

$$PE_y = \sum_i F_{p=y,i}$$

Where,

PE_y = Project emissions for year y (tCO₂e)

$F_{p=y,i}$ = Stationary combustion emissions in project year y from fuel type i (tCO₂e)

5.2.2 Stationary Combustion Project Emission Adjustments

According to the methodology, where the project only qualifies for GHG emission reductions for stationary combustion emissions, the quantification of reductions must be adjusted when technologies or measures implemented to reduce stationary combustion emissions result in increases in scope 2 electricity, heat, cooling, and steam emissions.

The tests and calculation for project emission adjustments are as follows:

Adjustment Test A:

$PE\Delta_y = 0$ if changes in scope 2 emissions < 5%, and passes additionality

Adjustment Test B:

$PE\Delta_y = 0$ if $\Delta E_y \leq 0.05 * (BE_y - PE_y)$

Where,

ΔE_y = Incremental scope 2 electricity emissions, scope 2 heat emissions, scope 2 cooling emissions and/or scope 2 steam emissions in project year y due to adjustment technologies (tCO₂e)

BE_y = Baseline stationary combustion emissions

PEY = Project stationary combustion emissions

Adjustment Test C:

$$PE\Delta_y = 0 \text{ if } \sum_{p=1}^y \Delta E_y \leq E_{b=1} - E_{p=1} + PSH_{b=1} - PSH_{p=1} + PC_{b=1} - PC_{p=1}$$

Where,

ΔE_y = Incremental scope 2 electricity, scope 2 heat emissions, scope 2 cooling emissions and/or scope 2 steam emissions in project year y due to adjustment technologies (tCO₂e)

$E_{p=1}$ = Scope 2 electricity emissions in project year 1 (tCO₂e)

$E_{b=1}$ = Scope 2 electricity emissions in the first year of the baseline period (tCO₂e)

$PSH_{p=1}$ = Scope 2 steam emission and/or scope 2 heat emissions in project year 1 (tCO₂e)

$PSH_{b=1}$ = Scope 2 steam emission and/or scope 2 heat emissions in the first year of the baseline period (tCO₂e)

$PC_{p=1}$ = Scope 2 cooling emissions in project year 1 (tCO₂e)

$PC_{b=1}$ = Scope 2 cooling emissions in the first year of the baseline period (tCO₂e)

The following consist of related square footage-adjusted parameters.

For Scope 2 emissions from purchased steam and/or heat:

$$PSH_b = 1adj_{sf} = PSH_{b=1} * \frac{SF_{p=1}}{SF_{b=1}}$$

Where,

$PSH_{b=1adj_{sf}}$	= Square footage-adjusted scope 2 steam emissions and/or scope 2 heat emissions in the first year of the baseline period (tCO ₂ e)
$PSH_{b=1}$	= Scope 2 steam emissions and/or scope 2 heat emissions in the first year of the baseline period (tCO ₂ e)
$SF_{p=1}$	= Total campus-wide square footage in project year 1 (ft ²)
$SF_{b=1}$	= Total campus-wide square footage in the first year of the baseline period (ft ²)

For Scope 2 emissions from purchased cooling:

$$PC_b = 1adj_{sf} = PC_{b=1} * \frac{SF_{p=1}}{SF_{b=1}}$$

Where,

$PC_{b=1adj_{sf}}$	= Square footage-adjusted scope 2 cooling emissions in the first year of the baseline period (tCO ₂ e)
$PC_{b=1}$	= Scope 2 cooling emissions in the first year of the baseline period (tCO ₂ e)
$SF_{p=1}$	= Total campus-wide square footage in project year 1 (ft ²)
$SF_{b=1}$	= Total campus-wide square footage in the first year of the baseline period (ft ²)

Adjustment Test D:

$$PE\Delta_y = 0.10 * PAT * (BE_y - PE_y)$$

Where,

$PE\Delta_y$	= Project emission adjustments for stationary combustion emissions (tCO ₂ e)
BE_y	= Baseline stationary combustion emissions
PE_y	= Project stationary combustion emissions
PAT	= Percentage of total stationary combustion emissions in year y due to adjustment technologies (percent)

$$PAT = \frac{\sum_i AT_{y,i}}{PE_y}$$

Where,

PAT = Percentage of total stationary combustion emissions in year y due to adjustment technologies (percent)

AT_{y,i} = Stationary combustion emissions due to adjustment technologies from fuel type i in project year y (tCO₂e)

PE_y = Project stationary combustion emissions in year y (tCO₂e)

Adjustment Test F:

$$PE\Delta_y = \Delta E_y$$

Where,

PE Δ_y = Project emission adjustments for stationary combustion emissions (tCO₂e)

ΔE_y = Incremental scope 2 electricity emissions, scope 2 heat emissions, scope 2 cooling emissions and/or scope 2 steam emissions in project year y due to adjustment technologies (tCO₂e)

For FY2018 (2nd half) and FY2019 using the version of SIMAP calculator and equation(s) described above, PE_y = 303,924 tCO₂e

5.2.3 Scope 2 Electricity Project Emissions

Project emissions for scope 2 electricity are calculated with the following equations:

$$PE_y = E_{p=y}$$

Where,

PE_y = Project emissions for year y (tCO₂e)

E_{p=y} = Scope 2 electricity emissions in project year y (tCO₂e)

Overall PE Δ_y for the following two project year y (tCO₂e) were made:

15984 [PE Δ_5 for project year 6]

12379 [PE Δ_6 for project year 7]

5.3 Leakage

Leakage emissions in this methodology are also referred to as project emission adjustments to account for potential increases in Scope 2 emissions, which may include, but is not limited to, an increase in electricity, heat, cooling, and steam. Section 5.2.2 highlights the tests outlined in the protocol to assess the methodology required to calculate project emission adjustments.

To calculate the project emission adjustments/leakage emissions for this particular project, the total Scope 2 purchased electricity GHG emissions is multiplied by the proportion of net increase in Scope 2 purchased electricity relative to the total Scope 2 purchased electricity campuswide.

This results in the following leakage emissions:

January 1, 2018 – June 30, 2018: 6,189 tCO₂e

July 1, 2018 – June 30, 2019: 46,009 tCO₂e

For conservativeness, these leakage emissions are deducted from the baseline emissions as illustrated in Section 5.4.

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
FY2018 (01-01-2018 – 06-30-2018)	162,818	116,819	6,189	39,810
FY2019 (07-01-2018 – 06-30-2019)	321,404	187,105	46,009	88,290
Total for this monitoring period only (1 Jan 2018 –	484,222	303,924	52,198	128,100

30 June 2019)				
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APPENDIX A: DETAILED DESCRIPTION OF PROJECT ACTIVITIES

Behavior Change Campaign/Communications

- o Campus Conservation Nationals is a national competition working to encourage energy conservation by students. In FY14, Illinois I participated in this competition for the first time, and the winning residence hall had over 10% savings during the competition. For faculty and staff behavior change, the primary effort at Illinois is a program called the “Energy Conservation Incentive Program” or ECIP. ECIP awards the top performing buildings on campus each year, based on the reduction in energy consumption from the previous year’s totals. This effort has shared the energy conservation method with hundreds of Illinois employees in the first year of the program, and we are pleased with the interest shown at this point.

- CoGen & Fuel Switch/Optimization

- o Since signing the Illinois Climate Action Plan in 2010, our campus has embraced a fuel optimization strategy: where feasible, we have elected to utilize lower CO2 purchased electricity from MISO and to back off on our use of on-site existing coal and gas cogeneration facilities. This strategy, combined with the other measures described here, has led to a significant decrease in our CO2 emissions; for at least 1-3 months each year since FY2012, campus has been able to avoid burning coal at its co-gen plant.

- Lighting Retrofits

- o With support from F&S, grant agencies, individual departments, the Student Sustainability Committee, and the campus, 118,567 fixtures had been retrofitted by the end of FY13, saving 19,425,042 kWh/year. This program involves grant applications, prioritizing locations, and managing the design, implementation, and tracking aspects. The campus funded fixture retrofits are very close to completion; however, there are several T-12 fixtures in departmentally funded areas on campus, such as large equipment like walk-in refrigerators. Departments with T-12 fixtures need to be informed of the requirement to replace these fixtures, so that the transition can be fully completed.

- On-Site Renewables

- o The first rooftop solar was installed on the Business Instructional Facility (2009 LEED Platinum building). This 33kw system was the first large solar project on campus. Since then, solar pv panels have also been installed at the Building Research Council building and solar thermal panels have been installed on the Activities and Recreation Center.

- Boiler Retrofits/Central Heating/Cooling Upgrades

- o Central heating through an extensive system of steam tunnels is used for heating the vast majority of campus buildings. The older buildings use steam radiators to heat individual rooms, and the more modern buildings convert the steam to either hot water heating or forced air systems. Campus also has worked on a central cooling system, using Chilled Water. The chilled water system is still under expansion.

- Building System Retro-Commissioning & Upgrades Including Automation

- o Multi-disciplinary teams work through high energy-use buildings to re-commission the buildings, with an emphasis on HVAC systems and Controls and temperature setbacks (often referred to as “scheduling”). Since the program began in FY08, RCx teams have updated and upgraded systems in 70+ campus buildings, reducing energy consumption by an average of 27% and avoiding \$47M in utility costs for over 10 million gross square feet of facilities

- Weatherization Improvements

- o From 2010 to 2013, major deferred maintenance projects prioritized weatherization improvements of campus buildings. Specifically, these projects focused on envelope improvements, such as brick tuck-pointing. A list of completed projects is online at <http://www.fs.illinois.edu/services/capital-programs/deferred-maintenance/project-list>.

- LEED Certification/GreenBuildings

- o The University of Illinois at Urbana-Champaign campus currently features eleven LEED® certified facilities, with more than sixteen projects active in the certification process. The university is a national leader in sustainable building design by establishing requirements of LEED® Gold certification for all major renovations and new construction projects with values greater than \$5M, applying these techniques to both new construction and historic preservation.

- Innovative Strategies

- o Illinois has received innovation points through STARS for various innovative strategies that have decreased our greenhouse gas emissions. One such innovation of note in the energy domain is the web-based Illini Energy Dashboard, which provides clearly understandable data describing the energy consumption rate of selected campus buildings so that users can make educated choices about their energy-use habits.

Enter ALL required campus-wide data; consistency with publicly reported GHG and sq ft data is a UNDOCS38 requirement		Last baseline year														ESTIMATED: year 2-10 figures are based on prior year GHG's as estimates; when actuals are available, insert actual GHG emissions for each year into the cell									
		Baseline year Prior	Baseline year Prior	Baseline year Prior	Project Year 0	Project YEAR 1	Project year 2	Project year 3	Project year 4	Project year 5	Project year 6	Project year 7	Project year 8	Project year 9	Project year 10										
Enter year for campus project year 1 (only)		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021									
Square footage (enter for all years)		19,433,439	20,113,569	20,128,325	20,389,897	20,771,195	20,918,296	20,908,187	21,003,246	21,502,660	21,625,434	21,924,201	21,625,434	21,625,434	21,625,434	21,625,434									
Stationary 1 emissions (enter for all years) (in tons)		390,864	378,803	370,923	313,584	306,996	250,211	239,379	275,858	271,524	253,655	241,170	233,638	187,105	187,105	187,105									
Scope 2 electricity emissions (enter for all years) (in tons)		99,382	116,943	115,962	114,748	114,936	143,655	149,970	155,803	137,510	162,404	176,039	133,616	183,595	183,595	183,595									
		99.99	99.99	99.99	103.39	103.39	97.67	97.67	96.79	96.79	94.94														
scope 2		99,522	117,108	116,128	111,054	111,237	147,125	153,592	161,338	142,218	171,081														
H27-327 data - CCC as reported / H31-331 data - SIMAP for comparison																									