

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

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Project Title	University of Illinois Urbana-Champaign Campus Wide Clean Energy & Energy Efficiency
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The following resources and tools are provided for campuses to use to help them to assess whether they want to pursue certification by VCS. The resources and tools are offered for assistance only and campus' use of the resources and tools is at its sole expense and discretion. Alternatively, campuses are free to develop their own tools to generate the necessary information to give to VCS for possible certification if they wish to do so. Use of these resources and tools does not guarantee certification by VCS. In addition, neither the use of these tools nor the successful certification by VCS will necessarily result in the purchase of credits by BEF or Chevrolet.

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1 PROJECT DETAILS

This Monitoring Report has been prepared and submitted by this University/college ("Applicant") using data prepared and compiled by Applicant and reflects its best judgment. It may include the campus excel template sheet, supplied separately to verifiers, which contains all of the information and calculations Applicant believes are needed to support validators/verifiers in performing their evaluation of the campus' project candidacy for certification. It is the Applicant's judgment that this Monitoring Report and the excel template (if submitted) accurately set forth all relevant data and parameters, on a reproducible basis, necessary to establish the project's performance in these regards, indexing clearly to the numbered equations applicable in VMD0038.

Campus name/location: University of Illinois at Urbana-Champaign

By submitting this pdd and accompanying materials, does the above named University/College intend to affirm its agreement with the above statement? ☒ Yes ☐ No

1.1 Summary Description of the Implementation Status of the Project

This campus' activities include:

Behavior Change Campaign/Communications	☒ Yes	☐ No
CoGen & Fuelswitch	☒ Yes	☐ No
Lighting Retrofits	☒ Yes	☐ No
On-Site Renewables	☒ Yes	☐ No
Boiler Retrofits/Central Heating/Cooling Upgrades	☒ Yes	☐ No
Building System Retro-Commissioning & Upgrades Including Automation	☒ Yes	☐ No
Weatherization Improvements	☒ Yes	☐ No
LEED Certification/Green Buildings	☒ Yes	☐ No
Innovative Strategies	☒ Yes	☐ No

Describe specifics of at least two the measures undertaken:

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
Appendix A.

A detailed description of all activities is presented in

For stat 1 reduction projects, describe the stationary 1 facilities being backed down

Coal and gas boilers at Abbott Power Plant

Do any of these activities differ from those already described during validation or during a prior monitoring period? ☐ Yes ☒ No

If so, consistent with the new activities described in section 2.1, please provide brief implementation timelines for these new activities:

Credits are sought in:

Stationary 1 combustion reductions	☒ Yes	☐ No
Scope 2 electricity based reductions	☐ Yes	☒ No

First project year implementation date FY2012

The baseline scenario as prescribed in VMD0038 is the campus' historical emissions (as further described in sections 2.4 and 3.1).

Since CACP periodically updates its calculator and the most applicable, contemporaneous version is to be used to calculate each year's GHG inventory:

Per equations 12 or 23: [BE Per equations 12 or 23 tCO₂e/year]

Thus average baseline emissions =

For year 1 and 2 using 6.9 CACP	351263	[BE Per equations 12 or 23 tCO ₂ e/year]
For year 3 using 7.0 CACP	352234	[BE Per equations 12 or 23 tCO ₂ e/year]
For year 4 using 8.0 CCC	338675	[BE Per equations 12 or 23 tCO ₂ e/year]
For year 5 using 9.0 CCC	334271	[BE Per equations 12 or 23 tCO ₂ e/year]
For year 6 using SIMAP*	329926	[BE Per equations 12 or 23 tCO ₂ e/year]
For year 7 (first ½) using SIMAP	177430	[BE Per equations 12 or 23 tCO ₂ e/year]

*In 2017 the CCC was updated and rebranded as SIMAP. SIMAP is the most applicable and contemporaneous version of the CACP Campus Carbon Calculator.

As an example for the project emissions/reductions profile for project year 1:

Project emissions for year 1 250144 [PE₁ For year 1, per Eq 14 or 25 tCO₂e/yr]

Applied EE technologies require PE Emissions Adjustments? ☒ Yes ☐ No

If yes, PE Adjustment test applied f) [Enter applied test name a) – j) from 8.1.3/8.2.3]

Resulting PE Adjustment, PE_{Δy} : 35961 [PE_{Δ1} For year 1, per Eq15-22, 26-8 tCO₂e/year]

Thus, year 1 emission reductions: 66062 [ER₁ For year 1, per Eq 29 tCO₂e/year]

Total emission reductions for this monitoring period:

95,689 [Summing for years 6 (2nd 1/2) and 7 (1st 1/2) ER_y per Eq 29 tCO₂e/year]

Consistent with tables in sections 4.4

Do campus sq footage variances apply during project period such that SF_{Δy} is not equal to 1 for some project year y? ☐ Yes ☒ No

1.2 Sectoral Scope and Project Type

Sector scope ☒ 1 Energy industries (renewable / non-renewable sources)
☒ 3 Energy demand

NOTE: “1 Energy industries” includes all renewable and energy efficiency measures; “3 Energy Demand” includes only demand-side management measures

1.3 Project Proponent

Organization name	University of Illinois at Urbana-Champaign; Institute for Sustainability, Energy, and Environment
Contact person	Micah Kenfield
Title	Sustainability Programs Coordinator
Address	1101 W. Peabody, Urbana IL 61801
Telephone	217-244-9342
Email	kenfield@illinois.edu

1.4 Other Entities Involved in the Project

Organization name	University of Illinois at Urbana-Champaign; Facilities & Services, Energy Services
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Role in the project	(see monitoring plan)
Contact person	Mike Marquissee
Title	Director of Budget Planning and Resources
Address	1501 S. Oak St., Champaign, IL 61820
Telephone	217-333-4909
Email	mlmarqui@illinois.edu

1.5 Project Start Date

Project start date: July 1, 2011 [Month/Day/Year]

1.6 Project Crediting Period

Project end date: June 30, 2021 [Month/Day/Year]

Project crediting period: 10 [Number of Years]

1.7 Project Location

Project location: _601 E. John St., Champaign, IL 61820

(Campus physical address)

Geodetic coordinates _40.108927 N, -88.2300837 E (GPS WGS84)

See Attachment A for Campus Map

1.8 Title and Reference of Methodology

Campus Clean Energy and Energy Efficiency Methodology VM0025: v 1.0

Campus Clean Energy and Energy Efficiency Module VMD0038: v 1.0

For current version, see

<http://www.v-c-s.org/methodologies/campus-clean-energy-and-energy-efficiency-methodology/>

1.9 Other Programs

Include the following information, as applicable:

- Emission Trading Programs and Other Binding Limits:**
 Is there an applicable carbon cap or binding limit in the campus region?
☐ Yes ☒ No
 - Other Forms of Environmental Credit:**
 Is there an applicable GHG reporting system under which the campus is publicly reporting its emissions?
☒ Yes ☐ No
- Please indicate which one: ☒ ACUPCC ☒ STARS

Other (please name)

Has or will the campus ensure that project reductions have not been double reported to this entity for project years in which reductions have been sold?

☒ Yes ☐ No

• Participation under Other GHG Programs:

Is there an applicable GHG program under which the campus is registering its credits?

☐ Yes ☒ No

1.10 Sustainable Development

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.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

For performance methodologies, updates on the overall project performance is required and provided below.

Years for which verification is sought	(2 nd ½) 2017	☒ Yes	☐ No
	(1 st ½) 2018	☒ Yes	☐ No

On an annual reporting basis of: ☒ Fiscal ☐ Calendar

Campus square footage for years where verification is sought

(2 nd ½) 2017	21924201	sq ft	
(1 st ½) 2018	21924201	sq ft	(provisional)

Are sq ft figures consistent with ACUPCC/STARS public GHG reporting? ☒ Yes ☐ No

Per equation 8/9 (for stationary 1 credits) and/or 10/11 (for scope 2 electricity credits), which evaluate whether the GHG emissions in project year 1 and y respectively were below the permissible threshold per Test 4a/b-S and/or Test a/b-E:

Equation 8:
$$\sum_i \frac{F_{b=1,i} - F_{p=1,i}}{F_{p=1,i}} \geq PBS_c * SCAP$$

Equation 9:
$$\sum_i \frac{F_{b=1,i}}{F_{p=y,i}} \geq (PBS_c * SCAP + 1) * \frac{SF_{p=1}}{SF_{p=y}}$$

Equation 10:
$$\frac{E_{b=1} - E_{p=1}}{E_{p=1}} \geq PBE_c * E2AP$$

Equation 11:
$$\frac{E_{b=1}}{E_{p=y}} \geq (PBE_c * E2AP + 1) * \frac{SF_{p=1}}{SF_{p=y}}$$

For stationary 1 credits:

Has Test 4a/b-S been met:

For project year 1: ☒ Yes ☐ No

Such that the principal % reduction threshold for project eligibility has been met in year 1:

Indicate the PBS required reduction rate **5.68 % per annum**

Indicate the campus project's actual annual average percentage **16.08 % per annum** reduction rate achieved in stationary 1 emissions between the first year of the additionality eligibility period and project year 1

For project year y, the stationary 1 emissions may not exceed the threshold value of GHG emissions from project year 1 required to pass test 4 in equation 8 above, (once adjusted, on a square foot adjusted basis, to reflect the new size of the campus). This value of adjusted GHG emissions each year serves as the applicable maximum threshold for project year y stationary 1 emissions whose compliance is assessed in equation 9

Such that the maximum threshold has not been exceeded for stat 1 emissions in subsequent years – since emissions may not exceed this threshold if credits are to be issued in that specific year

☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 (1st ½) ☒ 6 (2nd ½)
☒ 7 (1st ½) ☐ 7 (2nd ½) ☐ 8 ☐ 9 ☐ 10

Were simple weather adjusted factors applied in Eq 8 and 9? ☐ Yes ☒ No
 (using weather adjusted emissions per equations 6 and 7)

For scope 2 electricity credits:

Has Test 4a/b-E been met:

For project year 1: ☐ Yes ☐ No

Such that the principle % reduction threshold for project eligibility has been met in year 1:

Indicate the PBE required reduction rate % per annum

Indicate the campus project's actual annual average percentage reduction rate achieved in stationary 1 emissions between the first year of the additionality eligibility period and project year 1 % per annum

For project year y:

Such that the maximum threshold has not been exceeded for scope 2 electricity emissions in subsequent years – since emissions may not exceed this threshold if credits are to be issued in that specific year

(CHECK ONLY THOSE YEARS WHICH HAVE PASSED BASED ON ACTUAL GHG REPORTED DATA FOR YEARS INCLUDED IN THIS MONITORING PERIOD)

☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

Were simple weather adjusted factors applied in Eq 10 and 11? ☐ Yes ☐ No

For both credit scopes:

Were the campus-wide energy efficiency and clean energy measures undertaken as described in section 1.1 prior to or during this period? ☒ Yes ☐ No

Were there any unexpected events that impacted GHG emission reductions removals or monitoring? ☐ Yes ☒ No

Leakage is set at zero per the VMD0038 module.

Are there any other changes to report? ☐ Yes ☒ No

Are there any further activities/measures EE/clean energy undertaken beyond those described in 1.1?

☐ Yes ☒ No

If yes, please describe:

2.2 Deviations

2.2.1 Methodology Deviations

Were any deviations from the methodology applied? ☐ Yes ☒ No

2.2.2 Project Description Deviations

Are any project description deviations sought? ☐ Yes ☒ No

2.3 Grouped Project

Grouped project: ☐ Yes ☒ No .

2.4 Safeguards

2.4.1 No Net Harm

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

2.4.2 Local Stakeholder Consultation

Not applicable to this project.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

As described in sections 9.1 and 9.2 of the Campus-wide Clean Energy & Energy Efficiency Module:

Have all parameters for validation (as now applied for project monitoring/verification purposes) been adopted from and applied as described in these sections. ☒ Yes ☐ No

Check all applicable parameters used in the pdd for validation purposes (see methodology for definitions):

At validation	
	Confirm

PBS _c	☒ Yes	☐ No
PBE _c	☐ Yes	☒ No
B	☒ Yes	☐ No
HDD _{p=y}	☐ Yes	☒ No
CDD _{p=y}	☐ Yes	☒ No
SCAP	☒ Yes	☐ No
E2AP	☐ Yes	☒ No

For source of parameter definitions, see:

<http://www.v-c-s.org/methodologies/campus-clean-energy-and-energy-efficiency/>

For completeness sake, all the methodology definitions for the parameters applicable to this project validation are found below:

Data Unit / Parameter	PBS _c
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.
Equations	8 and 9, VMD00038
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
Comment	

Data Unit / Parameter	B
Data unit	Number
Description	Baseline period
Equations	2, 12 and 23, VMD00038
Source of data	Determined based on emissions data reported to third party GHG reporting program.
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
Any comment	

Data Unit / Parameter	SCAP
Data unit	Number
Description	Stationary combustion additionality eligibility period
Equations	8 and 9, VMD00038
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
Comment	In some cases, the additionality eligibility period is not the same as the baseline period or the scope 2 electricity additionality eligibility period.

3.2 Data and Parameters Monitored

As described in section 9.1 and 9.2 of the Campus-wide Clean Energy and Energy Efficiency Module:

Have all parameters for verification/monitoring been adopted from and applied as described in these sections? ☒ Yes ☐ No

Check all applicable parameters used in this monitoring report for verification purposes (see methodology for definitions):

Monitored	Confirm Y or N	
SF _{b=x}	☒ Yes	☐ No
SF _{p=y}	☒ Yes	☐ No
F _{b=x, i}	☒ Yes	☐ No
F _{p=y, i}	☒ Yes	☐ No
E _{b=x}	☒ Yes	☐ No
E _{p=y}	☒ Yes	☐ No
y	☒ Yes	☐ No
ΔE _y	☒ Yes	☐ No
AT _{y, i}	☐ Yes	☒ No
PSH _{b=x}	☒ Yes	☐ No
PSH _{p=y}	☒ Yes	☐ No
PC _{b=x}	☒ Yes	☐ No
PC _{p=y}	☒ Yes	☐ No
ΔF _{y, i}	☐ Yes	☒ No

For source of parameter definitions, see:

<http://www.v-c-s.org/methodologies/campus-clean-energy-and-energy-efficiency/>

For completeness sake, all the methodology definitions for the parameters applicable to this project verification are found below:

Data Unit / Parameter	SF _{b=x} , SF _{p=y}
Data unit	ft ²
Description	Total campus-wide square footage in the applicable year
Equations	1, 2, 3, 4, 9, 11, 30 and 31, VMD00038
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
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 data	Determination of additionality Calculation of baseline emissions Calculation of project emissions
Comment	Campus square footage data is typically reported to ACUPCC
Value monitored:	The values for each year are provided in section 2.1 above
Calculation method	Follows the protocols set out in the relevant third party reporting program
Monitoring Equipment	The data is calculated using common area calculations

Data Unit / 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
Equations	3, 5, 6, 8, 9, 12, 14 and 28, VMD00038
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
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 data	Determination of additionality Calculation of baseline emissions Calculation of project emissions

Comment	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.
Value monitored:	The values for each year are provided in section 4 below
Calculation method	Follows the protocols set out in the relevant third party reporting program
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.

Data Unit / Parameter	$E_{b=x}$ or $E_{p=y}$
Data unit	tCO ₂ e
Description	Scope 2 electricity emissions in the applicable year
Equations	4, 5, 7, 19, 11, 29, 23 and 25, VMD00038
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
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 data	Determination of additionality Calculation of baseline emissions Calculation of project emissions
Comment	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.
Value monitored:	The values for each year are provided in section 4 below
Calculation method	Follows the protocols set out in the relevant third party reporting program
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.

Data Unit / Parameter	y
Data unit	number
Description	Project year
Equations	13 and 24, VMD00038
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
QA/QC procedures to be applied	Project year y takes values 6 (2 nd ½) and 7 (1 st ½) 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 data	Calculation of baseline emissions
Comments	
Value monitored:	FY 2017 (2 nd ½), FY 2018 (1 st ½)
Calculation method	Follows the protocols set out in the relevant third party reporting program
Monitoring Equipment	Calendar

Data Unit / 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
Equations	15, 16, and 22, VMD00038
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
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 data	Calculation of project emissions
Comment	
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
Calculation method	Follows the protocols set out in VMD0038
Monitoring Equipment	Calculated value derived from E_y consistent with estimations and sub-metering allowed under VMD0038. See excel template.

Data Unit / 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
Equations	16, 17 and 27, VMD0038
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
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 data	Calculation of project emissions
Comment	
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
Calculation method	Follows the protocols set out in the relevant third party reporting program
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.

Data Unit / Parameter	$PC_{b=x}, PC_{p=y}$
Data unit	tCO ₂ e
Description	Scope 2 emissions from purchased cooling in the applicable year
Equations	16, 18 and 27, VMD00038
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
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 data	Calculation of project emissions
Comment	
Value monitored:	The values for each year are provided in the calculations of PE _{Δy} found in section 4.2 below and whose calculation basis is detailed in the excel project template
Calculation method	Follows the protocols set out in the relevant third party reporting program
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.

3.3 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.

(1) Mike Marquissee, Director of Budget and Resource Planning, Energy Services Administration, Facilities and Services. Marquissee is the chief financial and accounting officer for the division of campus Facilities and Services which handles the import of electricity as well as the operation of the Abbott Power Plant (including purchase of coal and natural gas). Marquissee reports to the Director of Utilities and Energy Services (Kent Reifsteck), who in turn reports to the Executive Director of Facilities and Services (Helen Coleman), who is a direct report to the Chancellor. Marquissee is a financial executive and certified management accountant with 26 years of experience including nearly 15 years at the University of Illinois.

(2) Micah Kenfield, Sustainability Programs Coordinator of the Institute for Sustainability, Energy, and Environment (ISEE). Kenfield is responsible for taking input data from Marquissee (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). He is further responsible for submitting our official reports to ACUPCC/Second Nature and STARS. He reports to the Director of ISEE (Prof. Evan DeLucia), who reports to the Vice Chancellor of Research (Prof. Peter Schiffer), who is a direct report to the Chancellor. Kenfield has a master's degree in public administration and has 9 years of experience with green initiatives, from tracking greenhouse gas emissions to overseeing a green fund budget of over \$1 million annually.

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 Marquissee's team 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 6 (01 Jan 2017 – 30 Jun 2017), SIMAP as well as the FY17 version Excel template and supercomputer exclusion file were used to compute the total carbon credits for FY17; the credits previously issued for the first half of FY17 (project year 6) were then subtracted from the fiscal year total to compute the appropriate remaining credits for the second half of the project year.

In order to derive monitored parameters and calculate credits for the first half of year 7 (01 July 2017 – 31 Dec 2017), SIMAP and a separate version of the Excel template and supercomputer exclusion file were generated using first-half fiscal year data both for FY18 and baseline years. When verification is later sought for the second half of year 7 (01 Jan 2018 – 30 Jun 2018), calculations will be performed for the entirety of FY18, and then the credits issued for the first half of year 5 will be subtracted. In this way, the total credits ultimately issued for FY18 (year 7) will be correct following the methods originally developed for full fiscal years.

Transactions of VCU 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) Two months will be randomly chosen by Kenfield (iSEE), and Marquissee (Facilities & Services) will provide detailed utility statements and documentation of coal and gas consumption to validate the entries in the Utility Summary_FY spreadsheet for those months.
- 4) Internal reviewers affiliated with the implementation of the Illinois Climate Action Plan and Kenfield will cross-check entries in the Campus Carbon Calculator and resulting greenhouse gas emission results.
- 5) Figures for coal combustion are reported as part of the campus's obligations under Title V of the Clean Air Act.
- 6) The campus conducts regular financial audits, and our energy accounting systems are subject to that audit process.
- 7) 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.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

The accompanying campus excel template sheet, as supplied separately to verifiers, contains all the required calculations Applicant believes, based on its best judgment, are needed for section 4 and 2.1 above to demonstrate whether and how the additionality performance tests are satisfied and how the baseline, project emissions and project Emission Reductions are established. In the best judgment of the campus, this excel template accurately provides all relevant data and parameters on a reproducible basis to establish the project's performance in these regards, indexing clearly to the numbered equations applicable in VMD0038.

For stationary 1 and scope 2 electricity GHG calculations, specify the version of CACP/CCC calculator which has consistently been used to generate BEy, PEy, LEy and ERY (tCO₂e)

Version 6.9 Project year 1

Version 6.9 Project year 2

Version 7	Project year 3
Version 8	Project year 4
Version 8	Project year 5 (1 st ½)
Version 9	Project year 5 (2 nd ½)
Version 9	Project year 6 (1 st ½)
SIMAP	Project year 6 (2 nd ½)
SIMAP	Project year 7 (1 st ½)
	Project year 7 (2 nd ½)

Project year 8

Project year 9

Project year 10

Beyond any automatic changes derived from the use of different version of the CACP calculator as described above (e.g. vs 6.9 compared to vs 7.0), are there any other changes in the project data as submitted for this project year credit verification which have been made (e.g. to earlier year data used for validation or previous verification bases)?

☐ Yes ☒ No

If yes, please describe:

4.1 Baseline Emissions

For FY2017 and 2018 (1/2 half) using the version of SIMAP calculator consistently described above:

For stationary 1 reductions, BE

For years 6 and 7 (1 st ½) using SIMAP	352234	tCO2e
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For scope 2 electricity reductions, BE N/A tCO2e

Based on equations 13/24 (stat 1/scope 2):

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

For stationary 1, BEy (tCO2e)

329926 Project year 6 using SIMAP

164032 Project year 7 (1st ½) using SIMAP

Project year 7 using CCC vs

Project year 8 using CCC vs

Project year 9 using CCC vs

Project year 10 using CCC vs

For scope 2 electricity, BEy (tCO2e) –N/A

Project year 1 using CACP vs

Project year 2 using CACP vs

Project year 3 using CACP vs

Project year 4 using CACP vs

Project year 5 using CACP vs

Project year 6 using CACP vs

Project year 7 using CACP vs

Project year 8 using CACP vs

Project year 9 using CACP vs

Project year 10 using CACP vs

4.2 Project Emissions

For FY 2017 and 2018 (1st ½) using the version of SIMAP consistently described above:

For stationary 1, PE_y (tCO₂e)

241170 Project year 7 using SIMAP

100977 Project year 7 (1st ½) using SIMAP

Project year 7 (2nd ½) using CCC vs

Project year 8 using CACP vs

Project year 9 using CACP vs

Project year 10 using CACP vs

For scope 2 electricity, PE_y (tCO₂e) N/A

Project year 1 using CACP vs

Project year 2 using CACP vs

Project year 3 using CACP vs

Project year 4 using CACP vs

Project year 5 using CACP vs

Project year 6 using CACP vs

Project year 7 using CACP vs

Project year 8 using CACP vs

Project year 9 using CACP vs

Project year 10 using CACP vs

For all FY years, using the appropriately generated GHG figures as above with CCC vs 8.0:

Do any of the EE measures require PE adjustments? ☒ Yes ☐ No

If yes, resulting PE_{Δy} for project year y (tCO₂e)

15984 [PE_{Δ5} for project year 6]

14981 [PE_{Δ6} for project year 7 (1st ½)]

[PE_{Δ6} for project year 7 (2nd ½)]

[PE_{Δ7} for project year 8]

[PE_{Δ8} for project year 9]

[PE_{Δ9} for project year 10]

4.3 Leakage

Project leakage is set at zero for all project years y:

Resulting LE_y for project year y (tCO₂e)

LE_y for all project years y

4.4 Net GHG Emission Reductions and Removals

For FY 2017 and 2018 (1st ½) using the relevant SIMAP generated results as described above:

For stationary 1 reductions:

Years	Baseline emissions or removals (tCO ₂ e) BE _y	Project emissions or removals (tCO ₂ e) PE _y	PE Adjustment emissions (tCO ₂ e) PE _{Δy}	Sq ft adjustment factor SF _{Δy}	Actual net GHG emission reductions or removals (tCO ₂ e) ER _y
Full Project Year 6 (1 July 2016 to 30 June 2017)	329,926	241,170	15,984	1	72,772
Subtracting Previously Issued Credits for 1 st ½ of Project Year 6 (1 July 2016 to 31 December 2016)	-166,193	-102,783	-38,253	1	-25,157
Project Year 7 (1 st ½; 1 July 2017 to 31 December 2017)	164,032	100,977	14,981	1	48,074
Project Year 8					
Project Year 9					
Project Year 10					
Total for year 6 (2nd ½) and 7 (1st ½) (01 January 2017-31 December 2017)	327,765	239,364	-7,288	1	95,689

For scope 2 electricity-based reductions:

Years	Baseline emissions or removals (tCO ₂ e) BE _y	Project emissions or removals (tCO ₂ e) PE _y	PE Adjustment emissions (tCO ₂ e) PE _{Δy}	Sq ft adjustment factor SF _{Δy}	Actual net GHG emission reductions or removals (tCO ₂ e) ER _y
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					
Total for this Monitoring Period (only)					

If both stationary 1 and scope 2 electricity reductions are sought, total project ER_y (their sum) for each project year and for the total monitoring period, following this same chart format, comprises:

Years	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	PE Adjustment emissions	Sq ft adjustment factor SF _{Δy}	Actual net GHG emission
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	BEy	PEy	(tCO ₂ e) PE _{Δy}		reductions or removals (tCO ₂ e) ERy
Total Project Year 1					
Total Project Year 2					
Total Project Year 3					
Total Project Year 4					
Total Project Year 5					
Total Project Year 6					
Total Project Year 7					
Total Project Year 8					
Total Project Year 9					
Total Project Year 10					
Total For This Monitoring Period					

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.

ATTACHMENT 1: Campus MAP REFLECTING PROJECT BOUNDARY

