

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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Attachment 1: Campus Map

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 includes 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 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, and we have been able to go three summers in a row without burning any coal.

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"). Each year, buildings are selected from the top 100 energy consumption buildings. By the end of FY13, the RCx teams completed 40 buildings, with an average of 26.5% energy reduction since beginning the program in FY08. In total, RCx efforts reduced energy costs by over \$14M.

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

For stat 1 reduction projects, describe Coal and gas boilers at Abbott Power Plant

the stationary 1 facilities being backed down

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 FY 2012, beginning July 1 2011

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

For year 1 and 2 using 6.9 CACP 351263 [BE Per equations 12 or 23 tCO₂e/year]

For year 3 using 7.0 CACP 352234 [BE Per equations 12 or 23 tCO₂e/year]

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_Δ : 36830 [PE_{Δ1} For year 1, per Eq15-22, 26-8 tCO₂e/year]

Thus, year 1 emission reductions: 64289 [ER₁ For year 1, per Eq 29 tCO₂e/year]

Total years emission reductions for this project's entire

Monitoring period: 166577 [Summing for years 1,2,3 ER_y per Eq 29 tCO₂e/year]

Consistent with table in section 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

1.3 Project Proponent

Organization name	University of Illinois at Urbana-Champaign
Contact person	Ben McCall
Title	Associate Director for Campus Sustainability
Address	1101 W. Peabody, Urbana, IL 61801
Telephone	217-244-0230
Email	Campus-sustainability@illinois.edu

1.4 Other Entities Involved in the Project

N/A

1.5 Project Start Date

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

1.6 Project Crediting Period

Project Crediting Period Start Date July 1, 2011 [Month/Day/Year]

Project Crediting Period End Date: June 30, 2020 [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 1 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 ensured 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

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

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

Years for which verification is sought

Project year 1	2012	☒ Yes	☐ No
Project year 2	2013	☒ Yes	☐ No
Project year 3	2014	☒ Yes	☐ No
Project year 4	2015	☐ Yes	☒ No
Project year 5	2016	☐ Yes	☒ No
Project year 6	2017	☐ Yes	☒ No
Project year 7	2018	☐ Yes	☒ No
Project year 8	2019	☐ Yes	☒ No
Project year 9	2020	☐ Yes	☒ No
Project year 10	2021	☐ Yes	☒ No

On an annual reporting basis of: ☒ Fiscal ☐ Calendar

If fiscal, does fiscal year commence July 1? ☒ Yes ☐ No

If not, please give fiscal year start date?

Campus square footage for years where verification is sought

2012	20918296	sq ft
2013	20908187	sq ft
2014	21003246	sq ft

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:

i.e. Did the project achieve or exceed the annual average percentage reduction rate specified in the methodology as the performance benchmark (PBS) appropriate to the campus' Carnegie classification given the scope of GHG's (for stationary 1) for which credits are here sought?

For project year 1:

Indicate whether the principal PBS % reduction threshold for project eligibility has been therefore been met (that is the campus reduction rate exceeded the PBS required minimum):

☒ 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 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

For project year y:

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

(CHECK ONLY THOSE YEARS WHICH HAVE PASSED BASED ON ACTUAL GHG REPORTED DATA FOR YEARS INCLUDED IN THIS MONITORING PERIOD, CONSISTENT WITH EXCEL TEMPLATE RESULTS)

☒ 2 ☒ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 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: N/A

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

Square Footage FY 2013

Compared to the square foot figures reviewed during validation, the FY13 square footage number we were using (which came from my copy of the CACP calculator) was incorrect. The correct (and now double-checked) square footage numbers are in our ACUPCC reports, and are reproduced above. They have been applied now in our updated CACP calculator and excel templates for FY 2012/13 (and FY 2014 template).

As a result, there was a VERY small square footage decrease (~10,000 sq ft) from FY12 to FY13, and a larger but still small (~100,000 sq ft) increase from FY13 to FY14. As before, the excel templates have automatically taken these variances into account when computing the final ER_y consistent with VMD0038 requirements.

PE ADJ FY2013

Compared to the estimates made during validation, the PE ADJ calculations were reviewed and the increase in electricity consumption due to the stationary 1 combustion adjustment technologies were discovered to have been estimated using total campus electricity consumption figures that, for FY2012/FY2013, were slightly in error because they included off site locations

which were not included in either the ACUPCC reporting boundary or, correspondingly, the VCS project boundary. As a result the PE ADJ GHG figure for FY2013 has changed.

In FY2013, the total campus purchased electricity was, as before, 192 GWh. In that year, the campus as a whole used 38 GWh more electricity than in the baseline year (FY2012), but the Supercomputer consumed 76 GWh. Thus if the supercomputer had not been switched on, the campus purchased electricity would have gone down by 38GWh (76GWh – 38GWh) instead of going up by 38 GWh. So the purchased electricity would have been 153 GWh instead of actual 192 GWh. The inferred purchased electricity without the supercomputer (153 GWh) is the figure used in the PE ADJ. It should be noted that the key figures for the supercomputer consumption in FY2013 have not changed: and supporting excel documentation has been supplied to the verifier.

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

☐ Yes ☒ No

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 .

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	
	<i>Confirm</i>
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: I. The baseline period must include project year 0 and three to five consecutive years prior to the project start date. II. 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

Which applicable public GHG reporting system has the campus used for this applicable monitoring period (including baseline and current project years)

Please indicate which one: ☒ ACUPCC
☒ STARS
Other (please name)

Are the GHG emissions and square foot data applied to this project in this monitoring period consistent with these public reports?

☒ Yes ☐ No

Has the CACP calculator been used to develop these GHG emissions?

☒ Yes ☐ No

If not, explain how the GHG calculation approach used is consistent with the CACP calculator

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
$\Delta F_{y,i}$	☐ Yes	☒ No

NOTE: Although PSH and PC are referenced parameters for the calculation of PE Adjustments, UIUC does not purchase any heat steam or cooling. Thus these parameters are not applicable under project monitoring.

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, VD00038
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.
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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 1, 2, and 3 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 2012, FY 2013, FY 2104
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	The primary data is checked during internal financial and

applied	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.

3.3 Monitoring Plan

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

Monitoring activities have been performed by the three personnel described below. Oversight and accountability of monitoring activities were achieved both through normal reporting channels as described below, and also through cross-checks between these personnel.

(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 (Allan Stratman), who is a direct report to the Chancellor. Marquissee is a financial executive and certified management accountant with 25 years of experience including nearly 14 years at the University of Illinois.

(2) Stephanie Lage, Assistant Director of the Institute for Sustainability, Energy, and Environment (iSEE). Lage 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. She is further responsible for submitting our official reports to ACUPCC and STARS. She 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. Lage has a background in business administration and has 14 years of experience with environmental programs, and 6 years of experience in tracking campus greenhouse gas emissions and other sustainability metrics.

(3) Prof. Ben McCall, Associate Director for Campus Sustainability at iSEE. Prof. McCall is responsible for coordinating with Marquissee and Lage to ensure that appropriate and accurate data are available for entry into the VCS Project Template to facilitate verification of VCU's for the campus. Prof. McCall 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. Prof. McCall has a Ph.D. in Chemistry and Astronomy & Astrophysics, and roughly 20 years of research experience in the physical sciences.

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 were collected by Marquissee's team and collated into a spreadsheet that contained all monthly data back to before Fiscal 2007 (the beginning of the baseline period for this project). This spreadsheet (called Utility_FY) sums the monthly data to yield a fiscal year total for electricity imported for the campus boundary (Column IA), coal burned at Abbott Power Plant (Column F), and natural gas burned (Column IF). This process was 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 provided annotations to selected entries in this spreadsheet to indicate relevant invoices.

These fiscal year totals were then entered into the Clean Air Cool Planet calculator, which is preferred and approved by the VCS methodology. Specifically, the totals were entered into the Input tab of the CACP calculator, in Column BX for purchased electricity in kWh, Column R for coal in short tons, and Column P for natural gas in MBTU. The appropriate eGRID subregion (SRMW) was used in the CACP calculator to facilitate the conversion of kWh to eCO₂.

The CACP calculator then generated greenhouse gas emissions outputs; these were directly entered into the VCS project template to enable the calculation of the amount of carbon credits. The CACP outputs were also reported publicly to ACUPCC and STARS. Because the same input data (the output of the CACP calculator) were used for both ACUPCC/STARS reporting and the VCS project template, we have ensured that the public data correspond to VCS project data. Credits sold to third parties such as Chevrolet will be referenced in these public reports. In the case of ACUPCC, this will be entered as negative offsets purchased, which will appropriately adjust the net greenhouse gas emissions total.

The Project Emission Adjustment was 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 was 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) was 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 calculated 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 was 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.

Transactions of VCU's will be executed in FY12-14 with BEF on behalf of Chevrolet (and possibly in future years with brokers on behalf of other buyers) 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 have been performed on an annual basis:

- 1) Our greenhouse gas emission figures have been publicly reported to ACUPCC, which has a stakeholder peer review process managed by Second Nature; any challenges to or comments about figures reported to ACUPCC must be responded to by the campus.
- 2) Informal consultation process with Chevrolet (and, in future years, other potential buyers) to discuss project parameters.
- 3) Two months have been randomly chosen by McCall (iSEE), and Marquissee (Facilities & Services) has provided detailed utility statements and documentation of coal and gas consumption to validate the entries in the Utility_FY spreadsheet for those months.
- 4) McCall and Lage have cross-checked entries in the Clean Air Cool Planet calculator and resulting greenhouse gas emission results.
- 5) Figures for coal combustion were 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.

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 has provided 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, supplied separately to verifiers, contains all the required calculations Applicant believes are needed for section 4 and 2.1 above to demonstrate whether and how the additional 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 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
Project year 4	
Project year 5	
Project year 6	
Project year 7	
Project year 8	
Project year 9	
Project year 10	

Beyond any automatic changes derived from the use of CACP vs 7.0 rather than CACP vs 6.9, are there any other changes in the project data as submitted for later project year credit verification which have been made (e.g. to earlier year data)?

☒ Yes ☐ No

If yes, please describe:

Square footage

Compared to the square foot figures reviewed during validation, the FY13 square footage number we were using (which came from my copy of the CACP calculator) was incorrect. The correct (and now double-checked) square footage numbers are in our ACUPCC reports, and are reproduced above. They have been applied now in our updated CACP calculator and excel templates for FY 2012/13 (and FY 2014 template).

As a result, there was a VERY small square footage decrease (~10,000 sq ft) from FY12 to FY13, and a larger but still small (~100,000 sq ft) increase from FY13 to FY14. As before, the excel templates have automatically taken these variances into account when computing the final ER_y consistent with VMD0038 requirements.

PE ADJ FY2013

Compared to the estimates made during validation, the PE ADJ calculations were reviewed and the increase in electricity consumption due to the stationary 1 combustion adjustment technologies were discovered to have been estimated using total campus electricity consumption figures that, for FY2012/FY2013, were slightly in error because they included off site locations which were not included in either the ACUPCC reporting boundary or, correspondingly, the VCS project boundary. As a result the PE ADJ GHG figure for FY2013 has changed.

In FY2013, the total campus purchased electricity was, as before, 192 GWh. In that year, the campus as a whole used 38 GWh more electricity than in the baseline year (FY2012), but the Supercomputer consumed 76 GWh. Thus if the supercomputer had not been switched on, the campus purchased electricity would have gone down by 38GWh (76GWh – 38GWh) instead of going up by 38 GWh. So the purchased electricity would have been 153 GWh instead of actual 192 GWh. The inferred purchased electricity without the supercomputer (153 GWh) is the figure used in the PE ADJ. It should be noted that the key figures for the supercomputer consumption in FY2013 have not changed: and supporting excel documentation has been supplied to the verifier.

4.1 Baseline Emissions

For FY 2012/13/14 using the version of CACP calculator consistently described above:

For stationary 1 reductions, BE

For years 1 and 2 using 6.9 CAPC	351263	tCO ₂ e
For year 3 using 7.0 CACP	352234	tCO ₂ e

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, BE_y (tCO₂e)

351263 Project year 1 using CACP vs 6.9

346697 Project year 2 using CACP vs 6.9

343135 Project year 3 using CACP vs 7.0

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 scope 2 electricity, BE_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

4.2 Project Emissions

For FY 2012/13/14 using the version of CACP calculator consistently described above:

For stationary 1, PEy (tCO₂e)

250144	Project year 1 using CACP vs	6.9
279634	Project year 2 using CACP vs	6.9
275858	Project year 3 using CACP vs	7.0

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 scope 2 electricity, PEy (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 CACP vs 6.9 for FY 2012/13 and CACP vs 7.0 for FY 2014:

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

If yes, resulting $PE\Delta_y$ for project year y (tCO₂e)

36830 [PE Δ_1 for project year 1]

12650 [PE Δ_2 for project year 2]

19375 [PE Δ_3 for project year 3]

[PE Δ_4 for project year 4]

[PE Δ_5 for project year 5]

[PE Δ_6 for project year 6]

[PE Δ_7 for project year 7]

[PE Δ_8 for project year 8]

[PE Δ_9 for project year 9]

[PE Δ_{10} 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) 0 LE_y for all project years y

4.4 Net GHG Emission Reductions and Removals

For FY 2012, 2013, 2014 using the relevant CAPC 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 Δ_y	Sq ft adjustment factor SF Δ_y	Actual net GHG emission reductions or removals (tCO ₂ e) ER _y
Project Year 1	351263	250144	36830	1.0	64289
Project	346697	279634	12650	0.9995	54386

Year 2					
Project Year 3	343135	275858	19375	1.0	47902
Project Year 4					
Project Year 5					
Project Year 6					
Project Year 7					
Project Year 8					
Project Year 9					
Project Year 10					
Total for year 1,2,3	1041095	805636	68855	1	166577

For scope 2 electricity-based reductions: N/A

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) PEΔ _y	Sq ft adjustment factor SFΔ _y	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 E_{Ry} (their sum) following this same chart format, comprises:

Years	Baseline emissions or removals (tCO₂e) BE_y	Project emissions or removals (tCO₂e) PE_y	PE Adjustment emissions (tCO₂e) PE_{Δy}	Sq ft adjustment factor SF_{Δy}	Actual net GHG emission reductions or removals (tCO₂e) E_{Ry}
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, and we have been able to go three summers in a row without burning any coal.

- 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”). Each year, buildings are selected from the top 100 energy consumption buildings. By the end of FY13, the RCx teams completed 40 buildings, with an average of 26.5% energy reduction since beginning the program in FY08. In total, RCx efforts reduced energy costs by over \$14M. RCx leaders are now reaching out to auxiliaries, such as McKinley Health Center, to identify funding.

- 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 There are currently 12 University of Illinois buildings/capital projects which have received LEED certification. Six are LEED Silver, three are LEED Gold, and three are LEED Platinum.

- 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.