



CenHub Online Store Program Evaluation Plan

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Prepared for:

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I. Program Background: CenHub Online Store Program

Central Hudson Gas and Electric Corporation (“Central Hudson”) initiated CenHub as a REV Demonstration Project, which launched in April 2016. Along with encouraging customer engagement, CenHub drives customers to learn more about their specific usage, how to better manage their energy, then incentivizes the purchase of products that make it easy to do so. The online platform was created to modernize Central Hudson’s online presence and provide customers with an experience similar to other industries.

All Central Hudson residential customers are eligible to participate and purchase products from the CenHub Store. In order to receive an instant incentive on an eligible product, the customer must be signed into their CenHub My Account. Both electric and gas measures are offered such as, Wi-Fi thermostats, LEDs, faucet aerators, advanced power strips, and low-flow showerheads.

Central Hudson plans to evaluate the electric and gas components of the CenHub Online Store program concurrently due to similarities between the measures and for cost efficiency. Central Hudson contracted Independent Evaluator Cadmus and Demand Side Analytics (together the “EM&V team”) to evaluate programs included in Central Hudson’s Energy Efficiency Portfolio. Total energy savings is a key factor the EM&V Team considers when developing each program EM&V plan as it informs the levels of rigor and cost that are appropriate for evaluation activities. Figure 1 shows the electric energy savings and expenditures for each Residential and Commercial Program in Central Hudson’s Energy Efficiency Portfolio. The program, as a percent of total MWh, contributed 1.1% of portfolio electric Gross Savings (“GS”) in 2018 and 1.3% of portfolio electric GS in 2019. The CenHub Online Store Program cost, as a percent of the total EE expenditures was 1.4% in 2018 and 1.1% in 2019. Expenditures include incentives, services, and implementation.

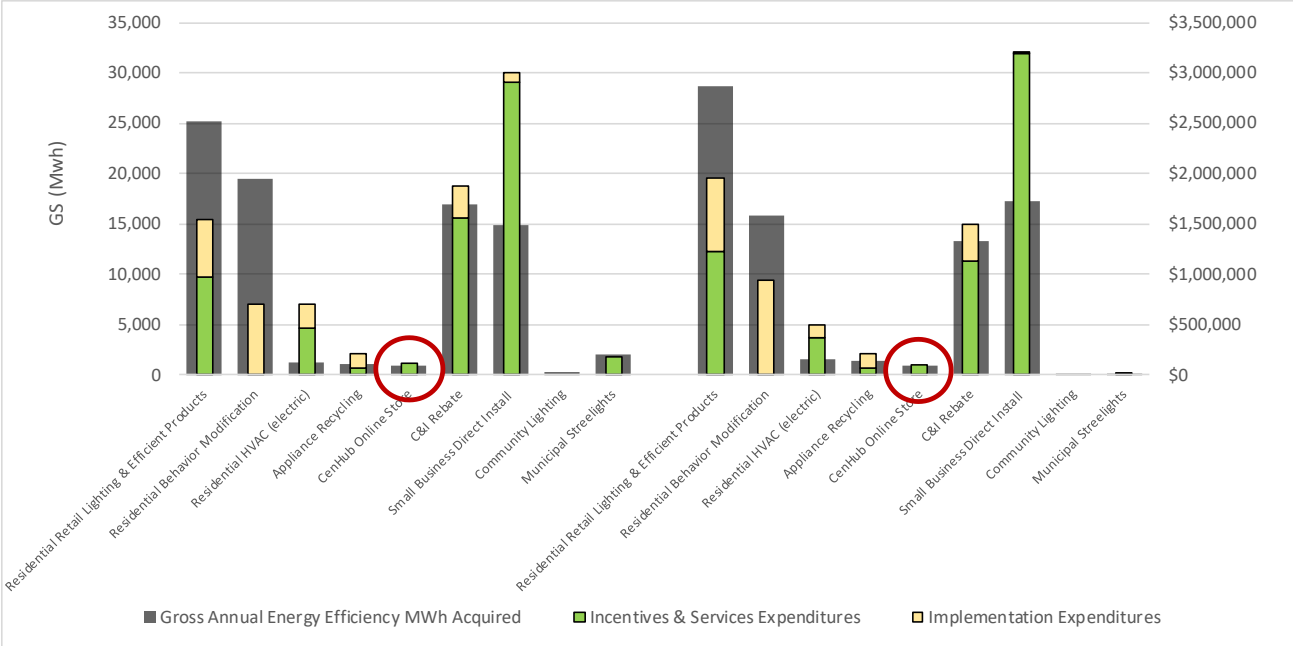


Figure 1. Summary of all Electric Energy Efficiency Program Energy Savings and Expenditures

Figure 2 shows the tracked electric energy savings and expenditures for the CenHub Online Store Program in 2018 and 2019, the Program evaluation period. While expenditures were comparable, savings increased in 2019.

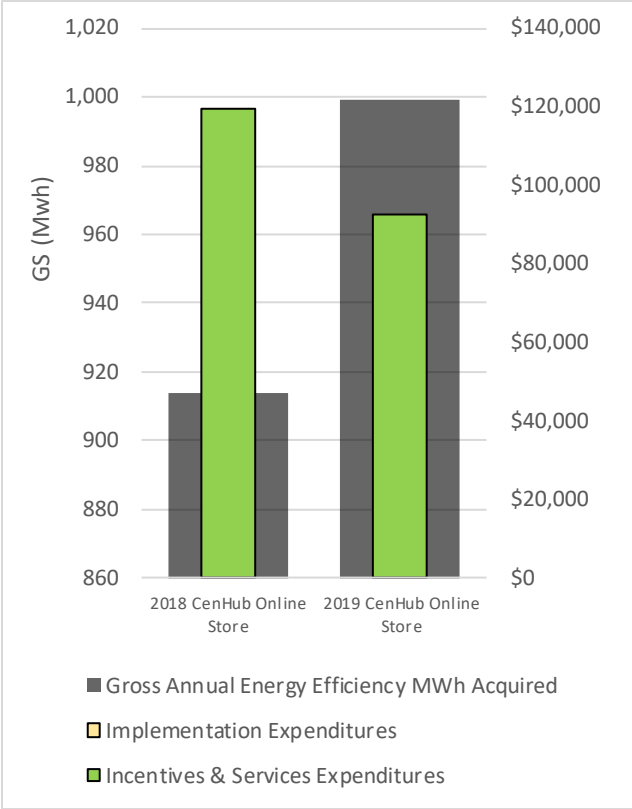


Figure 2. CenHub Online Store Program Energy Savings and Expenditures

The program offers gas-saving measures but MMBtu savings were reported under Residential HVAC (Gas) in 2019.

The following sections of this document describe the EM&V team’s general EM&V approach, EM&V schedule and budget, the detailed EM&V plan, and anticipated reporting deliverables.

II. General EM&V Approach

Central Hudson’s EM&V Team used The Office of Clean Energy’s CE-08 “Gross Savings Verification Guidance” to develop this EM&V plan. Table 1 summarizes the program savings types, entities responsible for developing savings estimates, and the savings analysis methods described in the Gross Savings Verification Guidance document. When developing each EM&V plan, the Independent Evaluator aims to balance EM&V cost with a reasonable level of evaluation rigor. The EM&V Team considered the uncertainty in GS estimates, the proportion of the Program’s savings and expenditures in the Energy Efficiency portfolio (See Figure 1), and the cost of various EM&V methods. The EM&V Team elected several analysis methods to determine Verified Gross Savings (VGS) for the CenHub Online Store Program. The bold text in the “Methods” column in Table 1 highlights these evaluation activities.

Table 1. Gross Savings Verification Summary

Program Savings Type	Responsible Entity	Methods		
Planned Savings	Program Administrator (PA)	NA		
Gross Savings (GS)	PA or Implementation Contractor	QA/QC TRM Calculations		
Verified Gross Savings (VGS)	Independent Evaluator	Gross Savings Analysis (GSA)		
		Verification Activities	Measurement Activities	Evaluation Activities
		- Documentation & project tracking - Site Visits - Surveys	- Metering - Advanced M&V - Surveys (quantitative)	- Experimental designs - Quasi-Experimental designs - Regression Analysis - Engineering Model Analysis
Alternative Prospective Realization Rate (AP RR)	Independent Evaluator	Re-calculate GS following recommended actions detailed in the Gross Savings Analysis Report.		

Gross Savings

The Program Administrator (PA) calculates GS for the CenHub Online Store Program using the formulas and factors found in the New York State Technical Resource Manual (TRM).

Verified Gross Savings

The EM&V Team will calculate VGS values by performing an engineering review of GS for all units in the tracking database. The EM&V Team will also cross-reference Central Hudson natural gas accounts with program participants to identify the homes with access to natural gas.

The EM&V team will invite a census of participants to complete an online survey. Each measure-specific survey will include questions designed to deliver each respondent’s appropriate TRM input values, to verify the measure was installed, and to confirm reported measure quantities. The EM&V Team will use the information collected to re-calculate savings using TRM algorithms and verified parameter values.

If information collected differs from entries in the program tracking system, the EM&V Team will update the savings in accordance with the TRM. Any material changes identified will be addressed in accordance with the Energy Efficiency Data Governance Report.¹

EM&V Schedule and Budget

The EM&V Team will conduct the activities and submit deliverable materials listed in **Error! Reference source not found.** prior to the end of the quarter listed for each activity.

Table 2. Impact Evaluation Budget and Schedule: 2019-2020 CenHub Online Store Program

Task/Activity	EM&V Activity	Milestone	Deliverable Date	Budget
Engineering Review	- Desk review of program tracking system	Engineering Review Memo to Central Hudson	2020 Q2	Electric: \$3,650
				Gas: \$350
Participant Survey	- Conduct online survey of 2019 and Q1 and Q2 2020 program participants	Survey results memo to Central Hudson	2020 Q4	Electric: \$15,100
				Gas: \$1,400
Analysis and Reporting	- EM&V Analysis and Report	EM&V Report Filed with DPS	2021 Q1	Electric: \$13,250
				Gas: \$1,250
Total Cost (Electric)				\$32,000
Total Cost (Gas)				\$3,000
Total Cost				\$35,000*

* Combines Impact Evaluation expenditures listed in Table 7A (electric) and 7B (gas) in the ETIP/SEEP Revision Letter filed March 2, 2020. A portion of survey expenditures will be included in Attribution Studies.

The EM&V Team developed the budget in **Error! Reference source not found.**. The participant survey activity will include incentives to encourage participants to complete the survey.

Cross-Cutting Activities

The EM&V Team will simultaneously conduct an Attribution study to address net savings. The study will use self-report responses from participant surveys to determine net savings. To maximize cost efficiency of both studies, a single survey will be designed to collect all necessary data for both the CenHub Online Store Impact Evaluation and Attribution Study. More details will be included within the Attribution Study Plan currently under development which is expected to be filed in Q2 2020.

¹ Case 15-M-0252, Energy Efficiency Data Governance Report (filed September 11, 2018)

Program Administrator Staff and Consultant Resources

Central Hudson has dedicated staff, created an organizational structure, and selected an independent third-party evaluator, to ensure the integrity of EM&V.

Addressing Ethical and Operational EM&V Standards

Through a competitive bidding process, the Central Hudson staff selected Cadmus and Demand Side Analytics (together the “EM&V Team”) to evaluate the CenHub Online Store Program and other programs included in Central Hudson’s DSM portfolio.

The EM&V Team has contributed to all of the accepted industry best practices and EM&V protocols, including the International Performance Measurement and Verification Protocol (IPMVP), the draft U.S. Environmental Protection Agency’s EM&V Guidance, and the U.S. Department of Energy Uniform Methods Project (UMP) protocols. The EM&V Team developed the impact, process, and attribution evaluation plans described in Central Hudson’s 2019 & 2020 SEEP filed February 2019. The EM&V Team developed the plans without communication from program implementers. Any changes in the evaluation approach (e.g. due to availability of data) will be clearly documented in each program-specific EM&V plan filing.

Central Hudson’s EM&V staff listed below meet bi-weekly with the EM&V Team to discuss EM&V activities, status, and to support the EM&V Team as requested.

Central Hudson Program Administrator Staff

Melanie Noye. Energy Efficiency EM&V Analyst. Project manager and team lead for the impact evaluation. She will provide project oversight and act as a primary contact for the EM&V Team. In addition, she will coordinate with the Central Hudson management team, fulfill data requests, and track deliverables.

Mark Sclafani. Director, Demand Side Management. Responsible for oversight of Central Hudson's DSM programs and EM&V Activities. Collaborates with DPS Staff & other New York utilities on DSM strategic direction and program design.

Michael Lauchaire. Energy Efficiency Program Manager. Serves as Program Administrator (PA) of several energy efficiency programs and initiatives including the CenHub Online Store Program. As PA, coordinates with the implementation team on aspects of program design, marketing initiatives, and program performance.

Key Roles – EM&V Team

Brian Hedman. EM&V Team’s Quality Assurance Officer. Advises on evaluation activities including confirmation of the scope, methodology, and dedicated staff, limiting communication exclusively to the EM&V team. Mr. Hedman is also responsible for maintaining compliance with Central Hudson’s “Code of Business Conduct and Ethics” and “Anti-Corruption Policy”.

Jason Christensen. Impact evaluation program expert. Provides quantitative analysis for client impact evaluations. Mr. Christensen's experience has emphasized retail market assessment and price elasticity modeling. He has expertise in regression analysis, ANOVA, forecasting, random forest, and non-linear models. He specializes in impact evaluation of market transformation retail products and appliance recycling programs.

Josh Bode. EM&V Team's technical lead for evaluation. Specializes in advanced applications of data analytics using large volumes of hourly and subhourly data for evaluation, valuation, planning and forecasting in the energy sector. He has led over 50 studies including some of the first innovations and largest applications of smart meter data analytics in energy efficiency, behavioral programs, time varying pricing, and demand response.

III. Detailed EM&V Approach

The CenHub Online Store Program will undergo Gross Savings Analysis for program period of 2019-2020. The estimated completion of the Gross Savings Analysis Report is Q1 2021. An independent evaluator (Cadmus, part of the EM&V Team) will perform the Gross Savings Analysis. This section provides details of the EM&V approach by task.

Verification Activities

The EM&V Team will conduct an engineering review of the tracked data, program QA/QC process, and the implementation team's savings methodology.

Project Tracking Data Review

The EM&V Team will conduct a census review of the program tracking database and an engineering review of the savings estimates. The review will consist of:

- Reviewing the tracking database for completeness, accuracy, presence of anomalous entries, and that savings values are within range of expected values
- Verifying reported savings values and calculations, including confirming that algorithms and inputs conform with the approach defined in the NY TRM for each measure.

If the review finds any discrepancies, these will be corrected where possible, and included in the final VGS estimate. The EM&V team will describe findings in the Gross Savings Analysis report.

Surveys

The EM&V Team will survey a sample of participants to verify participation and to verify measure installation and quantity. The survey will collect additional information the EM&V Team will use to calculate VGS. The next section includes additional information about the participant surveys.

QA/QC Protocol Review

The EM&V Team will also review the QA/QC process, which is designed to validate eligibility of all participants and to ensure ordered measures and quantities align with reported GS estimates. If reported measure-level savings diverge from expected values, the QA/QC results may explain reason(s) for unexpected values. The main goal of this review is to develop actionable recommendations, if needed, to improve GS estimates. Recommendations will be included in the Gross Savings Analysis report.

Measurement Activities

The EM&V Team will conduct participant surveys to independently analyze CenHub Online Store Program savings for a sample of participants. For each participant surveyed, the EM&V Team will review all project tracking information to confirm eligibility and to collect measure-specific details to adjust TRM savings estimates if necessary.

Sampling

The coefficient of variation (cv) of 0.5 is typically assumed to determine sample size requirements. A large population with cv of 0.5 would require about 70 responses to achieve 10% precision at the 90% confidence interval (90/10). The EM&V Team will calculate relative precision using a participant-level realization rate. Participant responses can result in only a limited number of unique outcomes for each measure. For example, if a participant receiving a smart thermostat indicates the thermostat is not connected to a central air conditioner, the EM&V Team will adjust the reported savings for that participant.

The number of possible measure-level GS values is limited, so high variance in results (which require larger samples) is not expected. In the EM&V Team's experience, similar evaluations yield a cv of less than 0.5. If this holds true for the CenHub Store, 70 participant surveys would be more than needed to achieve 10% precision at the 90% confidence interval for the program. Over 5,000 Central Hudson customers participated in 2019, installing various types of measures. Therefore, the EM&V Team will attempt to achieve 90/10 confidence and precision for individual measures.

Evaluation Activities

Evaluation activities, which could include experimental and quasi-experimental designs, engineering modeling, or regressions analysis, are not planned for evaluation of the CenHub Online Store Program.

Gross Savings Analysis

The EM&V Team assumes the savings values in the NY TRM, when used correctly, represent the confirmed gross savings for each measure purchased through the CenHub Online Store Program. The following examples of each evaluation activity illustrate reasons VGS may not match tracked gross savings:

- **Verification: Tracking Database Review:** Energy savings in tracking database finds anomalous value that is confirmed to be erroneous (e.g. quantity 11, should be 1, savings too high by factor of 11)
- **Verification: Survey Response.** A participant indicates they chose not to install an advanced power strip and does not intend to connect AV or IT equipment.
- **Measurement: Survey Response.** A participant recorded in tracking database having installed a showerhead indicates the hot water heater in their home is natural gas, but GS are electric.

Any savings update due to findings from the tracking database review result in adjusted gross savings. This is a census review and would not impact relative precision. The survey activity will include a sample of participants. The EM&V team will apply the realization rate from all other verification and measurement activities to the adjusted gross savings to calculate final VGS for the program overall and for separately for each measure type.

IV. Status Reporting

This section explains the EM&V Teams' plan to update Central Hudson with the progress of evaluation activities and relevant interim findings.

Status Reports

The EM&V Team has scheduled bi-weekly meetings and will provide status updates on a bi-weekly basis or more frequently as-needed. Central Hudson and the EM&V Team will review the status of each activity listed in **Error! Reference source not found.**. The EM&V Team will track the status using status log that is maintained and updated weekly. The status log will include all key EM&V activities and track the progress and expenditures of each evaluation task.

Final EM&V Reports

Final EM&V reports will adhere to the outline provided in Appendix G of the CE-05 Evaluation, Measurement & Verification Guidance. As outlined in the CE-05 document, the EM&V report will include:

- Executive Summary
- Main Report
 - Introduction
 - Evaluation results
 - Conclusions and recommendations
 - Methods
- Appendices - will include additional information to ensure brevity of the Main Report. Appendices will include, but are not limited to:
 - Glossary of terms
 - Program Logic Model
 - Survey Disposition Information
 - Detail on statistical analysis
 - Other relevant information
 - TRM update information for consideration
 - Explanation of AP RR that would be achievable if the PA implements recommended actions.

The EM&V Team will share findings and insights from the evaluation on an on-going basis to facilitate early feedback and to expedite the review of the final EM&V reports. Central Hudson plans to file a CenHub Online Store Program EM&V report in Q1 of 2021.