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Department of Energy and Environment

Verification of the District of Columbia Sustainable Energy Utility

FY2015 Annual Evaluation Report for the Performance Benchmarks (Final Draft)

June 21, 2016

DEPARTMENT OF ENERGY & ENVIRONMENT

DC SUSTAINABLE ENERGY UTILITY

Your Guide to Green

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BAUMANN CONSULTING

Formerly Ebert & Baumann Consulting Engineers

GDS Associates, Inc.

Engineers and Consultants

Department of Energy and Environment

Verification of the District of Columbia Sustainable Energy Utility

FY2015 Annual Evaluation Report for the Performance Benchmarks (Final Draft)

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ACKNOWLEDGEMENTS

This evaluation effort was performed by Tetra Tech, GDS Associates, Leidos, and Baumann Consulting under the leadership of Tetra Tech.

This effort was supported by the provision of project data in the form of Knowledge Information Transfer Tool (KITT) data extracts, project files, memos, staff interviews, and responses to other requests for data and information by the DOEE, DCSEU, and VEIC Evaluation, Measurement, and Verification Services group.

The evaluation team thanks the DOEE, DCSEU, and VEIC teams for their timely and thorough responses to all data requests and follow-up questions. In particular, we thank Robert Stephenson, VEIC EM&V Services Group, for his support and responses to the many questions from the evaluation team as we conducted our impact evaluation activities.

The table below displays the role of each lead evaluation team member and report content contributor.

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ACRONYMS

ACEEE	American Council for an Energy-Efficient Economy
AESC	Avoided Energy Supply Component
AMI	Advanced Metering Infrastructure
Btu	British thermal unit
C&I	Commercial and institutional
CA SPM	California Standard Practice Manual
CAEA	Clean and Affordable Energy Act of 2008
CAT	Comprehensive Analysis Tool
ccf	100 cubic feet
CPUC	California Public Utility Commission
DCSEU	District of Columbia Sustainable Energy Utility
DDOE	District Department of the Environment
DOEE	Department of Energy and Environment
DI	Direct install
EISA	Energy Independence and Security Act of 2007
EM&V	Evaluation, measurement, and verification
ESCO	Energy Service Company
FERC	Federal Energy Regulatory Commission
FHLB	Federal Home Loan Bank
FTE	Full time equivalent
FY	Fiscal year
GHG	Greenhouse Gas
GSF	Gross Square Feet
HUD	Housing and Urban Development
KITT	Knowledge Information Transfer Tool
kW	Kilowatt
kWh	Kilowatt hour
LI	Low-income
LIMF	Low-income Multifamily
LPG	Liquefied petroleum gas
MW	Megawatt
M&V	Measurement and verification
Mcf	1,000 cubic feet

MF	Multifamily
MMBtu	1 million Btu
NAPEE	National Action Plan for Energy Efficiency
NTG	Net-to-gross
O&M	Operation and maintenance
PAC	Program administrator cost
PCT	Participant Cost Test
PJM	Pennsylvania New Jersey Maryland
PV	Photovoltaic
QA	Quality Assurance
RIM	Rate Impact Measure
RPM	Reliability Pricing Model
SCT	Societal cost test
SqFt	Square Foot
SETF	Sustainable Energy Trust Fund
SEU	Sustainable Energy Utility
SEUAB	Sustainable Energy Utility Advisory Board
SREC	Solar renewable energy certificate
T&D	Transmission and distribution
TRM	Technical reference manual
TRC	Total Resource Cost
Tt	Tetra Tech
VEIC	Vermont Energy Investment Corporation

1. EXECUTIVE SUMMARY

The Department of Energy and Environment (DOEE) has contracted with Tetra Tech (as the prime contractor), Leidos, GDS Associates, and Baumann Consulting to provide evaluation, measurement, and verification (EM&V) of the portfolio of energy efficiency and renewable energy programs, or initiatives, offered in the District of Columbia (DC), along with six performance benchmarks associated with these initiatives. The initiatives are implemented through the DC Sustainable Energy Utility (DCSEU) partnership.

The Clean and Affordable Energy Act of 2008 (CAEA) requires the Mayor, through DOEE, to contract with a private entity to conduct sustainable energy programs on behalf of the District of Columbia. The CAEA authorizes the creation of a Sustainable Energy Utility (SEU) and designates the SEU to be the one-stop resource for energy efficiency and renewable energy services for District residents and businesses.

The DCSEU is led by the Sustainable Energy Partnership and under contract to the DOEE. The Sustainable Energy Partnership includes the following organizations:[1]

- Vermont Energy Investment Corporation (VEIC)—Partnership Lead
- George L. Nichols & Associates
- Groundswell
- Institute for Market Transformation
- Nextility
- PEER Consultants.

The SEU Advisory Board provides monitoring of the DCSEU and advice to DOEE and the Council of the District of Columbia according to the *Bylaws of the Sustainable Energy Utility Advisory Board ("Board") adopted pursuant to Section 204(b) of the Clean and Affordable Energy Act ("Act")*[2], Article 1, Section 1.2.

> *"In accordance with the Clean and Affordable Energy Act of 2008, D.C. Official Code § 8-1774.03, the Board shall: (a) Provide advice, comments, and recommendations to the Department of Energy and Environment ("DOEE") and Council of the District of Columbia ("Council") regarding the procurement and administration of the Sustainable Energy Utility (hereinafter referred to as the "SEU") contract described in sections 201 and 202 of the Act; (b) Advise the DOEE on the performance of the SEU under the SEU contract; and, (c) Monitor the performance of the SEU under the SEU contract. Section 203(a) of the Act."*

The DCSEU began implementing energy efficiency and renewable energy programs in FY2011.

[1] DC Sustainable Energy Utility 2015 Annual Report, page 36.
[2] SEU Advisory Board Bylaws, http://green.dc.gov/page/seu-advisory-board-bylaws.

Sections two through seven of this report summarize the measurement, evaluation, and verification of the six performance benchmarks included within DOEE's contract with the DCSEU for fiscal year 2015 (FY2015). The performance benchmarks are listed in Table 1-1. Section eight provides a FY2015 portfolio and track-level cost-effectiveness analysis. The fiscal year is defined as October 1, 2014 through September 30, 2015.

Table 1-1. FY2015 Performance Benchmarks

Item	Benchmark
1a	Reduced per-capita energy consumption—electricity
1b	Reduced per-capita energy consumption—gas
2	Increase renewable energy generation capacity
3	Reduce growth in peak demand
4	Improve energy efficiency in low-income housing
5	Reduce growth in energy demand of largest users
6	Increase number of green-collar jobs (GJ)[3]

1.1 PERFORMANCE BENCHMARK ASSESSMENT RESULTS

In FY2015, the DCSEU continued to make progress on performance benchmark achievement, with all six of the benchmarks achieved at either the highest level or minimum threshold. The DCSEU exceeded the minimum performance targets for the electric and natural gas energy savings benchmark for the second time (FY2014 was the first year this occurred). In summary, the DCSEU fully achieved and exceeded the maximum performance targets for three performance benchmarks and achieved the minimum performance targets for three performance benchmarks. Performance Benchmark 2, "Reducing the acquisition cost of renewable energy initiatives," which did achieve the minimum performance target in FY2014, met the minimum performance target this year.

In addition to these achievements, the DCSEU continued to deliver a cost-effective portfolio, with a cost-benefit ratio of 4.06 for the fully-loaded cost scenario under the Societal Benefit Test.[4]

The results of the evaluation team's verification of the six performance benchmarks are summarized below and detailed in Table 1-2. In this table the performance benchmarks that have been achieved are highlighted in yellow for easy viewing.

[3] DOEE verified the "Total number of FTE green job hours worked by DCSEU staff and subcontractors that are District residents". The evaluation team verified the amount of SEU direct cash incentives to end-use customers and/or manufacturers and divided by $200,000 (as set forth in the contract) to arrive at the FTE spend equivalent. These two figures were added together to arrive at the total green-collar jobs

[4] Includes the cost of the third-party independent evaluation as well as the effect of the realization rates determined through the evaluation effort and estimated free-ridership and spillover (net-to-gross estimates).

Maximum Performance Benchmark targets achieved or exceeded

4. Improve energy efficiency in low-income housing: 30 percent spend ($). The DCSEU reached 105 percent of this maximum performance target for this benchmark.

5. *Reduce growth in energy demand of largest users: number of projects completed with a square footage > 200,000*. The DCSEU reached 104 percent of the maximum performance target for this benchmark.

6. Increase number of green-collar jobs: green-job hours directly worked by District residents (FTE). The DCSEU reached 127 percent of the maximum performance target for this benchmark.

Minimum Performance Benchmark targets achieved or exceeded

***1a. Reduce per-capita energy consumption—electricity (MWh*).** The DCSEU achieved 104 percent of the minimum performance benchmark threshold and achieved 52 percent of the maximum performance target for this benchmark.

***1b. Reduce per-capita energy consumption—natural gas (mcf*).** The DCSEU achieved 153 percent of the minimum performance benchmark threshold and achieved 35 percent of the maximum performance target for this benchmark.

2. Increase renewable energy generating capacity. Cost per MMBtu reduction from prior year (percentage). The DCSEU cost per MMBTu decreased by 14 percent over FY2014. This was in contrast to FY2014 where the DCSEU costs per MMBtu where found to have increased by 20 percent compared to the prior year, FY2013.

3. Reduce growth in peak demand (kW). The DCSEU exceeded the minimum performance target for this benchmark by more than 398 percent.

Table 1-2. FY2015 DCSEU Performance Benchmarks Verification Summary

PB	Performance Benchmark	Metric Unit	Maximum Performance Target	Minimum Performance Target	FY2015 Reported[5]	FY2015 Verified	Maximum Performance Target Achieved (%)	Minimum Performance Target Achieved (%)
1a	Reduce per-capita energy consumption—electricity	MWh	103,690	51,845	57,208	53,724	No (52%)	Yes (104%)
1b	Reduce per-capita energy consumption—natural gas	Mcf	273,428	61,521	87,694	94,399	No (35%)	Yes (153%)
2	Increase renewable energy generating capacity	% Reduction in Cost/kWh	20%	10%	23% (reduction)	14% (reduction)	No	Yes
3	Reduce growth in peak demand	kW	20,000	2,000	8,625	7,950	No (40%)	Yes (398%)
4	Improve energy efficiency in low-income housing	% of annual budget (30% spend)	$5,280,000	$3,520,000	$5,569,636	$5,569,636	Yes (105%)	Yes (158%)
5	Reduce growth in energy demand of largest users	# of projects completed with sq./ft. > 200,000	50	30	61	52 (85%)	Yes (104%)	Yes (173%)
6	Increase number of green-collar jobs (GJ)	# of FTEs Earning a Living Wage& Amount of direct incentive Dollars	88	53	95	112	Yes (127%)	Yes (211%)

[5] As reported in DCSEU's 2015 Annual Report.

1.2 KEY FINDINGS AND RECOMMENDATIONS

As an overarching recommendation, the evaluation team recommends that DOEE, in conjunction with the implementation and evaluation contractors, develop a guidance document for each performance benchmark. Currently, the performance benchmarks and their methods for evaluation are only partially documented. The current documentation includes contract documents and evaluation memos, but in some cases the documentation is not present. For example, if "generator level" data is used the implementation contractor may meet the performance benchmark whereas if "meter level" data is used they could miss the benchmark target entirely. The data source was not clearly specified in the contract or the evaluation protocol. The calculation of the renewables benchmark target is another example where the data to be used for the calculation—with or without administrative costs- is not clearly called out. It should also be clear how any omission or errors (e.g., lack of documentation to verify low-income customers) will influence the analysis results. Would certain omissions or errors result in a minor adjustment, a larger adjustment or no adjustment at all but rather a notification? Currently some of these areas are addressed specifically in the contract or in evaluation memos, however, some items are less obvious (possibility historical) with no clear source, or, in some cases, not addressed at all.

The guidance document would specify the documentation that must be provided to support attainment of performance targets for each benchmark, how the review will be conducted, and how the results will be addressed and presented in the case of missing or incomplete documentation. Similar to an M&V framework, the guidance document would set out how the individual performance benchmarks would be assessed at the beginning of each contract period. The guidance document would briefly describe the approach for the verification of the benchmark and could be updated annually to reflect changes in contracts, the implementation, or evaluation processes. The guidance document would ensure that all parties are aware of the performance benchmark metrics, evaluation process, performance expectations, and that inputs are transparent and fully documented. The guidance document would also ensure that DOEE is directing the evaluation of the performance contract, with the evaluation team using DOEE's direction to conduct the evaluation. DOEE would also have certainty regarding the outcome metrics they use to assess performance.

The evaluation team identified a number of key findings and recommendations including:

- **Performance Benchmark 1:** Since FY2012, DCSEU was able to drive down acquisition costs for three consecutive years of implementation. In FY2015, that trend shifted to an increase in acquisition costs for both MMBtu and MWh. This, however, is in line with data from other neighboring states and national studies that suggest that more mature programs experience a rise in acquisition costs. This could be due, in part, to providing more comprehensive program offerings that move beyond lighting and targeting harder to reach customers. As identified in last year's report, this upswing may warrant additional funding in order to achieve performance benchmark targets or the targets may require ongoing review. The District potential study completed in 2013 should provide key data and information for informing meaningful targets. Should the District conduct a baseline study in the future, this data in conjunction with the DCSEU portfolio savings data to date can be used to update and calibrate the potential study.

- **Performance Benchmark 2:** While the solar PV and solar thermal installation costs are largely outside of the DCSEU's control, other components of the initiative's expenditures (e.g. administrative costs and incentives) may offer further opportunity to reduce acquisition costs depending on the market and the customers' receptivity. For future tracking, the market rate initiatives (7101PVMR) should be broken out from the 7107PV expenditures. The market rate efforts for PV and solar thermal technologies should also be tracked separately; right now they are combined under the 7101PVMR which is misleading.

- **Performance Benchmark 3:** The DCSEU crossed a threshold this year with its sale of demand resources resulting from energy efficiency projects into the PJM Capacity Market. There may be opportunities to coordinate the evaluation required to bid resources into the PJM market with the initiative level evaluation to help leverage resources and keep down costs.

- **Performance Benchmark 4:** DCSEU exceeded the maximum performance target for this benchmark by 5 percent. The evaluation team continues to recognize that the DCSEU is tasked with achieving several (and sometimes conflicting) performance benchmarks and contractual obligations requiring close management of the portfolio throughout the year. The evaluation team also identified process related recommendations that include:

  - Ensure project files are properly filed under the overarching file structure. This will be beneficial for both long-term project documentation and future evaluations.
  - Update the low-income verification process document each year to ensure accurate Housing and Urban Development (HUD) income levels are reflected.
  - Update program documents to ensure all forms of accepted income documentation are listed on customer documents, such as applications.

- **Performance Benchmark 5:** The evaluation team recommends better tracking of the largest energy users and largest energy user opportunities and projects. Tracking opportunities with largest energy users in KITT and linking to square footage will enhance verification of this metric. Ensuring that all completed projects also have documented square footage will further the verification of the performance benchmark. Other opportunities for improvement include tracking the buildings energy management history and documenting federal- and District-owned properties to ensure that the project applications are fully filled out and populated in the applicable field in KITT.

- **Cost Effectiveness:** The total societal cost-benefit results for the portfolio ranges from 5.07 to 4.06 (depending on the testing scenario), which means that the DCSEU continued to operate its initiatives in a very cost-effective manner in FY2015. The 4.06 figure represent the fully-loaded assessment which includes the cost of the third-party independent evaluation as well as the effect of the realization rates determined through the evaluation effort and estimated free-ridership and spillover (net-to-gross estimates). For every dollar spent the District realized anywhere from a $5.07 to $4.06 return on its investment.

  On a track level, the Income Qualified Home Performance initiative (formerly the Federal Home Loan Bank initiative) and the Home Performance with ENERGY STAR initiative were the only two initiatives that were not cost effective and have

not been since the first evaluation in FY2012. This could be, in part, as a result of the incentive levels for Income Qualified Home Performance with incentives up to $6,000 and Home Performance with ENERGY STAR with incentives up to 1,800. Also under the Income Qualified Home Initiative, DCSEU is able to cover up to $1,000 in “health and safety” improvements that help lay the foundation for the installation of energy measures but in an of themselves do not result in savings. The evaluation team recognizes these two initiatives serve a purpose and a market that would not otherwise be served and requires an extra level of support by DCSEU staff. We recommend, however, that a full review of each initiatives’ structure, incentive levels and program approach be conducted to better understand why these initiatives have not been cost effective. Researching other utilities or jurisdictions that provide such programs’ cost effectively could be an area to explore in the FY2016 evaluation.

The evaluation team has no outstanding issues or recommendations regarding the VEIC cost-effectiveness evaluation procedure.

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2. REDUCE PER-CAPITA ENERGY CONSUMPTION IN THE DISTRICT OF COLUMBIA (CAEA §201(D)(1))

2.1 DESCRIPTION

The DCSEU is charged with reducing energy consumption in the District of Columbia for both electric and natural gas. For FY2015, the maximum performance target was set as 0.85 percent of the total 2009 electricity and natural gas use. The minimum performance target was set as 50 percent of the maximum performance target for electricity savings, and 22.5 percent of the maximum performance target for natural gas savings. Per DCSEU contract, modification 7[6], the contractor must achieve the minimum target for *both* electricity and natural gas to be eligible for an incentive payment.

> *"Beginning in option year 3 of the SEU contract, the Contractor shall develop and implement renewable energy and energy efficiency programs for electricity and natural gas users that directly lead to an annual reduction equivalent to 0.85% of the weather-normalized total electricity consumption in the District for 2009 and an annual reduction equivalent to 0.85% of the weather-normalized natural gas consumption in the District for 2009.[7]*
>
> *If the SEU implements energy efficiency programs that cause customers to switch how equipment or and application is powered (i.e., from electricity to natural gas or from natural gas to electricity), any increase in the kWh or therms as a result of the switch would be counted as 'negative savings' towards the relevant benchmark. For example, if an energy efficiency program causes a consumer to replace an electric heat pump with a natural gas furnace, then the increase in the consumption of therms as a result of the switch to using natural gas for space heating would be counted as negative savings toward the therm savings benchmark while the reduction in kWh from the no longer using electricity for space heating would be counted as 'positive savings' toward the kWh savings benchmark. Similarly, if an energy efficiency program causes a consumer to replace natural gas furnace with a heat pump, then the increase in the consumption of kWh as a result of the switch to electricity for space heating would be counted as negative savings toward the kWh savings benchmark while the reduction in therms from no longer using natural gas for space heating would be counted as positive savings toward the therms savings benchmark.*
>
> *For any SEU energy efficiency program that causes customers to switch how equipment or an application is powered (i.e., from electricity to natural gas or from natural gas to electricity), kWh and therms savings shall be converted to BTUs, in accordance with the total fuel cycle methodology used by the U.S. Department*

[6] Contract Number DDOE-2010-SEU-0001, Amendment /Modification No. M07.

[7] For FY2014, the electricity and natural gas savings targets were adjusted from 1.0 percent to 0.85 percent of the weather-normalized total electricity consumption in the District for 2009 and an annual reduction equivalent to 0.85 percent of the weather-normalized natural gas consumption in the District for 2009.

Environmental Information Agency data for the District of Columbia, for the purpose of calculating the Societal Benefit Test.

The SEU shall use gross verified natural gas savings as the claimed savings towards the annual reduction in weather-normalized total natural gas consumption in the District for 2009. Energy and demand savings measure the amount of energy and demand saved as a result of the SEU programs without the inclusion of the facility heating and cooling interactive effects whether they are gas or electric."

While a contract modification was not officially executed, a policy change was authorized by DOEE and implemented by DCSEU in FY2015 specific to how the interactive effects would be accounted for in reported savings. The policy change was detailed in two memos by VEIC dated June 12, 2015, and January 7, 2016. The change moved from excluding all interactive effects from the reported energy savings to including like-fuel interactive effects and continuing to exclude cross-fuel interactive effects.

2.2 VERIFIED RESULTS

The DCSEU achieved the minimum performance targets for both the electric and natural gas performance benchmarks for FY2015. This is the second year in which the DCSEU portfolio has achieved both the electric and natural gas minimum targets. The maximum performance target has not yet been achieved for either energy metric.

Table 2-1. FY2015 Per Capita Energy Consumption Results Summary[8]

Metric	Maximum Performance Target	Minimum Performance Target	FY2015 Reported	FY2015 Verified	Maximum Performance Target Achieved (%)	Minimum Performance Target Achieved (%)
Electric (MWh)	103,690	51,845	57,208	53,724	No (52%)	Yes (104%)
Natural gas (mcf)	273,428	61,521	88,124	94,399	No (35%)	Yes (153%)

2.3 EVALUATION AND VERIFICATION APPROACH

The independent evaluation team verified the impacts on electric and gas usage from the installation of measures by track and for the portfolio as a whole as described in the *Department of Energy and Environment Energy Efficiency Evaluation Plans for Portfolio of Programs Offered in the District of Columbia.* Verified results for each program and portfolio as a whole are reported in the *Department of Energy and Environment Evaluation,*

[8] Gas and electric verified savings excludes cross-fuel lighting interactive effects. The electric data are reported at the generator level. FY2015 gas reported and verified numbers of 85,975 MMBTu and 92,096.4 MMBTu, respectively, were converted from MMBTu metric to mcf metric using a factor of 1.025.

Measurement, and Verification of Energy Efficiency and Renewable Energy Programs in the District of Columbia FY2015 Annual Evaluation Report, Volume I.

2.4 ADJUSTMENTS

The evaluation team's verified, or ex-post, results of the KITT reported electric savings, demand reduction, and natural gas savings for the overall portfolio are presented in Table 2-2

Realization rates are the ratio of verified savings to the tracking system savings for a representative sample of projects reported with each track. Realization rates are typically calculated for each end-use category and then applied to the total end-use tracking system savings for a particular program, or track. The results are rolled up to develop program, or track, verified savings. The verified savings for all tracks are summed to obtain portfolio level verified savings.

These verified results reflect portfolio level realization rate estimates of 0.94 for kWh, 1.19 for kW, and 1.08 for MMBtu (excluding cross-fuel interactive effects for lighting)[9]. This means that the evaluation team estimates that the actual portfolio electric savings result is 94 percent of the DCSEU reported electric savings, the demand reduction result is 119 percent of the DCSEU reported demand reduction, and the gas savings net of cross-fuel interactive effects for lighting resulted in 108 percent of savings. This compares to FY2014 realization rate estimates at the portfolio level of 0.98, 0.92, and 1.00 for kWh, kW, and MMBtu, respectively.

Table 2-2. Realization Rate Comparison Summary for the FY2015 Portfolio

Metric	DCSEU				PA Range		Maryland Statewide	
	FY2012	FY2013	FY2014	FY2015	2013–2014	2014–2015	2012	2013
kWh	0.92	1.04	0.98	0.94	1.06	1.12	1.00	0.93
kW	0.95	1.07	0.92	1.19	1.02	1.10	1.15	1.01
MMBtu	0.99	1.00	1.00	1.08	NA	NA	NA	NA

Tracking and calculation differences between claimed and verified results are common. The realization rates for DCSEU have historically been in a tight range, which means DCSEU's claimed energy savings have closely matched actual energy savings. The kWh and MMBTu portfolio realization rates for FY2015 are within a reasonable range (6 and 8 percent, respectively). However, the kW realization rate is 19 percent higher than the reported savings and should be looked at more closely. Obtaining better precision in estimating kW savings will help to narrow that variance. On a track level, analysis showed that there were some significant variances that feed into these aggregate results. Commercial custom and low-income multifamily tracks showed significant opportunity to improve estimations across kWh, kW, and MMBtu. Track level realization rates and specific recommendations are provided in the FY2015 Annual Evaluation Report, Volume I, Table 4-2.

[9] The realization rate for the gas (MMBTu) savings including all interactive effects is 1.13; however, the gas savings used for the benchmarking analysis is net of cross-fuel interactive effects.

As a comparison, the Pennsylvania Statewide Evaluator reported realization rates of 106 and 102 percent for energy and demand in Program Year 5[10] and 112 and 110 percent for energy and demand in Program Year 6[11]. The EmPOWER Maryland 2012 statewide verified results are reported as 100 and 115 percent of reported values for electric savings and demand reduction, respectively.[12] In 2013, evaluated results were 93 percent and 101 percent of reported savings for kWh and kW, respectively.[13] Pennsylvania and Maryland make for good comparisons because they have similar geographical location, availability of information, and similar implementation periods since inception. Please see Table 2-2 for a summary of these realization rate comparisons.

The reported and verified electric savings (kWh) and demand reduction (kW) results are adjusted for line losses (8 percent and 6 percent increases, respectively) to express savings at the electric generator rather than at the customer meter.

$$\textit{Non-solar electric savings at generator} = 1.08 * kWh_{KITT/verified}$$

$$\textit{Non-solar demand savings at generator} = 1.06 * kW_{KITT/verified}$$

In addition, the savings and demand for the renewable energy tracks are increased by an additional 15 percent to account for assumed spillover.[14] For the Solar tracks (7101PVMR, 7107PV, and 7110SHOT), therefore, the total savings are multiplied by 1.242 (1.08*1.15) and demand is multiplied by 1.219 (1.06*1.15).

$$\textit{Solar electric savings at generator} = 1.08 * 1.15 * kWh_{KITT/verified}$$

$$\textit{Solar demand savings at generator} = 1.06 * 1.15 * kW_{KITT/verified}$$

The gas savings results are converted from MMBtu as reported in KITT to mcf according to the following equation:

$$1\ mcf = 1.025^{15} * MMBtu$$

[10] Act 129 Statewide Evaluator Annual Report, Program Year 5: June 1, 2013 – May 31, 2014. http://www.puc.state.pa.us/Electric/pdf/Act129/SWE_PY5-Final_Annual_Report.pdf.

[11] Act 129 Statewide Evaluator Annual Report, Program Year 6: June 1, 2014 – May 31, 2015. http://www.puc.state.pa.us/Electric/pdf/Act129/SWE_PY6-Final_Annual_Report.pdf.

[12] *Verification of Reported Impacts from 2012 EmPOWER Maryland Energy Efficiency Programs* http://neep.org/Assets/uploads/files/emv/emv-library/MDPSC_2012_Verification_Report_Compiled.pdf.

[13] *Verification of Reported Impacts from 2013 EmPOWER Maryland Energy Efficiency Programs* http://www.neep.org/sites/default/files/resources/9153-57-Itron2013VerificationReport-081314%20%282%29.pdf.

[14] Reference DCSEU memorandum to DDOE and Tetra Tech, *Screening assumptions for the DCSEU solar renewable energy program portfolio*, dated August 30, 2012.

[15] The 1.025 conversion factor is slightly conservative compared to the conversion factor of 1.032 established by the U.S. Energy Information Administration last updated April 2016; see https://www.eia.gov/tools/faqs/faq.cfm?id=45&t=8.

2.5 PERFORMANCE BENCHMARK ASSESSMENT

2.5.1 Background

In its fourth full year of portfolio implementation,[16] the DCSEU was able to achieve the minimum performance targets for both electric and natural gas savings benchmarks. Starting in FY2014, the electricity and natural gas savings targets were adjusted from 1.0 percent to 0.85 percent of the weather-normalized total electricity consumption in the District for 2009 and an annual reduction equivalent to 0.85 percent of the weather-normalized natural gas consumption in the District for 2009. This change holds the electric savings minimum target at the FY2013 level.

2.5.2 Assessment

A. Acquisition cost comparisons

The acquisition cost discussion is intended to provide DOEE with analysis to inform future budget and target setting. Acquisition cost comparisons between jurisdictions and similar, or differing, implementation models are meaningful as there is no need to distinguish how various costs are categorized since the cost is the sum of direct, indirect, and incentive expenditures associated with acquiring these energy efficiency resources. This includes all costs associated with designing, administering and implementing, tracking, reporting, and evaluating energy efficiency portfolios. As with many metric comparisons, though, this is not perfect. The high-level acquisition cost does not provide insight into differences in cost drivers such as portfolio maturity or jurisdictional specific requirements, markets served, and constraints in acquiring energy efficiency resources.

These caveats are noteworthy given that the DCSEU contractual obligations will likely increase the cost of acquiring energy efficiency resources for the District. A cost study was conducted in FY2013 to compare DCSEU acquisition costs to other jurisdictions across the United States and to attempt to quantify contractual obligations. Although data was not sufficient to provide quantification, the acquisition cost benchmarks indicate that the DCSEU is performing in line with other program administrators, municipal and cooperative utilities.

i. Acquisition cost: $ per MWh, excluding renewable energy

The DCSEU Portfolio of Energy Efficiency electric track offerings reported FY2015 MWh savings 11 percent lower than FY2014, while electric spending increased by 9 percent in absolute terms.

In FY2015, the first-year savings acquisition cost, or MWh achieved (based on verified savings adjusted for line losses) per dollar spent excluding renewable energy tracks, was $237, up 22 percent from $195 in FY2014. This increase followed three consecutive years of declining cost. As noted in last year's report, an increase in cost per MWh (estimated at $244) would achieve the FY2015 minimum target. The prediction was not far off. It was also

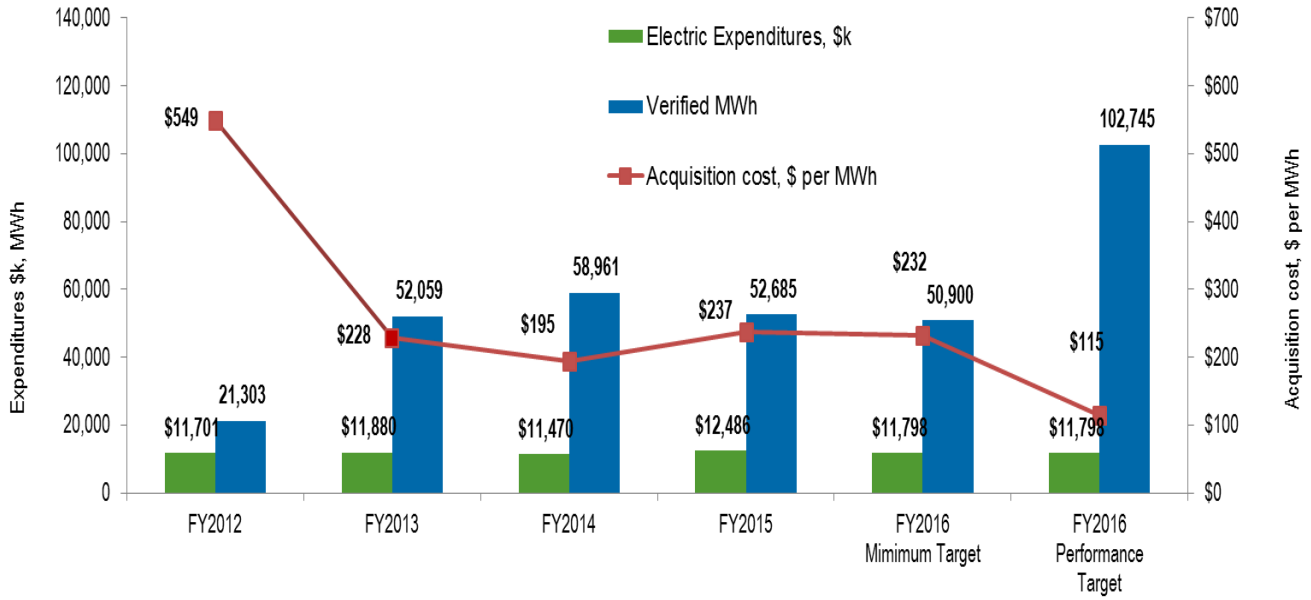
[16] The DCSEU offered quick start programs in FY2011.

suggested that acquisition costs begin to rise as portfolios mature, as discussed further below.

Figure 2-1 illustrates the DCSEU annual expenditures for FY2012 through FY2015 compared to the savings achieved in FY2012 through FY2015.[17] Acquisition costs per MWh declined from FY2012 through FY2014 (based on reported nonrenewable electric savings adjusted for line losses) year over year and moved upwards in FY2015.

The FY2016 projections show that it will require a slight reductions (2%) from FY2015 acquisitions costs to meet the minimum target. It would take a cut of more than half (52%) the current FY2015 acquisition costs to meet the FY2016 performance targets. This projection assumes that the DCSEU spends the same proportion of its allocated budget on electric-saving measures, which accounted for 74 percent of expenditures in FY2015.

Figure 2-1. Total Electric Savings Acquisition Costs: FY2012 - FY2015 Verified and FY2016 Budget at Generator Level[18]



As a comparison, the Pennsylvania utilities under PA Act 129 have demonstrated variable acquisition costs over time as illustrated in Table 2-3 below. Phase I of PA Act 129 required

[17] Actual costs and budget exclude third-party evaluation costs.

[18] Expenditures are from the "DCSEU FY'15 Gas Electric Split_corrected.xlsx" file provided by DCSEU. These expenditures exclude spending on renewable energy initiatives. Savings are verified MWh/MMBtu as reported in the portfolio evaluation reports. The FY2016 expenditures and performance benchmark targets are provided by DOEE and verified by DCSEU. The FY2016 renewable budget was provided by DCSEU.

each of the seven major Electric Distribution Companies (EDCs) to reduce energy and consumption and peak demand by 1 percent by May 31, 2011. It required a 3 percent and 4.5 percent reduction in energy and peak demand by May 31, 2013. Reduction targets are cumulative.[19] In Phase II, individual EDC cumulative reduction targets for energy consumption were based on the statewide potential study and ranged from 1.6 to 2.9 percent for the three-year implementation period (demand reduction was not applicable in Phase II but is proposed again for Phase III). In addition, Act 129 sets a spending cap of 2 percent of 2006 annual revenues for annual program spending and sets "carve-out" savings targets for government, non-profit, schools, and institutions and low-income sectors. Failure to meet compliance targets can result in up to $20 million in penalties. Maryland utilities, implementing programs through the statewide EmPOWER Maryland initiative, also showed variable acquisition costs through FY2015, which was the final year of the initial goal for the program of achieving a 15 percent reduction in energy use by 2015.

Table 2-3. Portfolio Level Acquisition Costs FY2012 through FY2015 for DCSEU, PA, and MD

Fiscal Year	DCSEU Acquisition Cost $/MWh	Pennsylvania Acquisition Cost $/MWh	Maryland[20] Acquisition Cost $/MWh
FY2012	$549	-	-
FY2013	$230	-	$208
FY2014	$195	$170	$271
FY2015	$237	$209	$338

In the initial years, the acquisition costs generally declined for each PA utility, but in plan year 2014 (PY 5), costs began rising as shown, in part, in Table 2-3. In 2015 (PY6), acquisition costs continued to rise, increasing by 23 percent—roughly the same rate of increase as DCSEU for the same time period. This might be due to a couple of factors—less expensive resource acquisition opportunities are diminishing in turn requiring more staff effort and incentives to engage the customer, and there are increasing efficiency codes and standards, such as Energy Independence and Security Act (EISA) impacts for lighting efficiency standards. The average Maryland acquisition cost was $271 per MWh for FY2014, which was up from $208 per MWh (or 30 percent) for 2013. In Maryland, the acquisition costs for FY2015 increased again to $338 per MWh, or an increase of 25 percent. The DCSEU's FY2015 acquisition costs of $237 per MWh continues to be comparable to these Pennsylvania and Maryland benchmarks. The DCSEU acquisition cost is reasonable given that programs are less mature than in Pennsylvania or Maryland, but also have additional goals described by the benchmarks in this report.

Two studies raised in last year's report offered acquisition cost comparisons that are still worth noting. An ACEEE report titled, *An Empirical Model for Predicting Electric Energy*

[19] All PA Act 129 filings and proceedings are found here: http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/energy_efficiency_and_conservation_ee_c_program.aspx.

[20] Maryland 2014 evaluation in not yet available as there is a two-year lag on regulatory reporting. The report should be public in May 2016.

Efficiency Resource Acquisition Costs in North America: Analysis and Application[21]*.* In 2012, provides analysis regarding savings over time and suggests that acquisition costs should decline over the first five to six years of implementation as savings targets increase, and then begin to rise as acquisition costs increase with portfolio maturity. A 2014 ACEEE report, The *Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs*[22] provides a summary of four-year averages (2009–2012) for dollars per MWh ranging from $130 to $420 with an average of $230 per MWh.

Maryland, Pennsylvania, and the District of Columbia may be indications that the acquisition cost increase as portfolios mature is accelerating; that is, costs to acquire energy efficiency savings begins to increase sooner than what prior research and experience indicates.

ii. Acquisition cost: $ per MMBtu, excluding renewable energy

The FY2015 nonrenewable savings for energy efficient natural gas measures decreased by 31 percent while the expenditures decreased by 6 percent.[23] The first-year acquisition cost, or dollars spent per MMBtu saved, increased by 37.5 percent. Table 2-4 provides the portfolio level DCSEU's acquisition costs per MMBTu for all the program years. An ACEEE report, The *Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs*[24] provides a summary of four-year averages (2009–2012) for dollars per MMBtu ranging from $19 to $59 with an average of $37 per MMBtu. The DCSEU FY2015 acquisition cost of $44 per MMBtu compares favorably to these benchmarks.

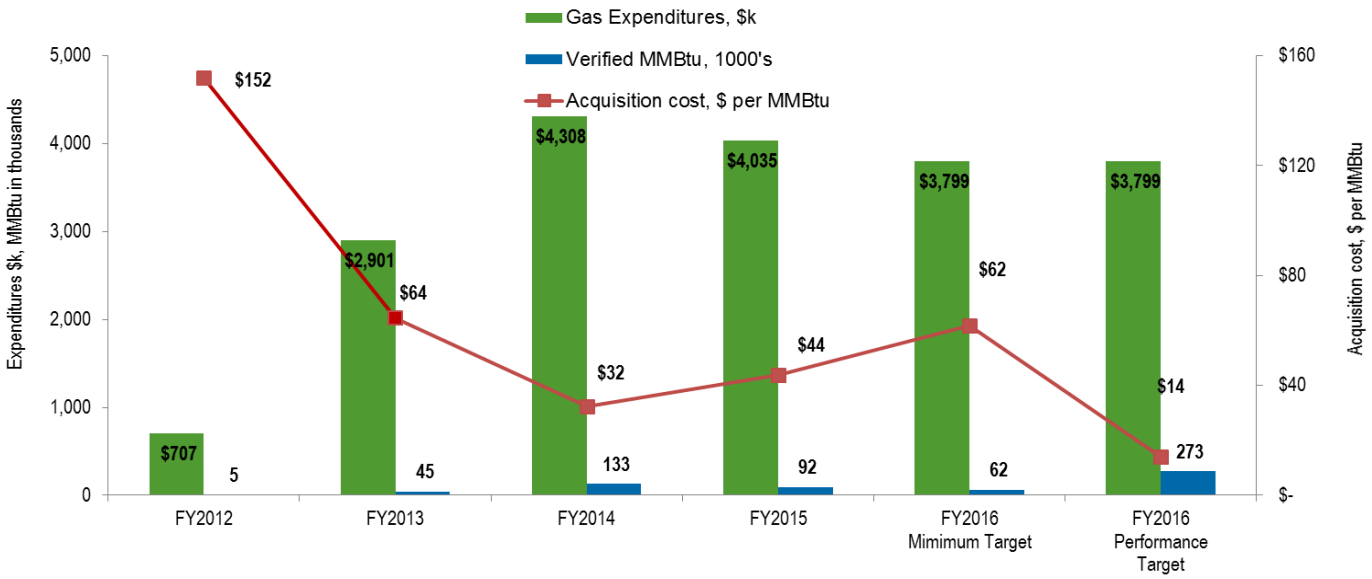
FY2016 projections indicate that with the current budget and the current targets, gas acquisition cost could increase roughly 40 percent while still obtaining the minimum MMBTu target, and to reach the maximum performance benchmark target the acquisition cost would have to significantly decrease (68%) from the FY2015 level. This projection assumes that the DCSEU spends the same proportion of its allocated budget on gas-saving measures, which accounted for 26 percent of expenditures in FY2015.

Table 2-4. Portfolio Level DCSEU Acquisition Costs per MMBTu for FY2012 through FY2015

Fiscal Year	DCSEU Acquisition Cost $/MMBtu
FY2012	$152
FY2013	$64
FY2014	$32
FY2015	$44

[21] *An Empirical Model for Predicting Electric Energy Efficiency Resource Acquisition Costs in North America: Analysis and Application,* John Plunkett, Theodore Love, and Francis Wyatt, Green Energy Economics Group, Inc., Summer 2012. http://www.aceee.org/files/proceedings/2012/data/papers/0193-000170.pdf.
[22] Maggie Molina, Report Number U1402, March 2014, http://aceee.org/research-report/u1402.
[23] Excludes renewable energy expenditures and associated MMBtu energy savings.
[24] Maggie Molina, Report Number U1402, March 2014, http://aceee.org/research-report/u1402.

Figure 2-2. Total Gas Saving Acquisition Costs: FY12, FY13, FY14 Actual and FY2015 Budget [25]



2.5.3 Conclusion

From FY2012 through FY2014, DCSEU drove down acquisition costs for three consecutive years of implementation. In FY2015, that trend shifted to an increase in acquisition costs for both MMBtu and MWh. However, this is in line with data from other neighboring states and national studies that suggest that more mature programs experience a rise in acquisition cost. This could be due, in part, to providing more comprehensive program offerings that move beyond lighting, targeting harder to reach customers and working to meet competing performance benchmark targets. In addition, increasing federal standards for major measures such as lighting and HVAC mean initiatives have to move to promoting even higher efficiency levels of equipment.

The FY2016 projections show that on the electric side it will take some cost-cutting efforts to meet the minimum performance benchmark target. The maximum targets for both gas and electric, however, seem to be out of reach with the current budgets especially since acquisition cost trends may not continue to decrease as seen in earlier program years. The acquisition cost for each fuel would have to significantly be reduced to meet the maximum targets as they are currently set; electric acquisition costs would need to be reduced by more than half the FY2015 costs and the gas acquisitions cost would need to be reduced by more

[25] Expenditures are from the "DCSEU FY'15 Gas Electric Split_corrected.xlsx" file provided by DCSEU. These expenditures exclude spending on renewable energy initiatives. Savings are verified MWh/MMBtu as reported in the portfolio evaluation reports. The FY2016 budget was provided by DOEE and verified by DCSEU. DCSEU provided the FY2016 renewable budget.

than two thirds. Even with cost-cutting efforts the level of reduction appears to be unrealistic. Program design or delivery changes could address some of the discrepancy between FY2015 actual acquisition costs and those needed to achieve FY2016 targets. This could also warrant additional funding considerations to achieve the maximum performance benchmark targets or it may mean that the targets may require ongoing review.

3. INCREASE RENEWABLE ENERGY GENERATING CAPACITY IN THE DISTRICT OF COLUMBIA (CAEA §201(D)(2))

3.1 DESCRIPTION

The DCSEU contract provides a performance benchmark for the increase of renewable energy generating capacity in the District of Columbia that is described as follows:

> *"The Contractor shall design and implement a cost-effective renewable energy program(s) for installations of renewable energy within the borders of the District. Beginning in Year 3 of the SEU contract, the Contractor shall receive 50% of the compensation at risk allocated for this benchmark for a 10% decrease in $/kWh of the first year of energy production of renewable energy installations incentivized by the renewable energy program(s), compared to the $/kWh for the previous year (energy production from non-electricity producing renewable energy calculations shall be converted to kWh). For every 5% decrease in $/kWh beyond the initial 10% reduction, the Contractor shall receive an additional 25% of the incentive allocated to this benchmark."*[26]

Beginning in option year two, (contract modification MO5) a Penalty Scheme was also put in place if the SEU fails to achieve 8 percent (50 percent penalty) and 4 percent (100 percent penalty) decrease in the cost of installation (expensed in $/kWh) incentive by the programs compared to $/kWh for the previous year.

3.2 VERIFIED RESULTS

DCSEU achieved its minimum performance benchmark target (highlighted in yellow), as there was a 14 percent cost reduction ($/kWh) in renewable energy installations in FY2015 compared to the cost in FY2014. DCSEU did not, however, meet the maximum performance target.

Table 3-1. FY2015 Renewable Energy Generation Capacity Cost Results Summary

Metric	Maximum Performance Target	Minimum Performance Target	FY2015 Reported	FY2015 Verified	Maximum Performance Target Achieved	Minimum Performance Target Achieved
Cost per kWh reduction from FY2014	20%	10%	23% cost reduction [27]	14% cost reduction	No	Yes

[26] Contract Number DDOE-2010-SEU-0001, Attachment J.1, page 56.
[27] Per FY2015 Annual Report—23 percent reduction in price per kWh, page 33.

3.3 EVALUATION AND VERIFICATION APPROACH

The DCSEU offered two renewable energy measures in FY2015—photovoltaic (PV) rooftop panels and solar thermal hot water systems—and installed a program high of 149 renewable energy projects this program year. Solar installations took place in multiple initiative tracks this year. The first track, 7107PV, primarily targets low-income single-family housing but also serves some multifamily facilities. Within this past fiscal year, DCSEU and DOEE worked together to put the Solar Advantage Plus Program (SAPP) in place in the District. This initiative ultimately claimed 139 low-income installations by September 30, 2015.[28] The solar thermal track (7110SHOT) targets solar domestic hot water systems in low-income multifamily buildings and commercial and institutional facilities with high hot water demand and is designed to replace existing inefficient hot water heating systems. Finally, in FY2015 DCSEU added the 7101PVMR track that provides both of these renewable energy technologies to market rate customers.

The impact of the SAPP initiative was apparent in the savings in FY2015. In FY2014, the solar thermal track comprised 63 percent of the renewable energy savings, but the program saw a change in its renewable energy installation mix in FY2015. In FY2015, the solar thermal track made up just 27 percent of the renewable energy savings, while 73 percent of the renewable energy savings—a majority of which are electric savings—came from the PV and PVMR programs, respectively. The solar thermal initiative contributes primarily to natural gas savings, while the solar PV initiative contributes to electric savings. As mandated by the contract, the MMBtu savings within the solar thermal and the PVMR tracks were converted to kWh to calculate a total acquisition cost across all renewable initiatives. The budget for PVMR and PV were combined in FY2015; therefore, it was not possible to report acquisition costs separately for each track as had been done in past years.

To verify the progress made towards meeting this performance benchmark, the evaluation team developed FY2015 acquisition costs for all renewable energy initiatives by dividing the total renewable initiative expenditures by the kWh savings. The resulting acquisition cost was compared to FY2014 to determine the percent change. The initiative costs where obtained from the financial summary files received from the DCSEU for FY2015 titled “DCSEU FY’15 Gas Electric Split corrected” and for FY2014 “Electric Gas Split FY2014”. These files provided the administrative costs overall and the direct spend costs per track as defined by the DCSEU. The administrative costs were allocated to the track based on the percent direct spend of each track and the total track costs were derived by adding the direct spend to the allocated administrative cost. For the evaluation of the benchmark, the evaluation team assumed that the total costs (administrative cost allocation plus the direct spend) was to be used for the acquisition cost assessment, as acquisition cost assessments typically include all costs.

Next, the verified MMBtu savings values for the solar hot water measures were converted to kWh per the following conversion:

[28] Per 2015 Annual Report, page 15.

1 MMBtu = 293.3 kWh[29]

After totaling the two measures' kWh savings and total costs, the renewable acquisition cost per kWh was calculated as:

Renewable acquisition costs per kWh = Total renewable cost / by renewable kWh

The change from FY2014 to FY2015 was calculated both with and without administrative costs.

Table 3-2. Renewable Energy Initiatives Acquisition Cost per kWh (with administrative cost allocation)

Fiscal Year	kWh	Expenditures	Acquisition Cost
2014[30]	1,508,651	$2,352,492	$1.56
2015[31]	1,620,455	$2,174,475	$1.34
Change FY2014 to FY2015	7%	-8%	-14%

Table 3-3. Renewable Energy Initiatives Acquisition Cost per kWh (without administrative cost allocation)

Fiscal Year	kWh	Expenditures	Acquisition Cost
2014[32]	1,508,651	$1,689,138	$1.12
2015[33]	1,620,455	$1,405,276	$0.87
Change FY2014 to FY2015	7%	-17%	-23%

3.4 PERFORMANCE BENCHMARK ASSESSMENT

3.4.1 Background

In FY2012, the DCSEU was tasked with delivering a cost-effective renewable program within the District. The DCSEU offered the Solar PV initiative, a solar photovoltaic rooftop offering that targeted low-income housing. The FY2012 cost-effectiveness result for this effort was

[29] 1 kilowatt hour = 3,412 Btu, or 1 Btu = 0.0002933, and 1 MMBtu = 0.0002933 kWh * 1,000,000 = 293.3 kWh; source: http://www.eia.gov/energyexplained/index.cfm?page=about_btu, accessed on April 1, 2016.
[30] Source: file provide by DCSEU titled "Electric Gas Split FY2014, DCSEU Cost Breakdown FY14' worksheet", cells L13 and L14.
[31] Source: file provide by DCSEU titled "DCSEU FY15' Gas Electric Split _corrected", cells K2 plus K3.
[32] Source: file provide by DCSEU titled "Electric Gas Split FY'2014", DCSEU Cost Breakdown FY14' worksheet", cells E13 and E14.
[33] Source: file provide by DCSEU titled "DCSEU FY15' Gas Electric Split _corrected", cells I2 plus I3.

0.82. Beginning in FY2013, the DCSEU offered an additional measure, solar thermal hot water systems, and that measure continued to be offered within DCSEU's renewable energy portfolio in FY2015. A track specific review of the individual renewable energy technologies could not be calculated for each initiative in FY2015 because (1) program costs (expenditures) for renewable tracks 7107PV and 7101PVMR were comingled this year and (2) the PVMR track is not exclusively one renewable energy technology—it includes both gas (Solar Thermal) and electric (PV) project types.

3.4.2 Assessment

The FY2015 renewable energy resource acquisition cost per kWh reduction of 14 percent from the FY2014, was driven by both an increase in kWh savings and a decrease in total expenditures.

3.4.3 Conclusion

While the solar PV and solar thermal installation costs are largely outside of the DCSEU's control, other components of the initiative's expenditures (e.g. administrative costs and incentives) may offer further opportunity to reduce acquisition costs depending on the market and the customers' receptivity. For future tracking, the expenses associated with the market rate initiatives (7101PVMR) should be broken out from the 7107PV expenditures. The market rate efforts for PV and solar thermal technologies should also be tracked separately; right now they are combined under the 7101PVMR which is misleading.

4. REDUCE GROWTH OF PEAK DEMAND IN THE DISTRICT OF COLUMBIA (CAEA §201(D)(3))

4.1 DESCRIPTION

The DCSEU contract provides a performance benchmark for the growth reduction of peak demand (MkW) in the District of Columbia that is described as follows:

> *"The SEU is not required to undertake any programs aimed exclusively at reducing the growth of peak demand. However, the SEU is required to estimate, using protocols developed by PJM for evaluating the capacity effects of energy efficiency projects for base residual auction, the impact on peak demand of its energy efficiency programs. The forecast increase in electric demand in the District between July 2010 and July 2011 is 40.8 MW."*[34] The minimum performance benchmark is 2 MW, or 2,000 kW.

4.2 VERIFIED RESULTS

DCSEU achieved the minimum performance target for the benchmark (highlighted in yellow) for peak demand reduction. DCSEU did not, however, meet the maximum performance target.

Table 4-1. Peak Demand Reduction Results Summary—FY2015

Metric	Maximum Performance Target (kW)	Minimum Target (kW)	FY2015 Reported (kW)[35]	FY2015 Verified (kW)[36]	Maximum Performance Target Achieved (%)	Minimum Performance Target Achieved (%)
Reduce growth in peak demand (kW)	20,000	2,000	6,667	7,950	No (40%)	Yes (398%)

The evaluation team's verified, or ex-post, results for the overall portfolio are presented in the table above. These results reflect a realization rate estimate of 1.19 for kW. This means that the evaluation team estimates that the verified portfolio electric demand reduction result is 7,950 kW, or 119 percent of the DCSEU final dataset (KITT) demand reduction of 6,667 kW.

[34] Contract Number DDOE-2010-SEU-0001, Amendment/Modification No. M07.
[35] End of year reporting of net savings by the DCSEU.
[36] FY2015 Verified kW is utilizing generator-level kW ex-post savings.

4.3 EVALUATION AND VERIFICATION APPROACH

To assess this benchmark, the independent evaluator verified the demand reductions associated with the energy efficiency and renewable programs within the DCSEU portfolio and for the portfolio as a whole as described in the *Department of Energy and Environment Energy Efficiency Evaluation Plans for Portfolio of Programs Offered in the District of Columbia.* Verified results for each program and portfolio as a whole are reported in the *Department of Energy and Environment Evaluation, Measurement, and Verification of Energy Efficiency and Renewable Energy Programs in the District of Columbia FY2015 Annual Evaluation Report, Volume I*.

4.4 PERFORMANCE BENCHMARK ASSESSMENT

4.4.1 Background

The DCSEU is not required to implement demand reduction specific programs and relies on the associated demand reduction component of the electric energy reduction initiatives to contribute to this target. Modifications to this year's contract[37] provides further guidance for how the DCSEU can now bid energy resources into the PJM market.

Pepco offers demand response programs that focus on temporary demand reduction and have the ability to utilize metered data using Advanced Metering Infrastructure (AMI) or "smart meters" as a strategy to reduce demand. Pepco, however, does not share electric usage data with the DCSEU nor does it provide DCSEU access to its AMI and electric infrastructure, limiting DCSEU's ability to offer these types of programs.

In FY2015, the DCSEU began selling energy efficiency (kW reduction) resources in the PJM Capacity Market with the assistance of an aggregator "Encentiv Energy". While DCSEU was only able to bid a select portion of its portfolio into the market, DCSEU reports that an estimated $141,000 in total revenue was generated in FY2015. DOEE will receive this revenue in four equal installments and the financial holding structure is currently being established. DCSEU will reinvest these funds back into DCSEU's initiatives and activities. Since the process is new and the logistics are still being work out with legal representatives of all the parties involved (Encentiv Energy, DCSEU/VEIC, and DOEE), DOEE will validate the resource sale and program revenue in the near term. DCSEU is planning to bid a total of 2,261 kW for initial delivery into the PJM Capacity Market auction in May of 2016. This is in addition to the 6,679 kW that was accepted last year.

4.4.2 Assessment

Similar to last year, Tetra Tech is not aware of any DCSEU-specific initiatives that have the specific intent of reducing demand savings. The reported savings result from the installation of electric savings measures and the associated reduction in demand. While there may be opportunity for DCSEU to achieve additional savings by working cooperatively with Pepco to

[37] Contract Number DDOE-2010-SEU-0001, Amendment /Modification No. M09.

receive or review data collected through the recent installation of advanced metering infrastructure, this is not currently happening.

Demand reduction initiatives that yield energy resource savings also create more opportunity for DCSEU to sell available resources into the PJM Capacity Market, which generates revenues that are reinvested back into the into DCSEU's initiatives and activities. The energy demand resources being sold into the PJM, total revenue generated, and net revenue being reinvested back into the DCSEU will be reviewed as part of FY2016 performance benchmarking verification process.

4.4.3 Conclusion

Tetra Tech confirms that DCSEU exceeded their minimum peak demand reduction target in FY2015. Further, the DCSEU crossed a threshold this year with its sale of demand resources resulting from energy efficiency projects into the PJM Capacity Market. There may be opportunities to coordinate the evaluation required to bid resources into the PJM market with the initiative level evaluation to help leverage resources and keep down costs.

5. IMPROVE THE ENERGY EFFICIENCY OF LOW-INCOME HOUSING IN THE DISTRICT OF COLUMBIA (CAEA §201(D)(4))

5.1 DESCRIPTION

The DCSEU contract provides a performance benchmark to improve the energy efficiency of low–income housing that is described as follows:

> *"On an annual basis, a minimum of 30 percent of the SETF funds expended by the SEU shall be dedicated to improving the energy efficiency of low-income housing in all eight wards of the District. Programmatic, administrative, evaluation, and other expenses of the SEU for all of its programs shall be included in the denominator (the SEU's total expenditures) but not the numerator (the amount spent on low-income programs)"*[38]

> *" Low-Income Households are defined as households with incomes that are at or below the greater of either 200% of Federal Poverty Level or 60% of Area Median Income (AMI). For buildings with more than 200 units, services to low-income multifamily housing shall include projects in which at least 50% of units are at or below this income threshold; for buildings with fewer than 200 units, services shall include projects in which at least 66% of units are at or below this income threshold. The threshold is based on: (1) existing tenant incomes, or(2)established contracts with feral or municipal agencies or departments, or (3) established and documented rent levels that are at or below 30% of that level (that is, affordable to a household at or below the income threshold, with housing expenses being no more than 30% of income.)"*[39]

5.2 VERIFIED RESULTS

As seen in Table 5-1, the evaluation team's verified low-income spend sum confirms that DCSEU's low-income spend for FY2015 exceeded both the minimum and the maximum performance targets for this benchmark.

Table 5-1. Low-Income Housing Results Summary—FY2015

Metric	Maximum Performance Target	Minimum Performance Target	FY2015 Reported	FY2015 Verified	Maximum Performance Target Achieved (%)	Minimum Performance Target Achieved (%)
Improve energy efficiency in low-income housing: (30% spend ($))	$5,280,000	$3,520,000	$5,569,636	$5,456,699	Yes (103%)	Yes (155%)

[38] DCSEU Contract, page 57.
[39] Contract modification M003, page 2.

Table 5-2 provides a summary list of low-income spending by track and a track level verification of low-income dollars spent towards this benchmark. In summary, the evaluation team calculated minor spend adjustments to the Income Qualified Home Performance (7401FHLB) and Solar Photovoltaic (7107PV) tracks due to three (3) total cases of insufficient income-qualification documentation based on its desk review of project documentation. The details of the activity results are found below.

Table 5-2. Low-Income Spend—Actual vs. Adjusted—FY2015

Track	Track Description	Actual (Direct) Spend	Adjustment Needed?	Adjusted Spend
7612LICP	LIMF Comprehensive	$711,996.42	N	$711,996.42
7610ICDI,7610LICP	LIMF Direct Install	$2,339,358.46	N	$2,339,358.46
7710FBNK	Efficient Products: Food Bank Lighting	$188,507.61	N	$188,507.61
7401FHLB	Income Qualified Home Performance	$410,887.29	Y	$352,211.96
7110SHOT	LIMF Solar Hot Water	$281,402.99	N	$281,402.99
7107PV	Solar Photovoltaic	$1,637,482.83	Y	$1,583,221.80
Total		**$5,569,635.60**		**$5,456,699.23**

5.3 EVALUATION AND VERIFICATION APPROACH

The evaluation team reviewed track level spending on low-income projects, as well as project files from a sample of low-income projects to verify the total amount which DCSEU reported spending on improving the energy efficiency of low-income housing. The review also validated that the customers receiving the services in fact qualified as low-income. The documents and data were reviewed to verify that the DCSEU met or exceeded the performance target for the low-income performance benchmark of at least 30 percent of their monetary spend going towards low-income qualified projects. For FY2015, there were seven (7) tracks that included low-income projects (five (5) low-income tracks, and two (2) renewables tracks). The full breakdown includes Low Income Multifamily Comprehensive (7612LICP), Low Income Multifamily Direct Install and Low Income Custom Projects (7610ICDI, 7610LICP), Efficient Products: Food Bank Lighting (7710FBNK), Income Qualified Home Performance (7401FHLB), LIMF Solar Hot Water (7110SHOT), and Solar Photovoltaic (7107PV). In FY2015, the Solar PV initiative (7107PV) was eligible to contribute to this performance benchmark.

The evaluation team reviewed track-level low-income spending by examining a summary-level financial document provided by DCSEU the “DCSEU FY15 Gas-Electric Split-corrected”. This document summarizes project spending for each track including: program costs, administrative costs, incentive dollars, and low-income spend. With this document, the evaluation team verified the total dollars spent towards low-income by examining where funds were allocated among and within program tracks.

The evaluation team then conducted a detailed desk review of all low-income projects that had been sampled as part of the impact evaluation; this included a sample of projects for each track counting towards this performance benchmark, except “Efficient Products: Food

Bank Lighting (7710FBNK)". This exception was made because documentation for this track was not available as income eligibility is verified by Food Bank staff during food and DCSEU lighting distribution events. By examining the project files, we determined (1) whether projects were accurately classified as low-income projects, as defined by the DOEE, and (2) whether the projects had sufficient documentation to indicate that they were completed. During the desk review, the evaluation team also noted opportunities for process improvements.

In order to verify low-income status, the evaluation team followed the low-income verification process of DCSEU. For this process, DCSEU provided a reference document (DCSEU Low Income Programs – LI Verification QA Procedures - 012215), which is used to verify the income status of customers in order to qualify for the low-income programs. This document clearly sets out the procedures DCSEU follows to verify the status. The evaluation team notes that the documents listed as qualifying income documents in this file are different from those listed on other FY2015 program documents such as customer applications. The evaluation team also notes that the income levels in this guidance document were not updated for FY2015. During their verification, the evaluation team used the 2015 HUD poverty guidelines to verify income eligibility.

Properties are eligible within the low-income tracks when at least 66 percent of the residential units per building are designated for, or inhabited by, households with incomes at or below 60 percent Area Median Income. Properties with 200 or more units have slightly different eligibility; they become eligible when at least 50 percent of the residential units are at that Median Income level. Likewise, households are considered low-income if their income is at or below 60 percent of state median income, or 200 percent of federal poverty level, whichever is higher. Moreover, buildings not meeting requirements but with sufficient numbers of low-income residents may qualify for low-income funds as special cases reviewed and approved by DOEE. The evaluation team checked for low-income status reported on the application or other materials as well as for supporting documents. Projects were considered to have low-income status verified if they had an indication of their low-income eligibility.

In order to ensure sufficient information in project files to indicate project completion, the evaluation team looked for certain key pieces of documentation—an application, income eligibility documentation with supporting documents, an inspection or QAQC form, a check copy or check request from DCSEU, and a contractor invoice. Having the majority of these documents indicated to the evaluation team that the project had been completed and that the low-income money spent had supported a low-income project.

5.4 VERIFICATION RESULT—DETAILS

Table 5-3 provides a summary of the activities and results of the desk review. A total of 75 projects were sampled across six of the seven tracks eligible to contribute towards this performance benchmark.

Table 5-3. Low-Income Track Desk Review Summary for Performance Benchmark Assessment—FY2015

Track	Project Files Reviewed (n)	Application Available	Income Eligibility Documentation	Inspection/ QAQC Form Available	Check and/or Check Request	Contractor Invoice
7610ICDI	35	35	34	33	33	35
7610LICP	2	2	1	2	2	1
7612LICP	3	3	3	3	3	0
7401FHLB	5	5	4	5	0	5
7110SHOT	5	5	4	5	5	4
7710FBNK	0	Not applicable	Assumed verified through partnering food banks; documentation not available	Not applicable	Not applicable	Not applicable
7107PV	25	25	23	25	25	20
Total	75	75	69	73	70	65

For those projects with all pertinent documents available, there were no issues found related to income eligibility—that is, all projects passed the income cutoffs as defined by HUD. However, three of 75 reviewed projects (4 percent) were missing documentation to support their income eligibility. The evaluation team extrapolated that missing documentation rate within their desk review sample to their calculations to the total low-income program spend. We adjusted the spend downward to account for the rate of projects that are likely, based on our sample desk reviews, to have missing or unclear supporting income-qualification documentation. This resulted in Tetra Tech verifying a Low-Income program spend of $5,456,699, or 97 percent of the program-reported spend of $5,569,636.

All of the tracks had good records and documentation to indicate project completion and the appropriate use of low-income funds. Seventy-three of the projects had inspection or QA/QC reports indicating project completion and 70 had either checks or check requests. Moreover, the largest track—7610ICDI—had nearly perfect documentation availability. While the documentation levels of the projects included in this performance benchmark were adequate, the project files were disorganized. Each project file contained a logical and uniform (among tracks) system of sub-folders in it; however, the project files were often not contained in their relevant folders.

5.5 PROCESS RECOMMENDATIONS

The evaluation team has the following recommendations:

- Ensure project files are properly filed under the overarching file structure. This will be beneficial for both long-term project documentation and future evaluations.

- Update the low-income verification process document (DCSEU Low Income Programs – LI Verification QA Procedures – 012215) each year to ensure accurate HUD income levels are reflected.
- Update program documents to ensure all forms of accepted income documentation (as listed in DCSEU's process document) are also listed on customer documents, such as applications.

5.6 PERFORMANCE BENCHMARK ASSESSMENT

5.6.1 Background

This benchmark has not changed over the contracting period's inception; however, the eligibility of initiatives that count toward this benchmark has changed. For FY2014, the spending analysis included all low-income nonrenewable-specific initiatives plus the Solar Hot Water (7110SHOT) initiative but did not include the Solar PV spending. The reason for this is that the performance benchmark was specific to energy efficiency measures rather than renewable generation. The law was changed, however, to included Solar Photovoltaic (7107PV) initiative costs into the analysis starting in FY2015.

5.6.2 Assessment

A. Acquisition cost review and cost-effectiveness assessment

The FY2015 low-income acquisition costs were $852 per MWh including renewable energy projects or $728 per MWh without renewable energy projects. The low-income initiatives were cost effective at the track level except for the Income Qualified track (7401FHLB). The volume of projects within this track was limited; therefore, reported savings were limited and administrative costs were not diluted by high savings.

5.6.3 Conclusion

DCSEU exceeded its performance target for this benchmark by three percent. The evaluation team continues to recognize, as it did in FY2014, that the DCSEU is tasked with achieving several (and sometimes conflicting) performance benchmarks and contractual obligations requiring close management of the portfolio throughout the year. Additionally, the DCSEU remains committed to serving the low-income population within the District. Thus, it is a challenging undertaking to precisely achieve each and every benchmark and obligation.

6. REDUCE THE GROWTH OF ENERGY DEMAND OF THE DISTRICT OF COLUMBIA'S LARGEST ENERGY USERS (CAEA § 201(D)(5))

6.1 DESCRIPTION

The DCSEU contract provides a performance benchmark to reduce the growth of energy demand of the District's largest energy users that is described as follows:

> *"Beginning in option year 3 of the SEU contract, the contractor shall design and implement energy efficiency program(s) that provide technical and financial assistance that result in at least 50 completed energy efficiency projects. Large energy users are defined as organizations or individuals that own a business, government, or residential building with more than 200,000 square feet of gross floor area or own a campus of buildings in a contiguous geographical area that share building systems or at least one common energy meter without separate metering, or sub-metering, such that their energy use cannot be individually tracked. Gross floor area include infrastructure that contain heated and unheated space that is connected to a qualified building. Energy efficiency or renewable energy measures must be installed in a qualified building or an infrastructure connected to a qualified building in order to qualify as a large energy user project. A completed large energy user project is one in which there is a signed customer agreement and completed and verified energy savings."*[40]

6.2 VERIFIED RESULTS

DCSEU achieved both its minimum and maximum performance target for this benchmark (highlighted in yellow).

Table 6-1. District Largest Energy Users Verification Summary—FY2015

Metric	Maximum Performance Target	Minimum Performance Target	FY2015 Reported	FY2015 Verified	Maximum Performance Target Achieved	Minimum Performance Target Achieved
Reduce growth in energy demand of largest users(# of projects completed with a sq. ft. > 200,000)	50	30	61	52 (85%)	Yes (104%)	Yes (173%)

[40] Contract Number DDOE-2010-SEU-0001, Amendment of Solicitation / Modification of Contract No. M07.

6.2.1 Approach and summary results

The evaluation team performed a number of activities examining several information sources to evaluate and verify this benchmark against the reported largest energy user project counts and the requirements for large energy user projects set forth in the contract and contract amendment.

We first obtained a list from DCSEU of the largest energy user projects—"DCSEU FY2015 Largest Energy Users" (largest user list). The team verified the number of completed projects, checking the largest energy user status of each project and the required documentation needed to be counted as a completed project, as well as the additional tracking requirements for each project. Working with this list, we examined information about projects from three sources—(1) the KITT extract provided by VEIC, (2) project files from those projects sampled as part of the Impact Evaluation, and (3) the DOEE 2013 private building benchmarking dataset (DOEE)[41]. The table below summarizes the FY2015 evaluation activities and results.

[41] http://doee.dc.gov/page/energy-benchmarking-disclosure.

Table 6-2. District Large Energy Users Verification Actions and Result Summary—FY2015

Verifications	Source	Evaluation Activity (contract section)	Number Reviewed	Result
Largest Energy User Opportunities	Source not identified	Verify number of opportunities with large users (1.3.5.1.1)	251 projects	NA
Reported Projects	Largest user list	Verify number of projects completed (1.3.5.1.2)	61 projects	100%
	Largest user list	Verify count of unique properties	45 Users	100%
Largest Energy User Definition	KITT	Count number not missing sq. ft. & number passing sq. ft. requirement in KITT	61 projects	-
	Project files	Count number with clear Indication of sq. ft. in project files & number passing sq. ft. requirement	33 projects	-
	DOEE	Count number passing sq. ft. requirement	61 projects	-
	Overall	Number of projects with any indication of passing sq. ft. requirement	61 projects	85%
Completed Project - Definition for Largest Energy User PB	Project files	Number of Projects with a signed customer agreement	33 projects	94%
	KITT	Number of projects with completed and verified energy savings	61 projects	98%
Additional Tracking Requirements	Project files	1.3.5.1.3 Number of projects with an agreement or MOU which includes scope and cost of each project, dated prior to project completion	33 projects	97%
	KITT	1.3.5.1.4 Number projects with estimated total energy savings (kWh or MMBTU)	61 projects	98%
	KITT	1.3.5.1.5 Number of projects with total project costs	61 projects	98%
	Project files	1.3.5.1.6 Number of customers with energy management history documented	33 projects	6%
	Project files	1.3.5.1.7 Number of federal or district owned buildings designation not-missing	33 projects	64%

Below we describe the processes of these activities.

A. Number of opportunities with largest energy users (1.3.5.1.1)

DCSEU tracks opportunities with largest energy users in KITT, using information provided by the customer and verified using outside information such as the DC Private Building Benchmarking project. The evaluation team recommends that DCSEU continue tracking opportunities with largest users in KITT for FY2016 to aid in the verification of this performance benchmark and help the DCSEU program staff understand how many opportunities are converted to completed projects.

B. Verification of the number of completed projects (1.3.5.1.2)

The evaluation team identified the number of completed projects by examining the largest user list. The evaluation team also ensured that each project was present in KITT. During this process, the evaluation team also noted the number of unique customers.

C. Verification of largest energy user status

Largest energy users are broadly defined as those users who have buildings that are larger than 200,000 sq. ft.; the precise contractual definition may be found at the top of this section. The evaluation team verified the gross square footage of a user in three different ways—(1) examining the square footage associated with the project in KITT, (2) examining the project files for any record of square footage, and (3) looking up the square footage of the property in DOEE provided Benchmarking data. If any one of these sources recorded a square footage of greater than 200,000, then the project was considered to have passed the requirement to be a largest energy user.

D. Verification of completed project documentation status

A completed energy project is defined by a "signed customer agreement and completed and verified energy savings." The evaluation team examined the project files of the 33 projects sampled for the impact evaluation to determine whether there was a signed customer agreement. Additionally, the evaluation team examined the energy savings of each of the projects as listed in KITT; having either gas or electric savings defined a project as having energy savings tracked.

E. Additional tracking requirements

> *1.3.5.1.3 The Scope of each project and the dollar amount provided by the SEU is documented in a properly executed incentive agreement or memorandum of understanding prior the completion date of the project.*

For the 33 projects sampled for the impact evaluation, the evaluation team examined the project files to determine if the document fulfilling the above requirements was present.

> *1.3.5.1.4 The estimated annual amount of natural gas and electricity savings for each project.*

For all 61 projects, the evaluation team looked at whether there was an associated gas and electricity savings in KITT for the project. The presence of either one counted towards passing.

1.3.5.1.5 Total project cost.

For all 61 projects, the evaluation team looked to see whether a total project cost was listed in KITT.

1.3.5.1.6 Project notes including summary of energy management history including energy services companies ("ESCO") or performance contracting used by the owner.

For the 33 projects sampled for the impact evaluation, the evaluation team examined the project files to determine whether there were notes or other documentation of energy management history.

1.3.5.1.7 Identification of federal and district governments owned buildings completed.

For the 33 projects sampled for the impact evaluation, the evaluation team examined the application, contract, or other formal document which included a question to see if a building was federally or district owned to determine whether that question was answered. DCSEU had also informed the evaluation team that building type could be tracked in KITT by examining the description variable in the building type table; however, this variable did not appear to be fully filled-out and did not identify any non-commercial ("Commercial, unspecified") buildings, which seemed to be the default for the field.

6.2.2 Detailed results

The detailed results of the evaluation and verification activities are listed by track in the tables below. Table 6-3 presents the count of completed projects, the verification of those projects as largest energy user projects, and the verification of the required documents for completed projects.

Table 6-3. Detailed Summary of Completed Project Verification—FY2015

	Project and Customer Counts			Large Energy User Verification (Number of Projects)								Completed Project Verification (Number of Projects)	
				Verified all completed projects				Verified projects sampled for impact		Verified all completed projects		Verified projects sampled for impact	Verified all completed projects
	DCSEU Largest Energy User List		Impact Sample	KITT		DOEE		Project Files		Overall		Project Files	KITT
Track	Number of unique customers	Number of projects completed (Tracking Requirement 1.3.5.1.2)	Number of projects sampled for impact	Sq. footage >200,000	Have sq. footage	Sq. footage >200,000	Have sq. footage	Sq. footage >200,000	Have sq. footage	Sq. footage >200,000, any source	Have sq. footage, any source	Signed customer agreement	Completed and verified energy savings
7101PVMR	2	2	2	1	1	0	0	0	0	1	1	2	2
7511CIRX	27	32	12	28	29	19	20	7	10	29	30	10	32
7512MTV	1	2	2	0	0	0	1	0	0	0	1	2	2
7520CUST	16	20	14	17	18	12	12	1	1	17	18	14	20
7520MARO	3	3	3	3	3	1	1	0	0	3	3	3	3
7610LICP	1	1	0	1	1	1	1	0	0	1	1	0	1
7612LICP	1	1	0	1	1	0	0	0	0	1	1	0	1
All Projects	45*	61	33	51	53	33	35	8	11	52	55	31	60
Pass Rate	-	100%	-	-	-	-	-	-	-	85%	90%	94%	100%

*Note: Count does not equal column sum as some customers had projects in multiple tracks.

Among 61 projects, there were 45 unique customers. Eighty-five percent of projects had a documented square footage of greater than 200,000 sq. ft. Three projects (5 percent) had a documented square footage from at least one source, but all the documented square footage numbers were less than 200,000 sq. ft. Additionally, five projects (10 percent) did not have any documented square footage. Moreover, when the evaluation team compared the projects in the project list to projects that met the square footage requirement in KITT, we found 51 additional projects meeting the requirement that were unclaimed by DCSEU.

All sampled projects had signed customer agreements in their project files except the 7511CIRX track, where just 83 percent of reviewed projects had signed customer agreements. All projects had energy savings recorded in KITT. Because largest energy users are defined by their square footage, improvements in tracking this metric in both KITT and project files will improve the verification of this performance benchmark for FY2016.

Table 6-4. Detailed Summary of Tracking Requirements Verification—FY2015

	Source: Project Files from Impact Evaluation Sample				Source: KITT				
Track	Number of projects verified	Number of projects with an agreement or MOU that includes scope and cost of each project, dated prior to project completion (1.3.5.1.3)	Number of customers with energy management history documented (1.3.5.1.6)	Number of federal or district owned buildings designation not-missing (1.3.5.1.7)	Number of projects verified	Number of projects with estimated total energy savings (kWh) (1.3.5.1.4)	Number of projects with estimated total energy savings (MMBTU) (1.3.5.1.4)	Number of projects with estimated total energy savings - gas or electric (1.3.5.1.4)	Number of projects with total project costs (1.3.5.1.5)
7101PVMR	2	2	0	0	2	2	1	2	2
7511CIRX	12	12	1	9	32	32	23	32	32
7512MTV	2	1	0	0	2	2	2	2	2
7520CUST	14	14	1	10	20	19	6	19	19
7520MARO	3	3	0	2	3	2	2	3	3
7610LICP	0	0	0	0	1	1	0	1	1
7612LICP	0	0	0	0	1	1	1	1	1
All Projects	33	32	2	21	61	59	35	60	60
Verification Rate	**-**	**97%**	**6%**	**64%**	**-**	**-**	**-**	**98%**	**98%**

In addition to verifying the completed projects, the evaluation team verified five additional tracking requirements. Three were verified by examining the project files for 33 sampled projects. Of these, all but one (97 percent) of the projects had an agreement or MOU with the appropriately documented information. However, only two projects had a documented energy management history, although ten more had energy usage history in their archived utility bills. Twenty-one projects (64 percent) included a designation of ownership in the project files, while the remainder were not included on the application. Three projects (9 percent) reported the facility was owned by the district or federal government. The evaluation team encourages the collection of energy management histories for FY2016 and encourages DCSEU to ensure that applications are properly and entirely filled out.

Two information needs, total energy savings and total project costs, were verified by examining the KITT extract. For both data points, all projects had the required information.

Completeness of documentation varied by project. Only 1 project out of the 33 sampled for detailed desk reviews passed all requirements. Just as in FY2014, the evaluation team still believes that the interpretation of energy management system history criteria can vary and recommends a 100 percent verification rate. The evaluation team believes that while only 64 percent of projects actually had designations of public or private ownership, many projects missing that piece of information are probably commercial buildings based on other project information; in that light, the evaluation team recommends a 100 percent verification rate for this metric for FY2015. Overall, the evaluation team recommends a verification rate of 85 percent based on the 15 percent of buildings that have no indication of square footage greater than 200,000 among three different sources checked.

6.3 PERFORMANCE BENCHMARK ASSESSMENT

6.3.1 Background

The DCSEU does not have access to District-wide utility billing data to identify the largest energy users, so a proxy metric is required. The current metric was established in September 2014, under Contract Amendment/Modification No. M07. This benchmark was based on the first set of buildings that had to report energy benchmarking data to DOEE under the Energy Benchmarking Program (as laid out in D.C. Code § 6-1451.03(c)(2)(D) and 20 DCMR 3513). The set of buildings covered by the benchmarking program has since been expanded to include all buildings over 50,000 gross square feet. Data collected through this program is shared with DOEE for program design and lead generation.

6.3.2 Assessment

The evaluation team recommends assessing whether defining buildings greater than 200,000 sq. ft. as the largest energy users is still the best metric. Additionally, the evaluation team suggests clarifying what defines an energy management history, so that it can be more accurately tracked.

6.3.3 Conclusion

The evaluation team recommends better tracking of largest energy users and largest energy user opportunities and projects. A concise method of tracking opportunities with largest energy users in KITT and linking opportunities to square footage will enhance verification of this metric. Ensuring that all completed projects also have documented square footage will further the verification of the performance benchmark. While concerns about the energy management history metric to be tracked are addressed above, the evaluation team also encourages better documentation of federal- and district-owned properties, which will involve ensuring that project applications are fully filled out and that that information is populated in the applicable field in KITT.

7. INCREASE THE NUMBER OF GREEN-COLLAR JOBS IN THE DISTRICT OF COLUMBIA (CAEA § 201 (D)(6))

7.1 DESCRIPTION

The Green-Collar Jobs contract performance benchmark target calls for DCSEU to create a specific number of Green Jobs annually. The target and the metric for measuring the target is described in the FY2015 contract modification as follows:

"The SEU shall ensure that…at least 88 green jobs [are created] in Year 4. The following criteria will be used in the calculations of what constitutes a green job for the purposes of this benchmark:

- A green job or green-collar job is 1 Full Time Equivalent (FTE) job held by a District resident who is paid at least a living wage[42] or a factor of $200,000 of SEU direct cash incentives to end-use customers and/or manufacturers. No distinction is required for new versus retained jobs.
- 1 FTE = 1,950 work-hours and is applied to hours reported by the SEU and its subcontractors.
- SEU direct cash incentives to end-use customers and for upstream/midstream cash incentives to manufacturers to buy down the cost of energy efficiency measures will be used to estimate the number of green jobs created through DCSEU incentive programs.
- Only direct jobs are to be used in the green jobs calculation. Indirect (primarily suppliers to SEU contractors or subcontractors) and induced jobs (derived from a multiplier effect) are not counted."[43, 44]

"*The Contractor shall receive 60% of the compensation at risk allocated for this benchmark in Table 1 for creating 60% of the number of green jobs*."[45] This calculation (88 green jobs *.60) results in a minimum target of 53 green jobs for FY2015.

[42] The Living Wage Act of 2006 is Title I of the "Way to Work Amendment Act of 2006", D.C. Law 16-118 (D.C. Official Code §2-220.01 to .11), which became effective June 8, 2006. See the following cite for details: http://www.does.dc.gov/does/cwp/view,a,1233,q,636800,doesNav,%7C32064%7C.asp.

[43] For a more complete definition of indirect and induced jobs, see Executive Office of the President, Council of Economic Advisors, Estimates of job Creation from the American Recovery and Reinvestment Act of 2009, May 2009, p. 6.

[44] Contract Number DDOE-2010-SEU-0001, Amendment /Modification No. M07.

[45] Contract Number DDOE-2010-SEU-0001, Amendment /Modification No. M07.

7.2 VERIFIED RESULTS

Table 7-1 highlights the FY2015 Green Jobs Benchmarks, and the verified results against those initiative goals. The FY2015 verified green jobs total of 112 jobs exceed the Maximum Performance Target of 88 for the Green Jobs Performance Benchmark. This total was arrived at by adding 71 DOEE-verified FTE green jobs (that earned a living wage) and 41 green job equivalents as calculated in accordance with the DCSEU contract (1 FTE for every $200,000 of DCSEU direct cash incentives to end-use customers or manufactures).

Table 7-1. Green-collar Jobs Summary—FY2015

Metric	Maximum Performance Benchmark	Minimum Performance Benchmark	FY2015 Reported[1]	FY2015 Total Verified Green Job FTEs + Equivalents	FY2015 DOEE Verified Green Job FTEs	FY2015 Green Job Equivalents	Maximum Performance Benchmark Achieved (%)	Minimum Benchmark Achieved (%)
Increase the number of green-collar jobs (FTE or equivalent)	88	53	95	112	71	41	Yes (127%)	Yes (211%)

[1] Source: DC SEU Annual Report FY2015.

7.3 EVALUATION AND VERIFICATION APPROACH

Evaluation of this benchmark in FY2015 involved two distinct approaches. First, DOEE conducted a detailed audit and review of the DCSEU reporting for this benchmark. DOEE appraises DCSEU tracked contractor payroll and hours for FY2015, and converts every 1,950 work-hours to 1 FTE. This year, DOEE verified that DCSEU provided 70.83 green jobs for which a District resident was paid a living wage. Second, the Tetra Tech evaluation team used the total of a) DCSEU direct cash incentives to end-use customers and b) upstream and/or midstream cash incentives to buy down the cost of energy efficiency measures in FY2015 to calculate an estimated number of additional green jobs created through program activity this year. Tetra Tech arrived at a total of $8,218,700[46] in FY2015 program incentives to convert into use in the following green jobs calculation:

Total end-use and manufacturer incentives for FY2015 / *$200,000* = FY2015 Calculated Green Jobs Equivalent

$8,218,700 / $200,000 = 41 calculated green jobs

[46] DC SEU KITT Database, Action Cost Table, accessed on 3/25/16.

7.4 PERFORMANCE BENCHMARK ASSESSMENT

7.4.1 Background

This benchmark exists to measure jobs *directly* created for District residents resulting from the DCSEU's implementation of the DCSEU energy efficiency and renewable energy portfolio. This includes jobs held with the DCSEU and those resulting from others in the District performing work directly associated with the DCSEU portfolio. It excludes indirect jobs—those jobs created in support of direct jobs such as suppliers of energy efficiency equipment—and induced jobs, which are those created due to the economic impact of hired workers spending incomes within the District.

This Performance Benchmark was modified in FY2014 to allow for the inclusion of estimated green job creation based on the "Total dollar amount of DCSEU cash incentives to end-use customers and for upstream/midstream cash incentives to manufacturers to buy down the cost of energy efficient measures."[47] This was done in order to allow DCSEU to estimate and claim some indirect program credit for Green Job creation in the District by expressing jobs as a factor of the direct cash incentives to end-use customers and for upstream/midstream cash incentives to manufactures to buy down the cost of energy efficient measures.

7.4.2 Assessment

This year, Tetra Tech offers a verified Green Jobs result that reflects an estimated growth of green jobs between FY2014[48] and FY2015. The DCSEU continues to work toward a consumer-driven energy efficiency market and most programmatic designs allow for District residents and businesses to select the vendors and contractors of their choice to implement energy efficiency projects. While this limits the directly measurable green jobs created, new renewable energy offerings such as the "Solar Advantage Plus Program" (SAPP) likely supported a measurable increase in renewable energy contractors in the District this year.

7.4.3 Conclusion

The inclusion of "estimated green job creation for cash incentives"—as initiated in FY2014—does not necessarily produce a more reliable estimate of District green jobs created, but it does account for dollars spent outside of the DCSEU control. This method allowed our evaluation team to recognize a portion of the program expenditures that deliver energy and demand savings within our FY2015 Green Jobs assessment, and add the calculated Green Jobs estimate to the DOEE verified Green Jobs that are more directly measurable.

Tetra Tech also acknowledges that DCSEU's SAPP initiative in FY2015 likely led to an increase in actual jobs in the District. Going forward, if DCSEU continues to move toward a market-based programmatic approach, less of the green job creation will be within the control

[47] Contract Number DDOE-2010-SEU-0001, Amendment /Modification No. M07, Article 1.3.6.1.11.
[48] Tetra Tech verified 85 Green Jobs in its FY2014 Performance Benchmarking report.

of the DCSEU—that is, District businesses and households will be driving job creation through their selection of who to hire to implement energy efficient projects and where to purchase energy efficient equipment. While this may lead to less assurance in Green Job creation, it may increase program implementation efficiency and potentially lower energy resource acquisition costs.

8. COST-EFFECTIVENESS ASSESSMENT

The evaluation team conducted a cost-benefit analysis for 11 energy efficiency initiatives sponsored by the DCSEU. The evaluation team performed a Societal Cost Test (SCT) for each program and compared the results to the SCT results provided by the DCSEU.

The DCSEU provided track and portfolio level cost-effectiveness test results for FY2015. The program level results include expenses and savings estimates that were accounted for in the DCSEU KITT database tracking system plus direct costs as tracked in the Deltek system.[49] The portfolio level results include administrative and support costs that were not directly allocated to programs.

8.1 VERIFIED RESULTS

The total societal cost-benefit results for the portfolio ranges from 5.07 to 4.06, which means that the DCSEU continued to operate its initiatives in a very cost effective manner in FY2015. The 4.06 figure represent the fully-loaded assessment which includes the cost of the third-party independent evaluation as well as the effect of the realization rates determined through the evaluation effort and estimated free-ridership and spillover (net-to-gross estimates). For every dollar spent the District realized anywhere from a $5.07 to $4.06 return on its investment.

The variances between the DCSEU's benefit cost model and the evaluation team's model were minimal, especially at the portfolio level with all initiative administrative costs and third party evaluator costs included. Some variability between cost-benefit models is expected, as not all the calculation methods and assumptions between both models can be specifically quantified. The evaluation team notes no significant differences between the cost-benefit ratios calculated in the GDS models versus the DCSEU model.

On a track level, the Income Qualified Home Performance initiative (formerly the Federal Home Loan Bank initiative) and the Home Performance with ENERGY STAR initiative are the only two initiatives that were not cost effective and have not been since the first evaluation in FY2012. This could be, in part, as a result of the incentive levels for Income Qualified Home Performance with incentives up to $6,000 and Home Performance with ENERGY STAR with incentives up to 1,800. Also under the Income Qualified Home Initiative, DCSEU is able to cover up to $1,000 in "health and safety" improvements that help lay the foundation for the installation of the energy measures but in and of themselves do not result in savings. The evaluation team recognizes these initiatives serve a purpose and a market that would not otherwise be served and requires an extra level of support by DCSEU staff. We recommend, however, that a review of each initiatives structure, incentive levels and program approach be conducted to better understand why these initiatives have not been cost effective. Researching other utilities or jurisdictions that provide such programs cost effectively could be an area to explore in the FY2016 evaluation.

[49] KITT tracks information on the people, projects, measures, and associated savings for DCSEU. It is the system of record for tracking energy savings and cost-effectiveness screening data. Deltek tracks financial information such as time, expenses and financial accounting.

The evaluation team has no outstanding issues or recommendations regarding the VEIC cost-effectiveness evaluation procedure.

8.2 SOCIETAL COST TEST ANALYSIS

The evaluation team reviewed four scenarios to compare cost-effectiveness results. The analysis first compares the DCSEU's cost-effectiveness results to the GDS model results (Scenario 1). The analysis then further applies—in a stepwise fashion—other adjustments to see how each impacts the cost-effectiveness results. From the base cost-effectiveness results (Scenario 1), the third-party evaluation costs are added (Scenario 2), realization rates are then applied (Scenario 3), and NTG factors are then applied (Scenario 4). Following is a description of each scenario and the summary of results. Please note the impacts of each scenario are cumulative, i.e., Scenario 4 includes the impacts of all the previous scenarios. In addition, Scenarios 1–4 are all based upon the GDS Benefit Cost Model. The results across all four scenarios are detailed in Table 8-1.

Scenario 1—Comparison of DCSEU *vs. GDS Cost-Effectiveness Results*

This scenario compares the results of the DCSEU cost-effectiveness test versus the results determined using the evaluation team's cost-benefit model. The FY2015 DCSEU benefit cost model classifies one category of cost and benefits differently than the GDS model. The DCSEU model separates the total MMBtu savings from fossil fuels into two categories—cost penalties and benefits savings (referenced in Table 8-1 as DCSEU Original). The evaluation team's model groups the MMBtu savings into one category and nets the penalties and savings as a benefit.

In past FY2012–FY2013 evaluations, the evaluation team recommended that the DCSEU classify fossil fuel savings into the benefit category. The National Action Plan for Energy Efficiency specifies that co-benefits in water, natural gas, fuel oil, etc. be regarded as energy savings benefits. The DCSEU decided against this recommendation and will continue to treat MMBtu savings from fossil fuels as either cost penalties or benefit savings as needed.

To reconcile the classification of MMBtu savings, the evaluation team adjusted the DCSEU benefit cost results to show all MMBtu savings and penalties as a net benefit[50] (referenced in Table 8-1 as "DCSEU adjusted"). The original DCSEU model produced an updated original cost benefit ratio of 4.57 and the adjusted DCSEU model produces a benefit cost ratio of 5.07. This adjusted ratio is comparable to the evaluation team's benefit cost ratio of 5.09.

Scenario 2—Inclusion of Evaluation Costs

The third-party evaluation (Tetra Tech evaluation team) costs for the DCSEU FY2015 (Contract Year FY2016) totaled $657,700 that was not included in either the evaluation team

[50] Per the National Action Plan for Energy Efficiency (NAPEE) guide, the GDS model shows all co-benefits in natural gas as energy savings benefits.

or VEIC benefit cost models results in Scenario 1. In Scenario 2 that evaluation expense amount is added to the cost side of the analysis and is allocated to specific programs based upon direct expense program allocations in the DCSEU benefit cost model. Adding this third-party evaluation expense decreases the overall portfolio benefit cost ratio to 4.98.

Scenario 3—Inclusion of Realization Rates

The evaluation team developed realization rates for each track through the impact evaluation effort. These realization rates were applied to the kWh, kW, and MMBtu savings in the benefit cost model for Scenario 2. The overall impact of incorporating realization rates decreases the benefit cost ratio of the total portfolio to 4.80.

Scenario 4—Inclusion of Net-to-Gross Ratio

The FY2014 net-to-gross ratios (NTGR) were applied to the FY2015 kWh, kW, and MMBtu savings for each initiative track in the benefit cost model for Scenario 3. The overall impact of incorporating NTGR decreases the benefit cost ratio of the total portfolio to 4.06.

The results of these comparisons and scenarios are presented in Table 8-1.

Table 8-1. Societal Cost Test Comparison

Initiative	DCSEU (original)	DCSEU (adjusted)	Scenario 1 Compared to Model	Scenario 2[51] +Evaluation Cost	Scenario 3[52] + RR	Scenario 4[53] +NTG
7107PV Solar Photo Voltaic	1.91	1.91	1.94	1.89	1.89	2.09
7110SHOT Solar Hot Water	1.24	1.24	1.28	1.27	1.27	1.31
7401FHLB Federal Home Loan Bank	0.97	0.97	0.99	0.93	1.02	1.01
7420HPES HOME Performance with ENERGY STAR	0.69	0.70	0.67	0.65	0.80	0.77
7511CIRX Business Energy Rebates	7.95	9.26	10.37	10.01	9.77	9.25
7510MTV T12 Lighting Replacement	5.20	6.26	6.18	5.86	5.53	5.11
7520CUST, 7520MARO, 7520NEWC Commercial Custom	7.45	7.55	7.63	7.49	7.09	6.48
7610ICDI, LICP	5.02	5.72	5.74	5.46	5.47	5.47
7612LICP	4.07	4.28	4.51	4.41	3.56	3.56
7710APPL Appliances, 7710LITE Retail Efficient Products	5.12	7.41	8.17	7.96	8.00	6.66
7710FBNK Retail Lighting Food Bank	2.69	3.58	3.09	2.91	2.90	2.90
Program Total	**5.61**	**6.36**	**6.53**	**6.35**	**6.12**	**5.39**
Portfolio Including Support & Admin	**4.57**	**5.07**	**5.09**	**4.98**	**4.80**	**4.06**

[51] Includes the cost of the third-party independent evaluation conducted by the Tetra Tech evaluation team.
[52] Includes the cost of the third-party independent evaluation and the effect of the realization rates determined through the evaluation effort.
[53] Includes the cost of the third-party independent evaluation, the effect of the realization rates determined through the evaluation effort, and estimated free-ridership and spillover (net-to-gross estimates).

8.3 SOCIETAL COST TEST MODEL, ASSUMPTIONS, AND ADDERS

The Societal Cost Test (SCT) measures the net direct economic impact to the utility service territory, state, or region, plus indirect benefits such as environmental benefits and direct non-energy related customer benefits. Below is a brief description of the benefits and costs included by DCSEU (and hence the evaluation team) to determine the societal cost test results for this analysis.

Table 8-2. Benefits and Costs Included in the DCSEU Societal Cost Test

Benefits	Costs
Avoided Energy Costs Avoided Capacity Costs Avoided Transmission & Distribution Costs Avoided Fossil Fuel Costs Avoided Water Costs Risk Adder (Percent of Electric and Fossil Fuel Avoided cost) Non-Energy Benefits Adder (Percent of Electric and Fossil Fuel Avoided Costs) Avoided Environmental Externality Costs for Electric and Fossil Fuels ($/kWh and $/MMBtu)	Program Administrator Costs Energy Efficiency Measure Cost—Financial Incentives Energy Efficiency Measure Cost—Participant Contribution

8.3.1 Societal Cost Test assumptions

The following table presents the SCT cost-benefit assumptions and sources used by DCSEU for FY2015.

Table 8-3. Societal Cost Test Benefits Assumptions and Sources[54]

Screening Assumption	Value (monetary values in 2015$)*	Source
Future Inflation Rate	2.38%	Based on past 10 years of consumer price index data, calculated October 2014.
Water Avoided Cost	$10.65/CCF	State of Vermont screening tool, established by the Department of Public Service as $.01 per gallon in 2000.
Real Discount Rate	2.385%	10-year treasury rate posted in the Wall Street Journal on the first business day of October 2014 (as specified in the DC SEU contract).
Line Losses	8% (energy) 6% (demand)	Based on a Pepco screening tool developed by IFC International, Inc.

[54] Documentation for FY2015 Screening Assumptions, Program Implementation Procedure (PIP), 10/1/2014.

Screening Assumption	Value (monetary values in 2015$)*	Source
Natural Gas Capacity Adder	5%	Professional judgment, to capture the costs of capacity and delivery of gas.
Transmission Cost	$24.949/kW-yr.	Pepco's June 18, 2014, filing of the FERC formula transmission rate update.
Distribution Cost	$217.737/kW-yr.	Calculated, based on Pepco's indication that distribution costs are 8.73 times that of transmission costs.
Electric & Fuel Externalities	See Table 8-8	See "2015 DC externality values" memo for methodology.
Electric Energy Cost	See Table 8-4	Years 2012–2015 and 2020 were drawn from Pepco's filed 2012 through 2014 EmPOWER Maryland Energy Efficiency Plan. The missing years were estimated by linear extrapolation up to 2025, at which point the costs were held constant to be conservative.
Electric Power Cost	See Table 8-5	Years 2012–2015 and 2020 were drawn from Pepco's filed 2012 through 2014 EmPOWER Maryland Energy Efficiency Plan. The missing years were estimated by linear extrapolation up to 2025, at which point the costs were held constant to be conservative.
Natural Gas Cost	See Table 8-6	Provided by Washington Gas.
Other Fuels Cost	See Table 8-7	Synapse Energy Economics, Inc.'s "Avoided Energy Supply Costs in New England: 2013 Report" was used as a basis. The average 10-year historical price ratio between the DC and New England retail markets, sourced from the US EIA, was used to adjust values to the DC market.
Risk Adder	10%	Specified in the DCSEU contract.
NEB Adder	10%	Specified in the DCSEU contract.
Low-Income NEB Renewable Adder	15%	See "Screening assumptions for the DCSEU solar renewable energy program portfolio" memo January7, 2015, for methodology
Low-Income Spillover Value	1.15	See "Screening assumptions for the DCSEU solar renewable energy program portfolio" memo January7, 2015, for methodology
Solar SREC Price	$479.84	See "Screening assumptions for the DCSEU solar renewable energy program portfolio" memo January7, 2015, for methodology

The tables below presents the avoided supply costs for 2015–2041 (in 2015 dollars) included in the DCSEU screening tool.

Table 8-4. Electric Energy Cost in 2015 Dollars, ($/kWh)

Year	Winter Peak	Winter Off-Peak	Summer Peak	Summer Off-Peak
2015	0.0868	0.0670	0.1011	0.0648
2016	0.0893	0.0685	0.1041	0.0670
2017	0.0914	0.0700	0.1066	0.0686
2018	0.0934	0.0716	0.1091	0.0702
2019	0.0955	0.0731	0.1116	0.0719
2020	0.0976	0.0746	0.1141	0.0735
2021	0.0996	0.0762	0.1166	0.0751
2022	0.1017	0.0777	0.1190	0.0767
2023	0.1038	0.0793	0.1215	0.0783
2024	0.1058	0.0808	0.1240	0.0800
2025–2041[55]	0.1079	0.0824	0.1265	0.0816

Table 8-5. Electric Power Cost in 2015 Dollars

Year	$/kW-yr.
2015	66.82
2016	72.71
2017	78.65
2018	84.59
Ibid.	90.53
2020	97.97
2021	98.53
2022	102.42
2023	106.30
2024	110.19
2025–2041[56]	114.07

[55] Data remains the same for years 2025 through 2041.
[56] ibid.

Table 8-6. Natural Gas Cost in 2015 Dollars

Year	$/MMBtu	Year	$/MMBtu
2015	9.82	2029	15.89
2016	9.98	2030	16.72
2017	10.18	2031	17.58
2018	10.43	2032	18.50
2019	10.71	2033	19.47
2020	10.99	2034	20.48
2021	11.34	2035	21.56
2022	11.58	2036	22.69
2023	11.77	2037	23.89
2024	12.37	2038	25.15
2025	13.00	2039	26.48
2026	13.67	2040	27.89
2027	14.37	2041	29.38
2028	15.11		

Table 8-7. Other Fuels Costs in 2015 Dollars ($/MMBtu)

Year	Commercial Distillate	Residential Distillate	Propane	Kerosene
2015	21.91	29.59	25.73	27.71
2016	22.91	30.91	26.60	28.94
2017	23.55	31.73	27.72	29.71
2018	23.96	32.17	28.28	30.12
2019	24.36	32.68	28.81	30.59
2020	24.71	33.14	29.31	31.03
2021	25.18	33.65	29.66	31.50
2022	25.66	34.16	30.05	31.97
2023	26.05	34.69	30.40	32.47
2024	26.46	35.24	30.70	32.99
2025	26.90	35.83	30.99	33.54
2026	27.31	36.35	31.28	34.04
2027	27.72	36.89	31.52	34.54
2028	28.15	37.46	31.75	35.06
2029	28.60	38.02	32.10	35.60

Year	Commercial Distillate	Residential Distillate	Propane	Kerosene
2030	29.08	38.61	32.45	36.15
2031	29.54	39.20	32.80	36.70
2032	30.02	39.80	33.15	37.26
2033	30.51	40.40	33.52	37.82
2034	31.01	41.02	33.88	38.41
2035	31.51	29.65	34.25	38.99
2036	32.01	42.28	34.62	39.58
2037	32.54	42.93	35.00	40.19
2038	33.06	43.58	35.38	40.81
2039	33.60	44.25	35.76	41.43
2040	34.15	44.92	36.15	42.06
2041	34.70	45.60	36.54	42.70

8.3.2 Environmental adders used in the DCSEU Societal Cost Test

For FY2015, the District of Columbia estimated the value of environmental adders by calculating the externality avoided costs based on reduced CO_2 emissions. Below are excerpts from the DCSEU 2015 District Externality Values memo that specify the values and sources for fossil fuel and electric for the evaluation period.[57]

> ***Fossil Fuel Externalities[58]***
>
> *All of the fossil fuel externality values are based on the $100/ton CO_2. The AESC 2013 Report mentioned above provided the values for natural gas and residential, commercial and industrial distillate (fuel oil). The commercial and industrial distillate externality values were combined into one value based on 2010 Energy Information Administration (EIA) data, which indicated 99.8% commercial versus 0.2% industrial distillate consumption. These values were inflated to 2015 dollars using a 2.39% inflation assumption.*
>
> *The externality values for propane and kerosene were not provided in the AESC 2013 Report. These were calculated using the $100/ton CO_2 and EIA emission factors of 63.07 kg CO_2/MMBtu and 72.31 kg CO_2/MMBtu for propane and kerosene, respectively.*
>
> *The following table shows the externality values for fossil fuels used in FY2015.*

[57] October 10, 2014 Memo from VEIC to Tetra Tech regarding 2015 DC Externality Values.
[58] 2015 DC Externality values memo from VEIC to Tetra Tech, October 10, 2014.

Table 8-8. Fossil Fuel Externality Values FY2015 (in 2015 dollars)

	Natural Gas	Residential Distillate	Residential Propane	Commercial Distillate	Commercial Propane	Kerosene
$/MMBtu	$6.02	$8.86	$7.12	$8.40	$7.12	$8.16

Electric Externalities[59]

The electric externalities are also based on $100 per short ton of CO2. Calculating the marginal electric externality value also required the marginal type of generation mix, the heat rate for each generation type, and the CO2 emissions rates by fuel type.

Combining all of the above factors together produces a weighted average electric externality for CO2 emissions of $ 0.062/kWh in 2013 dollars. Inflating by 2.39% (the FY2014 Future Inflation Rate) annual and inflating, the resultant by 2.38% (the FY2015 Future Inflation Rate) gives an electric externality value of $0.0655/kWh in 2015 dollars.

The above electric externality value assumes that none of the costs for CO2 abatement are internalized in the PEPCO electric avoided costs used for efficiency cost-effectiveness analysis in DC. If any of the costs are internalized, then that amount internalized for each particular year should be subtracted from the $0.0655/kWh externality value calculated above.

8.3.3 Other adders used in the DCSEU Societal Cost Test

In addition to environmental externality adders, DCSEU also includes Risk and Non-Energy Benefits adders in its program cost-effectiveness analysis. Each adder assumes a value of 10 percent. The adders are applied to total energy and capacity avoided costs.

Per the DCSEU contract, the definitions of these adders are as follows:

Risk adder: Recognizes the benefits of energy efficiency and conservation in addressing risk and uncertainty.

Non-energy benefits (NEB) adder: Recognizes the non-energy benefits of energy efficiency including comfort, noise reduction, aesthetics, health and safety, ease of selling/leasing home or building, improved occupant productivity, reduced work absences due to reduced illnesses, ability to stay in home/avoided moves, and macroeconomic benefits.

8.3.4 Assessment Evaluation of the DCSEU

In past evaluation reports, the evaluation team noted that the general calculation framework of the SCT cost-effectiveness screening as implemented by DCSEU closely follows the prescribed methodology detailed in the California Standard Practice Manual (CA SPM). The CA SPM establishes standard procedures for cost-effectiveness evaluations for utility-

[59] Ibid.

sponsored programs, is generally considered the authoritative source for defining cost-effectiveness criteria, and is often referenced by many other states and utilities. In addition, the screening tool is capable of evaluating cost-effectiveness based on various market replacement approaches, including replace-on-burnout, retrofit, and early retirement.

8.3.5 Conclusion

The total societal cost-benefit results for the portfolio ranges from 5.07 to 4.06, which means that the DCSEU continued to operate its initiatives in a very cost effective manner in FY2015. On a track level basis, a review of Income Qualified Home Performance initiative (formerly the Federal Home Loan Bank initiative) and the Home Performance with ENERGY STAR initiative may be warranted to help increase the cost-effectiveness of these initiatives. The evaluation team has no other outstanding issues or recommendations regarding the DCSEU cost-effectiveness evaluation procedure.