

# Small Business Direct Install Program EM&V Report

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Jersey Central Power & Light  
PY22: July 1, 2021–June 30, 2022

Prepared by:



ADM Associates, Inc.  
3239 Ramos Circle  
Sacramento, CA 95827  
916-363-838

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# 1. Abstract

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On May 23, 2018, New Jersey's Governor signed into law the Clean Energy Act of 2018<sup>1</sup> (CEA). It calls for a significant overhaul of New Jersey's energy systems while growing the economy, building sustainable infrastructure, creating well-paying local jobs, reducing carbon emissions, and improving public health to ensure a cleaner environment for current and future residents. The CEA plays a key role in achieving the State's goal of 100 percent clean energy by 2050 by establishing aggressive energy reduction requirements, among other clean energy strategies. Specifically, the CEA directs the Board of Public Utilities (BPU) to require that:

- Each electric public utility to achieve annual reductions of at least 2 percent of the average annual electricity usage in the prior three years within five years of implementation of its electric energy efficiency program.
- Each natural gas public utility to achieve annual reductions in the use of natural gas of at least 0.75 percent of the average annual natural gas usage in the prior three years within five years of implementation of its gas energy efficiency program.

The CEA requires that evaluation, measurement, and verification activities are used to review the electric and gas energy usage reductions and peak demand reductions for the utility's energy efficiency programs. A Statewide Evaluator (SWE), hired by the BPU to coordinate the evaluations for all utilities, provided guidelines for basic and advanced rigor evaluations that apply to new or changed programs and established programs, respectively. The SWE also required at least two full impact and process evaluations during the first triennium, with the CEA required triannual report due at the end of the first triennium. This report conforms to the SWE's basic rigor guidance for evaluations for all JCP&L programs and aligns with approved M&V Plans from June 2, 2022.

For programs that produce both electricity and gas savings, the lead utility is responsible for evaluating both fuels, and reported savings that are held on behalf of the partner utility will be passed via the Statewide Coordinator system in 2023. Therefore, program gas savings are included in this report.

ADM is under contract with Jersey Central Power & Light Company (JCP&L) to provide evaluation, measurement, and verification (EM&V) services of its energy efficiency programs, including the Small Business Direct Install (SBDI) program. The contract provides for annual EM&V reporting covering a three-year period from July 1, 2021, through June 30, 2024, culminating in a final report that covers the triennium to be

<sup>1</sup> P.L. 2018, c.17 (N.J.S.A. 48:3-87.8 et seq.).

delivered to the BPU. This report summarizes findings from an initial evaluation of the program, covering activities in the first year of implementation (PY22).

Both reported (or *ex-ante*) and verified (or *ex-post*) impacts in this report are constructed with calculation methods prescribed in the NJ Coordinated Measures List (NJCML or CML)<sup>2,3</sup>. The NJCML serves as the technical reference manual (TRM) for the CEA's first triennium. The NJ FY20 Protocols and the FY21 Protocols Addendum are the primary documents referenced in the CML. The CML also prescribes sections from other TRMs for measures that are not yet included in the NJ Protocols.

## 1.1. PY22 Achievements

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The reported and verified annual electric energy, electric demand, and gas energy impacts<sup>4</sup> for the SBDI program are shown in Table 1-1 below.

*Table 1-1: SBDI Program PY22 Gross Energy and Demand Impacts*

Impact	Reported	Verified
Electric Energy (kWh)	818,675	621,989
Demand (kW)	147.48	126.87
Gas Energy (Therms)	(42,594)	(2,706)

## 1.2. PY22 Evaluation Results

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### 1.2.1. Gross Verified Impacts and Realization Rates

The SBDI Program for PY22 contains ten different measures. Gross impact evaluation results by measure are reported in Table 1-2 (kWh energy savings), Table 1-3 (kW peak demand reduction) and Table 1-4 (natural gas savings).

<sup>2</sup> Per [BPU DOCKET NOS. QO19010040. Agenda Date: 10/12/2022. Agenda Item: 8D. Page 7](#): "Calculations used by the utilities to determine program savings counted toward compliance are cataloged in the Joint Utility Coordinated Measures List, which references the FY20 Protocols, the FY21 Protocols Addendum, and TRMs from other states when no applicable New Jersey specific measure calculation was available."

<sup>3</sup> While the NJ CML served as the basis for evaluation, ADM determined site-specific lighting hours of use for sampled projects. This would typically be reserved for enhanced-rigor activities, but ADM opted for site-specific hour of use to facilitate concurrent measurement and verification for JCP&L's offers in PJM's forward capacity market.

<sup>4</sup> Evaluated therms and MMBtus include heating penalties where included in applicable protocols.

*Table 1-2: SBDI Gross Retail Annual Electric Savings*

Measure Category	Quantity	Ex-ante kWh	Ex-post kWh	RR kWh
Prescriptive Lighting LED Hard-Wired Fixtures	697	432,498	351,396	81%
Prescriptive Lighting LED Linear Tubes	918	274,671	177,369	65%
Gasket	154	45,055	35,762	79%
Strip Curtains	9	31,899	25,769	81%
Prescriptive Lighting LED Screw-In	99	16,145	14,289	89%
Aluminum Night Covers	5	10,512	10,512	100%
Door Closer	6	4,422	3,916	89%
Cooler and Freezer Door Heater Control	2	2,888	2,392	83%
Unitary HVAC	1	510	510	100%
Programmable Thermostats	1	76	76	100%
<b>Total</b>	<b>1,892</b>	<b>818,675</b>	<b>621,989</b>	<b>76%</b>

*Table 1-3: SBDI Gross Retail Peak Demand Reduction*

Measure Category	Ex-ante kW	Ex-post kW	RR kW
Prescriptive Lighting LED Hard-Wired Fixtures	77.81	66.68	86%
Prescriptive Lighting LED Linear Tubes	55.84	48.27	86%
Gasket	2.14	1.72	80%
Strip Curtains	4.07	3.31	81%
Prescriptive Lighting LED Screw-In	4.25	3.87	91%
Aluminum Night Covers	-	-	-
Door Closer	2.78	2.47	89%
Cooler and Freezer Door Heater Control	0.25	0.21	84%
Unitary HVAC	0.35	0.35	100%
Programmable Thermostats	-	-	-
<b>Total</b>	<b>147.48</b>	<b>126.87</b>	<b>86%</b>

*Table 1-4: SBDI Gross Retail Annual Gas Savings*

Measure Category	Ex-ante Therms	Ex-post Therms	Ex-ante MMBtu	Ex-post MMBtu	RR
Prescriptive Lighting LED Hard-Wired Fixtures	(25,517)	(1,603)	(2,551.7)	(160.3)	6%
Prescriptive Lighting LED Linear Tubes	(16,125)	(992)	(1,612.5)	(99.2)	6%
Gasket	-	-	-	-	-
Strip Curtains	-	-	-	-	-
Prescriptive Lighting LED Screw-In	(952)	(111)	(95)	(11)	12%
Aluminum Night Covers	-	-	-	-	-
Door Closer	-	-	-	-	-
Cooler and Freezer Door Heater Control	-	-	-	-	-
Unitary HVAC	-	-	-	-	-
Programmable Thermostats	-	-	-	-	-
<b>Total</b>	<b>(42,594)</b>	<b>(2,706)</b>	<b>(4,259)</b>	<b>(271)</b>	<b>6%</b>

### 1.2.2. Summary of Key Parameters Collected by the Evaluation Effort

The evaluation effort collected data on key parameters that are inputs to TRM algorithms used for reporting impacts in PY22. The measure verification rate was the key parameter collected during this evaluation and is shown in Table 1-5 below and is defined as the verified delta-watts divided by the reported delta-watts for a line-item in a lighting calculator. The verification rate was calculated based on findings during the on-site visits.

*Table 1-5: Summary of Key Parameters*

Measure	Parameter Name	Parameter Mean	Parameter Standard Deviation	Sample Size	Relative Precision at 90%
Lighting	Verification Rate	0.992	0.089	284	0.8%

### 1.3. Evaluation Recommendations

ADM has provided the recommendations summarized in Table 1-6 for continued improvement of tracking and reporting for the SBDI Program. As of this writing, two the three recommendations have been accepted and follow-up actions completed. The recommendation to coordinate site visits with implementation is accepted and will be applied when evaluation field work starts for PY23.

*Table 1-6: Summary of Tracking and Reporting Recommendations*

Recommendation	JCP&L Disposition	Status of Follow-Up Items	Verified by ADM
<b>Continue quality check of claimed savings</b> through the review of energy impacts by measure if they fall out of the expected boundaries.	Accepted	Complete	Yes
<b>Evaluator to coordinate with implementation on joint inspections (pre- and post- project implementation)</b> to reduce on-site verifications burden on participants.	Accepted	Underway	TBD
<b>Continue to provide evaluator with ex-ante calculation templates</b> for review to ensure consistency and reduce evaluation risk.	Accepted	Complete	Yes

### 1.4. TRM Updates

Recommendations for technical reference manual (TRM) updates and evaluation data collected to support the effort are included in the Cross Cutting Program Results document submitted in conjunction with this report. Since the initial draft of this report, many draft TRM sections have been made available to utilities and their evaluators for review. In this process we have confirmed that two measures in this program that

lacked entries in the NJ Protocols, door gaskets and strip curtains, have been added to the Protocols for the next Triennium.

## **1.5. Process Evaluation Activity Summary**

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To date, process evaluation activities have served two objectives. The first objective is to ensure that program tracking and reporting systems and processes are established, accurate, and contain sufficient information to support upcoming enhanced-rigor process evaluations. The second objective is to gather contextual information to conduct deeper process evaluation activities in PY23. The first objective was accomplished through active participation in the launch of the data tracking and reporting systems. The ADM team reviewed all measure attributes that should be tracked and recorded and helped in the implementation of quality assurance rules related to key data fields for each measure. JCP&L has developed a process which applies logical and quantitative quality assurance rules to incoming program tracking data. Any outliers are flagged for further review and investigated to resolution by JCP&L's evaluation and implementation staff.

To build context for upcoming process evaluations, the ADM team has reviewed documentation such as policy documents drafted by BPU staff, evaluation guidance documents drafted by the SWE, and JCP&L's Energy Efficiency and Conservation plan. The ADM team has also conducted initial interviews with JCP&L's Energy Efficiency program managers and overall implementation managers to identify researchable issues for process evaluation.

Evaluators for utilities that participate in the CEA jointly gathered data to facilitate program benchmarking. The ADM team used benchmarking data primarily to identify gaps in energy efficiency measures or delivery that may be offered by CEA programs. The benchmarking study gathered program metrics such as realization rates, participation rates (normalized to 100,000 participants). In most cases, direct comparison of realization rates and participation rates is significantly qualified by differences in program maturity and state-to-state differences in reporting and evaluation conventions. This is particularly true for PY22, which was a startup year for New Jersey. For example, in this basic-rigor evaluation ADM applied as-found lighting hours of use to calculate verified savings, and this accounts for most of the variance between reported and verified savings. However, our documentation review also confirms that the implementation team correctly applied hours of use from the NJ Protocols. The lower than 100 percent realization rates, then, do not indicate any problem with implementation, tracking, or reporting – these simply reflect differences in how savings were reported, and how they were evaluated.

## 2. Executive Summary

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### 2.1. Introduction

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The CEA requires that evaluation, measurement, and verification activities are used to review the electric and gas energy usage reductions and peak demand reductions for the utility's energy efficiency programs. A Statewide Evaluator (SWE), hired by the BPU to coordinate the evaluations for all utilities, provided guidelines for basic and advanced rigor evaluations that apply to new or changed programs and established programs, respectively. The SWE also required at least two full impact and process evaluations during the first triennium, with the CEA required triannual report due at the end of the first triennium. This report conforms to the SWE's basic rigor guidance for evaluations for all JCP&L programs and aligns with approved M&V Plans from June 2, 2022.

For programs that produce both electricity and gas savings, the lead utility is responsible for evaluating both fuels, and reported savings that are held on behalf of the partner utility will be passed via the Statewide Coordinator system in 2023. Therefore, program gas savings are included in this report.

ADM is under contract with JCP&L to provide evaluation, measurement, and verification (EM&V) services of its energy efficiency programs. The contract provides for annual EM&V reporting covering a three-year period from July 1, 2021, through June 30, 2024, culminating in a final report that covers the triennium to be delivered to the BPU. This report summarizes findings from an initial evaluation of the program, covering activities in the first year of implementation (PY22).

### 2.2. Program Description

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The SBDI Program provides no-cost energy assessments to small businesses, non-profit organizations, municipalities, schools, and faith-based organizations. Energy auditors may install basic energy-savings measures and may recommend additional measures. The program will pay a percentage of the cost to install additional recommended energy efficiency measures. The program is administered by a contracted program implementer, Willdan.

The program is divided into two tiers of eligibility, determined by the facility's peak electric demand from the previous 12 months.

- **Tier 1.** Customers eligible for Tier 1 have an average peak demand up to 100 kW. Tier 1 also includes government facilities and K-12 public schools with an average peak demand up to 200 kW. Additionally, customers with an average peak demand from 101 – 200 kW that are located within designated opportunity zones or Urban Enterprise Zones may also qualify for Tier 1 status. In this tier,

standard basic energy savings measures may be installed at no cost during the time of the energy assessment. The SBDI program will offer to pay up to 80 percent of the project cost to install the recommended energy efficiency measures, while the participant pays the balance or may apply for financing.

- **Tier 2.** Tier 2 is open to all customers with a 12-month average demand of 200kW or less. The SBDI program picks up to 70 percent of the cost for Tier 2 customers.

The SBDI program prioritizes the most cost-effective measures (e.g., LED lighting retrofits) and also recommends additional cost-effective retrofit measures such as HVAC, controls, refrigeration, food service, motors, low-flow devices, pipe wrap, and domestic hot water equipment.

The SBDI program was launched relatively late in PY22 and had initial audits at the start of PY22. Measure installations started May 2022. The first few months of the program year involved establishing program eligibility requirements, data needs, and tracking and reporting processes. The program implementer recruited and trained trade allies as the data infrastructure was developing. The program runs on an open direct install model (e.g., trade allies are recruited to market, conduct audit, and implement retrofits), which takes time to ramp up. In PY22, the program scaled to approximately 20% of the assumed levels in JCP&L's Energy Efficiency and Conservation (EE&C) plan. As of this writing, the program is on track to increase throughput by tenfold in PY23, relative to PY22, and is closing the gap to the assumed throughput values in JCP&L's EE&C plan.

### 2.3. Evaluation Summary

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Both reported and verified impacts in this report are constructed with calculation methods prescribed in the NJCML<sup>5</sup>. The NJCML serves as the TRM for the CEA's first triennium. The NJ FY20 Protocols and the FY21 Protocols Addendum are the primary documents referenced in the CML. The CML also prescribes sections from other TRMs for measures that are not yet included in the NJ Protocols.

Gross impact evaluations for the program included the following process:

- Review program tracking data to inform sample design and target sample sizes.
- Pull samples and compute gross impacts in accordance with agreed-upon TRM protocols as specified in the NJCML using the following data:

<sup>5</sup> Per [BPU DOCKET NOS. QO19010040. Agenda Date: 10/12/2022. Agenda Item: 8D. Page 7](#): "Calculations used by the utilities to determine program savings counted toward compliance are cataloged in the Joint Utility Coordinated Measures List, which references the FY20 Protocols, the FY21 Protocols Addendum, and TRMs from other states when no applicable New Jersey specific measure calculation was available."

- Verified installation derived from customer interviews, site visits and/or documentation review
- Installation locations and hours of use<sup>6</sup>
- Develop gross realization rates as the ratios of reports (or ex-ante) and verified (or ex-post) impacts for sampled projects or measured within each sampling stratum.

While gross realization rates are an important evaluation outcome, other key evaluation findings include specific recommendations for implementation, tracking, and reporting in subsequent program years. This initial evaluation yielded the following important information:

- A list of measures that are not currently covered by the NJ Protocols (but are covered by the NJCML)
- Specific recommendations for additions or enhancements of TRM protocols (whether in the NJ Protocols or other regional TRMs cited by the NJCML)
- Measured values for key parameters such as hours of use for exterior lighting in commercial spaces.

More detailed descriptions of the evaluation effort and findings are provided in Section 3, with detailed results provided in subsequent appendices.

This report does not include results from a full round of process evaluations. Process activities to date have been of two kinds. The first kind is *embedded evaluation* in the sense that the evaluation team works closely and concurrently with the implementation and tracking and reporting teams to ensure that important data are collected and saved for each program. The outcome of this effort is that the tracking and reporting process is properly established and maintained. The second kind of process evaluation activity conducted thus far is to gather data to provide context for upcoming process evaluations to be completed in PY23.

### **2.3.1. Evaluation Methods**

Evaluation of the SBDI program included an impact analysis and a condensed process evaluation. ADM calculated ex-post kWh savings through program data review, measure verification, and using industry standard protocols to calculate energy impacts. Energy savings algorithms for the SBDI program are dependent on the measure type and feasible level of rigor. This includes the use of engineering algorithms from the NJCML with

<sup>6</sup> ADM verified that the implementation team applies the prescribed hours of use and coincidence factors from the NJ Protocols. ADM used site-specific hours of use for this evaluation to compile data in support of the ongoing TRM updates. This methodological difference drives realization rates for this program in PY22. Had ADM used the TRM hours of use, the realization rates would have been close to 100%.

algorithm variables based on primary data collection whenever practicable. The NJCML serves as the TRM for the CEA’s first triennium. The NJ FY20 Protocols and the FY21 Protocols Addendum are the primary documents referenced in the CML. The CML also prescribes sections from other TRMs for measures that are not yet included in the NJ Protocols.

The process evaluation assessed the qualitative aspects of the SBDI program including an assessment of the program design and implementation, as well as the customer experience. The SBDI program process evaluation included interviews with program staff and implementation teams during PY22. The evaluator will complete a comprehensive process in PY23, including surveys with program participants and participating trade allies.

## 2.4. Evaluation Results

The SBDI Program for PY22 contains ten different measures. Gross impact evaluation results by measure are reported in Table 1-2 (kWh energy savings), Table 1-3 (kW peak demand reduction) and Table 1-4 (natural gas savings).

*Table 2-1: SBDI Gross Retail Annual Electric Savings*

Measure Category	Quantity	Ex-ante kWh	Ex-post kWh	RR kWh
Prescriptive Lighting LED Hard-Wired Fixtures	697	432,498	351,396	81%
Prescriptive Lighting LED Linear Tubes	918	274,671	177,369	65%
Gasket	154	45,055	35,762	79%
Strip Curtains	9	31,899	25,769	81%
Prescriptive Lighting LED Screw-In	99	16,145	14,289	89%
Aluminum Night Covers	5	10,512	10,512	100%
Door Closer	6	4,422	3,916	89%
Cooler and Freezer Door Heater Control	2	2,888	2,392	83%
Unitary HVAC	1	510	510	100%
Programmable Thermostats	1	76	76	100%
<b>Total</b>	<b>1,892</b>	<b>818,675</b>	<b>621,989</b>	<b>76%</b>

Table 2-2: SBDI Gross Retail Peak Demand Reduction

Measure Category	Ex-ante kW	Ex-post kW	RR kW
Prescriptive Lighting LED Hard-Wired Fixtures	77.81	66.68	86%
Prescriptive Lighting LED Linear Tubes	55.84	48.27	86%
Gasket	2.14	1.72	80%
Strip Curtains	4.07	3.31	81%
Prescriptive Lighting LED Screw-In	4.25	3.87	91%
Aluminum Night Covers	-	-	-
Door Closer	2.78	2.47	89%
Cooler and Freezer Door Heater Control	0.25	0.21	84%
Unitary HVAC	0.35	0.35	100%
Programmable Thermostats	-	-	-
<b>Total</b>	<b>147.48</b>	<b>126.87</b>	<b>86%</b>

Table 2-3: SBDI Gross Retail Annual Gas Savings

Measure Category	Ex-ante Therms	Ex-post Therms	Ex-ante MMBtu	Ex-post MMBtu	RR
Prescriptive Lighting LED Hard-Wired Fixtures	(25,517)	(1,603)	(2,551.7)	(160.3)	6%
Prescriptive Lighting LED Linear Tubes	(16,125)	(992)	(1,612.5)	(99.2)	6%
Gasket	-	-	-	-	-
Strip Curtains	-	-	-	-	-
Prescriptive Lighting LED Screw-In	(952)	(111)	(95)	(11)	12%
Aluminum Night Covers	-	-	-	-	-
Door Closer	-	-	-	-	-
Cooler and Freezer Door Heater Control	-	-	-	-	-
Unitary HVAC	-	-	-	-	-
Programmable Thermostats	-	-	-	-	-
<b>Total</b>	<b>(42,594)</b>	<b>(2,706)</b>	<b>(4,259)</b>	<b>(271)</b>	<b>6%</b>

The evaluation effort collected data on key parameters that are inputs to TRM algorithms used for reporting impacts in PY22. These parameters are summarized in Table 2-4 below.

Table 2-4: Summary of Key Parameters

Measure	Parameter Name	Parameter Mean	Parameter Standard Deviation	Parameter Count	Relative Precision at 90%
Lighting	Verification Rate	0.992	0.089	284	0.8%

ADM also determined site-specific hours of use for 12 sampled lighting projects. While the site-specific hours differed from TRM values, ADM is not recommending any specific changes to lighting. The main intent of collecting site-specific hours of use are to support measurement and verification for JCP&L's offers in PJM's forward capacity market. A secondary intent was to support the ongoing TRM updates, and for this purpose we have compiled hours of use in Table A-5 of Appendix A. We note that the differences between the TRM and as-found hours are expected due to the small sample size for the PY22 evaluation.

## 2.5. Recommendations and Next Steps

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### 2.5.1. Tracking and Reporting Updates

ADM has provided the recommendations summarized in Table 1-6 for continued improvement of tracking and reporting for the SBDI Program. As of this writing, all of the recommendations have been accepted and follow-up actions completed.

*Table 2-5: Summary of Tracking and Reporting Recommendations*

Recommendation	JCP&L Disposition	Status of Follow-Up Items	Verified by ADM
<b>Continue quality check of claimed savings</b> through the review of energy impacts by measure if they fall out of the expected boundaries.	Accepted	Complete	Yes
<b>Evaluator to coordinate with implementation on joint inspections (pre- and post- project implementation)</b> to reduce on-site verifications burden on participants.	Accepted	Underway	TBD
<b>Continue to provide evaluator with ex-ante calculation templates</b> for review to ensure consistency and reduce evaluation risk.	Accepted	Complete	Yes

### 2.5.2. TRM Updates

Recommendations for technical reference manual (TRM) updates and evaluation data collected to support the effort are included in the Cross Cutting Program Results document and are summarized below:

*Table 2-6: Summary of Tracking and Reporting Recommendations*

<b>Measure</b>	<b>Recommendation</b>
Lighting: Commercial Exterior Hours of Use	The 2020 NJ Protocols provide exterior hours of use for Multifamily Lighting but not for general commercial and industrial facilities. While the utilities have agreed to use exterior hours of use from the New York TRM it would be beneficial to include lighting exterior hours for additional facility types. Add this deemed variable to the NJ Protocols.
Refrigeration: Door Gaskets	Add this measure to the NJ Protocols.
Refrigeration: Strip Curtain for Walk in Coolers and Freezers	Add this measure to the NJ Protocols.
Refrigeration: reach-In Door Closer	Add this measure to the NJ Protocols.

### **2.5.3. Next Steps**

The ADM team is carrying out a second round of basic rigor evaluations for the program. In PY23, the ADM team will also conduct process evaluations and enhanced-rigor studies for SBDI. As of this writing, the program has scaled considerably relative to PY22 and appears to be on track to achieve its targets for the first triennium.

## 3. Evaluation Methods

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This section discusses gross impact evaluation approaches and process evaluation activities for the SBDI Program. The ADM team relied primarily on site visits for measure verification and determination of key parameter values. Project documents such as work order, invoices, and site inspection notes, served to determine and verify key attributes of the efficient equipment rebated or distributed by the program.

Both reported (or *ex-ante*) and verified (or *ex-post*) impacts in this report are constructed with calculation methods prescribed in the NJCML. The NJCML serves as the TRM for the CEA's first triennium. The NJ FY20 Protocols and the FY21 Protocols Addendum are the primary documents referenced in the CML. The CML also prescribes sections from other TRMs for measures that are not yet included in the NJ Protocols.

### 3.1. Description of the SBDI Program

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The SBDI Program provides no-cost energy assessments to small businesses, non-profit organizations, municipalities, schools, and faith-based organizations. Energy auditors may install basic energy-savings measures and may recommend additional measures. The program will pay a percentage of the cost to install additional recommended energy efficiency measures. The program is administered by a contracted program implementer, Willdan.

The program is divided into two tiers of eligibility, determined by the facility's peak electric demand from the previous 12 months.

- **Tier 1.** Customers eligible for Tier 1 have an average peak demand up to 100 kW. Tier 1 also includes government facilities and K-12 public schools with an average peak demand up to 200 kW. Additionally, customers with an average peak demand from 101 – 200 kW that are located within designated opportunity zones or Urban Enterprise Zones may also qualify for Tier 1 status. In this tier, standard basic energy savings measures may be installed at no cost during the time of the energy assessment. The SBDI program will offer to pay up to 80 percent of the project cost to install the recommended energy efficiency measures, while the participant pays the balance or may apply for financing.
- **Tier 2.** Tier 2 is open to all customers with a 12-month average demand of 200kW or less. The SBDI program picks up to 70 percent of the cost for Tier 2 customers.

### 3.2. Gross and Net Savings

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Gross savings reflect the change in energy consumption directly resulting from program-related actions taken by participants, regardless of why they participated. Net savings

refer to savings that are attributed to the program efforts after accounting for free ridership (the portion of gross energy impacts that would have occurred even in the absence of the program) and spillover (additional program-induced energy savings, generated by both participants and non-participants, for which the program didn't provide any specific financial incentive). Net savings are calculated by multiplying gross savings by a net-to-gross (NTG) ratio. NTG equals one minus free ridership plus spillover.

The NJ BPU has stipulated that NTG is set to 1.0<sup>7</sup> for the first triennium of the program. The data to calculate NTG will be collected using an approved battery of free ridership and spillover questions in customer surveys that are run during the first triennium to apply in future program years.

### **3.3. Data Review**

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ADM reviewed program tracking data for all measures installed during PY22 to verify that each measure meets program qualifications, was installed in the PY22 project year, and that there were no duplicates or otherwise erroneous entries. ADM confirmed that the participant tracking data contains enough detail for the impact evaluation to be completed.

To assist with quality control, ADM identified boundaries for annual energy impacts and peak demand reduction by measure. For measures that fall outside of these boundaries, ADM performed an engineering desk review to either approve the measure or request modification.

### **3.4. Sampling**

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ADM developed a stratified sample plan to verify and calculate program savings for PY22. The stratification plan isolates projects by type (in PY22, lighting and non-lighting). The lighting stratum had three substrata which consisted of projects with reported savings below 30 MWh (L1), projects with reported savings between 30 and 70 MWh (L2), and larger projects (L3).

Realization rates (the ratio of *ex-post* to *ex-ante* savings) for projects sampled in each stratum are extrapolated to other projects within that stratum. Verification of sample precision, using each stratum's contribution to variance, is then performed on the *ex-post* extrapolated annual energy savings for the program. The sample design is shown in Table 3-1 below. The coefficients of variation (CV) reflect the variation in realization rates for sampled sites within each stratum. These CVs are consistent with CVs for prescriptive projects that ADM evaluates for four utility companies in bordering Pennsylvania. This

<sup>7</sup> [BPU Docket Nos. QO1901040, QO19060748 & QO17091004, Agenda Date: 6/10/2020, Agenda Item: 8D](#), page 31.

suggests that variance between reported and verified for JCP&L's SBDI program is comparable to similar programs that are offered in the region.

*Table 3-1: Sample results for the SBDI program*

Stratum	Reported kWh	Projects	Sampled Projects	Verified kWh	CV	RP @ 90% CL
Lighting 1	139,737	8	3	137,311	0.13	10%
Lighting 2	200,214	4	2	182,973	0.31	25%
Lighting 3	383,363	4	4	222,770	0.44	0%
Non-Lighting	95,360	22	5	78,935	0.47	30%
<b>Total</b>	<b>818,675</b>	<b>38</b>	<b>14</b>	<b>621,989</b>	<b>0.44</b>	<b>8.6%</b>

Results from the evaluation sample are extrapolated to the program population to determine program-level evaluation results. Sample-level results are extrapolated at the strata level to similar projects in the population. This approach ensures evaluation findings are only extrapolated to similar projects. For the purposes of the SBDI evaluation, the population is defined as the set of rebated projects in the given program year.

### 3.5. Gross Verified Savings Calculation

ADM calculated gross verified energy impacts (also referred to as ex-post savings throughout the report) for measures in this program using savings algorithms from the NJ Protocols as listed in Table 3-2.

*Table 3-2: SBDI TRM Summary<sup>8</sup>*

Measure	Method to Determine Savings
Aluminum Night Covers	2020 NJ TRM (pg. 122)
Cooler and Freezer Door Heater Control	2020 NJ TRM (pg. 126)
Door Closer	2021 PA TRM (pg. 171)
Door Gasket	Mid-Atlantic TRM V10 TRM (pg. 350)
Prescriptive Lighting LED Hard-Wired Fixtures	2020 NJ TRM (pg. 189)
Prescriptive Lighting LED Linear Tubes	2020 NJ TRM (pg. 189)
Prescriptive Lighting LED Screw-In	2020 NJ TRM (pg. 189)
Programmable Thermostats	2020 NJ TRM (pg. 176)
Strip Curtains	PA TRM (pg. 166)
Unitary HVAC/Split Systems and Single Package, Air	2020 NJ TRM (pg. 172)

<sup>8</sup> Source: NJCML.

The impact calculations have the following types of variable input parameters:

- Equipment-specific capacities and efficiencies
- Baseline equipment efficiencies provided by the TRM

The relevant TRM protocols also supply parameters such as annual hours of use, peak demand coincidence factors, or other terms that characterize equipment utilization. These parameters are considered to be fixed for the purposes of impact evaluation at the basic level of rigor.

ADM calculated ex-post savings for a sample of records in the tracking data. ADM verified that measures were installed either by physical or virtual site visits in a sample of randomly selected sites. Virtual visits were provided as an option to participants and were conducted by phone interviews and email exchanges. Site visits verify baseline conditions, efficient equipment specifications, quantities, and operating conditions.

All available project documentation was acquired for sampled projects. Project documentation includes ex-ante energy savings analysis, participant application, scope of work documents, specification sheets, trend data, and pre- and post-implementation inspection reports. In the situation where all data and information requested is not available during a site verification, these project documents may be relied on to support evaluation results. When both on-site and virtual verification were not possible, ADM completed an engineering desk review of the supporting documents.

ADM utilized on-site visits, interviews, and desk reviews to analyze the sampled projects. Table 3-3 summarizes verification activities.

*Table 3-3: SBDI Project Verification Effort*

Stratum	Sampled Projects	On-Site Visit	Interview /Desk Review	Monitoring
Lighting 1	3	2	1	0
Lighting 2	2	0	2	0
Lighting 3	4	4	0	2
Non-Lighting	5	3	2	0
<b>Total</b>	<b>14</b>	<b>9</b>	<b>5</b>	<b>2</b>

For lighting measures, ADM gathered primary data through logging, metering, billing analysis, site contact interviews, or energy management system (EMS) trend data to determine the hours of use. For comprehensive lighting upgrades in the education sector, the deemed hours of use from the NJ Protocols were used, unless the hours of use were known in advance to be appreciably different than the protocols.

Additional data for evaluation analysis was primarily collected through customer interviews, engineering desk reviews, site trend data available from EMS data, and data collected during evaluation site visits.

ADM evaluated prescriptive non-lighting projects using applicable protocols with the goal of verifying the values of all key parameters in the algorithms. Depending on the total impacts represented by the project, the level of documentation provided by the applicant, and results from a preliminary desk review, data gathering may involve an on-site visit. On-site visits are typically required if key parameters required by algorithms cannot be determined otherwise, or if the initial desk review discovers significant data inconsistencies or omissions.

After determining the ex-post savings for each sampled project, results were extrapolated to the program population using project-specific weights. This allows for the estimation of program-level evaluated annual energy savings with a given amount of sampling precision and confidence. A realization rate is constructed as the ratio of the total impacts, as constructed by ADM for the selected projects, to the total reported impacts. The ex-post energy and demand impacts for the sampling stratum were obtained as the product of gross ex-ante impacts, and the realization rates.

### **3.6. Process Evaluation Activities**

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For PY22, the process evaluation consisted of an in-depth interview with JCP&L's program managers and the SBDI implementation contractor. Expanded process evaluation activities for PY23 will also include customer surveys and interviews with implementation staff, trade allies, and retailers. Appendix A includes PY23 process evaluation research questions.

## 4. Process Evaluation

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Process evaluation activities in PY22 focused on (1) understanding the program design, (2) gaining insight around the outreach efforts for the programs with program allies and customers, (3) how the transition to utility-driven programs has gone, and (4) identifying evaluation priorities. ADM interviewed the JCP&L program managers and representatives from the third-party implementer and completed an evaluability assessment of the program tracking data. ADM will complete a comprehensive process and NTG evaluation for the SBDI program in PY23, including surveys with program participants and participating trade allies.

### 4.1. Program Design and Implementation

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The SBDI Program provides no-cost energy assessments to small businesses, non-profit organizations, municipalities, schools, and faith-based organizations. Energy auditors may install basic energy-savings measures and may recommend additional measures. The program will pay a percentage of the cost to install additional recommended energy efficiency measures. The SBDI program is implemented uniformly across JCP&L's central and northern New Jersey service territories.

### 4.2. Marketing

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Both JCP&L and the implementer are responsible for program outreach. Presentations to internal JCP&L groups, outdoor events, and outreach to program allies and customers through webinars, e-blast, and virtual and in-person meetings were used to promote the programs. JCP&L's 800 number creates leads for the program; however, most of the program participation comes from program allies actively marketing the program. Willdan, the program implantation contractor, conducted outreach for the C&I DI program via multiple channels. Willdan uses its call center for direct contact with customers, commercial building owners, and contractors but also uses internal resources such as account managers to promote the program. Additionally, the implementer has outreach activities focused on engagement with businesses in overburdened and other disadvantaged communities.

### 4.3. Implementation and Barriers to Participation

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- **The implementer reviews all cost proposals to ensure the reasonableness of savings and cost estimates** for each recommendation. JCP&L program managers review cost proposals as needed, such as when they are above a specific threshold (i.e., \$25,000) or include natural gas projects.

- **Per the SBDI Program Participating Contractor Agreement, assessments must be comprehensive and provide comprehensive solutions.** The contract implementers reported that program allies provide comprehensive assessments and subcontract each other to provide customers with complete solutions, while one program ally remains responsible for the total project oversight.
- **No-cost financing is available to customers participating in all commercial and industrial programs through the National Energy Improvement Fund (NEIF).** Each commercial and industrial program has a maximum dollar cap to be financed, and all of them have a minimum dollar cap of \$2,500 for financing. The NEIF held contractor training for all program allies interested in becoming NEIF-certified contractors, allowing them to install projects when the financing option is used. Incentives and financing may cover 70 to 80 percent of the project cost, dependent on the Tier (1 or 2) of the program which the customer falls under.
- **The supply chain delays and labor shortages have extended the length of time required for projects to be completed.** JCP&L typically allows a certain amount of time to complete the project, but they have been more flexible given labor and material shortages.
- **Although program attributes (i.e., measures, qualifications, incentives) are to align between utilities for Core Utility programs, the implementer reported that contractor labor shortages, differing incentive levels, and documentation requirements might impact which utility companies the contractors prefer to work with.** Working across the state, contractors must understand the programs' rules for all six utilities. The program implementers mentioned that program allies reported that incentives and ease of participation, especially project documentation requirements, impact contractors' participation in the program.

## 5. Key Findings and Recommendations

### 5.1. Energy Impacts Achieved in PY22

The SBDI Program PY22 results are reported in Table 5-1 (electric savings), Table 5-2 (peak demand reduction), and Table 5-3 (natural gas savings).

*Table 5-1: SBDI Gross Retail Annual Electric Savings*

Measure Category	Quantity	Ex-ante kWh	Ex-post kWh	RR kWh
Prescriptive Lighting LED Hard-Wired Fixtures	697	432,498	351,396	81%
Prescriptive Lighting LED Linear Tubes	918	274,671	177,369	65%
Gasket	154	45,055	35,762	79%
Strip Curtains	9	31,899	25,769	81%
Prescriptive Lighting LED Screw-In	99	16,145	14,289	89%
Aluminum Night Covers	5	10,512	10,512	100%
Door Closer	6	4,422	3,916	89%
Cooler and Freezer Door Heater Control	2	2,888	2,392	83%
Unitary HVAC	1	510	510	100%
Programmable Thermostats	1	76	76	100%
<b>Total</b>	<b>1,892</b>	<b>818,675</b>	<b>621,989</b>	<b>76%</b>

*Table 5-2: SBDI Gross Retail Peak Demand Reduction*

Measure Category	Ex-ante kW	Ex-post kW	RR kW
Prescriptive Lighting LED Hard-Wired Fixtures	77.81	66.68	86%
Prescriptive Lighting LED Linear Tubes	55.84	48.27	86%
Gasket	2.14	1.72	80%
Strip Curtains	4.07	3.31	81%
Prescriptive Lighting LED Screw-In	4.25	3.87	91%
Aluminum Night Covers	-	-	-
Door Closer	2.78	2.47	89%
Cooler and Freezer Door Heater Control	0.25	0.21	84%
Unitary HVAC	0.35	0.35	100%
Programmable Thermostats	-	-	-
<b>Total</b>	<b>147.48</b>	<b>126.87</b>	<b>86%</b>

Table 5-3: SBDI Gross Retail Annual Gas Savings

Measure Category	Ex-ante Therms	Ex-post Therms	Ex-ante MMBtu	Ex-post MMBtu	RR
Prescriptive Lighting LED Hard-Wired Fixtures	(25,517)	(1,603)	(2,551.7)	(160.3)	6%
Prescriptive Lighting LED Linear Tubes	(16,125)	(992)	(1,612.5)	(99.2)	6%
Gasket	-	-	-	-	-
Strip Curtains	-	-	-	-	-
Prescriptive Lighting LED Screw-In	(952)	(111)	(95)	(11)	12%
Aluminum Night Covers	-	-	-	-	-
Door Closer	-	-	-	-	-
Cooler and Freezer Door Heater Control	-	-	-	-	-
Unitary HVAC	-	-	-	-	-
Programmable Thermostats	-	-	-	-	-
<b>Total</b>	<b>(42,594)</b>	<b>(2,706)</b>	<b>(4,259)</b>	<b>(271)</b>	<b>6%</b>

The SBDI program accounted for 0.88 percent of the total portfolio kWh savings during the PY22.

## 5.2. Program Launch and Benchmarking

The SBDI program was launched relatively late in PY22 and had initial audits at the start of PY22. Measure installations started May 2022. The first few months of the program year involved establishing program eligibility requirements, data needs, and tracking and reporting processes. The program implementer recruited and trained trade allies as the data infrastructure was developing. The program runs on an open direct install model (e.g., trade allies are recruited to market, conduct audit, and implement retrofits), which takes time to ramp up. In PY22, the program scaled to approximately 20% of the assumed levels in JCP&L's Energy Efficiency and Conservation (EE&C) plan. As of this writing, the program is on track to increase throughput by tenfold in PY23, relative to PY22, and is closing the gap to the assumed throughput values in JCP&L's EE&C plan.

The four FirstEnergy Companies in Pennsylvania launched similar programs starting June 2021. The program launch in PA was faster than the one in New Jersey: the first-year savings in Pennsylvania were approximately 2,200 MWh, compared to 818 MWh in New Jersey(. The faster launch in Pennsylvania can possibly be attributed to the preexisting trade ally network in the state, since June 2021 marked the start of 13<sup>th</sup> year of continuous energy efficiency program offerings in the state.

The SBDI program's gross realization rate of 76 percent was somewhat lower than realization rates for comparable programs in Pennsylvania, which ranged from 84 percent to 96 percent and averaged 91 percent. This difference is not due to any shortcoming in

reporting calculation and rigor. Rather, methodological differences between reporting and evaluation are the primary cause. The implementation team correctly applied the prescribed hours of use for lighting projects, but ADM utilized hours of use as determined through customer interviews and monitoring. Had ADM also used TRM hours of use in savings calculations, the realization rate would have been much closer to 100 percent. ADM opted for as-found hours of use in case the findings would inform the TRM updates for the next triennium. Although the lighting hours of use were generally lower than the TRM, at this time we do not recommend a change based on evidence collected in the PY22 evaluation. TRM hours of use span the entire nonresidential market and are assumed to be accurate for a large portfolio of projects, but not necessarily on a site-by-site basis. Anecdotal evidence suggest that lighting hours of use are positively correlated with overall facility size. Therefore, it makes sense that a program that targets on small businesses may involve lighting hours of use that are somewhat lower than the TRM, while larger projects in the Custom and Prescriptive program may have hours of use that are higher than the TRM.

### **5.3. Key Evaluation Findings**

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The following are key findings from the PY22 evaluation effort.

- The SBDI program resulted in positive electricity savings of 621,989 kWh savings, 126.87 kW demand reduction, and -2,706 therms savings. The program accounted for 0.88 percent of the total portfolio during the first year of operation. The PY22 impact evaluation resulted in a 76 percent kWh realization rate and 86 percent realization rate for kW peak demand reduction. The realization rate for the program is driven by differences in as-found lighting operating hours compared to deemed lighting operating hours.
- The program continues to recruit more trade allies and is ramping up the implementation rate through PY23.
- Tracking and reporting systems were established, commissioned, and include sufficient detail to enable upcoming enhanced-rigor evaluations.
- Communication channels for fast evaluation impact have been established, and many areas of improvement identified in the PY22 evaluation have been implemented by JCP&L and its implementation and data tracking vendors.
- The utilities that participate in the NJ CEA have launched and managed their programs in close coordination.
  - One of the key startup activities was the establishment of the New Jersey Coordinated Measures List, which support uniform reporting by utilities and incorporates protocols for measures that were not in the New Jersey Protocols.

## 5.4. Recommendations

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### 5.4.1. Prescriptive lighting

**Ensure accurate classification of facility type.** Through site visits and interviews, the ADM team verified that ex-ante facility classifications and hours of use were inaccurate for several sites. It is not atypical to find discrepancies between ex-ante and ex-post facility types and hours of use; however, a portion of sites had significant discrepancies that adversely affected realization rates. One possible solution is to expand the list of TRMs that the NJCML references for commercial lighting hours of use, since a more detailed table of facility types could provide applicants better options for characterizing facility types. The following building types are of particular interest:

- Lodging
- Restaurants
- Public Service / Institutional
- Exterior Lighting (other than in MF common areas)

**Confirm exterior lighting hours of use have been updated,** to match the coordinated measure list. Ensuring the exterior schedules of use in the coordinated measure list are used will improve the realization rate for exterior lighting projects.

**Use appropriate interactive effects for each area type;** this will improve the accuracy of the savings calculations for interior-type spaces.

**Ensure natural gas impacts are applied to the appropriate operating conditions,** such as no gas impacts for exterior fixtures.

### 5.4.2. Door Gasket

**Provide a more detailed description of the door gasket locations.** This will better enable the evaluator to verify the installation of this measure.

**Eligibility requirements should be reviewed before accepting any door gasket projects.** Per the Mid-Atlantic TRM, if a condensing unit is located outside of the facility, the unit does not qualify for door gasket rebates.

### 5.4.3. Strip Curtains

The evaluation effort did not find any significant opportunities to improve program operations or data tracking and reporting accuracy.

#### **5.4.4. Aluminum Night Covers**

The evaluation effort did not find any significant opportunities to improve program operations or data tracking and reporting accuracy.

#### **5.4.5. Door Closer**

The evaluation effort did not find any significant opportunities to improve program operations or data tracking and reporting accuracy.

#### **5.4.6. Cooler and Freezer Door Heater Control**

The evaluation effort did not find any significant opportunities to improve program operations or data tracking and reporting accuracy.

#### **5.4.7. Unitary HVAC**

The evaluation effort did not find any significant opportunities to improve program operations or data tracking and reporting accuracy.

#### **5.4.8. Programmable Thermostats**

The evaluation effort did not find any significant opportunities to improve program operations or data tracking and reporting accuracy.

## Appendix A. SBDI Impact Evaluation Detail

The SBDI Program provides no-cost energy assessments to small businesses, non-profit organizations, municipalities, schools, and faith-based organizations. Energy auditors may install basic energy-savings measures and may recommend additional measures. The program will pay a percentage of the cost to install additional recommended energy efficiency measures.

### Gross Impact Evaluation Results

ADM calculated ex-post gross impact savings are summarized in Table A-1, Table A-2 and Table A-3.

*Table A-1: SBDI Gross Retail Annual Electric Savings*

Measure Category	Quantity	Ex-ante kWh	Ex-post kWh	RR kWh
Prescriptive Lighting LED Hard-Wired Fixtures	697	432,498	351,396	81%
Prescriptive Lighting LED Linear Tubes	918	274,671	177,369	65%
Gasket	154	45,055	35,762	79%
Strip Curtains	9	31,899	25,769	81%
Prescriptive Lighting LED Screw-In	99	16,145	14,289	89%
Aluminum Night Covers	5	10,512	10,512	100%
Door Closer	6	4,422	3,916	89%
Cooler and Freezer Door Heater Control	2	2,888	2,392	83%
Unitary HVAC	1	510	510	100%
Programmable Thermostats	1	76	76	100%
<b>Total</b>	<b>1,892</b>	<b>818,675</b>	<b>621,989</b>	<b>76%</b>

*Table A-2: SBDI Gross Retail Peak Demand Reduction*

Measure Category	Ex-ante kW	Ex-post kW	RR kW
Prescriptive Lighting LED Hard-Wired Fixtures	77.81	66.68	86%
Prescriptive Lighting LED Linear Tubes	55.84	48.27	86%
Gasket	2.14	1.72	80%
Strip Curtains	4.07	3.31	81%
Prescriptive Lighting LED Screw-In	4.25	3.87	91%
Aluminum Night Covers	-	-	-
Door Closer	2.78	2.47	89%
Cooler and Freezer Door Heater Control	0.25	0.21	84%
Unitary HVAC	0.35	0.35	100%
Programmable Thermostats	-	-	-
<b>Total</b>	<b>147.48</b>	<b>126.87</b>	<b>86%</b>

Table A-3: SBDI Gross Retail Annual Gas Savings

Measure Category	Ex-ante Therms	Ex-post Therms	Ex-ante MMBtu	Ex-post MMBtu	RR
Prescriptive Lighting LED Hard-Wired Fixtures	(25,517)	(1,603)	(2,551.7)	(160.3)	6%
Prescriptive Lighting LED Linear Tubes	(16,125)	(992)	(1,612.5)	(99.2)	6%
Gasket	-	-	-	-	-
Strip Curtains	-	-	-	-	-
Prescriptive Lighting LED Screw-In	(952)	(111)	(95)	(11)	12%
Aluminum Night Covers	-	-	-	-	-
Door Closer	-	-	-	-	-
Cooler and Freezer Door Heater Control	-	-	-	-	-
Unitary HVAC	-	-	-	-	-
Programmable Thermostats	-	-	-	-	-
<b>Total</b>	<b>(42,594)</b>	<b>(2,706)</b>	<b>(4,259)</b>	<b>(271)</b>	<b>6%</b>

## Discussion of Realization Rates

In the discussions that follow, the term “realization rate” without any qualifiers refers to the electric energy realization rate. In almost all cases, resolution of an underlying issue would also push peak demand and gas savings realization rates toward 100 percent.

### Prescriptive Lighting

Each lighting project is documented with a lighting inventory form, cut sheets, and other relevant project documentation. Table A-4 includes annual electricity savings (kWh) and peak demand reduction (kW). Prescriptive lighting projects fell into the Lighting strata dependent on project size.

Table A-4: Prescriptive Lighting Gross Retail Annual Electric Savings and Demand Reduction

Measure Category	Ex-ante kWh	Ex-post kWh	RR kWh	Ex-ante kW	Ex-post kW	RR kW
Prescriptive Lighting LED Hard-Wired Fixtures	432,498	351,396	81%	77.81	66.68	86%
Prescriptive Lighting LED Linear Tubes	274,671	177,369	65%	55.84	48.27	86%
Prescriptive Lighting LED Screw-In	16,145	14,289	89%	4.25	3.87	91%
<b>Total</b>	<b>723,314</b>	<b>543,054</b>	<b>75%</b>	<b>137.90</b>	<b>118.82</b>	<b>86%</b>

The gross realization rate for prescriptive lighting is 75 percent for energy savings and 86 percent for demand reduction. This realization rate is due to differences in hours of use (HOU), quantities verified, interactive effects applied, and calculator errors.

HOU played a significant role in these differences. Table A-5 compares ex-ante and ex-post HOUs. The ex-ante calculations used deemed values from the NJ TRM, including the Multifamily Exterior HOU value of 3,338 hours for any exterior, not conditioned lighting. The verified calculations used HOU values based on the site visits for a more accurate representation of the lighting usage. Different schedules were created based on these visits that categorize the lighting by location such as main office areas, or conference and support rooms, by the timers used to control the lighting, or by dusk to dawn. Three of the projects chosen in the sample did not have a site visit due to customers not responding or refusing. For these projects, the applicable deemed HOU from the NY TRM was utilized. The NY TRM was prioritized over the NJ TRM because the NY TRM has more facility types such as parking lots. The building classification also had a significant role on the realization rates, especially if the reported and verified calculations classified the projects differently. The “Other” and the “Grocery” were found to be incorrect facility types.

*Table A-5: Prescriptive Lighting Hours of Use*

Space Type Classification	Ex-ante Hours	Ex-post Hours	Sample Size
Exterior Lighting	3,338	4,237	3
Office	2,950	2,894	4
Warehouse/Industrial	5,236	3,035	2
Other*	4,573	1,397	1

Other minor differences included quantity verified. Based on the site visits, some of the projects had updated quantities of bulb types based on which bulbs were installed and where they were installed.

The realization rates for Gross Annual Retail Gas savings are listed in Table A-6. The realization rates are different than expected for several reasons. The ex-ante calculations for a sampled exterior lighting project, which accounted for 47 percent of program natural gas savings (therms), incorrectly applied a  $HVAC_e$  heating penalty of 0.5. The source for this value is unknown. The verified calculations used a value of 0.1, which corresponds with the NJ TRM value for AC/Gas Heat in an Office Building. This impacts the peak demand savings, and consequently, the gas energy savings, as the gas savings are a product of the peak demand savings, the hours, and another HVAC interactive factor.

*Table A-6: SBDI Gross Retail Annual Gas Savings*

Measure Category	Ex-ante Therms	Ex-post Therms	Ex-ante MMBtu	Ex-post MMBtu	RR
Prescriptive Lighting LED Hard-Wired Fixtures	(25,517)	(1,603)	(2,551.7)	(160.3)	6%
Prescriptive Lighting LED Linear Tubes	(16,125)	(992)	(1,612.5)	(99.2)	6%
<b>Total</b>	<b>(41,642)</b>	<b>(2,595)</b>	<b>(4,164.2)</b>	<b>(259.5)</b>	<b>6%</b>

Additionally, there was a calculation error associated with the first version of the implementation lighting calculator. The error was corrected in the next version of the lighting calculator such that there was no impact on subsequent projects.

### ***Door Gasket***

Rebates are offered on the installation of new reach-in cooler or freezer door gaskets. The realization rate for electricity savings for gaskets is 60 percent due to onsite findings. The primary reason for the low realization rate is that one of the sampled projects was found to not qualify per the Mid-Atlantic TRM specification in the coordinated measure list. The gaskets were installed for a remote-condensing unit, which does not qualify for the measure.

### ***Strip Curtains***

Two of the nine total strip curtain projects fell into ADM's sample. During site visits of the selected projects, it was found that the area of the doorway for the strip curtains was lower than the ex-ante. This led to a gross realization rate of 78 percent.

### ***Door Closer***

There were six door closer projects rebated in PY22, two of which fell into ADM's sample. The gross realization rate for the door closers was 100 percent as ADM was able to verify the units properly installed and that the ex-ante impacts were correctly calculated and reported.

### ***Aluminum Night Covers***

The realization rate for this measure was 100 percent. There were no data tracking or verification issues.

### ***Unitary HVAC***

The realization rate for this measure was 100 percent. There were no data tracking or verification issues.

### ***Programmable Thermostats***

The realization rate for this measure was 100 percent. There were no data tracking or verification issues.

### ***Lifetime Savings***

Lifetime savings were calculated for each measure by multiplying ex-post annual savings by the expected useful measure life. Lifetime savings results are reported in Table A-7 and Table A-8. EUL Measure life values were sourced from the NJCML.

*Table A-7: SBDI Retail Lifetime Electric Savings and Demand Reduction*

Measure Category	Qty	Measure Life	Ex-post Annual kWh	Ex-post Lifetime kWh	Ex-post Annual kW	Ex-post Lifetime kW
Prescriptive Lighting LED Hard-Wired Fixtures	697	14.4	351,396	5,051,110	66.68	960
Prescriptive Lighting LED Linear Tubes	918	14.9	177,369	2,641,614	48.27	719
Gasket	154	4	35,762	143,048	1.72	7
Strip Curtains	9	4	25,769	103,076	3.31	13
Prescriptive Lighting LED Screw-In	99	14.7	14,289	209,546	3.87	57
Aluminum Night Covers	5	5	10,512	52,560	-	-
Door Closer	6	8	3,916	31,325	2.47	20
Cooler and Freezer Door Heater Control	2	12	2392	28701	0.21	2.52
Unitary HVAC	1	15	510	7,643	0.35	5
Programmable Thermostats	1	7.5	76	567	-	-
<b>Total</b>	<b>1,892</b>	<b>13.29</b>	<b>621,989</b>	<b>8,269,190</b>	<b>126.87</b>	<b>1,784</b>

*Table A-8: SBDI Retail Lifetime Gas Savings*

Measure Category	Measure Life	Ex-post Annual Therms	Ex-post Lifetime Savings Therms	Ex-Post Annual MMBtu	Ex-post Lifetime MMBtu
Gasket	4	-	-	-	-
Strip Curtains	4	-	-	-	-
Aluminum Night Covers	5	-	-	-	-
Door Closer	8	-	-	-	-
Cooler and Freezer Door Heater Control	12	-	-	-	-
Unitary HVAC	15	-	-	-	-
Programmable Thermostats	8	-	-	-	-
Prescriptive Lighting LED Screw-In	15	(111)	(1,626)	(11.1)	(162.6)
Prescriptive Lighting LED Linear Tubes	15	(992)	(14,780)	(99.2)	(1,478)
Prescriptive Lighting LED Hard-Wired Fixtures	14	(1,603)	(23,043)	(160.3)	(2,304.3)
<b>Total</b>	<b>13</b>	<b>(2,706)</b>	<b>(35,968)</b>	<b>(270.6)</b>	<b>(3,596.8)</b>

## **Data Review**

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ADM reviewed program documentation, including program plans, the website, and the participant tracking data, to determine the evaluability of data, develop interview topic guides and inform the discussion with program staff. The program tracking database was reviewed for accuracy and evaluability and to measure progress toward goals and customer engagement with the program. ADM found no errors or omissions in the program tracking data to report. Project documentation included proposals, purchase orders, and scope of work documents.

## Appendix B. Evaluation Activities Planned for PY23

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The following subsections present the impact and process evaluation activities planned for PY23 for the Energy Solutions for Business Program.

### Process Evaluation Activities Planned for PY23

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The New Jersey Clean Energy Act Programs Final Evaluation Plan described the data collection activities to support a comprehensive process and NTG evaluation of the SBDI program. The plan also outlined the researchable questions and the associated data collection activity. For ease of reference, this section briefly summarizes the proposed evaluation activities and what each entail.

The evaluation team will complete the following activities to address the key research issues:

- Review or draft a logic model to use as a reference to help guide the process and NTG evaluation work, such as measuring the program's influence on customer satisfaction, identifying patterns in data to help refine program design and marketing, and overall program awareness.
- Conduct interviews with the JCP&L program manager and program implementation contractors. The ADM team will reach out to the program manager and implementation contractors to check in on program progress and changes to the program and discuss any additional researchable issues they would like addressed. These discussions will help to ensure all survey instruments and topic guides are accurate and appropriately focused.
- Conduct participant surveys. Surveys will be conducted with customers to understand experiences with different program aspects and customer decision-making processes to calculate NTG. As part of the sampling plan, strata will be developed to capture different measures. Sampling will be conducted in conjunction with the impact evaluation when possible.
- Conduct trade ally interviews. Surveys will be conducted with a sample of trade allies to capture a range of equipment types and experiences.
- Perform a benchmarking review. A benchmarking review will be conducted to see how the JCP&L utilities' incentives and qualifying criteria compare to other programs across the country and in the region. The benchmarking results will be used to inform future program design and provide information on how current incentive levels and qualifying criteria may impact customer participation. Where possible, this review will be coordinated with other utilities.

## Impact Evaluation Activities Planned for PY23

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The evaluation team will complete the following activities as part of the PY23 evaluation:

- Review program tracking data for systematic issues, inconsistencies, and data entry errors. JCP&L and ADM jointly perform a semi-automated quality control check on program tracking data by identifying measures in which annual energy savings and peak demand reduction fall outside of expected boundaries.
- Continue to review ex-ante calculators as needed. The ADM team will ensure TRM updates and revisions are incorporated into ex-ante calculators, as necessary.
- Conduct ride-along visits along with the implementation post-inspection team. Visiting sites with the implementor will help streamline the verification process for the customer and help to confirm and understand which variables were used and why.
- Perform On-site visits for projects selected in ADM's evaluations plan. Site visits will continue to be used to collect measurement and verification data used in the ex-post analysis. Power monitoring will be done as needed, when applicable, by qualified personnel. Verification site visits will cover samples of the different measure types and various project sizes.