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Energy Retrofit in Administrative Building: A Post- Retrofit Evaluation using IPMVP Option-C (Whole- Facility Approach)

Mohammed Yahiya Naveed[1]; Sami M. Jaradat[2]

[1,2] Quantum Energy Solutions Company, M&V Department Al-Khobar, Saudi Arabia.

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Abstract: This study presents a comprehensive evaluation of an energy retrofit project carried out at a government administrative facility located in the Eastern Province of Saudi Arabia. The project was undertaken as part of a broader initiative to improve energy performance, reduce electricity consumption, and modernize outdated building systems in public-sector facilities. Key interventions included the optimization and replacement of inefficient Heating, Ventilation, and Air Conditioning (HVAC) equipment, the installation of a variable chilled water flow system to enhance chiller plant efficiency, and the replacement of conventional lighting fixtures with energy-efficient LED technology alongside the introduction of advanced lighting controls. To quantify the impact of these Energy Saving Measures (ESMs), the project adopted the International Performance Measurement and Verification Protocol (IPMVP), utilizing Option C – Whole Facility Approach. This methodology involves analyzing utility billing data and developing regression models that correlate energy consumption with weather variables, such as Cooling Degree Days (CDD) [1]. The evaluation revealed that the implemented measures achieved a substantial annual energy savings of 904,557 kilowatt-hours (kWh), which corresponds to a 28.06% reduction in total electricity consumption when compared to the pre-retrofit baseline of 3,223,680 kWh. These results demonstrate the effectiveness of a data-driven, whole-building energy retrofit strategy in significantly lowering energy demand and operational costs. Moreover, the findings highlight the potential of such initiatives to contribute meaningfully to national energy conservation goals and sustainability commitments, especially in regions with high cooling loads and prolonged operating hours. The success of this project provides a valuable reference for future retrofits in similar administrative and institutional settings.

Keywords: *Energy Efficiency, HVAC, Retrofit, IPMVP Option C, Measurement and Verification, Lighting Control, Administrative Building.*

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I. INTRODUCTION

Public administrative facilities in Saudi Arabia are increasingly under pressure to improve energy efficiency due to a combination of factors, including the country's extreme climate, prolonged cooling seasons, and the widespread use of aging mechanical systems. These buildings often operate year-round with extended hours and consistent occupancy, leading to high energy demand, particularly for air conditioning and lighting. In many cases, the existing infrastructure—such as HVAC systems, lighting fixtures, and control mechanisms—is outdated, inefficient, and lacks the integration of modern energy-saving technologies [2].

In alignment with the Kingdom's broader objectives for energy conservation and sustainability, this administrative building project undertook a strategic energy retrofit project. This initiative was designed not only to reduce electricity consumption but also to enhance operational performance and occupant comfort through the modernization of critical building systems. The scope of the retrofit included the replacement and optimization of HVAC systems, the installation of variable chilled water flow controls, and the deployment of high-efficiency LED lighting with intelligent control solutions.

Unlike educational institutions, where energy usage patterns are often tied to academic calendars and seasonal occupancy, administrative facilities operate with more consistent and diversified energy profiles. This distinction necessitated a tailored approach to both the design and evaluation of the retrofit strategy. To ensure accurate and transparent assessment of the energy savings achieved, a robust Measurement and Verification (M&V) framework was adopted in accordance with the International Performance Measurement and Verification Protocol (IPMVP),specifically using Option C – Whole Facility. This method allows for a comprehensive analysis of total building energy performance

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and accounts for variable conditions such as weather and occupancy, which are critical in a facility of this nature[3].

This research centers on evaluating the performance and outcomes of the energy retrofit project implemented at one of the administrative facilities in eastern region of Saudi Arabia. Emphasis is placed on the effectiveness and reliability of the adopted Measurement and Verification (M&V) methodology—IPMVP Option C—in capturing whole-facility energy savings and accounting for influencing factors such as weather variability and operational schedules. The study also explores the persistence of energy savings following the retrofit and assesses the replicability of such interventions in similar administrative and institutional environments. By documenting a real-world application of integrated energy conservation strategies, this research contributes practical insights to the field of energy management within public- sector facilities. Moreover, it reinforces the critical role that data-driven retrofit projects can play in advancing Saudi Arabia's national objectives for energy efficiency, cost reduction, and environmental stewardship.

II. UNDERSTANDING ENERGY RETROFITS IN ADMINISTRATIVE FACILITIES

➢ *An energy retrofit involves upgrading existing systems within a building to improve energy efficiency and reduce overall consumption, without compromising occupant comfort or operational functionality. These upgrades typically include the replacement of inefficient lighting systems, outdated HVAC equipment, and the implementation of intelligent control strategies. In the case of facility under study, the retrofit project included the following key interventions:*

- Replacement of conventional interior and exterior lighting with high-efficiency LED luminaires.
- Installation of advanced lighting controls, including occupancy-based sensors, to reduce unnecessary energy use.
- Optimization and replacement of HVAC systems, including air handling units, packaged units, and chilled water pumps.

➢ *The Role of Measurement and Verification (M&V) in Retrofit Projects*

Measurement and Verification (M&V) is a structured process used to quantify the energy savings resulting from Energy Saving Measures (ESMs). It ensures that reported savings are accurate, credible, and based on recognized industry standards [5]. For administrative facilities—where operational consistency and transparency are critical—M&V provides a solid foundation for performance assurance and investment justification.

➢ *In this Project, M&V was Instrumental in:*

Verifying energy savings through standardized protocols aligned with the International Performance Measurement and Verification Protocol (IPMVP). Ensuring transparency and accountability for all stakeholders, including the implementing entity and facility management. Accurately calculating financial returns based on actual performance data, rather than theoretical projections [6].

III. RESEARCH OBJECTIVE

To assess the impact of HVAC and lighting retrofits on total energy consumption within a public administrative facility.

To validate energy savings using IPMVP Option C (Whole Facility), incorporating utility data and regression modelling.

To demonstrate the practical benefits of implementing energy efficiency strategies in public-sector administrative buildings.

IV. METHODOLOGY

The energy retrofit project was executed at a prominent administrative facility serving as an administrative and training hub. Located in the Eastern Province of Saudi Arabia, the facility comprises several buildings; however, the retrofit initiative focused exclusively on the main operational buildings and the central chiller plant, which together span a total conditioned floor area of 12,912 square meters.

The scope of the retrofit was extensive and designed to modernize the facility's energy systems while maintaining full functionality and occupant comfort. The key objectives included:

- Enhancing the energy performance of HVAC systems through optimization and component replacement.
- Reducing lighting energy consumption by replacing conventional luminaires with high-efficiency LED fixtures.
- Improving control and automation, particularly for lighting systems, through the integration of occupancy-based lighting controls.

This approach sought to address both baseload and variable- load energy demands, contributing to sustained energy savings and a lower operational carbon footprint.

➢ *Measurement and Verification (M&V) Approach*

Measurement and Verification (M&V) was a critical component of this project, ensuring that the energy savings achieved through the retrofit were measurable, verifiable, and aligned with international standards. The M&V strategy adhered to the International Performance Measurement and Verification Protocol (IPMVP) – Core Concepts, 2016, a globally recognized framework for energy performance evaluation. Given the integrated and interactive nature of the Energy Saving Measures (ESMs), IPMVP Option C: Whole Facility Approach was selected. This approach evaluates energy savings by comparing total facility-level electricity consumption before and after the retrofit, using actual utility meter data. Adjustments are made to account for routine variations—primarily weather-related impacts—using

Cooling Degree Days (CDD) [2].

➢ *The justification for selecting option c was based on the following considerations*

Multiple ESMs were implemented concurrently, and their performance outcomes were interconnected. Isolating individual contributions using Options A or B would have led to inaccurate or incomplete results. The facility had comprehensive utility billing records spanning several years, enabling accurate development of a baseline energy model.

The magnitude of expected savings exceeded 10% of the annual energy consumption, meeting the threshold at which whole-facility evaluation becomes both justified and beneficial.

Option C also provides a holistic representation of performance, which is particularly important for administrative buildings with complex operational profiles.

V. BASELINE DEVELOPMENT

Establishing a reliable energy baseline is essential for accurately quantifying energy savings. For this project, baseline energy consumption was determined using 12 months of historical utility data from the Saudi Electricity Company (SEC), covering the period from December 2020 to November 2021. The total energy consumption recorded during this period was 3,223,680 kWh, serving as the reference point for post-retrofit comparison.

To adjust for variations in cooling demand caused by seasonal changes, the baseline was normalized using Cooling Degree Days (CDD), which quantify the cooling load requirements based on ambient temperature. CDD values were obtained based on CDD Tool, with a balance point temperature of 18°C, representing the temperature above which cooling is required.

A simple linear regression analysis was performed to model the relationship between energy consumption and weather. The resulting regression equation was:

$$Baseline\ Energy\ Consumption\ (kWh) = 296.42 * CDD + 173538.5$$

This model demonstrated a strong statistical fit, with an R^2 value of 0.8889, indicating that nearly 89% of the variation in energy consumption could be explained by changes in CDD. This level of correlation provided confidence in the model's predictive accuracy and its suitability for ongoing performance evaluation. This model demonstrated a strong statistical fit, with an R^2 value of 0.8889, indicating that nearly 89% of the variation in energy consumption could be explained by changes in CDD. This level of correlation provided confidence in the model's predictive accuracy and its suitability for ongoing performance evaluation. The baseline developed is as shown in Table 1.

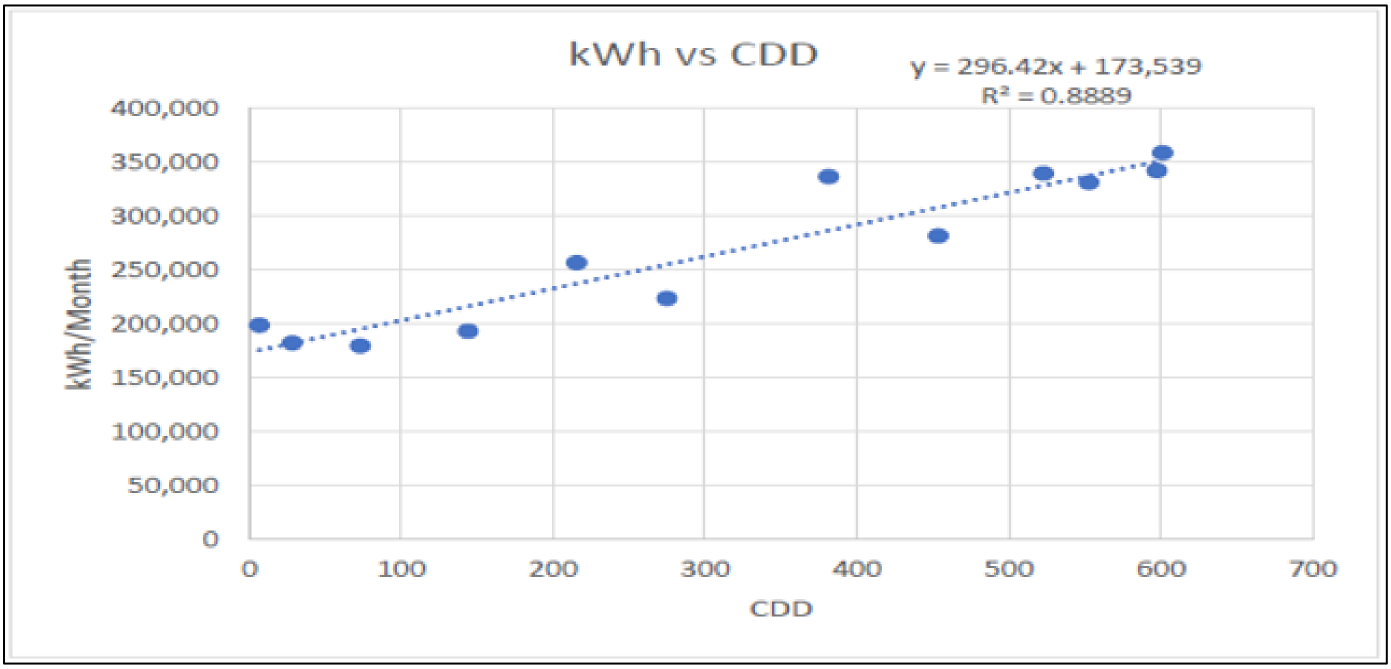

Fig 1 Regression Model for Baseline Development

VI. SAVINGS CALCULATION APPROACH

Energy savings were calculated by comparing the post- retrofit electricity consumption to the weather-adjusted baseline, following the standard IPMVP Option C methodology [7]. The core savings equation is:

$$Energy\ Savigs = (Baseline\ Energy) - (Reporting\ Period\ consumption) \pm Routine\ Adjustment$$

$$\pm Non - Routine\ Adjustment$$

Routine adjustments were made monthly based on updated CDD values to account for weather-related impacts on energy use.

Non-routine adjustments, such as changes in building occupancy or equipment use, were not observed during the reporting period and therefore were not included in the final analysis.

Actual post-retrofit energy consumption was recorded through the facility's existing utility meter. Monthly data was collected, and reconciliation reports were generated to track savings against the projected baseline. The calculated savings were subject to quality assurance reviews and validated using the statistical parameters of the regression model.

➢ *Summary of Implemented Energy Saving Measures (ESMs):*

The retrofit project involved the deployment of a diverse set of ESMs targeting both mechanical and electrical systems. Each measure contributed to reducing the overall energy footprint of the facility. The implemented ESMs included:

- *AHUs Performance Optimization*

Fine-tuning of supply air systems and addressing control issues for improved ventilation efficiency.

- *Replacement of Outdated Packaged AC Units*

Installation of high efficiency packaged units with better Energy Efficiency Ratios (EER).

- *Upgrade of Chilled Water Pumps and Flow Control System*

Replacement of aging pumps and implementation of a variable flow system to reduce pump energy use.

- *Installation of a Chiller Plant Manager (CPM)*

Integration of an advanced control platform to optimize chiller sequencing and load distribution.

- *Interior Lighting Replacement*

Substitution of traditional fluorescent fixtures with energy- efficient LED luminaires across offices, corridors, and meeting spaces.

- *Exterior Lighting Replacement*

Upgrading of external area lights to LED for improved efficacy and reduced night-time load.

- *Installation of Interior Lighting Control Systems*

Deployment of occupancy-based sensors to automate lighting and reduce energy waste during non-use hours.

The detailed energy savings attributable to each ESM, including monthly trends and overall performance, are discussed in the subsequent Results section.

The following tables summarize the annual and monthly energy savings achieved through the implementation of the Energy Saving Measures (ESMs) at the facility under study. These savings are derived from the validated M&V process, using utility billing data and weather-adjusted regression modelling in accordance with IPMVP Option C[8].

Table 2: displays the monthly distribution of energy savings for the entire facility as per the IPMVP Option C approach. These values reflect total savings achieved from all implemented ESMs, normalized for weather using Cooling Degree Days (CDD).

➢ *Performance Period Activities for the Administrative Building Project:*

The primary method of Measurement & Verification (M&V) will be through the evaluation of utility bills and building- level meters. In addition, the following activities were conducted monthly, at a minimum, to verify and maintain performance:

- *Monthly Inspections:*

✓ Conduct monthly inspections to verify that all equipment, software, and control sequences are functional, up-to-date, and fully operational.
✓ Ensure that systems and sequences have not been bypassed, overridden, or compromised in any way.

- *Verification of Performance Levels:*

✓ Verify that performance levels (such as lighting, temperature, ventilation, and other environmental conditions) are within the acceptable limits.
✓ Acceptable limits include the building's current operational standards, facility-specific needs, and the performance criteria defined in the Energy Savings Measures (ESMs) scope (e.g., temperature set-points, ventilation rates, lighting levels).

- *Operation & Maintenance Activities:*

✓ Ensure that operations and maintenance activities are being conducted in accordance with the manufacturer's recommendations and the operational guidelines established.
✓ Confirm that preventive maintenance schedules are being followed, and that corrective actions are taken when needed to ensure continuous optimal performance.

- *Monitoring of Static Factors:*

✓ Confirm that no significant changes have occurred with respect to defined static factors such as electrical load, operational changes, or manual interventions on equipment.
✓ If any changes have occurred (e.g., addition of load, equipment manual overrides), document the changes, the date of occurrence, and propose an adjustment to the baseline for review and approval. Non-routine baseline adjustments will be considered when there are significant operational or environmental changes.

➢ *Reporting Period:*

The reporting period begins immediately after the implementation of the Energy Savings Measures (ESMs). This period is considered indeterminate, with reconciliation occurring over the long term. A typical reporting period is one

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year, corresponding to a consecutive period of 12 months. The reporting period starts once all ESMs have been successfully completed and performance verification processes have commenced. The performance and savings reconciliation will be conducted periodically throughout the reporting period, with final validation at the end of the term. This ongoing monitoring and performance validation ensure the sustainability of energy savings over the life of the project and allow for timely identification and correction of any issues that may arise during the operational phase. In this study, the performance of two successive years after implementation of all the ESMs is evaluated and results are discussed.

VII. RESULTS

This energy retrofit project demonstrates the effectiveness of targeted Energy Conservation Measures (ESMs) in institutional facilities. Implemented across the main building and chiller plant, the project followed the International Performance Measurement and Verification Protocol (IPMVP), ensuring a transparent, data-driven approach to verifying energy savings over time.

- ➢ The baseline annual electricity consumption was established at 3,223,680 kWh, based on 2021 utility data. This reflects the facility's post-2020 chiller upgrade condition, establishing a realistic foundation for measuring retrofit performance. The implemented ESMs focused primarily on HVAC system efficiency and lighting upgrades, including:

- AHU performance optimization (ESM1)
- Replacement of aging package units (ESM2)
- Installation of VFDs on chilled water pumps (ESM3)
- Integration of a chiller plant manager (ESM4)
- Interior and exterior LED lighting retrofits (ESM5, ESM6)

➢ *Energy Performance Overview:*

Over two consecutive performance years, the retrofits consistently reduced energy consumption:

- Year-1 verified savings: 933,592 kWh (29.2%)
- Year-2 verified savings: 911,357 kWh (28.5%)
- Average annual savings: 922,475 kWh (~28.6% of baseline)

These savings demonstrate a high level of persistence, indicating that the installed measures have maintained their effectiveness over time despite seasonal and operational variability [9].

➢ *ESM-Level Insights*

- AHU Performance Optimization (ESM1) emerged as the highest impact measure, delivering 387,855 kWh/year of verified savings, which accounts for over 42% of total savings.
- Interior lighting retrofits followed, contributing 149,193 kWh/year, enhancing both efficiency and lighting quality across the facility.
- The CHW pump VFDs and chiller plant manager played crucial roles in reducing pumping energy during high load conditions, particularly noticeable during peak cooling months (May–August).
- Seasonal Performance Trends
- The savings exhibited seasonal variation aligned with the facility's cooling load patterns:
- Highest monthly savings were consistently recorded between March and July, when cooling degree days (CDDs) and HVAC loads peaked.
- For example, in May–July 2023 (Year-1), the combined verified savings exceeded 290,000 kWh, representing nearly one-third of total annual savings in just three months.
- In both years, shoulder months (November– February) still recorded consistent savings, highlighting the year-round effectiveness of base- load efficiency measures like lighting and improved AHU control logic.

These seasonal patterns reflect the synergy between demand- side HVAC measures and climatic conditions, validating the strategic timing and selection of ESMs for a facility in a hot & humid region.

➢ *Operational and Environmental Impact:*

In financial terms, assuming an average electricity tariff of SAR 0.0.32/kWh, the project yields:

- Annual cost savings: ~SAR 289,500
- Cumulative cost savings over two years: ~SAR 578,900.

Environmentally, with an average grid emission factor of 0.527 kg CO_2/kWh, the project avoided approximately:

- Annual emissions: ~486 metric tons of CO_2
- Cumulative emissions avoided: ~972 metric tons of CO_2

During the first two performance years the following savings were recorded as mentioned in the Tables 4 & 5:

VIII. CONCLUSION

This study highlights the successful implementation of targeted energy conservation measures (ESMs), showcasing the effectiveness of structured retrofitting strategies in apublic-sector educational facility operating in a high cooling- demand climate [10,11,12]. The project employed a robust and transparent Measurement and Verification (M&V) approach, grounded in IPMVP Options A and B, to quantify and validate energy performance improvements.

Over two consecutive performance years, the retrofit achieved consistent and meaningful reductions in electricity consumption. In Performance Year 1, the verified savings amounted to 933,592 kWh, representing a 29.2% reduction compared to the adjusted baseline. In Performance Year 2, the savings were 911,357 kWh, equating to a 28.5% reduction. On average, the project delivered annual savings of 922,475 kWh, translating to an approximate 28.6%

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decrease in electricity usage from the baseline year of 2021 (3,223,680 kWh). These outcomes confirm the durability and persistence of savings when supported by well-designed ESMs and accurate verification protocols.

Among all ESMs, the AHU Performance Optimization (ESM1) contributed the largest share of annual savings at 387,855 kWh/year, followed by interior lighting retrofits (149,193 kWh/year) and CHW pump VFD installations, affirming the impact of HVAC tuning and lighting efficiency in high-utilization zones. The measures not only optimized performance but also avoided major capital expenditures by improving the efficiency of existing systems.

In addition to the operational and financial benefits, the project resulted in a significant environmental impact, avoiding approximately 430 metric tons of CO_2 emissions annually, based on standard emission factors. This aligns with Saudi Arabia's national sustainability and energy efficiency objectives, while enhancing the institution's environmental stewardship.

Moreover, the project served as a practical demonstration of energy efficiency within an academic setting. It provided real-world educational value for students, reinforcing the college's vision of integrating sustainability into technical curricula. The live implementation of retrofitting strategies allowed students to engage with energy management concepts and systems, preparing them for future roles in the energy and building performance sectors.

This project stands as a replicable and scalable model for public institutions across the Kingdom, particularly those operating in similar climatic conditions. It underscores the significant benefits of adopting data-driven retrofitting practices, especially when combined with structured M&V protocols. This initiative reaffirms that impactful energy and environmental gains can be achieved through cost-effective interventions and institutional commitment to operational excellence and sustainability.

Table 1 Estimated Energy Savings by Measure

From	To	Month	Days	CDD	kWh
10/23/2021	11/21/2021	November	30	215.3	256,680
9/23/2021	10/22/2021	October	30	381.4	336,720
8/24/2021	9/22/2021	September	30	522.7	339,480
7/25/2021	8/23/2021	August	30	601.1	358,800
6/25/2021	7/24/2021	July	30	597.3	342,240
5/26/2021	6/24/2021	June	30	552.6	331,200
4/26/2021	5/25/2021	May	30	453.4	281,520
3/27/2021	4/25/2021	April	30	274.8	223,560
2/25/2021	3/26/2021	March	30	143.9	193,200
1/26/2021	2/24/2021	February	30	28.1	182,160
12/22/2020	1/25/2021	January	35	6.6	198,720
11/22/2020	12/21/2020	December	30	72.8	179,400
			365	**3850**	**3,223,680**

Table 2 Details of Estimated Energy Savings by Measure

Energy Saving Measure	Annual Savings (kWh)	Savings (SAR)	Savings (%)
AHUs Performance Optimization	387,855	124,114	12.03%
Package Units Replacement	108,113	34,596	3.35%
CHW Pumps & Flow Control System	153,068	48,982	4.75%
Chiller Plant Manager (CPM)	88,808	28,419	2.75%
Interior Lighting Replacement	149,193	47,742	4.63%
Exterior Lighting Replacement	7,600	2,432	0.24%
Interior Lighting Control System	9,920	3,174	0.31%
Total	**904,557**	**289,458**	**28.06%**

Table 3 ESM Monthly Savings

ESM Description	Annual Savings (kWh)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ESM 1	387,855	21,689	38,422.5	52,657.4	60,555.8	60,172.5	55,670.0	45,675	27,683.5	14,496.5	2,831.3	666.6	7,333.8
ESM 2	108,113.0	6,046.0	10,710.3	14,678.0	16,879.4	16,773.5	15,517.8	12,732	7,716.5	4,040.4	789.3	185.7	2,043.9
ESM 3	153,068.0	8,560.2	15,164.3	20,781.4	23,898.5	23,747.5	21,970.4	18,026	10,925.2	5,721.1	1,117.0	262.0	2,894.1
ESM 4	88,808.0	4,965.9	8,797.9	12,057.4	13,865.2	13,777.9	12,746.6	10,458	6,339.3	3,319.4	648.6	152.3	1,679.0
ESM 5	149,193.0	12,671	11,444.8	12,671.4	12,262.2	12,671.4	12,262.2	12,671	12,671.4	12,262.2	12,671.4	12,262.2	12,671.4
ESM 6	7,600.0	645.2	583.2	645.2	625.2	645.2	625.2	645.2	645.2	625.2	645.2	625.2	645.2
ESM 7	9,920.0	842.8	761.2	842.8	814.9	842.8	814.9	842.8	842.8	814.9	842.8	814.9	842.8
Total	**904,557.0**	**55,420**	**85,884**	**114,333**	**128,901**	**128,630**	**119,607**	**101,052**	**66,823.8**	**41,279.7**	**19,545.6**	**14,968.8**	**28,110.0**

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Table 4 Savings Performance Year-1

From	To	No. of days	CDD	Adjusted (Routine Adjustment)	Actual Consumption	Actual Savings	NRA	Total savings including NRA	Savings Achieved
			18° C	kWh	kWh	kWh	kWh	kWh	%
29-Nov-22	25-Dec-22	27	64.7	173,224	149,040	24,184	0	24,184	14.0%
26-Dec-22	29-Jan-23	35	0.9	199,955	146,280	53,675	0	53,675	26.8%
30-Jan-23	28-Feb-23	30	41.3	183,403	121,440	61,963	0	61,963	33.8%
1-Mar-23	30-Mar-23	30	145.6	214,320	132,480	81,840	0	81,840	38.2%
31-Mar-23	29-Apr-23	30	239.1	242,035	115,920	126,115	0	126,115	52.1%
30-Apr-23	29-May-23	30	432.2	299,274	215,280	83,994	0	83,994	28.1%
30-May-23	28-Jun-23	30	538	330,635	223,560	107,075	23,420	107,075	25.4%
29-Jun-23	28-Jul-23	30	587.1	345,190	242,880	102,310	23,846	25,729	38.0%
29-Jul-23	27-Aug-23	30	597.8	348,361	287,040	61,321	20,420	85,168	56.2%
28-Aug-23	26-Sep-23	30	511.9	322,899	281,520	41,379	15,876	61,799	44.1%
27-Sep-23	26-Oct-23	30	398	289,137	242,880	46,257	8,162	62,133	33.9%
27-Oct-23	25-Nov-23	30	204.6	231,809	187,680	44,129	642	52,290	31.3%
26-Nov-23	28-Nov-23	3	16.1	21,888	14,904	6,984	23,420	7,627	29.1%
Total		**365**	**3,777**	**3,028,907**	**2,360,904**	**909,395**	**92,366**	**933,592**	**29.2%**

Table 5 Savings Performance Year-2

From	To	No. of days	CDD 18° C	Routine Adjustment kWh	Actual Consumption kWh	Actual Savings kWh	NRA kWh	Total savings with NRA	Savings Achieved (%)
29-Nov-23	26-Dec-23	28	44.1	172,823	134,136	38,687	0	38,687	22.4%
27-Dec-23	30-Jan-24	35	36.9	210,626	146,280	64,346	0	64,346	30.5%
31-Jan-24	29-Feb-24	30	36.3	181,921	121,440	60,481	0	60,481	33.2%
1-Mar-24	30-Mar-24	30	100.9	201,070	132,480	68,590	0	68,590	34.1%
31-Mar-24	29-Apr-24	30	269.2	250,958	167,256	83,702	0	83,702	33.4%
30-Apr-24	29-May-24	30	407.1	291,834	218,316	73,518	0	73,518	25.2%
30-May-24	28-Jun-24	30	565.8	338,876	196,098	142,778	0	142,778	42.1%
29-Jun-24	28-Jul-24	30	618.6	354,527	252,512	102,014	0	102,014	28.8%
29-Jul-24	27-Aug-24	30	580.8	343,322	258,143	85,179	0	85,179	24.8%
28-Aug-24	26-Sep-24	30	500.2	319,431	246,882	72,549	0	72,549	22.7%
27-Sep-24	26-Oct-24	30	359.4	277,695	225,878	51,816	0	51,816	18.7%
27-Oct-24	25-Nov-24	30	206	232,224	174,487	57,737	0	57,737	24.9%
26-Nov-24	28-Nov-24	3	5	18,598	8,638	9,960	0	9,960	53.6%
Total		**366**	**3730**	**3,193,904**	**2,282,547**	**911,357**	**0**	**911,357**	**28.5%**

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