NEW JERSEY MULTIFAMILY BASELINE STUDY

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GLOSSARY

Term	Definition
ACS	American Community Survey
ADM	ADM Associates, Inc.
Analytical Strata	The stratification of a sampled population for the purpose of increasing representativeness relative to the overall population of interest
C Corporation	Any corporation that is taxed separately from its owners.
CEE	Consortium for Energy Efficiency
CFL	Compact fluorescent light
Convectors	A heater that operates by circulating air across a heating element
District Stream	Heating provided to a specific geographical area through steam tunnels
DX Cooling	Direct expansion cooling--cools air using a condensed refrigerant liquid
EnergyStar	A program managed by the Environmental Protection Agency and U.S. Department of Energy that provides guidelines for energy efficient appliances and buildings
EV	Electric vehicles
Forced Air Furnace	A central heating system that transfers heat to air
Geographic Canvasing	A sampling method in which a random sample is selected for the purpose of study and surrounding nearby sample points are selected as additional sample points
GSHP	Ground-source heat pump
HID	High-intensity discharge lamp
High-Rise Building	Buildings of four stories or higher
HMFA	New Jersey Housing and Mortgage Finance Agency
HVAC	Heating, ventilation, and air conditioning
Individual (Sole Proprietorship)	A business in which the sole owner is taxed directly as part of their income
Individually Metered	A utility meter that is installed on a tenant unit
Instantaneous Water Heater	Also known as a tankless water heater--A water heater that provides hot water by heating water from the source without storing it
LED	Light-emitting diode
LEED	Leadership in Energy and Environmental Design
Limited Liability Corporation ("LLC")	A corporation in which a sole proprietorship or partnership is not personally liable for a company's debts
Low-E Windows	Low-emissivity windows
Low-Rise Building	Buildings of fewer than four stories
Master Metered	A utility meter that meters an entire building
MOD-IV	The New Jersey Property Tax System
Multifamily Housing	For the purposes of this study, any property with five or more units, including apartments, condominiums, and senior homes but excluding seasonal rentals
Owner-Occupancy Rate	The percent of units in a property that are sold to buyers rather than rented to tenants
Pool Timer	A timer that controls when a pool pump turns on and off
Privately-Held Property	A property that is not subsidized (whether partially or wholly) by the government. Privately-held properties may still accept Section 8 Housing

	Choice Vouchers
Programmable Thermostats	A thermostat that allows a user to provide specific times and days an HVAC system should be set to a specific temperature
Property Management Company	A company that is responsible for maintaining properties including renting out tenant units
PTAC	Packaged-terminal air conditioner
PTHP	Packaged-terminal heat pump
Public/Government-Assisted Housing	A property that is subsidized by the government. These properties do not include properties that are privately-held and accept Section 8 Housing Choice Vouchers.
RAC	Room air conditioner
S Corporation	A corporation which elects to pass on its tax liability to its shareholders
Sampling Strata	The stratification of a population of interest for the purpose of representative sampling
Simple On/Off Thermostat	A thermostat that allows a user to turn on or off an HVAC system without providing a temperature at which the system will turn off
Simple Setpoint Thermostat	A thermostat that allows a user to pick a specific temperature that will turn on or off a system depending on whether the internal air temperature is within the tolerance band of that temperature
Smart Thermostat	Also known as a connected thermostat--A thermostat that provides connected access via the internet that may include additional advanced features such as geolocation
Stratification	The process by which a population of interest is divided into groups, known as strata, either by quantitative values of a given variable or qualitative values of a given variable
Utility Service Territory	The geographical region which a given utility company provides service to
Vacancy Rate	The percent of units in a property that are not currently occupied
VSD Pool Pump	Variable speed drive pool pump--A pool pump that can be programmed to operate at different speeds during its filtration cycle
Window AC	Window air conditioner

ACKNOWLEDGEMENTS

1 INTRODUCTION

In coordination with Rutgers Center for Green Building (RCGB), ADM Associates, Inc. (ADM) conducted a baseline study of multifamily properties in New Jersey (hereby referred to as the Multifamily Baseline Study) in 2018. The study was funded by the New Jersey Board of Public Utilities, through the Division of Clean Energy.

Through the study, data was collected for a sample of multifamily properties in New Jersey that can be used to establish a baseline profile of building characteristics and appliance types in the multifamily market segment. Included in the baseline profile is information on the saturations of energy-consuming equipment (electric, natural gas, and other fuels), the saturation of energy efficient equipment, building characteristics, and energy management practices. The study also collects customer household and demographic information that can be used to segment markets of interest to determine how appliance saturations and building characteristics differ by those markets of interest. The baseline profile will inform program planning and design and provide data and market insights to help advance the New Jersey Energy Master Plan and the goals of New Jersey's Clean Energy Program. This study also provides support for the development energy efficiency programming for multifamily homes in New Jersey.

2 METHODOLOGY

The Multifamily Baseline Study was designed to capture information on multifamily housing in New Jersey through a survey of a representative sample among multifamily market sub-segments. This section details:

- The stratified sampling approach used in this study,
- ADM's approach to data collection, and
- ADM's approach to data cleaning and analysis.

2.1 SAMPLE DESIGN

For the purposes of this study, multifamily housing was defined as any property providing permanent residences that have five or more units as part of the property. Both owner-occupied and rental properties were included as part of the intended population of the study. Properties related to the hospitality industry such as hotels, motels, and vacation rentals were not included as part of this study. Health care facilities such as assisted living facilities, hospitals, and recovery care centers were not considered part of the multifamily sector, although senior living communities (i.e., apartment complexes or condominiums that cater exclusively to those 55 years of age and older) were considered part of multifamily.

In order to generate values that are reflective of the state, ADM used a stratified sampling approach to collect data for this study. A stratified approach divides a sample frame into different segments, known as strata, for sampling. Sample points that are achieved in a specific stratum are thus weighted relative to their respective stratum's contribution to the overall sample frame in order to ensure that the data is reflective of the total population.

ADM utilized qualitative sampling strata that divided the sample frame by county and whether a property was privately-held or public/government-assisted housing. County was selected as the basis of the qualitative strata for multiple reasons. One of the areas of interest of this study is looking at the division of end-use characteristics and building characteristics by utility territory for both gas and electric utility companies. Sampling by county ensures a flexible approximation of both service territories—ensuring a representative sample is present regardless of whether the data set is divided by gas utility or electric utility. Secondly, sample data is weighted using data obtained through the American Community Survey (ACS) (U.S. Census Bureau, 2019), which is discussed in further detail in Section 2.3.1. Additionally, ADM considered the role of private v. public/government-assisted housing to be important as the type of equipment provided may deviate significantly depending on whether a property is privately-held or public/government-assisted due to differences in funding resources. Additional variables, such as property size, building age, and ownership type, were not readily available for the population frame and were not reliable identifiers for additional sampling stratification.

To develop the sample frame, ADM relied on data from the New Jersey Property Tax System (MOD-IV) and the New Jersey Department of Community Affairs in order to approximate the

number of multifamily buildings present in New Jersey. The data on multifamily properties comes from the MOD-IV data and is comprised of properties that are classified as "4C," which indicates that they are apartment buildings with at least five units. Although the MOD-IV data set also provides information regarding other types of residential properties, data was not available to identify which residential properties were multifamily properties versus single family properties. Thus, the data set was focused solely on properties listed as "4C." Public and government-assisted housing data from the New Jersey Department of Community Affairs was used to identify which properties were public/government-assisted housing in the MOD-IV data set. Data from the New Jersey Department of Community Affairs provides information regarding six public/government-assisted housing programs:

1. Farm Home – A program administered by the U.S. Department of Agriculture to build income-restricted apartments in rural areas.

2. Low Income Tax Credit – A federal program which provides tax credits to properties that reserve a portion of units for income-qualified customers per specific guidelines.

3. Mount Laurel – Multifamily properties that are developed due to constitutional requirements that require all counties to have a minimum supply of income-qualified housing, regardless of whether those properties are rental properties or have units for sale. Funding for properties developed through Mount Laurel can be federal or state.

4. New Jersey Housing and Mortgage Finance Agency – A state program which provides incentives for the construction of income-qualified housing.

5. U.S. Department of Housing and Urban Development (HUD) Public Housing Authority Program – A federally funded program which provides grants to state and local agencies to develop multifamily housing for income-qualified residents.

6. Other HUD Programs – The NJ Department of Community Affairs data set provides information regarding other programs administered by HUD, including programs that provide subsidized housing for the elderly and disabled. Additionally, information regarding properties that receive project-based vouchers to develop low-income units through HUD Section 8 are included. Properties that accept vouchers through the Section 8 Housing Choice Voucher Program, which provides housing vouchers to income-qualified individuals, are not included in the data set.

It should be noted that data obtained through MOD-IV skews the sample frame towards rental properties despite the study focusing on both rental properties and owner-occupied condominiums. As noted previously, condominium data could not be readily discerned from the MOD-IV data set. Thus, only apartment data was used for sample generation. Property lists specifying condominium contact information in the state of New Jersey or expounding upon the number of condominiums present in New Jersey is not readily obtainable. Despite this, because ADM relied on a geographic canvasing data collection method, some condominiums are included in the final sample and make up roughly 25% of the responses collected. That said, it is

uncertain what the true ratio between condominiums and apartments is in the state of New Jersey and additional weighting was not considered in order to increase or decrease the weight of condominiums versus apartment complexes.

The number of multifamily properties identified in New Jersey is summarized in Table 2-1.

Table 2-1: Distribution of Multifamily Properties

County	Number of Privately-Held Properties	Number of Public and Government-Assisted Housing	Total
Atlantic	334	55	389
Bergen	1,689	135	1,824
Burlington	329	80	409
Camden	542	117	659
Cape May	412	18	430
Cumberland	135	47	182
Essex	2,660	264	2,924
Gloucester	140	45	185
Hudson	4,026	196	4,222
Hunterdon	122	25	147
Mercer	394	118	512
Middlesex	832	153	985
Monmouth	922	140	1,062
Morris	377	82	459
Ocean	324	62	386
Passaic	1,125	85	1,210
Salem	55	18	73
Somerset	239	70	309
Sussex	103	15	118
Union	1,198	120	1,318
Warren	133	24	157
Total	**16,091**	**1,869**	**17,960**

In coordination with Rutgers Center for Green Building, ADM determined a target sample size of 375 properties. To achieve this sample size, ADM calculated a target number of sample points for each county, distinguishing between privately-held properties and public/government-assisted housing properties.

Table 2-2 summarizes the distribution of sampled properties.

Table 2-2: Target Number of Samples by County and Housing-Type

County	Number of Privately-Held Properties	Number of Public and Government-Assisted Housing	Total
Atlantic	7	1	8
Bergen	35	3	38
Burlington	7	2	9
Camden	11	2	13
Cape May	9	0	9
Cumberland	3	1	4
Essex	56	6	62
Gloucester	3	1	4
Hudson	84	4	88
Hunterdon	3	1	4
Mercer	8	2	10
Middlesex	17	3	20
Monmouth	19	3	22
Morris	8	2	10
Ocean	7	1	8
Passaic	23	2	25
Salem	1	0	1
Somerset	5	1	6
Sussex	2	0	2
Union	25	3	28
Warren	3	1	4
Total	**336**	**39**	**375**

Of the properties contacted for participation in the survey, 384 properties completed the survey. Of these 384 completed surveys, one property did not provide enough information to determine which stratum the property belonged in and was dropped from the study. Additionally, five properties did not report the number of tenant units at their respective properties. Because the number of tenant units plays an integral role in the response-weighting structure, ADM reviewed publicly available databases such as Rent.com and ApartmentFinder.com to determine if the number of tenant units could be supplemented. Of the five properties, information on the number of tenant units could be found for two of the properties. The three remaining properties were removed from the study. The final number of properties included in this study was 380.

Table 2-3 presents the final number of sample properties by stratum.

Table 2-3: Distribution of Sampled Properties

County	Number of Privately-Held Properties	Number of Public and Government-Assisted Housing	Total
Atlantic	4	4	8
Bergen	33	2	35
Burlington	15	2	17
Camden	6	8	14
Cape May	4	0	4
Cumberland	4	0	4
Essex	59	10	69
Gloucester	5	2	7
Hudson	59	11	70
Hunterdon	3	0	3
Mercer	10	1	11
Middlesex	18	3	21
Monmouth	19	4	23
Morris	10	5	15
Ocean	5	3	8
Passaic	26	1	27
Salem	0	1	1
Somerset	4	1	5
Sussex	1	1	2
Union	27	6	33
Warren	3	0	3
Total	**315**	**65**	**380**

Some volatility between the target number of sample points per stratum and the achieved number of sample points per stratum was observed. In some cases, the distribution of sample points between privately-held properties v. public/government-assisted housing deviated from the target number of sample points, although the total number of sample points for the county as a whole was still achieved. Table 2-4 provides information regarding the achieved number of sample points expressed as a percent of the original targets.

Table 2-4: Achieved Percent of Target Sample

County	Privately-Held Properties (% of Target)	Public and Government-Assisted Housing (% of Target)	Total (% of Target)
Atlantic	57%	400%	100%
Bergen	94%	67%	92%
Burlington	214%	100%	189%
Camden	55%	400%	108%
Cape May	44%	N/A	44%
Cumberland	133%	0%	100%
Essex	105%	167%	111%
Gloucester	167%	200%	175%
Hudson	70%	275%	80%
Hunterdon	100%	0%	75%
Mercer	125%	50%	110%
Middlesex	106%	100%	105%
Monmouth	100%	133%	105%
Morris	125%	250%	150%
Ocean	71%	300%	100%
Passaic	113%	50%	108%
Salem	0%	N/A	100%
Somerset	80%	100%	83%
Sussex	50%	N/A	100%
Union	108%	200%	118%
Warren	100%	0%	75%
Total	**94%**	**167%**	**101%**

ADM's overall number of sample points per county were, at minimum, within 25% of the original targets except for Cape May county. Variation between the achieved sample points for privately-held properties and the number of public/government-assisted housing properties with a specific county stems primarily from the data collection method. Because ADM staff relied on an in-person canvasing approach to recruit participants, staff members were unable to verify which properties were privately-held or public/government-assisted housing in real-time prior to inviting the property to participate. These results are controlled by ADM's weighting

methodology, which is discussed in detail in Section 2.3.1. Sampling strata which ultimately had an achieved number of samples of 0 were low-impact strata (i.e., a contribution of less than 0.5% to the total population), therefore, missing sample points in these strata has a negligible impact on the representativeness of the results of this study.

2.1.1 Representation of Utility Service Territories

As noted earlier in the section, one of the primary concerns of this study is to ensure that responses accurately represent the number of multifamily homes in each utility service territory.

Figure 2-1 presents a heatmap of the number of multifamily units estimated to be in each county with an overlay of electric utility service territory and number of sample points. A darker shade on the heatmap represents a higher number of multifamily units concentrated in that county. Solid black lines represent the division of electric service territory. White lines represent county borders. Black dots represent achieved sample points. As can be seen in the heatmap, sample points are well-distributed relative to the number of multifamily units represented in each county. This is to be expected, given that county served as the basis of ADM's sampling stratification. Additionally, counties with the densest number of multifamily units tend to fall in the Public Service Electric and Gas (PSE&G) electric service territory. Conversely, this also means that the values reported in Section 3, which represent statewide values, will tend to be weighted more heavily towards multifamily units in PSE&G electric service territory over multifamily units in other service territories.

Figure 2-1: Number of Sample Points by County Size and Electric Utility
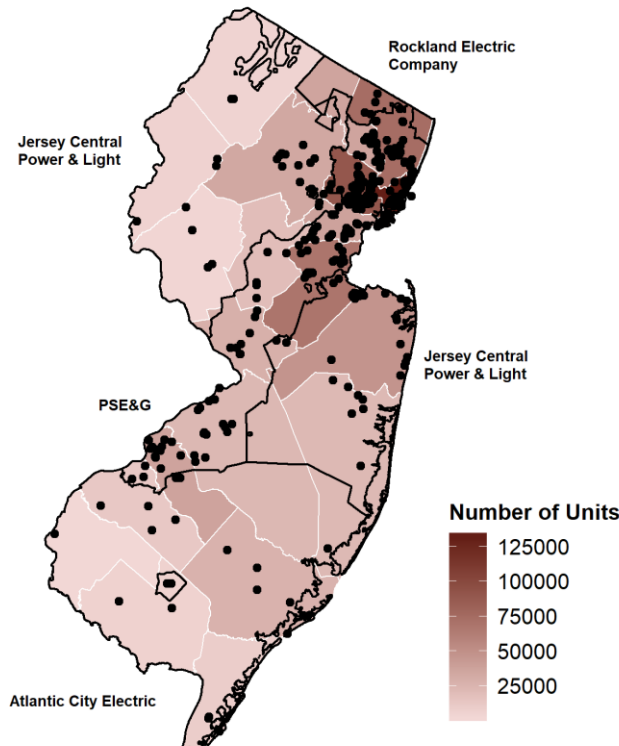
Figure 2-2 presents a heatmap of the number of multifamily units estimated to be in each county with an overlay of gas utility service territory and number of sample points. The representation of county and sample points remain the same as the heatmap for electric service territory. Solid black lines represent the division of gas service territory. Counties with the densest number of multifamily units tend to fall in the PSE&G gas service territory. Conversely, this also means that the values reported in Section 3, which represent statewide values, will tend to be weighted more heavily towards multifamily units in PSE&G gas service territory over multifamily units in other service territories.

Figure 2-2: Number of Sample Points by County Size and Gas Utility
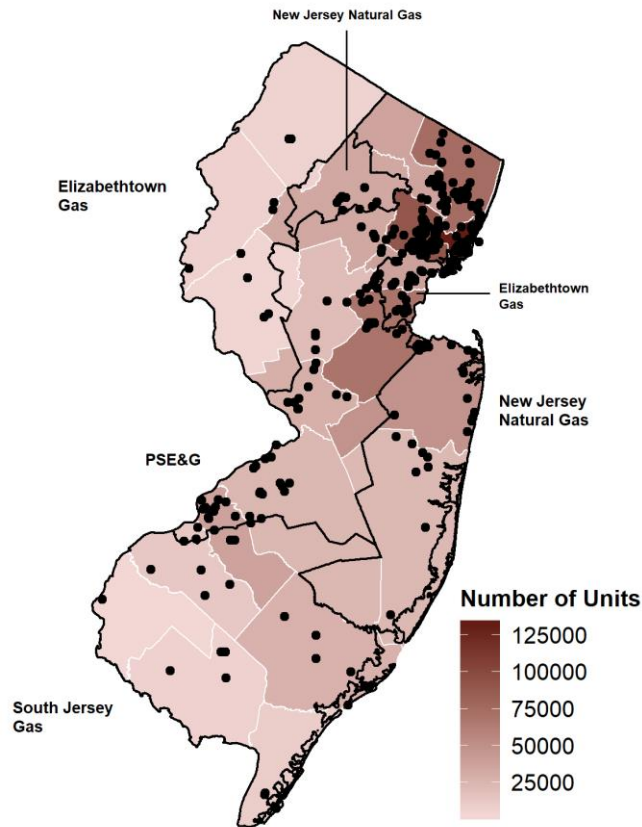
2.1.2   Additional Discussion Regarding Potential Sources of Bias

In Section 2.1, ADM noted that the sample design targeted a representative geographic distribution at the county level as a proxy for representativeness across major utilities. Figure 2-1 and Figure 2-2 show that the distribution of sample points across utility territories corresponds to the distribution of multifamily units within each of the utility territories. While this study is representative regarding geographic distribution (defined using population densities by county and utility territory), one potential source of bias comes from the canvasing design.

The data collection effort prioritized achieving survey completions through the canvasing effort – moving on to another county once the target number of completions were achieved within one.

Given the focus on achieving completions, less emphasis was placed on screening properties (those open to participating) using additional criteria. Once the data was reviewed, ADM noted that there may be an overrepresentation of subsidized housing within the final data set. However, it is unclear to what extent this may be present as the survey design only identified the "presence of subsidized housing" on site. It did not quantify the specific fraction of facilities, which accepted vouchers, currently occupied by residents taking advantage of subsidized housing programs.

2.2   DATA COLLECTION

Participant recruitment and data collection utilized a geographic canvasing approach. Through this approach, field staff identified multifamily properties and visited the properties in person to solicit participation in the study.

A summary of the steps taken to implement this approach is outlined below:

- ADM grouped multifamily properties by geographic area (e.g., municipality).

- ADM identified the number of sample units from each geographic area needed to reach the sample requirements for the study.

- A random sample of premises was drawn from each sampling stratum using the MOD-IV data set.

- ADM staff developed a route of properties to visit based on the list of sampled properties.

- Field staff worked from the list of properties to call upon each sampled property.

- At each property, staff attempted to seek out onsite property staff such as a property manager, facilities manager, leasing supervisor, etc. who could provide the information and access needed for the study.

- If no property management staff were found onsite, contact information for the property was obtained either through MOD-IV data or through internet searches and the property management company was contacted to schedule an onsite visit.

- Property staff was asked to provide access to up to four vacant tenant units.

- For properties that agreed to the study and could not provide access to vacant tenant units, upon agreement of the contact, ADM performed door-to-door canvassing of tenant units to seek access to tenant units.

- A $25 incentive was provided to tenants who allowed unit access.

ADM developed a data collection instrument that was shared in the SurveyGizmo online platform. The data collection instrument was comprised of three primary modules:

- An interview module to collect data on the following:
  - Property ownership

- Job position of the person responding to the survey

- Receipt of affordable housing subsidies

- Tenant ownership status

- Electric/natural gas service metering

- Tenant payment of utilities

- Age of property

- Renovation history

- Number of units in the property

- Common area amenities (e.g., club rooms, laundry facilities)

- Appliances/thermostats provided in units

- Heating/cooling/water heating equipment types and age of units

- Air conditioner (AC) maintenance procedures

- Ownership of common area laundry equipment

- Utility meter and associated account numbers

- Energy management practices (awareness/use of rebate programs, participation in New Jersey Housing and Mortgage Finance Agency (HMFA) green building programs, implementation of building practices in the NJ Green Building Manual, use of ENERGY STAR portfolio manager/certification, Leadership in Energy and Environmental Design (LEED) certifications, use of energy management system, enrollment in demand response programs, efficiency improvements made)

- A common area/building walkthrough module to collect data on the following:

  - Property parking facilities

  - Presence solar panels

  - Physical characteristics of the building (e.g., number of buildings, number of floors)

  - Windows: location, dimension, number of panes, presence of low emissivity windows (Low-E windows), percentage of glazing, and window shading)

  - Wall locations and type, siding type and color

  - Number and type of heating and cooling units/ efficiency ratings / size

  - Mechanical ventilation: make, model, type, location, control type, rated cubic feet per minute, and efficiency

- Ducting type, insulation type and thickness, sealing, whether it is supply or return ducting, location (conditioned vs. unconditioned space)
- Common area and exterior lighting inventory
- Common area kitchen / refrigeration equipment
- Laundry facility equipment
- Swimming pool characteristics and equipment
- A tenant unit module to collect data on:
    - Kitchen appliances, types, fuel types, number, ENERGY STAR designation
    - Room air conditioning units
    - In-unit water heating equipment type, rated efficiency, size
    - Thermostat set points
    - In unit laundry equipment type, size, ENERGY STAR designation

Information regarding whether surveys were completed by a field-staff person or self-completed by a staff member of the property was not collected for 55 of the 380 responses. For the 326 responses for which this information was collected, the percent of responses that were self-reported by a property staff person are reported in Figure 2-3. A copy of the data collection instrument is provided in APPENDIX A: Data Collection Instrument.

Figure 2-3: Survey Collection Method

Property staff person, 39.4%

Field-staff person, 60.6%
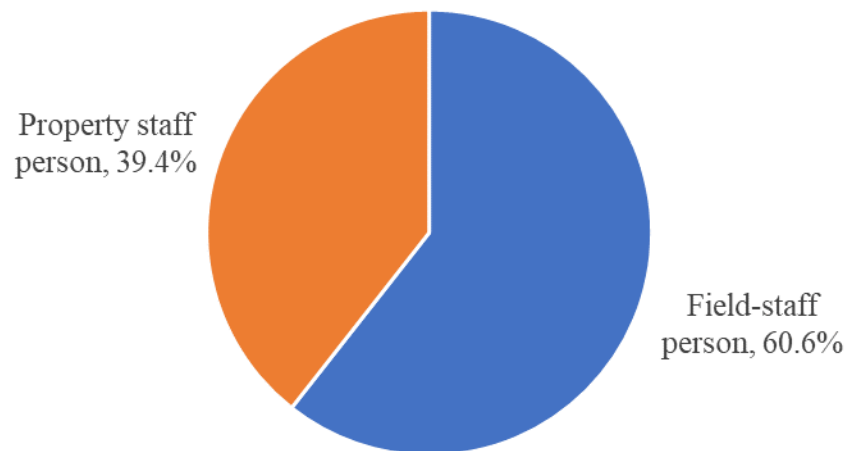
2.3   DATA CLEANING AND ANALYSIS

As described in Section 2.1, ADM first reviewed the data set for duplicated responses and for missing critical fields such as missing number of tenants or missing information that would prevent ADM from identifying the corresponding county for the property. ADM then weighed each response relative to a property's representativeness of the overall population. The process for weighing responses to be representative of the population is described in Section 2.3.1.

2.3.1   Population Estimates

A canvasing method was used to recruit properties to participate in the study. Although ADM stratified the sampling effort by county and private/public housing, there is potential within a given sampling stratum to over-represent buildings of a certain type. Furthermore, although the MOD IV data set provides an accurate representation of the population of multifamily properties in New Jersey, there are still potential differences between counties in terms of property size, which, in turn has a direct impact on the proportionate energy use in buildings of a certain location. Therefore, ADM defined analytical strata for analysis by dividing the sample by county, building size (in number of units), and private or public/government-assisted housing status (as defined through the New Jersey Department of Community Affairs data set). These analytical strata were then used to create a series of weights to adjust responses to the survey in order to best represent the population of multifamily housing units in New Jersey.

The American Community Survey[1] (ACS) is a publicly available study conducted by the U.S. Census Bureau on an annual basis to assess the socioeconomic, demographic, and housing characteristics of households in the United States. Data profiles from the ACS are presented as an aggregation of responses over the previous five calendar years and are available at a county level across the U.S. Included in the data profiles is information regarding the number of units in buildings of various size categories. For the purpose of this study, ADM focused on responses that fell into building sizes above five units.

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[1] https://www.census.gov/programs-surveys/acs/about.html

The projected number of units in the three size categories for buildings of five units and larger ("5 to 9 units", "10 to 19 units", "20 or more units") are presented in Table 2-5.

Table 2-5: Estimated Number of Units by Building Size and County

County	5 to 9 units	10 to 19 units	20 or more units	Total
Atlantic	6,465	7,150	13,375	26,990
Bergen	13,082	13,862	47,106	74,050
Burlington	7,692	7,618	8,000	23,310
Camden	8,082	9,687	19,430	37,199
Cape May	2,556	2,076	4,575	9,207
Cumberland	1,944	1,590	2,673	6,207
Essex	17,717	15,756	56,368	89,841
Gloucester	4,619	3,412	4,563	12,594
Hudson	31,187	21,699	78,381	131,267
Hunterdon	1,293	1,679	1,120	4,092
Mercer	5,927	10,947	11,829	28,703
Middlesex	17,473	26,299	24,629	68,401
Monmouth	11,179	12,151	23,575	46,905
Morris	6,461	10,779	16,603	33,843
Ocean	6,357	5,785	10,339	22,481
Passaic	11,020	7,989	17,363	36,372
Salem	772	938	1,164	2,874
Somerset	5,537	6,857	7,083	19,477
Sussex	2,671	1,385	1,258	5,314
Union	7,756	7,421	22,359	37,536
Warren	2,371	1,984	1,598	5,953
Total	**172,161**	**177,064**	**373,391**	**722,616**

The data obtained through the ACS was used to generate weighting variables for two of the factors used to define ADM's analytical strata: county and building-size within each county. Table 2-6 provides the weights that were attributed to each county based on the number of multifamily units in each county.

Table 2-6: Population Weight of Each County

County	Weight
Atlantic	3.7%
Bergen	10.2%
Burlington	3.2%
Camden	5.1%
Cape May	1.3%
Cumberland	0.9%
Essex	12.4%
Gloucester	1.7%
Hudson	18.2%
Hunterdon	0.6%
Mercer	4.0%
Middlesex	9.5%
Monmouth	6.5%
Morris	4.7%
Ocean	3.1%
Passaic	5.0%
Salem	0.4%
Somerset	2.7%
Sussex	0.7%
Union	5.2%
Warren	0.8%
Total	**100.0%**

In addition to the weights that adjusted responses for each county, ADM also adjusted the weight of responses within a given county based on the building size. These building size weights are presented in Table 2-7.

Table 2-7: Within-County Weight of Each Building Size

County	5 to 9 units	10 to 19 units	20 or more units	Total
Atlantic	24%	26%	50%	100%
Bergen	18%	19%	64%	100%
Burlington	33%	33%	34%	100%
Camden	22%	26%	52%	100%
Cape May	28%	23%	50%	100%
Cumberland	31%	26%	43%	100%
Essex	20%	18%	63%	100%
Gloucester	37%	27%	36%	100%
Hudson	24%	17%	60%	100%
Hunterdon	32%	41%	27%	100%
Mercer	21%	38%	41%	100%
Middlesex	26%	38%	36%	100%
Monmouth	24%	26%	50%	100%
Morris	19%	32%	49%	100%
Ocean	28%	26%	46%	100%
Passaic	30%	22%	48%	100%
Salem	27%	33%	41%	100%
Somerset	28%	35%	36%	100%
Sussex	50%	26%	24%	100%
Union	21%	20%	60%	100%
Warren	40%	33%	27%	100%

ADM also created weights that scaled responses relative to whether a property is privately-held or public/government housing. As shown in Table 2-2, ADM set a target number of sample points for private and public/government-subsidized housing in order to ensure that one housing-type was not over-represented compared to the other. However, because of the sampling methodology, public/government-subsidized housing may be over-represented relative to privately-held properties. To correct for this potential over-representation, ADM created a series of weights that adjusted responses according to the ratio of privately-held to public/government housing in a given county. Because public/government-housing data is not available as part of the ACS data set, these weights were determined using the MOD IV/New Jersey Department of Community Affairs data. The weights associated with private or public/government housing are presented in Table 2-8.

Table 2-8: Within-County Weight of Private or Public/Government Assisted Housing

County	Within-County Weight of Privately-Held Properties	Within-County Weight of Public/Government Housing	Total
Atlantic	86%	14%	100%
Bergen	93%	7%	100%
Burlington	80%	20%	100%
Camden	82%	18%	100%
Cape May	96%	4%	100%
Cumberland	74%	26%	100%
Essex	91%	9%	100%
Gloucester	76%	24%	100%
Hudson	95%	5%	100%
Hunterdon	83%	17%	100%
Mercer	77%	23%	100%
Middlesex	84%	16%	100%
Monmouth	87%	13%	100%
Morris	82%	18%	100%
Ocean	84%	16%	100%
Passaic	93%	7%	100%
Salem	75%	25%	100%
Somerset	77%	23%	100%
Sussex	87%	13%	100%
Union	91%	9%	100%
Warren	85%	15%	100%

To weigh the responses to each question, ADM first defined a response weight for the analytical stratum (county x building size x private/public housing status) by calculating the intersection of the three independent weights. This calculation is presented in Equation 2-2. For each question, the appropriate weight is first identified for the analytical stratum. For example, for Atlantic County properties that were in the "5 to 9 units" category and were privately-held, the county weight would be 3.7%, the size weight would be 24%, and the private/public housing weight would be 86%. The stratum weights were then scaled depending on whether whole categories of responses were missing. For example, if no public housing responses were recorded for Atlantic County for this question, the private/public housing weight would then become 100% instead of 86%. The product of the three adjusted weights would then become the response weight for that stratum.

<div align="center">Equation 2-1: Stratum Weight Calculation</div>

$$RW_s = \frac{PH_s}{\sum PH_{cnm}} \cdot \frac{BW_s}{\sum BW_{cnm}} \cdot \frac{CW_s}{\sum CW_{nm}}$$

Where:

- RW_s is the response weight for the analytical stratum;

- PH_s is the un-adjusted private/public housing weight for the analytical stratum;

- $\sum PH_{cnm}$ is the adjustment factor for the private/public housing weight, which represents the sum of all private/public housing weights for the county for which there are no missing responses for the question of interest;

- BW_s is the un-adjusted building-size weight for the analytical stratum;

- $\sum BW_{cnm}$ is the adjustment factor for the building-size weight, which represents the sum of all building-size weights for the county for which there are no missing responses for the question of interest;

- CW_s is the un-adjusted county weight for the analytical stratum; and

- $\sum CW_{nm}$ is the adjustment factor for the county weight, which represents the sum of all county weights for which there are no missing responses for the question of interest

After calculating the response weights for each analytical stratum, the response weights are then applied to each individual response for each question in order to scale the response to the population. The equation for weighting individual responses is presented in Equation 2-2.

Equation 2-2: Response Weighting Equation

$$X_N = \frac{X_n}{n_s} \cdot RW_s$$

Where:

- X_n is a given unweighted response to a question;

- n_s is the number of responses belonging to the analytical stratum (county, building-size, and private/public housing type)

Because study participants were able to either not respond or respond with "Don't Know" to most survey questions, the number of valid responses to each question is provided with the results in Section 3.

3 RESULTS

The following section provides a summary of the results of the Multifamily Baseline Study across the state of New Jersey. Additional comparisons of physical descriptions of multifamily properties and equipment saturations by utility territory, ownership structure, etc. are presented in the appendices. Responses were categorized into one of four categories:

- Market Baseline Attributes – Information regarding management structure, ownership type, utilities, and income-qualified housing subsidies.

- Physical Description of Multifamily Properties

- Equipment and End-Use Saturations

- Behavioral Characteristics – Information regarding knowledge of and participation in energy efficiency programs.

As noted in Section 2.3.1, the values presented in this section have been scaled proportionally based on the analytical stratum for which a given respondent belongs. The number of sample points included in each calculation is provided in each table and chart. Values are presented based on the number of properties for which a measure applies rather than using the total population as the denominator value. This is because inclusion of non-applicable properties in a calculation may unfairly bias a value, making it less interpretable. For example, reporting of the age of a washing machine in a common laundry facility should only be calculated for properties that have washing machines—including properties that do not have washing machines pollutes the calculated value. For the sake of presentation, cases in which values should be interpreted as a percent of the total population v. as a percent or mean of properties for which a question is applicable are indicated in tables and the surrounding text.

3.1 MARKET BASELINE ATTRIBUTES

This sub-section presents information pertaining to market baseline attributes. Specifically, this sub-section reviews characteristics such as the management structure and ownership type of the properties, information regarding utilities provided at the properties, and the distribution of income-qualified housing subsidies at the properties.

3.1.1 Management Structure and Ownership Type

Study participants were asked to provide information regarding the management structure and ownership type of the property. This included information regarding whether the property management company manages more than one property, the number of other properties managed by the property management company, and information regarding building ownership.

Study participants were asked whether the property management company manages multiple properties, including the property included in the study. As can be seen in Figure 3-1, most properties are managed by a company that manages more than one property (85.6%). As a follow-up question, participants were asked how many other properties their respective property management company manages. On average, property management companies manage 975 other properties, with responses ranging from 1 to 400,000 (n=303). Although this may appear to be a large value, it is important to note that properties could be owned or managed either by a sole proprietorship or large corporation. A large-scale national property management company or commercial real estate company could own or manage these many properties. Alternatively, some respondents could have misinterpreted the question as asking the total number of units across all properties managed by their company rather than the number of properties.

Figure 3-1: Company Manages Other Properties

No, 14.4%

Yes, 85.6%

n=358
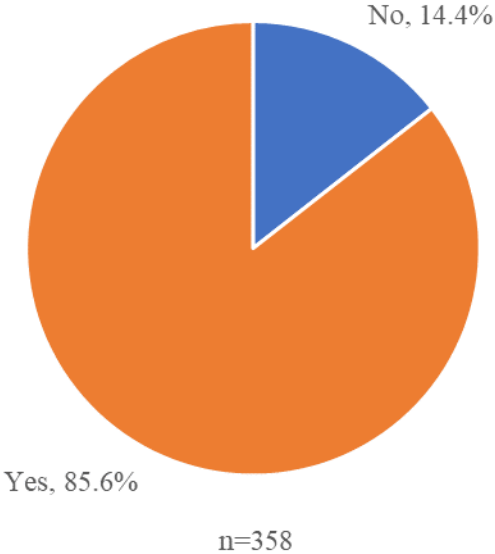
In addition to being asked whether the property management company manages other properties, participants were asked what type of company owns the property: an individual (sole proprietorship), Limited Liability Corporation ("LLC"), C corporation, or S corporation. As can be seen in Figure 3-2, most respondents noted that their respective properties are owned by LLCs (71%). It should be noted that LLCs can be individual owners (sole proprietorships), partnerships, or other business structures.

Figure 3-2: Property Ownership Type
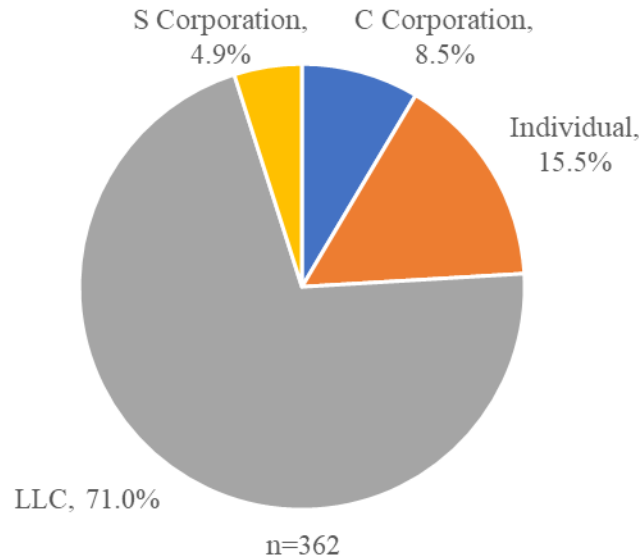
3.1.2 **Utility Information**

Participants were asked about utilities (i.e., gas and electricity) and other services (i.e., water heating, space heating, cooling, etc.) at each of their respective properties. Specifically, participants were asked what services are provided to tenants at no cost by the property, which electric and gas utility companies provide electric and gas service to the property, and what type of utility meters are installed at the property.

Participants were asked whether the following utilities or services were provided at no cost to tenants: cooling, electricity, gas, heating, hot water, or none of the above. The results of this question are presented in Figure 3-3. About half of all properties reported that no utilities or services are provided to tenants at no-cost (53.8%). In other cases, the most commonly provided services were hot water (41.2%) and space heating (34.4%).

Figure 3-3: Services Provided to Tenants at No-Cost

n=380
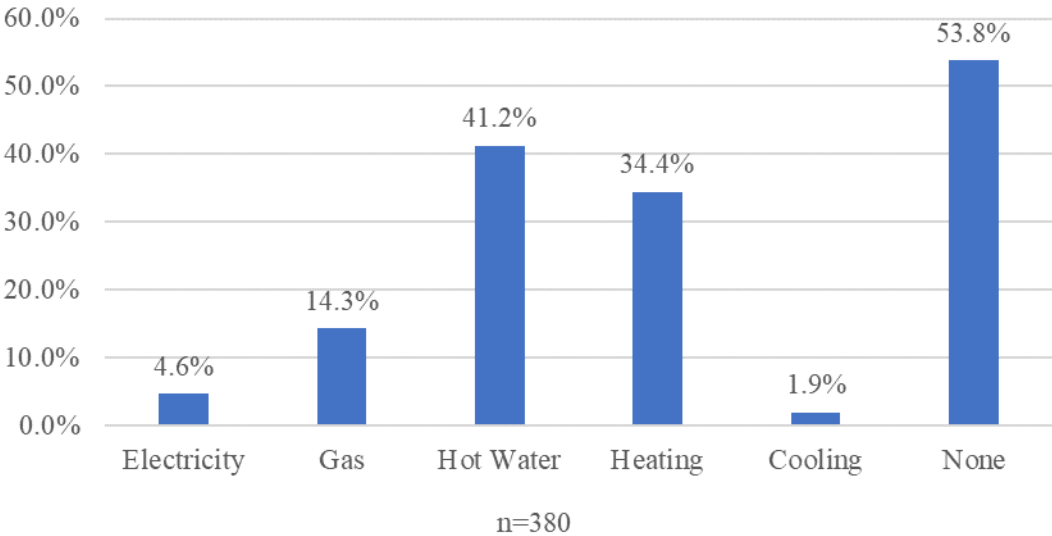
It should be noted that the utilities and services from which participants could select from are not mutually-exclusive. For example, a portion of the participants who reported water heating and space heating as being provided to the tenants at no cost could also be participants who reported providing gas service at no cost to participants as well. ADM reviewed the intersection between properties that provide space heating to tenants at no-cost to see whether space heating was provided to tenants at no-cost because gas or electric service is provided to tenants at no-cost. These results are presented in Figure 3-4.

Figure 3-4: Percent of Properties That Provide No-Cost Space Heating That Provide No-Cost Gas or Electric Service

Yes, 52.0%   No, 48.0%

n=167
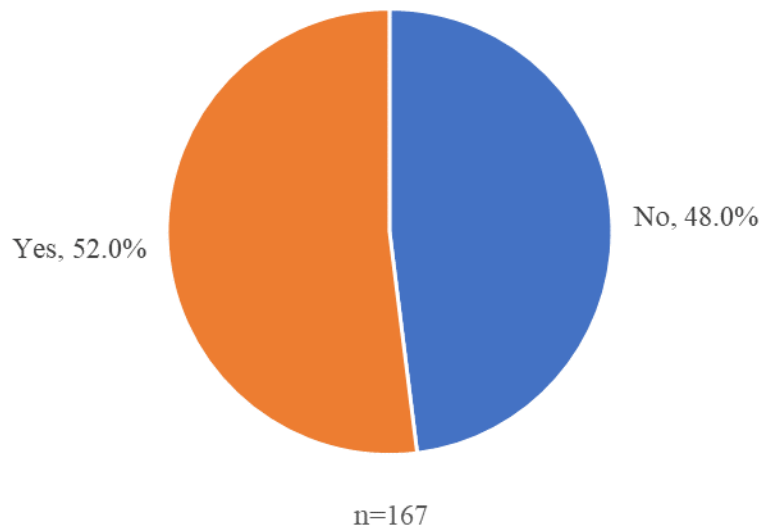
Similarly, ADM also reviewed the number of properties that provide no-cost water heating to tenants and whether these properties also provide no-cost gas or electricity. These results are presented in Figure 3-5.

Figure 3-5: Percent of Properties That Provide No-Cost Water Heating That Provide No-Cost Gas or Electric Service

Yes, 41.0%

No, 59.0%

n=191
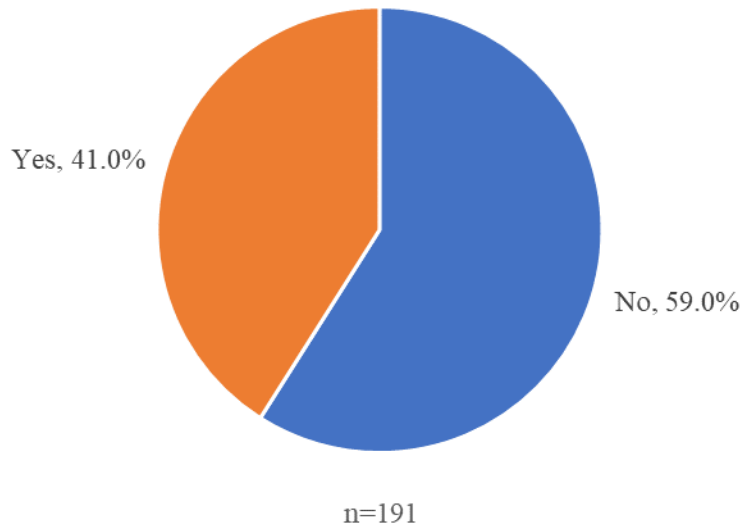
Additionally, ADM also reviewed the number of properties that provide no-cost cooling to tenants and whether these properties also provide no-cost electricity. These results are presented in Figure 3-6.

Figure 3-6: Percent of Properties That Provide No-Cost Cooling That Provide No-Cost Electric Service

No, 16.4%

Yes, 83.6%

n=13
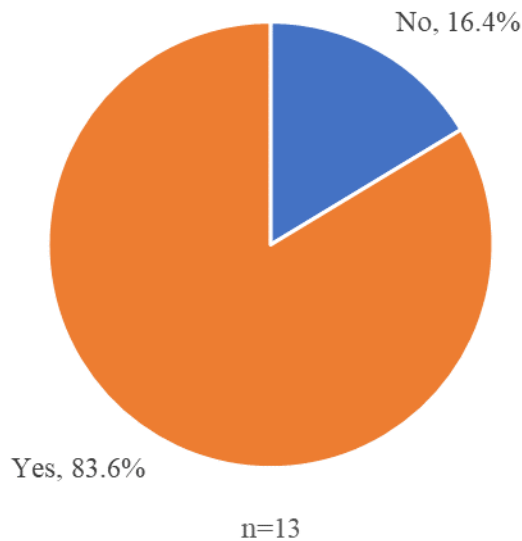
Study participants were asked whether electric service was master metered, individually metered, master metered with sub-meters, or individually metered with additional meters for common areas. As can be seen in Figure 3-7, most properties are individually metered with additional meters for common areas.

Figure 3-7: Electric Meter Type

One Master Meter with no Tenant Meters, 4.6%

Master Meter Plus Sub-Meters for Individual Tenants, 16.2%

All Individually Metered Tenant Units, No Master Meter, 9.0%

Individually Metered plus Separate Meters for Common Area, 70.3%

n=378
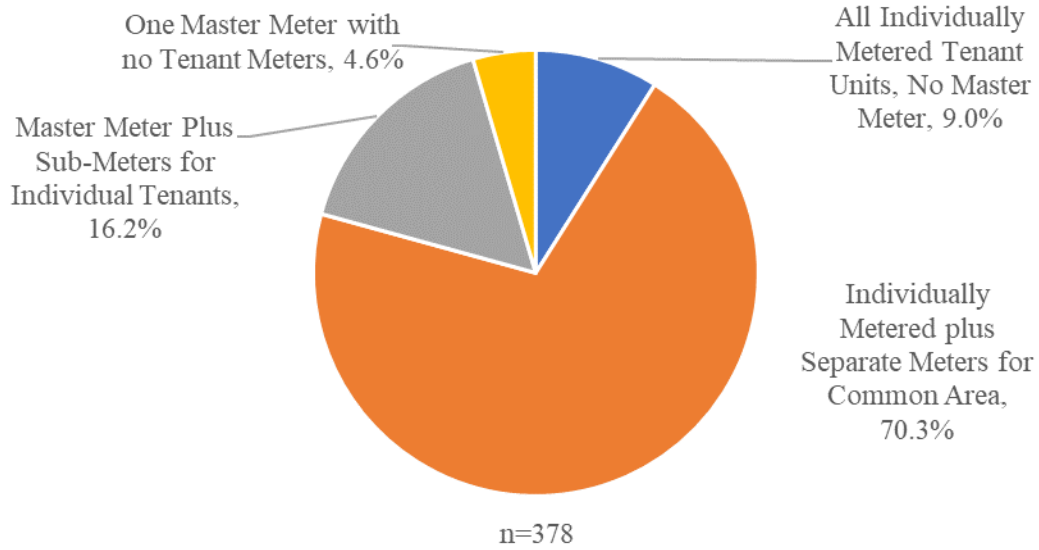
These values are further broken out by electric utility company, building size, and building height in Table 3-2 through Table 3-3.

Table 3-1: Electric Meter Type by Electric Utility Company

Type	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=290)	Rockland Electric Company (n=2)
All Individually Metered Tenant Units, No Master Meter	5.3%	6.1%	0.0%	8.2%	0.0%
Individually Metered plus Separate Meters for Common Area	79.7%	77.6%	100.0%	69.3%	100.0%
Master Meter Plus Sub-Meters for Individual Tenants	5.2%	9.5%	0.0%	19.1%	0.0%
One Master Meter with no Tenant Meters	9.8%	6.9%	0.0%	3.4%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table 3-2: Electric Meter Type x Building Size

Type	5 to 9 units (n=29)	10 to 19 units (n=27)	20 or more units (n=322)
All Individually Metered Tenant Units, No Master Meter	24.1%	9.6%	4.5%
Individually Metered plus Separate Meters for Common Area	51.2%	67.9%	76.3%
Master Meter Plus Sub-Meters for Individual Tenants	24.7%	12.6%	14.3%
One Master Meter with no Tenant Meters	0.0%	9.9%	5.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table 3-3: Electric Meter Type x Building Height

Type	High-Rise (n=144)	Low-Rise (n=232)
All Individually Metered Tenant Units, No Master Meter	2.8%	8.2%
Individually Metered plus Separate Meters for Common Area	71.9%	73.0%
Master Meter Plus Sub-Meters for Individual Tenants	17.8%	17.3%
One Master Meter with no Tenant Meters	7.5%	1.5%
Total	**100.0%**	**100.0%**

Participants were also asked to report their electric utility provider. These results are presented in Figure 3-8. As discussed previously in Section 2.1.1, the number of multifamily units in each

utility service territory is skewed relative to both the geographic size of the utility service territory and the density of multifamily units in those respective service territories. For example, PSE&G has a high representation per Figure 3-8 (74.4%) because it encompasses counties for which a high density of multifamily units is estimated to be present—specifically Hudson County, Essex County, etc. Conversely, Rockland Electric Company, which is one of the four investor-owned utilities, makes up a small representation of the survey responses (0.3%) primarily because its service territory currently consists of half of Bergen and Passaic Counties out of the 21 current counties in the state of New Jersey.

Figure 3-8: Electric Utility Provider
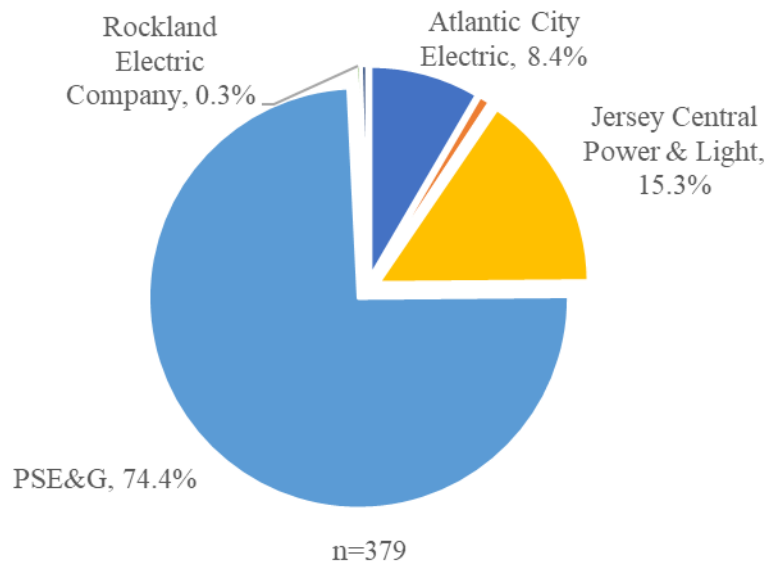
Study participants were asked whether gas service was available at their respective properties. As can be seen in Figure 3-9, most properties reported having gas service (91.7%)

Figure 3-9: Gas Service Availability
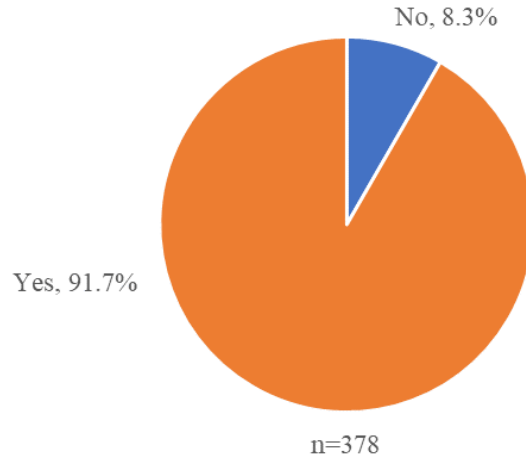
Participants who reported having gas service at their property were then asked whether gas service was master metered, individually metered, master metered with sub-meters, or individually metered with separate meters for common areas. Results are presented as a function of the percent of the population that reported having gas service rather than as a percent of the total population. As with electric usage, most participants reported individual meters with separate meters for common areas (50.1%). However, master metered gas usage with no tenant meters was reported at a higher rate for gas service than electric service (25.5% compared to 4.6%).

Figure 3-10: Gas Meter Type
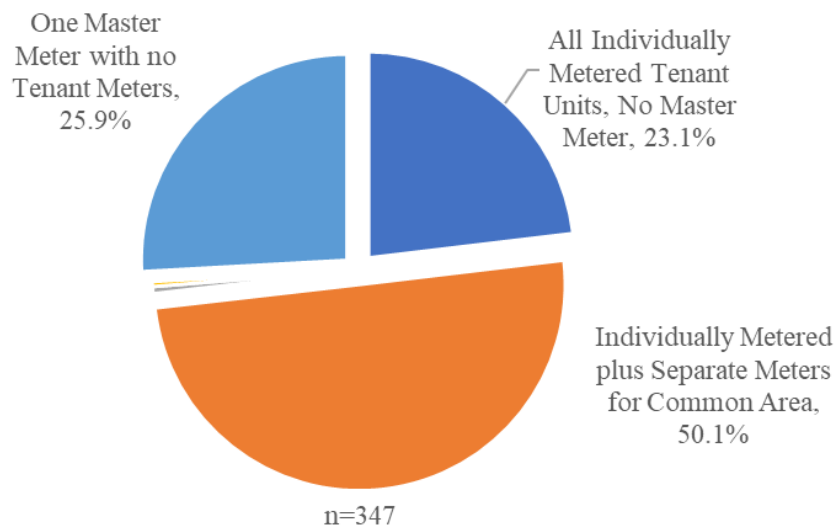
Study participants were asked to report their gas utility provider. These results are presented in Figure 3-11. As with electric utility service, the most common provider was reported as PSE&G. As discussed previously in Section 2.1.1, the number of multifamily units in each utility service territory is skewed relative to both the geographic size of the utility service territory and the density of multifamily units in those respective service territories. For example, PSE&G has a high representation in Figure 3-11 (76.6%) because it encompasses counties for which a high density of multifamily units is estimated to be present—specifically Hudson County, Essex County, etc.

Figure 3-11: Gas Utility Provider
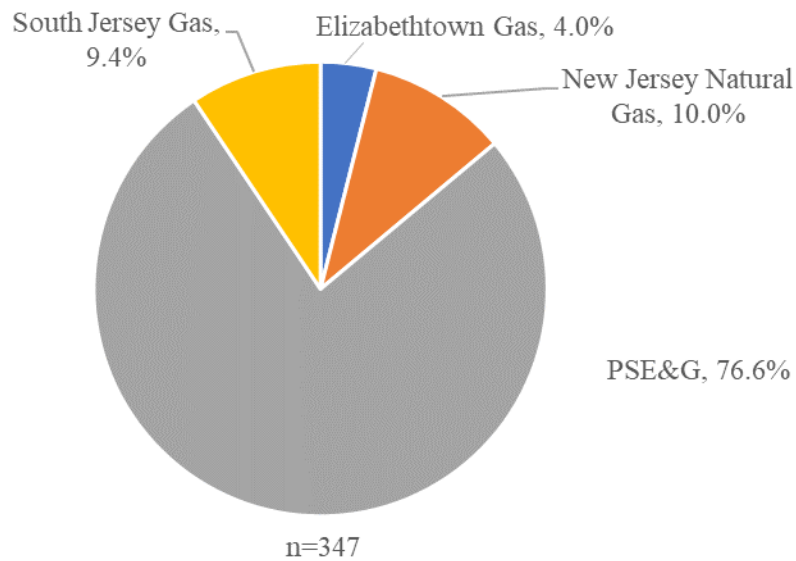
ADM also looked at the gas and electric metering type for properties that reported providing no-cost space heating to tenants. Figure 3-12 presents the gas metering structure for gas space-heat properties that reported providing no-cost space heating to tenants. Figure 3-13 presents the electric metering structure for electric space-heat properties that reported providing no-cost space heating to tenants.

Figure 3-12: Gas Metering Type x No-Cost Tenant Space Heating x Gas Primary Heating Fuel

All Individually Metered Tenant Units, No Master Meter, 3.6%

Individually Metered plus Separate Meters for Common Area, 38.8%

One Master Meter with no Tenant Meters, 57.1%

Mixed: Some units master metered and some units individually metered, 0.5%

n=159
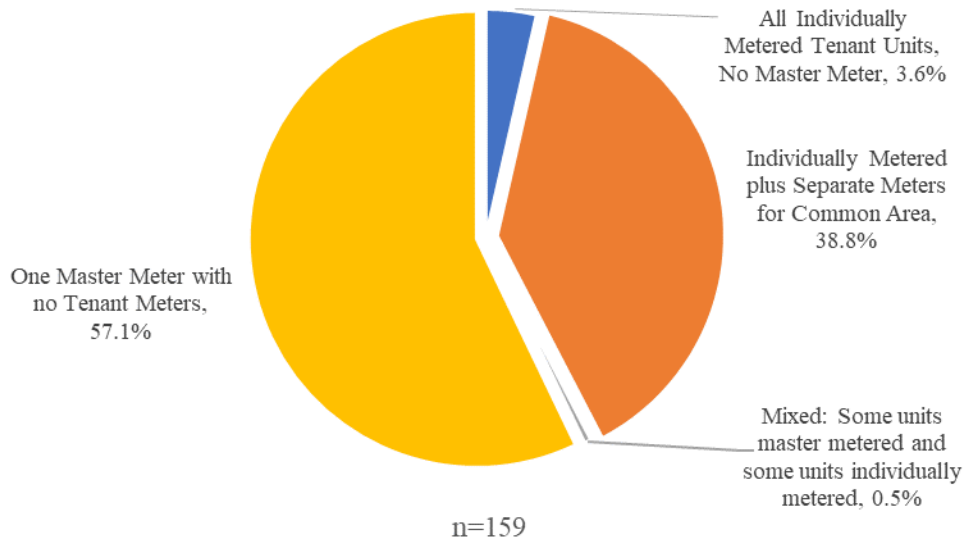
Figure 3-13: Electric Metering Type x No-Cost Tenant Space Heating x Electric Primary Heating Fuel

All Individually Metered Tenant Units, No Master Meter, 1.9%

Master Meter Plus Sub-Meters for Individual Tenants, 8.9%

One Master Meter with no Tenant Meters, 89.2%

n=7
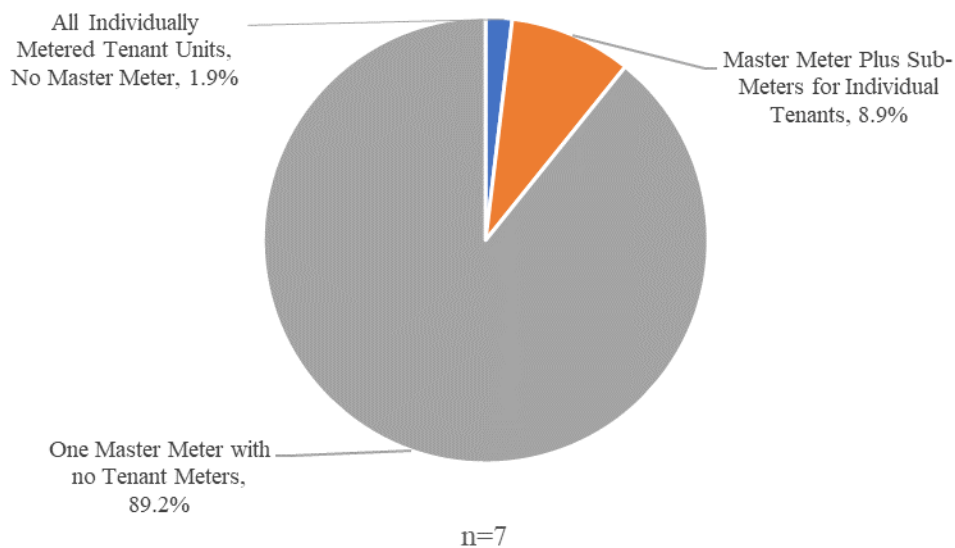
3.1.3 Income-Qualified Housing

Study participants were asked about the status of income-qualified housing at their respective properties. Specifically, participants were asked whether their respective property participated in two New Jersey income-qualified housing programs—the Low-Income Housing Tax Credit Program or in one of New Jersey's Housing and Mortgage Finance Agency Multifamily Housing programs. Study participants were also asked if their property receives income-qualified housing vouchers through HUD Section 8. The results of these questions are provided in Figure 3-14. It should be noted that a large proportion of participants reported receiving vouchers through HUD Section 8 (46.4%). While this figure represents responses as an "all-or-nothing" response, it should be noted that it is more likely that a portion of units are reserved for HUD Section 8 eligible tenants rather than whole properties. Additionally, properties could be reporting receipt of tenants using HUD Section 8 housing choice vouchers, which allow income-qualified tenants to receive subsidized housing as a property that does not directly participate in a HUD Section 8 program, rather than HUD Section 8 project-based vouchers, which a property receives directly from HUD for reserving a portion of units for income-qualified tenants.

Figure 3-14: Income-Qualified Housing Participation
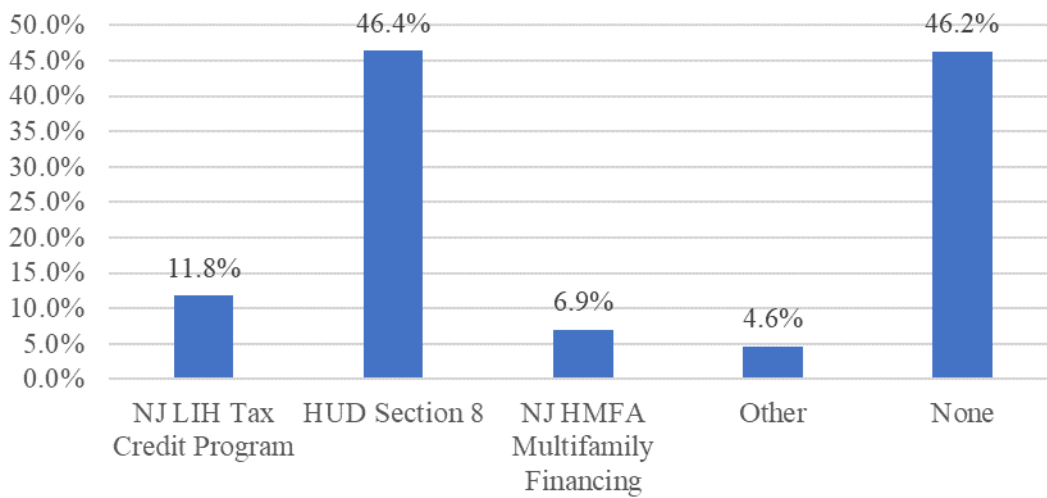
n=365

In addition to reviewing the portion of the population that received specific types of housing subsidies, ADM also reviewed the proportion of the population that received some form of housing subsidy and what proportion of the population reported receiving more than one housing subsidy-type at the property. These results are presented in Figure 3-15.

Figure 3-15: Number of Subsidies Received by Multifamily Properties
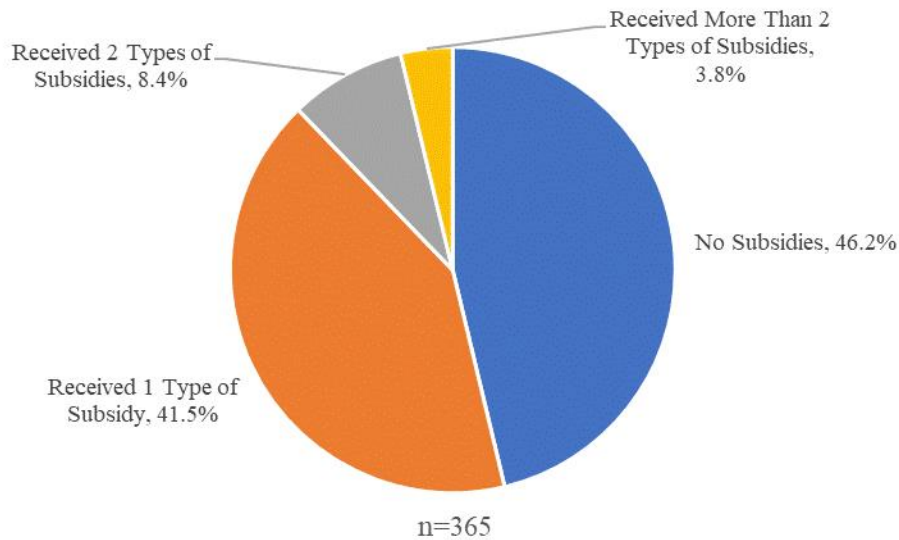
3.2 PHYSICAL DESCRIPTION OF MULTIFAMILY PROPERTIES

The following sub-section provides baseline physical characteristics regarding multifamily properties, not including equipment or end use saturations, which are discussed in Section 3.3 Information included in this sub-section includes:

- Information regarding building size and occupancy,

- Information regarding the building shell, construction year, and construction materials,

- Information regarding windows,

- Information regarding solar panels, and

- Information regarding parking lots.

3.2.1 Building Size and Occupancy

Participants were asked various questions to assess the size and occupancy of their respective buildings.

Participants were asked about the relative size of their property. Participants were first asked whether the property had more or less than five units. As can be seen in Table 3-4, all properties reported having more than five units.

Table 3-4: Property Size

Property Size	Percent of Population (n=380)
Less than 5 units	0.0%
5 or more units	100.0%
Total	**100.0%**

Participants were asked about the number of buildings on the property (mean: 9, range: 1-502, n=360) and the average number of floors per building (mean: 4, range: 1-23, n=378).

ADM categorized buildings into high-rise or low-rise depending on the number of floors reported by survey respondents. Properties with fewer than four floors were considered low-rise while properties with four floors or higher were considered high-rise. The results are presented in Table 3-5.

Table 3-5: High-Rise or Low-Rise

Type	Percent of Population (n=378)
Low-Rise	64.0%
High-Rise	36.0%
Total	**100.0%**

Additionally, properties were categorized by size based on the three size categories previously defined in Section 2.3.1 ("5 to 9 units," "10 to 19 units," and "20 or more units"). These results are presented in Table 3-6.

Table 3-6: Properties by Size

Type	Percent of Population (n=380)
5 to 9 units	19.9%
10 to 19 units	11.8%
20 or more units	68.3%
Total	**100.0%**

Participants were asked to report the average square footage of different-sized units at their respective properties as well as the number of those units present at their respective properties. Based on whether participants provided responses for units of specific sizes, ADM was able to calculate how common certain-sized units are at multifamily properties. These calculations are presented in Table 3-7. As can be seen through this table, 1-bedroom and 2-bedroom units are the most common unit-type at most multifamily properties.

Table 3-7: Presence of Specific Unit-Types at Multifamily Properties

Unit-Type	Present at Property (% of Population) (n=379)	Not Present at Property (% of Population) (n=379)
Studio	26.5%	73.5%
1 Bedroom	82.1%	17.9%
2 Bedroom	87.8%	12.2%
3 Bedroom	35.6%	64.4%
4 Bedroom	3.6%	96.4%
5 Bedroom	0.8%	99.2%

ADM then calculated the average square footage and the average number of units per property for properties that reported having these unit-types. These results are presented in Table 3-8 and Table 3-9.

In order to prevent biasing the averages reported in these tables (i.e., understating the average square footage of a 3-bedroom unit, for example), the averages are taken for respondents who *reported having these unit-types present at the complex*. For example, the average square footage reported for a 3-bedroom unit is 1,309 square feet. This square footage is only applicable for properties that report having a 3-bedroom unit. A population average (i.e., the average square footage across all properties, including those that do not have 3-bedroom units), can be calculated by multiplying the prevalence rate reported in Table 3-7 (35.6%) by the average square footage reported in Table 3-8 (1,309 square feet). Similar calculations should be made for the values in Table 3-9 when extrapolating beyond buildings that report having specific unit-types.

Table 3-8: Average Square Footage by Unit-Type

Unit-Type	Average Sqft per Unit-Type	Min Sqft	Max Sqft
Studio (n=94)	486	150	800
1 Bedroom (n=328)	742	250	1,280
2 Bedroom (n=338)	1,001	450	2,500
3 Bedroom (n=112)	1,309	650	3,000
4 Bedroom (n=17)	1,525	850	2,000
5 Bedroom (n=3)	1,984	1,375	2,500

Table 3-9: Average Number of Units per Unit-Type

Unit-Type	Average Number of Units per Property	Min Number of Units	Max Number of Units
Studio (n=96)	17.34	1	274
1 Bedroom (n=333)	58.05	1	494
2 Bedroom (n=344)	48.34	1	984
3 Bedroom (n=118)	20.75	1	300
4 Bedroom (n=18)	7.65	1	44
5 Bedroom (n=4)	20.53	1	35

Participants were asked about the owner-occupancy rate and vacancy rate at the property. The owner-occupancy rate refers specifically to properties that are not exclusively rental properties (i.e., properties in which all or a portion of units are sold to individual owners rather than properties that are fully owned by an individual or company for rental purposes). The owner-occupancy rate is expressed as the percent of units that are owned by individuals over the total number of units at the property. Similarly, the vacancy rate refers to the number of units that are vacant over the total number of units at the property. Table 3-10 presents the average owner-occupancy rate and the average vacancy rate per property.

Table 3-10: Average Owner-Occupancy and Vacancy Rate

Measure	Weighted Average Percent (n=373)
Percent Owner-Occupied	15.6%
Percent Vacancy	16.2%

3.2.2 Building Shell, Construction Year and Construction Materials

Study participants were asked various questions pertaining to the building shell, construction year, and construction materials.

Participants were asked about when their property was constructed from the options presented in Table 3-11. As can be seen in the table, the year of construction of surveyed properties was relatively distributed, with most construction occurring before the year 2010.

Table 3-11: Construction Year

Construction Year	Percent of Population (n=366)
Before 1940	10.80%
1940 - 1949	7.20%
1950 - 1959	8.50%
1960 - 1969	16.70%
1970 - 1979	10.30%
1980 - 1989	4%
1990 - 1999	3.10%
2000 - 2009	12.60%
2010 - 2014	10.70%
2015	4.40%
2016	4.50%
2017	3.30%
2018	3.90%
Total	**100.0%**

In addition to asking when the property was constructed, study participants were also asked whether the property had undergone major construction over the past ten years, as presented in Table 3-12. Major construction is defined in the survey as any major renovations, remodels, additions that could include activities such as adding more buildings or units, adding additional common area space, installing new systems, or reconstruction due to natural disaster. Roughly a third of properties (28.2%) reported having undergone major construction under the past ten years.

Table 3-12: Major Construction in the Past 10 Years

Major Construction <= 10 Years	Percent of Population (n=375)
No	71.8%
Yes	28.2%
Total	**100.0%**

Survey participants who reported their property as having undergone major construction over the past ten years were asked what year construction occurred. The results of this question are presented in Table 3-13. A third of properties who underwent major construction over the past ten years had the construction occur in the year 2018 while a third reported construction occurring between the years 2008-2014.

Table 3-13: Year of Last Major Construction

Year of Construction	Percent of Properties w/ Construction in the Past 10 Years (n=94)
2008-2014	31.2%
2015	12.3%
2016	9.3%
2017	13.8%
2018	33.4%
Total	**100.0%**

Survey participants were asked what construction material was used for exterior walls at their property. The results of this question are presented in Table 3-14. The most common exterior wall material is brick (37.0%) with the second most common material being aluminum/asbestos/plastic/wood (27.1%).

Table 3-14: Exterior Wall Material

Exterior Wall Material	Percent of Population (n=348)
Brick	37.0%
Aluminum, Asbestos, Plastic or Wood Materials (Siding, Shingle Tiles, or Shakes)	27.1%
Concrete Block or Poured Concrete	16.5%
No One Major Type	11.2%
Other	3.5%
Pre-Cast Concrete Panels	3.3%
Window or Vision Glass (Glass that can be Seen Through)	0.9%
Sheet Metal Panels	0.4%
Decorative or Construction Glass	0.0%
Total	**100.0%**

Survey participants were asked about the shape of the building, as reported in Table 3-15. The most common building shape is rectangular (62.8%), although a wide variety of building shapes was reported by participants.

Table 3-15: Building Shape

Building Shape	Percent of Population (n=358)
Rectangle	62.8%
Square	12.0%
U-Shaped	8.7%
L-Shaped	5.8%
Rectangle or Square with an Interior Courtyard	3.9%
H-Shaped	3.1%
Other	1.0%
T-Shaped	1.0%
No One Major Type	0.8%
M-Shaped	0.3%
E-Shaped	0.2%
Y-Shaped	0.1%
G-Shaped	0.1%
Total	**100.0%**

Participants were also asked about roofing material. Table 3-16 presents the results of this question. The most common roofing material was found to be asphalt/fiberglass/other shingles (40.8%), with the second and third most common responses being built-up (18.8%) and slate/tile shingles (15.0%).

Table 3-16: Roofing Material

Roofing Material	Percent of Population (n=350)
Asphalt, Fiberglass, or Other Shingles	40.8%
Built-Up (Tar, Felts, or Fiberglass and a Ballast, Such as Stone)	18.8%
Slate or Tile Shingles	15.0%
Plastic, Rubber, or Synthetic Sheeting (Single or Multiple Ply)	13.0%
Wood Shingles, Shakes, or Other Wooden Materials	5.7%
Concrete	4.0%
Metal Surfacing	2.1%
Aluminum Top Coat with a Felt Layer	0.4%
Fiberglass and Rubber Membrane	0.1%
Total	**100.0%**

3.2.3 Windows

Survey participants were asked various questions regarding windows. Specifically, participants were asked about the percent of exterior walls covered by windows, the amount of sunlight on walls where windows were present, and questions regarding window efficiency.

Participants were asked about the relative percent of exterior wall window coverage. The results of this question are presented in Table 3-17. Most respondents reported less than 50% window coverage of exterior walls (94.7%).

Table 3-17: Exterior Wall Window Coverage

Exterior Wall Window Coverage	Percent of Population (n=345)
1% or less	2.9%
2% to 10%	27.3%
11% to 25%	42.4%
26% to 50%	22.2%
51% to 75%	4.6%
76% to 100%	0.7%
Total	**100.0%**

Participants were asked whether window coverage was the same for all walls. As can be seen in Table 3-18, most respondents reported equal window coverage for all walls (83.2%).

Table 3-18: Equal Window Coverage for All Walls

Equal Window Coverage for All Walls	Percent of Population (n=357)
No	16.8%
Yes	83.2%
Total	**100.0%**

Participants who reported the window coverage being different between the walls of their respective property's buildings were asked how glass surface area differed between sunlight facing walls and non-sunlight facing walls. Table 3-19 presents the results of this question. Of the respondents who reported having different window surface area on all walls, 53.1% reported that the amount of glass area on sunlight-facing walls was equal to the amount of glass area on non-sunlight facing walls.

Table 3-19: Amount of Glass Area on Sunlight-Facing Walls v. Non-Sunlight Facing Walls

Glass Area of Sunlight-Facing v. Non-Sunlight Facing Walls	Percent of Properties that Report Uneven Wall-Window Distribution (n=55)
About the same amount between Sunlight-Facing and Non-Sunlight Facing Walls	53.1%
More Glass Area on Sunlight-Facing Walls	33.3%
Less Glass Area on Sunlight-Facing Walls	13.6%
Total	**100.0%**

Participants were asked whether windows were single-layer or multi-layer, as presented in Table 3-20. Most properties were found to have multi-layer windows (80.5%).

Table 3-20: Single-Layer or Multi-Layer Windows

Window-Type	Percent of Population (n=349)
Multi-layer	80.5%
Single layer	14.7%
Combination of both types	4.9%
Total	**100.0%**

Low-emissivity glass (Low-E) is a type of energy efficient glass that reduces the amount of infrared and ultraviolet light that is absorbed through windows, thereby reducing the amount of energy necessary for space cooling. Participants were asked whether windows were Low-E. Most respondents reported that windows were not Low-E (62.2%) as shown in Table 3-21. It should be noted that reliability of this question may be low. Despite all survey participants being presented with this question, more than a quarter of participants (105 of 380) reported not knowing whether properties had Low-E windows or not.

Table 3-21: Presence of Low-E Windows

Low-E Windows	Percent of Population (n=275)
No	66.6%
Yes	33.4%
Total	**100.0%**

Finally, program participants were asked whether different types of windows were present at their complex. Specifically, they were asked if clear, tinted, reflective, or opaque windows were present at the complex. Clear windows were most commonly present (98.7%) while other forms or windows were uncommon (<2.0%).

Table 3-22: Presence of Window Types

Window-Type	Yes (n=358)	No (n=358)
Clear	98.7%	1.3%
Tinted	2.0%	98.0%
Reflective	0.1%	99.3%
Opaque	0.1%	99.5%

3.2.4   Solar Panels

Participants were asked whether solar panels were present on the property in general, whether roof mounted solar panels were present, and whether parking structure solar panels were present. Table 3-23 shows that most multifamily properties do not currently have solar panels (94.6%).

Table 3-23: Solar Panels Present on Property

Solar Panels Present on Property	Percent of Population (n=380)
No	94.6%
Yes	5.4%
Total	**100.0%**

Of the respondents who reported having solar panels present at their respective properties, ADM asked whether solar panels were reported as being roof-mounted or not. Most solar panels were reported as being roof-mounted (77.1%), as shown in Table 3-24.

Table 3-24: Roof-Mounted Solar Panels

Roof -Mounted Solar Panels	Percent of Properties with Solar Panels (n=25)
No	22.9%
Yes	77.1%
Total	**100.0%**

In addition to asking whether solar panels were roof-mounted, participants were also asked whether solar panels were mounted to parking structures such as parking garages, tenant-unit garages, or carports. Section 3.2.6 discusses the general prevalence of certain types of parking at multifamily properties. Of the properties who reported having solar panels, 23.6% reported having parking garages, although none reported having carports. Despite the prevalence of parking garages, none of the participants who reported having solar panels reported any of the solar panels as being parking structure-mounted, as shown in Table 3-25.

Table 3-25: Parking Structure-Mounted Solar Panels

Parking Structure-Mounted Solar Panels	Percent of Properties with Solar Panels (n=25)
No	100.0%
Yes	0.0%
Total	**100.0%**

3.2.5   Roofs

Study participants were asked questions pertaining to roof pitch and roof shading. As can be seen in Table 3-26, most participants (57.4%) reported their property as having a pitched roof.

Table 3-26: Roof Pitch

Roof Pitch	Percent of Population (n=380)
Pitched	57.4%
Flat	42.6%
Total	**100.0%**

Furthermore, as can be seen in Table 3-27, most respondents reported minimal roof shading (86.3% reported less than 25% roof shading).

Table 3-27: Percent Roof Shading

Percent Shading	Percent of Population (n=376)
0%-25%	86.3%
26%-50%	11.7%
51%-75%	1.8%
75%-100%	0.3%
Total	**100.0%**

3.2.6 Parking Lots

Table 3-28 shows the type of parking available at properties. Properties most commonly reported the presence of an open parking lot (74.7%), with garages being the second most commonly reported parking type (23.6%). Additionally, participants were asked how many parking spaces were available at their respective property. On average, 133 parking spots were reported as being available (range: 0-2,250; n=305).

Table 3-28: Types of Parking Available

Parking Type	Yes (n=380)	No (n=380)
Open Lot	74.7%	25.3%
Garage	23.6%	76.4%
Carport	3.3%	96.7%
Other	9.6%	90.4%
None	11.7%	88.3%

Study participants were asked whether EV charging stations were present at their respective properties. Most respondents reported EV charging stations as not being present at the property (96.9%). Of the respondents who reported an EV charging station present, the average number of charging stations was reported as 4 (range:1-12, n=13).

Table 3-29: EV Stations Present

EV Stations Present	Percent of Population (n=380)
No	96.9%
Yes	3.1%
Total	**100.0%**

In addition to reviewing whether EV stations were present on the property, ADM also reviewed whether properties that have EV stations present also have solar panels present on the property. As can be seen in the Table 3-30, all properties that reported having EV stations also reported having solar panels.

Table 3-30: Presence of Solar Panels at Properties with EV Stations

Solar Panels Present	Percent of Properties with EV Stations (n=13)
No	0.0%
Yes	100.0%
Total	**100.0%**

3.2.7 Common Areas

Participants were asked whether enclosed common areas were present at their respective properties. Most participants reported having enclosed common areas (57.3%), although a large percent of properties did not have enclosed common areas (42.7%).

Table 3-31: Enclosed Common Areas Present

Enclosed Common Areas	Percent of Properties (n=379)
No	42.7%
Yes	57.3%
Total	**100.0%**

Respondents who reported having enclosed common areas at their facility were asked to select whether they had the following common areas at their property:

Table 3-32: Presence of Different Common Area Types at Properties with Enclosed Common Areas

Space-Type	Yes (n=228)	No (n=228)
Boiler Room	45.3%	54.7%
Club House	21.2%	78.8%
Community Center	33.1%	66.9%
Gym	34.6%	65.4%
Swimming Pool	17.3%	82.7%
Laundry	59.0%	41.0%
Equipment Shed	39.5%	60.5%
Rental Office	65.8%	34.2%
Storage Units	32.0%	68.0%
Other	8.7%	91.3%

No one dominant common space-type emerged from the survey. Rather, responses were relatively distributed amongst the different space-types provided, with the most common response being rental offices (65.8%).

3.3 EQUIPMENT AND END-USE SATURATIONS

The following section provides information regarding the saturation of common appliances found at multifamily properties. The section is organized by end-use, with specific divisions made by the following end-uses:

- HVAC
- Water Heating

- In-Unit Appliances

- Common Area Appliances

- Lighting

3.3.1 HVAC

The following section provides information regarding age, type, and maintenance of HVAC equipment at multifamily properties. This includes questions on three specific measures:

- Heating

- Cooling

- Thermostats

It is important to note that efficient HVAC equipment is not always rated by EnergyStar. Rather, another common energy efficiency rating structure used for the certification of energy efficient equipment was established by the Consortium for Energy Efficiency (CEE) in 2001. Although there is significant overlap between the certification criteria for both EnergyStar and CEE, some equipment may be certified exclusively by one organization.

3.3.1.1 Heating

Survey respondents were asked to select whether the following heating equipment types were available at their apartment complex. The results of this question are presented in Table 3-33. It should be noted that a common heating equipment type did not emerge from the responses; rather responses were well-distributed between central gas furnaces, hot water boilers, and other types of responses such as ground source heat pumps (GSHP) and individual gas oil furnaces.

Table 3-33: Available Heating Types

Heating Type	Central/Individual	Yes (n=356)	No (n=356)
Central Gas Furnace	Central	25.3%	74.7%
Steam Boiler	Central	9.2%	90.8%
Hot Water Boiler	Central	33.0%	67.0%
District Steam	Central	0.0%	100.0%
GSHP	Central	4.3%	95.7%
Individual Gas Oil Furnace	Individual	25.0%	75.0%
Electric Baseboards	Individual	10.5%	89.5%

Participants were also asked about their primary heating fuel type. These results are presented in Table 3-34. Most respondents reported having natural gas as the primary heating fuel type (84.3%). Electric space heating encompassed only 15.2% of multifamily units.

Table 3-34: Primary Heating Fuel-Type

Heating Fuel-Type	Percent of Population (n=380)
Natural Gas	84.3%
Electricity	15.2%
Oil	0.3%
Mixed: Electric & Gas	0.1%
Boiler	0.1%
Total	**100.0%**

Respondents were asked to report the primary heating equipment type used to heat tenant units. The results of this question are presented in Table 3-35. Responses varied, although most respondents reported forced air furnaces and radiators, which is consistent with a natural gas fuel-type. Interestingly, packaged terminal air conditioners (PTACs)/packaged terminal heat pumps (PTHPs) were reported as being present 3.1% of the time. PTACs/PTHPs can be especially popular when retrofitting older construction, as they require no central ductwork in order to equip a space with heating.

Table 3-35: Primary Heating Equipment Type

Heating Equipment-Type	Percent of Population (n=355)
Forced Air Furnace	39.6%
Radiators	24.5%
Baseboard: Electric	11.2%
ASHP	6.2%
No One Major Type	4.7%
Baseboard: Gas	4.6%
Baseboard: Hot Water	3.5%
PTAC	3.1%
Other	0.9%
Baseboard: Unknown Fuel Type	0.6%
Convectors	0.6%
Hot Water Boiler	0.3%
Wood or Coal Burning Stove	0.1%
Total	**100.0%**

In addition to asking about heating fuel and heating equipment types, participants were also asked how old heating equipment at the property was, specifically for heating equipment that is in tenant units and heating equipment that is central to the building (i.e., central heating where the unit is a master unit as opposed to individual units). The results of this question are presented in Table 3-36.

Table 3-36: Average Age of Heating Equipment

Heating Equipment-Type	Weighted Average Age	Min	Max
Central Heating (n=244)	11.1	0.0	63.0
Tenant-Unit Heating (n=97)	9.7	0.5	45.0

The average age of heating equipment located in tenant units is roughly 10 years old, which is slightly newer than the 11 years reported for building-centralized heating equipment. This could be due to a variety of reasons. For example, tenant unit equipment is more likely smaller in scale and directly under control of the tenant. It is possible that the equipment is more likely to be refreshed during a renovation of the individual unit, or that the equipment has a higher failure rate than building-centralized equipment, which is more likely to be commercial-rated.

Additionally, participants were asked whether heating equipment was ENERGY STAR certified. The results of this question are presented in Table 3-37. Most respondents reported all or some of their heating equipment as being ENERGY STAR certified (70.4%). However, it should be noted that given the age of the equipment, this equipment may not meet current ENERGY STAR standards.

Table 3-37: ENERGY STAR Certified Heating Equipment

ENERGY STAR Certified	Percent of Population (n=325)
No	29.6%
Yes: All	56.4%
Yes: Some	14.0%
Total	**100.0%**

Respondents were asked whether their property conducted annual maintenance of heating equipment. The results of this question are presented in Table 3-38. Most respondents reported conducting annual tune-ups of heating equipment (85.5%).

Table 3-38: Annual Tune-Up of Heating Equipment

Annual Tune-Up	Percent of Population (n=372)
No	14.5%
Yes: Heating Contractor	44.4%
Yes: Staff Person	41.1%
Total	**100.0%**

3.3.1.2   *Cooling*

Survey respondents were asked to select whether central chillers, individual units, or no cooling were available at their properties. Respondents reported not having any cooling present at the property roughly 24.9% of the time. Central chillers were reported as being present 2.8% of the time, whereas individual units were reported as being present 72.3% of the time.

Table 3-39: Available Cooling Types

Available Cooling Types	Yes (n=380)	No (n=380)
Central Chiller	2.8%	97.2%
Individual Units	72.3%	27.7%
No Cooling	24.9%	75.1%

Survey respondents were asked about the type of primary cooling equipment present at the property. Most respondents reported room air conditioners (RAC) as being the most common cooling equipment type (51.0%), with residential-grade direct expansion split systems being the second most common (26.6%).

Table 3-40: Primary Cooling Equipment Type

Equipment Type	Percent of Population (n=369)
Individual RAC	51.0%
Residential Split System - DX	26.6%
Packaged AC - Roof Mounted DX	9.2%
PTAC	3.6%
Other	3.6%
Central Chiller	2.2%
Heat Pump	1.4%
None	1.2%
No One Major Type	0.6%
Mini-Split Units	0.3%
Wall AC Units	0.3%
Total	**100.0%**

In addition to asking about cooling equipment types, participants were asked how old cooling equipment at the property was, specifically for cooling equipment that is in tenant units and cooling equipment that is central to the building (i.e., central cooling where the unit is a master unit as opposed to individual units). The results of this question are presented in Table 3-41.

Table 3-41: Average Age of Cooling Equipment

Cooling Equipment-Type	Weighted Average Age	Min	Max
Central Cooling (n=12)	9.55	2.0	20.0
Tenant-Unit Cooling (n=244)	6.50	0.0	20.0

The average age of heating equipment located in tenant units is roughly 6.5 years old, which is newer than the 9.55 years reported for building-centralized heating equipment. This could be due to a variety of reasons. For example, few respondents reported having central cooling equipment at the property (12 v. 244). Sampling variation could be the cause of the discrepancies between the two ages. Additionally, it is possible that tenant unit equipment is more likely smaller in scale and directly under control of the tenant. It is possible that the equipment is more likely to be refreshed during a renovation of the individual unit, or that the equipment has a higher failure rate than building-centralized equipment, which is more likely to be commercial-rated. Additionally, tenant-unit equipment could be a retrofit of equipment installed on buildings that initially had central cooling installed.

Additionally, participants were asked whether cooling equipment was ENERGY STAR certified. The results of this question are presented in Table 3-42. Most respondents reported all or some of their cooling equipment as being ENERGY STAR certified (87.9%). However, it should be noted that given the age of the equipment, this equipment may not meet current ENERGY STAR standards.

Table 3-42: ENERGY STAR Certified Cooling Equipment

ENERGY STAR Certified	Percent of Population (n=309)
No	17.5%
Yes: All	54.1%
Yes: Some	28.4%
Total	**100.0%**

Respondents were asked whether their property conducted annual maintenance of cooling equipment. The results of this question are presented in Table 3-43. There was a relatively even split between respondents who reported conducting an annual tune-up of their cooling equipment and respondents who reported not conducting an annual tune-up of their cooling equipment.

Table 3-43: Annual Tune-Up of Cooling Equipment

Annual Tune-Up	Percent of Population (n=369)
No	46.1%
Yes: AC Contractor	17.7%
Yes: Staff Person	36.2%
Total	**100.0%**

Given the frequency with which annual tune-ups are not conducted in the multifamily sector, ADM reviewed whether this was potentially due to properties not offering cooling of any kind to tenant units. These results are provided in Table 3-44. As can be seen in the table, 36% of the properties that report no annual tune-ups for cooling equipment do so because these units do not have cooling supplied by the property.

Table 3-44: Cooling Provided by Properties That Report No Cooling Tune-Up

Cooling Provided by Property	Percent of Population That Report No Cooling Tune-Up (n=174)
No	36.0%
Yes	64.0%
Total	**100.0%**

For the remaining 64% of properties who reported not performing an annual tune-up of cooling equipment, ADM reviewed what type of cooling equipment was present. As can be seen in Table 3-45, most properties who do not provide an annual tune-up of cooling equipment but do provide cooling equipment typically provide individual room air conditioners.

Table 3-45: Cooling Equipment for Properties That Do Not Have Annual Tune-Ups but Provide Cooling Equipment

Equipment Type	Percent of Population That Provide Cooling Equipment but do not Conduct Annual Tune-Ups (n=100)
Individual RAC	75.04%
Residential Split System - DX	9.27%
Packaged AC - Roof Mounted DX	4.71%
PTAC	3.88%
Wall AC Units	2.08%
Central Chiller	1.99%
Other	1.32%
Heat Pump	1.16%
No One Major Type	0.55%
Total	**100.0%**

3.3.1.3   Thermostats

Respondents were asked what types of thermostats were present in tenant units. Most respondents reported that tenants had access to simple setpoint-based thermostats, i.e., thermostats in which a temperature is set, and the unit turns on or off solely based on deviations from that setpoint. The second most commonly reported thermostat type were programmable thermostats; thermostats which allow users to provide a schedule of set points for either two day-types (weekends/weekdays) or all seven weekdays at given hours of the day.

Table 3-46: Thermostat Equipment Type

Equipment Type	Yes (n=380)	No (n=380)
Tenant Thermostat—Any Kind	88.6%	93.1%
Simple On/Off	9.3%	90.7%
Simple Setpoint	55.2%	44.8%
Programmable Thermostat	27.3%	72.7%
Smart Thermostat	1.3%	98.7%

ADM reviewed whether the presence or absence of tenant unit thermostats was related to whether the property provided heating to tenants at no cost. Table 3-47 presents the results of this analysis.

Table 3-47: Presence of Tenant Thermostats x No-Cost Space Heating

Tenant Thermostat	Percent of Properties that Provide No-Cost Space Heating (n=167)
No	31.2%
Yes	68.8%
Total	**100.0%**

Respondents who reported thermostats in tenant units were asked whether thermostats control heating, cooling, or both heating and cooling. These results are illustrated in Table 3-48. As expected, most respondents reported that thermostats controlled both heating and cooling. However, given the saturation of room air conditioners, which are typically separate units from heating units, it is not surprising that 36.2% of respondents reported that their thermostats only controlled heating.

Table 3-48: Thermostat Control Type

Control Type	Percent of Population with Tenant-Unit Thermostats (n=310)
Both	61.8%
Heating	36.2%
Cooling	1.9%
Total	**100%**

A large proportion of respondents reported that tenant-unit thermostats do not control cooling equipment. ADM suspected that this could be attributable to the saturation of individual room air conditioners installed in units, as it is unlikely that room air conditioners would be controlled by a central thermostat. Therefore, ADM reviewed the reported primary cooling technology used in units where the central thermostat does not control cooling. These results are provided in Table 3-49. As can be seen in the table, most of these units have individual RACs as their primary cooling system (82.6%).

Table 3-49: Cooling Equipment Type for Tenant-Unit Thermostats that do not Control Cooling

Equipment Type	Percent of Population where Tenant-Unit Thermostat do not Control Cooling (n=95)
Individual RAC	82.6%
Residential Split System - DX	7.7%
None	6.9%
Other	1.4%
Wall AC Units	1.0%
Packaged AC - Roof Mounted DX	0.5%
Total	**100.0**

Additionally, participants who reported having thermostat in tenant units were asked how many thermostats were present per unit. Most participants reported only a single thermostat per tenant unit (82.2%), although some reported 2 or more thermostats per unit (17.8%).

Table 3-50: Number of Thermostats per Unit

Number of Thermostats	Percent of Population with Tenant-Unit Thermostats (n=310)
1	82.2%
2 or more	17.8%
Total	**100.0%**

3.3.2 Water Heating

The following section provides information regarding water heating in multifamily properties. Specifically, this section reviews whether properties utilize hot water heaters that are central to the building or central to the unit, the type of water heating unit, fuel-type, and age. Specific items pertaining to in-unit water heaters are reviewed in Section 3.3.3.

Respondents were asked whether the property has water heating that is central to the building or central to the tenant unit. Hot water was central to the building roughly half the time. Additionally, participants were asked the approximate age of building-centralized water heating equipment. The average age was reported as roughly 9 years old (range:0-66, n=331).

Table 3-51: Building-Centralized Hot Water

Building-Centralized Hot Water	Percent of Population (n=376)
No	55.1%
Yes	44.9%
Total	**100.0%**

Respondents were asked to report primary water heating equipment type at their respective property.

Table 3-52: Primary Water Heating Equipment Type

Equipment Type	Percent of Population (n=372)
Self-Contained Tank	61.4%
Separate Water Heating Boiler	23.8%
Part of Heating System Boiler	10%
Instantaneous Water Heater	4.7%
Commercial Water Heaters	0.1%
Total	**100.0%**

Additionally, study participants were asked to report the primary fuel-type for water heating at their respective property. Most respondents reported natural gas as being the primary water heating fuel type (79.4%).

Table 3-53: Primary Water Heating Fuel Type

Fuel-Type	Percent of Population (n=375)
Natural Gas	79.4%
Electricity	20.1%
No One Major Type	0.2%
Solar	0.1%
Oil	0.0%
Total	**100.0%**

3.3.3   In-Unit Appliances

The following section provides information on in-unit appliances that are provided by the apartment complex. This includes:

- Refrigerators
- Dishwashers
- Clothes Washers
- Clothes Dryers
- Water Heaters
- Window and Room ACs

Please note that the saturations and reported values are relative to respondents who report providing these appliances only.

Study participants were asked what types of appliances are provided by their property. In general, most properties provide basic appliances such as a stove, a refrigerator, and an oven. Dishwashers are provided roughly half of the time (48.1%).

Table 3-54: Appliances Provided by the Property

Appliance Type	Yes (n=380)	No (n=380)
Refrigerator	95.1%	4.9%
Stove	95.4%	4.6%
Oven	85.3%	14.7%
Dishwasher	48.1%	51.9%
Microwave	42.1%	57.9%
In Unit Clothes Washer	33.5%	66.5%
In Unit Clothes Dryer	33.9%	66.1%
In Unit Water Heater	38.1%	61.9%
Window AC or RAC	31.0%	69.0%
Nothing	2.1%	97.9%

Of the appliances that are provided, whether the appliances are ENERGY STAR certified are reported below:

Table 3-55: ENERGY STAR Appliances

Appliance Type	Yes	No
Refrigerator (n=322)	78.6%	21.4%
Dishwasher (n=170)	81.7%	18.3%
In Unit Clothes Washer (n=104)	90.6%	9.4%
In Unit Clothes Dryer (n=106)	89.7%	10.3%
In Unit Water Heater (n=110)	94.0%	6.0%
Window AC or RAC (n=111)	64.1%	35.9%

In addition to asking respondents whether certain appliance types are present in tenant units, respondents were also asked the approximate ages of in-unit appliances. These results are presented in Table 3-56 through Table 3-61.

Table 3-56: Age of In-Unit Refrigerators

Age Range	Percent of Properties That Provide Refrigerators (n=345)
Less than 2 years old	15.7%
2 to 4 years old	28.8%
5 to 9 years old	44.1%
10 to 14 years old	9.7%
15 to 19 years old	1.4%
20 years old or more	0.2%
Total	**100.0%**

Table 3-57: Age of In-Unit Dishwashers

Age Range	Percent of Properties That Provide Dishwashers (n=178)
Less than 2 years old	17.4%
2 to 4 years old	30.3%
5 to 9 years old	36.5%
10 to 14 years old	13.2%
15 to 19 years old	2.4%
20 years old or more	0.2%
Total	**100.0%**

Table 3-58: Age of In-Unit Clothes Washers

Age Range	Percent of Properties That Provide In-Unit Clothes Washers (n=114)
Less than 2 years old	23.0%
2 to 4 years old	26.9%
5 to 9 years old	34.2%
10 to 14 years old	8.9%
15 to 19 years old	7.1%
20 years old or more	0.0%
Total	**100.0%**

Table 3-59: Age of In-Unit Clothes Dryers

Age Range	Percent of Properties That Provide In-Unit Clothes Dryers (n=112)
Less than 2 years old	23.6%
2 to 4 years old	24.0%
5 to 9 years old	35.6%
10 to 14 years old	9.4%
15 to 19 years old	7.5%
20 years old or more	0.0%
Total	**100.0%**

Table 3-60: Age of In-Unit Water Heaters

Age Range	Percent of Properties That Provide In-Unit Water Heaters (n=120)
Less than 2 years old	17.8%
2 to 4 years old	29.1%
5 to 9 years old	35.5%
10 to 14 years old	12.6%
15 to 19 years old	4.9%
20 years old or more	0.0%
Total	**100.0%**

Table 3-61: Age of In-Unit Window ACs and Room ACs

Age Range	Percent of Properties That Provide In-Unit Window ACs and RACs (n=124)
Less than 2 years old	11.0%
2 to 4 years old	21.2%
5 to 9 years old	55.4%
10 to 14 years old	11.5%
15 to 19 years old	0.0%
20 years old or more	0.9%
Total	**100.0%**

3.3.4 Common Area Appliances

The following section provides information regarding equipment installed in common areas. Specifically, this section focuses on:

- Common Area Kitchen Equipment

- Pool/Spa Equipment

- Common Area Laundry Equipment

It should be noted that most complexes did not report having common area kitchen areas or common area pools/spas.

3.3.4.1 Common Area Kitchen Equipment

Participants were asked whether a common area kitchen was present at their respective property. There was no apparent correlation from the data set between the presence of a common area kitchen and the presence of a club house at the property. Additional data was not collected regarding where the common area kitchen was located at the property.

Most respondents reported that a common area kitchen was not present at their respective property (81.2%).

Table 3-62: Common Area Kitchen Present

Common Area Kitchen Present	Percent of Population (n=380)
No	81.2%
Yes	18.8%
Total	**100.0%**

For participants who reported having a common area kitchen, participants were asked to report the number of microwaves, refrigerators, and stoves/ovens. The results are reported in Table 3-63.

Table 3-63: Average Number of Common Area Kitchen Appliances

Equipment Type	Average Number Present	Min	Max
Microwaves (n=83)	1.41	0.00	8.00
Refrigerators (n=91)	1.33	1.00	8.00
Stoves or Ovens (n=53)	1.53	0.00	8.00

Additionally, participants were asked the approximate ages of those kitchen appliances:

Table 3-64: Average Age of Common Area Kitchen Appliances

Equipment Type	Average Age	Min	Max
Refrigerators (n=87)	4.56	0.00	24.00
Stoves or Ovens (n=49)	6.07	0.00	60.00

Finally, participants were asked whether stoves/ovens present in common area kitchens were commercial grade. The results of this question are reported in Table 3-65.

Table 3-65: Commercial Grade Stoves or Ovens

Commercial Grade Stoves or Ovens	Percent of Properties That Report Having Common Area Stoves/Ovens (n=55)
No	71.3%
Yes	28.7%
Total	**100.0%**

3.3.4.2   *Common Area Pools/Spas*

Participants were asked whether a common area filtered pool was present at their respective property. Most respondents reported that a common area filtered pool was not present at their respective property (85.6%).

Table 3-66: Common Area Filtered Pool Present

Common Area Filtered Pool	Percent of Population (n=380)
No	85.6%
Yes	14.4%
Total	**100.0%**

Participants who reported having a common area filtered pool were asked whether their respective pools were heated:

Table 3-67: Pool Heater

Pool Heater	Percent of Properties with a Filtered Pool (n=52)
No	58.0%
Yes	42.0%
Total	**100.0%**

Furthermore, participants who reported having a heated pool were asked what fuel type was used for the pool heater:

Table 3-68: Pool Heater Fuel

Pool Heater Fuel	Percent of Properties with a Pool Heater (n=18)
Natural Gas	82.3%
Electricity	17.7%
Total	**100.0%**

Participants who reported having a heated pool were also asked whether that pool has a pool cover:

Table 3-69: Pool Cover

Pool Cover	Percent of Properties with a Pool Heater (n=18)
No	3.3%
Yes	96.7%
Total	**100.0%**

For all participants who reported having a filtered pool, participants were also asked whether they had a variable speed drive (VSD) pool pump and a pool timer:

Table 3-70: VSD Pool Pump

VSD Pool Pump	Percent of Properties with a Filtered Pool (n=41)
No	22.0%
Yes	78.0%
Total	**100.0%**

Table 3-71: Pool Timer

Pool Timer	Percent of Properties with a Filtered Pool (n=44)
No	29.6%
Yes	70.4%
Total	**100.0%**

All respondents were asked whether their respective properties have a hot tub, spa, or jacuzzi. Most respondents reported that their property does not have a hot tub, spa, or jacuzzi.

Table 3-72: Hot Tub, Spa, or Jacuzzi

Hot Tub, Spa, or Jacuzzi	Percent of Population (n=380)
No	96.9%
Yes	3.1%
Total	**100.0%**

Of the respondents who reported having a hot tub, spa, or jacuzzi, all respondents reported the hot tub, spa, or jacuzzi heat fuel type to be natural gas:

Table 3-73: Hot Tub, Spa, or Jacuzzi Fuel

Hot Tub, Spa, or Jacuzzi Fuel	Percent of Properties with a Hot Tub/Spa/Jacuzzi (n=7)
Natural Gas	100%
Electricity	0%
Total	**100.0%**

3.3.4.3 Common Area Laundry

Participants were asked whether their facility had a common area laundry facility. Results from this question are presented in Table 3-74. Roughly half of all properties had a common area laundry facility (54.2%).

Table 3-74: Common Area Laundry Facility

Common Area Laundry	Percent of Population (n=380)
No	54.2%
Yes	45.8%
Total	**100.0%**

The participants who reported having a common area laundry facility were then asked whether the laundry equipment was leased by the property or owned by the property. Roughly two-thirds of participants reported leasing the equipment (62.9%).

Table 3-75: Owned or Leased Common Laundry Equipment

Owned or Leased	Percent of Properties with Common Area Laundry (n=206)
Leased all	62.9%
Own all	35.2%
Lease some and own some	1.9%
Total	**100.0%**

In addition, participants were asked how many clothes washers and clothes dryers were present in their respective laundry facilities as well as their approximate age. These results are reported in Table 3-76 and Table 3-77.

Table 3-76: Average Number of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Average Number	Min	Max
Clothes Washers (n=209)	10.74	1.00	150.00
Clothes Dryers (n=209)	10.03	1.00	150.00

Table 3-77: Average Age of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Average Age	Min	Max
Clothes Washers (n=168)	6.09	0.00	20.00
Clothes Dryers (n=169)	6.02	0.00	20.00

Finally, participants who reported having common area laundry facilities were asked what fuel-type was being used for their clothes dryers. Most respondents reported natural gas as being the clothes dryer fuel-type (73.6%).

Table 3-78: Clothes Dryer Fuel Type

Clothes Dryer Fuel	Percent of Properties with Common Area Clothes Dryers (n=202)
Natural Gas	73.6%
Electricity	26.4%
Propane	0.0%
Other	0.0%
Total	**100.0%**

3.3.5 Lighting

The following section provides information regarding multifamily lighting, specifically regarding lighting provided in tenant units, interior lighting of community common areas, and exterior lighting.

3.3.5.1 In-Unit Lighting

Survey participants were asked to rank, from 1-5, the lighting technologies found in tenant units from most common (1) to least common (5). Some participants chose to leave certain technologies blank, signifying that the technology was not present in tenant units at their property. In these cases, ADM substituted a value of 5, signifying the lowest possible rank for the technology. ADM then calculated the average rank for each of the technology types. A lower value signifies that the technology is more common at multifamily tenant units and a higher value signifies that the technology is less common at multifamily tenant units. The results are presented in Table 3-79. As can be seen in the table, compact fluorescents (CFLs) were the most common technology type reported to be provided in tenant units, while light-emitting diodes (LEDs) and incandescent bulbs were reported to be the second and third most common type of lighting technology.

Table 3-79: Weighted Average In-Unit Lighting Rank

Lighting Technology	Rank (n=374)
CFL	3.16
LED Bulbs	3.24
Incandescent	3.68
Fluorescent Tubes	4.26
LED Tubes	4.62

In general, survey participants noted that specialized lighting controls were not present. Several respondents noted that lighting is controlled via on/off switches, which might fall under the classification of 'None' for the purpose of this study.

Table 3-80: In-Unit Lighting Controls

Lighting Control Type	Yes (n=380)	No (n=380)
Dimmers	4.9%	95.1%
Occupancy Sensors	4.2%	95.8%
Timers	2.0%	98.0%
Daylighting	0.7%	99.3%
On/Off Switch	19.9%	80.1%
None	65.8%	34.2%

3.3.5.2   Interior Common Area Lighting

Over 90% of respondents noted that there is interior lighting in common spaces. Note that this is slightly in conflict with the number of respondents who reported having interior common areas. However, respondents may consider spaces such as hallways, stairwells, etc. as interior common areas whereas the previous questions are referring to facilities offered by the property.

Table 3-81: Interior Common Area Lighting

Interior Common Area Lighting	Percent of Population (n=377)
No	10.7%
Yes	89.3%
Total	**100.0%**

Survey participants were asked to rank, from 1-6, the lighting technologies found in tenant units from most common to least common. Some participants chose to leave certain technologies blank, signifying that the technology was not present in common areas at their property. In these cases, ADM substituted a value of 6, signifying the lowest possible rank for the technology. ADM then calculated the average rank for each of the technology types. A lower value signifies that the technology is more common at multifamily common areas and a higher value signifies that the technology is less common at multifamily common areas.

The results are presented in Table 3-82. As can be seen in the table, LED bulbs were the most common technology type in multifamily common areas, with CFLs and fluorescent tubes being reported as the second and third most common.

Table 3-82: Weighted Average Interior Common Area Lighting Rank

Lighting Technology	Rank (n=343)
LED Bulbs	3.89
CFL	4.39
Fluorescent Tubes	4.40
Incandescent	5.04
LED Tubes	5.15
HID	5.77

In general, survey participants noted that specialized lighting controls were not present. Some respondents noted that lighting is controlled via on/off switches, which would fall under the classification of 'None' for the purpose of this study. The most common response was occupancy sensors.

Table 3-83: Interior Common Area Lighting Controls

Lighting Control Type	Yes (n=347)	No (n=347)
Dimmers	3.9%	96.1%
Occupancy Sensors	23.9%	76.1%
Timers	19.3%	80.7%
Daylighting	8.7%	91.3%
On/Off Switch	19.8%	80.2%
Other	0.4%	99.6%
None	39.8%	60.2%

3.3.5.3 *Exterior Lighting*

Generally, exterior lighting could be found in apartment complex parking lots, security lighting, and sidewalks/walkways.

Table 3-84: Exterior Lighting Location

Location	Yes (n=380)	No (n=380)
Parking Lot	64.1%	35.9%
Security Lighting	65.2%	34.8%
Sidewalk/Walkway Lighting	48.1%	51.9%
Decorative	10.9%	89.1%
Other Location	0.6%	99.4%
None	4.3%	95.7%

In general, most exterior lighting fixtures make use of LEDs, followed by HID and CFL. This makes sense since LED and HID are better capable of withstanding extreme temperature conditions. Generally, HID to LED retrofits provide less savings per unit, but, given the average number of outdoor lighting fixtures, it can be a worthwhile efficiency measure.

Table 3-85: Exterior Lighting Technology

Location	Yes (n=363)	No (n=363)
Incandescent	18.1%	81.9%
CFLs	23.8%	76.2%
Fluorescent Tubes	6.0%	94.0%
HIDs	33.7%	66.3%
LED Bulbs	43.5%	56.5%
LED Tubes	9.9%	90.1%
Other	7.8%	92.2%

3.4 BEHAVIORAL CHARACTERISTICS

The following section discusses respondents' awareness of energy efficiency programs offered in the state of New Jersey. This includes current participation in energy efficiency programs, any energy efficient improvements that have been made to the property, and future interest in participating in energy efficiency programs.

The respondents who reported participating in an energy efficiency program in the past five years were asked whether they participated in one of the programs offered through New Jersey's Clean Energy Program and, if so, what measure(s) were implemented as a result of their participation. Figure 3-16 and Figure 3-17 demonstrate that, of the properties that participated in an energy efficiency program in the past five years, 61.5% of them participated in a program offered through the New Jersey Clean Energy Program. Most respondents reported adopting lighting measures through the program (76.6%), while adoption of other measures was distributed.

Figure 3-16: Participation in the New Jersey Clean Energy Program

No, 38.5%

Yes, 61.5%

n=31
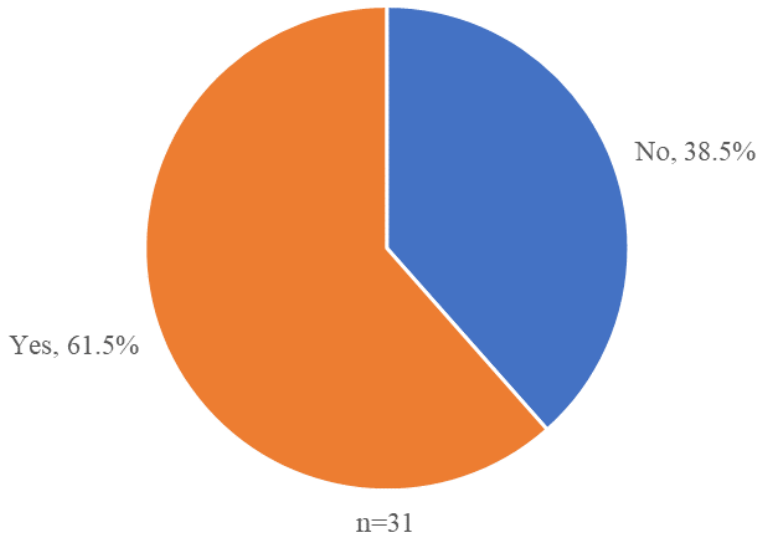
Figure 3-17: Measures Implemented Through the NJ Clean Energy Program

n=20
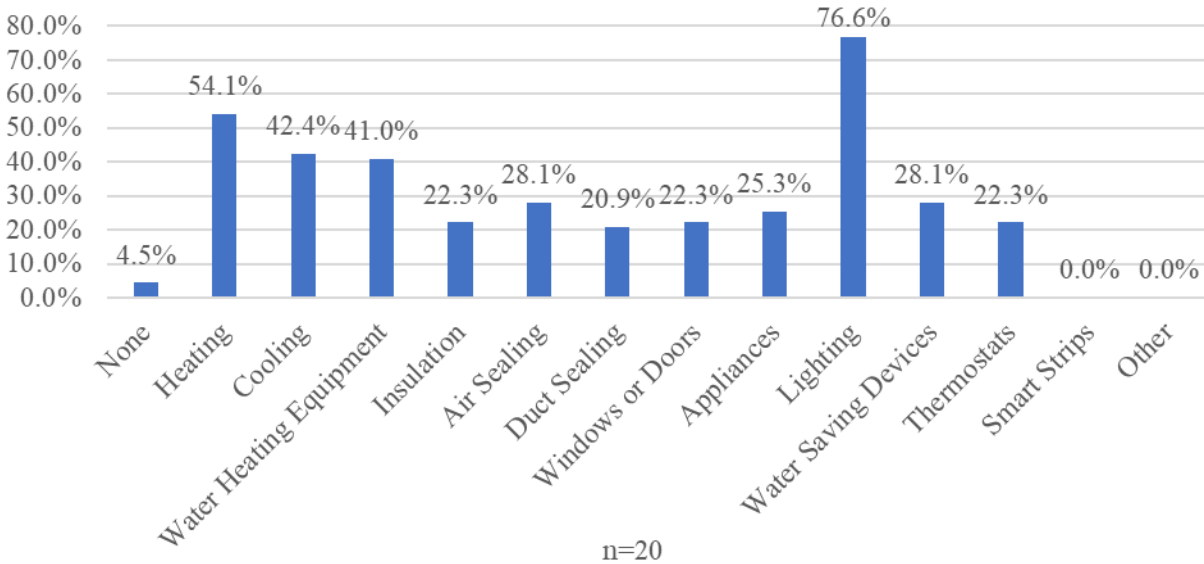
3.4.1 Energy Efficiency Program Awareness

Participants were asked about their awareness of energy efficiency rebate programs offered in the state of New Jersey. These results are reported in Figure 3-18. In general, awareness of energy efficiency rebate offerings in New Jersey amongst multifamily properties was low. Only 35.4% of respondents reported being aware of rebate opportunities, thus leaving over half of the multifamily market unaware of these opportunities (64.6%).

Figure 3-18: Awareness of EE Rebates in New Jersey

Figure 3-18: Awareness of EE Rebates in New Jersey
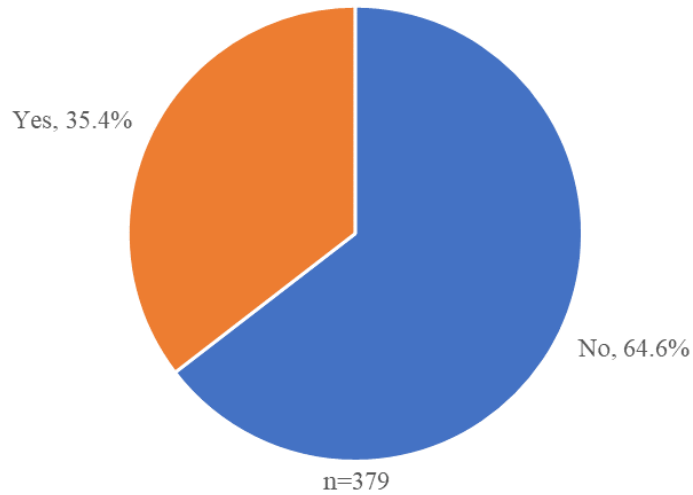
In addition to asking participants about their general awareness of energy efficiency rebate programs available in the state of New Jersey, all participants were asked whether they were aware of specific rebate programs offered by their electric or gas utility company. As with general awareness of rebate programs, awareness of specific rebate programs offered by utilities was low (34.2%).

Figure 3-19: Awareness of EE Rebates Offered by Utility Companies
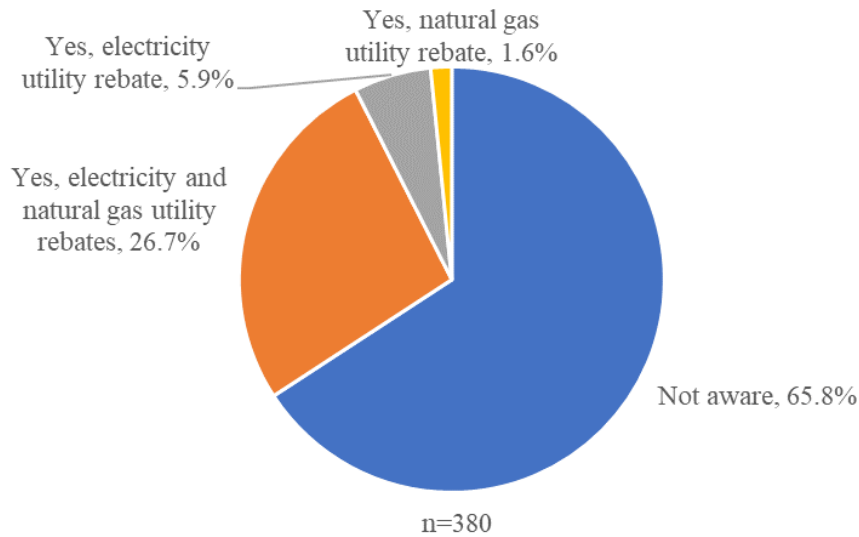
In addition to looking at utility rebate awareness across the total population, ADM also reviewed utility rebate awareness by electric utility company. These results are presented in Table 3-86.

Table 3-86: Utility Rebate Awareness by Electric Utility Company

Utility Rebate Awareness	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
Not aware	40.8%	81.4%	100.0%	64.4%	6.4%
Yes, electricity and natural gas utility rebates	56.4%	10.1%	0.0%	29.8%	93.6%
Yes, electricity utility rebate	0.0%	6.6%	0.0%	4.9%	0.0%
Yes, natural gas utility rebate	2.8%	1.9%	0.0%	1.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

3.4.2 Energy Efficiency Program Participation

Participants were asked about their property's participation in energy efficiency programs or adoption of energy efficient policies. Program participation and adoption rates were generally low. This is unsurprising given the low awareness of program offerings reported in Section 3.4.1.

Participants were first asked about their participation in the New Jersey Housing and Mortgage Finance Agency's (NJHMFA) Green Building Program. Participation rates for multifamily properties was low, with only 10.8% of properties reporting participation in the program.

Figure 3-20: Participation in NJHFMA Green Building Program

Yes, 10.8%

No, 89.2%

n=286
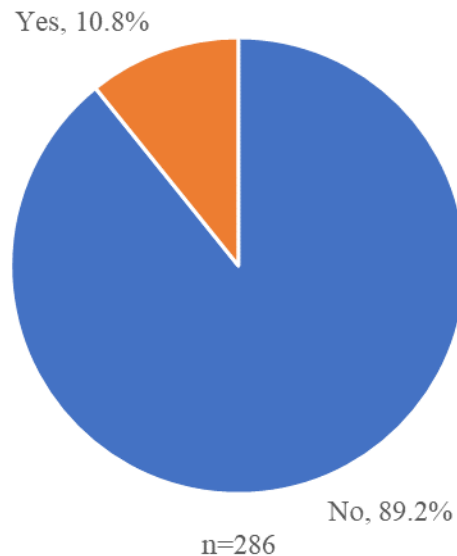
Study participants were also asked about their properties' implementation of the guidelines in the New Jersey Green Building Manual. This program is only required when utilizing New Jersey Economic Development Authority incentives. Adoption rates of the NJ Green Building Manual were 13.5% of properties reporting implementation of manual guidelines.

Figure 3-21: Implementation of NJ Green Building Manual

Yes, 13.5%

No, 86.5%

n=272
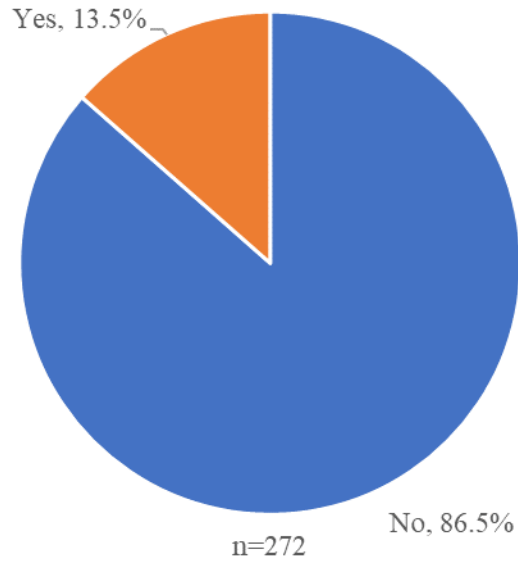
Study participants were asked whether their properties' energy usage is currently being benchmarked against other properties using the ENERGY STAR Portfolio Manager. Few properties reported using the ENERGY STAR Portfolio Manager (7.6%). Participants who reported using the ENERGY STAR Portfolio manager were then asked whether their property was ENERGY STAR certified. Of these respondents, 34.5% of respondents reported their property as being ENERGY STAR certified. Results from both questions are reported in Figure 3-22 and Figure 3-23.

Figure 3-22: ENERGY STAR Portfolio Manager
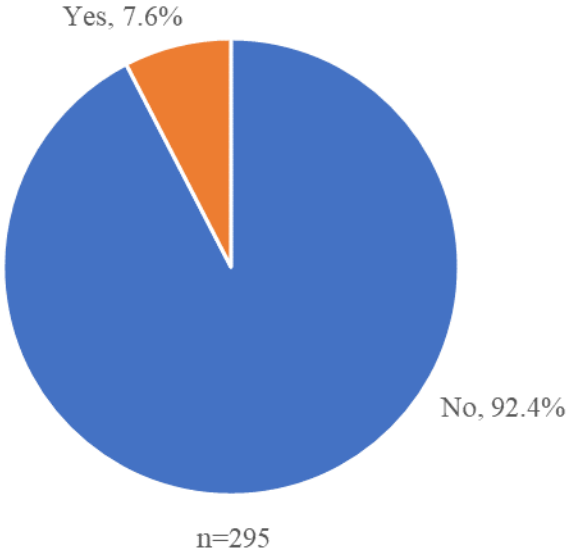
Figure 3-23: ENERGY STAR Certified Building
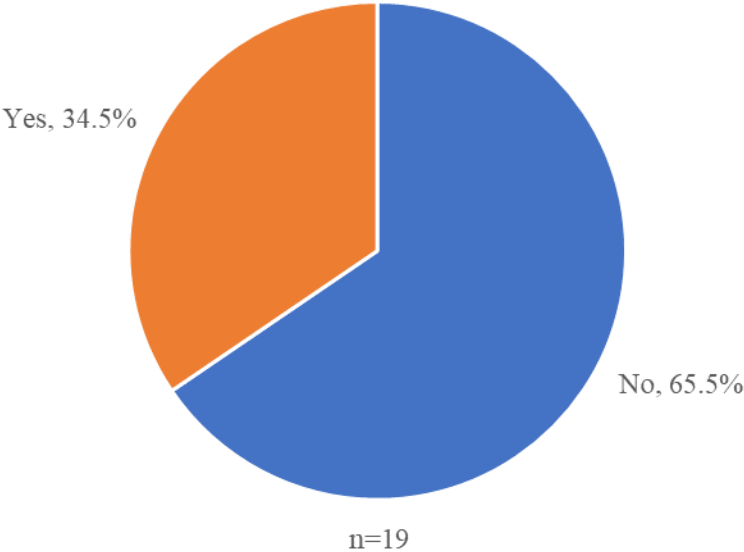
Participants were asked whether their property had received any Leadership in Energy and Environmental Design (LEED) certifications. Few properties were LEED certified (6.8%).

Figure 3-24: LEED Certification

n=315
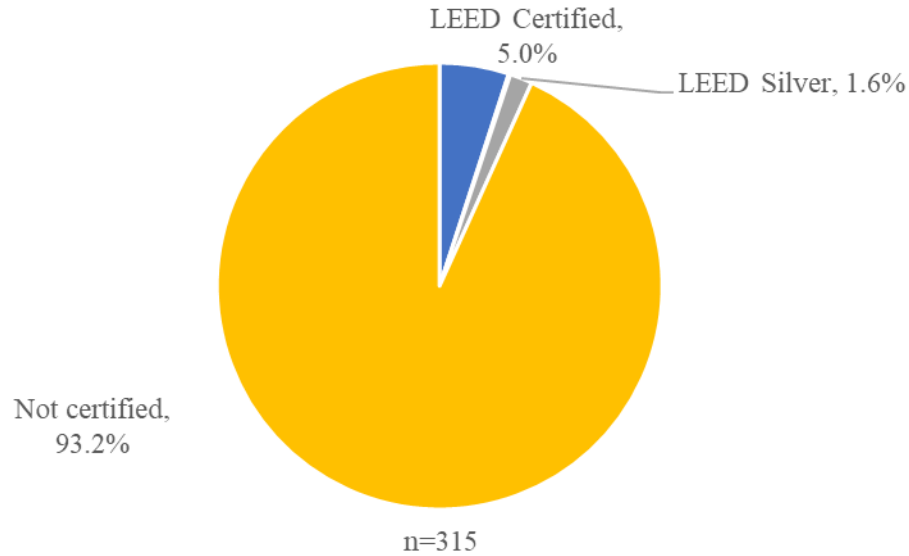
Participants who reported having building-centralized HVAC were asked whether their heating and cooling was managed via an energy management system. Roughly a quarter of these properties use an energy management system to manage heating and cooling.

Figure 3-25: Heating and Cooling Managed via Energy Management System

n=245
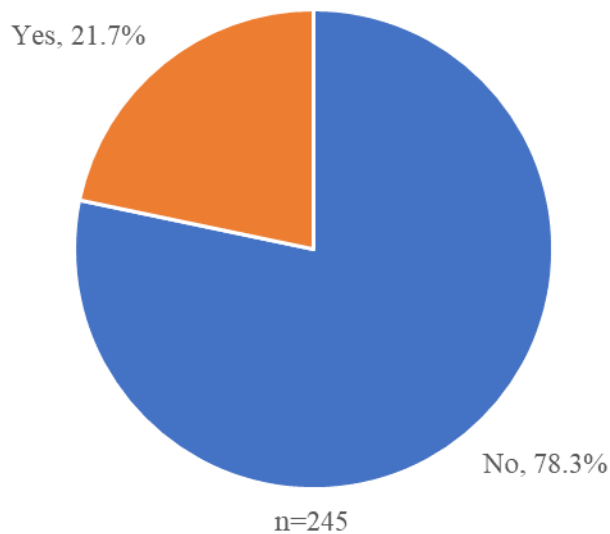
Participants were asked whether their property participated in a demand response program. Roughly 3.4% of multifamily properties reported being enrolled in a demand response program.

Figure 3-26: Demand Response Program Enrollment

Yes, 3.4%

No, 96.6%

n=328
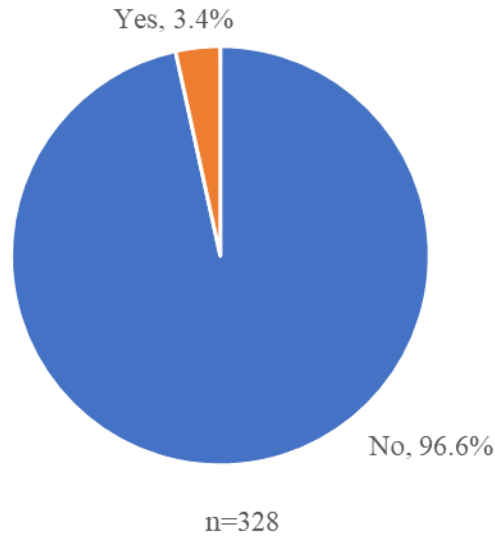
The survey respondents who reported their property as being enrolled in a demand response program were asked where the demand response control meters are located at their property. Most demand response participants reported the control meters as being in both tenant living spaces and common areas.

Figure 3-27: Demand Response Control Meter Location

Tenant living space, 12.0%

Common areas, 1.5%

Both, 86.5%

n=4
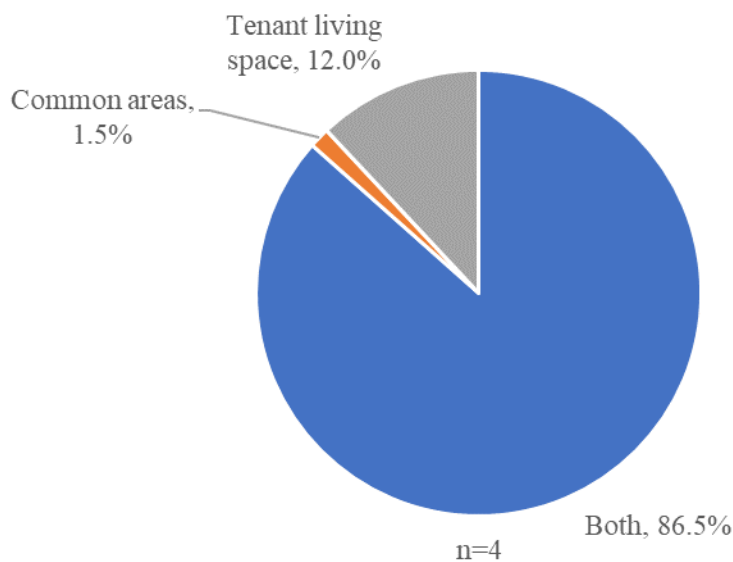
All survey respondents were asked whether their property had participated in an energy efficiency program in the past five years. Roughly 13.2% of all properties reported having participated in an energy efficiency program in that timeframe.

Figure 3-28: Participation in an EE Program in the Past 5 Years
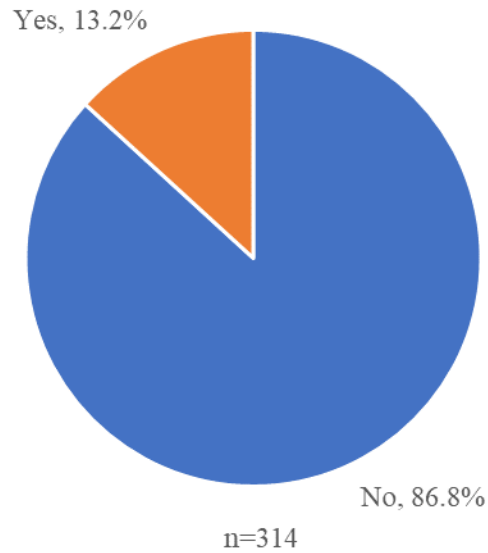
Although participants were not directly asked what type of energy efficiency program their property participated in or what measures were installed through program participation, participants were asked what energy efficiency measures, in general, were installed at their property over the past five years. Figure 3-29 presents the measures installed over the past five years in common areas by energy efficiency program participants. Similarly, Figure 3-30
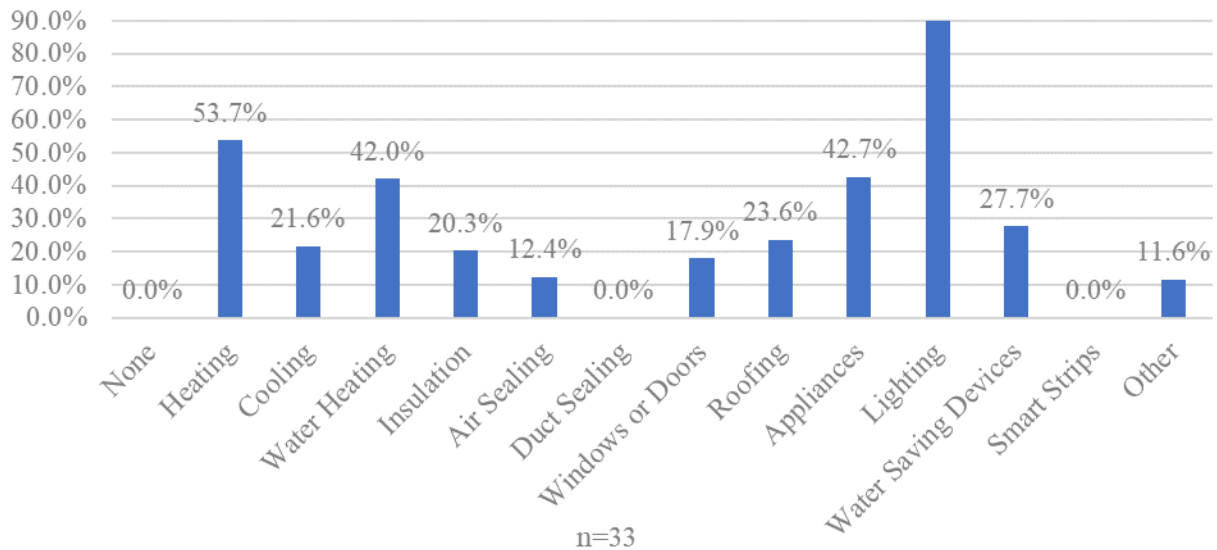
Figure 3-30 presents the measures installed over the past five years in tenant units by energy efficiency program participants.

Figure 3-29: EE Measures Installed by EE Program Participants in Common Areas

n=33
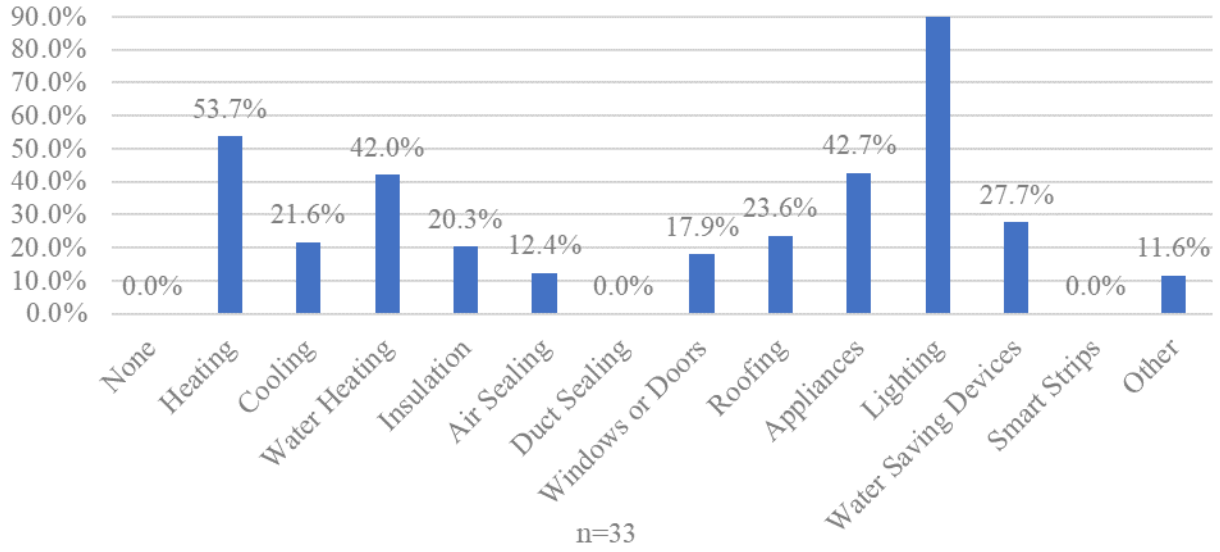
Figure 3-30: EE Measures Installed by EE Program Participants in Tenant Units

n=30
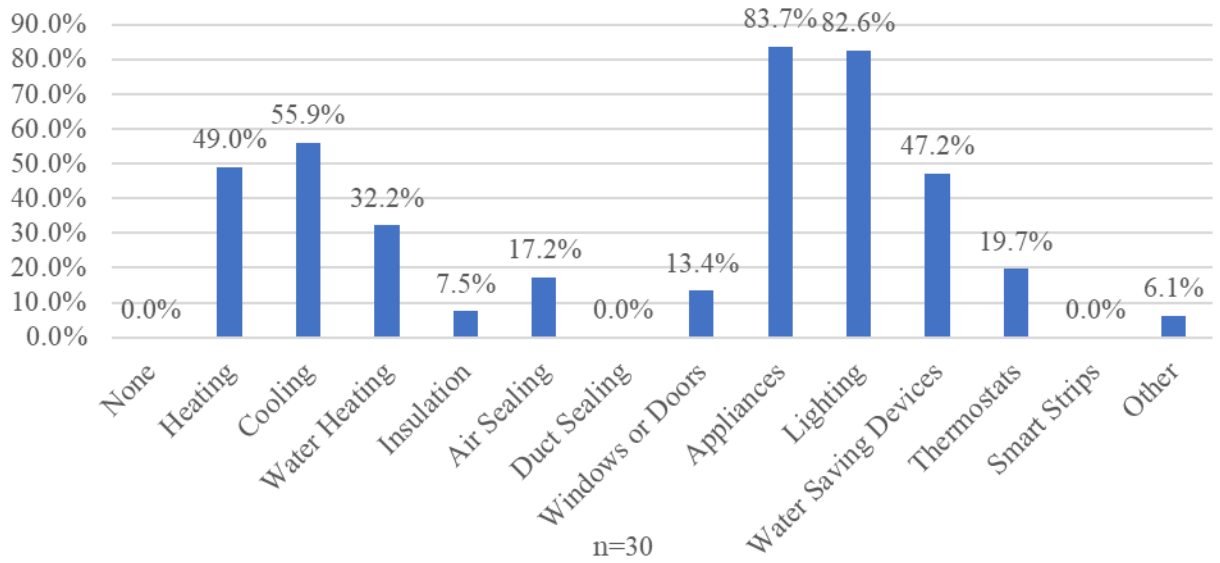
3.4.3 Energy Efficiency Property Improvements

In addition to questions specifically asking whether properties participated in energy efficiency rebate programs, survey participants were asked general questions regarding whether they had made any energy efficient improvements to their properties over the past five years. Roughly three-quarters of the multifamily properties (73.1%) reported making energy efficient property improvements over the past five years. Most properties reported making these improvements in both tenant units and common areas, although some only made improvements in either the common area or tenant units.

Figure 3-31: Energy Efficient Improvements Over the Past 5 Years
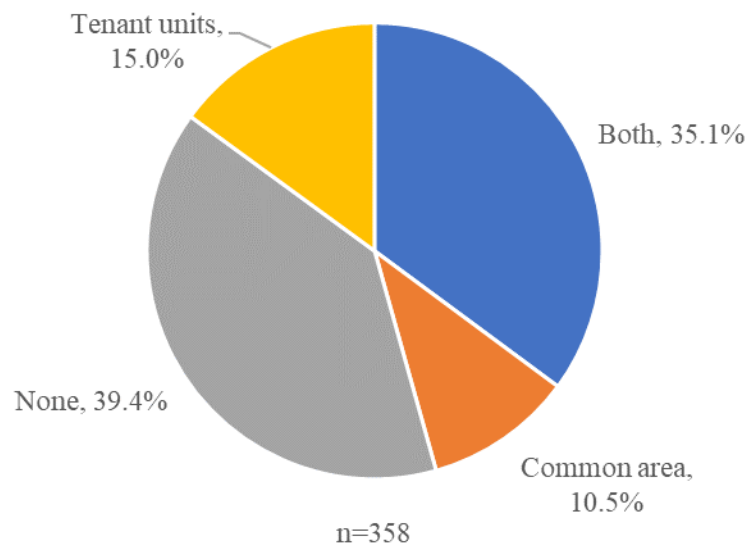
The participants who reported making improvements to either common area or tenant units (either both common areas and tenant units, exclusively common areas, or exclusively tenant units) were asked what type of improvements were made. Participants could select more than one response.

Figure 3-32 and Figure 3-33 summarize our findings regarding energy efficiency improvements to common areas and tenant units. The most common type of energy efficiency improvement made was lighting (86.7%). Other forms of energy efficient improvements were distributed.

Figure 3-32: Energy Efficient Improvements to Common Areas

n=183
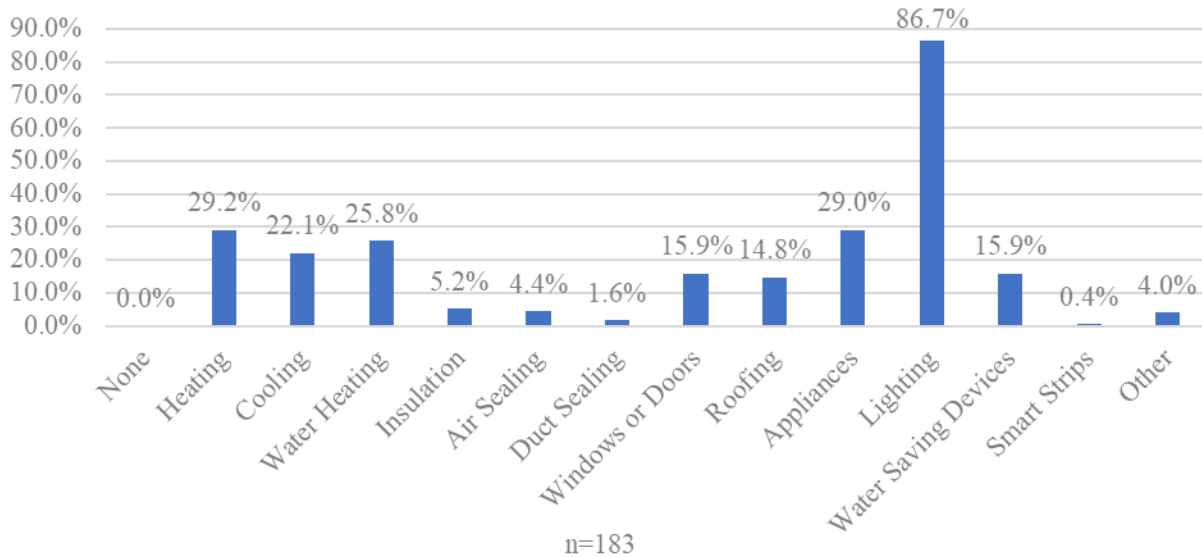
In tenant units, the study found that predominate implemented measures included lighting (78.4%), energy efficient appliances (73.7%), and upgrades to the cooling system (39.6%).

Figure 3-33: Energy Efficient Improvements to Tenant Units

n=196
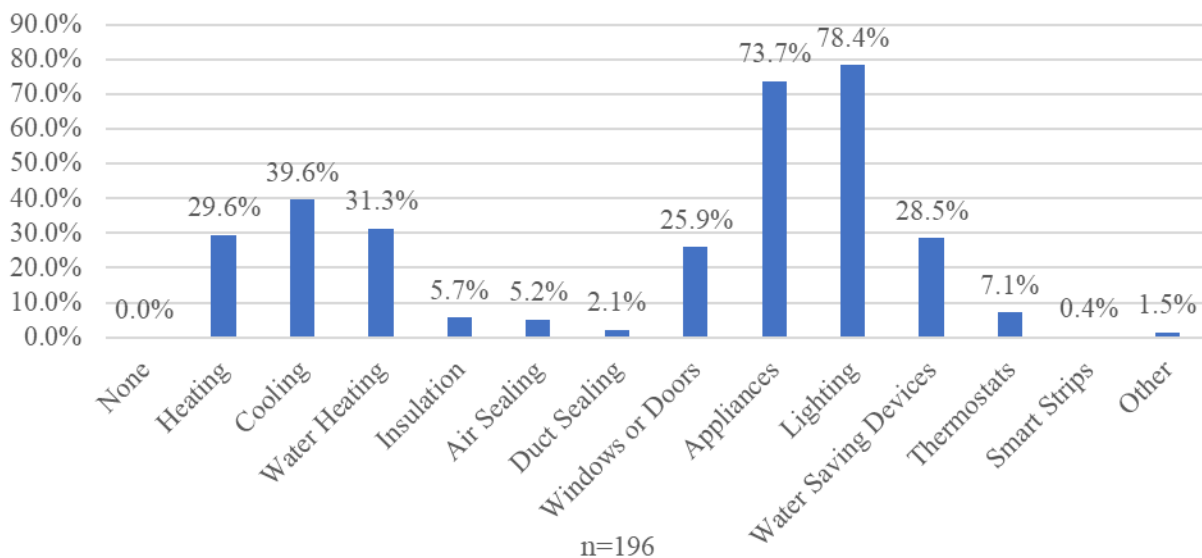
Study participants who reported making energy efficient improvements to either common area or tenant units were asked what motivated the properties' decision to adopt energy efficient improvements. Participants could select more than one response. Aside from making improvements due to building code (7.3%) and taking advantage of rebates (12.3%), most properties reported being motivated due to reduction of cost, replacement of older equipment, and general aesthetic improvement (> 54%).

Figure 3-34: Energy Efficient Improvement Motivation

n=237
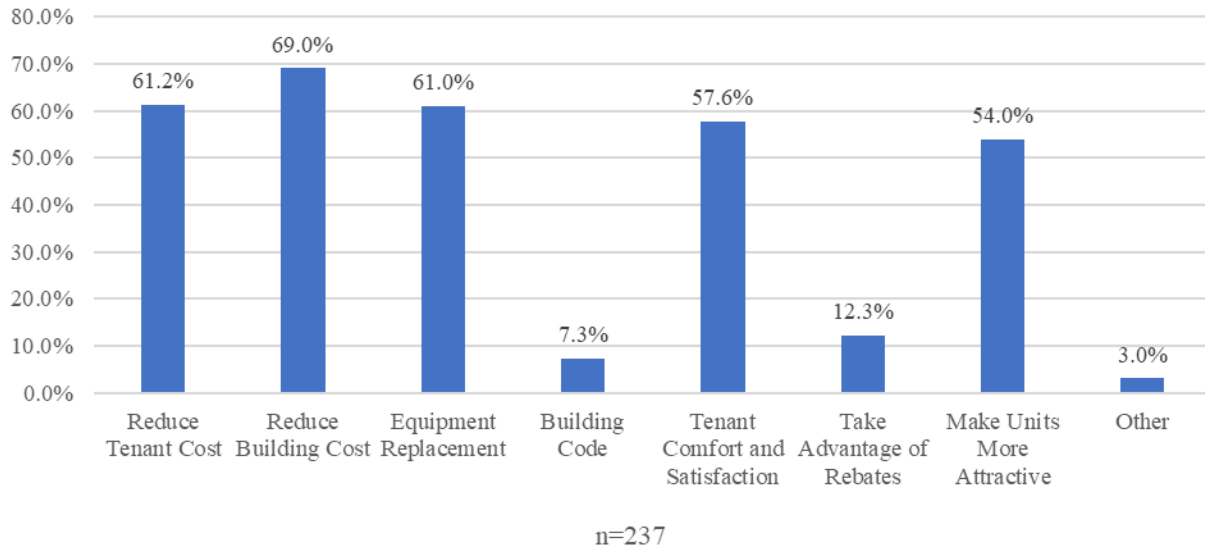
Study participants who reported making energy efficient improvements were also asked who made the improvements to the property. Participants could select more than one response. Most responded that improvements were made by property staff (71.5%) and contractors or the energy company (62.3%).

Figure 3-35: Who Made Energy Efficient Improvements to the Property

n=237
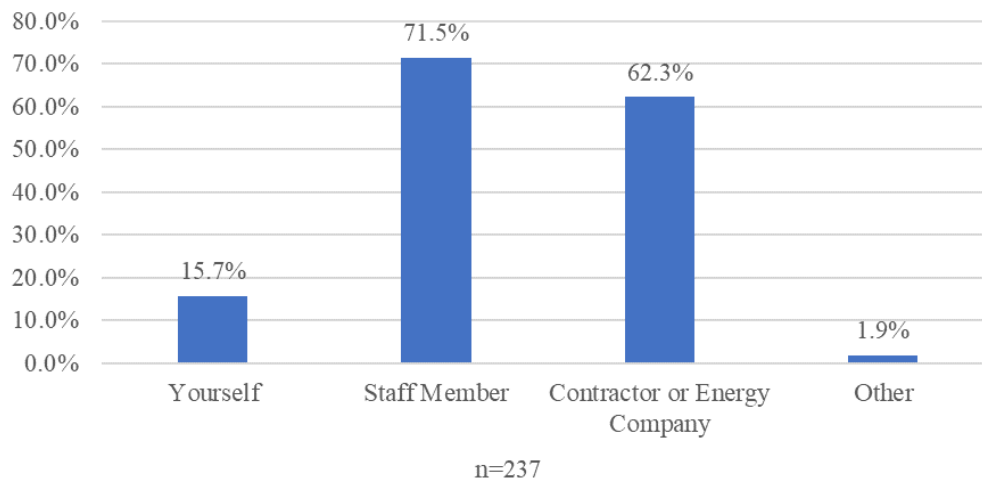
3.4.4 Future Interest in Rutgers Evaluations

Survey participants were asked whether they would be interested in participating in future Rutgers evaluations on multifamily building energy use. Roughly two-thirds of participants reported being interested in further participation.

Figure 3-36: Future Interest in Rutgers Evaluations
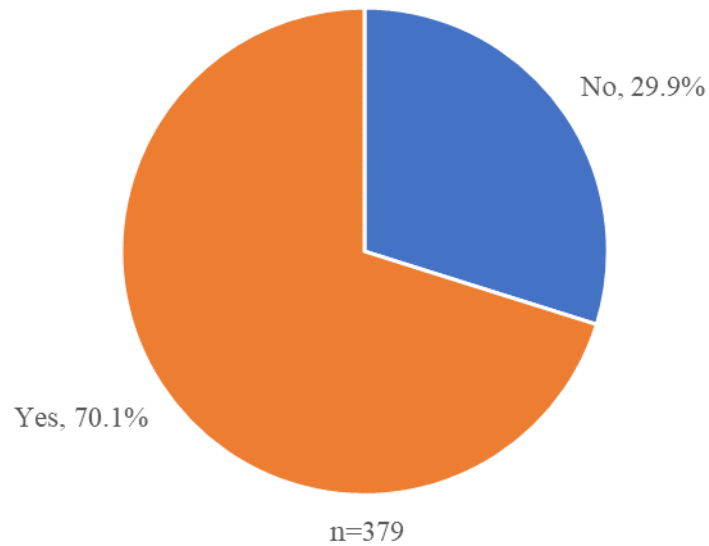
4 ENERGY EFFICIENCY CONSIDERATIONS FOR MULTIFAMILY PROPERTIES

One of the key purposes of this study, aside from characterizing the physical description of multifamily properties and equipment and end-use saturations, is to identify potential opportunities for commercial energy efficiency program design. Commercial energy efficiency programs for multifamily properties seek to reduce energy consumption by targeting energy efficiency measures to property management companies or property owners. Conversely, residential energy efficiency programs for multifamily properties seek to reduce energy consumption by targeting occupants of units. Results of this study provide potential implications for both commercial and residential multifamily programs as well as provide insight into future research opportunities. ADM discusses these implications in the remainder of this section.

4.1 DISCUSSION OF CONTEMPORARY STUDIES

ADM performed a literature review of recent multifamily studies which were expected to make more robust the data collected in this study and their considerations for energy efficiency programs targeting the multifamily sector in New Jersey. ADM initiated the literature review by compiling a list of potentially relevant studies and reviewing their contents for applicability to this study. Criteria used to assess applicability included:

- Date study was performed

- Geographic proximity to New Jersey

- Similarity in study objectives

A matrix was developed to review and compare the various studies identified for inclusion in the literature review. Note that not all studies were found to be particularly relevant within the objectives of this study. However; we understand that the intent of this study extends beyond merely establishing baseline data for the multifamily sector. Thus, in Table 4-1, ADM includes findings regarding all literature sources identified with potentially useful data for Rutgers and their partners with respect to the multifamily sector.

Table 4-1 Listing of Additional Studies

Study Title	Year	Location	Type	Description	Data Sources Used
Energy Efficiency Potential Study for Consolidated Edison Company of New York, Inc. Volume 1: Executive Summary	2010	NYC	Potential Study	Energy efficiency potential study that focuses on Con Edison's downstate markets of New York City and Westchester County through the year 2018.The overall goal of this study is to provide a comprehensive and realistic assessment of the available energy savings that can be obtained from viable energy efficiency measures through 2018. The main objectives for this study include: ■ Collect primary data from Con Edison customers to reflect the most representative estimates of energy equipment and consumption by service class, customer type, building category and business segment. Supplement primary data with applicable secondary data sources. ■ Develop baseline energy profiles, consumption and forecasts for each market segment. ■ Estimate the technical, economic and achievable potentials by passing all measures through screening processes to determine their viability, cost effectiveness and acceptance in the market.	■ Online survey with customers with onsite visits ■ Historical billing data ■ Floor area estimates (McGraw-Hill and NYC Department of City Planning PLUTO data files) ■ Energy consumption forecasts ■ Building audit data performed by New York City and NYSERDA ■ Market Identification Study for Con Edison (Dun & Bradstreet, 1998) Contemporary and historical potential studies
Electric Energy Efficiency Potential for Vermont	2011	State Non-NY	Potential Study	Presents results from the evaluation of opportunities for energy efficiency programs in the service areas of Vermont's two utilities (EVT and BED). Estimates of technical potential, economic potential, and maximum achievable potential from 2012-203 all sectors. The study had the following objectives: ■ Evaluate the electric energy efficiency technical potential savings in the overall State of Vermont, as well as in the EVT and BED service areas; ■ Calculate the Vermont Societal Test ("VT SCT") benefit-cost ratio for the achievable potential for electric energy efficiency measures and programs and determine the electric energy efficiency economic potential savings for Vermont homes and businesses; ■ Evaluate the potential for maximum achievable savings through electric efficiency programs over a twenty-year horizon (2012-2031); ■ Estimate resource plan scenario savings over a twenty-year period from the delivery of a portfolio of example energy efficiency programs based on specific funding levels or savings targets.	The commercial and industrial sector analysis was modeled using a top down approach. The top-down potential estimate begins with a disaggregated energy sales forecast over the 2012-2031 time period, and then estimates what percentage of these sales a given efficiency measure will save. Preferences for using data were, in order: data from DPS, Efficiency Vermont and BED, TRM data, other Vermont-specific data, region specific data, national data, and engineering estimates.

Process Evaluation: HVAC Business Partners Program	2012	Statewide	EM&V	Process evaluation of the Business Partners HVAC program designed to enhance quality installation and maintenance practices in the commercial HVAC market throughout NY State. Explores barriers to more widespread uptake, explore participant experience, identify if there is any potential spillover.	Primary data collected from depth interviews, program materials
DOE Buildings Energy Data Book	2012	Whole US	Database	Developed by the US DOE's Office of Energy Efficiency and Renewable Energy, this book contains data on the US boiling sector, energy supply, codes and standards, water use, and market transformation. Data tables break national energy use down by fuel type, sector, cost, end-use, and a range of other variables. Provides a current and accurate set of comprehensive buildings-related data, and to promote the use of such data for consistency throughout DOE programs.	Secondary sources, mostly EIA databases and reports, but some tables include data from other market-specific reports (i.e. BTP/Navigant Consulting, U.S. Lighting Market Characterization)
Pennsylvania Statewide Commercial & Industrial End Use & Saturation Study	2012	State Non-NY	Baseline Study	Baseline study of energy use characteristics for the non-residential sector in Pennsylvania. Evaluates the characteristics of the energy using equipment and building stock present in Pennsylvania for the seven electric distribution company (EDC) service territories. To determine the baseline energy efficiency potential in PA's C&I population.	Utility customer billing data, primary data collection through on-site surveys of C&I facilities
Electric Energy Efficiency Potential for Pennsylvania	2012	State Non-NY	Potential Study	Potential study for electric energy efficiency in Pennsylvania. The main objective of this energy efficiency potential study is to quantify the technical, economic, achievable and program potential for energy efficiency statewide for three- and five-year periods starting on June 1, 2013, and to provide potential kWh and kW savings estimates for each level (technical, economic, achievable and program potential) of energy efficiency potential.	Top down approach using forecasts of energy for the state of Pennsylvania using annual energy forecasts for Pennsylvania (provided by the Pennsylvania investor-owned electric distribution companies (EDCs).
NYSERDA 2006 - 2009 Existing Facilities Program Impact Evaluation Report	2012	Statewide	EM&V	One of NYSERDA's largest programs, the Existing Facilities Program (EFP) promotes EE and DR in C&I facilitates throughout the state, providing incentives for EE and DR equipment. Verify program impacts, calculate NTGR, and make recommendations for future program years and evaluation of DR projects.	■ Primary data collection (site visits, telephone survey) ■ NYSERDA program tracking data

New Jersey Energy Efficiency Market Potential Assessment	2012	State Non-NY	Potential Study	Market profiles describe electricity use by sector, segment, end use and technology in the base year of the study (2010). This study addresses energy efficiency potential in New Jersey and informs the comprehensive resource analysis (CRA) process by: (1) determining markets to address with EE programs, (2) estimating the potential for energy savings for the 2013-2016 period, (3) providing high-level recommendations regarding programs.The market profiles are given for average buildings and new vintages. This appendix presents the following market profiles: - Residential market profiles by segment - Commercial market profiles by building type - Industrial market profiles First developed a market characterization through secondary data and secondary research. From this, developed market profiles based on base-year (2010) energy use by sector/segment. Then used forecast data for out years to model the baseline and potential for energy efficiency using EnerNOC's Load management Analysis Planning Tool (LoadMAP)	Market characterization sources: existing data from prior NJ studies including customer participation rates, and EE technologies; EnerNOC databases and tools; ACS data; EIA data.
NYSERDA Commercial/Industrial Natural Gas Market Characterization	2012	Statewide	EM&V	This study provided NYSERDA with insight into the major players in the C&I natural gas market (i.e., large customers and ESCOs). The purpose of the study is to help inform the development of NYSERDA natural gas efficiency programs. Characterize the C&I natural gas efficiency market in NY to help inform program design. Included a literature review of secondary sources, in-depth interviews with NYSERDA staff, utility staff, representatives from ESCOs servicing non-res customers in NY State.	■ NYSERDA reports ■ EIA data and reports ■ US DOE website and reports ■ NOAA data ■ US Bureau of Census data ■ Utility websites ■ NY PSC website and reports
Electric and Natural Gas Energy Efficiency and Demand Response Potential for the District of Columbia	2013	State Non-NY	Potential Study	The District Department of the Environment (DDOE) completed this 2013 study of energy efficiency potential to assist policy makers with developing the CEP, to identify new energy efficiency initiatives for the District, and to refine existing program offerings and portfolios. The main analytical steps taken in this study were: ■ Measure List Development & Characterization ■ Load Forecast / Disaggregation ■ Potential Savings Overview ■ Technical Potential ■ Economic Potential ■ Measure Cost-Effectiveness Screening ■ Achievable Potential	■ Mid-Atlantic TRM 2.0 (July 2011) DC Sustainable Efficiency Utility TRM ■ NEEP Incremental Cost Study Report (2011) ■ Appliance saturation study conducted by Pepco in 2000 ■ 2009 EIA Residential Energy Consumption Survey (RECS) ■ 2007 American Housing Survey (AHS) ■ 2003 EIA CBECS

[Process Evaluation Report for Con Edison's Multi-Family Electric and Gas Program](#)	2013	NYC	EM&V	Process Evaluation Report of Con Edison's Multi-Family Electric and Gas Program. The program serves buildings with up to 75 units, offering a free energy assessment, in addition to refrigerator and room AC pick-up and replacement. These measures are free in rent-controlled situations, and differing incentives for equipment are provided in other situations. Also, the program provides some directly installed low-cost gas and electric measures--such as CFLs, smart strips, low-flow showerheads, and faucet aerators. Objectives of this process evaluation are to assess the program's design, delivery, and implementation processes to assist the program in meeting its savings goals. The specific process areas the evaluation addresses are program planning and design, infrastructure development, marketing and customer acquisition, program delivery, satisfaction with the program, and participant/non-participant interactions with all other available programs.	Con Edison's program tracking data, and program documents (i.e., marketing materials and planning/design documents). Primary data collection via in-depth interviews with program staff, sub-contractors, participants, and non-participants.
[Process Evaluation Report for Con Edison's Multi-Family Low-Income Program](#)	2013	NYC	EM&V	Process evaluation of ConEd's Multifamily Low-Income Program. The program focuses on gas measures (heating and hot water) in common areas for buildings within the New York City Housing Authority and the Westchester County Housing Authorities. Objectives were to assess the effectiveness and efficiency of the program design, delivery, and implementation processes.	Program tracking data, program materials, primary data collection (in-depth interviews)
[Estimating the Energy-Efficiency Potential in the Eastern Interconnection](#)	2013	Multi-state Region (Non-NY)	Potential Study	This study develops estimates of the economically achievable potential for improving the energy-efficiency of homes, commercial buildings, and industrial plants located in the Eastern Interconnection. The approach of this study involves identifying a series of energy-efficiency policies and examining their impacts and cost-effectiveness using Georgia Tech's version of the National Energy Modeling System (GT-NEMS). The project emphasizes the impacts on electricity consumption, the levelized cost of policy-driven electricity savings, and distributive effects at the state and regional levels. Thirty-six states and the District of Columbia are covered by this study. Secondary objectives are to review existing estimates of EE potential in the Eastern Interconnection and to refine methodologies for estimating EE potential in the Eastern Interconnection.	Uses primarily EIA data and other secondary sources

ComEd Commercial and Industrial Saturation/End Use, Market Penetration & Behavioral Study	2013	Local/Muni. Non-NY	Baseline Study	Study uses primary data collection to characterize the market penetration and saturation of measures in the C&I segment. The study also contains an analysis of electricity usage and waste, both for technologies and behaviors. The goal of this research is to inform program planning efforts by identifying gaps in current program measure offerings and any energy efficient technologies that have achieved sufficient market saturation to warrant exclusion from programs in the future.	Primary data collected through telephone surveys, on-site audits, and metering.
Minnesota Multifamily Rental Characterization Study	2013	State Non-NY	Market Study	Comprehensive characterization of the Minnesota rental housing market. The goal of the study was to provide background and a deep understanding of the MN rental market for policy making and EE programs. The study was commissioned by the MN Dept. of Commerce Division of Energy Resources.	Primary data collection (paper surveys, site visits), billing data, secondary sources (US Census data)
Energy Efficiency and Renewable Energy Potential Study of New York State	2014	Statewide	Potential Study	Presents the potential for increased adoption of energy efficiency and renewable energy technologies in New York State. It focuses on the long-term potential using a twenty-year study period, 2013–2032. Efficiency potential results are presented in terms of "achievable potential" and "economic potential" (the cost-effective energy savings). Includes electricity, natural gas, and petroleum fuels in the building and industrial sectors, but excludes transportation energy use. For renewable energy, the study analyzes the economic potential and the "bounded technical potential," a measurement of what theoretically would be possible if cost were not a factor. The major renewable resource categories include biomass, hydro, solar, and wind. The study also assesses alternative allocations between various renewable technology options. Uses a top-down analysis: Starts with assessment of current and forecasted energy generation and consumption, then develops understanding of how energy is generated and used by market segments, and for what end uses. Energy use forecast is developed for fuel type, sector, end use, and building or industrial type. Then, the percentage of potential energy use reduction in each of those four categories is determined. Analysis was done using Optimal Energy's proprietary model, the Portfolio Screening Tool.	■ NYISO econometric and base case electric sales forecasts ■ NYSERDA petroleum sales forecasts ■ NYSERDA-developed forecasts of avoided electric energy costs ■ NYSERDA-developed forecasts of annual avoided fossil fuel costs.

	Year				
Multifamily Performance Program Process Evaluation and Market Characterization	2014	Statewide	EM&V	Process Evaluation and Market Characterization and Assessment (PE/MCA) team's evaluation of NYSERDA's Multifamily Performance Program (MPP) and characterization of the multifamily building market in New York State (NYS). Characterize multifamily buildings in NYS (5+ units); provide a baseline for multifamily housing market	▪ NYS tax data ▪ US Census data ▪ Comprehensive Residential Information Database ▪ Dodge data ▪ Primary data collection (participant and market actor survey)
Heat Pumps Potential for Energy Savings in New York State - Final Report - July 2014	2014	Statewide	Potential Study	This study assesses the potential for energy savings from heat pumps in New York State. The study looks at the technical potentials for air source and ground source heat pumps separately and then considers the economic potential for air source and ground source heat pumps combined. Uses a top-down analysis starting with statewide usage forecasts for energy sources including electricity, natural gas, and petroleum fuels. Builds upon the analysis conducted for the EE and Renewable Potential study of New York State published in April 2014.	Statewide usage forecasts for electricity, natural gas, and petroleum fuels disaggregated into annual energy usage by end use, including space heating and cooling
Study of Potential for Energy Savings in Delaware	2014	State Non-NY	Potential Study	The Delaware Department of Natural Resources and Environmental Control (DNREC) commissioned this study to estimate two achievable energy efficiency potential scenarios for Delaware for electricity, natural gas, and unregulated fossil fuel usage (petroleum fuels) in the buildings sector. This Phase II report builds on an initial effort to estimate Delaware's economic energy efficiency potential report completed earlier in 2013. The analysis considers a 12-year study period, from 2014-2025.	Annual energy sales forecasts for each energy type and each sector over 12 years. Data come from Delaware utilities and cooperatives, EIA data, and are adjusted for future codes and standards.
Con Edison EEPS Programs-Impact Evaluation of Multifamily Electric and Gas Program	2014	NYC	EM&V	Study included engineering estimates, billing analysis, measurement-based savings estimates, on-site data collection (for lighting, smart-strip and energy management systems), participant survey, building manager survey, and application of NYTM assumptions. Program delivered as a joint electric and gas program that installs ECMs in multifamily buildings with 5 to 75 units. Two types of measures are installed: common area measures and in-unit measures. The baseline for each measure was estimated using NYTM values, or self-reported equipment information from the participant survey.	NYTM, customer project files, program tracking data, weather data, primary data collection (participant survey and building manager survey; site visits)

[2014 Commercial Building Stock Assessment: Final Report](#)	2014	Multi-state Region (Non-NY)	Baseline Study	The 2014 CBSA study sought to further improve upon the first two studies by drawing a new random sample of regional commercial buildings and conducting highly detailed audits to develop a more accurate and current picture of energy consumption in the Pacific Northwest.	Primary data collection (859 on-site visits) Commercial building population developed from the Commercial Building Inventory, CoStar Databases, McGraw Hill Construction Dodge, American Hospital Directory, Integrated Postsecondary Education Data System.
[Black Hills Energy Updated Energy-Efficiency Plan 2012-2015](#)	2015	Local/Muni. Non-NY	Baseline Study	The commercial and industrial (C&I) baseline study provided an inventory of existing building equipment to determine an accurate C&I building and measure baseline for Black Hill Energy (CO). During facility audits, general building information and energy using measures were documented. Energy using measures included heating and cooling equipment, plumbing information, lighting equipment and plug load information. The 116 facilities audited represent the Black Hills service territory, based on segmentation by business type and energy usage.	Primary collection (116 on-site commercial facility audits)
[Multifamily Performance Program Impact Evaluation (2009-2011)](#)	2015	Statewide	EM&V	Assesses savings attributable to the Multifamily Performance Program (MPP) from 2009-2011. On-site engineering analysis on a sample of projects to determine inputs for whole building energy model, telephone survey to determine NTGR (including NPSO)	▪ Primary data collection (Site visits, telephone survey) ▪ NYSERDA program tracking data ▪ Dodge data
[Impact Evaluation of Con Edison Multifamily Low Income Program](#)	2015	NYC	EM&V	Impact evaluation of ConEd's Multifamily Low-Income Program. The program focuses on gas measures (heating and hot water) in common areas for buildings within the New York City Housing Authority and the Westchester County Housing Authorities. Conduct primary data collection focused on steam trap, boiler, and air sealing measures; and report annual gross natural gas savings at the customer meter based on billing analysis.	▪ Utility billing data ▪ Program tracking data ▪ Primary data collection from on-site.
[Commercial Building Energy Consumption Survey (CBECS) 2012](#)	2015	Whole US	Database	A National sample survey detailing the stock of U.S. commercial buildings, including energy-related characteristics and energy usage data. The 2012 dataset includes 6,720 records (1,106 of whom are located in the Northeast). Goal is to provide statistical information about the energy consumption and expenditures of the U.S. commercial buildings and information about energy-related characteristics of those buildings.	Primary data collection using site-visits and in-person interviews at building locations

Residential Statewide Baseline Study Volume 2: Multifamily Report	2015	Statewide	Baseline Study	Baseline study of energy use characteristics for low-rise multifamily and high-rise multifamily residential sectors in New York State. The study excludes multi-metered buildings because they are more closely aligned with commercial buildings. The overall objective of the study is to understand the residential building stock and associated energy use, including the saturation of energy-consuming equipment (electric, natural gas, and other fuels) and the penetration of energy efficient equipment, building characteristics, and energy management practices.	Utility data, primary data collection (tenant and building owner/manager surveys, site visits)
Building Performance Database	2015	Whole US	Database	The DOE's Buildings Performance Database (BPD) is a decision-support platform, comprised of a database and data analysis tools, that enables statistical analysis of building energy performance, operational, and physical characteristic data. Extract of DOE's building performance database that summarizes each Building's Source EUI (kBTU/sq ft/yr) for all commercial buildings in the database in New York State. As of May 2014, the database contains information voluntarily submitted on over 750,000 buildings nation-wide. The majority of buildings (90%) are residential, though the EIA (2003) found that the BPD represented 0.9% of the US commercial building stock.	Data from over 25 sources, including federal, state, and local government building performance data; utility and energy efficiency program data; data from private companies and building owners.
Building Optimization and Commissioning Services	2015	Multi-state Region (Non-NY)	Market Study	Examines the global market for building optimization and commissioning services, including initial commissioning, retro commissioning, and monitoring-based commissioning. The study explores the market drivers and barriers related to optimization and commissioning services in detail, along with global demand-side dynamics.	Unknown
Local Law 87	N/A	NYC	Database	NYC law requiring buildings over 50,000 sqft to submit to an energy audit every ten years and conduct retro-commissioning on base building systems if deemed necessary. These buildings must submit an Energy Efficiency Report (EER), by the end of the year they are audited. Data on building equipment, end uses, and energy conservation measures is collected during the audit.	Data collected from EERs.
Open NY	N/A	Statewide	Database	Downloadable and viewable data on many topics in NYS, including energy price trends, usage by sector, energy efficiency projects by municipalities, and other information.	Data collected from various NYS sources.

4.2 NJCEP MULTIFAMILY PROGRAM CONTEXT

In addition to the previously summarized literature study, ADM reviewed the NJCEP Multifamily program description provided in the *Multifamily Sections of Updated TRC Compliance Filing, Volume 2 (Fiscal Year 2019)* document in order to determine its context relative to other contemporary programs. In the remaining sections we synthesize this information as it implicates measure specific design implications for the program. In this section we broadly discuss the general program design as it compares to other Multifamily programs evaluated by ADM.

Our review of the NJCEP Multifamily program design focused to several key elements:

1) Target market
2) Program Scope (e.g. participation paths)
3) Measure Offerings

Before the NJCEP Multifamily program all multifamily residential facilities that participated in the NJCEP program offerings would do so through either the C&I or Residential program paths. The NJCEP Multifamily program was specifically designed to simplify the participation process for multifamily buildings run by a single owner or management entity and having five or more dwelling units. As such, the program targets both common areas and dwelling units in a common effort – rather than separating them into separate programs as is common in many contemporary programs. However; this program design is certainly not unique and carries with it the advantage of engaging the key decision makers regarding energy efficiency improvements for the larger portion of facility's infrastructure. One specific (and successful) Multifamily program that ADM observed to have many similarities in its program design in this respect is the Multifamily Energy Efficiency Program run by the Public Service Company of New Mexico (PNM) and also implemented by TRC.

Many of the multifamily programs reviewed by ADM targeted residential accounts and commercial accounts through separate multifamily programs (e.g. targeting common areas and dwelling units separately), or they were much more focused in their scope. For example, NYSERDA separates its multifamily offering into separate offerings for new construction and existing buildings. To some extent the NJEC Multifamily program does this as well through the different pathways based on program scope(Paths A, B, and C) with Path C likely to be dominated by new construction projects because it offers whole-building options that are well-suited for new construction projects and the remaining paths seeing more uptake from existing facilities. Pennsylvania offers another example of more focused Multifamily program designs. In Pennsylvania the First Energy utilities run multifamily programs that are restricted to single meter (multifamily) residential accounts and those who have incomes below 150% of the federal poverty line. Multifamily common areas are engaged through the commercial and industrial program offerings.

Measure offerings across multifamily programs tend to be more homogeneous then the program designs, particularly in their prescriptive offerings. However, due to the wide scope of NJCEP's program, it includes many measures that are typically found in the C&I offerings elsewhere (e.g. central plant upgrades and variable frequency drives). When this difference in scope is considered, ADM did not identify any significant differences in the NJCEP program offerings relative to other multifamily programs. This is not surprising as building energy systems and energy conservation technologies are largely governed by a building's structure and usage. Some measure offerings however will be affected

by the local conditions of the multifamily market (e.g. building vintages, economic conditions, weather patterns, etc.) and we discuss our findings as they are relevant to the NJCEP Multifamily program in the remaining sections.

4.3   MEASURE OFFERING IMPLICATIONS FOR MULTIFAMILY PROGRAM

Multifamily property owners and property management companies generally reported overall motivation for making energy efficient improvements due to reduction of tenant and building costs, standard equipment replacement, and improving the comfort and aesthetics of units in order to make the units more attractive to potential tenants. Keeping these considerations in mind, ADM identified the following potential opportunities for program design:

- **Window tinting:** Window tinting or applying a reflective coating to windows is an energy efficiency measure that reduces the energy associated with space cooling by reducing the amount of light absorbed through windows. The study found that most multifamily properties have clear windows (98.7%) with limited reports of window tinting (2.0%) or other reflective coating (0.1%). Given the low cost of entry to implement a window tinting or reflective coating program, this type of program may be attractive to potential participants.

- **Heating equipment:** The current study does not capture information regarding the average efficiency of equipment installed at multifamily properties. From the information currently provided, however, a subsector of multifamily properties may be good candidates for heating retrofit incentives. Roughly 11.2% of multifamily properties reported having electric baseboard heating as their primary mode of tenant unit heating. Savings could be achieved by incentivizing the installation of packaged terminal heat pump or ductless mini-split heat pump units in these properties.

- **Solar panel incentives:** The study found a low overall saturation of solar panels, with only 5.4% of the multifamily sector reporting having solar panels. Despite this, 86.3% of properties reported having less than 25% roof shading, indicating good solar generation potential. Additionally, most properties reported having an open parking lot (74.7%), which could have potential for subsidized solar farm development.

- **EV charging stations:** Depending on New Jersey's prioritization of reduction of greenhouse gas emissions, one potential avenue would be to incentivize multifamily properties to install EV charging stations. Cost of entry into the EV market continues to be reduced for consumers, thereby increasing potential adoption of electric vehicles. However, market barriers still exist for occupants of multifamily units if accessible charging is not available. Only 3.1% of multifamily properties reported having an EV charging station present. Therefore, an opportunity exists to decrease market barriers by increasing the availability of EV charging stations at multifamily properties.

- **Building shell insulation:** Construction materials and age varied, although most buildings surveyed were building before the year 2000 (60.6%) with few properties having undergone major construction in the past ten years (28.2%). Given the low amount of properties that reported undergoing infiltration improvements over the past five years, given the vintage of homes and the lack of major construction, there may be good opportunities for energy savings through building shell improvements such as air sealing, insulation, duct sealing, etc.

- **Thermostats:** Most properties reported using simple setpoint thermostats to control HVAC systems. Large savings can be achieved by retrofitting simple on/off thermostats and simple setpoint thermostats to seven-day programmable thermostats or smart thermostats, as these allow users to automate the process of turning off their heating and cooling when they are not home or are asleep.

- **Lighting:** Despite decreasing cost of LED bulbs, many properties still reported CFL and incandescent bulbs as being common in tenant units. The saturation of both technologies leaves open opportunities for further retrofits to LEDs, which on average save 80% of the energy used in traditional incandescent bulbs and 40% of the energy used in equivalent CFL bulbs.

- **Faucet aerators:** Although a large percentage of properties reported water heating as being a service provided to tenants at no-cost, 58.8% of multifamily properties have water heating that is paid for by tenants. Additionally, 20% of water heating is fueled by electricity. Therefore, one potential avenue for energy savings associated with water heating savings is to provide faucet and showerhead aerators. Aerators limit the amount of water used per minute by mixing water with air. Future research should confirm the rate at which aerators are already used and installed by multifamily properties.

- **Room air conditioners and dehumidifiers:** Roughly a quarter of all multifamily properties (24.9%) do not provide any form of space cooling to resident units—neither window or room air conditioners nor central air conditioning. This leaves potential savings in the residential sector for appliances related to space cooling. Because of New Jersey's humid climate during summer months, space cooling not only serves to reduce indoor air temperature but also reduce indoor humidity levels. Future research should confirm the rate at which residents without in-unit space cooling purchase both window/room air conditioners and dehumidifiers and determine whether there are opportunities to rebate energy efficient equipment over the purchase of equipment that solely meets federal minimum equipment standards.

4.4 CONSIDERATIONS FOR FUTURE STUDIES

Future studies on multifamily properties should focus on market barriers for participation in energy efficiency programs and attitudes regarding energy efficiency. Additionally, follow-up information regarding penetration of energy efficiency program marketing could provide insight on why most multifamily properties are not currently aware of energy efficiency programs available in the state. Finally, future studies may benefit from sampling tenants of multifamily properties. Researchers should contact property management companies to conduct research on tenant unit behaviors and additional research on common appliance types in tenant units.

APPENDIX A: DATA COLLECTION INSTRUMENT

A copy of the data collection instrument has been included via an electronic appendix.

APPENDIX B: SUMMARY STATISTICS – ELECTRIC UTILITY

In addition to calculating summary statistics for building physical properties and equipment and end-use saturations across the entire state, ADM also segmented the summary statistics by electric utility company. As noted in Section 2.1, samples for the study were obtained using a representative sampling method by county based on a target sample size of 375. The total population of multifamily properties was estimated using data obtained through the New Jersey Property Tax System (MOD-IV) with adjustments made via additional data from the New Jersey Department of Community Affairs. A target number of sample points was then created based on the number of multifamily properties in each county relative to the statewide number of multifamily properties.

As noted previously in Section 2.3.1, ADM's final sample was representative of the distribution of multifamily units from county to county. The number of sample points achieved for a given utility is ultimately determined by the density of multifamily properties within that utility's geographic service territory. As can be seen in Figure B-0-1, PSE&G service territory had the highest density of multifamily units. Furthermore, Rockland Electric Company had fewer sample points due primarily to servicing a smaller geographic area than the other investor-owned utilities.

Figure B-0-1: Number of Sample Points by County Size and Electric Utility
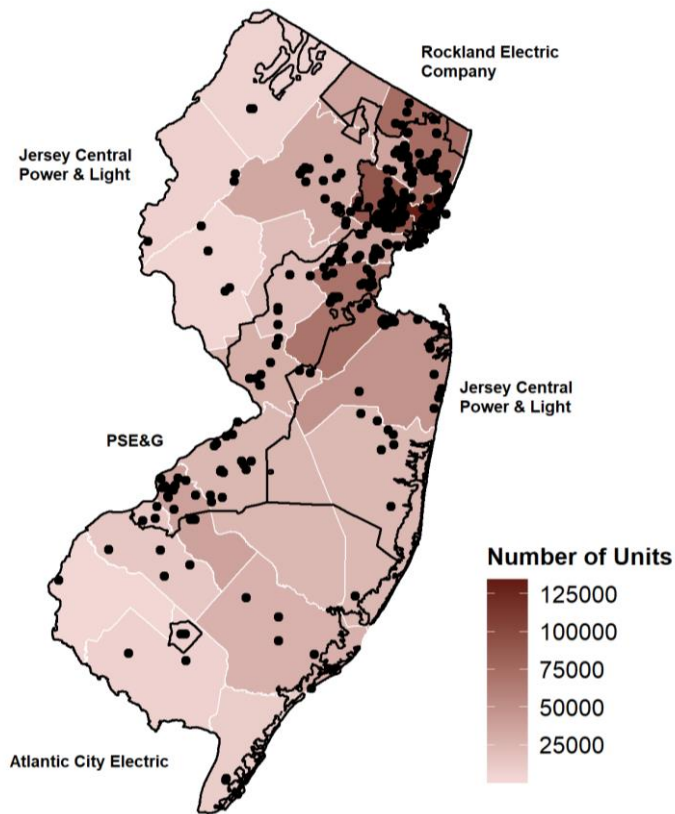
Table B-0-1 presents the number of sample points per utility company. One sample point, out of the initial 380, was removed due to the respondent providing an address that could not be geolocated back to a utility company.

Table B-0-1: Number of Sample Points per Electric Utility Company

Utility	Number of Sample Points
Atlantic City Electric	22
Borough of Madison	3
Borough of Park Ridge	1
Jersey Central Power & Light	57
PSE&G	292
Rockland Electric Company	2
Vineland Municipal Authority	2
Total	**379**

The remainder of this appendix provides information regarding the physical description of multifamily properties and equipment saturations by end-use by utility company. Municipal utilities such as the Borough of Madison, Borough of Park Ridge, and Vineland Municipal Authority have been aggregated together for the sake of presentation. Because Rockland Electric Company is an investor-owned utility, results are presented separately for this utility company. However, it should be noted that although the statewide sample is a representative sample, responses for Rockland Electric Company may not be representative due to a smaller number of sample points (n=2).

B.1   PHYSICAL DESCRIPTION OF MULTIFAMILY PROPERTIES

B.1.1   Building Size and Occupancy

Table B-0-2: Number of Buildings per Complex

Utility	Average Number of Buildings
Atlantic City Electric (n=22)	10.44
Jersey Central Power & Light (n=54)	12.86
Municipal Utility (n=6)	2.49
PSE&G (n=275)	11.00
Rockland Electric Company (n=2)	6.25

Table B-0-3: Number of Floors per Building

Utility	Average Number of Floors
Atlantic City Electric (n=22)	2.92
Jersey Central Power & Light (n=57)	2.82
Municipal Utility (n=6)	3.10
PSE&G (n=290)	3.57
Rockland Electric Company (n=2)	2.00

Table B-0-4: Average Square Footage by Unit-Type

Unit-Type	Atlantic City Electric	Jersey Central Power & Light	Municipal Utility	PSE&G	Rockland Electric Company
Studio	NA	368 (n=8)	NA	511 (n=86)	NA
1 Bedroom	772 (n=16)	774 (n=47)	608 (n=6)	726 (n=257)	746 (n=2)
2 Bedroom	954 (n=17)	1,032 (n=50)	858 (n=5)	972 (n=264)	1,104 (n=2)
3 Bedroom	1,218 (n=9)	1,225 (n=14)	NA	1,342 (n=88)	1,150 (n=1)
4 Bedroom	NA	850 (n=1)	NA	1,580 (n=16)	NA
5 Bedroom	NA	NA	NA	1,984 (n=3)	NA

Table B-0-5: Average Number of Units by Unit-Type

Unit-Type	Atlantic City Electric	Jersey Central Power & Light	Municipal Utility	PSE&G	Rockland Electric Company
Studio	1 (n=1)	10 (n=10)	NA	19 (n=85)	NA
1 Bedroom	51 (n=17)	116 (n=48)	25 (n=6)	54 (n=259)	78 (n=2)
2 Bedroom	87 (n=17)	100 (n=50)	11 (n=5)	45 (n=269)	33 (n=2)
3 Bedroom	26 (n=9)	17 (n=16)	NA	21 (n=92)	3 (n=1)
4 Bedroom	NA	6 (n=1)	NA	8 (n=17)	NA
5 Bedroom	NA	NA	NA	21 (n=4)	NA

Table B-0-6: Average Owner-Occupancy and Vacancy Rate

Measure	Atlantic City Electric	Jersey Central Power & Light	Municipal Utility	PSE&G	Rockland Electric Company
Percent Owner-Occupied	14.22% (n=22)	8.64% (n=56)	0.00% (n=6)	13.94% (n=286)	0.00% (n=2)
Percent Vacancy	11.25% (n=20)	41.71% (n=57)	2.19% (n=6)	18.16% (n=287)	15.73% (n=2)

B.1.2 Building Shell, Construction Year and Construction Materials

Table B-0-7: Construction Year

Construction Year	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=278)	Rockland Electric Company (n=2)
Before 1940	1.8%	1.4%	0.0%	12.1%	0.0%
1940 - 1949	2.7%	3.9%	0.0%	7.0%	0.0%
1950 - 1959	4.6%	0.0%	22.6%	9.4%	0.0%
1960 - 1969	12.6%	29.2%	0.0%	13.3%	93.6%
1970 - 1979	54.1%	13.6%	0.0%	6.9%	0.0%
1980 - 1989	7.7%	3.9%	23.5%	6.2%	0.0%
1990 - 1999	0.7%	2.9%	7.0%	3.1%	0.0%
2000 - 2009	10.2%	32.5%	0.0%	10.4%	6.4%
2010 - 2014	5.5%	1.0%	46.8%	11.2%	0.0%
2015	0.0%	0.0%	0.0%	5.2%	0.0%
2016	0.0%	3.5%	0.0%	4.3%	0.0%
2017	0.0%	1.2%	0.0%	4.0%	0.0%
2018	0.0%	6.8%	0.0%	6.9%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-8: Major Construction in the Past 10 Years

Major Construction <= 10 Years	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=55)	Municipal Utility (n=6)	PSE&G (n=289)	Rockland Electric Company (n=2)
No	66.8%	84.9%	77.4%	71.3%	6.4%
Yes	33.2%	15.1%	22.6%	28.7%	93.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-9: Year of Last Major Construction

Year of Construction	Atlantic City Electric (n=8)	Jersey Central Power & Light (n=16)	Municipal Utility (n=2)	PSE&G (n=67)	Rockland Electric Company (n=1)
2008-2014	29.2%	45.5%	0.0%	25.9%	0.0%
2015	0.0%	0.0%	0.0%	17.2%	0.0%
2016	0.0%	3.5%	0.0%	13.0%	0.0%
2017	45.2%	5.8%	0.0%	13.9%	0.0%
2018	25.6%	45.3%	100.0%	30.1%	100.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

B.1.3 Windows

Table B-0-10: Single-Layer or Multi-Layer Windows

Window-Type	Atlantic City Electric (n=18)	Jersey Central Power & Light (n=49)	Municipal Utility (n=6)	PSE&G (n=274)	Rockland Electric Company (n=2)
Combination of both types	5.9%	5.2%	11.3%	8.1%	0.0%
Multi-layer	87.5%	88.1%	88.7%	76.2%	100.0%
Single layer	6.7%	6.7%	0.0%	15.7%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-11: Presence of Low-E Windows

Low-E Windows	Atlantic City Electric (n=14)	Jersey Central Power & Light (n=30)	Municipal Utility (n=5)	PSE&G (n=226)	Atlantic City Electric (n=14)
No	51.0%	66.0%	46.9%	70.1%	51.0%
Yes	49.0%	34.0%	53.1%	29.9%	49.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-12: Presence of Window Types

Window-Type	Atlantic City Electric (n=18)	Jersey Central Power & Light (n=52)	Municipal Utility (n=6)	PSE&G (n=280)	Rockland Electric Company (n=2)
Clear	100.0%	100.0%	100.0%	97.9%	100.0%
Tinted	7.0%	1.5%	0.0%	3.2%	0.0%
Reflective	0.0%	0.0%	0.0%	1.9%	0.0%
Opaque	2.8%	0.0%	0.0%	0.1%	0.0%

B.1.4 Solar Panels

Table B-0-13: Solar Panels Present on Property

Solar Panels	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
Solar Panels (Any Kind)	11.2%	3.6%	0.0%	5.1%	0.0%
Roof-Mounted Solar Panels	8.5%	3.6%	0.0%	3.1%	0.0%
Parking Structure Solar Panels	0.0%	0.0%	0.0%	0.0%	0.0%

B.1.5 Parking Lots

Table B-0-14: EV Stations Present

EV Stations Present	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
No	100.0%	100.0%	100.0%	96.3%	100.0%
Yes	0.0%	0.0%	0.0%	3.7%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-15: Average Number of EV Stations

Utility	Average Number of EV Stations
Atlantic City Electric	0.00
Jersey Central Power & Light	0.00
Municipal Utility	0.00
PSE&G (n=13)	3.83
Rockland Electric Company	0.00

B.2 EQUIPMENT AND END-USE SATURATIONS

B.2.1 HVAC

B.2.1.1 Heating

Table B-0-16: Available Heating Types

Heating Type	Atlantic City Electric (n=18)	Jersey Central Power & Light (n=52)	Municipal Utility (n=5)	PSE&G (n=279)	Atlantic City Electric (n=18)
Central Gas Furnace	3.9%	17.5%	16.2%	28.2%	3.9%
Steam Boiler	0.0%	5.2%	23.1%	9.8%	0.0%
Hot Water Boiler	44.5%	25.8%	29.2%	39.1%	44.5%
GSHP	10.1%	1.4%	0.0%	2.6%	10.1%
Individual Gas Oil Furnace	35.0%	39.2%	47.7%	19.7%	35.0%
Electric Baseboards	7.6%	14.5%	13.0%	8.7%	7.6%

Table B-0-17: Primary Heating Fuel-Type

Heating Fuel-Type	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
Electricity	16.5%	20.0%	7.0%	11.0%	0.0%
Mixed: Electric & Gas	0.0%	0.0%	0.0%	0.2%	0.0%
Natural Gas	80.8%	80.0%	93.0%	88.8%	100.0%
Oil	2.7%	0.0%	0.0%	0.1%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-18: Primary Heating Equipment Type

Heating Equipment-Type	Atlantic City Electric (n=18)	Jersey Central Power & Light (n=52)	Municipal Utility (n=6)	PSE&G (n=277)	Rockland Electric Company (n=2)
ASHP	14.4%	0.0%	7.0%	4.3%	0.0%
Baseboard: Electric	36.2%	10.1%	12.7%	7.4%	0.0%
Baseboard: Gas	0.0%	2.0%	0.0%	5.0%	0.0%
Baseboard: Hot Water	0.0%	0.7%	0.0%	4.6%	0.0%
Baseboard: Unknown Fuel Type	0.0%	2.7%	0.0%	0.4%	0.0%
Convectors	0.0%	0.0%	0.0%	0.8%	0.0%
Forced Air Furnace	33.4%	51.6%	0.0%	37.5%	100.0%
Hot Water Boiler	0.0%	7.3%	0.0%	0.0%	0.0%
No One Major Type	0.0%	2.7%	0.0%	5.4%	0.0%
Other	0.0%	2.6%	0.0%	0.4%	0.0%
PTAC	0.0%	7.9%	46.8%	2.7%	0.0%
Radiators	15.9%	12.4%	33.5%	31.5%	0.0%
Wood or Coal Burning Stove	0.0%	0.0%	0.0%	0.1%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-19: Average Age of Heating Equipment

Heating Equipment-Type	Atlantic City Electric	Jersey Central Power & Light	Municipal Utility	PSE&G	Rockland Electric Company
Central Heating	12 (n=5)	13 (n=26)	20 (n=4)	10 (n=207)	5 (n=1)
Tenant-Unit Heating	9 (n=9)	9 (n=27)	11 (n=2)	11 (n=58)	11 (n=1)

Table B-0-20: EnergyStar Certified Heating Equipment

EnergyStar Certified	Atlantic City Electric (n=15)	Jersey Central Power & Light (n=48)	Municipal Utility (n=5)	PSE&G (n=255)	Rockland Electric Company (n=2)
No	8.5%	26.5%	42.4%	29.7%	0.0%
Yes: All	58.0%	49.7%	57.6%	59.4%	100.0%
Yes: Some	33.4%	23.8%	0.0%	10.9%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

B.2.1.2 Cooling

Table B-0-21: Available Cooling Types

Available Cooling Types	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
Central Chiller	0.0%	2.2%	0.0%	2.4%	0.0%
Individual Units	81.5%	86.2%	53.8%	72.1%	100%
No Cooling	18.5%	13.1%	46.2%	24.9%	0.0%

Table B-0-22: Primary Cooling Equipment Type

Equipment Type	Atlantic City Electric (n=21)	Jersey Central Power & Light (n=55)	Municipal Utility (n=6)	PSE&G (n=284)	Rockland Electric Company (n=2)
Central Chiller	10.2%	0.8%	0.0%	1.7%	0.0%
Heat Pump	7.1%	0.0%	7.0%	0.0%	0.0%
Individual RAC	64.8%	36.5%	35.4%	53.0%	93.6%
Mini-Split Units	0.0%	0.0%	0.0%	0.4%	0.0%
No One Major Type	0.0%	2.6%	0.0%	0.6%	0.0%
None	0.0%	0.8%	0.0%	1.1%	0.0%
Other	0.0%	3.2%	0.0%	3.5%	0.0%
Packaged AC - Roof Mounted DX	4.4%	4.4%	10.8%	8.4%	0.0%
PTAC	0.0%	8.1%	46.8%	3.5%	0.0%
Residential Split System - DX	13.4%	43.6%	0.0%	27.4%	6.4%
Wall AC Units	0.0%	0.0%	0.0%	0.4%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-23: Average Age of Cooling Equipment

Cooling Equipment-Type	Atlantic City Electric	Jersey Central Power & Light	Municipal Utility	PSE&G	Rockland Electric Company
Central Cooling	NA	4 (n=3)	NA	10 (n=9)	NA
Tenant-Unit Cooling	8 (n=12)	8 (n=50)	8 (n=2)	6 (n=178)	7 (n=2)

Table B-0-24: EnergyStar Certified Cooling Equipment

EnergyStar Certified	Atlantic City Electric (n=16)	Jersey Central Power & Light (n=54)	Municipal Utility (n=5)	PSE&G (n=231)	Rockland Electric Company (n=2)
No	10.0%	19.0%	22.1%	19.4%	0.0%
Yes: All	52.6%	49.3%	52.5%	55.2%	100.0%
Yes: Some	37.4%	31.7%	25.4%	25.4%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

B.2.1.2 Thermostats

Table B-0-25: Thermostat Equipment Type

Equipment Type	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
Simple On/Off	39.9%	4.7%	0.0%	8.5%	0.0%
Simple Setpoint	48.1%	60.6%	19.7%	51.9%	93.6%
Programmable Thermostat	12.1%	41.7%	46.8%	27.4%	100.0%
Smart Thermostat	0.0%	0.0%	0.0%	1.6%	0.0%
No Tenant Thermostat	3.5%	1.5%	33.5%	15.5%	0.0%

Table B-0-26: Thermostat Control Type

Control Type	Atlantic City Electric (n=19)	Jersey Central Power & Light (n=53)	Municipal Utility (n=3)	PSE&G (n=223)	Rockland Electric Company (n=2)
Both	43.5%	58.4%	80.9%	62.7%	100.0%
Cooling	0.0%	2.6%	0.0%	2.4%	0.0%
Heating	56.5%	39.0%	19.1%	34.9%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-27: Number of Thermostats per Unit

Number of Thermostats	Atlantic City Electric (n=20)	Jersey Central Power & Light (n=54)	Municipal Utility (n=3)	PSE&G (n=231)	Rockland Electric Company (n=2)
1	100.0%	78.1%	70.3%	82.9%	100.0%
2 or more	0.0%	21.9%	29.7%	17.1%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

B.2.2 Water Heating

Table B-0-28: Building-Centralized Hot Water

Building-Centralized Hot Water	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=55)	Municipal Utility (n=6)	PSE&G (n=290)	Rockland Electric Company (n=2)
No	45.5%	62.2%	46.8%	51.5%	6.4%
Yes	54.5%	37.8%	53.2%	48.5%	93.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-29: Primary Water Heating Equipment Type

Equipment Type	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=55)	Municipal Utility (n=6)	PSE&G (n=287)	Rockland Electric Company (n=2)
Commercial Water Heaters	0.0%	0.4%	0.0%	0.0%	0.0%
Instantaneous Water Heater	0.0%	4.3%	0.0%	7.2%	0.0%
Part of Heating System Boiler	2.5%	17.4%	12.7%	10.3%	0.0%
Self-Contained Tank	57.6%	63.0%	17.8%	57.5%	6.4%
Separate Water Heating Boiler	39.9%	14.9%	69.4%	25.0%	93.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-30: Primary Water Heating Fuel Type

Equipment Type	Atlantic City Electric (n=21)	Jersey Central Power & Light (n=55)	Municipal Utility (n=6)	PSE&G (n=290)	Rockland Electric Company (n=2)
Electricity	24.8%	24.8%	46.8%	15.6%	0.0%
Natural Gas	75.2%	74.6%	53.2%	84.0%	100.0%
Oil	0.0%	0.0%	0.0%	0.1%	0.0%
Solar	0.0%	0.6%	0.0%	0.0%	0.0%
No One Major Type	0.0%	0.0%	0.0%	0.4%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-31: Average Age of Building-Centralized Water Heating Equipment

Utility	Average Age
Atlantic City Electric (n=14)	9.90
Jersey Central Power & Light (n=50)	10.90
Municipal Utility (n=6)	21.67
PSE&G (n=258)	7.53
Rockland Electric Company (n=2)	4.84

B.2.3   In-Unit Appliances

Table B-0-32: Appliances Provided by the Property

Appliance Type	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
Refrigerator	88.5%	99.3%	100.0%	96.5%	100.0%
Stove	85.8%	100.0%	100.0%	96.9%	100.0%
Oven	67.7%	85.7%	87.3%	86.2%	100.0%
Dishwasher	54.0%	74.0%	0.0%	49.0%	100.0%
Microwave	7.9%	56.7%	0.0%	43.0%	100.0%
In Unit Clothes Washer	14.3%	52.3%	0.0%	31.9%	6.4%
In Unit Clothes Dryer	14.3%	52.3%	0.0%	32.3%	6.4%
In Unit Water Heater	25.4%	56.0%	0.0%	37.2%	6.4%
Window AC or RAC	40.6%	62.7%	17.8%	26.5%	100%
Nothing	11.5%	0.0%	0.0%	0.3%	0.0%

Table B-0-33: EnergyStar Appliances

Appliance Type	Atlantic City Electric	Jersey Central Power & Light	Municipal Utility	PSE&G	Rockland Electric Company
Refrigerator	82% (n=18)	86.8% (n=53)	72.4% (n=4)	77% (n=244)	100% (n=2)
Dishwasher	94.3% (n=9)	88.5% (n=36)	NA	81.2% (n=123)	100% (n=2)
In Unit Clothes Washer	73.9% (n=2)	94.5% (n=21)	NA	91.5% (n=80)	100% (n=1)
In Unit Clothes Dryer	68.2% (n=3)	91.1% (n=21)	NA	91.7% (n=81)	100% (n=1)
In Unit Water Heater	91.1% (n=5)	95.9% (n=24)	NA	94.4% (n=80)	100% (n=1)
Window AC or RAC	80.1% (n=4)	82.0% (n=25)	0.0%	64.6% (n=78)	100% (n=2)

Table B-0-34: Age of In-Unit Refrigerators

Age Range	Atlantic City Electric (n=16)	Jersey Central Power & Light (n=56)	Municipal Utility (n=6)	PSE&G (n=264)	Rockland Electric Company (n=2)
Less than 2 years old	4.3%	12.9%	0.0%	17.7%	0.0%
2 to 4 years old	46.7%	14.5%	0.0%	28.4%	0.0%
5 to 9 years old	21.8%	35.0%	82.2%	44.7%	100.0%
10 to 14 years old	23.9%	36.8%	7.0%	7.7%	0.0%
15 to 19 years old	3.3%	0.0%	10.8%	1.5%	0.0%
20 years old or more	0.0%	0.8%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-35: Age of In-Unit Dishwashers

Age Range	Atlantic City Electric (n=8)	Jersey Central Power & Light (n=39)	Municipal Utility (n=0)	PSE&G (n=129)	Rockland Electric Company (n=2)
Less than 2 years old	0.0%	14.7%	0.0%	25.1%	0.0%
2 to 4 years old	64.8%	15.4%	0.0%	24.5%	5.6%
5 to 9 years old	22.7%	33.6%	0.0%	35.0%	94.4%
10 to 14 years old	8.0%	35.5%	0.0%	12.8%	0.0%
15 to 19 years old	4.6%	0.0%	0.0%	2.6%	0.0%
20 years old or more	0.0%	0.8%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**0.0%**	**100.0%**	**100.0%**

Table B-0-36: Age of In-Unit Clothes Washers

Age Range	Atlantic City Electric (n=3)	Jersey Central Power & Light (n=23)	Municipal Utility (n=0)	PSE&G (n=87)	Rockland Electric Company (n=1)
Less than 2 years old	0.0%	33.7%	0.0%	26.4%	0.0%
2 to 4 years old	68.2%	6.5%	0.0%	26.2%	0.0%
5 to 9 years old	31.8%	26.3%	0.0%	33.4%	100.0%
10 to 14 years old	0.0%	33.5%	0.0%	5.2%	0.0%
15 to 19 years old	0.0%	0.0%	0.0%	8.9%	0.0%
20 years old or more	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**0.0%**	**100.0%**	**100.0%**

Table B-0-37: Age of In-Unit Clothes Dryers

Age Range	Atlantic City Electric (n=3)	Jersey Central Power & Light (n=23)	Municipal Utility (n=0)	PSE&G (n=87)	Rockland Electric Company (n=1)
Less than 2 years old	0.0%	32.6%	0.0%	26.3%	0.0%
2 to 4 years old	0.0%	6.6%	0.0%	26.0%	0.0%
5 to 9 years old	100.0%	26.8%	0.0%	33.4%	100.0%
10 to 14 years old	0.0%	34.0%	0.0%	5.3%	0.0%
15 to 19 years old	0.0%	0.0%	0.0%	9.0%	0.0%
20 years old or more	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**0.0%**	**100.0%**	**100.0%**

Table B-0-38: Age of In-Unit Water Heaters

Age Range	Atlantic City Electric (n=8)	Jersey Central Power & Light (n=26)	Municipal Utility (n=0)	PSE&G (n=85)	Rockland Electric Company (n=1)
Less than 2 years old	3.6%	22.4%	0.0%	22.1%	0.0%
2 to 4 years old	47.7%	13.1%	0.0%	25.9%	100.0%
5 to 9 years old	48.6%	24.5%	0.0%	36.0%	0.0%
10 to 14 years old	0.0%	38.2%	0.0%	10.3%	0.0%
15 to 19 years old	0.0%	1.8%	0.0%	5.8%	0.0%
20 years old or more	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**0.0%**	**100.0%**	**100.0%**

Table B-0-39: Age of In-Unit Window ACs and Room ACs

Age Range	Atlantic City Electric (n=6)	Jersey Central Power & Light (n=29)	Municipal Utility (n=2)	PSE&G (n=84)	Rockland Electric Company (n=2)
Less than 2 years old	7.1%	12.3%	0.0%	6.9%	0.0%
2 to 4 years old	64.2%	19.4%	0.0%	17.3%	0.0%
5 to 9 years old	17.9%	39.9%	0.0%	63.2%	95.1%
10 to 14 years old	0.0%	28.4%	100.0%	12.6%	4.9%
15 to 19 years old	0.0%	0.0%	0.0%	0.0%	0.0%
20 years old or more	10.7%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

B.2.4 Common Area Appliances

B.2.4.1 Common Area Kitchen Equipment

Table B-0-40: Common Area Kitchen Present

Common Area Kitchen Present	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
No	72.5%	85.3%	76.5%	79.2%	93.6%
Yes	27.5%	14.7%	23.5%	20.8%	6.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-41: Average Number of Common Area Kitchen Appliances

Equipment Type	Atlantic City Electric	Jersey Central Power & Light	Municipal Utility	PSE&G	Rockland Electric Company
Microwaves	1 (n=6)	1 (n=14)	1 (n=2)	2 (n=59)	1 (n=1)
Refrigerators	2 (n=6)	1 (n=16)	2 (n=2)	1 (n=65)	1 (n=1)
Stoves or Ovens	1 (n=3)	1 (n=5)	1 (n=2)	2 (n=41)	0 (n=1)

Table B-0-42: Average Age of Common Area Kitchen Appliances

Equipment Type	Atlantic City Electric	Jersey Central Power & Light	Municipal Utility	PSE&G	Rockland Electric Company
Refrigerators	9 (n=6)	4 (n=16)	10 (n=2)	4 (n=61)	4 (n=1)
Stoves or Ovens	27 (n=3)	4 (n=6)	10 (n=2)	5 (n=37)	N/A

Table B-0-43: Commercial Grade Stoves or Ovens

Commercial Grade Stoves or Ovens	Atlantic City Electric (n=3)	Jersey Central Power & Light (n=6)	Municipal Utility (n=2)	PSE&G (n=42)	Rockland Electric Company (n=1)
No	41.2%	32.9%	100.0%	83.1%	100.0%
Yes	58.8%	67.1%	0.0%	16.9%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

B.2.4.2 Common Area Pools/Spas

Table B-0-44: Common Area Filtered Pool Present

Common Area Filtered Pool	Atlantic City Electric (n=3)	Jersey Central Power & Light (n=6)	Municipal Utility (n=2)	PSE&G (n=42)	Rockland Electric Company (n=1)
No	41.2%	32.9%	100.0%	83.1%	100.0%
Yes	58.8%	67.1%	0.0%	16.9%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-45: Pool Heater

Pool Heater	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
No	76.1%	71.3%	100.0%	90.0%	0.0%
Yes	23.9%	28.7%	0.0%	10.0%	100.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-46: Pool Heater Fuel

Pool Heater Fuel	Atlantic City Electric (n=6)	Jersey Central Power & Light (n=13)	Municipal Utility (n=0)	PSE&G (n=31)	Rockland Electric Company (n=2)
Electricity	39.4%	44.7%	0.0%	49.8%	92.5%
Natural Gas	60.6%	55.3%	0.0%	50.2%	7.5%
Total	**100.0%**	**100.0%**	**0.0%**	**100.0%**	**100.0%**

Table B-0-47: Pool Cover

Pool Cover	Atlantic City Electric (n=2)	Jersey Central Power & Light (n=2)	Municipal Utility (n=0)	PSE&G (n=13)	Rockland Electric Company (n=1)
No	0.0%	0.0%	0.0%	4.4%	0.0%
Yes	100.0%	100.0%	0.0%	95.6%	100.0%
Total	**100.0%**	**100.0%**	**0.0%**	**100.0%**	**100.0%**

Table B-0-48: VSD Pool Pump

VSD Pool Pump	Atlantic City Electric (n=5)	Jersey Central Power & Light (n=12)	Municipal Utility (n=0)	PSE&G (n=22)	Rockland Electric Company (n=2)
No	53.4%	20.6%	0.0%	19.7%	0.0%
Yes	46.6%	79.4%	0.0%	80.3%	100.0%
Total	**100.0%**	**100.0%**	**0.0%**	**100.0%**	**100.0%**

Table B-0-49: Pool Timer

Pool Timer	Atlantic City Electric (n=5)	Jersey Central Power & Light (n=13)	Municipal Utility (n=0)	PSE&G (n=24)	Rockland Electric Company (n=2)
No	80.3%	7.7%	0.0%	31.7%	0.0%
Yes	19.7%	92.3%	0.0%	68.3%	100.0%
Total	**100.0%**	**100.0%**	**0.0%**	**100.0%**	**100.0%**

Table B-0-50: Hot Tub, Spa, or Jacuzzi

Hot Tub, Spa, or Jacuzzi	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
No	95.6%	78.6%	100.0%	97.6%	100.0%
Yes	4.4%	21.4%	0.0%	2.4%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-51: Hot Tub, Spa, or Jacuzzi Fuel

Hot Tub, Spa, or Jacuzzi Fuel	Atlantic City Electric (n=1)	Jersey Central Power & Light (n=2)	Municipal Utility (n=0)	PSE&G (n=4)	Rockland Electric Company (n=0)
Natural Gas	100%	100.0%	0.0%	100.0%	0.0%
Electricity	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**0.0%**	**100.0%**	**0.0%**

B.2.4.3 *Common Area Laundry*

Table B-0-52: Common Area Laundry Facility

Common Area Laundry	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
No	39.5%	53.3%	0.0%	50.9%	6.4%
Yes	60.5%	46.7%	100.0%	49.1%	93.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-53: Owned or Leased Common Laundry Equipment

Owned or Leased	Atlantic City Electric (n=11)	Jersey Central Power & Light (n=36)	Municipal Utility (n=6)	PSE&G (n=152)	Rockland Electric Company (n=1)
Lease some and own some	0.0%	0.0%	0.0%	3.1%	0.0%
Leased all	63.0%	80.6%	21.7%	65.0%	100.0%
Own all	37.0%	19.4%	78.3%	31.9%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-54: Average Number of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Atlantic City Electric	Jersey Central Power & Light	Municipal Utility	PSE&G	Rockland Electric Company
Clothes Washers	11 (n=11)	42 (n=36)	3 (n=6)	10 (n=154)	8 (n=1)
Clothes Dryers	11 (n=11)	42 (n=36)	3 (n=6)	9 (n=154)	8 (n=1)

Table B-0-55: Average Age of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Atlantic City Electric	Jersey Central Power & Light	Municipal Utility	PSE&G	Rockland Electric Company
Clothes Washers	4 (n=7)	5 (n=27)	8 (n=6)	6 (n=126)	10 (n=1)
Clothes Dryers	4 (n=7)	5 (n=27)	8 (n=6)	6 (n=127)	10 (n=1)

Table B-0-56: Clothes Dryer Fuel Type

Clothes Dryer Fuel	Atlantic City Electric (n=10)	Jersey Central Power & Light (n=32)	Municipal Utility (n=6)	PSE&G (n=152)	Rockland Electric Company (n=1)
Electricity	22.5%	46.2%	8.3%	21.5%	0.0%
Natural Gas	77.5%	53.8%	91.7%	78.5%	100.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

B.2.5 Lighting

B.2.5.1 In-Unit Lighting

Table B-0-57: Weighted Average In-Unit Lighting Rank

Lighting Technology	Atlantic City Electric (n=21)	Jersey Central Power & Light (n=55)	Municipal Utility (n=6)	PSE&G (n=289)	Rockland Electric Company (n=2)
Incandescent	3.98	3.67	3.24	3.60	5.00
CFLs	2.30	2.57	1.11	3.16	2.00
Fluorescent Tubes	4.58	4.30	3.53	4.30	5.00
LED Bulbs	3.04	2.88	4.21	3.38	1.00
LED Tubes	4.89	4.71	4.35	4.58	5.00

Table B-0-58: In-Unit Lighting Controls

Lighting Control Type	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
Dimmers	4.4%	25%	0.0%	3.1%	0.0%
Occupancy Sensors	0.0%	4.6%	0.0%	3%	0.0%
Timers	2.8%	0.0%	0.0%	2.1%	0.0%
Daylighting	0.0%	0.0%	0.0%	0.8%	0.0%
On/Off Switch	0.0%	8%	0.0%	25.2%	93.6%
None	85.7%	62.3%	100%	63.6%	6.4%

B.2.5.2 Interior Common Area Lighting

Table B-0-59: Interior Common Area Lighting

Interior Common Area Lighting	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=289)	Rockland Electric Company (n=2)
No	16.5%	19.5%	0.0%	6.8%	0.0%
Yes	83.5%	80.5%	100.0%	93.2%	100.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table B-0-60: Weighted Average Interior Common Area Lighting Rank

Lighting Technology	Atlantic City Electric (n=16)	Jersey Central Power & Light (n=50)	Municipal Utility (n=6)	PSE&G (n=268)	Rockland Electric Company (n=2)
Incandescent	4.75	4.95	5.49	4.84	6.00
CFLs	3.12	4.01	4.43	4.51	2.31
Fluorescent Tubes	4.05	4.58	2.47	4.37	1.39
HID	5.98	4.23	5.62	5.78	6.00
LED Bulbs	3.43	4.71	1.73	4.01	5.61
LED Tubes	5.75	4.94	5.11	5.15	6.00

Table B-0-61: Interior Common Area Lighting Controls

Lighting Control Type	Atlantic City Electric (n=17)	Jersey Central Power & Light (n=50)	Municipal Utility (n=6)	PSE&G (n=271)	Rockland Electric Company (n=2)
Dimmers	14.7%	0.0%	0.0%	2.1%	0.0%
Occupancy Sensors	41.7%	29%	57.7%	24.7%	0.0%
Timers	11.8%	13.3%	44.9%	17.5%	92.2%
Daylighting	4.6%	10.5%	0.0%	8%	0.0%
On/Off Switch	0.0%	9.8%	0.0%	24.2%	92.2%
Other	0.0%	0.8%	0.0%	0.0%	0.0%
None	46.6%	45.4%	42.3%	37.4%	7.8%

B.2.5.3 Exterior Lighting

Table B-0-62: Exterior Lighting Location

Location	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=292)	Rockland Electric Company (n=2)
Parking Lot	85.5%	79.2%	93%	64.1%	6.4%
Security Lighting	44.8%	77.8%	17.8%	69.9%	100%
Sidewalk/Walkway Lighting	44.3%	44.6%	100%	44.8%	100%
Decorative	8.5%	29.1%	12.7%	13.6%	6.4%
Other Location	0.0%	0.8%	0.0%	0.4%	0.0%
None	0.0%	0.0%	0.0%	5%	0.0%

Table B-0-63: Exterior Lighting Technology

Location	Atlantic City Electric (n=22)	Jersey Central Power & Light (n=57)	Municipal Utility (n=6)	PSE&G (n=275)	Rockland Electric Company (n=2)
Incandescent	10.7%	13.2%	0.0%	23%	0.0%
CFLs	61.6%	9%	22.6%	25.8%	93.6%
Fluorescent Tubes	6.5%	0.0%	0.0%	6.5%	0.0%
HIDs	59.1%	25.4%	11.3%	36.1%	0.0%
LED Bulbs	35.6%	54.6%	70.3%	42.6%	100%
LED Tubes	14.2%	9.8%	12.7%	7.5%	0.0%
Other	2.5%	8.5%	0.0%	5.7%	0.0%

APPENDIX C: SUMMARY STATISTICS – GAS UTILITY

In addition to calculating summary statistics for building physical properties and equipment and end-use saturations across the entire state, ADM also segmented the summary statistics by gas utility company. As noted in Section 2.1, samples for the study were obtained using a representative sampling method by county based on a target sample size of 375. The total population of multifamily properties was estimated using data obtained through the New Jersey Property Tax System (MOD-IV) with adjustments made via additional data from the New Jersey Department of Community Affairs. A target number of sample points was then created based on the number of multifamily properties in each county relative to the statewide number of multifamily properties.

Table C-0-1 presents the number of sample points per utility company. One sample point, out of the initial 380, was removed due to the respondent providing an address that could not be geolocated back to a utility company. Additionally, 32 respondents did not report having gas service and are excluded from the results presented in this appendix.

Table C-0-1: Number of Sample Points per Gas Utility Company

Utility	Number of Sample Points
Elizabethtown Gas	18
New Jersey Natural Gas	31
PSE&G	277
South Jersey Gas	21
Total	**347**

C.1   PHYSICAL DESCRIPTION OF MULTIFAMILY PROPERTIES

C.1.1   Building Size and Occupancy

Table C-0-2: Number of Buildings per Complex

Utility	Average Number of Buildings
Elizabethtown Gas (n=18)	7.20
New Jersey Natural Gas (n=31)	4.60
PSE&G (n=261)	10.95
South Jersey Gas (n=21)	15.64

Table C-0-3: Number of Floors per Building

Utility	Average Number of Floors
Elizabethtown Gas (n=18)	2.61
New Jersey Natural Gas (n=31)	2.64
PSE&G (n=276)	3.63
South Jersey Gas (n=21)	2.44

Table C-0-4: Average Square Footage by Unit-Type

Unit-Type	Elizabethtown Gas	New Jersey Natural Gas	PSE&G	South Jersey Gas
Studio	450 (n=2)	334 (n=4)	485 (n=81)	NA
1 Bedroom	994 (n=18)	715 (n=26)	713 (n=239)	716 (n=16)
2 Bedroom	1,364 (n=17)	1,029 (n=28)	948 (n=250)	906 (n=16)
3 Bedroom	2,408 (n=3)	1,291 (n=8)	1,302 (n=90)	1,218 (n=9)
4 Bedroom	1,475 (n=1)	NA	1,524 (n=15)	NA
5 Bedroom	NA	NA	2,028 (n=2)	NA

Table C-0-5: Average Number of Units by Unit-Type

Unit-Type	Elizabethtown Gas	New Jersey Natural Gas	PSE&G	South Jersey Gas
Studio	17 (n=2)	14 (n=4)	18 (n=80)	1 (n=1)
1 Bedroom	57 (n=18)	42 (n=26)	58 (n=241)	67 (n=17)
2 Bedroom	29 (n=17)	26 (n=28)	48 (n=255)	106 (n=16)
3 Bedroom	20 (n=3)	23 (n=9)	19 (n=94)	26 (n=9)
4 Bedroom	17 (n=1)	NA	7 (n=16)	NA
5 Bedroom	NA	NA	13 (n=3)	NA

Table C-0-6: Average Owner-Occupancy and Vacancy Rate

Measure	Elizabethtown Gas	New Jersey Natural Gas	PSE&G	South Jersey Gas
Percent Owner-Occupied	12% (n=18)	20% (n=30)	14% (n=272)	7% (n=20)
Percent Vacancy	56% (n=18)	7% (n=31)	17% (n=273)	5% (n=19)

C.1.2 Building Shell, Construction Year and Construction Materials

Table C-0-7: Construction Year

Construction Year	Elizabethtown Gas (n=17)	New Jersey Natural Gas (n=31)	PSE&G (n=264)	South Jersey Gas (n=21)
Before 1940	0.0%	3%	12.1%	1.8%
1940 - 1949	0.0%	8.2%	7.1%	0.0%
1950 - 1959	16.2%	0.0%	8.1%	9.9%
1960 - 1969	12.4%	53.3%	14.7%	10.1%
1970 - 1979	23.2%	0.7%	8.3%	42.1%
1980 - 1989	10.8%	0.0%	6%	13.7%
1990 - 1999	10.8%	4%	2.6%	4%
2000 - 2009	4%	19.5%	12%	12.9%
2010 - 2014	22.6%	2%	9.4%	5.4%
2015	0.0%	0.0%	4.5%	0.0%
2016	0.0%	6.2%	4.7%	0.0%
2017	0.0%	3.1%	3.9%	0.0%
2018	0.0%	0.0%	6.6%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-8: Major Construction in the Past 10 Years

Major Construction <= 10 Years	Elizabethtown Gas (n=17)	New Jersey Natural Gas (n=30)	PSE&G (n=275)	South Jersey Gas (n=21)
No	69.8%	74.3%	70.8%	77.8%
Yes	30.2%	25.7%	29.2%	22.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-9: Year of Last Major Construction

Year of Construction	Elizabethtown Gas (n=5)	New Jersey Natural Gas (n=8)	PSE&G (n=65)	South Jersey Gas (n=6)
2008-2014	28.8%	35.9%	26%	43.9%
2015	0.0%	0.0%	14.8%	0.0%
2016	0.0%	4%	8.1%	0.0%
2017	0.0%	0.0%	12.9%	31.1%
2018	71.2%	60%	38.2%	25.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

C.1.3 Windows

Table C-0-10: Single-Layer or Multi-Layer Windows

Window-Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=25)	PSE&G (n=261)	South Jersey Gas (n=18)
Combination of both types	0.0%	2.3%	9.4%	8.7%
Multi-layer	93.1%	90.7%	74.0%	90.2%
Single layer	6.9%	7.0%	16.7%	1.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-11: Presence of Low-E Windows

Low-E Windows	Elizabethtown Gas (n=13)	New Jersey Natural Gas (n=17)	PSE&G (n=208)	South Jersey Gas (n=14)
No	71%	42.4%	71.6%	51%
Yes	29%	57.6%	28.4%	49%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-12: Presence of Window Types

Window-Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=27)	PSE&G (n=267)	South Jersey Gas (n=18)
Clear	100.0%	100.0%	98.3%	100.0%
Tinted	0.0%	4.2%	2.8%	7.0%
Reflective	0.0%	0.0%	1.6%	0.0%
Opaque	0.0%	0.0%	0.1%	2.8%

C.1.4 Solar Panels

Table C-0-13: Solar Panels Present on Property

Solar Panels	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
No Solar Panels	97.8%	93.4%	94.3%	94.5%
Roof-Mounted Solar Panels	2.2%	6.6%	2.5%	5.5%
Parking Structure Solar Panels	0.0%	0.0%	0.0%	0.0%

C.1.6 Parking Lots

Table C-0-14: EV Stations Present

EV Stations Present	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
No	100.0%	100.0%	96.4%	100.0%
Yes	0.0%	0.0%	3.6%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-15: Average Number of EV Stations

Utility	Average Number of EV Stations
Elizabethtown Gas	0.00
New Jersey Natural Gas	0.00
PSE&G (n=11)	4.24
South Jersey Gas	0.00

C.2 EQUIPMENT AND END-USE SATURATIONS

C.2.1 HVAC

C.2.1.1 Heating

Table C-0-16: Available Heating Types

Heating Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=27)	PSE&G (n=266)	South Jersey Gas (n=18)
Central Gas Furnace	78.0%	18.7%	27.9%	3.9%
Steam Boiler	0.0%	0.0%	10.5%	5.4%
Hot Water Boiler	19.0%	13.0%	42.3%	44.5%
District Steam	0.0%	0.0%	0.0%	0.0%
GSHP	0.0%	3.9%	2.8%	0.0%
Individual Gas Oil Furnace	3.0%	39.5%	20%	45.1%
Electric Baseboards	0.0%	25%	6%	2.2%

Table C-0-17: Primary Heating Fuel-Type

Heating Fuel-Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
Electricity	0.0%	17.7%	7.7%	2.2%
Mixed: Electric & Gas	0.0%	0.0%	0.3%	0.0%
Natural Gas	100.0%	82.3%	92.0%	97.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-18: Primary Heating Equipment Type

Heating Equipment-Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=27)	PSE&G (n=264)	South Jersey Gas (n=18)
ASHP	0.0%	0.0%	4.3%	4.1%
Baseboard: Electric	6.9%	29.9%	5.8%	30.7%
Baseboard: Gas	3.9%	0.0%	5.4%	0.0%
Baseboard: Hot Water	0.0%	0.0%	5.1%	0.0%
Baseboard: Unknown Fuel Type	0.0%	0.0%	0.8%	0.0%
Convectors	0.0%	0.0%	0.9%	0.0%
Forced Air Furnace	77.1%	63.6%	36.6%	43.8%
Hot Water Boiler	0.0%	0.0%	0.4%	0.0%
No One Major Type	0.0%	0.0%	5.7%	0.0%
Other	0.0%	4.2%	0.5%	0.0%
PTAC	0.0%	0.0%	2.6%	0.0%
Radiators	12.1%	2.2%	31.9%	21.5%
Wood or Coal Burning Stove	0.0%	0.0%	0.1%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-19: Average Age of Heating Equipment

Heating Equipment-Type	Elizabethtown Gas	New Jersey Natural Gas	PSE&G	South Jersey Gas
Central Heating	15 (n=15)	11 (n=13)	10 (n=200)	14 (n=8)
Tenant-Unit Heating	35 (n=1)	9 (n=15)	9 (n=53)	9 (n=8)

Table C-0-20: EnergyStar Certified Heating Equipment

EnergyStar Certified	Elizabethtown Gas (n=16)	New Jersey Natural Gas (n=27)	PSE&G (n=241)	South Jersey Gas (n=15)
No	24.8%	27.6%	29%	14.5%
Yes: All	45.5%	59.8%	59.8%	54.9%
Yes: Some	29.7%	12.7%	11.3%	30.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

C.2.1.2   Cooling

Table C-0-21: Available Cooling Types

Available Cooling Types	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
Central Chiller	3.9%	0.0%	4.0%	2.9%
Individual Units	100.0%	74.7%	69.0%	76.2%
No Cooling	0.0%	25.3%	26.8%	20.9%

Table C-0-22: Primary Cooling Equipment Type

Equipment Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=30)	PSE&G (n=268)	South Jersey Gas (n=21)
Central Chiller	0.0%	0.0%	2.2%	12.9%
Heat Pump	0.0%	0.0%	0.3%	0.0%
Individual RAC	22.9%	17.8%	55.5%	64.8%
No One Major Type	0.0%	22%	0.7%	0.0%
None	0.0%	11.8%	1.2%	0.0%
Other	9%	3%	2.8%	2.9%
Packaged AC - Roof Mounted DX	44.2%	9.8%	8%	0.0%
PTAC	0.0%	0.0%	3.4%	0.0%
Residential Split System - DX	23.9%	35.5%	25.5%	19.4%
Wall AC Units	0.0%	0.0%	0.4%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-23: Average Age of Cooling Equipment

Cooling Equipment-Type	Elizabethtown Gas	New Jersey Natural Gas	PSE&G	South Jersey Gas
Central Cooling	4 (n=1)	No Response	9 (n=10)	20 (n=1)
Tenant-Unit Cooling	8 (n=16)	11 (n=27)	6 (n=163)	7 (n=11)

Table C-0-24: EnergyStar Certified Cooling Equipment

EnergyStar Certified	Elizabethtown Gas (n=17)	New Jersey Natural Gas (n=28)	PSE&G (n=219)	South Jersey Gas (n=18)
No	5.4%	19.7%	18.2%	7.5%
Yes: All	55.2%	59.3%	55.3%	49.8%
Yes: Some	39.4%	20.9%	26.5%	42.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

C.2.1.3 Thermostats

Table C-0-25: Thermostat Equipment Type

Equipment Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
Simple On/Off	9.9%	0.0%	8.1%	39.5%
Simple Setpoint	25%	56.9%	52%	51.3%
Programmable Thermostat	62.1%	30%	26.9%	6.7%
Smart Thermostat	0.0%	0.0%	1.7%	0.0%
No Tenant Thermostat	3%	24.9%	17.2%	9.3%

Table C-0-26: Thermostat Control Type

Control Type	Elizabethtown Gas (n=16)	New Jersey Natural Gas (n=29)	PSE&G (n=212)	South Jersey Gas (n=17)
Both	85.1%	49.1%	60.4%	46.6%
Cooling	7.4%	0.0%	2.5%	0.0%
Heating	7.6%	50.9%	37.1%	53.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-27: Number of Thermostats per Unit

Number of Thermostats	Elizabethtown Gas (n=16)	New Jersey Natural Gas (n=30)	PSE&G (n=219)	South Jersey Gas (n=17)
1	100.0%	78.6%	84.3%	100.0%
2 or more	0.0%	21.4%	15.7%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

C.2.2 Water Heating

Table C-0-28: Building-Centralized Hot Water

Building-Centralized Hot Water	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=29)	PSE&G (n=276)	South Jersey Gas (n=21)
No	74.1%	43.9%	47.4%	40.4%
Yes	25.9%	56.1%	52.6%	59.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-29: Primary Water Heating Equipment Type

Equipment Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=29)	PSE&G (n=273)	South Jersey Gas (n=21)
Commercial Water Heaters	0.0%	0.9%	0.0%	0.0%
Instantaneous Water Heater	0.0%	10.1%	6.9%	0.0%
Part of Heating System Boiler	3.0%	30.6%	12.0%	2.5%
Self-Contained Tank	84.0%	32.1%	55.1%	49.8%
Separate Water Heating Boiler	12.9%	26.3%	26.0%	47.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-30: Primary Water Heating Fuel Type

Equipment Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=30)	PSE&G (n=275)	South Jersey Gas (n=20)
Electricity	3.0%	11.8%	13.0%	8.3%
Natural Gas	97.0%	88.2%	86.4%	91.7%
No One Major Type	0.0%	0.0%	0.6%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-31: Average Age of Building-Centralized Water Heating Equipment

Utility	Average Age
Elizabethtown Gas (n=16)	5.63
New Jersey Natural Gas (n=29)	6.89
PSE&G (n=242)	7.70
South Jersey Gas (n=16)	12.99

C.2.3 In-Unit Appliances

Table C-0-32: Appliances Provided by the Property

Appliance Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
Refrigerator	97.0%	88.5%	97.0%	100.0%
Stove	100.0%	100.0%	97.3%	100.0%
Oven	100.0%	63.5%	86.0%	73.2%
Dishwasher	76.9%	61.7%	46.8%	60.0%
Microwave	15.4%	42.2%	42.9%	13.9%
In Unit Clothes Washer	24.4%	30.3%	29.9%	25.6%
In Unit Clothes Dryer	24.4%	30.3%	30.3%	25.6%
In Unit Water Heater	81.0%	53.9%	32.7%	28.1%
Window AC or RAC	16.8%	47.4%	28.2%	37.4%
Nothing	0.0%	0.0%	0.3%	0.0%

Table C-0-33: EnergyStar Appliances

Appliance Type	Elizabethtown Gas	New Jersey Natural Gas	PSE&G	South Jersey Gas
Refrigerator	96.7% (n=17)	97.7% (n=28)	76.9% (n=233)	79.3% (n=19)
Dishwasher	94.1% (n=10)	86.5% (n=18)	82.5% (n=116)	93.8% (n=8)
In Unit Clothes Washer	100% (n=5)	100% (n=11)	92.1% (n=74)	73.9% (n=2)
In Unit Clothes Dryer	100% (n=5)	91.4% (n=11)	91.4% (n=75)	68.2% (n=3)
In Unit Water Heater	100% (n=12)	100% (n=13)	96.2% (n=66)	89.9% (n=4)
Window AC or RAC	100% (n=5)	77.9% (n=11)	62.4% (n=78)	89.7% (n=3)

Table C-0-34: Age of In-Unit Refrigerators

Age Range	Elizabethtown Gas (n=17)	New Jersey Natural Gas (n=30)	PSE&G (n=252)	South Jersey Gas (n=18)
Less than 2 years old	0.0%	18.5%	16.3%	4.3%
2 to 4 years old	55.7%	21.0%	26.4%	49.6%
5 to 9 years old	22.7%	46.1%	48.4%	27.2%
10 to 14 years old	21.6%	14.4%	7.3%	15.7%
15 to 19 years old	0.0%	0.0%	1.6%	3.3%
20 years old or more	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-35: Age of In-Unit Dishwashers

Age Range	Elizabethtown Gas (n=10)	New Jersey Natural Gas (n=20)	PSE&G (n=119)	South Jersey Gas (n=7)
Less than 2 years old	0.0%	14.7%	22.9%	0.0%
2 to 4 years old	8.8%	23.8%	21.7%	70.0%
5 to 9 years old	76.1%	16.8%	40.2%	16.4%
10 to 14 years old	15.1%	18.6%	12.8%	8.6%
15 to 19 years old	0.0%	26.2%	2.4%	5.0%
20 years old or more	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-36: Age of In-Unit Clothes Washers

Age Range	Elizabethtown Gas (n=5)	New Jersey Natural Gas (n=12)	PSE&G (n=79)	South Jersey Gas (n=3)
Less than 2 years old	0.0%	30.8%	21.4%	0.0%
2 to 4 years old	35.9%	17.0%	25.7%	68.2%
5 to 9 years old	42.7%	35.1%	38.6%	31.8%
10 to 14 years old	21.4%	17.1%	5.3%	0.0%
15 to 19 years old	0.0%	0.0%	8.9%	0.0%
20 years old or more	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-37: Age of In-Unit Clothes Dryers

Age Range	Elizabethtown Gas (n=5)	New Jersey Natural Gas (n=11)	PSE&G (n=79)	South Jersey Gas (n=2)
Less than 2 years old	0.0%	26.8%	21.3%	0.0%
2 to 4 years old	35.9%	18.0%	25.6%	0.0%
5 to 9 years old	42.7%	37.1%	38.5%	100.0%
10 to 14 years old	21.4%	18.1%	5.5%	0.0%
15 to 19 years old	0.0%	0.0%	9.1%	0.0%
20 years old or more	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-38: Age of In-Unit Water Heaters

Age Range	Elizabethtown Gas (n=12)	New Jersey Natural Gas (n=13)	PSE&G (n=70)	South Jersey Gas (n=8)
Less than 2 years old	0.0%	17.4%	21.0%	3.6%
2 to 4 years old	59.1%	22.8%	21.0%	47.7%
5 to 9 years old	14.4%	11.4%	43.9%	48.6%
10 to 14 years old	26.6%	21.1%	8.2%	0.0%
15 to 19 years old	0.0%	27.4%	5.9%	0.0%
20 years old or more	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-39: Age of In-Unit Window ACs and Room ACs

Age Range	Elizabethtown Gas (n=5)	New Jersey Natural Gas (n=12)	PSE&G (n=85)	South Jersey Gas (n=5)
Less than 2 years old	0.0%	3.5%	5.4%	8.0%
2 to 4 years old	0.0%	27.3%	15.3%	71.9%
5 to 9 years old	42.5%	61.2%	69.1%	20.1%
10 to 14 years old	57.5%	8.1%	10.3%	0.0%
15 to 19 years old	0.0%	0.0%	0.0%	0.0%
20 years old or more	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

C.2.4 Common Area Appliances

C.2.4.1 Common Area Kitchen Equipment

Table C-0-40: Common Area Kitchen Present

Common Area Kitchen Present	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
No	97.8%	80.2%	78.8%	72.5%
Yes	2.2%	19.8%	21.2%	27.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-41: Average Number of Common Area Kitchen Appliances

Equipment Type	Elizabethtown Gas	New Jersey Natural Gas	PSE&G	South Jersey Gas
Microwaves	1 (n=2)	1 (n=10)	2 (n=57)	1 (n=7)
Refrigerators	1 (n=2)	1 (n=12)	1 (n=62)	2 (n=7)
Stoves or Ovens	1 (n=1)	1 (n=3)	2 (n=39)	1 (n=4)

Table C-0-42: Average Age of Common Area Kitchen Appliances

Equipment Type	Elizabethtown Gas	New Jersey Natural Gas	PSE&G	South Jersey Gas
Refrigerators	10 (n=2)	5 (n=12)	4 (n=59)	10 (n=7)
Stoves or Ovens	7 (n=1)	6 (n=3)	5 (n=35)	27 (n=4)

Table C-0-43: Commercial Grade Stoves or Ovens

Commercial Grade Stoves or Ovens	Elizabethtown Gas (n=1)	New Jersey Natural Gas (n=3)	PSE&G (n=40)	South Jersey Gas (n=4)
No	100.0%	13.2%	78.5%	50.0%
Yes	0.0%	86.8%	21.5%	50.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

C.2.4.2   Common Area Pools/Spas

Table C-0-44: Common Area Filtered Pool Present

Common Area Filtered Pool	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
No	93.1%	93.7%	89.5%	76.0%
Yes	6.9%	6.3%	10.5%	24.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-45: Pool Heater

Pool Heater	Elizabethtown Gas (n=2)	New Jersey Natural Gas (n=4)	PSE&G (n=33)	South Jersey Gas (n=4)
No	100.0%	75.0%	46.4%	41.5%
Yes	0.0%	25.0%	53.6%	58.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-46: Pool Heater Fuel

Pool Heater Fuel	Elizabethtown Gas	New Jersey Natural Gas (n=1)	PSE&G (n=13)	South Jersey Gas (n=2)
Electricity	N/A	0.0%	17.1%	0.0%
Natural Gas	N/A	100.0%	82.9%	100.0%
Total	**N/A**	**100.0%**	**100.0%**	**100.0%**

Table C-0-47: Pool Cover

Pool Cover	Elizabethtown Gas	New Jersey Natural Gas (n=1)	PSE&G (n=15)	South Jersey Gas (n=1)
No	N/A	0.0%	4.0%	0.0%
Yes	N/A	100.0%	96.0%	100.0%
Total	**N/A**	**100.0%**	**100.0%**	**100.0%**

Table C-0-48: VSD Pool Pump

VSD Pool Pump	Elizabethtown Gas (n=2)	New Jersey Natural Gas (n=4)	PSE&G (n=25)	South Jersey Gas (n=3)
No	86.3%	0.0%	11.3%	34.1%
Yes	13.7%	100.0%	88.7%	65.9%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-49: Pool Timer

Pool Timer	Elizabethtown Gas (n=2)	New Jersey Natural Gas (n=4)	PSE&G (n=27)	South Jersey Gas (n=3)
No	86.3%	0.0%	20.6%	41.5%
Yes	13.7%	100%	79.4%	58.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-50: Hot Tub, Spa, or Jacuzzi

Hot Tub, Spa, or Jacuzzi	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
No	100%	98.4%	97.3%	89.9%
Yes	0.0%	1.6%	2.7%	10.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-51: Hot Tub, Spa, or Jacuzzi Fuel

Hot Tub, Spa, or Jacuzzi Fuel	Elizabethtown Gas	New Jersey Natural Gas (n=1)	PSE&G (n=5)	South Jersey Gas (n=1)
Electricity	N/A	0.0%	0.0%	0.0%
Natural Gas	N/A	100.0%	100.0%	100.0%
Total	**N/A**	**100.0%**	**100.0%**	**100.0%**

C.2.4.3 Common Area Laundry

Table C-0-52: Common Area Laundry Facility

Common Area Laundry	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
No	25.8%	41.4%	47.5%	36.4%
Yes	74.2%	58.6%	52.5%	63.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-53: Owned or Leased Common Laundry Equipment

Owned or Leased	Elizabethtown Gas (n=11)	New Jersey Natural Gas (n=18)	PSE&G (n=154)	South Jersey Gas (n=13)
Lease some and own some	0.0%	0.0%	3.2%	0.0%
Leased all	33.3%	52.9%	64.4%	68.2%
Own all	66.7%	47.1%	32.3%	31.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-54: Average Number of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Elizabethtown Gas	New Jersey Natural Gas	PSE&G	South Jersey Gas
Clothes Washers	9 (n=11)	5 (n=18)	11 (n=155)	11 (n=13)
Clothes Dryers	10 (n=11)	6 (n=18)	10 (n=155)	11 (n=13)

Table C-0-55: Average Age of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Elizabethtown Gas	New Jersey Natural Gas	PSE&G	South Jersey Gas
Clothes Washers	11 (n=8)	4 (n=16)	6 (n=125)	4 (n=9)
Clothes Dryers	12 (n=8)	3 (n=16)	6 (n=126)	4 (n=9)

Table C-0-56: Clothes Dryer Fuel Type

Clothes Dryer Fuel	Elizabethtown Gas (n=11)	New Jersey Natural Gas (n=17)	PSE&G (n=150)	South Jersey Gas (n=12)
Electricity	5.9%	7.7%	20.2%	14.3%
Natural Gas	94.1%	92.3%	79.8%	85.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

C.2.5 Lighting

C.2.5.1 In-Unit Lighting

Table C-0-57: Weighted Average In-Unit Lighting Rank

Lighting Technology	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=30)	PSE&G (n=274)	South Jersey Gas (n=21)
Incandescent	4.15	3.13	3.55	4.05
CFLs	3.04	4.26	3.17	2.17
Fluorescent Tubes	3.63	4.37	4.30	4.74
LED Bulbs	2.07	2.78	3.47	2.77
LED Tubes	5.00	4.76	4.61	4.89

Table C-0-58: In-Unit Lighting Controls

Lighting Control Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
Dimmers	0.0%	7.5%	3.2%	0.0%
Occupancy Sensors	0.0%	8.2%	2.9%	0.0%
Timers	0.0%	0.0%	2.1%	2.8%
Daylighting	0.0%	0.0%	1.2%	0.0%
On/Off Switch	23.9%	12.1%	22.7%	0.0%
None	76.1%	72.1%	65.2%	97.2%

C.2.5.2 Interior Common Area Lighting

Table C-0-59: Interior Common Area Lighting

Interior Common Area Lighting	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=274)	South Jersey Gas (n=21)
No	0.0%	15.2%	7.3%	13.6%
Yes	100.0%	84.8%	92.7%	86.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table C-0-60: Weighted Average Interior Common Area Lighting Rank

Lighting Technology	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=28)	PSE&G (n=253)	South Jersey Gas (n=16)
Incandescent	5.88	5.58	4.76	4.78
CFLs	4.20	5.18	4.57	2.80
Fluorescent Tubes	2.69	4.59	4.28	3.69
HID	6.00	5.98	5.75	5.98
LED Bulbs	4.69	4.25	4.07	3.31
LED Tubes	5.76	4.30	5.14	5.80

Table C-0-61: Interior Common Area Lighting Controls

Lighting Control Type	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=28)	PSE&G (n=256)	South Jersey Gas (n=16)
Dimmers	0.0%	0.0%	1.8%	2.6%
Occupancy Sensors	3%	18.3%	26.4%	30.9%
Timers	53.3%	18.8%	16.6%	7.3%
Daylighting	0.0%	7.9%	10.3%	0.0%
On/Off Switch	23.9%	14.7%	21.9%	0.0%
None	19.8%	55.9%	37.7%	59.2%

C.2.5.3 Exterior Lighting

Table C-0-62: Exterior Lighting Location

Location	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=277)	South Jersey Gas (n=21)
Parking Lot	33%	71.7%	67.1%	85.3%
Security Lighting	100%	52%	71%	47.5%
Sidewalk/Walkway Lighting	27%	42%	46%	44.2%
Decorative	48.1%	5%	12.7%	4%
Other Location	0.0%	0.0%	0.4%	0.0%
None	0.0%	0.0%	4.9%	0.0%

Table C-0-63: Exterior Lighting Technology

Location	Elizabethtown Gas (n=18)	New Jersey Natural Gas (n=31)	PSE&G (n=261)	South Jersey Gas (n=21)
Incandescent	11.5%	1.6%	22.5%	16.7%
CFLs	12.4%	11.2%	26.6%	69.8%
Fluorescent Tubes	0.0%	0.0%	7.4%	6.4%
HIDs	3%	29.7%	38%	73.8%
LED Bulbs	79.2%	47.7%	43.7%	21.3%
LED Tubes	3%	2.2%	7.7%	2.9%
Other	0.0%	10.9%	6.1%	5.4%

APPENDIX D: SUMMARY STATISTICS – HOUSING TYPE

In addition to calculating summary statistics for building physical properties and equipment and end-use saturations across the entire state, ADM also segmented the summary statistics by whether properties were privately-held or public/government-assisted housing. The designation for private and public-housing relied on whether properties fell within the public housing data set taken from the New Jersey Department of Community Affairs. Specifically, public-housing designation was determined by whether a property fell into any of the six programs that were included as part of the NJ Department of Community Affairs data set:

1. Farm Home – A program administered by the U.S. Department of Agriculture to build income-restricted apartments in rural areas.

2. Low Income Tax Credit – A federal program which provides tax credits to properties that reserve a portion of units to income-qualified customers per specific guidelines.

3. Mount Laurel – Multifamily properties that are developed due to constitutional requirements that require all counties to have a minimum supply on income-qualified housing, regardless of whether those properties are rental properties or have units for sale. Funding for properties developed through Mount Laurel can be federal or state.

4. New Jersey Housing and Mortgage Finance Agency – A state program which provides incentives for the construction of income-qualified housing.

5. U.S. Department of Housing and Urban Development (HUD) Public Housing Authority Program – A federally funded program which provides grants to state and local agencies to develop multifamily housing for income-qualified residents.

6. Other HUD Programs – The NJ Department of Community Affairs data set provides information regarding other programs administered by HUD, including programs that provide subsidized housing the elderly and disabled. Additionally, information regarding properties that receive project-based vouchers to develop low-income units through HUD Section 8 are included. Properties that accept vouchers through the Section 8 Housing Choice Voucher Program, which provides housing vouchers to income-qualified individuals, are not included in the data set.

Table D-0-1 presents the number of sample points by whether properties were privately-held of public/government assisted housing.

Table D-0-1: Number of Sample Points by Housing-Type

Housing-Type	Number of Sample Points
Privately-Held Properties	315
Public/Government-Assisted Housing	65
Total	**380**

D.1 PHYSICAL DESCRIPTION OF MULTIFAMILY PROPERTIES

D.1.1 Building Size and Occupancy

Table D-0-2: Number of Buildings per Complex

Housing-Type	Average Number of Buildings
Privately-Held Properties (n=302)	9.53
Public and Government-Assisted Housing (n=58)	7.35

Table D-0-3: Number of Floors per Building

Housing-Type	Average Number of Floors
Privately-Held Properties (n=314)	3.39
Public and Government-Assisted Housing (n=64)	4.85

Table D-0-4: Average Square Footage by Unit-Type

Unit-Type	Privately-Held Properties	Public and Government-Assisted Housing
Studio	491 (n=80)	438 (n=14)
1 Bedroom	751 (n=275)	654 (n=53)
2 Bedroom	1,011 (n=288)	895 (n=50)
3 Bedroom	1,320 (n=85)	1,182 (n=27)
4 Bedroom	1,572 (n=9)	1,147 (n=8)
5 Bedroom	2,028 (n=2)	1,375 (n=1)

Table D-0-5: Average Number of Units by Unit-Type

Unit-Type	Privately-Held Properties	Public and Government-Assisted Housing
Studio	16 (n=79)	28 (n=17)
1 Bedroom	54 (n=276)	92 (n=57)
2 Bedroom	47 (n=290)	63 (n=54)
3 Bedroom	20 (n=88)	33 (n=30)
4 Bedroom	8 (n=10)	8 (n=8)
5 Bedroom	20 (n=3)	35 (n=1)

Table D-0-6: Average Owner-Occupancy and Vacancy Rate

Measure	Privately-Held Properties	Public and Government-Assisted Housing
Percent Owner-Occupied	16% (n=311)	13% (n=62)
Percent Vacancy	16% (n=309)	16% (n=64)

D.1.2 Building Shell, Construction Year and Construction Materials

Table D-0-7: Construction Year

Construction Year	Privately-Held Properties (n=303)	Public and Government-Assisted Housing (n=63)
Before 1940	11.3%	5.5%
1940 - 1949	7.5%	3.8%
1950 - 1959	9.1%	3.0%
1960 - 1969	18.1%	2.6%
1970 - 1979	10.0%	13.0%
1980 - 1989	2.4%	20.1%
1990 - 1999	1.8%	16.7%
2000 - 2009	11.4%	24.6%
2010 - 2014	10.8%	9.4%
2015	4.8%	0.0%
2016	4.8%	1.3%
2017	3.7%	0.0%
2018	4.2%	0.0%
Total	**100.0%**	**100.0%**

Table D-0-8: Major Construction in the Past 10 Years

Major Construction <= 10 Years	Privately-Held Properties (n=312)	Public and Government-Assisted Housing (n=63)
No	72%	69.8%
Yes	28%	30.2%
Total	**100.0%**	**100.0%**

Table D-0-9: Year of Last Major Construction

Year of Construction	Privately-Held Properties (n=72)	Public and Government-Assisted Housing (n=22)
2008-2014	26.3%	69.1%
2015	13%	6.8%
2016	8.8%	12.9%
2017	15.6%	0.5%
2018	36.4%	10.7%
Total	**100.0%**	**100.0%**

Table D-0-10: Exterior Wall Material

Exterior Wall Material	Privately-Held Properties (n=293)	Public and Government-Assisted Housing (n=55)
Aluminum, Asbestos, Plastic or Wood Materials (Siding, Shingle Tiles, or Shakes)	25.4%	44.9%
Brick	38.7%	19.9%
Concrete Block or Poured Concrete	16.2%	19.8%
No One Major Type	0.0%	0.5%
Other	11.2%	11.6%
Pre-Cast Concrete Panels	3.7%	1.6%
Sheet Metal Panels	3.5%	1.1%
Window or Vision Glass (Glass that can be Seen Through)	0.4%	0.5%
Total	**100.0%**	**100.0%**

Table D-0-11: Building Shape

Building Shape	Privately-Held Properties (n=298)	Public and Government-Assisted Housing (n=60)
C-Shaped	0.1%	0.0%
E-Shaped	0.3%	0.0%
G Shaped	0.0%	1.3%
H-Shaped	3.1%	2.6%
J-Shaped	0.8%	0.0%
L-Shaped	4.7%	8.9%
M-Shaped	0.4%	0.0%
No One Major Type	0.9%	0.0%
Other	0.3%	8.9%
Rectangle	63.8%	52.4%
Rectangle or Square with an Interior Courtyard	3.7%	5.5%
Square	13%	2.4%
T-Shaped	0.6%	5.4%
U-Shaped	8.2%	12.6%
Y-Shaped	0.2%	0.0%
Total	**100.0%**	**100.0%**

Table D-0-12: Roofing Material

Roofing Material	Privately-Held Properties (n=294)	Public and Government-Assisted Housing (n=56)
Aluminum Top Coat with a Felt Layer	0.4%	0.0%
Asphalt, Fiberglass, or Other Shingles	41.1%	38.1%
Built-Up (Tar, Felts, or Fiberglass and a Ballast, Such as Stone)	19.7%	9.7%
Concrete	4.4%	0.7%
Fiberglass and Rubber Membrane	0.0%	1.3%
Metal Surfacing	2.3%	0.0%
Plastic, Rubber, or Synthetic Sheeting (Single or Multiple Ply)	12.6%	16.9%
Slate or Tile Shingles	13.4%	32%
Wood Shingles, Shakes, or Other Wooden Materials	6.2%	1.4%
Total	**100.0%**	**100.0%**

D.1.3 Windows

Table D-0-13: Exterior Wall Window Coverage

Exterior Wall Window Coverage	Privately-Held Properties (n=294)	Public and Government-Assisted Housing (n=51)
1% or less	3%	1.1%
2% to 10%	29.1%	8.4%
11% to 25%	42.4%	41.7%
26% to 50%	20.3%	42%
51% to 75%	4.4%	6.9%
76% to 100%	0.7%	0.0%
Total	**100.0%**	**100.0%**

Table D-0-14: Equal Window Coverage for All Walls

Equal Window Coverage for All Walls	Privately-Held Properties (n=298)	Public and Government-Assisted Housing (n=59)
No	16.4%	20.4%
Yes	83.6%	79.6%
Total	**100.0%**	**100.0%**

Table D-0-15: Amount of Glass Area on Sunlight-Facing Walls

Glass Area on Sunlight-Facing Walls	Privately-Held Properties (n=46)	Public and Government-Assisted Housing (n=9)
About the same amount	52.4%	66.1%
Less glass area	14.4%	0.0%
More glass area	33.2%	33.9%
Total	**100.0%**	**100.0%**

Table D-0-16: Single-Layer or Multi-Layer Windows

Window-Type	Privately-Held Properties (n=291)	Public and Government-Assisted Housing (n=58)
Combination of both types	4.2%	11.5%
Multi-layer	80.5%	80%
Single layer	15.3%	8.5%
Total	**100.0%**	**100.0%**

Table D-0-17: Presence of Low-E Windows

Low-E Windows	Privately-Held Properties (n=234)	Public and Government-Assisted Housing (n=41)
No	66.4%	69.6%
Yes	33.6%	30.4%
Total	**100.0%**	**100.0%**

Table D-0-18: Presence of Window Types

Window-Type	Privately-Held Properties (n=298)	Public and Government-Assisted Housing (n=60)
Clear	98.1%	100%
Tinted	3.5%	3.9%
Reflective	1.7%	0.0%
Opaque	0.3%	1.1%

D.1.4 Solar Panels

Table D-0-19: Solar Panels Present on Property

Solar Panels	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
No Solar Panels	95.1%	88.8%
Roof-Mounted Solar Panels	3.3%	10.1%
Parking Structure Solar Panels	0.0%	0.0%

D.1.5 Roofs

Table D-0-20: Roof Pitch

Roof Pitch	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
Flat	42.9%	38.8%
Pitched	57.1%	61.2%
Total	**100.0%**	**100.0%**

Table D-0-21: Percent Roof Shading

Percent Shading	Privately-Held Properties (n=313)	Public and Government-Assisted Housing (n=63)
0%-25%	86.9%	79.8%
26%-50%	11.2%	16.4%
51%-75%	1.6%	3.8%
75%-100%	0.3%	0.0%
Total	**100.0%**	**100.0%**

D.1.6 Parking Lots

Table D-0-22: Types of Parking Available

Parking Type	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
Open Lot	72.9%	93.2%
Garage	25.4%	4.7%
Carport	3.6%	0.0%
Other	9.7%	7.9%
None	12.3%	5.9%

Table D-0-23: Number of Parking Spaces per Property

Housing-Type	Average Number of Parking Spaces
Privately-Held Properties (n=254)	133.46
Public and Government-Assisted Housing (n=51)	133.42

Table D-0-24: EV Stations Present

EV Stations Present	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
No	96.6%	100%
Yes	3.4%	0.0%
Total	**100.0%**	**100.0%**

<center>Table D-0-25: Average Number of EV Stations</center>

Housing-Type	Average Number of EV Stations
Privately-Held Properties (n=13)	3.83
Public and Government-Assisted Housing (n=0)	0.00

D.1.7 Common Areas

<center>Table D-0-26: Enclosed Common Areas Present</center>

Enclosed Common Areas	Privately-Held Properties (n=314)	Public and Government-Assisted Housing (n=65)
No	44.2%	27.1%
Yes	55.8%	72.9%
Total	**100.0%**	**100.0%**

<center>Table D-0-27: Presence of Different Common Area Types</center>

Space-Type	Privately-Held Properties (n=180)	Public and Government-Assisted Housing (n=48)
Boiler Room	43.2%	64.6%
Club House	21%	22.2%
Community Center	29.9%	62.1%
Gym	35%	30.8%
Swimming Pool	18.7%	4.1%
Laundry	57.7%	70.2%
Equipment Shed	40.3%	32.6%
Rental Office	63.2%	88.7%
Storage Units	34.1%	12.7%
Other	7.5%	19.6%

D.2 EQUIPMENT AND END-USE SATURATIONS

D.2.1 HVAC

D.2.1.1 Heating

Table D-0-28: Available Heating Types

Heating Type	Privately-Held Properties (n=298)	Public and Government-Assisted Housing (n=58)
Central Gas Furnace	25.1%	27.9%
Steam Boiler	9.3%	7.8%
Hot Water Boiler	32.7%	37.1%
District Steam	0.0%	0.0%
GSHP	4.7%	0.0%
Individual Gas Oil Furnace	24.6%	29.3%
Electric Baseboards	10.8%	6.6%

Table D-0-29: Primary Heating Fuel-Type

Heating Fuel-Type	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
Boiler	0.0%	1.0%
Electricity	15.8%	9.4%
Mixed: Electric & Gas	0.2%	0.0%
Natural Gas	83.8%	89.1%
Oil	0.2%	0.5%
Total	**100.0%**	**100.0%**

Table D-0-30: Primary Heating Equipment Type

Heating Equipment-Type	Privately-Held Properties (n=295)	Public and Government-Assisted Housing (n=60)
ASHP	6.4%	4.2%
Baseboard: Electric	11%	12.7%
Baseboard: Gas	4.5%	5.2%
Baseboard: Hot Water	3.9%	0.0%
Baseboard: Unknown Fuel Type	0.3%	3.4%
Convectors	0.6%	0.0%
Forced Air Furnace	38.4%	52.2%
Hot Water Boiler	0.3%	0.0%
No One Major Type	5.2%	0.0%
Other	1%	0.7%
PTAC	3.3%	1.2%
Radiators	24.9%	20.3%
Wood or Coal Burning Stove	0.1%	0.0%
Total	**100.0%**	**100.0%**

Table D-0-31: Average Age of Heating Equipment

Heating Equipment-Type	Privately-Held Properties	Public and Government-Assisted Housing
Central Heating	11 (n=205)	15 (n=39)
Tenant-Unit Heating	9 (n=82)	14 (n=15)

Table D-0-32: EnergyStar Certified Heating Equipment

EnergyStar Certified	Privately-Held Properties (n=270)	Public and Government-Assisted Housing (n=55)
No	30.6%	18.8%
Yes: All	55.6%	65.1%
Yes: Some	13.8%	16.1%
Total	**100.0%**	**100.0%**

Table D-0-33: Annual Tune-Up of Heating Equipment

Annual Tune-Up	Privately-Held Properties (n=310)	Public and Government-Assisted Housing (n=62)
No	15.5%	4.4%
Yes: Heating Contractor	44.5%	43.9%
Yes: Staff Person	40.1%	51.7%
Total	**100.0%**	**100.0%**

D.2.1.2   Cooling

Table D-0-34: Available Cooling Types

Available Cooling Types	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
Central Chiller	2.5%	5.6%
Individual Units	71.6%	79.6%
No Cooling	25.8%	15.8%

Table D-0-35: Primary Cooling Equipment Type

Equipment Type	Privately-Held Properties (n=308)	Public and Government-Assisted Housing (n=61)
Central Chiller	2%	3.8%
Heat Pump	1.3%	3.1%
Individual RAC	51.5%	46%
Mini-Split Units	0.4%	0.0%
No One Major Type	0.7%	0.0%
None	1.1%	1.9%
Other	3.7%	2%
Packaged AC - Roof Mounted DX	9.5%	5.5%
PTAC	3.5%	4.1%
Residential Split System - DX	25.9%	33.7%
Wall AC Units	0.3%	0.0%
Total	**100.0%**	**100.0%**

Table D-0-36: Average Age of Cooling Equipment

Cooling Equipment-Type	Privately-Held Properties	Public and Government-Assisted Housing
Central Cooling	9 (n=9)	16 (n=3)
Tenant-Unit Cooling	6 (n=207)	9 (n=37)

Table D-0-37: EnergyStar Certified Cooling Equipment

EnergyStar Certified	Privately-Held Properties (n=263)	Public and Government-Assisted Housing (n=46)
No	17.4%	17.5%
Yes: All	53.9%	56.8%
Yes: Some	28.7%	25.7%
Total	**100.0%**	**100.0%**

Table D-0-38: Annual Tune-Up of Cooling Equipment

Annual Tune-Up	Privately-Held Properties (n=306)	Public and Government-Assisted Housing (n=63)
No	47.1%	35.4%
Yes: AC Contractor	16.9%	26.0%
Yes: Staff Person	36.0%	38.6%
Total	**100.0%**	**100.0%**

D.2.1.3   Thermostats

Table D-0-39: Thermostat Equipment Type

Equipment Type	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
Simple On/Off	9.8%	4.1%
Simple Setpoint	53.9%	68.5%
Programmable Thermostat	27.1%	29.3%
Smart Thermostat	1.4%	0.9%
No Tenant Thermostat	11.7%	8.5%

Table D-0-40: Thermostat Control Type

Control Type	Privately-Held Properties (n=249)	Public and Government-Assisted Housing (n=51)
Both	61.4%	66.1%
Cooling	2%	1%
Heating	36.5%	32.9%
Total	**100.0%**	**100.0%**

Table D-0-41: Number of Thermostats per Unit

Number of Thermostats	Privately-Held Properties (n=260)	Public and Government-Assisted Housing (n=50)
1	82.1%	84.1%
2 or more	17.9%	15.9%
Total	**100.0%**	**100.0%**

D.2.2 Water Heating

Table D-0-42: Building-Centralized Hot Water

Building-Centralized Hot Water	Privately-Held Properties (n=312)	Public and Government-Assisted Housing (n=64)
No	57.1%	34.1%
Yes	42.9%	65.9%
Total	**100.0%**	**100.0%**

Table D-0-43: Primary Water Heating Equipment Type

Equipment Type	Privately-Held Properties (n=310)	Public and Government-Assisted Housing (n=62)
Commercial Water Heaters	0.0%	1.7%
Instantaneous Water Heater	4.6%	5.3%
Part of Heating System Boiler	9.1%	19.4%
Self-Contained Tank	62.7%	47.4%
Separate Water Heating Boiler	23.6%	26.2%
Total	**100.0%**	**100.0%**

Table D-0-44: Primary Water Heating Fuel Type

Equipment Type	Privately-Held Properties (n=312)	Public and Government-Assisted Housing (n=63)
Electricity	20.7%	14.3%
Natural Gas	79.0%	84.0%
Oil	0.0%	0.5%
Solar	0.0%	1.2%
No One Major Type	0.4%	0.0%

Table D-0-45: Average Age of Building-Centralized Water Heating Equipment

Housing-Type	Average Age
Privately-Held Properties (n=278)	8.51
Public and Government-Assisted Housing (n=53)	8.72

D.2.3   In-Unit Appliances

Table D-0-46: Appliances Provided by the Property

Appliance Type	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
Refrigerator	94.8%	97.6%
Stove	95.2%	97.6%
Oven	85.9%	79.4%
Dishwasher	48.5%	43.7%
Microwave	44.7%	15.6%
In Unit Clothes Washer	34.9%	20%
In Unit Clothes Dryer	35.2%	20%
In Unit Water Heater	39.4%	25.1%
Window AC or RAC	31.5%	25.5%
Nothing	2.3%	0.0%

Table D-0-47: EnergyStar Appliances

Appliance Type	Privately-Held Properties	Public and Government-Assisted Housing
Refrigerator	77.2% (n=270)	91.6% (n=52)
Dishwasher	80.2% (n=150)	96.6% (n=20)
In Unit Clothes Washer	90.6% (n=96)	89.7% (n=8)
In Unit Clothes Dryer	89.8% (n=97)	89.7% (n=9)
In Unit Water Heater	94.1% (n=96)	92.1% (n=14)
Window AC or RAC	66.8% (n=99)	37.4% (n=12)

Table D-0-48: Age of In-Unit Refrigerators

Age Range	Privately-Held Properties (n=285)	Public and Government-Assisted Housing (n=60)
Less than 2 years old	16.5%	8.3%
2 to 4 years old	30.8%	10.0%
5 to 9 years old	43.3%	52.0%
10 to 14 years old	8.5%	21.2%
15 to 19 years old	0.7%	8.5%
20 years old or more	0.2%	0.0%
Total	**100.0%**	**100.0%**

Table D-0-49: Age of In-Unit Dishwashers

Age Range	Privately-Held Properties (n=156)	Public and Government-Assisted Housing (n=22)
Less than 2 years old	19.1%	0.0%
2 to 4 years old	32.2%	10.4%
5 to 9 years old	35.2%	49.2%
10 to 14 years old	11.6%	30.6%
15 to 19 years old	1.7%	9.8%
20 years old or more	0.2%	0.0%
Total	**100.0%**	**100.0%**

Table D-0-50: Age of In-Unit Clothes Washers

Age Range	Privately-Held Properties (n=105)	Public and Government-Assisted Housing (n=9)
Less than 2 years old	24.0%	0.0%
2 to 4 years old	28.1%	0.0%
5 to 9 years old	33.4%	51.7%
10 to 14 years old	8.1%	26.0%
15 to 19 years old	6.4%	22.3%
20 years old or more	0.0%	0.0%
Total	**100.0%**	**100.0%**

Table D-0-51: Age of In-Unit Clothes Dryers

Age Range	Privately-Held Properties (n=103)	Public and Government-Assisted Housing (n=9)
Less than 2 years old	24.7%	0.0%
2 to 4 years old	25.1%	0.0%
5 to 9 years old	34.8%	51.7%
10 to 14 years old	8.6%	26.0%
15 to 19 years old	6.8%	22.3%
20 years old or more	0.0%	0.0%
Total	**100.0%**	**100.0%**

Table D-0-52: Age of In-Unit Water Heaters

Age Range	Privately-Held Properties (n=105)	Public and Government-Assisted Housing (n=15)
Less than 2 years old	18.9%	0.0%
2 to 4 years old	28.5%	38.7%
5 to 9 years old	35.2%	40.9%
10 to 14 years old	12.2%	20.3%
15 to 19 years old	5.2%	0.0%
20 years old or more	0.0%	0.0%
Total	**100.0%**	**100.0%**

Table D-0-53: Age of In-Unit Window ACs and Room ACs

Age Range	Privately-Held Properties (n=111)	Public and Government-Assisted Housing (n=13)
Less than 2 years old	7.9%	41.6%
2 to 4 years old	21.9%	15.0%
5 to 9 years old	58.0%	30.2%
10 to 14 years old	11.3%	13.2%
15 to 19 years old	0.0%	0.0%
20 years old or more	1.0%	0.0%
Total	**100.0%**	**100.0%**

D.2.4 Common Area Appliances

D.2.4.1 Common Area Kitchen Equipment

Table D-0-54: Common Area Kitchen Present

Common Area Kitchen Present	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
No	85.4%	38.1%
Yes	14.6%	61.9%
Total	**100.0%**	**100.0%**

Table D-0-55: Average Number of Common Area Kitchen Appliances

Equipment Type	Privately-Held Properties	Public and Government-Assisted Housing
Microwaves	2 (n=42)	1 (n=41)
Refrigerators	1 (n=48)	1 (n=43)
Stoves or Ovens	2 (n=20)	1 (n=33)

Table D-0-56: Average Age of Common Area Kitchen Appliances

Equipment Type	Privately-Held Properties	Public and Government-Assisted Housing
Refrigerators	4 (n=46)	7 (n=41)
Stoves or Ovens	6 (n=20)	7 (n=29)

Table D-0-57: Commercial Grade Stoves or Ovens

Commercial Grade Stoves or Ovens	Privately-Held Properties (n=22)	Public and Government-Assisted Housing (n=33)
No	67.7%	81.7%
Yes	32.3%	18.3%
Total	**100.0%**	**100.0%**

D.2.4.2 Common Area Pools/Spas

Table D-0-58: Common Area Filtered Pool Present

Common Area Filtered Pool	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
No	85.2%	89.4%
Yes	14.8%	10.6%
Total	**100.0%**	**100.0%**

Table D-0-59: Pool Heater

Pool Heater	Privately-Held Properties (n=48)	Public and Government-Assisted Housing (n=4)
No	56.6%	82.5%
Yes	43.4%	17.5%
Total	**100.0%**	**100.0%**

Table D-0-60: Pool Heater Fuel

Pool Heater Fuel	Privately-Held Properties (n=17)	Public and Government-Assisted Housing (n=1)
Electricity	19.2%	0.0%
Natural Gas	80.8%	100%
Total	**100.0%**	**100.0%**

Table D-0-61: Pool Cover

Pool Cover	Privately-Held Properties (n=17)	Public and Government-Assisted Housing (n=1)
No	3.6%	0.0%
Yes	96.4%	100.0%
Total	**100.0%**	**100.0%**

Table D-0-62: VSD Pool Pump

VSD Pool Pump	Privately-Held Properties (n=38)	Public and Government-Assisted Housing (n=3)
No	22%	20.6%
Yes	78%	79.4%
Total	**100.0%**	**100.0%**

Table D-0-63: Pool Timer

Pool Timer	Privately-Held Properties (n=40)	Public and Government-Assisted Housing (n=4)
No	26.4%	82.5%
Yes	73.6%	17.5%
Total	**100.0%**	**100.0%**

Table D-0-64: Hot Tub, Spa, or Jacuzzi

Hot Tub, Spa, or Jacuzzi	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
No	97.3%	92.9%
Yes	2.7%	7.1%
Total	**100.0%**	**100.0%**

Table D-0-65: Hot Tub, Spa, or Jacuzzi Fuel

Hot Tub, Spa, or Jacuzzi Fuel	Privately-Held Properties (n=6)	Public and Government-Assisted Housing (n=1)
Electricity	0.0%	0.0%
Natural Gas	100.0%	100.0%
Total	**100.0%**	**100.0%**

D.2.4.3   Common Area Laundry

Table D-0-66: Common Area Laundry Facility

Common Area Laundry	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
No	56.6%	29.3%
Yes	43.4%	70.7%
Total	**100.0%**	**100.0%**

Table D-0-67: Owned or Leased Common Laundry Equipment

Owned or Leased	Privately-Held Properties (n=160)	Public and Government-Assisted Housing (n=46)
Lease some and own some	2.0%	1.3%
Leased all	61.0%	76.0%
Own all	37.1%	22.7%
Total	**100.0%**	**100.0%**

Table D-0-68: Average Number of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Privately-Held Properties	Public and Government-Assisted Housing
Clothes Washers	11 (n=162)	7 (n=47)
Clothes Dryers	11 (n=162)	7 (n=47)

Table D-0-69: Average Age of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Privately-Held Properties	Public and Government-Assisted Housing
Clothes Washers	6 (n=129)	7 (n=39)
Clothes Dryers	6 (n=130)	6 (n=39)

Table D-0-70: Clothes Dryer Fuel Type

Clothes Dryer Fuel	Privately-Held Properties (n=158)	Public and Government-Assisted Housing (n=44)
Electricity	23.8%	44.3%
Natural Gas	76.2%	55.7%
Total	**100.0%**	**100.0%**

D.2.5 Lighting

D.2.5.1 In-Unit Lighting

Table D-0-71: Weighted Average In-Unit Lighting Rank

Lighting Technology	Privately-Held Properties (n=309)	Public and Government-Assisted Housing (n=65)
Incandescent	3.64	3.99
CFLs	3.22	2.57
Fluorescent Tubes	4.32	3.64
LED Bulbs	3.19	3.74
LED Tubes	4.63	4.56

Table D-0-72: In-Unit Lighting Controls

Lighting Control Type	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
Dimmers	5.4%	0.0%
Occupancy Sensors	4.6%	0.0%
Timers	2.0%	2.0%
Daylighting	0.8%	0.0%
On/Off Switch	19.7%	21.9%
None	64.8%	75.6%

D.2.5.2 Interior Common Area Lighting

Table D-0-73: Interior Common Area Lighting

Interior Common Area Lighting	Privately-Held Properties (n=312)	Public and Government-Assisted Housing (n=65)
No	10.2%	15.6%
Yes	89.8%	84.4%
Total	**100.0%**	**100.0%**

Table D-0-74: Weighted Average Interior Common Area Lighting Rank

Lighting Technology	Privately-Held Properties (n=284)	Public and Government-Assisted Housing (n=59)
Incandescent	5.04	5.03
CFLs	4.43	3.94
Fluorescent Tubes	4.56	2.60
HID	5.77	5.76
LED Bulbs	3.84	4.45
LED Tubes	5.16	4.98

Table D-0-75: Interior Common Area Lighting Controls

Lighting Control Type	Privately-Held Properties (n=288)	Public and Government-Assisted Housing (n=59)
Dimmers	3.8%	5.0%
Occupancy Sensors	24.4%	18.6%
Timers	20.4%	7.2%
Daylighting	9.3%	3.0%
On/Off Switch	19.4%	24.3%
Other	0.3%	1.1%
None	39.0%	48.8%

D.2.5.3 Exterior Lighting

Table D-0-76: Exterior Lighting Location

Location	Privately-Held Properties (n=315)	Public and Government-Assisted Housing (n=65)
Parking Lot	61.7%	88.5%
Security Lighting	65.5%	61.4%
Sidewalk/Walkway Lighting	47.4%	55.0%
Decorative	11.5%	5.3%
Other Location	0.6%	1.0%
None	4.7%	0.0%

Table D-0-77: Exterior Lighting Technology

Location	Privately-Held Properties (n=298)	Public and Government-Assisted Housing (n=65)
Incandescent	18.6%	13.5%
CFLs	23.3%	29.0%
Fluorescent Tubes	6.2%	3.6%
HIDs	33.8%	32.2%
LED Bulbs	45.2%	26.2%
LED Tubes	9.9%	9.7%
Other	6.7%	18.2%

APPENDIX E: SUMMARY STATISTICS – ELECTRIC METERING TYPE

In addition to calculating summary statistics for building physical properties and equipment and end-use saturations across the entire state, ADM also segmented the summary statistics by electric meter type: master meter, master meter with tenant sub-meters, tenant meter, and tenant meter with common area meters.

Table E-0-1 presents the number of sample points by electric meter type. Of the 380 properties included in the survey, one participant did not provide a response to the question while one additional participant reported not knowing what type of electric meters were present at the property. These two properties were not included in the results presented in this appendix.

Table E-0-1: Number of Sample Points per Electric Meter-Type

Meter-Type	Number of Sample Points
Master Meter Only	24
Master Meter with Tenant Sub	50
Tenant Meter Only	25
Tenant Meter with Common Area Meter	279
Total	**378**

E.1 PHYSICAL DESCRIPTION OF MULTIFAMILY PROPERTIES

E.1.1 Building Size and Occupancy

Table E-0-2: Number of Buildings per Complex

Meter-Type	Average Number of Buildings
Master Meter Only (n=21)	70.47
Master Meter with Tenant Sub (n=49)	4.11
Tenant Meter Only (n=23)	4.78
Tenant Meter with Common Area Meter (n=265)	6.67

Table E-0-3: Number of Floors per Building

Meter-Type	Average Number of Floors
Master Meter Only (n=24)	7.88
Master Meter with Tenant Sub (n=50)	3.65
Tenant Meter Only (n=24)	3.88
Tenant Meter with Common Area Meter (n=278)	3.36

Table E-0-4: Average Square Footage by Unit-Type

Unit-Type	Master Meter Only	Master Meter with Tenant Sub	Tenant Meter Only	Tenant Meter with Common Area Meter
Studio	375 (n=12)	448 (n=14)	435 (n=2)	535 (n=66)
1 Bedroom	609 (n=21)	762 (n=44)	799 (n=17)	729 (n=245)
2 Bedroom	1,072 (n=15)	1,074 (n=43)	1,106 (n=22)	967 (n=256)
3 Bedroom	1,482 (n=8)	1,477 (n=10)	1,542 (n=12)	1,246 (n=82)
4 Bedroom	1,481 (n=3)	1,400 (n=1)	1,182 (n=2)	1,652 (n=11)
5 Bedroom	N/A	N/A	N/A	1,984 (n=3)

Table E-0-5: Average Number of Tenants by Unit-Type

Unit-Type	Master Meter Only	Master Meter with Tenant Sub	Tenant Meter Only	Tenant Meter with Common Area Meter
Studio	63 (n=13)	17 (n=14)	93 (n=2)	15 (n=67)
1 Bedroom	64 (n=24)	53 (n=45)	20 (n=17)	67 (n=246)
2 Bedroom	56 (n=17)	26 (n=45)	24 (n=22)	59 (n=258)
3 Bedroom	86 (n=9)	10 (n=11)	15 (n=12)	17 (n=86)
4 Bedroom	5 (n=3)	2 (n=1)	1 (n=2)	10 (n=12)
5 Bedroom	N/A	N/A	N/A	21 (n=4)

Table E-0-6: Average Owner-Occupancy and Vacancy Rate

Measure	Master Meter Only	Master Meter with Tenant Sub	Tenant Meter Only	Tenant Meter with Common Area Meter
Percent Owner-Occupied	38% (n=23)	17% (n=48)	13% (n=24)	13% (n=276)
Percent Vacancy	36% (n=23)	19% (n=49)	27% (n=23)	17% (n=276)

E.1.2 Building Shell, Construction Year and Construction Materials

Table E-0-7: Construction Year

Construction Year	Master Meter Only (n=23)	Master Meter with Tenant Sub (n=47)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=269)
Before 1940	34.3%	14.0%	0.0%	7.8%
1940 - 1949	14.3%	5.9%	6.6%	6.0%
1950 - 1959	0.4%	7.5%	8.2%	8.4%
1960 - 1969	20.9%	19.7%	0.0%	18.4%
1970 - 1979	16.7%	5.4%	0.0%	10.3%
1980 - 1989	0.0%	1.9%	3.8%	5.2%
1990 - 1999	0.2%	2.7%	0.0%	3.6%
2000 - 2009	13.2%	11.5%	15.7%	12.5%
2010 - 2014	0.0%	4.1%	53.3%	9.7%
2015	0.0%	0.0%	6.0%	5.6%
2016	0.0%	12.4%	0.0%	4.6%
2017	0.0%	7.5%	6.5%	3.2%
2018	0.0%	7.5%	0.0%	5.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-8: Major Construction in the Past 10 Years

Major Construction <= 10 Years	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=48)	Tenant Meter Only (n=24)	Tenant Meter with Common Area Meter (n=277)
No	59.0%	66.0%	81.3%	76.6%
Yes	41.0%	34.0%	18.7%	23.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-9: Year of Last Major Construction

Year of Construction	Master Meter Only (n=15)	Master Meter with Tenant Sub (n=14)	Tenant Meter Only (n=5)	Tenant Meter with Common Area Meter (n=60)
2008-2014	5.2%	14.9%	92.4%	24.8%
2015	0.0%	9.2%	0.0%	10.1%
2016	7.5%	21.2%	0.0%	8.3%
2017	26.1%	6.2%	0.0%	16.4%
2018	61.1%	48.5%	7.6%	40.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-10: Exterior Wall Material

Exterior Wall Material	Master Meter Only (n=18)	Master Meter with Tenant Sub (n=47)	Tenant Meter Only (n=23)	Tenant Meter with Common Area Meter (n=259)
Aluminum, Asbestos, Plastic or Wood Materials (Siding, Shingle Tiles, or Shakes)	0.0%	9.6%	17.5%	31.3%
Brick	31.0%	51.4%	6.7%	36.8%
Concrete Block or Poured Concrete	48.9%	10.1%	56.9%	14.8%
No One Major Type	0.5%	0.0%	0.0%	0.0%
Other	17.5%	6.1%	3.7%	14.3%
Pre-Cast Concrete Panels	1%	8.6%	12.2%	0.4%
Sheet Metal Panels	0.5%	9.8%	0.0%	1.9%
Window or Vision Glass (Glass that can be Seen Through)	0.5%	4.4%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-11: Building Shape

Building Shape	Master Meter Only (n=19)	Master Meter with Tenant Sub (n=48)	Tenant Meter Only (n=24)	Tenant Meter with Common Area Meter (n=266)
C-Shaped	0.0%	0.0%	0.0%	0.2%
E-Shaped	0.0%	0.0%	0.0%	0.3%
G Shaped	0.0%	0.0%	0.0%	0.2%
H-Shaped	9.8%	7.4%	7.5%	3.3%
J-Shaped	0.0%	0.0%	0.0%	0.8%
L-Shaped	4.9%	0.0%	3%	6.3%
M-Shaped	0.0%	0.0%	0.0%	0.5%
No One Major Type	0.0%	0.0%	0.0%	1.2%
Other	0.4%	0.0%	2%	1.8%
Rectangle	50%	65.1%	41.4%	63%
Rectangle or Square with an Interior Courtyard	0.0%	4.3%	32.4%	2.3%
Square	0.4%	10.7%	13.7%	10.2%
T-Shaped	24.9%	2.6%	0.0%	0.0%
U-Shaped	0.0%	9.9%	0.0%	10%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-12: Roofing Material

Roofing Material	Master Meter Only (n=18)	Master Meter with Tenant Sub (n=47)	Tenant Meter Only (n=20)	Tenant Meter with Common Area Meter (n=264)
Aluminum Top Coat with a Felt Layer	0.0%	0.0%	0.0%	0.5%
Asphalt, Fiberglass, or Other Shingles	10.9%	45.5%	22%	42.7%
Built-Up (Tar, Felts, or Fiberglass and a Ballast, Such as Stone)	17.2%	26.4%	0.0%	18.1%
Concrete	0.4%	4.3%	12.8%	3.9%
Fiberglass and Rubber Membrane	0.9%	0.0%	0.0%	0.0%
Metal Surfacing	0.0%	4.3%	0.0%	2%
Plastic, Rubber, or Synthetic Sheeting (Single or Multiple Ply)	45.2%	15.1%	30.3%	11.5%
Slate or Tile Shingles	0.0%	0.0%	24.2%	15.7%
Wood Shingles, Shakes, or Other Wooden Materials	25.4%	4.3%	10.7%	5.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

E.1.3 Windows

Table E-0-13: Exterior Wall Window Coverage

Exterior Wall Window Coverage	Master Meter Only (n=18)	Master Meter with Tenant Sub (n=46)	Tenant Meter Only (n=22)	Tenant Meter with Common Area Meter (n=258)
1% or less	12.6%	0.0%	24.4%	2.5%
2% to 10%	12.6%	22.6%	28.4%	26%
11% to 25%	55.4%	53.2%	21.7%	43.8%
26% to 50%	18.7%	13.4%	23.6%	22.1%
51% to 75%	0.7%	6.5%	2%	5.1%
76% to 100%	0.0%	4.4%	0.0%	0.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-14: Equal Window Coverage for All Walls

Equal Window Coverage for All Walls	Master Meter Only (n=19)	Master Meter with Tenant Sub (n=48)	Tenant Meter Only (n=23)	Tenant Meter with Common Area Meter (n=266)
No	14.8%	8.6%	46.9%	17.8%
Yes	85.2%	91.4%	53.1%	82.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-15: Amount of Glass Area on Sunlight-Facing Walls

Glass Area on Sunlight-Facing Walls	Master Meter Only (n=3)	Master Meter with Tenant Sub (n=3)	Tenant Meter Only (n=8)	Tenant Meter with Common Area Meter (n=41)
About the same amount	7.1%	14.7%	60.2%	49%
Less glass area	0.0%	0.0%	24.2%	23.2%
More glass area	92.9%	85.3%	15.5%	27.9%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-16: Single-Layer or Multi-Layer Windows

Window-Type	Master Meter Only (n=18)	Master Meter with Tenant Sub (n=46)	Tenant Meter Only (n=22)	Tenant Meter with Common Area Meter (n=262)
Combination of both types	25.9%	1.7%	15.9%	3.6%
Multi-layer	41.9%	93.6%	84.1%	79.8%
Single layer	32.2%	4.7%	0.0%	16.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-17: Presence of Low-E Windows

Low-E Windows	Master Meter Only (n=17)	Master Meter with Tenant Sub (n=40)	Tenant Meter Only (n=17)	Tenant Meter with Common Area Meter (n=200)
No	98.3%	72.7%	72.8%	66.6%
Yes	1.7%	27.3%	27.2%	33.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-18: Presence of Window Types

Window-Type	Master Meter Only (n=19)	Master Meter with Tenant Sub (n=48)	Tenant Meter Only (n=24)	Tenant Meter with Common Area Meter (n=266)
Clear	100.0%	100.0%	85.7%	98.4%
Tinted	0.0%	0.0%	14.8%	4.3%
Reflective	24.9%	0.0%	30.8%	0.0%
Opaque	0.0%	0.0%	0.0%	0.5%

E.1.4 Solar Panels

Table E-0-19: Solar Panels Present on Property

Solar Panels	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
No Solar Panels	83.1%	100%	100%	93.1%
Roof-Mounted Solar Panels	1.2%	0.0%	0.0%	5.6%
Parking Structure Solar Panels	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

E.1.5 Roofs

Table E-0-20: Roof Pitch

Roof Pitch	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
Flat	83.1%	100%	100%	93.1%
Pitched	1.2%	0.0%	0.0%	5.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-21: Percent Roof Shading

Percent Shading	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=275)
0%-25%	44.8%	96.4%	93.6%	83.8%
26%-50%	40.9%	3.6%	6.4%	13.6%
51%-75%	1.2%	0.0%	0.0%	2.7%
75%-100%	13.1%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

E.1.6 Parking Lots

Table E-0-22: Types of Parking Available

Parking Type	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
Open Lot	81.9%	87.9%	53.1%	69.1%
Garage	21.8%	29.7%	34.9%	25.0%
Carport	0.0%	13.8%	3.4%	1.1%
Other	45.0%	14.5%	8.9%	5.7%
None	18.1%	4.7%	12.0%	14.8%

Table E-0-23: Number of Parking Spaces per Property

Meter-Type	Average Number of Parking Spaces
Master Meter Only (n=20)	100.34
Master Meter with Tenant Sub (n=42)	87.53
Tenant Meter Only (n=17)	73.64
Tenant Meter with Common Area Meter (n=225)	165.68

Table E-0-24: EV Stations Present

EV Stations Present	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
No	100%	95.9%	100%	95.9%
Yes	0.0%	4.1%	0.0%	4.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-25: Average Number of EV Stations

Meter-Type	Average Number of EV Stations
Master Meter Only (n=0)	0
Master Meter with Tenant Sub (n=1)	2
Tenant Meter Only (n=0)	0
Tenant Meter with Common Area Meter (n=12)	4

E.1.7 Common Areas

Table E-0-26: Enclosed Common Areas Present

Enclosed Common Areas	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=24)	Tenant Meter with Common Area Meter (n=279)
No	23.8%	47.1%	78.9%	35.4%
Yes	76.2%	52.9%	21.1%	64.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-27: Presence of Different Common Area Types

Space-Type	Master Meter Only (n=16)	Master Meter with Tenant Sub (n=28)	Tenant Meter Only (n=6)	Tenant Meter with Common Area Meter (n=177)
Boiler Room	81.6%	28.0%	9.0%	48.9%
Club House	32.7%	10.4%	59.3%	21.5%
Community Center	15.8%	28.1%	61.8%	31.9%
Gym	47.5%	11.7%	59.3%	38.7%
Swimming Pool	2.9%	12.3%	6.5%	18.3%
Laundry	82.4%	54.9%	3.4%	62.9%
Equipment Shed	22.5%	48.1%	91.0%	41.8%
Rental Office	74.1%	38.3%	62.7%	71.9%
Storage Units	30.7%	52.4%	46.2%	29.0%
Other	0.0%	7.0%	0.0%	7.8%

E.2 EQUIPMENT AND END-USE SATURATIONS

E.2.1 HVAC

E.2.1.1 Heating

Table E-0-28: Available Heating Types

Heating Type	Master Meter Only (n=19)	Master Meter with Tenant Sub (n=48)	Tenant Meter Only (n=23)	Tenant Meter with Common Area Meter (n=265)
Central Gas Furnace	55.7%	35.1%	19.7%	24.1%
Steam Boiler	11.3%	11.7%	0.0%	6.1%
Hot Water Boiler	37.3%	29.2%	47.1%	37.2%
District Steam	0.0%	0.0%	0.0%	0.0%
GSHP	0.0%	5.3%	0.0%	4.8%
Individual Gas Oil Furnace	0.0%	20.9%	34.8%	20.4%
Electric Baseboards	5.8%	7.6%	0.0%	11.3%

Table E-0-29: Primary Heating Fuel-Type

Heating Fuel-Type	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
Boiler	1.0%	0.0%	0.0%	0.0%
Electricity	18.8%	23.9%	9.2%	14.2%
Mixed: Electric & Gas	0.0%	0.0%	0.0%	0.2%
Natural Gas	77.8%	76.1%	90.8%	85.3%
Oil	2.4%	0.0%	0.0%	0.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-30: Primary Heating Equipment Type

Heating Equipment-Type	Master Meter Only (n=19)	Master Meter with Tenant Sub (n=47)	Tenant Meter Only (n=24)	Tenant Meter with Common Area Meter (n=264)
ASHP	0.0%	8.9%	6.5%	4.1%
Baseboard: Electric	2.7%	7.6%	0.0%	12.5%
Baseboard: Gas	1.9%	5.7%	0.0%	4.9%
Baseboard: Hot Water	0.0%	22%	0.0%	2.1%
Baseboard: Unknown Fuel Type	0.0%	0.7%	0.0%	0.4%
Convectors	0.0%	0.0%	0.0%	0.8%
Forced Air Furnace	10%	19.5%	75.9%	41.2%
Hot Water Boiler	0.0%	0.0%	0.0%	0.4%
No One Major Type	0.0%	5.6%	0.0%	1.8%
Other	0.0%	0.0%	0.0%	2.3%
PTAC	2.2%	11.6%	0.0%	3.3%
Radiators	71.4%	18.4%	17.6%	26.4%
Wood or Coal Burning Stove	11.9%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-31: Average Age of Heating Equipment

Heating Equipment-Type	Master Meter Only	Master Meter with Tenant Sub	Tenant Meter Only	Tenant Meter with Common Area Meter
Central Heating	15 (n=13)	11 (n=33)	6 (n=12)	11 (n=186)
Tenant-Unit Heating	14 (n=3)	12 (n=12)	10 (n=8)	8 (n=73)

Table E-0-32: EnergyStar Certified Heating Equipment

EnergyStar Certified	Master Meter Only (n=18)	Master Meter with Tenant Sub (n=40)	Tenant Meter Only (n=20)	Tenant Meter with Common Area Meter (n=246)
No	44.9%	25%	7.1%	32.6%
Yes: All	36.4%	72.4%	91.2%	51.3%
Yes: Some	18.8%	2.6%	1.7%	16.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-33: Annual Tune-Up of Heating Equipment

Annual Tune-Up	Master Meter Only (n=23)	Master Meter with Tenant Sub (n=49)	Tenant Meter Only (n=23)	Tenant Meter with Common Area Meter (n=275)
No	5.2%	10.7%	41.3%	14.7%
Yes: Heating Contractor	41.7%	60.1%	15.1%	43.2%
Yes: Staff Person	53.1%	29.2%	43.6%	42.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

E.2.1.2   Cooling

Table E-0-34: Available Cooling Types

Available Cooling Types	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
Central Chiller	16.5%	10.3%	1.3%	1.3%
Individual Units	65.1%	67.5%	79.8%	77.9%
No Cooling	18.4%	23.7%	11.4%	20.8%

Table E-0-35: Primary Cooling Equipment Type

Equipment Type	Master Meter Only (n=23)	Master Meter with Tenant Sub (n=49)	Tenant Meter Only (n=23)	Tenant Meter with Common Area Meter (n=273)
Central Chiller	16.9%	0.0%	0.0%	2.5%
Heat Pump	3.2%	0.0%	0.0%	0.3%
Individual RAC	59.2%	49.9%	17.6%	51.8%
Mini-Split Units	0.0%	0.0%	0.0%	0.5%
No One Major Type	0.0%	4.1%	0.0%	0.5%
None	5.1%	3%	0.0%	1.1%
Other	0.0%	10.5%	3.1%	1.9%
Packaged AC - Roof Mounted DX	0.0%	21.3%	54.7%	5.6%
PTAC	1.2%	8.2%	1.3%	3.8%
Residential Split System - DX	14.4%	3%	23.4%	31.6%
Wall AC Units	0.0%	0.0%	0.0%	0.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-36: Average Age of Cooling Equipment

Cooling Equipment-Type	Master Meter Only	Master Meter with Tenant Sub	Tenant Meter Only	Tenant Meter with Common Area Meter
Central Cooling	11 (n=3)	9 (n=4)	7 (n=1)	10 (n=4)
Tenant-Unit Cooling	1 (n=3)	5 (n=30)	7 (n=16)	6 (n=194)

Table E-0-37: EnergyStar Certified Cooling Equipment

EnergyStar Certified	Master Meter Only (n=11)	Master Meter with Tenant Sub (n=38)	Tenant Meter Only (n=18)	Tenant Meter with Common Area Meter (n=242)
No	21.7%	27%	0.0%	17.6%
Yes: All	51.3%	47.4%	91.3%	52.5%
Yes: Some	27%	25.7%	8.7%	30%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-38: Annual Tune-Up of Cooling Equipment

Annual Tune-Up	Master Meter Only (n=22)	Master Meter with Tenant Sub (n=47)	Tenant Meter Only (n=24)	Tenant Meter with Common Area Meter (n=274)
No	25.7%	49.3%	54.8%	44.8%
Yes: AC Contractor	27.7%	26.7%	4.3%	17.9%
Yes: Staff Person	46.6%	24.0%	40.9%	37.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

E.2.1.3   Thermostats

Table E-0-39: Thermostat Equipment Type

Equipment Type	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
Simple On/Off	16.7%	4.7%	6%	11.4%
Simple Setpoint	70.8%	52.1%	64.7%	57%
Programmable Thermostat	2.6%	25.3%	20.3%	25.9%
Smart Thermostat	0.0%	0.0%	0.0%	1.9%
No Tenant Thermostat	21.4%	11.1%	0.0%	13.5%

Table E-0-40: Thermostat Control Type

Control Type	Master Meter Only (n=12)	Master Meter with Tenant Sub (n=40)	Tenant Meter Only (n=23)	Tenant Meter with Common Area Meter (n=223)
Both	81.9%	57.7%	88.3%	63.1%
Cooling	0.0%	1.0%	0.0%	2.5%
Heating	18.1%	41.3%	11.7%	34.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-41: Number of Thermostats per Unit

Number of Thermostats	Master Meter Only (n=12)	Master Meter with Tenant Sub (n=46)	Tenant Meter Only (n=24)	Tenant Meter with Common Area Meter (n=226)
1	74.3%	68.8%	78.8%	81.9%
2 or more	25.7%	31.2%	21.2%	18.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

E.2.2 Water Heating

Table E-0-42: Building-Centralized Hot Water

Building-Centralized Hot Water	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=48)	Tenant Meter Only (n=24)	Tenant Meter with Common Area Meter (n=279)
No	17.6%	36.7%	60.0%	52.0%
Yes	82.4%	63.3%	40.0%	48.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-43: Primary Water Heating Equipment Type

Equipment Type	Master Meter Only (n=22)	Master Meter with Tenant Sub (n=48)	Tenant Meter Only (n=24)	Tenant Meter with Common Area Meter (n=276)
Commercial Water Heaters	1.4%	0.0%	0.0%	0.0%
Instantaneous Water Heater	0.0%	0.0%	7.4%	5.6%
Part of Heating System Boiler	49.6%	13.3%	4.2%	10.1%
Self-Contained Tank	30.9%	71.5%	76.6%	54.7%
Separate Water Heating Boiler	18.2%	15.2%	11.7%	29.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-44: Primary Water Heating Fuel Type

Equipment Type	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=48)	Tenant Meter Only (n=24)	Tenant Meter with Common Area Meter (n=277)
Electricity	18.9%	12.3%	17.3%	20.6%
Natural Gas	80.0%	87.7%	82.7%	78.7%
Oil	0.0%	0.0%	0.0%	0.2%
Solar	1.2%	0.0%	0.0%	0.0%
No One Major Type	0.0%	0.0%	0.0%	0.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-45: Average Age of Building-Centralized Water Heating Equipment

Utility	Average Age
Master Meter Only (n=15)	6.86
Master Meter with Tenant Sub (n=45)	7.91
Tenant Meter Only (n=22)	7.64
Tenant Meter with Common Area Meter (n=248)	8.52

E.2.3 In-Unit Appliances

Table E-0-46: Appliances Provided by the Property

Appliance Type	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
Refrigerator	80.0%	89.9%	92.4%	98.6%
Stove	53.4%	91.5%	92.4%	99.2%
Oven	46.8%	84.2%	85.8%	89.6%
Dishwasher	18.1%	43.2%	70.2%	53.8%
Microwave	13.1%	36.3%	64.3%	45.7%
In Unit Clothes Washer	0.0%	22.3%	73.7%	34.4%
In Unit Clothes Dryer	0.0%	22.3%	73.7%	34.9%
In Unit Water Heater	14.3%	25.6%	39.1%	36.4%
Window AC or RAC	14.5%	46.0%	8.2%	36.2%
Nothing	3.1%	3.3%	0.0%	0.3%

Table E-0-47: EnergyStar Appliances

Appliance Type	Master Meter Only	Master Meter with Tenant Sub	Tenant Meter Only	Tenant Meter with Common Area Meter
Refrigerator	94.5% (n=17)	69.6% (n=44)	93.8% (n=23)	76.5% (n=237)
Dishwasher	100% (n=1)	55.7% (n=22)	84.3% (n=17)	83.2% (n=130)
In Unit Clothes Washer	N/A	70.8% (n=11)	86.6% (n=16)	92.7% (n=77)
In Unit Clothes Dryer	N/A	70.8% (n=11)	86.6% (n=16)	91.3% (n=79)
In Unit Water Heater	100% (n=1)	73.8% (n=13)	97.9% (n=13)	91.7% (n=83)
Window AC or RAC	0.0%	45.6% (n=19)	100% (n=2)	71.9% (n=88)

Table E-0-48: Age of In-Unit Refrigerators

Age Range	Master Meter Only (n=18)	Master Meter with Tenant Sub (n=45)	Tenant Meter Only (n=23)	Tenant Meter with Common Area Meter (n=258)
Less than 2 years old	43.6%	19.5%	17.6%	13.7%
2 to 4 years old	2.1%	39.2%	11.9%	27.0%
5 to 9 years old	52.1%	32.7%	61.9%	47.2%
10 to 14 years old	2.2%	7.7%	3.2%	10.2%
15 to 19 years old	0.0%	0.9%	5.4%	1.6%
20 years old or more	0.0%	0.0%	0.0%	0.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-49: Age of In-Unit Dishwashers

Age Range	Master Meter Only (n=1)	Master Meter with Tenant Sub (n=23)	Tenant Meter Only (n=17)	Tenant Meter with Common Area Meter (n=137)
Less than 2 years old	0.0%	28.0%	10.3%	18.4%
2 to 4 years old	0.0%	40.8%	15.9%	33.2%
5 to 9 years old	100.0%	15.4%	62.2%	34.8%
10 to 14 years old	0.0%	14.7%	3.9%	12.6%
15 to 19 years old	0.0%	1.1%	7.8%	0.8%
20 years old or more	0.0%	0.0%	0.0%	0.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-50: Age of In-Unit Clothes Washers

Age Range	Master Meter Only (n=0)	Master Meter with Tenant Sub (n=11)	Tenant Meter Only (n=17)	Tenant Meter with Common Area Meter (n=86)
Less than 2 years old	0.0%	42.9%	7.0%	24.5%
2 to 4 years old	0.0%	31.5%	15.5%	30.8%
5 to 9 years old	0.0%	10.2%	67.3%	30.2%
10 to 14 years old	0.0%	15.5%	1.2%	8.3%
15 to 19 years old	0.0%	0.0%	8.9%	6.2%
20 years old or more	0.0%	0.0%	0.0%	0.0%
Total	**0.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-51: Age of In-Unit Clothes Dryers

Age Range	Master Meter Only (n=0)	Master Meter with Tenant Sub (n=11)	Tenant Meter Only (n=16)	Tenant Meter with Common Area Meter (n=85)
Less than 2 years old	0.0%	42.9%	7.0%	25.1%
2 to 4 years old	0.0%	31.5%	15.5%	27.7%
5 to 9 years old	0.0%	10.2%	65.7%	32.0%
10 to 14 years old	0.0%	15.5%	1.2%	8.7%
15 to 19 years old	0.0%	0.0%	10.5%	6.5%
20 years old or more	0.0%	0.0%	0.0%	0.0%
Total	**0.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-52: Age of In-Unit Water Heaters

Age Range	Master Meter Only (n=1)	Master Meter with Tenant Sub (n=13)	Tenant Meter Only (n=13)	Tenant Meter with Common Area Meter (n=93)
Less than 2 years old	0.0%	17.5%	20.3%	22.4%
2 to 4 years old	0.0%	22.7%	6.1%	31.6%
5 to 9 years old	0.0%	21.8%	41.6%	33.4%
10 to 14 years old	100.0%	38.0%	13.7%	6.8%
15 to 19 years old	0.0%	0.0%	18.2%	5.8%
20 years old or more	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-53: Age of In-Unit Window ACs and Room ACs

Age Range	Master Meter Only (n=3)	Master Meter with Tenant Sub (n=20)	Tenant Meter Only (n=2)	Tenant Meter with Common Area Meter (n=99)
Less than 2 years old	30.5%	9.2%	100.0%	6.2%
2 to 4 years old	0.0%	24.3%	0.0%	22.1%
5 to 9 years old	0.0%	61.2%	0.0%	58.8%
10 to 14 years old	69.5%	5.3%	0.0%	11.9%
15 to 19 years old	0.0%	0.0%	0.0%	0.0%
20 years old or more	0.0%	0.0%	0.0%	1.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

E.2.4   Common Area Appliances

E.2.4.1   Common Area Kitchen Equipment

Table E-0-54: Common Area Kitchen Present

Common Area Kitchen Present	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
No	65.0%	80.9%	94.6%	78.1%
Yes	35.0%	19.1%	5.4%	21.9%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-55: Average Number of Common Area Kitchen Appliances

Equipment Type	Master Meter Only	Master Meter with Tenant Sub	Tenant Meter Only	Tenant Meter with Common Area Meter
Microwaves	2 (n=10)	3 (n=9)	1 (n=2)	1 (n=62)
Refrigerators	2 (n=11)	3 (n=9)	1 (n=3)	1 (n=68)
Stoves or Ovens	1 (n=11)	3 (n=7)	1 (n=2)	1 (n=33)

Table E-0-56: Average Age of Common Area Kitchen Appliances

Equipment Type	Master Meter Only	Master Meter with Tenant Sub	Tenant Meter Only	Tenant Meter with Common Area Meter
Refrigerators	4 (n=10)	5 (n=9)	5 (n=2)	4 (n=66)
Stoves or Ovens	6 (n=9)	4 (n=7)	6 (n=1)	6 (n=32)

Table E-0-57: Commercial Grade Stoves or Ovens

Commercial Grade Stoves or Ovens	Master Meter Only (n=11)	Master Meter with Tenant Sub (n=7)	Tenant Meter Only (n=2)	Tenant Meter with Common Area Meter (n=35)
No	86.5%	100%	100%	66.7%
Yes	13.5%	0.0%	0.0%	33.3%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

E.2.4.2 Common Area Pools/Spas

Table E-0-58: Common Area Filtered Pool Present

Common Area Filtered Pool	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
No	96.9%	91.9%	93.2%	83.2%
Yes	3.1%	8.1%	6.8%	16.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-59: Pool Heater

Pool Heater	Master Meter Only (n=1)	Master Meter with Tenant Sub (n=6)	Tenant Meter Only (n=4)	Tenant Meter with Common Area Meter (n=41)
No	0.0%	45.3%	100.0%	56.3%
Yes	100.0%	54.7%	0.0%	43.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-60: Pool Heater Fuel

Pool Heater Fuel	Master Meter Only (n=1)	Master Meter with Tenant Sub (n=2)	Tenant Meter Only (n=0)	Tenant Meter with Common Area Meter (n=15)
Electricity	100%	16.4%	N/A	14.6%
Natural Gas	0.0%	83.6%	N/A	85.4%
Total	**100.0%**	**100.0%**	**N/A**	**100.0%**

Table E-0-61: Pool Cover

Pool Cover	Master Meter Only	Master Meter with Tenant Sub (n=2)	Tenant Meter Only	Tenant Meter with Common Area Meter (n=16)
No	N/A	0.0%	N/A	3.3%
Yes	N/A	100.0%	N/A	96.7%
Total	**N/A**	**100.0%**	**N/A**	**100.0%**

Table E-0-62: VSD Pool Pump

VSD Pool Pump	Master Meter Only (n=1)	Master Meter with Tenant Sub (n=4)	Tenant Meter Only (n=2)	Tenant Meter with Common Area Meter (n=34)
No	100%	100%	0.0%	11.9%
Yes	0.0%	0.0%	100.0%	88.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-63: Pool Timer

Pool Timer	Master Meter Only (n=1)	Master Meter with Tenant Sub (n=6)	Tenant Meter Only (n=2)	Tenant Meter with Common Area Meter (n=35)
No	100.0%	75.6%	0.0%	18.1%
Yes	0.0%	24.4%	100.0%	81.9%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-64: Hot Tub, Spa, or Jacuzzi

Hot Tub, Spa, or Jacuzzi	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
No	100.0%	100.0%	100.0%	95.4%
Yes	0.0%	0.0%	0.0%	4.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-65: Hot Tub, Spa, or Jacuzzi Fuel

Hot Tub, Spa, or Jacuzzi Fuel	Master Meter Only	Master Meter with Tenant Sub	Tenant Meter Only	Tenant Meter with Common Area Meter (n=7)
Electricity	N/A	N/A	N/A	0.0%
Natural Gas	N/A	N/A	N/A	100.0%
Total	**N/A**	**N/A**	**N/A**	**100.0%**

E.2.4.3 Common Area Laundry

Table E-0-66: Common Area Laundry Facility

Common Area Laundry	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
No	20.2%	31.5%	91%	52.3%
Yes	79.8%	68.5%	9%	47.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-67: Owned or Leased Common Laundry Equipment

Owned or Leased	Master Meter Only (n=18)	Master Meter with Tenant Sub (n=34)	Tenant Meter Only (n=3)	Tenant Meter with Common Area Meter (n=151)
Lease some and own some	0.0%	0.0%	0.0%	2.1%
Leased all	57.7%	50.2%	53.8%	67.9%
Own all	42.3%	49.8%	46.2%	30.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-68: Average Number of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Master Meter Only	Master Meter with Tenant Sub	Tenant Meter Only	Tenant Meter with Common Area Meter
Clothes Washers	7 (n=20)	9 (n=35)	6 (n=3)	11 (n=151)
Clothes Dryers	7 (n=20)	9 (n=35)	6 (n=3)	10 (n=151)

Table E-0-69: Average Age of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Master Meter Only	Master Meter with Tenant Sub	Tenant Meter Only	Tenant Meter with Common Area Meter
Clothes Washers	5 (n=17)	6 (n=29)	4 (n=3)	6 (n=119)
Clothes Dryers	5 (n=17)	6 (n=29)	4 (n=3)	6 (n=120)

Table E-0-70: Clothes Dryer Fuel Type

Clothes Dryer Fuel	Master Meter Only (n=20)	Master Meter with Tenant Sub (n=32)	Tenant Meter Only (n=3)	Tenant Meter with Common Area Meter (n=147)
Electricity	35.1%	30.3%	39.0%	16.5%
Natural Gas	64.9%	69.7%	61.0%	83.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

E.2.5   Lighting

E.2.5.1   In-Unit Lighting

Table E-0-71: Weighted Average In-Unit Lighting Rank

Lighting Technology	Master Meter Only (n=23)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=275)
Incandescent	4.15	3.71	4.38	3.58
CFLs	3.81	3.58	4.11	3.06
Fluorescent Tubes	3.30	4.30	3.97	4.31
LED Bulbs	4.23	3.07	4.02	3.30
LED Tubes	4.38	4.74	4.14	4.62

Table E-0-72: In-Unit Lighting Controls

Lighting Control Type	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
Dimmers	0.0%	6.3%	12.5%	4%
Occupancy Sensors	0.0%	0.0%	3.9%	3.7%
Timers	0.0%	0.3%	0.0%	2.5%
Daylighting	0.0%	0.0%	0.0%	0.8%
On/Off Switch	11.2%	4.1%	6.5%	25%
None	85.6%	78.6%	62%	64.6%

E.2.5.2 Interior Common Area Lighting

Table E-0-73: Interior Common Area Lighting

Interior Common Area Lighting	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=23)	Tenant Meter with Common Area Meter (n=278)
No	2.4%	5.2%	44.3%	7.2%
Yes	97.6%	94.8%	55.7%	92.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table E-0-74: Weighted Average Interior Common Area Lighting Rank

Lighting Technology	Master Meter Only (n=22)	Master Meter with Tenant Sub (n=48)	Tenant Meter Only (n=11)	Tenant Meter with Common Area Meter (n=260)
Incandescent	5.81	4.99	5.10	5.00
CFLs	2.89	4.88	4.77	4.32
Fluorescent Tubes	4.63	5.08	5.42	4.20
HID	5.52	5.93	5.07	5.78
LED Bulbs	4.63	3.51	5.32	3.88
LED Tubes	4.81	5.19	5.52	5.03

Table E-0-75: Interior Common Area Lighting Controls

Lighting Control Type	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=48)	Tenant Meter Only (n=12)	Tenant Meter with Common Area Meter (n=261)
Dimmers	22.4%	13.1%	0.0%	0.6%
Occupancy Sensors	30.1%	26.0%	19.1%	23.5%
Timers	16.2%	37.0%	3.5%	16.5%
Daylighting	5.9%	11.8%	3.5%	9.1%
On/Off Switch	11.2%	5.2%	5.2%	24.5%
Other	1.0%	0.0%	0.0%	0.4%
None	58.1%	38%	68.7%	38.2%

E.2.5.3   Exterior Lighting

Table E-0-76: Exterior Lighting Location

Location	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=50)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=279)
Parking Lot	81.9%	74.8%	58.9%	65.6%
Security Lighting	36.9%	65.5%	28.8%	69.2%
Sidewalk/Walkway Lighting	28.5%	46.4%	48.1%	52.0%
Decorative	34.7%	26.1%	3.0%	9.9%
Other Location	1.0%	4.1%	0.0%	0.2%
None	0.0%	4.1%	12.0%	4.3%

Table E-0-77: Exterior Lighting Technology

Location	Master Meter Only (n=24)	Master Meter with Tenant Sub (n=49)	Tenant Meter Only (n=22)	Tenant Meter with Common Area Meter (n=267)
Incandescent	3.5%	7.3%	43.8%	17.8%
CFLs	17.4%	8.6%	54.6%	26.8%
Fluorescent Tubes	34.3%	6.6%	3.4%	7.2%
HIDs	13.1%	39.6%	9.1%	34.0%
LED Bulbs	40.2%	62.0%	26.9%	43.3%
LED Tubes	14.8%	14.1%	0.0%	8.3%
Other	1.2%	1.4%	3.0%	10.2%

APPENDIX F: SUMMARY STATISTICS – GAS METERING TYPE

In addition to calculating summary statistics for building physical properties and equipment and end-use saturations across the entire state, ADM also segmented the summary statistics by gas meter type. Few respondents reported having master metered gas with tenant sub-meters or a mix of both tenant unit and master meters (<1%). Therefore, ADM focused solely on master meters, tenant meters, and tenant meters with common area meters. As with ADM's report of descriptive statistics by gas utility, this section exclusively reports responses for properties with gas service only.

Of the 380 properties that participated in the study, the following participants were immediately excluded from this appendix:

- One participant reported not knowing what type of gas metering structure was present at their property;

- Two participants reported not knowing if their property had gas service,

- And 30 participants reported not having gas service.

Of the remaining 347 participants, the number of sample points per gas meter type is presented in Table F-0-1. The categories "Master Meter with Tenant Sub-Meter" and "Mixed" had a limited number of responses and were excluded from being presented in this appendix.

Table F-0-1: Number of Sample Points by Gas Meter-Type

Meter-Type	Number of Sample Points
Master Meter Only	105
Master Meter with Tenant Sub	1
Tenant Meter Only	55
Tenant Meter with Common Area Meter	183
Mixed	3
Total	**347**

F.1   PHYSICAL DESCRIPTION OF MULTIFAMILY PROPERTIES

F.1.1   Building Size and Occupancy

Table F-0-2: Number of Buildings per Complex

Meter-Type	Average Number of Buildings
Master Meter Only (n=100)	20.49
Tenant Meter Only (n=52)	7.32
Tenant Meter with Common Area Meter (n=175)	7.74

Table F-0-3: Number of Floors per Building

Meter-Type	Average Number of Floors
Master Meter Only (n=104)	4.43
Tenant Meter Only (n=55)	3.12
Tenant Meter with Common Area Meter (n=183)	3.22

Table F-0-4: Average Square Footage by Unit-Type

Unit-Type	Master Meter Only	Tenant Meter Only	Tenant Meter with Common Area Meter
Studio	470 (n=44)	400 (n=2)	482 (n=41)
1 Bedroom	748 (n=97)	708 (n=38)	713 (n=160)
2 Bedroom	1,010 (n=83)	1,022 (n=48)	980 (n=175)
3 Bedroom	1,347 (n=22)	1,454 (n=24)	1,249 (n=64)
4 Bedroom	1,402 (n=5)	1,121 (n=4)	1,703 (n=7)
5 Bedroom	N/A	N/A	2,028 (n=2)

Table F-0-5: Average Number of Tenants by Unit-Type

Unit-Type	Master Meter Only	Tenant Meter Only	Tenant Meter with Common Area Meter
Studio	23 (n=43)	17 (n=2)	16 (n=42)
1 Bedroom	76 (n=100)	49 (n=38)	59 (n=161)
2 Bedroom	46 (n=88)	41 (n=48)	65 (n=176)
3 Bedroom	43 (n=25)	15 (n=25)	18 (n=65)
4 Bedroom	4 (n=6)	4 (n=4)	10 (n=7)
5 Bedroom	32 (n=1)	N/A	3 (n=2)

Table F-0-6: Average Owner-Occupancy and Vacancy Rate

Measure	Master Meter Only	Tenant Meter Only	Tenant Meter with Common Area Meter
Percent Owner-Occupied	15% (n=99)	19% (n=54)	12% (n=183)
Percent Vacancy	25% (n=103)	21% (n=53)	13% (n=181)

F.1.2 Building Shell, Construction Year and Construction Materials

Table F-0-7: Construction Year

Construction Year	Master Meter Only (n=103)	Tenant Meter Only (n=54)	Tenant Meter with Common Area Meter (n=172)
Before 1940	9.2%	4.6%	9.7%
1940 - 1949	4.5%	16%	8.2%
1950 - 1959	7.5%	17.1%	7.3%
1960 - 1969	31.8%	8.3%	8.4%
1970 - 1979	14%	5.6%	8.2%
1980 - 1989	4.3%	1.2%	6.3%
1990 - 1999	1.3%	5.3%	3.1%
2000 - 2009	8.3%	17.2%	12.7%
2010 - 2014	4.6%	22.7%	11.2%
2015	0.0%	1.9%	6.3%
2016	5.1%	0.0%	8.1%
2017	5.4%	0.0%	4.6%
2018	3.9%	0.0%	5.8%

Table F-0-8: Major Construction in the Past 10 Years

Major Construction <= 10 Years	Master Meter Only (n=104)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=180)
No	67.9%	77.9%	80.6%
Yes	32.1%	22.1%	19.4%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-9: Year of Last Major Construction

Year of Construction	Master Meter Only (n=37)	Tenant Meter Only (n=10)	Tenant Meter with Common Area Meter (n=36)
2008-2014	22.2%	45.9%	24.8%
2015	14.3%	11.4%	13.9%
2016	8.0%	0.0%	8.7%
2017	4.3%	17.8%	11.8%
2018	51.1%	24.9%	40.8%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-10: Exterior Wall Material

Exterior Wall Material	Master Meter Only (n=93)	Tenant Meter Only (n=52)	Tenant Meter with Common Area Meter (n=176)
Aluminum, Asbestos, Plastic or Wood Materials (Siding, Shingle Tiles, or Shakes)	11.2%	18.8%	34.1%
Brick	48%	32.1%	34.5%
Concrete Block or Poured Concrete	17.9%	29.6%	16.2%
No One Major Type	0.1%	0.0%	0.0%
Other	6.5%	13%	12.2%
Pre-Cast Concrete Panels	3.6%	5.1%	1.6%
Sheet Metal Panels	10.2%	0.0%	0.6%
Window or Vision Glass (Glass that can be Seen Through)	2.5%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-11: Building Shape

Building Shape	Master Meter Only (n=95)	Tenant Meter Only (n=52)	Tenant Meter with Common Area Meter (n=181)
C-Shaped	0.0%	0.0%	0.2%
E-Shaped	0.0%	0.0%	0.6%
G-Shaped	0.0%	0.0%	0.2%
H-Shaped	2.1%	7%	4.3%
L-Shaped	6.2%	2.3%	6.8%
M-Shaped	0.0%	0.0%	0.8%
No One Major Type	2.4%	0.0%	1.5%
Other	0.6%	1%	1.2%
Rectangle	57.3%	63.6%	57.6%
Rectangle or Square with an Interior Courtyard	5.9%	12.6%	2.5%
Square	15%	9.1%	12.5%
T-Shaped	0.5%	0.0%	1%
U-Shaped	9.5%	4.4%	10.8%
Y-Shaped	0.7%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-12: Roofing Material

Roofing Material	Master Meter Only (n=92)	Tenant Meter Only (n=49)	Tenant Meter with Common Area Meter (n=179)
Aluminum Top Coat with a Felt Layer	0.0%	0.0%	0.8%
Asphalt, Fiberglass, or Other Shingles	41.3%	44.8%	42.2%
Built-Up (Tar, Felts, or Fiberglass and a Ballast, Such as Stone)	19.0%	12.0%	20.8%
Concrete	10.5%	5.7%	3.1%
Fiberglass and Rubber Membrane	0.3%	0.0%	0.0%
Metal Surfacing	2.4%	0.0%	2.4%
Plastic, Rubber, or Synthetic Sheeting (Single or Multiple Ply)	13.1%	14.3%	13.9%
Slate or Tile Shingles	9.7%	15.3%	13.1%
Wood Shingles, Shakes, or Other Wooden Materials	3.8%	7.9%	3.7%
Total	**100.0%**	**100.0%**	**100.0%**

F.1.3 Windows

Table F-0-13: Exterior Wall Window Coverage

Exterior Wall Window Coverage	Master Meter Only (n=91)	Tenant Meter Only (n=49)	Tenant Meter with Common Area Meter (n=177)
1% or less	0.0%	12.2%	3.5%
2% to 10%	23.1%	43.8%	19.2%
11% to 25%	53.8%	32.2%	49.8%
26% to 50%	15.5%	7.5%	20.2%
51% to 75%	5.2%	4.2%	6.5%
76% to 100%	2.4%	0.0%	0.7%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-14: Equal Window Coverage for All Walls

Equal Window Coverage for All Walls	Master Meter Only (n=95)	Tenant Meter Only (n=52)	Tenant Meter with Common Area Meter (n=181)
No	18.1%	21.8%	17.3%
Yes	81.9%	78.2%	82.7%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-15: Amount of Glass Area on Sunlight-Facing Walls

Glass Area on Sunlight-Facing Walls	Master Meter Only (n=13)	Tenant Meter Only (n=13)	Tenant Meter with Common Area Meter (n=26)
About the same as non-sunlight facing walls	55.0%	52.0%	51.2%
Less glass area than non-sunlight facing walls	25.5%	26.5%	20.6%
More glass area than non-sunlight facing walls	19.5%	21.4%	28.2%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-16: Single-Layer or Multi-Layer Windows

Window-Type	Master Meter Only (n=93)	Tenant Meter Only (n=50)	Tenant Meter with Common Area Meter (n=177)
Combination of both types	8.3%	7.2%	2.4%
Multi-layer	68.4%	81.2%	84.2%
Single layer	23.2%	11.6%	13.4%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-17: Presence of Low-E Windows

Low-E Windows	Master Meter Only (n=67)	Tenant Meter Only (n=37)	Tenant Meter with Common Area Meter (n=146)
No	75.5%	77.5%	65.1%
Yes	24.5%	22.5%	34.9%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-18: Presence of Window Types

Window-Type	Master Meter Only (n=95)	Tenant Meter Only (n=52)	Tenant Meter with Common Area Meter (n=181)
Clear	96.7%	98.4%	98.5%
Tinted	3.2%	4%	2.7%
Reflective	0.0%	11.9%	0.0%
Opaque	0.0%	0.0%	1.0%

F.1.4 Solar Panels

Table F-0-19: Solar Panels Present on Property

Solar Panels	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
No Solar Panels	92.5%	99.2%	93.6%
Roof-Mounted Solar Panels	6.4%	0.0%	4.9%
Parking Structure Solar Panels	0.0%	0.0%	0.0%

F.1.5 Roofs

Table F-0-20: Roof Pitch

Roof Pitch	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
Flat	47.6%	34.6%	41.5%
Pitched	52.4%	65.4%	58.5%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-21: Percent Roof Shading

Percent Shading	Master Meter Only (n=104)	Tenant Meter Only (n=54)	Tenant Meter with Common Area Meter (n=181)
0%-25%	90.3%	95.6%	83.5%
26%-50%	9.7%	4.4%	14.8%
51%-75%	0.0%	0.0%	1.8%
75%-100%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

F.1.6 Parking Lots

Table F-0-22: Types of Parking Available

Parking Type	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
Open Lot	82.5%	68.2%	69.2%
Garage	25.1%	26.6%	27.6%
Carport	2.9%	13.5%	1.8%
Other	11.7%	5.6%	6.9%
None	10.2%	18.3%	12.4%

Table F-0-23: Number of Parking Spaces per Property

Meter-Type	Average Number of Parking Spaces
Master Meter Only (n=89)	136.60
Tenant Meter Only (n=40)	129.23
Tenant Meter with Common Area Meter (n=145)	172.69

Table F-0-24: EV Stations Present

EV Stations Present	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
No	94.2%	100.0%	96.0%
Yes	5.8%	0.0%	4.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-25: Average Number of EV Stations

Meter-Type	Average Number of EV Stations
Master Meter Only (n=3)	3.33
Tenant Meter Only (n=0)	0.00
Tenant Meter with Common Area Meter (n=8)	4.41

F.1.7 Common Areas

Table F-0-26: Enclosed Common Areas Present

Enclosed Common Areas	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
No	28.6%	73.4%	33.1%
Yes	71.4%	26.6%	66.9%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-27: Presence of Different Common Area Types

Space-Type	Master Meter Only (n=71)	Tenant Meter Only (n=17)	Tenant Meter with Common Area Meter (n=112)
Boiler Room	60.3%	33.0%	40.5%
Club House	18.2%	5.1%	25.3%
Community Center	34.1%	11.2%	35.6%
Gym	22.3%	13.8%	45.7%
Swimming Pool	17.5%	17.6%	17.5%
Laundry	78.3%	42.0%	52.8%
Equipment Shed	31.0%	89.1%	44.7%
Rental Office	62.3%	60.9%	72.2%
Storage Units	33.7%	31.5%	26.3%
Other	0.7%	0.0%	12.7%

F.2   EQUIPMENT AND END-USE SATURATIONS

F.2.1   HVAC

F.2.1.1   *Heating*

Table F-0-28: Available Heating Types

Heating Type	Master Meter Only (n=94)	Tenant Meter Only (n=52)	Tenant Meter with Common Area Meter (n=181)
Central Gas Furnace	21.9%	24.5%	29.2%
Steam Boiler	4.8%	11.4%	10.3%
Hot Water Boiler	63.2%	40.4%	29.2%
District Steam	0.0%	0.0%	0.0%
GSHP	3.0%	0.0%	4.6%
Individual Gas Oil Furnace	2.1%	33.3%	25.5%
Electric Baseboards	10.0%	0.0%	5.1%

Table F-0-29: Primary Heating Fuel-Type

Heating Fuel-Type	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
Boiler	0.4%	0.0%	0.0%
Electricity	19.6%	0.0%	5.3%
Mixed: Electric & Gas	0.0%	0.0%	0.3%
Natural Gas	80%	100%	94.4%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-30: Primary Heating Equipment Type

Heating Equipment-Type	Master Meter Only (n=95)	Tenant Meter Only (n=51)	Tenant Meter with Common Area Meter (n=179)
ASHP	6.8%	3.2%	2.9%
Baseboard: Electric	13.9%	0.6%	7.2%
Baseboard: Gas	6.5%	2.2%	5.3%
Baseboard: Hot Water	9.9%	0.0%	2.2%
Baseboard: Unknown Fuel Type	1.9%	0.0%	0.0%
Convectors	1.5%	2.2%	0.0%
Forced Air Furnace	12.6%	57.5%	48.2%
Hot Water Boiler	1.5%	0.0%	0.0%
No One Major Type	2.4%	4.7%	1.6%
Other	0.0%	0.0%	1.7%
PTAC	6.4%	0.0%	1.9%
Radiators	35.7%	29.5%	28.9%
Wood or Coal Burning Stove	0.9%	0.0%	0.0%

Table F-0-31: Average Age of Heating Equipment

Heating Equipment-Type	Master Meter Only	Tenant Meter Only	Tenant Meter with Common Area Meter
Central Heating	13 (n=81)	10 (n=32)	10 (n=121)
Tenant-Unit Heating	8 (n=10)	10 (n=17)	9 (n=49)

Table F-0-32: EnergyStar Certified Heating Equipment

EnergyStar Certified	Master Meter Only (n=87)	Tenant Meter Only (n=50)	Tenant Meter with Common Area Meter (n=159)
No	38.4%	19.8%	27.2%
Yes: All	48.3%	66.4%	57.7%
Yes: Some	13.3%	13.8%	15.1%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-33: Annual Tune-Up of Heating Equipment

Annual Tune-Up	Master Meter Only (n=102)	Tenant Meter Only (n=54)	Tenant Meter with Common Area Meter (n=181)
No	6.2%	20.5%	13.7%
Yes: Heating Contractor	43.8%	43.1%	42.8%
Yes: Staff Person	50.0%	36.3%	43.5%
Total	**100.0%**	**100.0%**	**100.0%**

F.2.1.2   Cooling

Table F-0-34: Available Cooling Types

Available Cooling Types	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
Central Chiller	6.4%	4.1%	2.0%
Individual Units	72.9%	64.3%	73.7%
No Cooling	21.7%	28.1%	24.5%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-35: Primary Cooling Equipment Type

Equipment Type	Master Meter Only (n=100)	Tenant Meter Only (n=53)	Tenant Meter with Common Area Meter (n=181)
Central Chiller	3.8%	4.5%	1.7%
Heat Pump	0.4%	0.0%	0.0%
Individual RAC	73.3%	35.6%	46.9%
No One Major Type	0.0%	0.0%	0.7%
None	1.7%	3.8%	0.8%
Other	3.6%	6.5%	2.4%
Packaged AC - Roof Mounted DX	2.9%	20.5%	9.4%
PTAC	5.4%	0.6%	2.5%
Residential Split System - DX	7.6%	28.5%	35.5%
Wall AC Units	1.4%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-36: Average Age of Cooling Equipment

Cooling Equipment-Type	Master Meter Only	Tenant Meter Only	Tenant Meter with Common Area Meter
Central Cooling	14 (n=6)	9 (n=2)	8 (n=4)
Tenant-Unit Cooling	5 (n=53)	8 (n=38)	6 (n=122)

Table F-0-37: EnergyStar Certified Cooling Equipment

EnergyStar Certified	Master Meter Only (n=85)	Tenant Meter Only (n=47)	Tenant Meter with Common Area Meter (n=148)
No	14.4%	16.9%	17.7%
Yes: All	47.9%	54.9%	58.4%
Yes: Some	37.6%	28.2%	23.8%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-38: Annual Tune-Up of Cooling Equipment

Annual Tune-Up	Master Meter Only (n=103)	Tenant Meter Only (n=54)	Tenant Meter with Common Area Meter (n=177)
No	46.6%	53%	43%
Yes: AC Contractor	11.6%	15.9%	20.2%
Yes: Staff Person	41.9%	31.1%	36.8%
Total	**100.0%**	**100.0%**	**100.0%**

F.2.1.3 Thermostats

Table F-0-39: Thermostat Equipment Type

Equipment Type	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
Simple On/Off	7.5%	10.4%	8.5%
Simple Setpoint	68.9%	43.3%	49.7%
Programmable Thermostat	7.9%	29.1%	35.2%
Smart Thermostat	1.9%	3.3%	2.2%
No Tenant Thermostat	14.3%	20.2%	15.8%

Table F-0-40: Thermostat Control Type

Control Type	Master Meter Only (n=80)	Tenant Meter Only (n=48)	Tenant Meter with Common Area Meter (n=142)
Both	37.9%	67.6%	75.8%
Cooling	4.7%	0.0%	1.8%
Heating	57.4%	32.4%	22.3%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-41: Number of Thermostats per Unit

Number of Thermostats	Master Meter Only (n=81)	Tenant Meter Only (n=50)	Tenant Meter with Common Area Meter (n=146)
1	83.1%	92.6%	82.5%
2 or more	16.9%	7.4%	17.5%
Total	**100.0%**	**100.0%**	**100.0%**

F.2.2 Water Heating

Table F-0-42: Building-Centralized Hot Water

Building-Centralized Hot Water	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=181)
No	18.1%	53.4%	58.8%
Yes	81.9%	46.6%	41.2%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-43: Primary Water Heating Equipment Type

Equipment Type	Master Meter Only (n=102)	Tenant Meter Only (n=54)	Tenant Meter with Common Area Meter (n=180)
Commercial Water Heaters	0.6%	0.0%	0.0%
Instantaneous Water Heater	3.5%	0.5%	8.7%
Part of Heating System Boiler	28.4%	3.4%	6.6%
Self-Contained Tank	41.4%	65.9%	56.8%
Separate Water Heating Boiler	26.1%	30.2%	27.9%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-44: Primary Water Heating Fuel Type

Equipment Type	Master Meter Only (n=104)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=180)
Electricity	12.3%	5.5%	15.4%
Natural Gas	87.7%	94.5%	84%
No One Major Type	0.0%	0.0%	0.3%

Table F-0-45: Average Age of Building-Centralized Water Heating Equipment

Utility	Average Age
Master Meter Only (n=83)	10.16
Tenant Meter Only (n=48)	8.43
Tenant Meter with Common Area Meter (n=168)	7.70

F.2.3 In-Unit Appliances

Table F-0-46: Appliances Provided by the Property

Appliance Type	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
Refrigerator	93.9%	96.4%	97.7%
Stove	93.8%	93.1%	99.6%
Oven	83.5%	86.0%	87.5%
Dishwasher	35.8%	51.3%	57.0%
Microwave	39.3%	41.6%	45.2%
In Unit Clothes Washer	15.0%	47.9%	40.8%
In Unit Clothes Dryer	15.0%	47.9%	41.5%
In Unit Water Heater	15.2%	32.0%	42.8%
Window AC or RAC	50.6%	10.8%	27.3%
Nothing	0.7%	0.0%	0.0%

Table F-0-47: EnergyStar Appliances

Appliance Type	Master Meter Only	Tenant Meter Only	Tenant Meter with Common Area Meter
Refrigerator	83.3% (n=91)	80% (n=50)	74.1% (n=154)
Dishwasher	64.1% (n=30)	78.6% (n=31)	83.7% (n=89)
In Unit Clothes Washer	100.0% (n=9)	94.4% (n=26)	93.2% (n=56)
In Unit Clothes Dryer	100.0% (n=9)	94.4% (n=26)	90.0% (n=58)
In Unit Water Heater	100.0% (n=8)	98.9% (n=23)	94.1% (n=62)
Window AC or RAC	62.7% (n=42)	60% (n=8)	70.6% (n=47)

Table F-0-48: Age of In-Unit Refrigerators

Age Range	Master Meter Only (n=98)	Tenant Meter Only (n=52)	Tenant Meter with Common Area Meter (n=164)
Less than 2 years old	18.1%	9.8%	17.6%
2 to 4 years old	15.5%	25.9%	29.2%
5 to 9 years old	56.4%	51.3%	41.8%
10 to 14 years old	8.5%	11.4%	10.5%
15 to 19 years old	1.5%	1.7%	0.9%
20 years old or more	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-49: Age of In-Unit Dishwashers

Age Range	Master Meter Only (n=29)	Tenant Meter Only (n=31)	Tenant Meter with Common Area Meter (n=93)
Less than 2 years old	25.2%	1.1%	19.7%
2 to 4 years old	8.6%	23.0%	34.2%
5 to 9 years old	42.1%	50.7%	33.3%
10 to 14 years old	24.1%	21.2%	11.9%
15 to 19 years old	0.0%	4.0%	1.0%
20 years old or more	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-50: Age of In-Unit Clothes Washers

Age Range	Master Meter Only (n=9)	Tenant Meter Only (n=27)	Tenant Meter with Common Area Meter (n=62)
Less than 2 years old	81.2%	1.0%	24.2%
2 to 4 years old	11.2%	19.6%	35.2%
5 to 9 years old	7.6%	49.1%	30.2%
10 to 14 years old	0.0%	26.1%	4.2%
15 to 19 years old	0.0%	4.2%	6.2%
20 years old or more	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-51: Age of In-Unit Clothes Dryers

Age Range	Master Meter Only (n=9)	Tenant Meter Only (n=25)	Tenant Meter with Common Area Meter (n=62)
Less than 2 years old	81.2%	0.0%	25.2%
2 to 4 years old	11.2%	19.7%	31.8%
5 to 9 years old	7.6%	48.7%	32.1%
10 to 14 years old	0.0%	26.4%	4.4%
15 to 19 years old	0.0%	5.2%	6.5%
20 years old or more	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-52: Age of In-Unit Water Heaters

Age Range	Master Meter Only (n=9)	Tenant Meter Only (n=23)	Tenant Meter with Common Area Meter (n=68)
Less than 2 years old	35.8%	1.6%	18.5%
2 to 4 years old	0.0%	13.1%	37.3%
5 to 9 years old	13.9%	39.8%	33.2%
10 to 14 years old	50.3%	37.3%	5.4%
15 to 19 years old	0.0%	8.2%	5.6%
20 years old or more	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-53: Age of In-Unit Window ACs and Room ACs

Age Range	Master Meter Only (n=42)	Tenant Meter Only (n=10)	Tenant Meter with Common Area Meter (n=54)
Less than 2 years old	12.6%	5.9%	3.3%
2 to 4 years old	15.7%	16.7%	26.0%
5 to 9 years old	66.8%	38.5%	61.5%
10 to 14 years old	4.9%	38.9%	9.2%
15 to 19 years old	0.0%	0.0%	0.0%
20 years old or more	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

F.2.4 Common Area Appliances

F.2.4.1 Common Area Kitchen Equipment

Table F-0-54: Common Area Kitchen Present

Common Area Kitchen Present	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
No	78.6%	96.1%	74.0%
Yes	21.4%	3.9%	26.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-55: Average Number of Common Area Kitchen Appliances

Equipment Type	Master Meter Only	Tenant Meter Only	Tenant Meter with Common Area Meter
Microwaves	2 (n=26)	1 (n=6)	2 (n=45)
Refrigerators	1 (n=30)	1 (n=6)	1 (n=48)
Stoves or Ovens	1 (n=25)	1 (n=2)	2 (n=21)

Table F-0-56: Average Age of Common Area Kitchen Appliances

Equipment Type	Master Meter Only	Tenant Meter Only	Tenant Meter with Common Area Meter
Refrigerators	5 (n=28)	7 (n=6)	5 (n=47)
Stoves or Ovens	6 (n=22)	5 (n=1)	7 (n=21)

Table F-0-57: Commercial Grade Stoves or Ovens

Commercial Grade Stoves or Ovens	Master Meter Only (n=25)	Tenant Meter Only (n=2)	Tenant Meter with Common Area Meter (n=22)
No	81.7%	100.0%	69.4%
Yes	18.3%	0.0%	30.6%
Total	**100.0%**	**100.0%**	**100.0%**

F.2.4.2 Common Area Pools/Spas

Table F-0-58: Common Area Filtered Pool Present

Common Area Filtered Pool	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
No	85.1%	91.2%	83.8%
Yes	14.9%	8.8%	16.2%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-59: Pool Heater

Pool Heater	Master Meter Only (n=11)	Tenant Meter Only (n=8)	Tenant Meter with Common Area Meter (n=24)
No	60.6%	75.4%	42.1%
Yes	39.4%	24.6%	57.9%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-60: Pool Heater Fuel

Pool Heater Fuel	Master Meter Only (n=3)	Tenant Meter Only (n=2)	Tenant Meter with Common Area Meter (n=11)
Electricity	66.7%	0.0%	7%
Natural Gas	33.3%	100.0%	93%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-61: Pool Cover

Pool Cover	Master Meter Only (n=4)	Tenant Meter Only (n=2)	Tenant Meter with Common Area Meter (n=11)
No	0.0%	0.0%	9.0%
Yes	100.0%	100.0%	91.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-62: VSD Pool Pump

VSD Pool Pump	Master Meter Only (n=10)	Tenant Meter Only (n=5)	Tenant Meter with Common Area Meter (n=19)
No	0.0%	40.0%	18.7%
Yes	100.0%	60.0%	81.3%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-63: Pool Timer

Pool Timer	Master Meter Only (n=11)	Tenant Meter Only (n=5)	Tenant Meter with Common Area Meter (n=20)
No	18.8%	41.7%	17.2%
Yes	81.2%	58.3%	82.8%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-64: Hot Tub, Spa, or Jacuzzi

Hot Tub, Spa, or Jacuzzi	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
No	97.4%	95.5%	96.3%
Yes	2.6%	4.5%	3.7%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-65: Hot Tub, Spa, or Jacuzzi Fuel

Hot Tub, Spa, or Jacuzzi Fuel	Master Meter Only (n=1)	Tenant Meter Only (n=1)	Tenant Meter with Common Area Meter (n=5)
Electricity	0.0%	0.0%	0.0%
Natural Gas	100.0%	100.0%	100.0%
Total	**100.0%**	**100.0%**	**100.0%**

F.2.4.3   Common Area Laundry

Table F-0-66: Common Area Laundry Facility

Common Area Laundry	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
No	21.2%	61.7%	59.3%
Yes	78.8%	38.3%	40.7%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-67: Owned or Leased Common Laundry Equipment

Owned or Leased	Master Meter Only (n=88)	Tenant Meter Only (n=17)	Tenant Meter with Common Area Meter (n=87)
Lease some and own some	1.7%	0.0%	1.7%
Leased all	63.4%	86.6%	67.2%
Own all	34.9%	13.4%	31.1%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-68: Average Number of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Master Meter Only	Tenant Meter Only	Tenant Meter with Common Area Meter
Clothes Washers	10 (n=90)	9 (n=17)	15 (n=87)
Clothes Dryers	10 (n=90)	8 (n=17)	14 (n=87)

Table F-0-69: Average Age of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Master Meter Only	Tenant Meter Only	Tenant Meter with Common Area Meter
Clothes Washers	6 (n=75)	5 (n=15)	6 (n=65)
Clothes Dryers	6 (n=75)	6 (n=15)	6 (n=66)

Table F-0-70: Clothes Dryer Fuel Type

Clothes Dryer Fuel	Master Meter Only (n=87)	Tenant Meter Only (n=17)	Tenant Meter with Common Area Meter (n=83)
Electricity	29%	7.2%	24.7%
Natural Gas	71%	92.8%	75.3%
Total	**100.0%**	**100.0%**	**100.0%**

F.2.5   Lighting

F.2.5.1   In-Unit Lighting

Table F-0-71: Weighted Average In-Unit Lighting Rank

Lighting Technology	Master Meter Only (n=103)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
Incandescent	3.50	3.75	3.64
CFLs	3.10	3.36	3.39
Fluorescent Tubes	4.26	4.51	4.35
LED Bulbs	3.50	3.04	3.10
LED Tubes	4.57	4.59	4.65

Table F-0-72: In-Unit Lighting Controls

Lighting Control Type	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
Dimmers	1.9%	5.8%	4.2%
Occupancy Sensors	0.0%	3.8%	3.6%
Timers	2.0%	0.0%	3.2%
Daylighting	0.0%	2.8%	0.0%
On/Off Switch	21.7%	9.9%	25.4%
None	69.2%	74.1%	64.4%

F.2.5.2   Interior Common Area Lighting

Table F-0-73: Interior Common Area Lighting

Interior Common Area Lighting	Master Meter Only (n=105)	Tenant Meter Only (n=52)	Tenant Meter with Common Area Meter (n=183)
No	5.8%	33.8%	4.2%
Yes	94.2%	66.2%	95.8%
Total	**100.0%**	**100.0%**	**100.0%**

Table F-0-74: Weighted Average Interior Common Area Lighting Rank

Lighting Technology	Master Meter Only (n=100)	Tenant Meter Only (n=36)	Tenant Meter with Common Area Meter (n=175)
Incandescent	4.93	5.04	4.92
CFLs	4.44	4.63	4.31
Fluorescent Tubes	4.32	4.48	4.32
HID	5.77	5.39	5.82
LED Bulbs	4.13	4.14	3.62
LED Tubes	4.60	5.30	5.32

Table F-0-75: Interior Common Area Lighting Controls

Lighting Control Type	Master Meter Only (n=102)	Tenant Meter Only (n=37)	Tenant Meter with Common Area Meter (n=175)
Dimmers	4.2%	0.0%	1.2%
Occupancy Sensors	27.0%	12.1%	24.2%
Timers	16.4%	21.9%	17.3%
Daylighting	10.4%	7.3%	7.7%
On/Off Switch	22.3%	16.3%	24.7%
Other	0.4%	0.0%	0.0%
None	35.7%	49.1%	39.0%

F.2.5.3 Exterior Lighting

Table F-0-76: Exterior Lighting Location

Location	Master Meter Only (n=105)	Tenant Meter Only (n=55)	Tenant Meter with Common Area Meter (n=183)
Parking Lot	71.4%	57.6%	70.1%
Security Lighting	73.2%	61.8%	62.4%
Sidewalk/Walkway Lighting	39.6%	45.3%	52.5%
Decorative	14.1%	5.7%	11.6%
Other Location	2.3%	0.0%	0.0%
None	3.1%	12.5%	3.2%

Table F-0-77: Exterior Lighting Technology

Location	Master Meter Only (n=104)	Tenant Meter Only (n=47)	Tenant Meter with Common Area Meter (n=176)
Incandescent	9.6%	33.2%	17.3%
CFLs	21.4%	40.1%	26.8%
Fluorescent Tubes	8.0%	7.3%	7.0%
HIDs	47.5%	21.5%	34.2%
LED Bulbs	42.5%	38.6%	42.9%
LED Tubes	9.3%	1.0%	8.7%
Other	4.4%	0.0%	10.1%

APPENDIX G: SUMMARY STATISTICS – OWNERSHIP STRUCTURE

In addition to calculating summary statistics for building physical properties and equipment and end-use saturations across the entire state, ADM also segmented the summary statistics by ownership structure (i.e., whether properties were apartments, condos, or co-ops). Ownership structure was assessed by categorizing respondents' self-reported owner-occupancy rates. Properties that had a reported owner occupancy of 0% were categorized as "apartments." Properties with an owner occupancy of 100% were categorized as "condos." All other responses were categorized as "co-op."

The number of sample points by ownership structure is presented in Table G-0-1. Seven properties did not provide responses to the owner-occupancy rate question and were thus excluded from this appendix.

Table G-0-1: Number of Sample Points

Ownership Structure	Number of Sample Points
Apartment	283
Co-op	33
Condo	57
Total	**373**

G.1 PHYSICAL DESCRIPTION OF MULTIFAMILY PROPERTIES

G.1.1 Building Size and Occupancy

Table G-0-2: Number of Buildings per Complex

Ownership Structure	Average Number of Buildings
Apartment (n=268)	6.43
Co-op (n=32)	7.62
Condo (n=55)	48.57

Table G-0-3: Number of Floors per Building

Ownership Structure	Average Number of Floors
Apartment (n=282)	3.48
Co-op (n=33)	3.80
Condo (n=56)	3.81

Table G-0-4: Average Square Footage by Unit-Type

Unit-Type	Apartment	Co-Op	Condo
Studio	494 (n=73)	438 (n=9)	481 (n=11)
1 Bedroom	746 (n=236)	784 (n=30)	695 (n=55)
2 Bedroom	999 (n=246)	1,032 (n=31)	986 (n=54)
3 Bedroom	1,287 (n=73)	1,572 (n=11)	1,411 (n=28)
4 Bedroom	1,325 (n=11)	1,954 (n=1)	1,593 (n=5)
5 Bedroom	1,984 (n=3)	N/A	N/A

Table G-0-5: Average Number of Tenants by Unit-Type

Unit-Type	Apartment	Co-Op	Condo
Studio	18 (n=74)	26 (n=10)	13 (n=11)
1 Bedroom	57 (n=241)	113 (n=30)	93 (n=55)
2 Bedroom	45 (n=252)	102 (n=31)	68 (n=54)
3 Bedroom	15 (n=78)	24 (n=11)	54 (n=29)
4 Bedroom	3 (n=12)	23 (n=1)	5 (n=5)
5 Bedroom	21 (n=4)	N/A	N/A

Table G-0-6: Average Owner-Occupancy and Vacancy Rate

Measure	Apartment	Co-Op	Condo
Percent Owner-Occupied	0% (n=283)	31% (n=33)	100% (n=57)
Percent Vacancy	17% (n=278)	19% (n=32)	20% (n=56)

G.1.2 Building Shell, Construction Year and Construction Materials

Table G-0-7: Construction Year

Construction Year	Apartment (n=280)	Co-op (n=27)	Condo (n=52)
Before 1940	11.7%	7.2%	4.3%
1940 - 1949	5.5%	0.0%	14.5%
1950 - 1959	7.8%	9%	15.6%
1960 - 1969	15.4%	29.8%	20.8%
1970 - 1979	9.1%	11.6%	9%
1980 - 1989	5.4%	3.6%	2%
1990 - 1999	2.7%	8.8%	0.7%
2000 - 2009	11.7%	11.9%	16.1%
2010 - 2014	11.2%	13.3%	10.2%
2015	5.3%	0.0%	0.0%
2016	5.7%	0.0%	0.0%
2017	4.3%	0.0%	6.8%
2018	4.3%	4.8%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-8: Major Construction in the Past 10 Years

Major Construction <= 10 Years	Apartment (n=278)	Co-op (n=33)	Condo (n=57)
No	73.1%	75.4%	73.1%
Yes	26.9%	24.6%	26.9%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-9: Year of Last Major Construction

Year of Construction	Apartment (n=71)	Co-op (n=8)	Condo (n=12)
2008-2014	29.0%	8.6%	26.6%
2015	9.7%	38.1%	8.6%
2016	12.0%	2.3%	0.0%
2017	14.8%	3.6%	15.6%
2018	34.4%	47.5%	49.3%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-10: Exterior Wall Material

Exterior Wall Material	Apartment (n=264)	Co-op (n=26)	Condo (n=53)
Aluminum, Asbestos, Plastic or Wood Materials (Siding, Shingle Tiles, or Shakes)	32.2%	3.4%	2.9%
Brick	33.9%	71.3%	59.3%
Concrete Block or Poured Concrete	16.3%	11.6%	25%
No One Major Type	0.1%	0.0%	0.0%
Other	11.1%	9.6%	1.2%
Pre-Cast Concrete Panels	2.4%	0.0%	3%
Sheet Metal Panels	1.8%	4.2%	8.7%
Window or Vision Glass (Glass that can be Seen Through)	0.6%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-11: Building Shape

Building Shape	Apartment (n=271)	Co-op (n=27)	Condo (n=55)
C-Shaped	0.0%	0.8%	0.0%
E-Shaped	0.0%	0.0%	2.2%
G Shaped	0.1%	0.0%	0.0%
H-Shaped	0.8%	13.5%	12.8%
J-Shaped	0.7%	0.0%	0.0%
L-Shaped	5.8%	0.0%	2.8%
M-Shaped	0.5%	0.0%	0.0%
No One Major Type	1.2%	0.0%	0.0%
Other	0.8%	2.2%	0.8%
Rectangle	63.5%	68.4%	37.6%
Rectangle or Square with an Interior Courtyard	3.7%	0.0%	25.1%
Square	11.6%	3.4%	5%
T-Shaped	1.5%	0.0%	5.1%
U-Shaped	9.6%	11.7%	8.6%
Y-Shaped	0.3%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-12: Roofing Material

Roofing Material	Apartment (n=265)	Co-op (n=27)	Condo (n=54)
Aluminum Top Coat with a Felt Layer	0.0%	0.0%	7.6%
Asphalt, Fiberglass, or Other Shingles	40.3%	60.7%	42.7%
Built-Up (Tar, Felts, or Fiberglass and a Ballast, Such as Stone)	18%	22.9%	6.8%
Concrete	4.4%	0.0%	7.6%
Fiberglass and Rubber Membrane	0.1%	0.0%	0.0%
Metal Surfacing	2.5%	0.0%	0.0%
Plastic, Rubber, or Synthetic Sheeting (Single or Multiple Ply)	12.8%	4.1%	12.4%
Slate or Tile Shingles	15.8%	7.0%	10.2%
Wood Shingles, Shakes, or Other Wooden Materials	6.0%	5.3%	12.8%
Total	**100.0%**	**100.0%**	**100.0%**

G.1.3 Windows

Table G-0-13: Exterior Wall Window Coverage

Exterior Wall Window Coverage	Apartment (n=261)	Co-op (n=26)	Condo (n=53)
1% or less	1.6%	0.0%	9.3%
2% to 10%	29.4%	16.8%	8.6%
11% to 25%	42.0%	58.4%	62.4%
26% to 50%	20.6%	24.8%	19.5%
51% to 75%	5.4%	0.0%	0.2%
76% to 100%	1.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-14: Equal Window Coverage for All Walls

Equal Window Coverage for All Walls	Apartment (n=270)	Co-op (n=27)	Condo (n=55)
No	18.3%	3.4%	7.4%
Yes	81.7%	96.6%	92.6%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-15: Amount of Glass Area on Sunlight-Facing Walls

Glass Area on Sunlight-Facing Walls	Apartment (n=49)	Co-op (n=1)	Condo (n=5)
About the same amount as non-sunlight facing walls	52.9%	0.0%	32.5%
Less glass area as non-sunlight facing walls	13.7%	100.0%	0.0%
More glass area as non-sunlight facing walls	33.4%	0.0%	67.5%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-16: Single-Layer or Multi-Layer Windows

Window-Type	Apartment (n=265)	Co-op (n=27)	Condo (n=52)
Combination of both types	4.4%	5.3%	7.6%
Multi-layer	79.8%	93.9%	80.3%
Single layer	15.7%	0.8%	12.1%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-17: Presence of Low-E Windows

Low-E Windows	Apartment (n=202)	Co-op (n=21)	Condo (n=48)
No	61.6%	72.9%	88.6%
Yes	38.4%	27.1%	11.4%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-18: Presence of Window Types

Window-Type	Apartment (n=271)	Co-op (n=27)	Condo (n=55)
Clear	97.9%	100.0%	100.0%
Tinted	3.7%	0.0%	0.0%
Reflective	1.8%	0.0%	5.1%
Opaque	0.6%	0.0%	0.0%

G.1.4 Solar Panels

Table G-0-19: Solar Panels Present on Property

Solar Panels	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
No Solar Panels	94.8%	94.7%	85.8%
Roof-Mounted Solar Panels	4.7%	0.8%	6.8%
Parking Structure Solar Panels	0.0%	0.0%	0.0%

G.1.5 Roofs

Table G-0-20: Roof Pitch

Roof Pitch	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
Flat	42.8%	32.6%	34.1%
Pitched	57.2%	67.4%	65.9%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-21: Percent Roof Shading

Percent Shading	Apartment (n=279)	Co-op (n=33)	Condo (n=57)
0%-25%	85.3%	92.2%	84.5%
26%-50%	13.1%	6.6%	9.1%
51%-75%	1.6%	1.2%	1.9%
75%-100%	0.0%	0.0%	4.6%
Total	**100.0%**	**100.0%**	**100.0%**

G.1.6 Parking Lots

Table G-0-22: Types of Parking Available

Parking Type	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
Open Lot	75.4%	68.3%	71.7%
Garage	23.3%	39.1%	42%
Carport	2.1%	5.7%	9.2%
Other	7.5%	13.4%	9.7%
None	9.7%	14%	10.1%

Table G-0-23: Number of Parking Spaces per Property

Ownership Structure	Average Number of Parking Spaces
Apartment (n=232)	126.56
Co-op (n=23)	337.75
Condo (n=43)	220.01

Table G-0-24: EV Stations Present

EV Stations Present	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
No	96.4%	90.3%	93.2%
Yes	3.6%	9.7%	6.8%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-25: Average Number of EV Stations

Ownership Structure	Average Number of EV Stations
Apartment (n=10)	2.98
Co-op (n=2)	7.94
Condo (n=1)	4.00

G.1.7 Common Areas

Table G-0-26: Enclosed Common Areas Present

Enclosed Common Areas	Apartment (n=283)	Co-op (n=32)	Condo (n=57)
No	42.1%	23.4%	29.2%
Yes	57.9%	76.6%	70.8%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-27: Presence of Different Common Area Types

Space-Type	Apartment (n=179)	Co-op (n=19)	Condo (n=26)
Boiler Room	46.3%	42.2%	53.7%
Club House	21.0%	27.8%	26.6%
Community Center	33.6%	21.1%	28.8%
Gym	38.1%	35.2%	33.2%
Swimming Pool	15.1%	31.4%	25.2%
Laundry	58.7%	54.9%	58.5%
Equipment Shed	39.1%	38.3%	72.2%
Rental Office	63.9%	89.6%	86.8%
Storage Units	31.1%	27.6%	24.0%
Other	10.7%	0.0%	0.0%

G.2 EQUIPMENT AND END-USE SATURATIONS

G.2.1 HVAC

G.2.1.1 Heating

Table G-0-28: Available Heating Types

Heating Type	Apartment (n=269)	Co-op (n=27)	Condo (n=55)
Central Gas Furnace	28.6%	12.3%	27.5%
Steam Boiler	8.6%	6.0%	13.4%
Hot Water Boiler	32.7%	33.9%	36.1%
District Steam	0.0%	0.0%	0.0%
GSHP	1.8%	25.2%	0.0%
Individual Gas Oil Furnace	24.7%	9.4%	18.3%
Electric Baseboards	11.6%	13.3%	6.1%

Table G-0-29: Primary Heating Fuel-Type

Heating Fuel-Type	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
Boiler	0.1%	0.0%	0.0%
Electricity	14.1%	16.6%	17.0%
Mixed: Electric & Gas	0.2%	0.0%	0.0%
Natural Gas	85.3%	83.4%	83.0%
Oil	0.3%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-30: Primary Heating Equipment Type

Heating Equipment-Type	Apartment (n=269)	Co-op (n=27)	Condo (n=54)
ASHP	5.0%	4.1%	0.0%
Baseboard: Electric	12.8%	14.1%	7.1%
Baseboard: Gas	2.5%	8.0%	11.3%
Baseboard: Hot Water	3.3%	0.0%	4.3%
Baseboard: Unknown Fuel Type	0.9%	4.0%	0.0%
Convectors	0.4%	0.0%	5.1%
Forced Air Furnace	42.7%	16.4%	38.7%
Hot Water Boiler	0.4%	0.0%	0.0%
No One Major Type	4.4%	10.5%	0.0%
Other	0.6%	5.3%	0.0%
PTAC	3.8%	5.3%	0.0%
Radiators	22.8%	32.4%	33.6%
Wood or Coal Burning Stove	0.3%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-31: Average Age of Heating Equipment

Heating Equipment-Type	Apartment	Co-Op	Condo
Central Heating	11 (n=182)	15 (n=19)	12 (n=38)
Tenant-Unit Heating	9 (n=80)	9 (n=8)	9 (n=7)

Table G-0-32: EnergyStar Certified Heating Equipment

EnergyStar Certified	Apartment (n=248)	Co-op (n=27)	Condo (n=44)
No	28.4%	22.3%	35%
Yes: All	59.4%	27.4%	37.2%
Yes: Some	12.2%	50.3%	27.8%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-33: Annual Tune-Up of Heating Equipment

Annual Tune-Up	Apartment (n=278)	Co-op (n=32)	Condo (n=56)
No	12.3%	41.7%	21.7%
Yes: Heating Contractor	39.7%	44.8%	60.7%
Yes: Staff Person	48.0%	13.6%	17.6%
Total	**100.0%**	**100.0%**	**100.0%**

G.2.1.2 Cooling

Table G-0-34: Available Cooling Types

Available Cooling Types	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
Central Chiller	2.8%	0.0%	8.3%
Individual Units	75.9%	70.2%	74.4%
No Cooling	21.5%	29.8%	17.3%

Table G-0-35: Primary Cooling Equipment Type

Equipment Type	Apartment (n=275)	Co-op (n=32)	Condo (n=55)
Central Chiller	1.8%	2.3%	1.6%
Heat Pump	0.3%	2.4%	0.0%
Individual RAC	48.1%	53.7%	61.4%
Mini-Split Units	0.5%	0.0%	0.0%
No One Major Type	0.7%	3.8%	0.0%
None	1.4%	0.0%	0.7%
Other	2.9%	7.2%	12.2%
Packaged AC - Roof Mounted DX	9.2%	12.0%	6.9%
PTAC	4.3%	4.5%	0.0%
Residential Split System - DX	31.0%	10.7%	17.2%
Wall AC Units	0.0%	3.4%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-36: Average Age of Cooling Equipment

Cooling Equipment-Type	Apartment	Co-Op	Condo
Central Cooling	11 (n=9)	N/A	8 (n=2)
Tenant-Unit Cooling	6 (n=195)	8 (n=18)	6 (n=28)

Table G-0-37: EnergyStar Certified Cooling Equipment

EnergyStar Certified	Apartment (n=242)	Co-op (n=25)	Condo (n=37)
No	16.6%	27.2%	12.5%
Yes: All	58.6%	34.9%	28%
Yes: Some	24.8%	37.9%	59.4%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-38: Annual Tune-Up of Cooling Equipment

Annual Tune-Up	Apartment (n=277)	Co-op (n=31)	Condo (n=54)
No	38.9%	84.4%	61.8%
Yes: AC Contractor	17.2%	11.3%	24.7%
Yes: Staff Person	43.9%	4.3%	13.5%
Total	**100.0%**	**100.0%**	**100.0%**

G.2.1.3 Thermostats

Table G-0-39: Thermostat Equipment Type

Equipment Type	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
Simple On/Off	10.1%	11.6%	6.4%
Simple Setpoint	56.2%	46.6%	54.5%
Programmable Thermostat	31.3%	6.3%	21.5%
Smart Thermostat	0.5%	10%	2.7%
No Tenant Thermostat	8.7%	18.5%	19.9%

Table G-0-40: Thermostat Control Type

Control Type	Apartment (n=243)	Co-op (n=19)	Condo (n=33)
Both	61.3%	60.6%	79%
Cooling	1.9%	0.8%	4.4%
Heating	36.8%	38.5%	16.7%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-41: Number of Thermostats per Unit

Number of Thermostats	Apartment (n=247)	Co-op (n=21)	Condo (n=37)
1	86.1%	57.3%	54.9%
2 or more	13.9%	42.7%	45.1%
Total	**100.0%**	**100.0%**	**100.0%**

G.2.2 Water Heating

Table G-0-42: Building-Centralized Hot Water

Building-Centralized Hot Water	Apartment (n=280)	Co-op (n=32)	Condo (n=57)
No	55.1%	50.6%	46.9%
Yes	44.9%	49.4%	53.1%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-43: Primary Water Heating Equipment Type

Equipment Type	Apartment (n=277)	Co-op (n=33)	Condo (n=56)
Commercial Water Heaters	0.2%	0.0%	0.0%
Instantaneous Water Heater	5.9%	0.0%	2.6%
Part of Heating System Boiler	8.8%	11.4%	17.4%
Self-Contained Tank	61.0%	53.2%	68.0%
Separate Water Heating Boiler	24.1%	35.4%	12.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-44: Primary Water Heating Fuel Type

Equipment Type	Apartment (n=278)	Co-op (n=33)	Condo (n=57)
Electricity	17.5%	27.5%	28.0%
Natural Gas	81.9%	72.5%	72.0%
Oil	0.1%	0.0%	0.0%
Solar	0.1%	0.0%	0.0%
No One Major Type	0.4%	0.0%	0.0%

Table G-0-45: Average Age of Building-Centralized Water Heating Equipment

Ownership Type	Average Age
Apartment (n=251)	8.04
Co-op (n=29)	9.43
Condo (n=46)	9.63

G.2.3 In-Unit Appliances

Table G-0-46: Appliances Provided by the Property

Appliance Type	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
Refrigerator	99.0%	79.0%	80.1%
Stove	99.2%	83.4%	82.8%
Oven	89.9%	61.2%	66.5%
Dishwasher	52.4%	53.6%	51.0%
Microwave	47.2%	34.1%	50.1%
In Unit Clothes Washer	38.2%	35.6%	31.0%
In Unit Clothes Dryer	38.7%	35.6%	31.0%
In Unit Water Heater	41.1%	35.7%	39.8%
Window AC or RAC	30.0%	43.4%	46.2%
Nothing	0.0%	11.3%	0.0%

Table G-0-47: EnergyStar Appliances

Appliance Type	Apartment	Co-op	Condo
Refrigerator	82.1% (n=252)	67.4% (n=25)	55.5% (n=39)
Dishwasher	85.2% (n=135)	86.8% (n=13)	45.8% (n=20)
In Unit Clothes Washer	92.1% (n=85)	96.3% (n=9)	76% (n=8)
In Unit Clothes Dryer	91.1% (n=87)	96.3% (n=9)	76% (n=8)
In Unit Water Heater	93.4% (n=91)	100% (n=8)	74.1% (n=10)
Window AC or RAC	69.7% (n=79)	83.7% (n=10)	39.5% (n=19)

Table G-0-48: Age of In-Unit Refrigerators

Age Range	Apartment (n=273)	Co-op (n=27)	Condo (n=38)
Less than 2 years old	15.2%	3.7%	20.9%
2 to 4 years old	32.8%	0.0%	2.2%
5 to 9 years old	44.2%	76.9%	37.8%
10 to 14 years old	6.8%	16.1%	38.0%
15 to 19 years old	1.0%	2.0%	1.1%
20 years old or more	0.0%	1.3%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-49: Age of In-Unit Dishwashers

Age Range	Apartment (n=142)	Co-op (n=15)	Condo (n=19)
Less than 2 years old	20.2%	9.5%	9.5%
2 to 4 years old	34.4%	0.0%	2.5%
5 to 9 years old	37.4%	69.9%	28.2%
10 to 14 years old	6.4%	15.1%	58.9%
15 to 19 years old	1.7%	4.2%	1.0%
20 years old or more	0.0%	1.3%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-50: Age of In-Unit Clothes Washers

Age Range	Apartment (n=96)	Co-op (n=8)	Condo (n=8)
Less than 2 years old	25.1%	29.8%	10.9%
2 to 4 years old	30.6%	0.0%	0.0%
5 to 9 years old	32.2%	59.1%	54.3%
10 to 14 years old	5.0%	11.0%	34.8%
15 to 19 years old	7.2%	0.0%	0.0%
20 years old or more	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-51: Age of In-Unit Clothes Dryers

Age Range	Apartment (n=95)	Co-op (n=8)	Condo (n=8)
Less than 2 years old	26.1%	29.8%	10.9%
2 to 4 years old	27.4%	0.0%	0.0%
5 to 9 years old	33.5%	59.1%	54.3%
10 to 14 years old	5.3%	11.0%	34.8%
15 to 19 years old	7.6%	0.0%	0.0%
20 years old or more	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-52: Age of In-Unit Water Heaters

Age Range	Apartment (n=99)	Co-op (n=10)	Condo (n=10)
Less than 2 years old	20.8%	0.0%	11.5%
2 to 4 years old	33.7%	0.0%	0.0%
5 to 9 years old	29.8%	84.5%	57.0%
10 to 14 years old	8.6%	6.7%	31.5%
15 to 19 years old	7.0%	8.8%	0.0%
20 years old or more	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-53: Age of In-Unit Window ACs and Room ACs

Age Range	Apartment (n=88)	Co-op (n=12)	Condo (n=21)
Less than 2 years old	12.4%	8.9%	0.0%
2 to 4 years old	27.4%	0.0%	12.8%
5 to 9 years old	50.0%	91.1%	66.7%
10 to 14 years old	9.4%	0.0%	20.5%
15 to 19 years old	0.0%	0.0%	0.0%
20 years old or more	0.9%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

G.2.4 Common Area Appliances

G.2.4.1 Common Area Kitchen Equipment

Table G-0-54: Common Area Kitchen Present

Common Area Kitchen Present	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
No	79.1%	93.5%	85.3%
Yes	20.9%	6.5%	14.7%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-55: Average Number of Common Area Kitchen Appliances

Equipment Type	Apartment	Co-Op	Condo
Microwaves	1 (n=71)	2 (n=3)	1 (n=6)
Refrigerators	1 (n=77)	1 (n=3)	1 (n=7)
Stoves or Ovens	2 (n=43)	2 (n=3)	1 (n=4)

Table G-0-56: Average Age of Common Area Kitchen Appliances

Equipment Type	Apartment	Co-Op	Condo
Refrigerators	4 (n=75)	5 (n=3)	5 (n=6)
Stoves or Ovens	6 (n=41)	5 (n=3)	9 (n=3)

Table G-0-57: Commercial Grade Stoves or Ovens

Commercial Grade Stoves or Ovens	Apartment (n=45)	Co-op (n=3)	Condo (n=4)
No	62.8%	100.0%	100.0%
Yes	37.2%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**

G.2.4.2 Common Area Pools/Spas

Table G-0-58: Common Area Filtered Pool Present

Common Area Filtered Pool	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
No	87.0%	74.4%	74.9%
Yes	13.0%	25.6%	25.1%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-59: Pool Heater

Pool Heater	Apartment (n=36)	Co-op (n=8)	Condo (n=7)
No	60.0%	24.8%	64.9%
Yes	40.0%	75.2%	35.1%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-60: Pool Heater Fuel

Pool Heater Fuel	Apartment (n=10)	Co-op (n=5)	Condo (n=2)
Electricity	30.5%	14.0%	50.0%
Natural Gas	69.5%	86.0%	50.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-61: Pool Cover

Pool Cover	Apartment (n=10)	Co-op (n=5)	Condo (n=2)
No	0.0%	26.4%	0.0%
Yes	100.0%	73.6%	100.0%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-62: VSD Pool Pump

VSD Pool Pump	Apartment (n=26)	Co-op (n=8)	Condo (n=6)
No	24.6%	34.9%	16.1%
Yes	75.4%	65.1%	83.9%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-63: Pool Timer

Pool Timer	Apartment (n=28)	Co-op (n=8)	Condo (n=7)
No	31.6%	34.2%	0.8%
Yes	68.4%	65.8%	99.2%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-64: Hot Tub, Spa, or Jacuzzi

Hot Tub, Spa, or Jacuzzi	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
No	98.1%	93.2%	93.2%
Yes	1.9%	6.8%	6.8%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-65: Hot Tub, Spa, or Jacuzzi Fuel

Hot Tub, Spa, or Jacuzzi Fuel	Apartment (n=3)	Co-op (n=2)	Condo (n=1)
Electricity	0.0%	0.0%	0.0%
Natural Gas	100.0%	100.0%	100.0%
Total	**100.0%**	**100.0%**	**100.0%**

G.2.4.3   Common Area Laundry

Table G-0-66: Common Area Laundry Facility

Common Area Laundry	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
No	52.9%	49.4%	48.7%
Yes	47.1%	50.6%	51.3%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-67: Owned or Leased Common Laundry Equipment

Owned or Leased	Apartment (n=147)	Co-op (n=17)	Condo (n=35)
Lease some and own some	2.0%	0.0%	0.0%
Leased all	62.9%	72.6%	65.7%
Own all	35.1%	27.4%	34.3%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-68: Average Number of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Apartment	Co-Op	Condo
Clothes Washers	11 (n=149)	11 (n=17)	14 (n=36)
Clothes Dryers	10 (n=149)	11 (n=17)	14 (n=36)

Table G-0-69: Average Age of Clothes Washers and Dryers per Laundry Facility

Equipment Type	Apartment	Co-Op	Condo
Clothes Washers	6 (n=128)	8 (n=15)	10 (n=19)
Clothes Dryers	6 (n=129)	6 (n=15)	11 (n=19)

Table G-0-70: Clothes Dryer Fuel Type

Clothes Dryer Fuel	Apartment (n=143)	Co-op (n=17)	Condo (n=36)
Electricity	26.8%	18.5%	28.4%
Natural Gas	73.2%	81.5%	71.6%
Total	**100.0%**	**100.0%**	**100.0%**

G.2.5 Lighting

G.2.5.1 In-Unit Lighting

Table G-0-71: Weighted Average In-Unit Lighting Rank

Lighting Technology	Apartment (n=280)	Co-op (n=30)	Condo (n=57)
Incandescent	3.86	3.41	2.91
CFLs	3.27	3.08	2.93
Fluorescent Tubes	4.26	4.32	4.48
LED Bulbs	3.12	2.91	3.75
LED Tubes	4.59	4.52	4.54

Table G-0-72: In-Unit Lighting Controls

Lighting Control Type	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
Dimmers	4.9%	2.3%	0.0%
Occupancy Sensors	3.8%	0.0%	2.7%
Timers	2.1%	3.4%	0.0%
Daylighting	0.7%	0.0%	0.0%
On/Off Switch	24.7%	0.7%	7.5%
None	63.8%	78.8%	80.4%

G.2.5.2 Interior Common Area Lighting

Table G-0-73: Interior Common Area Lighting

Interior Common Area Lighting	Apartment (n=280)	Co-op (n=33)	Condo (n=57)
No	10.0%	7.4%	9.5%
Yes	90.0%	92.6%	90.5%
Total	**100.0%**	**100.0%**	**100.0%**

Table G-0-74: Weighted Average Interior Common Area Lighting Rank

Lighting Technology	Apartment (n=251)	Co-op (n=31)	Condo (n=54)
Incandescents	5.08	5.02	4.77
CFLs	4.42	4.28	3.77
Fluorescent Tubes	4.57	3.61	4.58
HID	5.73	5.88	5.84
LED Bulbs	3.76	4.28	4.14
LED Tubes	5.25	3.51	4.85

Table G-0-75: Interior Common Area Lighting Controls

Lighting Control Type	Apartment (n=254)	Co-op (n=31)	Condo (n=55)
Dimmers	2.3%	4.8%	4.6%
Occupancy Sensors	24.7%	25.2%	23.6%
Timers	16.5%	16.7%	19.4%
Daylighting	7.5%	30.2%	6.1%
On/Off Switch	24.5%	0.7%	10.1%
Other	0.1%	0.0%	2.3%
None	40%	34.3%	44.3%

G.2.5.3 *Exterior Lighting*

Table G-0-76: Exterior Lighting Location

Location	Apartment (n=283)	Co-op (n=33)	Condo (n=57)
Parking Lot	64.9%	71.2%	73.8%
Security Lighting	65.7%	77.7%	61.7%
Sidewalk/Walkway Lighting	41.2%	74.3%	69%
Decorative	12.2%	11.3%	1.6%
Other Location	0.6%	1.2%	0.0%
None	4.1%	0.0%	6.8%

Table G-0-77: Exterior Lighting Technology

Location	Apartment (n=268)	Co-op (n=32)	Condo (n=56)
Incandescent	14.9%	27.4%	37%
CFLs	19.2%	51.9%	52.4%
Fluorescent Tubes	3.6%	14.9%	10.3%
HIDs	32.5%	47.8%	33.8%
LED Bulbs	43.7%	42.9%	38.6%
LED Tubes	8.4%	22.4%	2.4%
Other	6.1%	23.9%	3.3%

APPENDIX H: SUMMARY STATISTICS – HIGH-RISE V. LOW-RISE

In addition to calculating summary statistics for building physical properties and equipment and end-use saturations across the entire state, ADM also segmented the summary statistics by whether properties were high-rise (four stories tall or higher) or low-rise (less than four stories tall). High-rise or low-rise was assessed by categorizing respondents' self-reported average number of floors per building.

Table H-0-1 presents the number of sample points for high-rise buildings and low-rise buildings. Two of the 380 survey respondents did not provide responses to the average number of floors per building question and were excluded from the results reported in this appendix.

Table H-0-1: Number of Sample Points per High-Rise v. Low-Rise

High-Rise or Low-Rise	Number of Sample Points
High-Rise	144
Low-Rise	234
Total	**378**

H.1 PHYSICAL DESCRIPTION OF MULTIFAMILY PROPERTIES

H.1.1 Building Size and Occupancy

Table H-0-2: Number of Buildings per Complex

High-Rise or Low-Rise	Average Number of Buildings
High-Rise (n=130)	1.40
Low-Rise (n=228)	12.31

Table H-0-3: Number of Floors per Building

High-Rise or Low-Rise	Average Number of Floors
High-Rise (n=144)	5.37
Low-Rise (n=234)	2.37

Table H-0-4: Average Square Footage by Unit-Type

Unit-Type	High-Rise	Low-Rise
Studio	528 (n=58)	458 (n=35)
1 Bedroom	730 (n=133)	728 (n=194)
2 Bedroom	1,010 (n=124)	988 (n=213)
3 Bedroom	1,275 (n=50)	1,334 (n=61)
4 Bedroom	1,778 (n=5)	1,407 (n=12)
5 Bedroom	1,700 (n=1)	2,332 (n=2)

Table H-0-5: Average Number of Tenants by Unit-Type

Unit-Type	High-Rise	Low-Rise
Studio	25 (n=59)	9 (n=36)
1 Bedroom	64 (n=136)	61 (n=196)
2 Bedroom	39 (n=127)	100 (n=216)
3 Bedroom	14 (n=51)	25 (n=66)
4 Bedroom	12 (n=6)	4 (n=12)
5 Bedroom	23 (n=2)	9 (n=2)

Table H-0-6: Average Owner-Occupancy and Vacancy Rate

Measure	Apartment	Co-Op
Percent Owner-Occupied	17% (n=140)	13% (n=231)
Percent Vacancy	26% (n=140)	12% (n=231)

H.1.2 Building Shell, Construction Year and Construction Materials

Table H-0-7: Construction Year

Construction Year	High-Rise (n=135)	Low-Rise (n=229)
Before 1940	17.0%	4.8%
1940 - 1949	5.2%	12.3%
1950 - 1959	6.9%	9.9%
1960 - 1969	4.4%	20.6%
1970 - 1979	8.4%	9.0%
1980 - 1989	3.1%	3.9%
1990 - 1999	3.9%	2.6%
2000 - 2009	10.8%	12.0%
2010 - 2014	11.9%	12.7%
2015	2.3%	4.5%
2016	8.6%	2.6%
2017	7.0%	2.3%
2018	10.5%	2.7%
Total	**100.0%**	**100.0%**

Table H-0-8: Major Construction in the Past 10 Years

Major Construction <= 10 Years	High-Rise (n=144)	Low-Rise (n=230)
No	76.1%	71.1%
Yes	23.9%	28.9%
Total	**100.0%**	**100.0%**

Table H-0-9: Year of Last Major Construction

Year of Construction	High-Rise (n=32)	Low-Rise (n=62)
2008-2014	44.4%	17.8%
2015	7.2%	15.3%
2016	4.9%	9.3%
2017	19.9%	7.4%
2018	23.7%	50.3%
Total	**100.0%**	**100.0%**

Table H-0-10: Exterior Wall Material

Exterior Wall Material	High-Rise (n=137)	Low-Rise (n=210)
Aluminum, Asbestos, Plastic or Wood Materials (Siding, Shingle Tiles, or Shakes)	30.4%	30.9%
Brick	26.7%	35.9%
Concrete Block or Poured Concrete	20.5%	18.3%
No One Major Type	0.1%	0.0%
Other	10.7%	10.7%
Pre-Cast Concrete Panels	3.0%	3.6%
Sheet Metal Panels	7.4%	0.0%
Window or Vision Glass (Glass that can be Seen Through)	0.6%	0.0%
Total	**100.0%**	**100.0%**

Table H-0-11: Building Shape

Building Shape	High-Rise (n=138)	Low-Rise (n=218)
C-Shaped	0.3%	0.0%
E-Shaped	1.0%	0.0%
G Shaped	0.3%	0.0%
H-Shaped	4.9%	1.6%
J-Shaped	0.0%	2.2%
L-Shaped	9.9%	4.4%
M-Shaped	0.5%	0.0%
No One Major Type	0.0%	1.2%
Other	5.7%	1.6%
Rectangle	46.4%	70.1%
Rectangle or Square with an Interior Courtyard	7.2%	1.0%
Square	8.6%	11.4%
T-Shaped	5.1%	0.0%
U-Shaped	9.8%	6.6%
Y-Shaped	0.3%	0.0%
Total	**100.0%**	**100.0%**

Table H-0-12: Roofing Material

Roofing Material	High-Rise (n=133)	Low-Rise (n=215)
Aluminum Top Coat with a Felt Layer	0.6%	0.0%
Asphalt, Fiberglass, or Other Shingles	12.8%	56.2%
Built-Up (Tar, Felts, or Fiberglass and a Ballast, Such as Stone)	32.4%	7.2%
Concrete	1.8%	9.8%
Fiberglass and Rubber Membrane	0.3%	0.0%
Metal Surfacing	1.1%	1.4%
Plastic, Rubber, or Synthetic Sheeting (Single or Multiple Ply)	28.9%	4.5%
Slate or Tile Shingles	13.7%	17%
Wood Shingles, Shakes, or Other Wooden Materials	8.3%	3.8%
Total	**100.0%**	**100.0%**

H.1.3 Windows

Table H-0-13: Exterior Wall Window Coverage

Exterior Wall Window Coverage	High-Rise (n=133)	Low-Rise (n=211)
1% or less	4.5%	2.1%
2% to 10%	20.1%	37%
11% to 25%	34.8%	41.5%
26% to 50%	25.8%	17.3%
51% to 75%	13.7%	2.1%
76% to 100%	1.1%	0.0%
Total	**100.0%**	**100.0%**

Table H-0-14: Equal Window Coverage for All Walls

Equal Window Coverage for All Walls	High-Rise (n=138)	Low-Rise (n=218)
No	17.1%	14.3%
Yes	82.9%	85.7%
Total	**100.0%**	**100.0%**

Table H-0-15: Amount of Glass Area on Sunlight-Facing Walls

Glass Area on Sunlight-Facing Walls	High-Rise (n=20)	Low-Rise (n=35)
About the same amount as non-sunlight facing walls	16.5%	72.3%
Less glass area as non-sunlight facing walls	10.7%	17.8%
More glass area as non-sunlight facing walls	72.8%	10%
Total	**100.0%**	**100.0%**

Table H-0-16: Single-Layer or Multi-Layer Windows

Window-Type	High-Rise (n=135)	Low-Rise (n=212)
Combination of both types	3.3%	4.1%
Multi-layer	80.0%	77.0%
Single layer	16.7%	18.9%
Total	**100.0%**	**100.0%**

Table H-0-17: Presence of Low-E Windows

Low-E Windows	High-Rise (n=111)	Low-Rise (n=162)
No	61.7%	72.3%
Yes	38.3%	27.7%
Total	**100.0%**	**100.0%**

Table H-0-18: Presence of Window Types

Window-Type	High-Rise (n=138)	Low-Rise (n=218)
Clear	96.6%	99%
Tinted	6.1%	1.9%
Reflective	3.7%	0.0%
Opaque	0.0%	0.5%

H.1.4 Solar Panels

Table H-0-19: Solar Panels Present on Property

Solar Panels	High-Rise (n=144)	Low-Rise (n=234)
No Solar Panels	92.9%	97%
Roof-Mounted Solar Panels	5.1%	1.9%
Parking Structure Solar Panels	0.0%	0.0%

H.1.5 Roofs

Table H-0-20: Roof Pitch

Roof Pitch	High-Rise (n=144)	Low-Rise (n=234)
Flat	77.1%	23.3%
Pitched	22.9%	76.7%
Total	**100.0%**	**100.0%**

Table H-0-21: Percent Roof Shading

Percent Shading	High-Rise (n=144)	Low-Rise (n=230)
0%-25%	96.3%	84.1%
26%-50%	2.0%	14.0%
51%-75%	0.3%	1.9%
75%-100%	1.4%	0.0%
Total	**100.0%**	**100.0%**

H.1.6 Parking Lots

Table H-0-22: Types of Parking Available

Parking Type	High-Rise (n=144)	Low-Rise (n=234)
Open Lot	61.3%	80.5%
Garage	25.1%	23.5%
Carport	6.8%	1.9%
Other	7.6%	13.6%
None	21.6%	8.1%

Table H-0-23: Number of Parking Spaces per Property

High-Rise or Low-Rise	Average Number of Parking Spaces
High-Rise (n=108)	116.16
Low-Rise (n=196)	132.11

Table H-0-24: EV Stations Present

EV Stations Present	High-Rise (n=144)	Low-Rise (n=234)
No	95.3%	99.2%
Yes	4.7%	0.8%
Total	**100.0%**	**100.0%**

Table H-0-25: Average Number of EV Stations

High-Rise or Low-Rise	Average Number of EV Stations
High-Rise (n=11)	3.63
Low-Rise (n=2)	5.00

H.1.7 Common Areas

Table H-0-26: Enclosed Common Areas Present

Enclosed Common Areas	High-Rise (n=143)	Low-Rise (n=234)
No	40.1%	48.6%
Yes	59.9%	51.4%
Total	**100.0%**	**100.0%**

Table H-0-27: Presence of Different Common Area Types

Space-Type	High-Rise (n=82)	Low-Rise (n=145)
Boiler Room	49.9%	44.5%
Club House	28.9%	15.2%
Community Center	49.2%	25.5%
Gym	55.1%	24.8%
Swimming Pool	19.4%	14.9%
Laundry	52.3%	62.2%
Equipment Shed	32.1%	45.8%
Rental Office	74.1%	66.6%
Storage Units	41.0%	26.0%
Other	20.5%	7.2%

H.2 EQUIPMENT AND END-USE SATURATIONS

H.2.1 HVAC

H.2.1.1 Heating

Table H-0-28: Available Heating Types

Heating Type	High-Rise (n=138)	Low-Rise (n=217)
Central Gas Furnace	33.3%	20.5%
Steam Boiler	15.5%	8.4%
Hot Water Boiler	24.9%	40.7%
District Steam	0.0%	0.0%
GSHP	10.3%	0.0%
Individual Gas Oil Furnace	21.3%	24.6%
Electric Baseboards	8.5%	9.2%

Table H-0-29: Primary Heating Fuel-Type

Heating Fuel-Type	High-Rise (n=144)	Low-Rise (n=234)
Boiler	0.5%	0.0%
Electricity	20.8%	9.3%
Mixed: Electric & Gas	0.0%	0.2%
Natural Gas	78.7%	90.1%
Oil	0.0%	0.4%
Total	**100.0%**	**100.0%**

Table H-0-30: Primary Heating Equipment Type

Heating Equipment-Type	High-Rise (n=135)	Low-Rise (n=218)
ASHP	9.4%	2.2%
Baseboard: Electric	1.7%	13.3%
Baseboard: Gas	0.8%	6.8%
Baseboard: Hot Water	1.0%	4.4%
Baseboard: Unknown Fuel Type	0.6%	0.4%
Convectors	1.4%	0.4%
Forced Air Furnace	36.7%	38.9%
Hot Water Boiler	0.0%	0.4%
No One Major Type	6.6%	0.2%
Other	2.7%	0.1%
PTAC	9.6%	0.0%
Radiators	29.1%	32.8%
Wood or Coal Burning Stove	0.3%	0.0%
Total	**100.0%**	**100.0%**

Table H-0-31: Average Age of Heating Equipment

Heating Equipment-Type	High-Rise	Low-Rise
Central Heating	11 (n=95)	12 (n=149)
Tenant-Unit Heating	6 (n=36)	11 (n=61)

Table H-0-32: EnergyStar Certified Heating Equipment

EnergyStar Certified	High-Rise (n=120)	Low-Rise (n=204)
No	27.5%	34.0%
Yes: All	62.6%	52.8%
Yes: Some	9.9%	13.2%
Total	**100.0%**	**100.0%**

Table H-0-33: Annual Tune-Up of Heating Equipment

Annual Tune-Up	High-Rise (n=142)	Low-Rise (n=229)
No	10.4%	11.2%
Yes: Heating Contractor	45.3%	45.7%
Yes: Staff Person	44.4%	43.1%
Total	**100.0%**	**100.0%**

H.2.1.2 Cooling

Table H-0-34: Available Cooling Types

Available Cooling Types	High-Rise (n=144)	Low-Rise (n=234)
Central Chiller	6.9%	1.2%
Individual Units	69.1%	74.8%
No Cooling	26.5%	23.9%

Table H-0-35: Primary Cooling Equipment Type

Equipment Type	High-Rise (n=140)	Low-Rise (n=227)
Central Chiller	1.8%	2.3%
Heat Pump	1.7%	0.3%
Individual RAC	40.9%	48.2%
Mini-Split Units	0.5%	0.0%
No One Major Type	0.0%	6.1%
None	2.8%	0.6%
Other	2.9%	3%
Packaged AC - Roof Mounted DX	14%	11.2%
PTAC	10%	0.2%
Residential Split System - DX	25.4%	27.6%
Wall AC Units	0.0%	0.4%
Total	**100.0%**	**100.0%**

Table H-0-36: Average Age of Cooling Equipment

Cooling Equipment-Type	High-Rise	Low-Rise
Central Cooling	10 (n=8)	9 (n=4)
Tenant-Unit Cooling	5 (n=79)	7 (n=165)

Table H-0-37: EnergyStar Certified Cooling Equipment

EnergyStar Certified	High-Rise (n=106)	Low-Rise (n=203)
No	24.7%	13.0%
Yes: All	55.3%	52.8%
Yes: Some	20.1%	34.3%
Total	**100.0%**	**100.0%**

Table H-0-38: Annual Tune-Up of Cooling Equipment

Annual Tune-Up	High-Rise (n=138)	Low-Rise (n=229)
No	39.5%	39.1%
Yes: AC Contractor	21.5%	21.1%
Yes: Staff Person	39.1%	39.9%
Total	**100.0%**	**100.0%**

H.2.1.3   Thermostats

Table H-0-39: Thermostat Equipment Type

Equipment Type	High-Rise (n=144)	Low-Rise (n=234)
Simple On/Off	8.8%	10.3%
Simple Setpoint	39.3%	59.6%
Programmable Thermostat	34.1%	23.9%
Smart Thermostat	2.8%	0.6%
No Tenant Thermostat	12.9%	15.5%

Table H-0-40: Thermostat Control Type

Control Type	High-Rise (n=103)	Low-Rise (n=197)
Both	70.2%	65.6%
Cooling	3.1%	1.7%
Heating	26.7%	32.7%
Total	**100.0%**	**100.0%**

Table H-0-41: Number of Thermostats per Unit

Number of Thermostats	High-Rise (n=106)	Low-Rise (n=204)
1	76.3%	88.6%
2 or more	23.7%	11.4%
Total	**100.0%**	**100.0%**

H.2.2 Water Heating

Table H-0-42: Building-Centralized Hot Water

Building-Centralized Hot Water	High-Rise (n=143)	Low-Rise (n=231)
No	57.2%	54.7%
Yes	42.8%	45.3%
Total	**100.0%**	**100.0%**

Table H-0-43: Primary Water Heating Equipment Type

Equipment Type	High-Rise (n=142)	Low-Rise (n=228)
Commercial Water Heaters	0.3%	0.0%
Instantaneous Water Heater	9.2%	4.2%
Part of Heating System Boiler	9.1%	14.8%
Self-Contained Tank	56.8%	59.9%
Separate Water Heating Boiler	24.5%	21.1%
Total	**100.0%**	**100.0%**

Table H-0-44: Primary Water Heating Fuel Type

Equipment Type	High-Rise (n=143)	Low-Rise (n=231)
Electricity	22.7%	16.2%
Natural Gas	77%	83.3%
Oil	0.0%	0.2%
Solar	0.3%	0.0%
No One Major Type	0.0%	0.4%

Table H-0-45: Average Age of Building-Centralized Water Heating Equipment

Ownership Type	Average Age
High-Rise (n=126)	6.83
Low-Rise (n=204)	9.13

H.2.3 In-Unit Appliances

Table H-0-46: Appliances Provided by the Property

Appliance Type	High-Rise (n=144)	Low-Rise (n=234)
Refrigerator	92.6%	98.1%
Stove	92.9%	98.2%
Oven	87.5%	87.7%
Dishwasher	47.2%	57.3%
Microwave	51.7%	41.3%
In Unit Clothes Washer	33.8%	29.2%
In Unit Clothes Dryer	34.3%	29.2%
In Unit Water Heater	38.4%	33.5%
Window AC or RAC	24.5%	31.1%
Nothing	4.8%	0.4%

Table H-0-47: EnergyStar Appliances

Appliance Type	High-Rise	Low-Rise
Refrigerator	79.3% (n=113)	74.6% (n=208)
Dishwasher	84.8% (n=58)	78.7% (n=112)
In Unit Clothes Washer	90.9% (n=41)	92% (n=63)
In Unit Clothes Dryer	92% (n=42)	90.9% (n=64)
In Unit Water Heater	93% (n=39)	95.7% (n=71)
Window AC or RAC	58.8% (n=34)	63.8% (n=77)

Table H-0-48: Age of In-Unit Refrigerators

Age Range	High-Rise (n=126)	Low-Rise (n=217)
Less than 2 years old	24.6%	11.8%
2 to 4 years old	29.0%	35.4%
5 to 9 years old	36.6%	39.7%
10 to 14 years old	9.5%	9.9%
15 to 19 years old	0.3%	2.9%
20 years old or more	0.0%	0.2%
Total	**100.0%**	**100.0%**

Table H-0-49: Age of In-Unit Dishwashers

Age Range	High-Rise (n=61)	Low-Rise (n=117)
Less than 2 years old	32.6%	12.5%
2 to 4 years old	13.4%	41.2%
5 to 9 years old	43.8%	29.5%
10 to 14 years old	10.1%	13.7%
15 to 19 years old	0.0%	2.9%
20 years old or more	0.0%	0.2%
Total	**100.0%**	**100.0%**

Table H-0-50: Age of In-Unit Clothes Washers

Age Range	High-Rise (n=45)	Low-Rise (n=69)
Less than 2 years old	47.9%	19.7%
2 to 4 years old	9.7%	32.3%
5 to 9 years old	42.4%	27.9%
10 to 14 years old	0.0%	11.7%
15 to 19 years old	0.0%	8.4%
20 years old or more	0.0%	0.0%
Total	**100.0%**	**100.0%**

Table H-0-51: Age of In-Unit Clothes Dryers

Age Range	High-Rise (n=46)	Low-Rise (n=66)
Less than 2 years old	47.7%	20.3%
2 to 4 years old	9.5%	29.5%
5 to 9 years old	42.8%	29.0%
10 to 14 years old	0.0%	12.4%
15 to 19 years old	0.0%	8.9%
20 years old or more	0.0%	0.0%
Total	**100.0%**	**100.0%**

Table H-0-52: Age of In-Unit Water Heaters

Age Range	High-Rise (n=42)	Low-Rise (n=78)
Less than 2 years old	33.9%	16.0%
2 to 4 years old	12.8%	35.7%
5 to 9 years old	48.0%	26.7%
10 to 14 years old	5.3%	15.4%
15 to 19 years old	0.0%	6.2%
20 years old or more	0.0%	0.0%
Total	**100.0%**	**100.0%**

Table H-0-53: Age of In-Unit Window ACs and Room ACs

Age Range	High-Rise (n=40)	Low-Rise (n=84)
Less than 2 years old	19.0%	5.3%
2 to 4 years old	27.1%	22.2%
5 to 9 years old	40.4%	61.3%
10 to 14 years old	13.5%	10.1%
15 to 19 years old	0.0%	0.0%
20 years old or more	0.0%	1.1%
Total	**100.0%**	**100.0%**

H.2.4 Common Area Appliances

H.2.4.1 Common Area Kitchen Equipment

Table H-0-54: Common Area Kitchen Present

Common Area Kitchen Present	High-Rise (n=144)	Low-Rise (n=234)
No	70.6%	86.2%
Yes	29.4%	13.8%
Total	**100.0%**	**100.0%**

Table H-0-55: Average Number of Common Area Kitchen Appliances

Equipment Type	High-Rise	Low-Rise
Microwaves	1 (n=40)	1 (n=43)
Refrigerators	1 (n=46)	1 (n=44)
Stoves or Ovens	1 (n=31)	2 (n=21)

Table H-0-56: Average Age of Common Area Kitchen Appliances

Equipment Type	High-Rise	Low-Rise
Refrigerators	5 (n=43)	4 (n=44)
Stoves or Ovens	6 (n=27)	5 (n=22)

Table H-0-57: Commercial Grade Stoves or Ovens

Commercial Grade Stoves or Ovens	High-Rise (n=31)	Low-Rise (n=23)
No	80.5%	73.1%
Yes	19.5%	26.9%
Total	**100.0%**	**100.0%**

H.2.4.2 Common Area Pools/Spas

Table H-0-58: Common Area Filtered Pool Present

Common Area Filtered Pool	High-Rise (n=144)	Low-Rise (n=234)
No	82.9%	88.4%
Yes	17.1%	11.6%
Total	**100.0%**	**100.0%**

Table H-0-59: Pool Heater

Pool Heater	High-Rise (n=17)	Low-Rise (n=35)
No	30.9%	68.2%
Yes	69.1%	31.8%
Total	**100.0%**	**100.0%**

Table H-0-60: Pool Heater Fuel

Pool Heater Fuel	High-Rise (n=12)	Low-Rise (n=6)
Electricity	30.4%	0.0%
Natural Gas	69.6%	100%
Total	**100.0%**	**100.0%**

Table H-0-61: Pool Cover

Pool Cover	High-Rise (n=12)	Low-Rise (n=6)
No	5.0%	0.0%
Yes	95.0%	100.0%
Total	**100.0%**	**100.0%**

Table H-0-62: VSD Pool Pump

VSD Pool Pump	High-Rise (n=13)	Low-Rise (n=28)
No	44.0%	16.9%
Yes	56.0%	83.1%
Total	**100.0%**	**100.0%**

Table H-0-63: Pool Timer

Pool Timer	High-Rise (n=14)	Low-Rise (n=30)
No	27.8%	27.5%
Yes	72.2%	72.5%
Total	**100.0%**	**100.0%**

Table H-0-64: Hot Tub, Spa, or Jacuzzi

Hot Tub, Spa, or Jacuzzi	High-Rise (n=144)	Low-Rise (n=234)
No	95.9%	97.5%
Yes	4.1%	2.5%
Total	**100.0%**	**100.0%**

Table H-0-65: Hot Tub, Spa, or Jacuzzi Fuel

Hot Tub, Spa, or Jacuzzi Fuel	High-Rise (n=4)	Low-Rise (n=3)
Electricity	0.0%	0.0%
Natural Gas	100.0%	100.0%
Total	**100.0%**	**100.0%**

H.2.4.3   Common Area Laundry

Table H-0-66: Common Area Laundry Facility

Common Area Laundry	High-Rise (n=144)	Low-Rise (n=234)
No	60.1%	49.4%
Yes	39.9%	50.6%
Total	**100.0%**	**100.0%**

Table H-0-67: Owned or Leased Common Laundry Equipment

Owned or Leased	High-Rise (n=76)	Low-Rise (n=130)
Lease some and own some	0.0%	2.3%
Leased all	59.3%	69.1%
Own all	40.7%	28.5%
Total	**100.0%**	**100.0%**

Table H-0-68: Average Number of Clothes Washers and Dryers per Laundry Facility

Equipment Type	High-Rise	Low-Rise
Clothes Washers	7 (n=78)	16 (n=131)
Clothes Dryers	7 (n=78)	15 (n=131)

Table H-0-69: Average Age of Clothes Washers and Dryers per Laundry Facility

Equipment Type	High-Rise	Low-Rise
Clothes Washers	5 (n=63)	6 (n=105)
Clothes Dryers	5 (n=63)	6 (n=106)

Table H-0-70: Clothes Dryer Fuel Type

Clothes Dryer Fuel	High-Rise (n=76)	Low-Rise (n=126)
Electricity	28.4%	32.5%
Natural Gas	71.6%	67.5%
Total	**100.0%**	**100.0%**

H.2.5 Lighting

H.2.5.1 In-Unit Lighting

Table H-0-71: Weighted Average In-Unit Lighting Rank

Lighting Technology	High-Rise (n=143)	Low-Rise (n=229)
Incandescent	3.87	3.63
CFLs	3.50	3.24
Fluorescent Tubes	4.03	4.45
LED Bulbs	3.17	3.19
LED Tubes	4.65	4.70

Table H-0-72: In-Unit Lighting Controls

Lighting Control Type	High-Rise (n=144)	Low-Rise (n=234)
Dimmers	6.1%	4.7%
Occupancy Sensors	4.1%	9.5%
Timers	0.6%	2.5%
Daylighting	1.5%	0.0%
On/Off Switch	26.9%	21.6%
None	58.2%	61.1%

H.2.5.2 Interior Common Area Lighting

Table H-0-73: Interior Common Area Lighting

Interior Common Area Lighting	High-Rise (n=143)	Low-Rise (n=232)
No	1.5%	12%
Yes	98.5%	88%
Total	**100.0%**	**100.0%**

Table H-0-74: Weighted Average Interior Common Area Lighting Rank

Lighting Technology	High-Rise (n=141)	Low-Rise (n=201)
Incandescent	5.11	5.13
CFLs	4.90	4.29
Fluorescent Tubes	4.61	4.54
HID	5.72	5.82
LED Bulbs	3.66	3.99
LED Tubes	4.64	5.43

Table H-0-75: Interior Common Area Lighting Controls

Lighting Control Type	High-Rise (n=141)	Low-Rise (n=205)
Dimmers	6.8%	1.6%
Occupancy Sensors	32.2%	25.7%
Timers	11%	22%
Daylighting	12.3%	6.4%
On/Off Switch	27.4%	20.9%
Other	0.5%	0.4%
None	29.5%	36.9%

H.2.5.3 Exterior Lighting

Table H-0-76: Exterior Lighting Location

Location	High-Rise (n=144)	Low-Rise (n=234)
Parking Lot	57.5%	70.7%
Security Lighting	67.9%	64.5%
Sidewalk/Walkway Lighting	51.4%	47.7%
Decorative	12.6%	10.0%
Other Location	1.0%	0.2%
None	3.9%	5%

Table H-0-77: Exterior Lighting Technology

Location	High-Rise (n=138)	Low-Rise (n=223)
Incandescent	11.9%	16.8%
CFLs	16.2%	22.8%
Fluorescent Tubes	10.9%	2.8%
HIDs	26.0%	31.1%
LED Bulbs	45.7%	46.5%
LED Tubes	12.2%	11.7%
Other	6.0%	8.2%

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