

Sample Report

Portfolio Facility Audit

Scope of Work

Foresight partnered with CLIENT to collect energy intensity information on 58 facilities. The goal of collecting this data was to generate a holistic energy management plan around these facilities that is explicitly actionable.

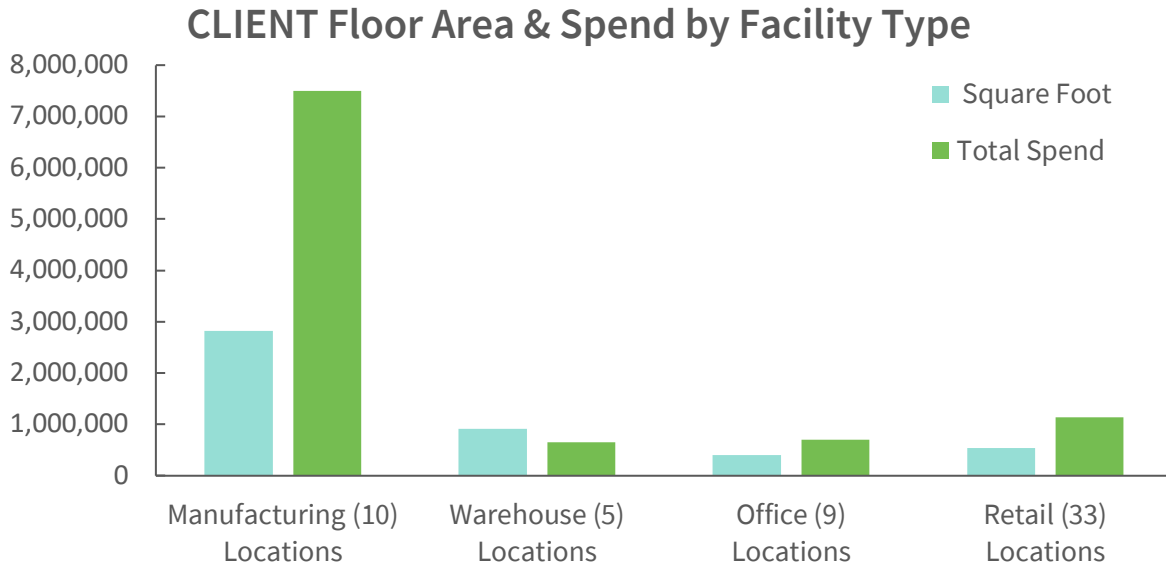
The 58 facilities vary widely. There are four general use types of the buildings including manufacturing, warehouse, office, and retail. The smallest facility is under 4,000 ft² and the largest facility is over 750,000 ft². The range in utility spend across the 58 buildings is from under \$15,000 to over \$2,000,000 annually. The purpose of analyzing a large cross section of CLIENT buildings is so that we can have a broad understanding of how energy flows through CLIENT.

Information regarding the facilities came from two sources: a master facility audit that was filled out by personnel onsite and utility data gathered from the bills or reported by the site. Each source contains valuable information, but the combination of data from both sources provides valuable insights into CLIENT's portfolio of buildings. Note, the information and insights from the master facility audits are only useful if the information provided to Foresight is accurate. Any major opportunities identified in this report that CLIENT would like to pursue should be quantified onsite by a professional from Foresight.

This report will begin with a broad discussion of all CLIENT's facilities and progressively drill down until it reaches observations on a facility level. This approach allows for greater context as to how each facility uniquely fits into CLIENT's portfolio of buildings.

Overall Building Portfolio Observations

It is prudent to begin with big picture analysis of all CLIENT's facilities. Understanding cost and floor area across the facility use types provides a first step in parsing the data.

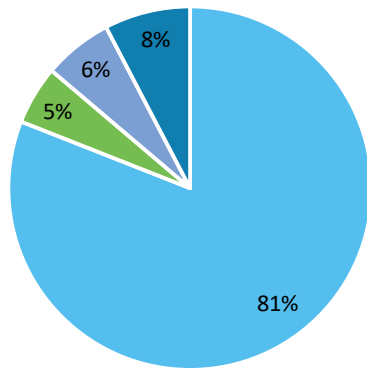


Numerous observations can be made from the above chart. First, manufacturing accounts for the largest share of floor space and utility usage despite only having 10 of the 58 locations covered in the report. In fact, 75% of all utility cost is incurred at manufacturing locations. Next, the five warehouses are the 2nd largest category in floor space, but have the smallest utility spend. This is unsurprising as warehouses are generally much less energy intense than the other facility use types. Finally, over half the locations are retail, but only account for a little more than 10% of both energy cost and floor space.

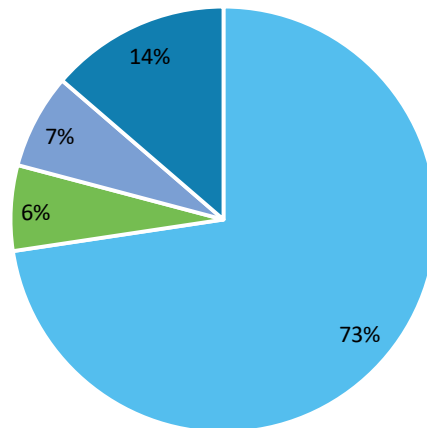
The biggest takeaway is that manufacturing facilities account for a disproportionate share of utility cost for CLIENT. Therefore, any goals to decrease usage and spend across CLIENT's portfolio should start with the manufacturing facilities.

The below charts show electricity cost and use across the four facility types.

Annual kWh Consumption



Annual Electric Spend

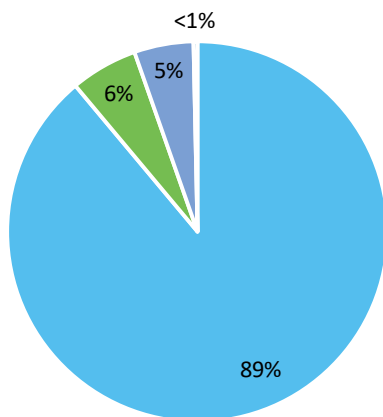


■ Manufacturing ■ Warehouse ■ Office ■ Retail

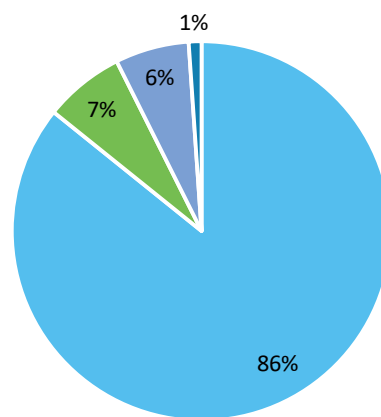
Manufacturing facilities account for 81% of CLIENT’s billed electrical consumption and 73% of cost. There are likely two drivers of the lower unit cost for electricity in manufacturing facilities. First, electricity accounts like the ones at CLIENT manufacturing facilities are quite large, so utilities offer lower pricing. Second, most of the manufacturing is done in the Midwest region of the US where electricity prices are lower than other regions.

The other three types use and cost significantly less than manufacturing. Warehouses account for 5% of use and 6% of cost. Offices account for 6% of use and 7% of cost. Finally, retail uses 8% of the electricity but accounts for 14% of the cost. Retail has the biggest variance between use and cost – likely driven by high utility prices on the coasts where most of the retail locations are sited.

Annual CCF Consumption



Annual Gas Spend



■ Manufacturing ■ Warehouse ■ Office ■ Retail

Again, manufacturing dwarfs any other facility type in usage and cost. The 10 manufacturing facilities consume 89% of all gas and incur 86% of the cost. Much of this is driven by CLIENT requiring heat for processes including powder coating. Also, most of the manufacturing facilities are in cold climates – driving gas consumption in the winter. Much of the process gas will be difficult to reduce as it is required to make furniture, but there are opportunities for efficiency in both the facility and process sides.

The other three facility types use just 11% of CLIENT’s gas. The warehouses lead the group with 6% of use and 7% of cost. This is unsurprising as warehouses in northern climates can require significant gas for heating in the winter months. Next, offices use 5% of the gas and drive 6% of cost. Finally, the 33 retail locations account for less than 1% of use and 1% of cost. This fractional share of gas use is the result of only 11 locations having gas service. This is unsurprising as virtually all retail locations are leased and in urban mixed-use facilities that have heating included in the lease and provided by the building.

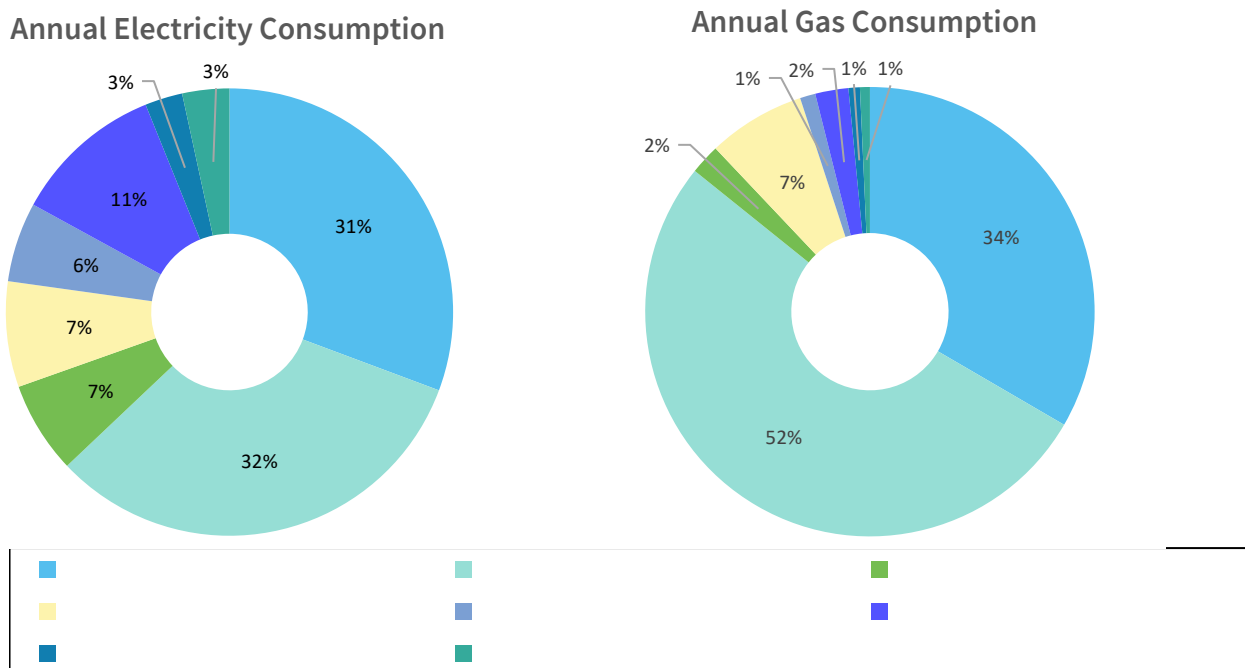
One theme runs through all the above information – the 10 manufacturing facilities use significantly more utilities than all other buildings combined. In fact, 4 out of every 5 kWh consumed by CLIENT flow into a manufacturing facility. Even more stark, 9 out of every 10 MCF of gas flow into a building performing manufacturing. This means that all CLIENT initiatives to reduce utility use must prioritize manufacturing.

The remainder of this report will drill deeper into the different facility types. It will discuss utility usage further as well as talk about the “virtual audits” that were performed by CLIENT personnel at each location.

Manufacturing Facilities

OVERALL FACILITY OBSERVATIONS

The following observations drill deeper into the 10 manufacturing facilities. This report has already established that at least 80% of all energy is consumed in the manufacturing facilities. Below is a breakdown of energy consumption for those nine manufacturing facilities.



The first take away from the above chart is that Site Name and Site Name are larger consumers than any of the other sites. In fact, these two sites consume 63% of all the manufacturing electricity and 86% of the manufacturing gas. The gas figure is especially high and means that Site Name and Site Name consume 79% of gas consumed across the whole CLIENT portfolio. Any attempt to reduce gas consumption at CLIENT must include those two sites. Interestingly, Site Name is the 3rd largest electricity consuming facility despite having less floor space than many of the other facilities. The Site Name and Site Name came in 3rd for gas consumption. All other facilities accounted for less than 10% of manufacturing energy consumption.

Total consumption analysis is valuable to gain perspective on what facilities are major consumers of energy, but don't provide context on energy intensity. Great metrics for understanding facility intensity include energy use and cost per square foot. Below is a table showing electricity usage and cost per square foot broken out by manufacturing site.

Site Name	Total ft ²	Annual Electric Consumption (kWh)	Annual Electric Cost	kWh/ft ²	\$/ft ²
Site Name	293,090	2,885,400	\$224,382	9.8	\$0.77
Site Name	170,000	2,161,691	\$308,779	12.7	\$1.82
Site Name	414,181	5,283,740	\$573,610	12.8	\$1.38
Site Name	246,000	4,583,130	\$487,887	18.6	\$1.98
Site Name	92,500	2,704,717	\$227,372	29.2	\$2.46
Site Name	750,776	24,417,419	\$1,693,469	32.5	\$2.26
Site Name	564,964	25,653,184	\$1,621,540	45.4	\$2.87
Site Name	187,000	8,682,520	\$804,430	46.4	\$4.30

The Site Name had the lowest energy intensity and cost per square foot. This is unsurprising as Site Name does a mix of manufacturing and R&D and has low hours of operation resulting in lower electricity intensity. Both Site Name and Site Name have a kWh/ft² of almost 13 and operate similar hours. Site Name and Site Name are another pair of locations that have very similar kWh/ft² figures. One meaningful difference could be that Site Name operates one shift whereas Site Name operates two to three shifts. Site Name and Site Name are by far the most energy intense facilities and operate similar hours.

Questions:

- Are Site Name and Site Name performing similar manufacturing functions? What are the operational similarities between these two locations that could be optimized?
- What are the operational similarities between Site Name and Site Name? The facilities are very different in size and operational hours, but similar in energy intensity.
- Do Site Name and Site Name manufacture similar products?

Next, the same exercise was performed on gas with the results displayed below.

Site Name	Total ft ²	Annual Gas Consumption (CCF)	Annual Gas Cost	CCF/ft ²	\$/ft ²
Site Name	246,000	38,860	\$20,051	0.16	\$0.08
Site Name	170,000	28,760	\$42,207	0.17	\$0.25
Site Name	414,181	76,000	\$144,121	0.18	\$0.35
Site Name	92,500	24,960	\$23,449	0.27	\$0.25
Site Name	661,755	246,760	\$110,341	0.37	\$0.17
Site Name	187,000	83,780	\$75,440	0.45	\$0.40
Site Name	750,776	1,171,890	\$467,729	1.56	\$0.62
Site Name	370,787	1,156,850	\$440,677	3.12	\$1.19
Site Name	194,177	681,420	\$278,081	3.51	\$1.43

It appears that three locations utilize gas for processes – Site Name, Site Name, and Site Name. These facilities have significantly higher gas consumption intensities than all the other facilities. Site Name intensities are especially high at over 3 ccf/ft² – over double that of Site Name. Site Name has the next highest gas intensity, which is surprising as it is the only facility located in the south half of the United States. All other locations appear to use gas exclusively for space heat. One final note, natural gas prices are lower in the US than the rest of the world, and that is clearly shown by Site Name and Site Name having higher \$/ft² than similar locations.

Question(s):

- Does the Site Name facility use any process gas?

After considering all the big picture data on the manufacturing facilities, the individual master site audits can provide further understanding of what is driving the energy consumption and intensity patterns in each facility.

Warehouse/Distribution Facilities

OVERALL FACILITY OBSERVATIONS

Warehouses account for the second largest share of square footage but are the smallest energy consumers. Two of the five locations account for 90% of the warehouse area across all of CLIENT – Site Name and Site Name. These two locations contribute a meaningful quantity of energy demand and cost to CLIENT’s portfolio of facilities.

Because total consumption is so skewed towards the large warehouses, it is most prudent to start by analyzing utility and cost intensity. Below is a table showing electricity usage and cost per square foot broken out by warehouse.

Site Name	Total ft ²	Annual Electric Consumption (kWh)	Annual Electric Cost	kWh/ft ²	\$/ft ²
Site Name	423,720	1,250,120	\$110,085	3.0	\$0.26
Site Name	17,510	63,152	\$11,338	3.6	\$0.65
Site Name	92,000	566,640	\$113,263	6.2	\$1.23
Site Name	368,665	3,187,200	\$296,227	8.6	\$0.80

Site Name and Site Name have very low electricity intensities. Site Name is about twice as intense as Site Name and Site Name is about three times more electrically intense. Note, Site Name electrical consumption is metered separately from Site Name while gas consumption is not. A walkthrough at Site Name should be performed if there are not plausible reasons for electricity intensity to be so high.

From a cost intensity, Site Name is the worst by far. This is because the utility servicing this location is Site Name, which is an extremely small and costly utility. For reference, Site Name pays about \$0.20/kWh where Site Name pays less than half as much at \$0.09/kWh. However, any efficiency projects Site Name will have faster returns on investment due to the high electricity rates.

Site Name is not included in the above analysis because no electricity data was provided to Foresight.

Questions:

- Why are Site Name and Site Name so inefficient?
- Does Site Name have any energy intensive processes going on?

Next, the same intensities for gas are shown.

Site Name	Total ft ²	Annual Gas Consumption (CCF)	Annual Gas Cost	CCF/ft ²	\$/ft ²
Site Name	423,720	72,930	\$46,968	1.721	\$0.11
Site Name	15,000	4,697	\$2,835	3.131	\$0.19
Site Name	661,755	246,758	\$110,341	3.729	\$0.17
Site Name	17,510	6,706	\$8,781	3.830	\$0.50
Site Name	92,000	36,104	\$21,504	3.924	\$0.23

Again, Site Name is the least energy intense. In this case, it uses approximately half as much gas per ft² than any other warehouse. All other locations use around 3 CCF/ ft². Some of Site Name's low gas intensity is driven by the fact that it is geographically located in the warmest location. All other locations are in the Northern half of the US.

From a cost intensity standpoint, Site Name is by far the most cost intense location. Again, this is driven by the utility. The gas utility for Site Name, Site Name, is an extremely expensive utility. There are also two accounts associated with the Site Name, and one has minimal use, driving up costs further.

The individual master site audits can provide further understanding of what is driving the intensity patterns in each facility.

Office Facilities

OVERALL FACILITY OBSERVATIONS

Offices account for the smallest share of square footage and are second smallest energy consumers. One location account for 60% of the office energy consumption across all of CLIENT – Site Name. This is because the Site Name is by far the largest facility in this category by square footage. It is also worth noting that the Site Name has some manufacturing and warehouse space as well. However, the single largest segment of floor space is office.

Below is a table showing electricity usage and cost per square foot broken out by office.

Site Name	Total ft ²	Annual Electric Consumption (kWh)	Annual Electric Cost	kWh/ft ²	\$/ft ²
Site Name	22,623	111,512	\$31,678	4.9	\$1.40
Site Name	28,138	230,482	\$26,185	8.2	\$0.93
Site Name	20,000	188,800	\$24,750	9.4	\$1.24
Site Name	20,000	218,368	\$34,825	10.9	\$1.74
Site Name	15,172	188,554	\$28,337	12.4	\$1.87
Site Name	238,215	5,012,980	\$443,542	21.0	\$1.86

Site Name is the outlier for electrical intensity showing under 5 kWh/ft². The four other non- Site Name office locations have an energy intensity that averages roughly 10 kWh/ft² – a reasonable bandwidth for office intensity. Unsurprisingly, Site Name is the most energy intense by a factor twice the average. Again, this is driven by the manufacturing space that is also present at the Site Name. The Master Audits received by Foresight didn't indicate any major operational differences between offices – most run about 10 hours per day, 5 days per week.

From a cost intensity, Site Name. performs poorly relative to their energy intensity, which is driven by high utility prices at that location. Site Name is the only location to pay less than \$0.10/kWh. Due to the size and location, it is reasonable that it has the lowest unit electricity prices.

Question(s):

- Is the Site Name office a new property for CLIENT? Have they recently done any energy efficiency projects?

Next is the table for gas intensity. There is no gas data for Site Name & Site Name; this is likely because it is included in their lease.

Site Name	Total ft ²	Annual Gas Consumption (CCF)	Annual Gas Cost	CCF/ft ²	\$/ft ²
Site Name	20,000	3,165	\$1,963	1.6	\$0.10
Site Name	20,000	4,673	\$8,942	2.3	\$0.45
Site Name	15,172	3,659	\$9,284	2.4	\$0.61
Site Name	238,215	181,785	\$94,077	7.6	\$0.39

Site Name was the least gas intense with Site Name and Site Name not far behind. Again, Site Name was about three times more intense – driven by the same factors discussed in the electric portion.

From a cost intensity, Site Name is by far the most cost intense location. This is driven by high costs associated with natural gas. Georgia is a deregulated state. The facility had an uncompetitive supplier that was charging over \$10/MCF. Foresight assisted CLIENT in renegotiating a new contract, and a competitive gas price of \$3.49/MCF took effect in August 2018.

The individual master site audits can provide further understanding of what is driving the intensity patterns in each facility.

Retail Facilities

OVERALL FACILITY OBSERVATIONS

Retail has the largest number of sites included in this report at 32. It also has the second largest electric use at 8% of total CLIENT consumption. Gas use is minimal, representing less than 1% of all consumption by CLIENT. This is driven by the fact that most locations don't have a gas connection. Instead, many retail locations are in highly urbanized areas where the store is part of a larger building that provides facility wide heat. Therefore, gas consumption at the retail locations will be omitted from the report as they don't represent meaningful consumption.

Every retail location is leased, so major capital investments into the spaces are not likely worth considering. Energy efficiency track and retail lighting can generally be installed with minor capital outlay and fast return on investment. Many facilities have already updated the inefficient halogen and metal halide floods to efficient LEDs. Foresight recommends continuing this initiative until all inefficient lighting has been replaced with LEDs. The other systems at each retail location are either the responsibility of the landlord or too capital intense with a long ROI to update. Therefore, Foresight recommends focusing on lighting at the retail locations.

The table on the following page shows electricity intensity and cost intensity for all retail locations utility data was provided. To further add clarity, the location names are highlighted to indicate the existing lighting technology in their space.

LED (16) Fluorescent (2) Metal Halide (4) N/A (10)

Site Name	Total ft ²	Annual Electric Consumption (kWh)	Annual Electric Cost	kWh/ft ²	\$/ft ²
Seattle	11,542	23,894	\$2,211	2.1	\$0.19
Los Angeles	90,016	211,800	\$38,827	2.4	\$0.43
Atlanta	4,000	24,160	\$4,677	6.0	\$1.17
Oxnard	26,132	178,292	\$30,719	6.8	\$1.18
Park Ave.	36,327	303,160	\$69,691	8.3	\$1.92
Portland	27,933	293,894	\$30,188	10.5	\$1.08
Stamford	28,113	297,600	\$53,369	10.6	\$1.90
Manhasset	12,000	131,617	\$26,552	11.0	\$2.21
Westport	9,000	113,440	\$21,869	12.6	\$2.43
Brooklyn	39,440	521,777	\$88,378	13.2	\$2.24
West Palm Beach	6,619	88,541	\$10,218	13.4	\$1.54
Milwaukee	5,812	80,342	\$11,447	13.8	\$1.97
Galleria Edina	18,004	258,192	\$25,383	14.3	\$1.41
Pasadena	5,750	91,456	\$15,039	15.9	\$2.62
Cambridge	20,000	325,608	\$48,337	16.3	\$2.42
Atlanta	13,267	218,118	\$26,538	16.4	\$2.00
Chicago	17,000	290,396	\$27,319	17.1	\$1.61
Melrose West Hollywood	10,000	176,853	\$27,703	17.7	\$2.77
Flatiron	3,700	70,812	\$16,788	19.1	\$4.54
Paramus	12,231	235,544	\$29,901	19.3	\$2.44
Austin- Domain	12,000	238,000	\$25,092	19.8	\$2.09
Toronto	13,790	275,535	\$41,432	20.0	\$3.00
Santa Monica	6,005	121,616	\$21,646	20.3	\$3.60
Charlotte	3,225	68,717	\$7,059	21.3	\$2.19
Costa Mesa	20,400	453,365	\$77,273	22.2	\$3.79
FL-Miami	11,263	279,486	\$31,379	24.8	\$2.79
Scottsdale Quarter	15,115	405,600	\$44,902	26.8	\$2.97
Berkeley	3,906	109,258	\$26,753	28.0	\$6.85
SoHo	8,550	241,404	\$44,474	28.2	\$5.20
East 57th	19,897	568,800	\$115,128	28.6	\$5.79
Houston	10,860	371,648	\$32,027	34.2	\$2.95
Denver	4,098	153,254	\$17,722	37.4	\$4.32
Total/Average	525,995	7,230,000	\$1,090,000	17.5	\$2.61

With 32 retail locations displayed in the table, this is the most robust comparison. Furthermore, all locations operate similar hours and have a similar purpose making outliers easier to spot. The only factor that varies widely across the list is geographic location and consequently, weather. It is reasonable to expect southern locations to be more electrically intense due to year-round operation of air conditioning.

Five locations had an kWh/ft² of under 10. This is extremely efficient, and these locations should be investigated for best practices. Houston and Denver are the only two locations with intensities over 30 kWh/ft²; more than double the average. A major driver of Denver's underperformance is driven by the inefficient Metal Halide lights. Further investigation into these underperforming locations would be prudent.

It is best to look for locations with very different colors for \$/ft² and kWh/ft². Chicago, for example, is one of the lowest cost locations despite an average kWh/ft². Inversely, Berkley is the most expensive \$/ft² location – nearly triple the average. Generally, utility rates are the highest on the coasts and lowest in the middle of the country. Keep that in mind when comparing use and cost.

Most of the facilities have upgraded to LED. Four locations exclusively use metal halide lighting. All these locations are at or near the top half of energy intensity. Two locations scored an orange grade because they utilize fluorescent technology and some metal halide. Ten locations didn't report lighting technology; it would be wise to circle back with them and confirm the lighting technology utilized in the facility.

Conclusion & Recommendations

This report included facility information on energy consumption, utility cost, facility systems, facility operation, and building use for 58 facilities. CLIENT could pursue energy efficiency at all 58 facilities simultaneously, but that would require large quantities of CLIENT personnel time and financial capital to implement projects. Instead, Foresight recommends taking a more intentional and effective approach of focusing on facilities that account for most of the energy consumption and have numerous opportunities for efficiency updates. Based on these criterion, nine CLIENT facilities across North America were identified as being where CLIENT should focus their resources.

Site Name	Site Name	Site Name
Site Name	Site Name	Site Name
Site Name	Site Name	Site Name

Here is our rationale as to why CLIENT should invest in these nine facilities first:

- All nine facilities are in North America and are over 90,000 ft²; five of them are in State.
- These nine sites are a total of 2.8 million ft² of the 4.7 million ft² covered in this report (60% of total ft²).
- These sites account for 80% of electricity consumption and 95% of gas use.

Based on the above bullet points, Foresight recommends focusing efforts to reduce energy consumption at the nine facilities listed. This is a more effective energy management plan than attempting to reduce usage at all 58 facilities simultaneously. These nine facilities will have the greatest impact on CLIENT portfolio energy consumption if they can be optimized.

Based on the Master Facility Audits and utility usage from these nine locations, CLIENT should focus their attention on the following systems:

1. Lighting

- Zero of the nine facilities have completely upgraded to LEDs inside the facility.
- Six facilities still have very inefficient metal halide lights outside.
- Updating to LED can provide significant electricity reductions with reasonable capital outlays resulting in ROIs around 2 - 4 years.

2. Compressed Air

- Across the nine facilities is a total 4,500+ HP of compressed air.
- Compressed air accounts for 11.2 million kWh of annual consumption - approximately 15% of total usage at these facilities.
- Compressed air distribution lines are prone to leaking and systems are rarely optimized without monitoring equipment.
- Foresight recommends scheduling regular leak detection studies and system audits to optimize each facility's compressed air system.

3. HVAC

- Among the top three energy intensive systems in a facility.
- The majority of the HVAC equipment at these nine facilities is over 20 years old.
- There is a high likelihood of equipment failure associated with operation of over 20 years.
- Foresight recommends doing an equipment lifetime analysis on all HVAC equipment.
 - CLIENT should have a schedule of expected life and capital requirements for replacements, so that budgeting is done proactively for equipment failures.
 - CLIENT should have a plan around specifying new equipment upon failure, so that more efficient replacement equipment can be used. Generally, HVAC updates for energy savings don't make sense until end of useful life.

Many other efficiency updates exist at CLIENT. However, Foresight recommends focusing on lighting, compressed air, and HVAC at the top nine facilities. The first step would be to gather more in-depth information about each of these systems on-site. Foresight can assist CLIENT in collecting the necessary data to empower CLIENT in their capital decision-making for energy efficiency.

Site Name | 750,776 ft²

LOCATION DATA

- Energy efficient!
- Work needed
- Significant work needed

	Annual Consumption	Annual Cost	Consumption per ft ²	Cost per ft ²
Electricity	24,417,419 kWh	\$1,693,468.82	32.52 kWh	\$2.26
Gas	1,171,890 ccf	\$467,728.57	1.56 ccf	\$0.62

LIGHTING

Mainsite has several different spaces with varying use types (offices, manufacturing, warehouse, etc.). The lighting is still Fluorescent with some Metal Halide – two outdated and inefficient technologies. An LED project in 2018 to replace the 400W metal halides was done. No other plans were noted.

EEO	Current Technology	Budget	Savings	ROI	Tonnes of CO ₂ Reduction
Office	Fluorescent and HID	\$32,000	\$5,700	5.6	
Warehouse & Manufacturing	Fluorescent and HID (LED replacement underway)	\$445,000	\$140,000	3.3	922
Exterior	HID and some LED	\$38,000	\$5,400	7.3	

BUILDING MANAGEMENT SYSTEMS

Current Systems	Recommendations
Direct Digital Controls with online access and lighting and HVAC integrated.	Mainsite has state of the art building management controls and has integrated various systems.

HVAC

Current Systems	Recommendations
Over 120 units that are all 20+ years old. This includes boilers, chillers, roof top units, cooling towers, etc.	Life-cycle analysis by a 3 rd party mechanical service contractor to prioritize the replacement schedule for all HVAC units.

COMPRESSED AIR SYSTEMS

Current Systems	Recommendations
Four fixed-speed screw compressors, in continuous operation. Six piston/reciprocating compressors.	Compressed Air Leak Studies as part of the regular preventative maintenance schedule.