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THE UNIVERSITY OF BRITISH COLUMBIA

Energy Team
The University of British Columbia |
Okanagan Campus
1060 Diversity Place | Kelowna BC |
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UBC Okanagan Campus
Energy Team
Quarterly Report
July 2023 – September 2023

Report Date: 2022-11-20

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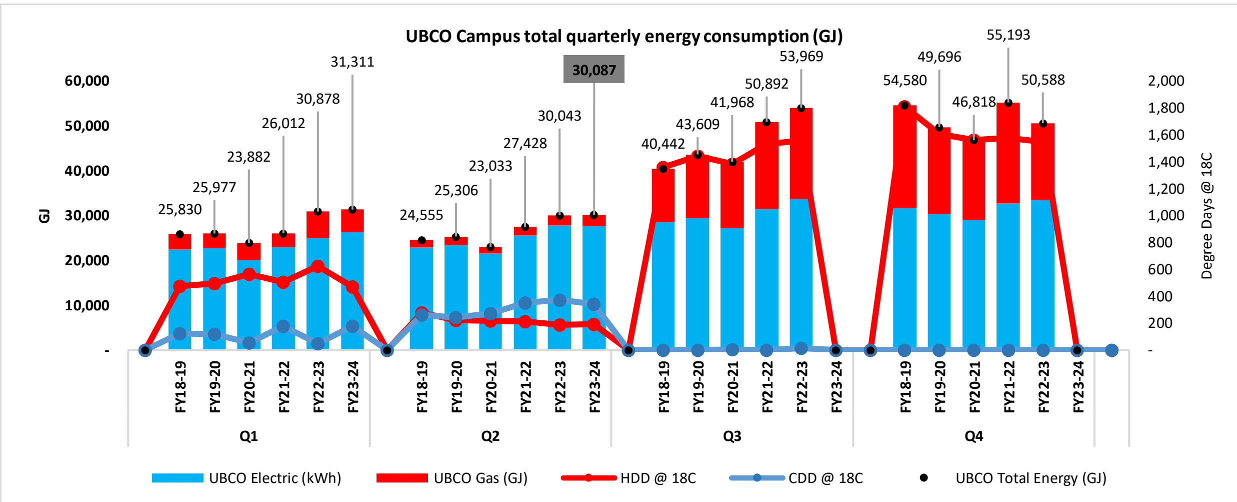
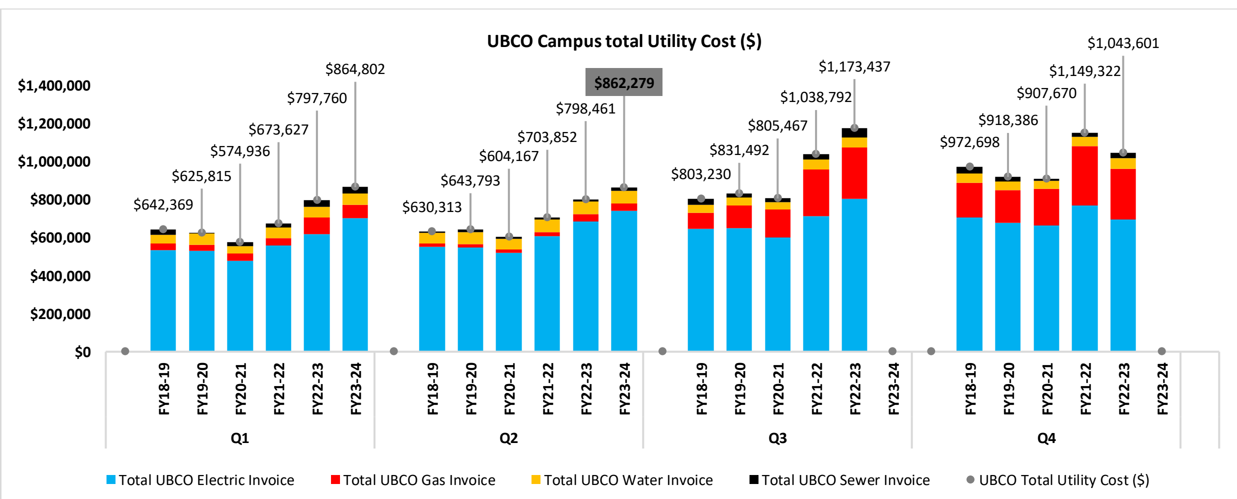
1. Overview of the Second Quarter of FY 2023-2024

As of Q2 2023, UBCO Campus's total energy consumption was 30,087 GJ, similar to Q2 of the previous fiscal year (Q2 2022), that had a total energy consumption of 30,043 GJ. Although there was a reduction in electricity consumption on the campus, this was offset by an increase in gas consumption. The total energy consumption includes a same Electricity consumption for the Q2 i.e. 7,703 MWh in Q2 2022 vs 7,684 MWh in Q2 2023 and an increment of 5% in campus Gas consumption i.e. from 2,310 GJ in Q2 2022 to 2,424 GJ in Q2 2023.





In Q2 2023, Cooling Degree-Days (CDD) was observed to be 8% less than previous year i.e. 373 degree-days in Q2 2022 vs 342 degree-days in Q2 2023. Heating Degree-Days (HDD) was observed to be similar i.e. 186 degree-days in Q2 2022 vs 194 degree-days in Q2 2023.

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The variance in energy consumption can be attributed to the following key factors:

Electricity:

- A 2% increase (99 MWh net) in electricity consumption for Academic buildings was observed. This can be primarily attributed to Innovation Annex (93% increase i.e. by 17 MWh), University House (80% increase i.e. by 3 MWh), CHP (58% increase i.e., by 48 MWh), SCI (22% increase i.e. by 153 MWh), Innovation Precinct 1 (19% increase i.e. by 33 MWh), CCS (10% increase i.e. by 13 MWh). There has been a significant increase in electricity consumption in the leased space 1200B Curtis, indicating that the space is now occupied. The electricity consumption for the space increased from 0.14 MWh in Q2 2022 to 12 MWh in Q2 2023.
- A few academic buildings observed reduction of electricity consumption. These buildings are GEO (20% reduction i.e., by 42 MWh), PGF (16% reduction i.e. by 11 MWh), UCH (12% reduction i.e. by 6 MWh), Arts (9% reduction i.e. by 31 MWh), EME (5% reduction i.e. by 69 MWh), ASC (by 23 MWh), FIP (by 17 MWh) due to a combination of recommissioning, retrofit, WiFi-based ventilation and efficiency measure implementation projects.
- An 8% reduction (109 MWh net) in Residences electricity consumption was observed i.e. from 1,369 MWh in Q2 2022 to 1,259 MWh in Q2 2023. Almost all Residences observed reduction in electricity consumption likely due to reduced occupancy during wildfire season and evacuation notice. In contrast to the general reduction in residences, Upper Cascades observed an increase in electricity consumption by 33% i.e. by 22 MWh.

Natural Gas:

- A 23% increment (294 GJ net) in Academic gas consumption was observed i.e. from 1,268 GJ in Q2 2022 to 1,562 GJ in Q2 2023. This increment can be primarily attributed to ASC (50% increase i.e., by 285 GJ).
- A 17% reduction (180 GJ net) in Residences gas consumption was observed i.e. 1,043 GJ in Q2 2022 vs 861 GJ in Q2 2023. 50% of this reduction can be attributed to Nechako (24% reduction i.e., by 97 GJ). All Residences observed reduction in gas consumption likely due to reduced occupancy during wildfire season and evacuation notice.

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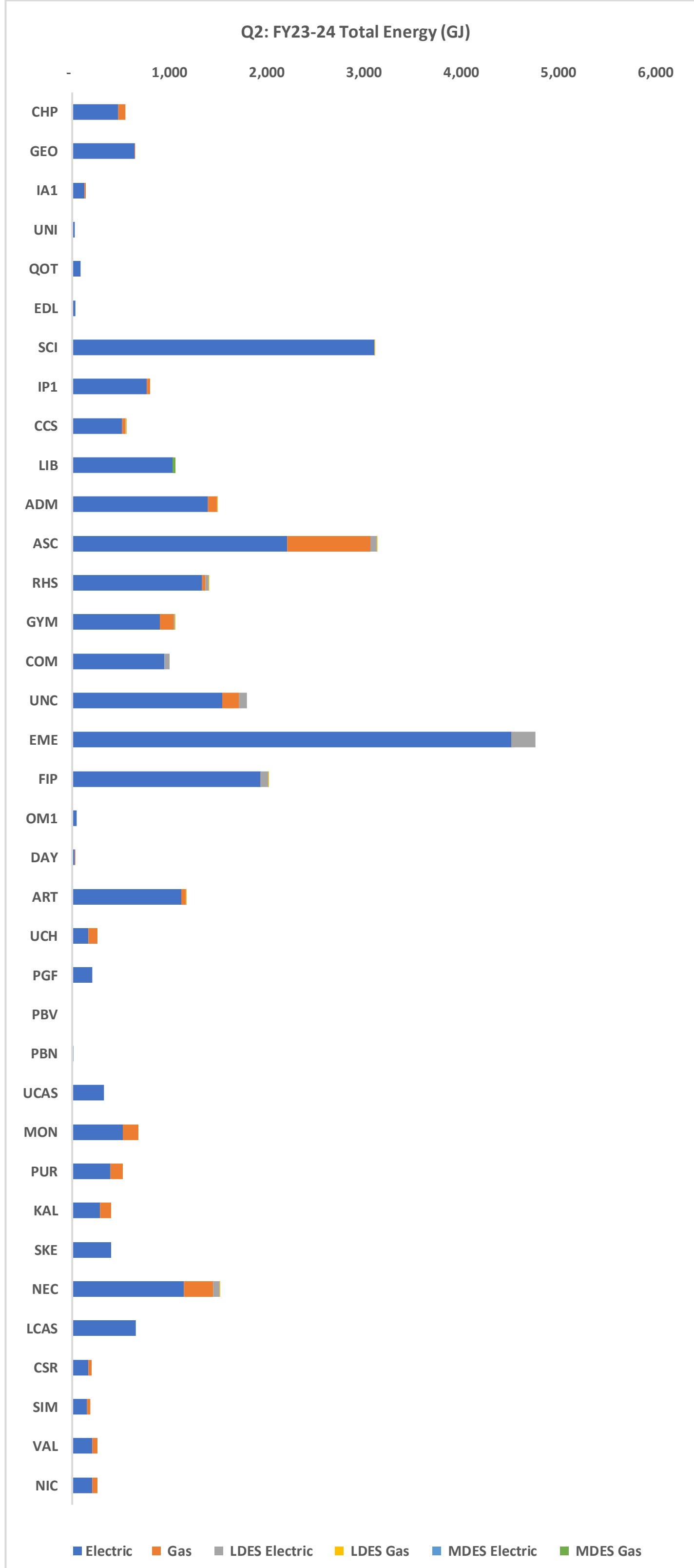
Type	Building	% Total energy change
DES	CHP	29%
DES	GEO	-19%
ACAD	IA1	97%
ACAD	UNI	79%
ACAD	QOT	56%
ACAD	EDL	29%
ACAD	SCI	20%
ACAD	IP1	19%
ACAD	CCS	16%
ACAD	LIB	7%
ACAD	ADM	6%
ACAD	ASC	6%
ACAD	RHS	-1%
ACAD	GYM	-2%
ACAD	COM	-3%
ACAD	UNC	-3%
ACAD	EME	-5%
ACAD	FIP	-6%
ACAD	OM1	-6%
ACAD	DAY	-7%
ACAD	ART	-11%
ACAD	UCH	-12%
ACAD	PGF	-16%
ACAD	PBV	-17%
ACAD	PBN	-26%
RES	UCAS	33%
RES	MON	-1%
RES	PUR	-4%
RES	KAL	-6%
RES	SKE	-9%
RES	NEC	-11%
RES	LCAS	-12%
RES	CSR	-17%
RES	SIM	-18%
RES	VAL	-19%
RES	NIC	-35%



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2. Policy Development

Appropriate policies and guidelines assist in meeting campus energy goals and as such are championed by the Energy Team. Significant developments in energy-related campus guidelines and policies that occurred in the past quarter are described below.

2.1. Strategic Energy Management Plan (SEMP) 2023

The 2023 update of the Strategic Energy Master Plan (SEMP) is a comprehensive integration of diverse initiatives aimed at advancing our high-level energy strategy. This update is in alignment with our goal to reach a future state with a view of modernization, renewal, and growth to meet current and future energy needs in line with UBC Okanagan's goals and resilience. Following are the various initiatives integrated under the 2023 edition of SEMP:

- Utilities tracking and forecasting (campus future utility needs and costs)
- Demand-Side Management (energy efficiency and optimization)
- Building Energy Targets (targets for net-positive ready buildings)
- Decarbonization with targets from the CAP (Climate Action Plan)
- Campus Growth (Buildings and FTE)
- Renewal and Modernization

Following are the recommended cost-effective strategies as per Strategic Energy Master Plan 2023:

- Add 1 MW CO2 ASHP (Benefits: meet decarbonization targets, capacity increases, future proofing)
- Increase demand side reduction program to $500k per year due to better ROI and achieve required CAP targets
- Retrofits/Modernization/Stranded Loads should be scheduled in alignment with DE strategy to minimize future capital costs
- Periodically update the Strategic Energy Master Plan (SEMP) to stay aligned with technological advancements, evolving regulations, market trends, and environmental goals

2.2. Demand-side management program

Energy Team is working on implementing the Energy Conservation Measures (ECMs) as per Strategic Energy Management Plan (SEMP) 2023. Following are the identified measures recently completed or currently underway:

- Campus-wide lab demand-controlled ventilation
  - IAQ-based Demand controlled ventilation for campus AHUs and/ or MUAs (Project implementation completed for a portion of SCI building)
  - Occupancy-based Demand controlled ventilation for campus AHUs and/ or MUAs (Study completed for ASC FIP, project implementation underway)
- Waste heat recovery from strobic exhaust for SCI building (Investigation completed, project design underway)
- LED lighting upgrade for Plant Growth Facility (Implementation completed)
- Recommissioning of existing controls at EME building (Investigation complete, implementation to be scheduled)

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- District Energy Optimization (Investigation underway)
- People counter HVAC scheduling (Investigation underway)
- Conversion of CAV to VAV and high temp to low temp terminal units for ARTS building (Investigation to be scheduled)

2.3. High-Level Net-Zero Carbon District Energy (DE) Strategy

A decision was made by the UBC steering committee to proceed with district energy utility services where district scaled water source heat pumps provide hot and cold water to the buildings. With the distribution and energy transfer station strategy set, the focus turned to DE decarbonization, as well as a strategy for service to the new Interdisciplinary Collaboration and Innovation (ICI) building on the main campus.

Energy Team has been working with DE consultants to advance the schematic design and development of the various cluster plants on campus LIPCP, Residence cluster plant, Commons cluster plant. These projects included a high-level concept design to outline preliminary requirements and indicative capital costs for a potential Lower Innovation Precinct Cluster Plant (LIPCP), Resindence Cluster Plant, and Commons Cluster Plant.

In terms of DE decarbonization, the key strategy for decarbonization features the integration of air source heat pumps (ASHP) in a transition to a future state that is affordable, sustainable, and resilient in service to connected customers.

A schematic design and economic assessment of an Air Source Heat Pump (ASHP) and thermal energy storage (TES) plant near the GEO building was conducted in subsequent DE strategy phase. Currently, work is underway to advance this strategy, explore other low carbon heating sources/ technologies through a study and install ASHP (Phase 1 of DE decarbonization strategy) by FY24-25.

2.4. Campus-Wide High Voltage Master Electric Plan

Energy Team has been working with engineering consultant to analyze the current campus wide high voltage electrical distribution systems and develop a strategy to best support the campus's future needs. This study was completed in Q2 of FY23-24 and recommends following:

- Design and implement EV charging infrastructure plan
- Upgrade main feeders (project sheet#1)
- Upgrade Admin TX (project sheet#5)
- Perform a campus-level power quality study
- Add a new switch near 74N2606 to service the Innovation Precinct (project sheet#2)
- Study -Develop a plan to accommodate zero-emission vehicles on campus, including electric and hydrogen vehicles for fleet vehicles, service vehicles, staff, faculty, and students.(project sheet#4)
- Develop a microgrid plan for the campus that can leverage various
- DERs such as solar, battery energy storage, combined heat & power, hydrogen, and vehicle-to-grid (V2G) and operate in islanding mode. (Project Sheet#3)
- Undertake a solar study to determine available roof-top siting locations and structural capability on existing roofs.

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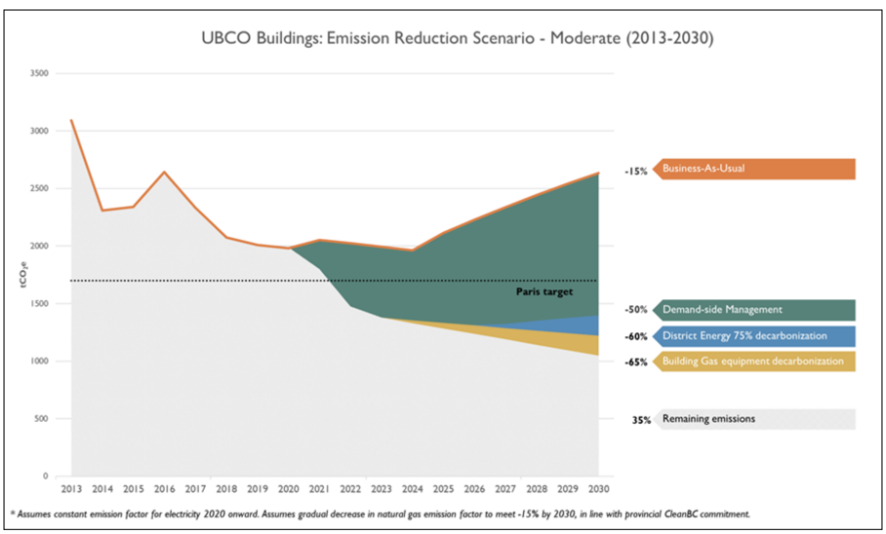
- Undertake a distributed energy resource study for the UBC Okanagan campus that evaluates onsite generation and energy assets options.

2.5. Indoor Air Quality monitoring

In response to COVID-19, UBCO increased ventilation rates in buildings across campus while maintaining comfortable indoor air temperature and humidity. In order to re-engage the occupancy sensors/ Wi-Fi-based controls, Energy Team has been tasked with developing a monitoring tool for CO2 sensors on campus and create a procedure to continue measurement and verification of air quality on campus. The CO_2 monitoring tool has been developed and is currently being actively employed to monitor air quality across the campus.

2.6. Low Carbon Energy Strategy

Energy Team was tasked by the Whole Systems Steering Committee with developing a High-Level Net-Zero Carbon District Energy (DE) Strategy that would help inform realistic carbon emission reduction targets. The strategy included the completion of pro forma for various alternate energy supply options, as well as a sensitivity analysis and rough "order of magnitude" costs for each option. The result was the selection of an option that was deemed to be the lowest cost for the campus, as well as the best option to achieve UBC carbon reduction goals, simplify building operations, maximize resilience, and provide a foundation for the integration of waste heat, renewable energy, and other low carbon energy sources in the future.



Based on the strategy, a moderate (realistic) target of 65% emission reduction[1] from 2013 levels by 2030 is recommended. This can be achieved by partial decarbonization of the central plant, implementing projects that will reduce energy demand, and connecting select existing buildings to central energy supply

[1] Note that when conducting the scenario analysis, the electricity emission factor used in 2020 was 2.587 tCO_2e/GWh and assumed constant till 2030. However, in Q1 FY21-22 this factor has been retroactively updated by Ministry of Environmental and Climate Change Strategy to 35 tCO_2e/GWh for 2013 and 40.1 tCO_2e/GWh for 2020. This modelling results do not reflect this change.

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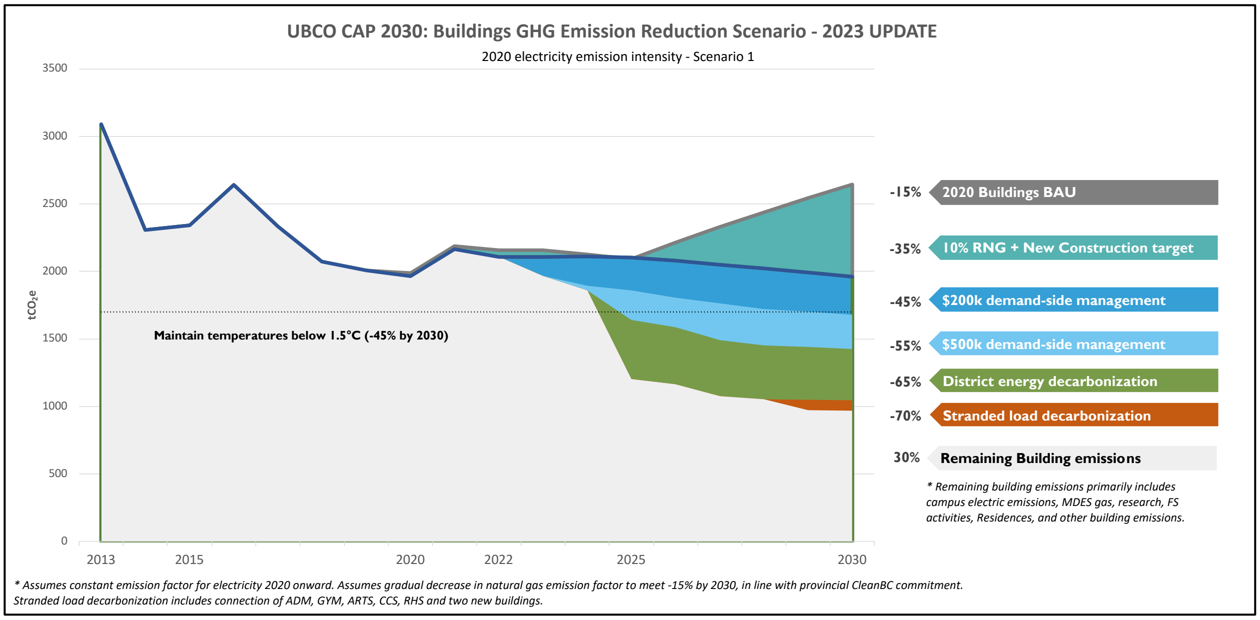
systems (district energy). The Campus Action Plan 2030 plan has been signed off by the UBC executive committee. Further work is being performed to keep track of the progress.



Following are few of the potential challenges to achieving CAP 2030 targets:

- Addition of high-intensive research facilities
- Market economy: Rising costs of new construction buildings might impact implementation of energy efficiency measures as a result of value engineering
- Need for a low carbon energy supply to replace deteriorating Geo-exchange infrastructure
- New construction Residences and leased buildings needs to be aligned with UBCO CAP targets
- Grid electricity emission factor

2.7. UBCO Net Positive Modelling Study – Archetype update and Analysis

Energy Team worked with RDH Building Science Inc. to update the five archetype energy models (Student Residence (no kitchen), Campus Rental Housing (with Commercial Retail Units and suite kitchen), Low intensity lab building, High intensity lab building, Classroom/Office building) from the previous 2016 UBC Net Positive Modelling Study and reflect UBC Okanagan campus typologies and climate zones based on current UBCO construction practices.

This work included formulating ECM bundles to identify achievable energy and greenhouse gas emission targets (TEUI, TEDI, GHGI) specific to UBCO, and then completing costing and financial analysis to identify the most cost-effective strategies to achieve those targets. Applicability of the proposed strategies to existing building retrofits was also considered.

A subsequent work to compare these parameters TEUI, GHGI, TEDI values for various archetypes from the study to other relevant standards and codes was completed in August 2022. This study also provided various energy targets for UBCO building archetypes.

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Parameter	Student Residence	Campus Housing	Dry Lab	Wet Bldg	Class / Office
TEUI kWhr/m^2/yr	97	137	217	290	127
TEDI kWhr/m^2/yr	12	13	43	50	8
GHGI* kgCO_2/m^2/yr	6	9	13	16	6
Peak Heating W/m^2	14	10	28	31	29
Peak Cooling W/m^2	14	21	40	53	39
Peak Electric W/m^2	9	11	23	31	19

Energy Team has been working with UBCO leadership to adopt proposed energy targets for net positive ready buildings for Okanagan campus. These targets have been approved and will be included in the UBCO Green building action plan targets.

2.8. Energy Monitoring and Data Management Platform

Energy data for the campus is obtained from a number of sources including utility bills, manual meter readings, and building digital control systems. UBCO Energy Team has engaged with the UBCO School of Engineering to develop a custom data management system for the campus. This project aims to develop an intelligent data-driven energy monitoring and management system for micro-communities using statistical and advanced data analysis methods.

In the meantime, Energy Team has developed a utility tracking tool using advanced programming language knowledge python and excel to track overall campus utility consumption (Electricity, Natural Gas, Water, Sewer) as well as building-level consumption at the monthly, quarterly, and annual interval. The tracking is being done for three different parameters i.e. utility consumption, utility cost, and carbon emissions associated and various intensity parameters EUI, ECI etc.

However, due to the BMS integration challenges during project and limited resource constaints, a display platform has been developed which shows BMS sensor trends for utility meters, KPIs tracked in excel, and also creates a parallel database. In addition, Energy Team is spearheading implementation of SkySpark at UBCO campus. SkySpark is an advanced analytics software platform that enables intelligent monitoring and analysis of building systems and energy data. By utilizing SkySpark, the Energy Team aims to enhance energy efficiency, identify optimization opportunities, and improve overall performance across campus buildings.

2.9. UBCO HVAC Infrastructure Asset Management Database

Energy Team has been working with the Facilities Management to advance and update the Infrastructure HVAC Asset Management database and potentially linking this up with the major capital retrofit projects on campus in the near future. This also includes consolidating campus-wide DDC points, physical meters, and manual metering points in one location and further developing a meter tree. Due to Facilities Management Engineers workload and other issues, progress on this project has been slow. Additional resources have been hired in the CORM department to fast track this project as it will be a critical input to the asset management module of the Enterprise Maintenance Management System that UBCO will be adopting in FY24-25.

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2.10. VLAN upgrade

The intent of this project is to segregate the controls equipment for each building on campus into individual VLANs. This project has been undertaken and currently in progress for three key reasons which include communication control, increased security as well as plan for future additions as more equipment in the controls industry operates primarily with IP interfaces. This includes meters, lighting, chillers, and zone HVAC controllers.

The current network infrastructure is a hybrid configuration with a flat “facilities” VLAN that covers multiple building, in addition all new construction since the Commons (TLC) building has been configured into individual VLANs. This project will migrate the older buildings into their individual VLANs, eventually removing the “facilities” VLAN entirely. Once the VLAN migration is complete, the Desigo server is intended to become the central hub for communication control, avoiding broadcast information between buildings and many firewall rules needed to accommodate facilities network access for all BMS systems. The project is substantially complete.

2.11. Future Campus Construction

In order to ensure that future campus energy goals and targets are met, it is important that new buildings constructed on campus are designed and built to be consistent with the Whole Systems Infrastructure plan as well as other campus plans and goals. As such, the Energy Team has been involved in conducting technical reviews and setting goals, targets, and strategies as early as possible for future campus expansions such as new construction ICI building, Childcare, OM2. A detailed summary for each new building has been presented in Section 4. of this document.

In August 2021, UBC Executive team took a significant step towards sustainable development on campus by approving first cluster plant and provisions for thermal storage within the ICI building currently in design with occupancy anticipated for Jan 2025. This cluster plant is expected to serve thermal demand to surrounding buildings potentially CCS, ADM, EME, GYM including ICI (South and east of main campus). This will provide significant savings with respect to deep building retrofits and new campus buildings.

ICI is intended to include spatial provisions and corridors to allow plant expansion into a nodal thermal energy plant that serves future developments around the ICI building. This “cluster” plant will produce heating water (HW) and chilled water (CHW) using the LDES and MDES interfaces, before distributing HW and CHW to the ICI building and the building cluster downstream of the ICI. Energy Team has been working with UBC Properties Trust and their consultant for successful design and construction of cluster plant at the ICI building.

2.12. Technical Guidelines

Technical Guidelines are intended to provide minimum standards for campus projects. There are a large number of guidelines that cover both UBC as a whole and some that are specific to the Okanagan campus.

In 2021 with a view to streamline the process, a new Joint Working Group including UBC Vancouver and UBC Okanagan facilities teams has been formed. The Working Group has been set up to provide potential TG updates, collaborate between campuses and between disciplines. The Energy Team has been

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involved in facilitating regular meetings for the Joint Working Groups and working to update several that are specific to energy performance and monitoring.

2.13. District Energy Plant efficiency study

Energy Team has been working to analyze performance of DE system and building plant to help optimize overall system performance. The scope of work under this study includes:

- **Energy Trend Analysis:** Validate existing trend logs for each building showing heating water consumption, gas consumption, district energy consumption, and electrical energy.
- **Develop Coefficients of Performance:** Develop a real-time coefficient of performance trends for the central heating plant, district energy plant, and building level heat pumps.
- **Develop Cost Trends:** Using the energy use profile, coefficients of performance, and utility rates, calculate the real-time costs of operation for each building, and for the plants.

Energy Team is working internally to carry out this study which has been kick started by reviewing hydronic schematic for campus buildings and developing COP trends for each building and central plant. Energy Team fast tracked a portion of this study to optimize operations of cooling towers. After a careful review of existing operations, Energy Team has put together an add-on sequence of operation (SOO) to

- make cooling towers run more efficiently,
- automate staging of various cooling sources, and
- increase operational capacities of existing cooling towers

This SOO update is expected to provide potentially 300 tons of additional cooling capacity from existing cooling towers. A similar exercise is being carried out to review District Energy heating season performance and investigate optimization opportunities. An average 7.5% efficiency gain for boilers in Geo-Exchange building has already been observed based on recommendations provided by Energy Team. This translates to around 750 GJ of natural gas savings. As a result of the plant efficiency study a parallel study is being kicked off to recommend solutions to the following identified issues:

1. LDES fluid cooler efficiency improvement: A significant portion of flow is being recirculated through the fluid coolers during part load conditions, which decreases the return water temperature to the cooling tower and reduces fluid cooler efficiencies. The primary system (plant to buildings) is a variable flow system, whereas boiler pumps are constant flow.
2. MDES Boiler efficiency improvement: During part load conditions, a significant portion of flow is being recirculated through the boilers, which increases the return water temperature to the boilers and reduces boiler efficiencies.
3. LDES fluid cooler free cooling operation: When free cooling operation is enabled during summer months, all three cooling towers operate at 100% to lower supply water temperature as much as possible. This creates an issue as at times LDES main loop flow is only a few hundred gallons whereas fluid cooler operates at 1000 gallons each.
4. Commons building LDES control valve and chiller operation: Review Commons LDES and chiller operations and suggest operations improvement. Currently, the LDES valve at Commons cycles frequently from 0 to 100%.

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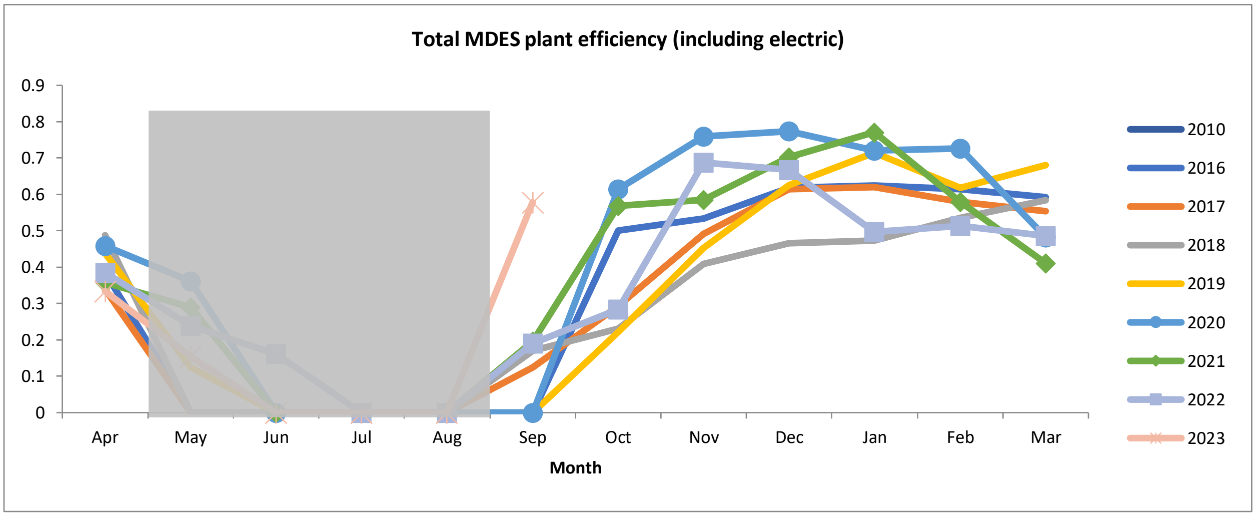

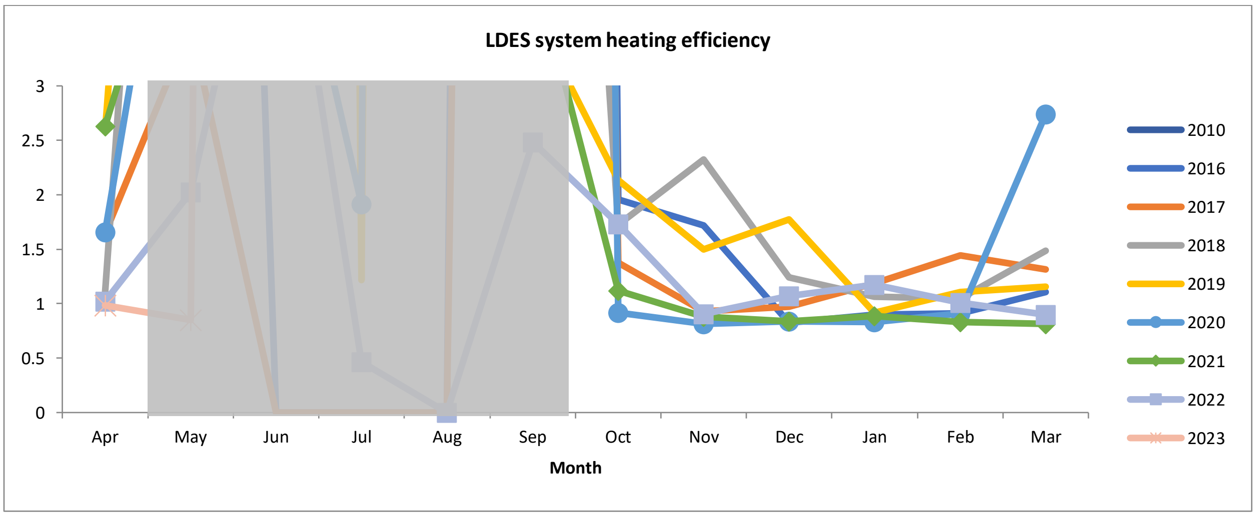

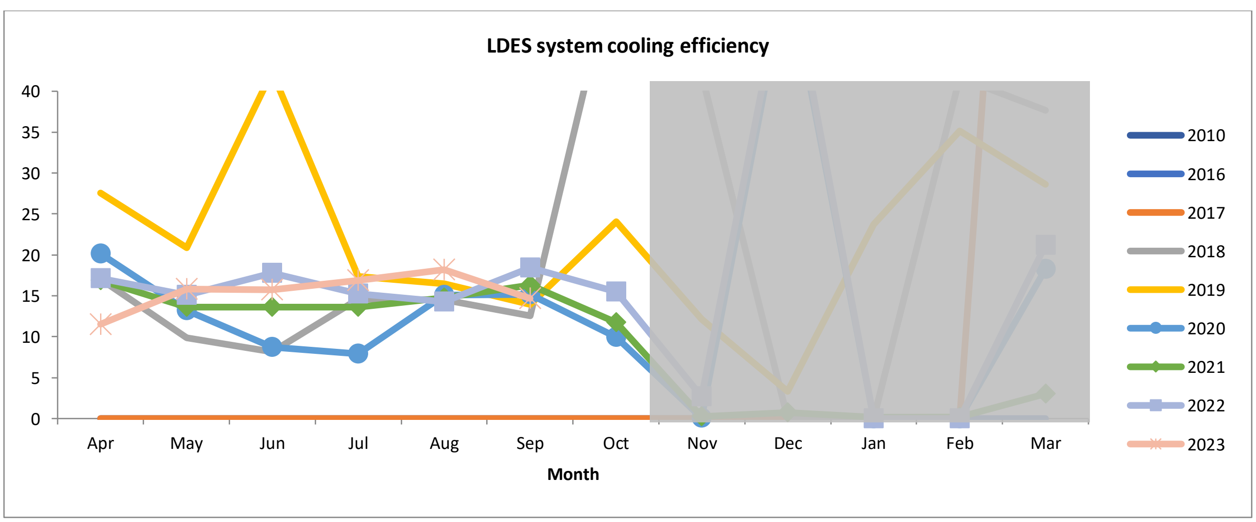

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2.14. Smoke and Indoor Air Quality (IAQ) Particulates

Currently smoke mitigation measures are initiated and implemented manually via a procedure. Air quality can be very localized, and current air quality notifications may not be specific to the local conditions at UBCO campus. Existing indoor air quality monitoring via the BMS currently is mainly limited to CO2. Some buildings also include relative humidity sensing, as well as CO and NO_2 for loading bays.

Wildfires are a common occurrence in the British Columbia, which has a high potential to bring wildfire smoke through Campus and into the buildings. Currently there are procedures in place to respond to wildfire conditions, such as changes to ventilation operation and changes to filtration, however we currently have no quantitative measurements to determine how successful these measures are.

The intent of this project is to implement additional outdoor air quality monitoring on campus to provide quantitative data to initiate air quality mitigation controls. Using a portable indoor meter can determine how successful our measures are in responding to poor outdoor air quality on campus. This information can be used for evaluation and processes can be adjusted accordingly. The project was implemented in Q2 FY23-24.

3. Energy Conservation Projects

In order to reduce utility costs, energy consumption and GHG emissions, energy conservation measures (ECMs) are regularly implemented on campus. In terms of actual studies/ projects, the following projects have been completed/ in progress over the last quarter.

3.1. UBCO ASC FIPKE Laboratory Rooms Demand Controlled Ventilation (DCV)

This measure was identified as part of 2020 SEMP report. The ventilation rate of non-critical laboratory spaces is not strictly controlled, causing significantly higher air changes per hour than required for occupant health and comfort. The use of upgraded controls equipment and strategies will be considered for reduction and standardization of air changes during both occupied and unoccupied hours. This project is expected to save 541,344 kWh Electricity and 2,677 GJ Natural Gas per year.

The engineering study for this measure was completed and approved by FortisBC in FY22-23 with an approved external funding of $90,000 and project implementation is currently underway.

3.2. Recommissioning study for the EME building

UBCO Energy Team is planning to recommission EME building and has put forward a FortisBC/ BCHydro incentive application to perform a Continuous Optimization study for the EME building. BC Hydro approved consultant Falcon Engineering will be contracted to provide support in performing this recommissioning for the EME building. This study is expected to identify deficiencies in the operation of the buildings that were wasting energy, increasing equipment wear and tear, or decreasing occupant comfort. The investigation phase of the project started in October 2022 and the project is expected to be completed by FY23-24.

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3.3. Science Heat recovery study

UBCO Energy Team is working with CURA Engineering to conduct a study to recover heat from the existing rooftop laboratory exhaust via glycol runaround heat recovery system. CURA Engineering identified to UBC Okanagan that the existing glycol runaround heat recovery system that interconnects recovered laboratory exhaust energy to the air handler AHU-1 system's outside air preheat ducting appeared to have spare capacity, because the exhaust coil's discharge air temperature held at 9.7˚C at an outdoor air temperature of -6˚C.

CURA suggested the potential of expanding the existing heat recovery system and coupling the existing exhaust coil runaround heat recovery either to air handler AHU-2 or AHU-3 preheat, or as potential source energy for the Multistack heat pump to displace input energy received from the campus' LDES system. Calculations verify that when the glycol runaround systems data points were acquired at -6˚C, the outside air preheat flow for AHU-1 was 18,188 CFM (8,585 L/S) while the exhaust air flow at the rooftop recovery coil air flow was 26,313 CFM (12,420 L/S); verifying that the exhaust air stream had additional flow and energy available that could not be transferred to AHU-1's preheat coil

An incentive application under FortisBC's Custom Efficiency Program has been submitted to conduct the study and potentially take advantage of the funding sources available. This study was completed in Q4 2022 with an approved external funding of $140,000. The project is expected to be implemented in FY24-25.

3.4. Air Handling Unit Supply Air Temperature reset

For three of the academic buildings (ADM, LIB, SCI), the reset of the supply air temperature (SAT) was tied to heating valve positions resulting in lower air handler setpoints during night setback periods. To address this issue, the SAT reset logic was adjusted to respond to cooling demand (number of cooling requests from different zones) rather than heating demand. This modification is expected to ensure that the SAT reset is aligned with the cooling requirements, preventing unnecessary reduction of the air handler setpoint during night setback scenarios. The project was completed in September 2023 and will be monitored.

3.5. Upper Campus Health controls recommissioning

Upper Campus Health was identified as having high energy usage and poor temperature control throughout the year, as well as simultaneous heating/cooling of AHU1. To address these concerns, the building controls programming was examined in detail, PID loops were tuned to enhance the responsiveness of the control system and ASHRAE standard programming were implemented wherever applicable. These interventions were aimed at optimizing energy efficiency, rectifying temperature control deficiencies, and eliminating the occurrence of simultaneous heating and cooling in AHU1. The project was completed in September 2023 and will be monitored.

3.6. Monitoring improvements

A few monitoring improvements are continuously being implemented by the UBCO Energy Team. For example, resolving the WIFI occupancy reporting issue, working with Siemens to fix the Desigo deficiencies list, resolving integration between Advantage Navigator and Desigo backend to maintain BMS database, adding missing trends on the key hydronic graphics etc.

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4. New Construction Projects

The Energy Team is involved in the design and construction process for new construction on campus. The Energy Team's goal is to ensure that the design and construction of new buildings on campus are consistent with the campus Whole Systems Plan in terms of energy targets and sources. The Energy Team also co-ordinates the pursuit of energy efficiency incentives from FortisBC.

4.1. Interdisciplinary Collaboration and Innovation (ICI)

The UBC Okanagan Campus (UBCO) is proposing a new building to facilitate world-leading, interdisciplinary/ transdisciplinary research and academic programming, and to advance its mandate as a partner in regional development. Tentatively titled the Interdisciplinary Collaboration and Innovation (ICI) building and is expected to be up to 13,364 gross square meters. Energy Team has been involved in advocating the creation of Owner's Project Requirements (OPR) for the ICI building, reviewing the schematic designs, detailed designs for the building and providing inputs on the building mechanical, electrical systems and energy-related standards/ benchmarks.

4.2. Office Modular II (OM2)

UBCO is currently working on a project proposing a new modular structure to address immediate space needs resulting from growth in UBC Okanagan's faculty and program staffing. The proposed building will be located directly north of Office Modular 1 (OM1). The new Office Modular 2 (OM2) building's design, footprint, and function will closely match that of OM1. OM2 will also have washrooms provided that will service the occupants of OM1 and OM2. Project Services has prepared the basis of design document. Energy Team has been working with Project Services to apply for an eligible incentive for the Office Modular building through FortisBC.

4.3. Childcare (Daycare Extension)

The Child Care Facility is a proposed new $3.294M facility, expected to be 520 GSM (5,600 GSF), located adjacent to the existing UBC Okanagan Daycare Building at 1262 Discovery Avenue and operated by the University Children's Learning Centre Society (UCLCS or 'the Centre'). Through the development of a new facility and outdoor play space adjacent to the existing Centre, the Child Care Facility will add 37 new childcare spaces (12 infant/toddler and 25 3-5 year) to the Centre's 57 childcare spaces (22 infant/toddler and 35 3-5 year) accommodated in the Daycare Building.

Energy Team has been involved in reviewing Design Brief of the project and will be working to apply for an eligible incentive for the this extension through FortisBC.

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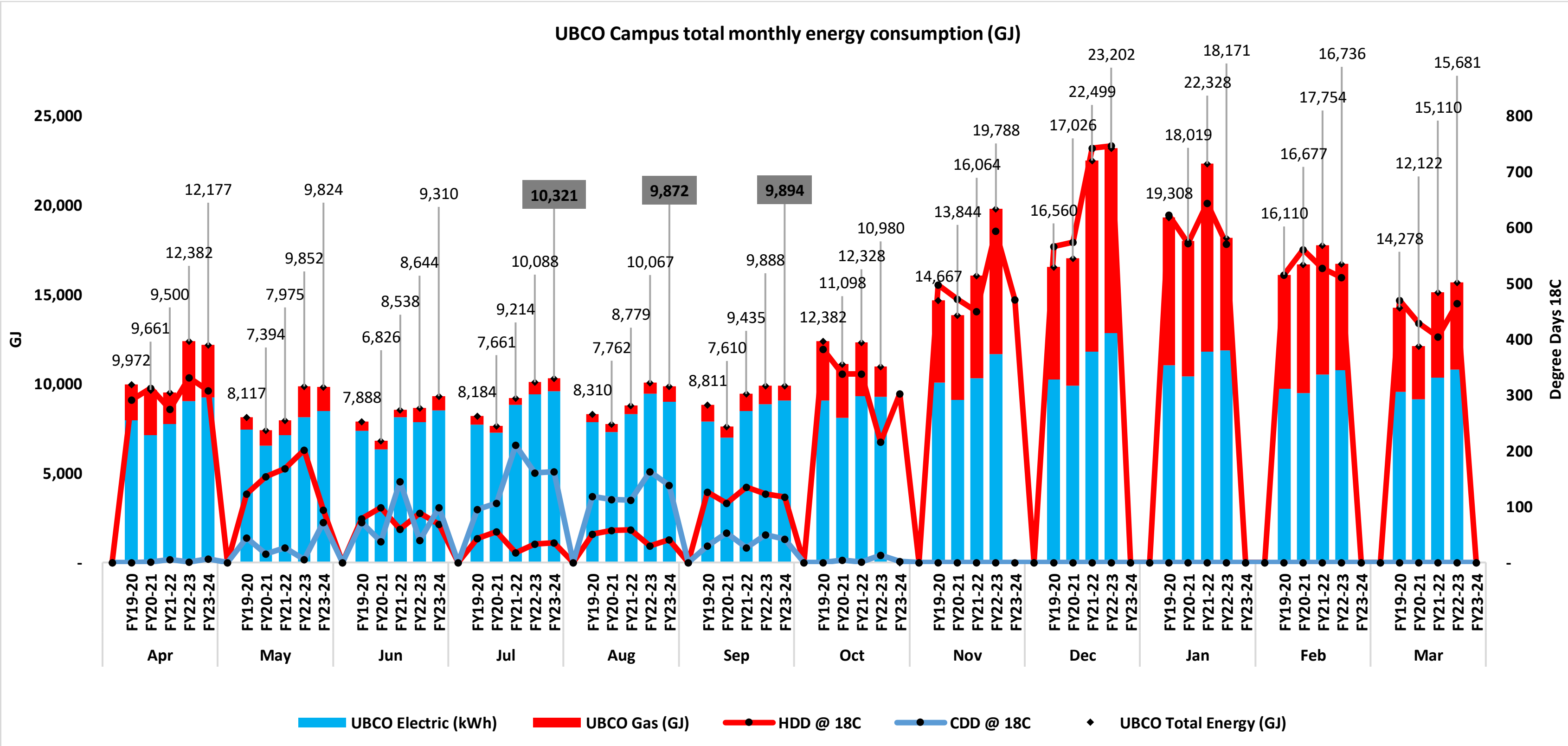
5. Monthly Energy Performance Graphs

This section presents various figures which show and compares the month over month energy consumption from FY 19-20 to FY 23-24[2].



[2] For section 5, any year listed in the graph is start of the fiscal year.

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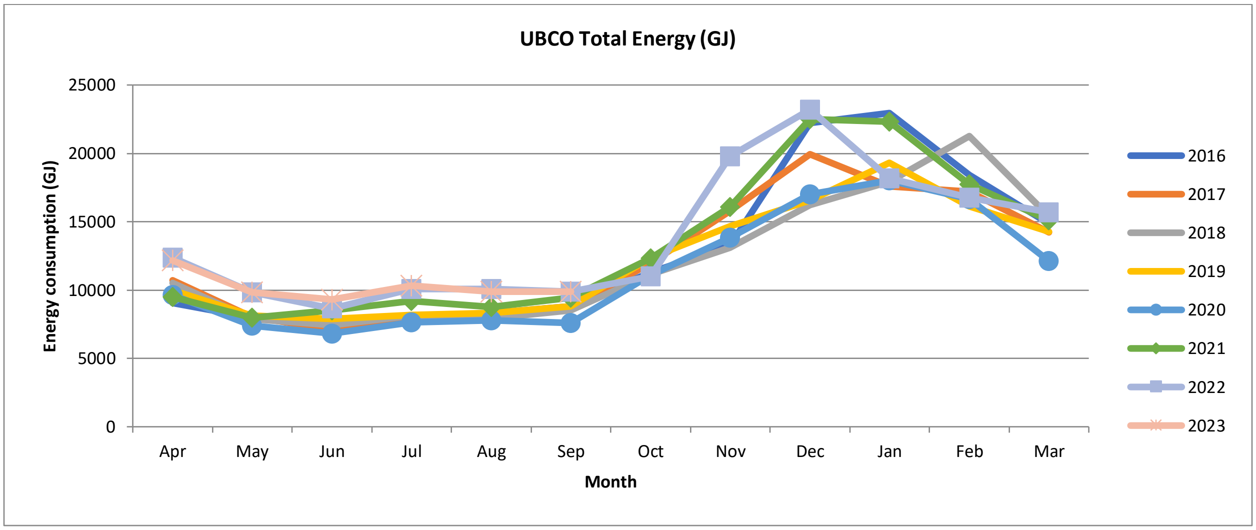

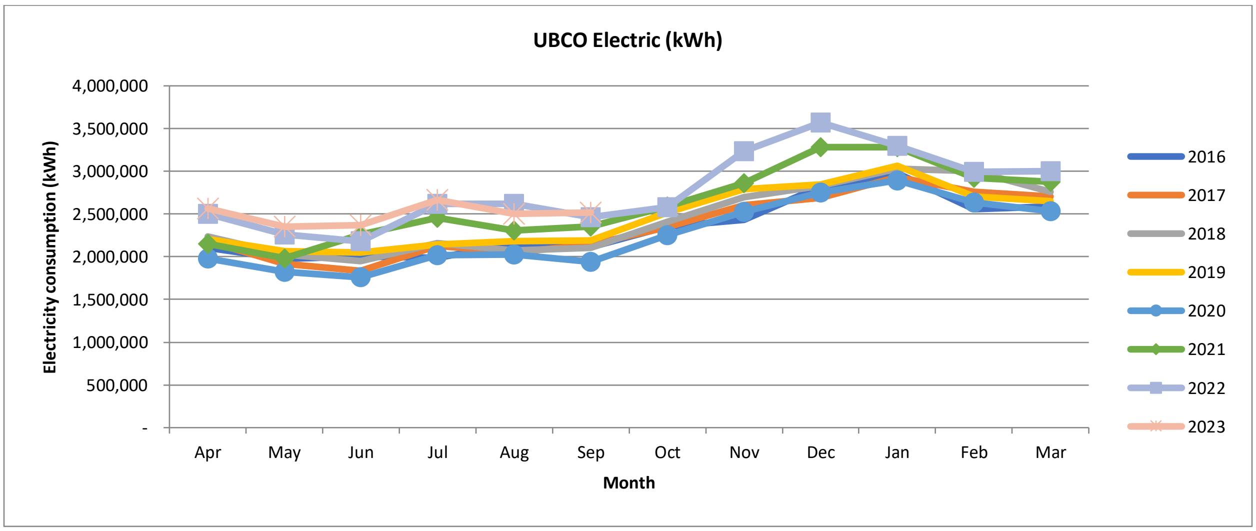

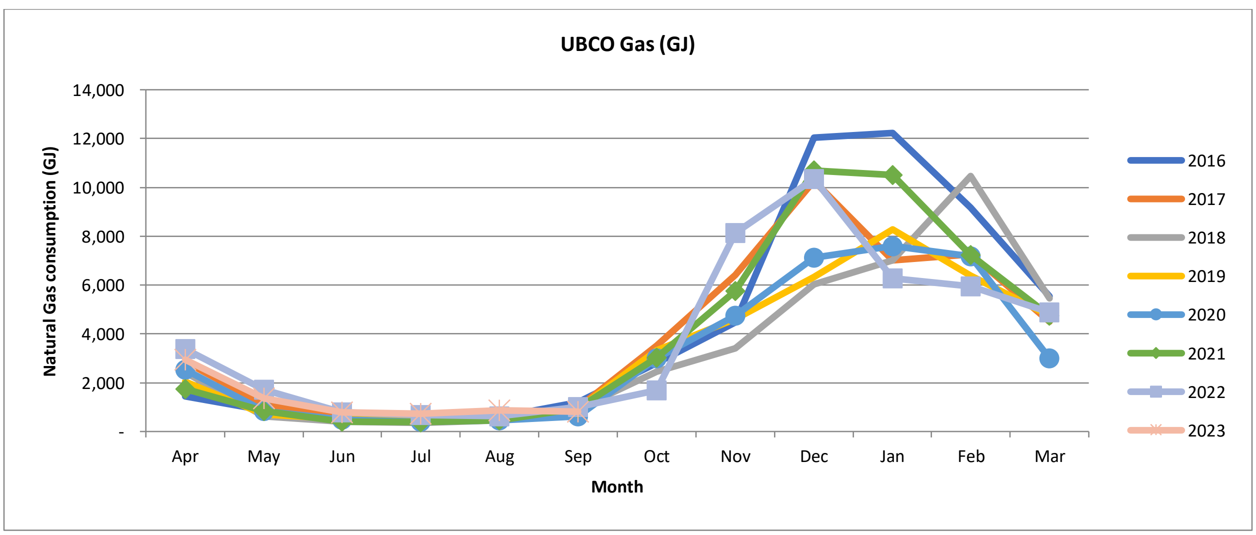

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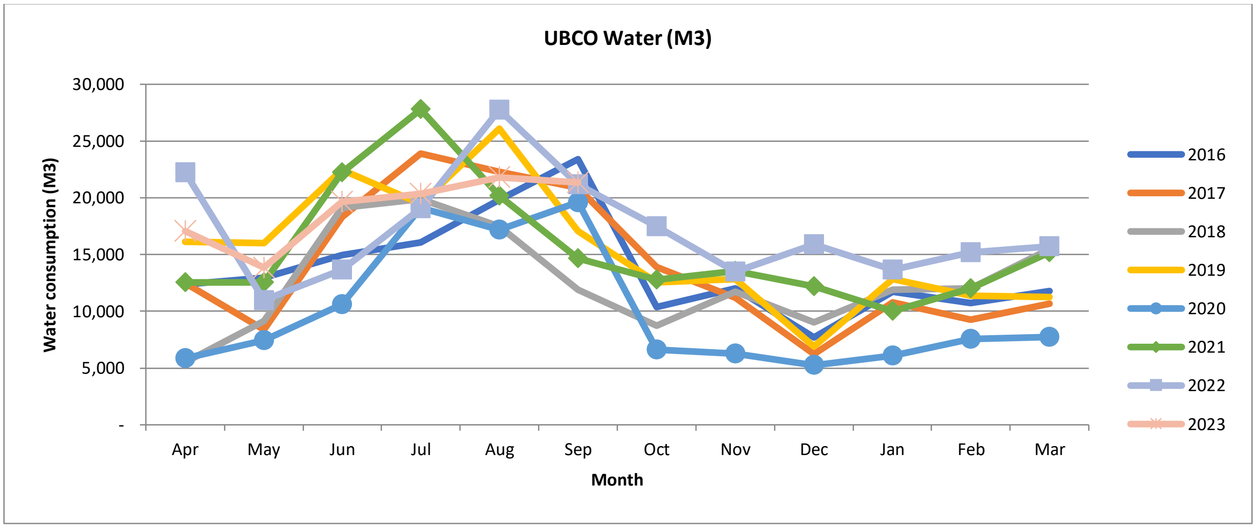

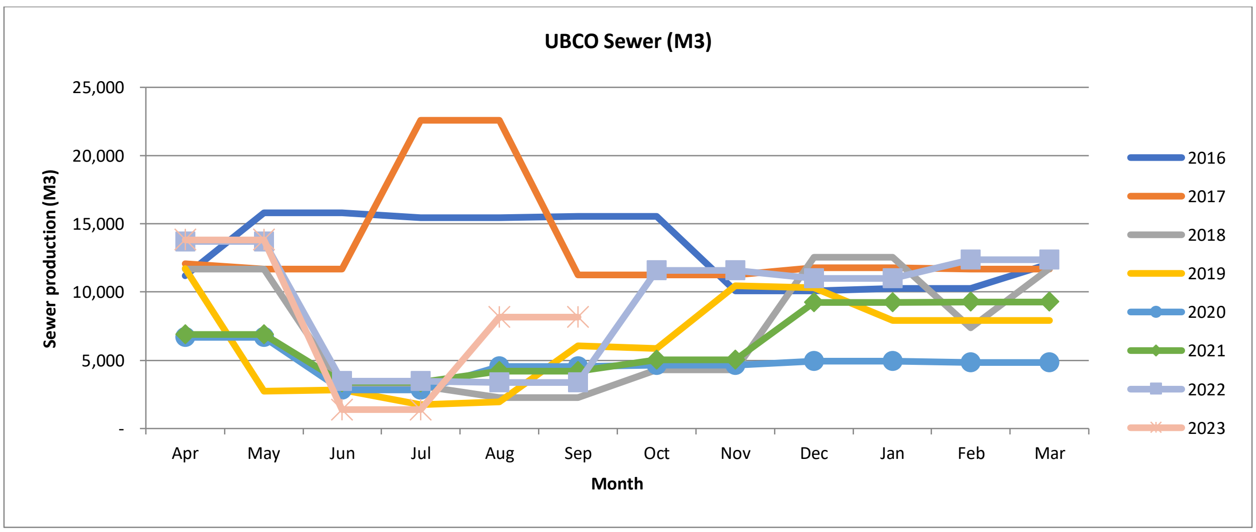

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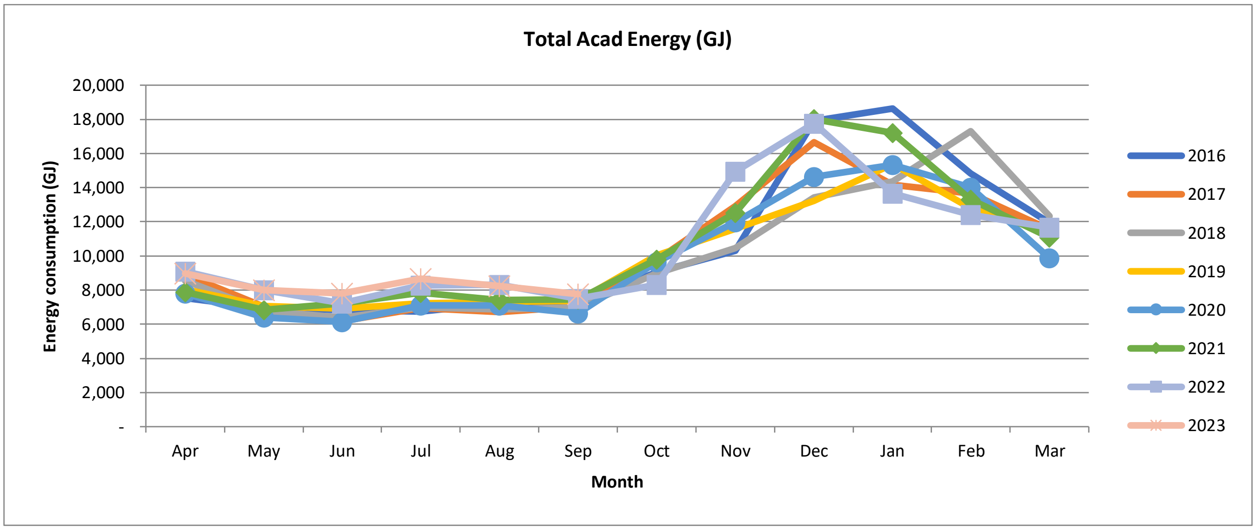

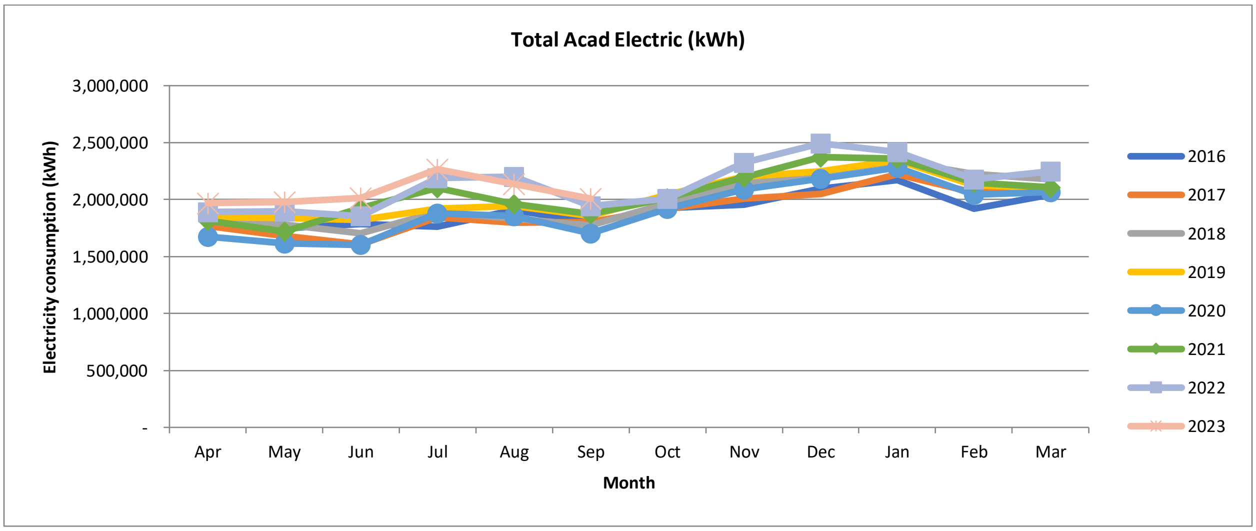

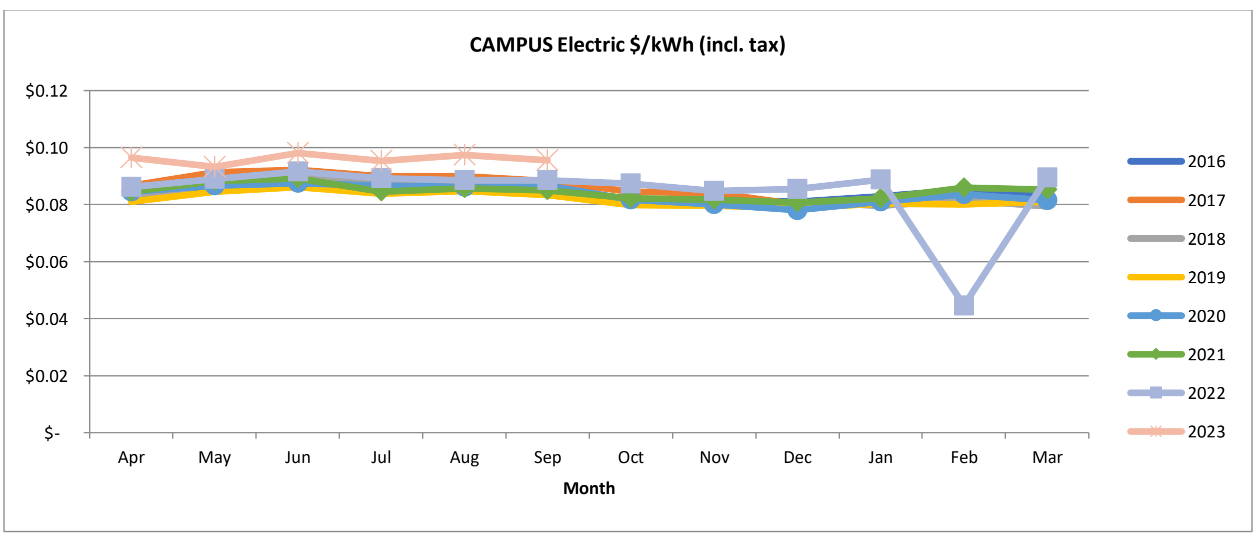

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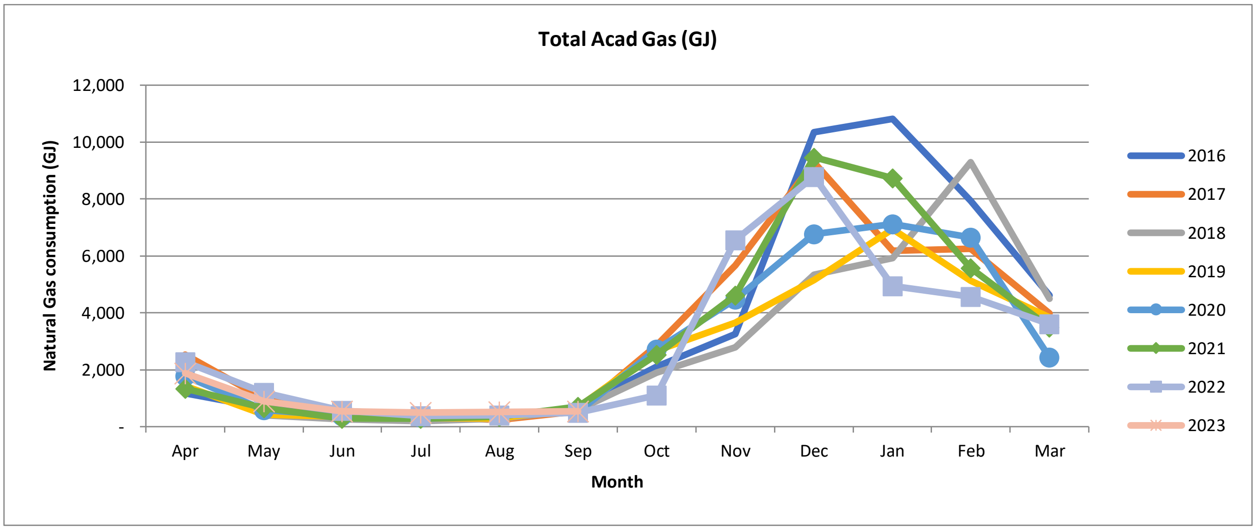

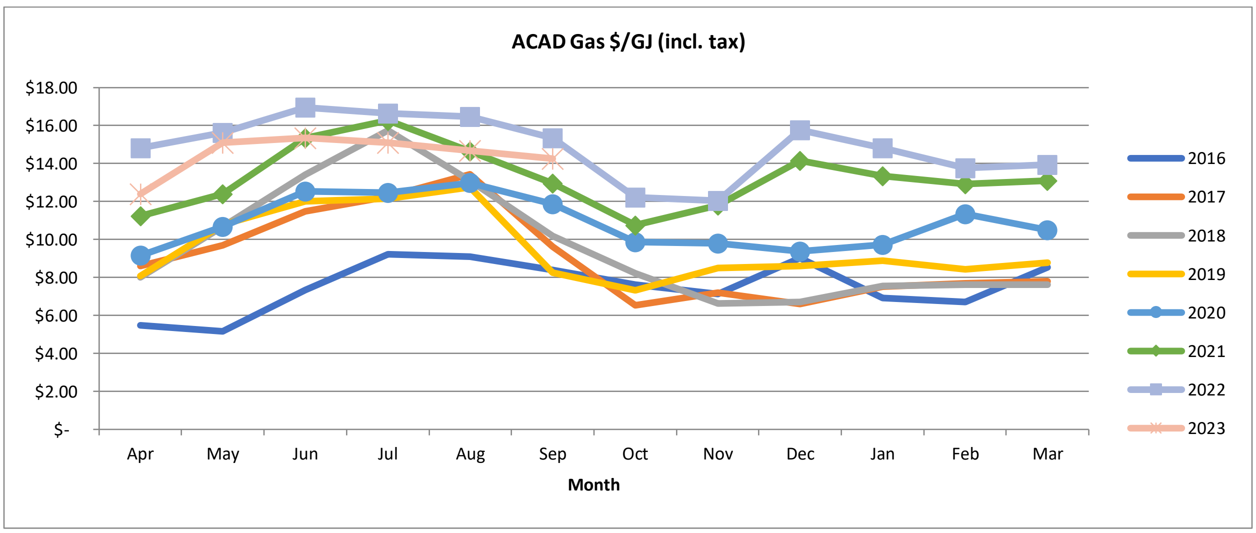

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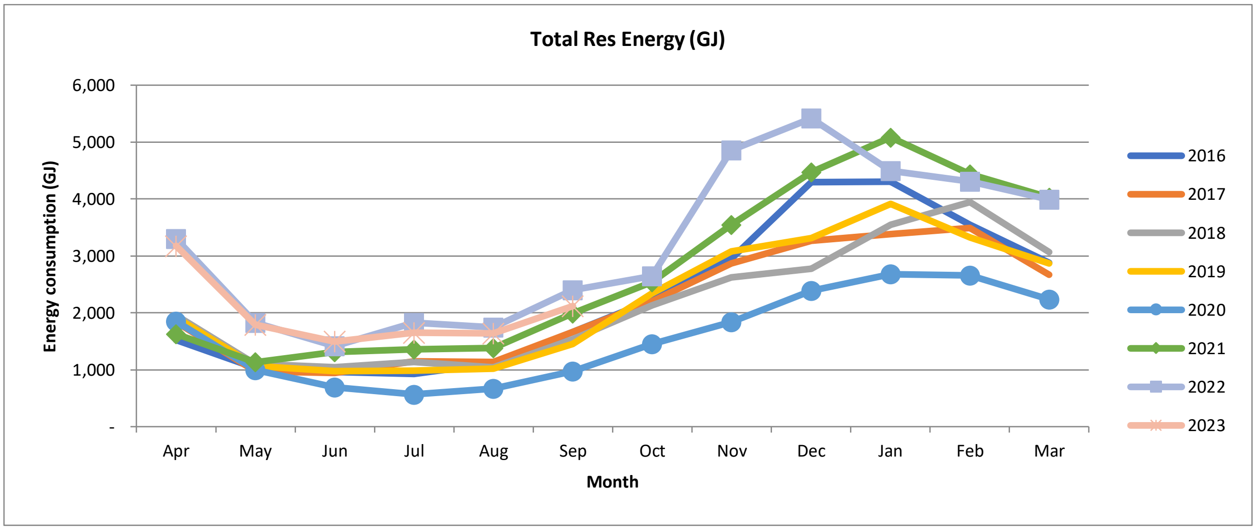

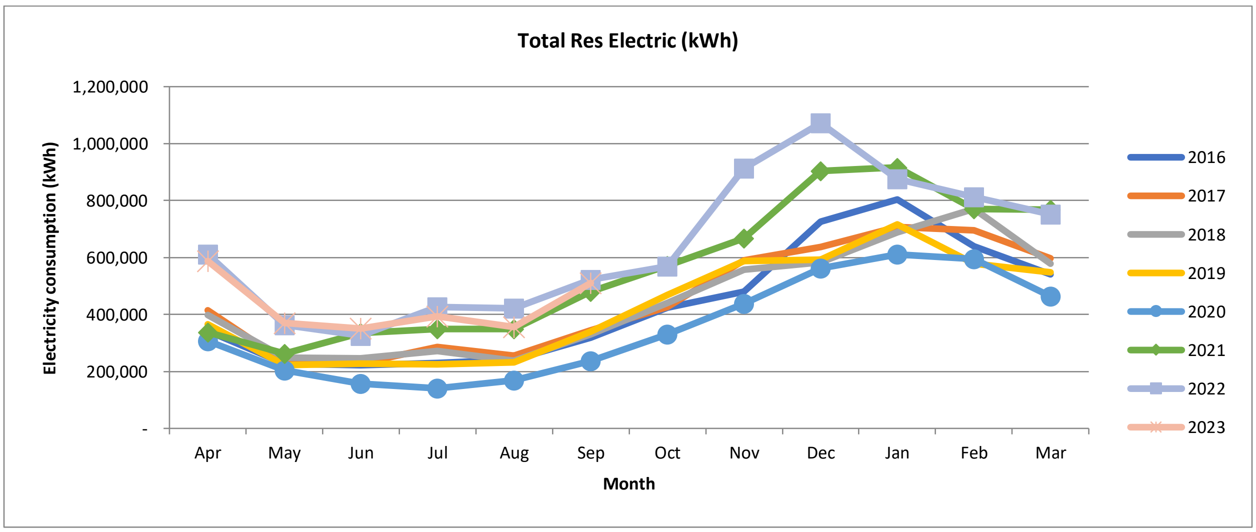

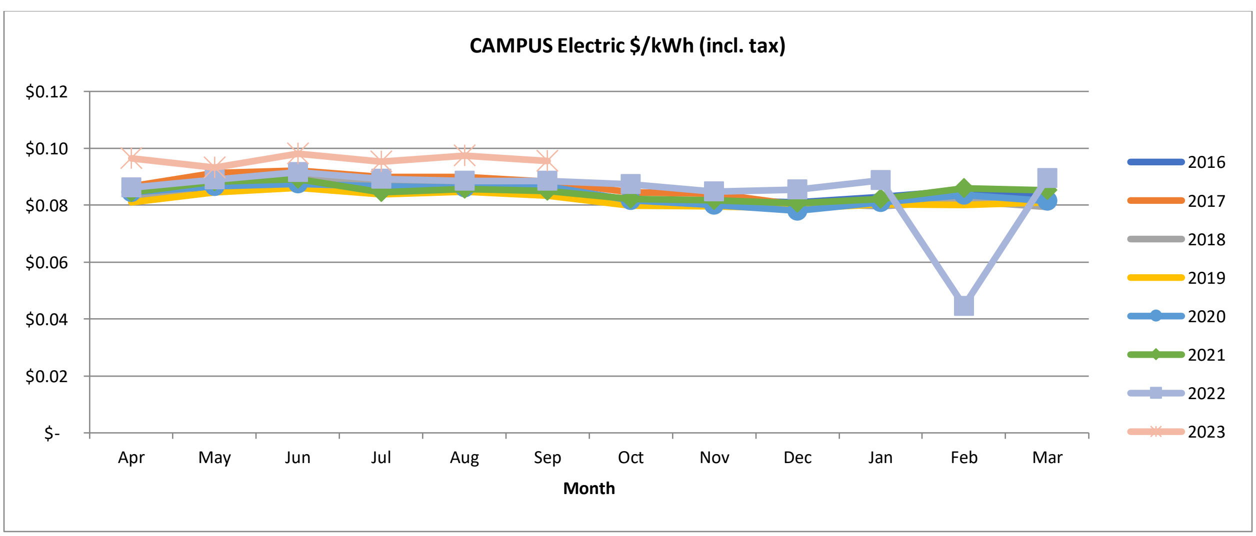

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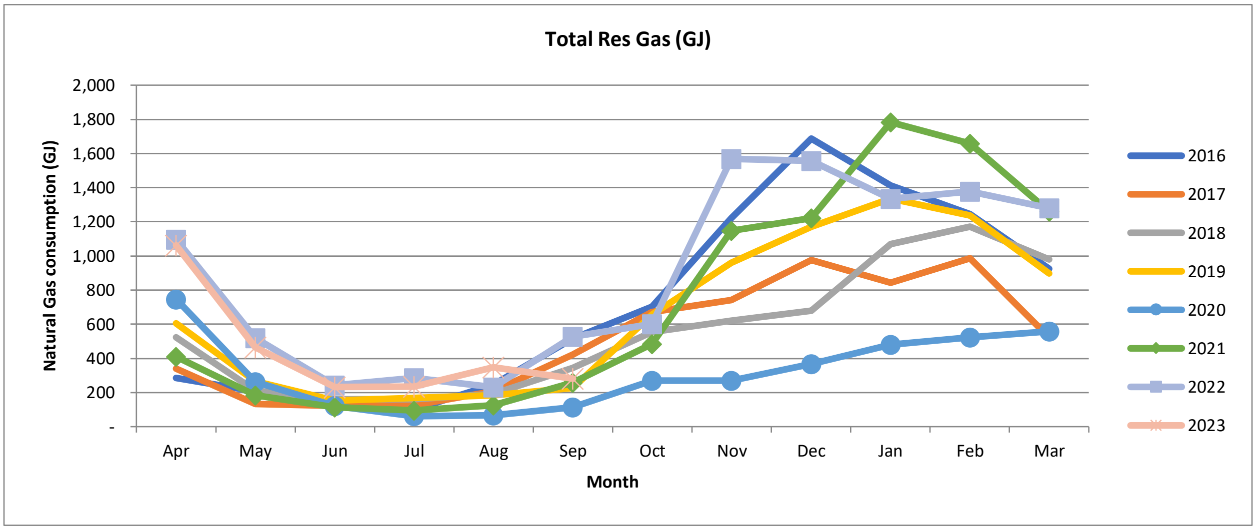

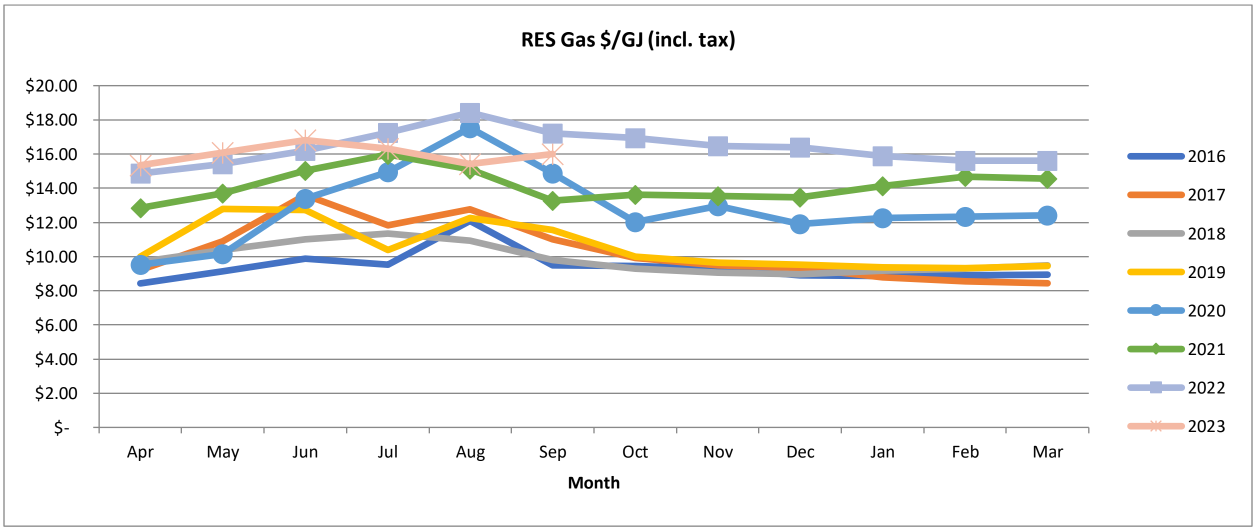

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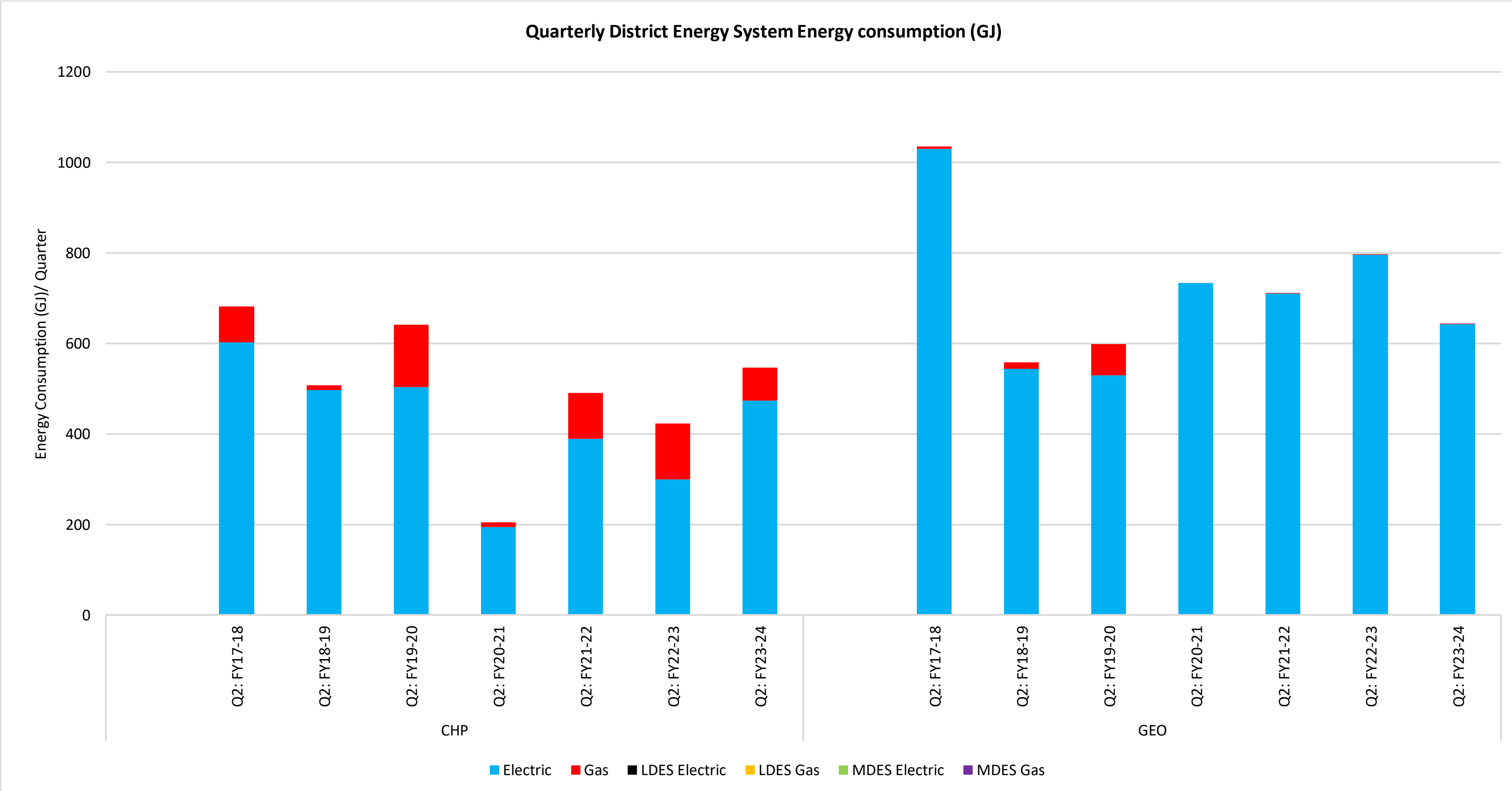

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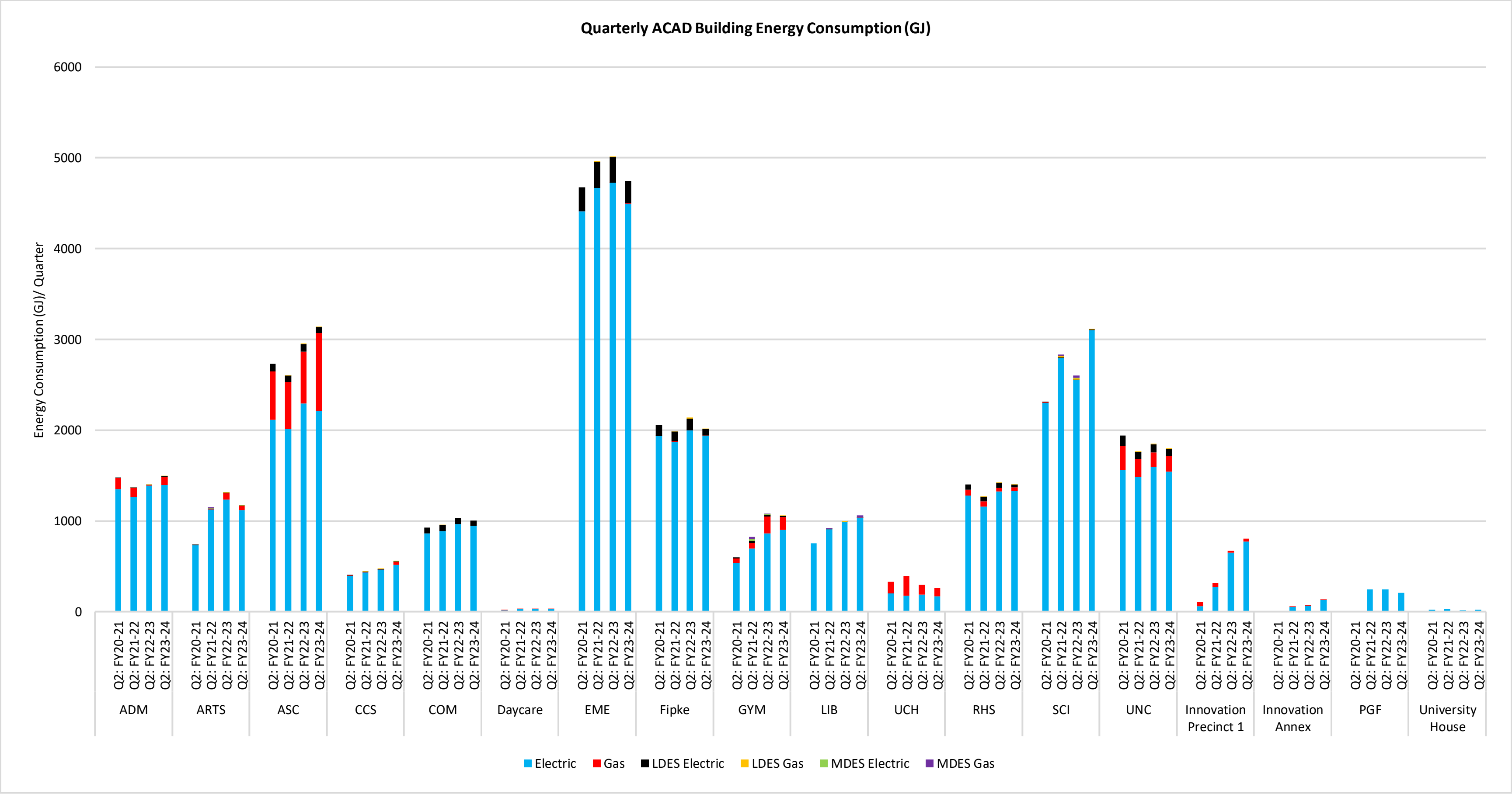

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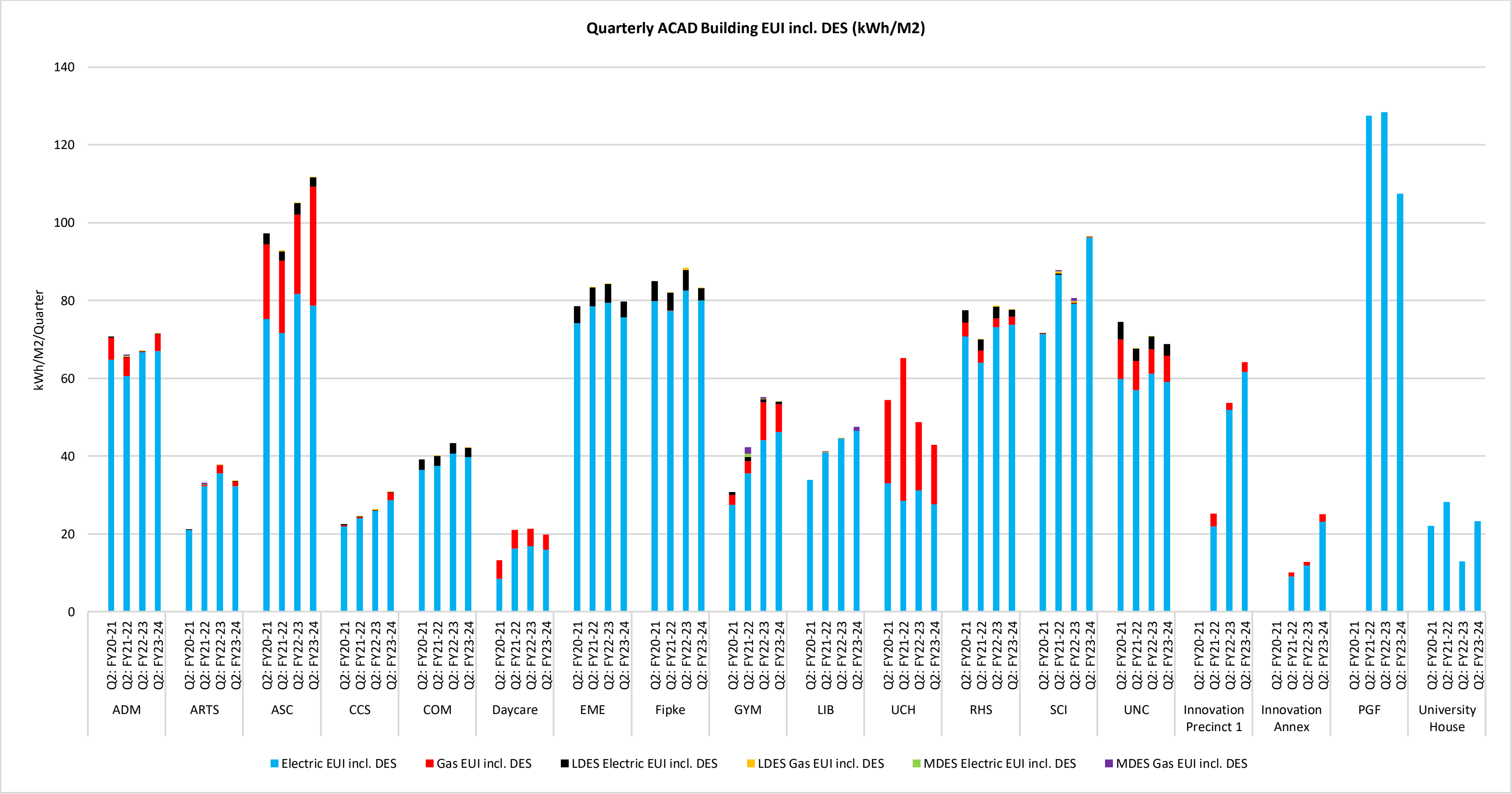

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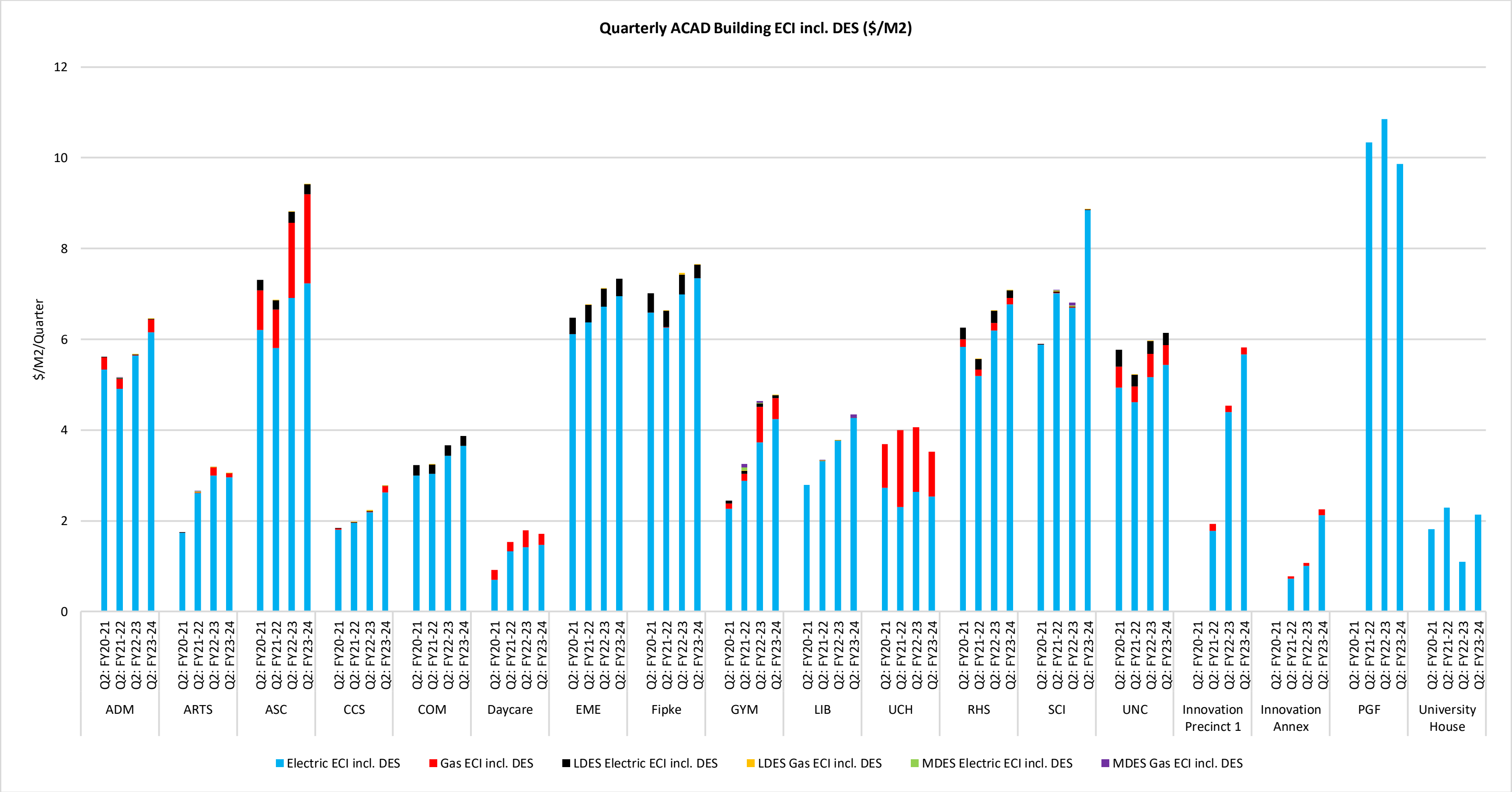

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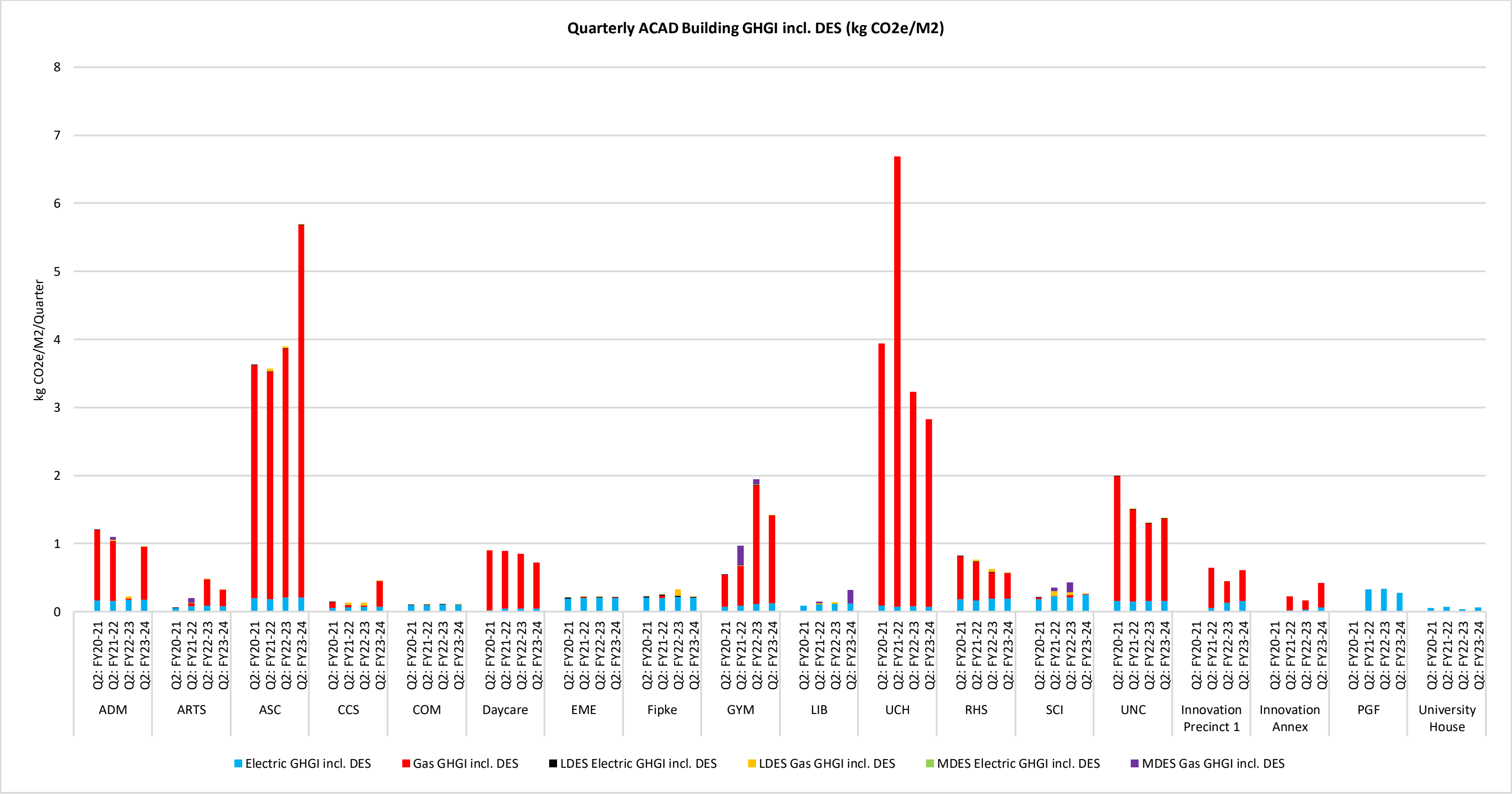

* Assuming electricity emission factor of 2.587 tCO_2e/GWh (old FortisBC grid factor)

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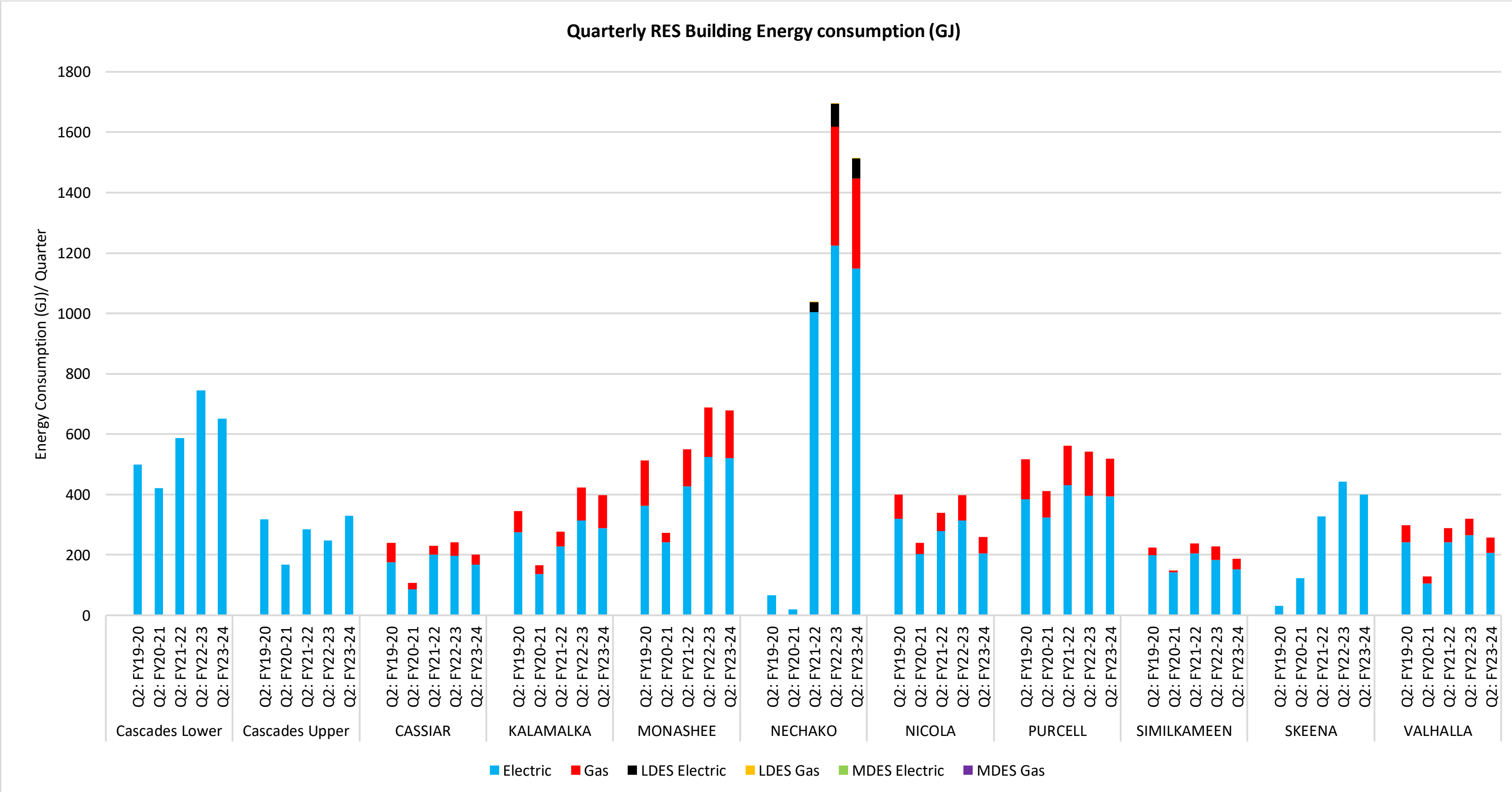

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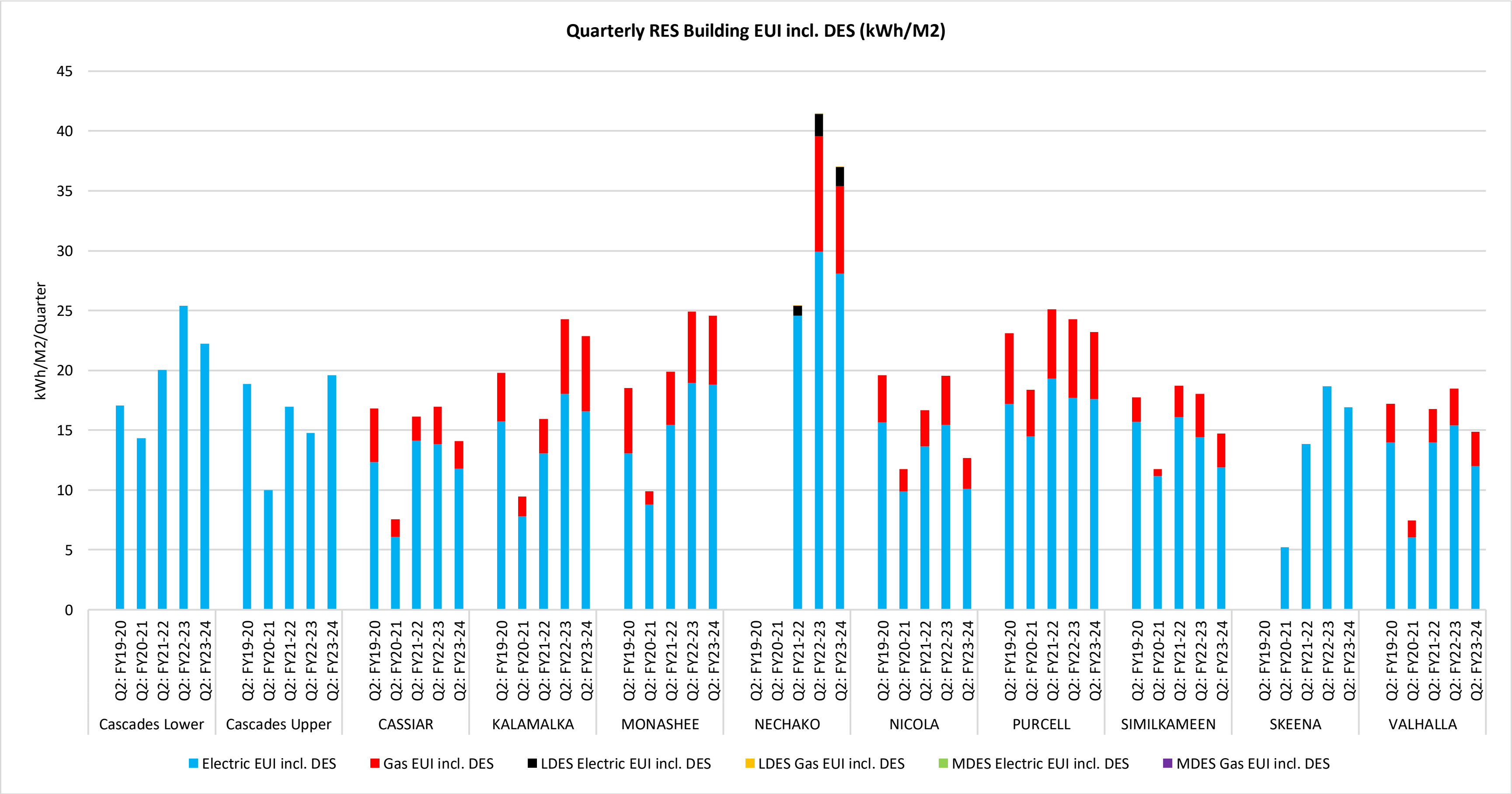

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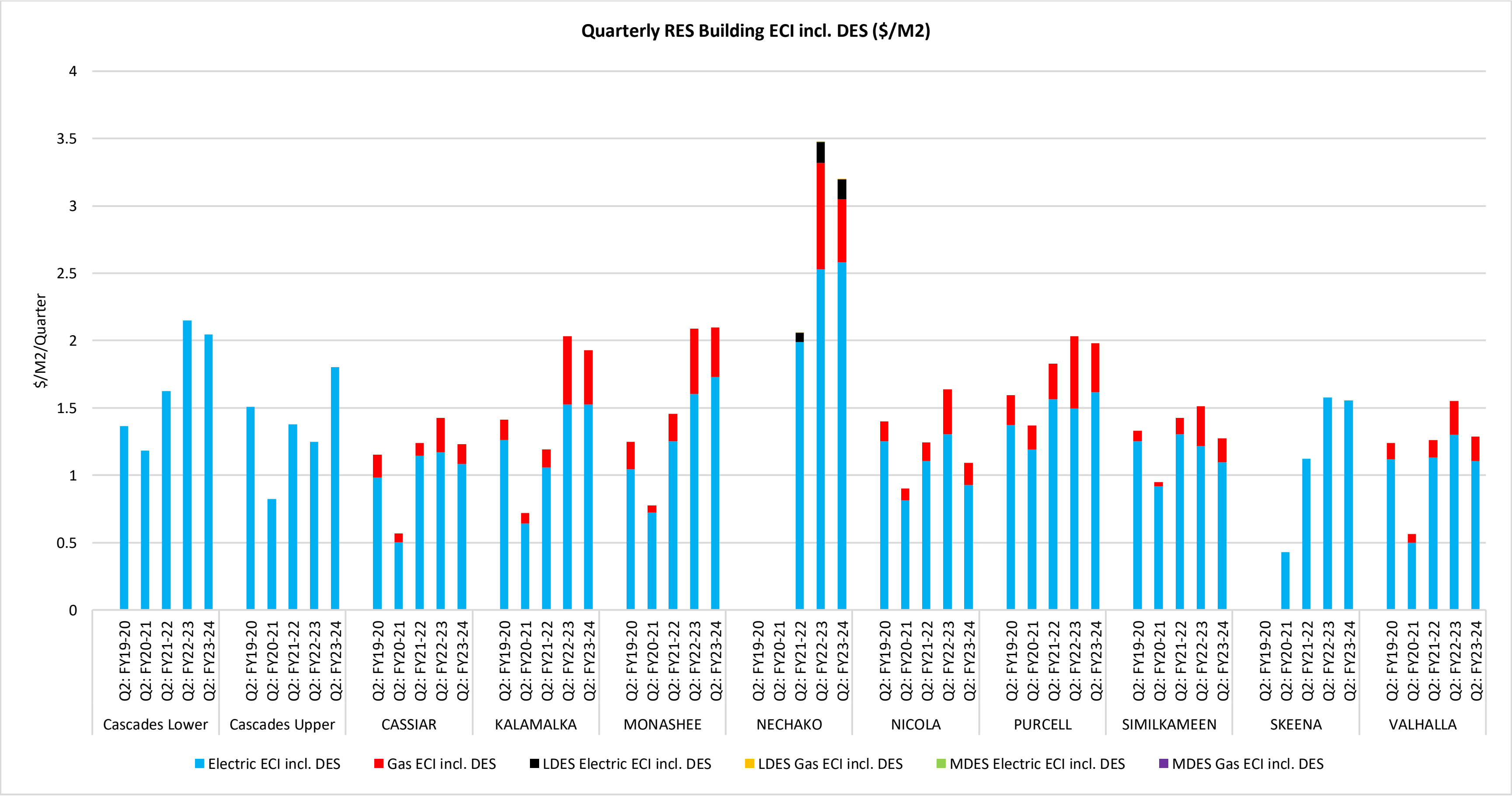

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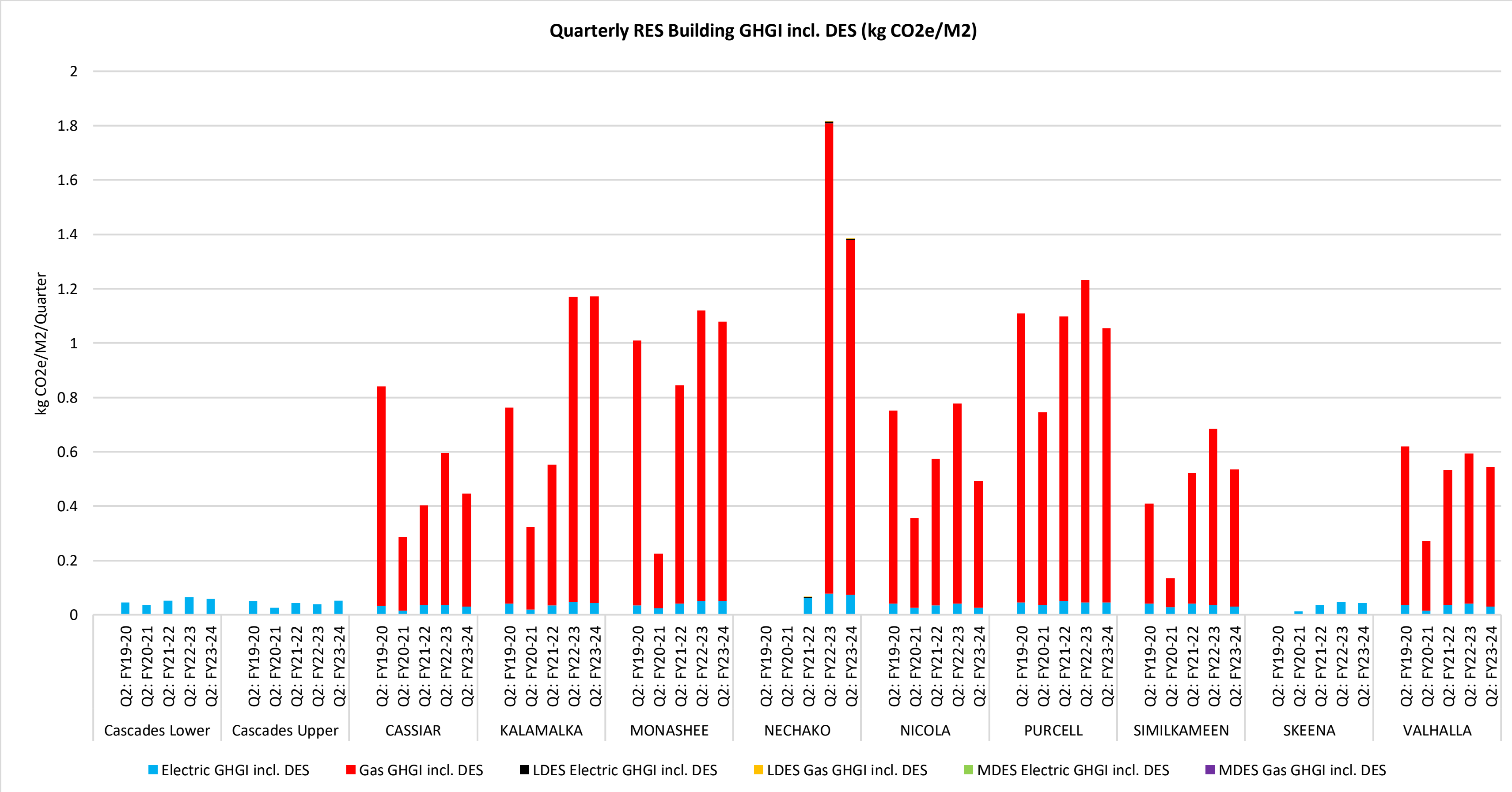

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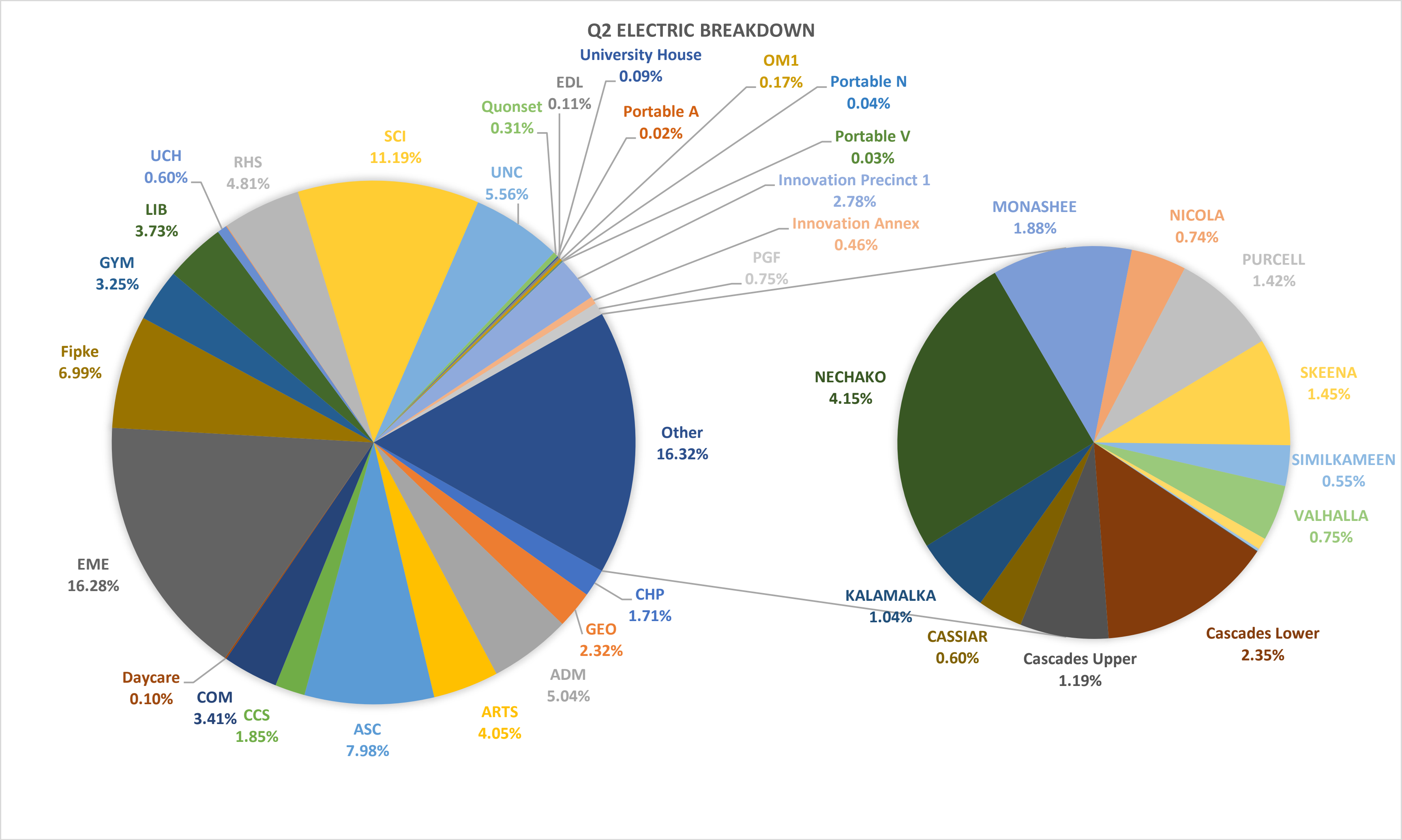

Note: Building electricity and gas consumption values shown are for consumption within the building. Indirect gas consumption via MDES & LDES is not included.

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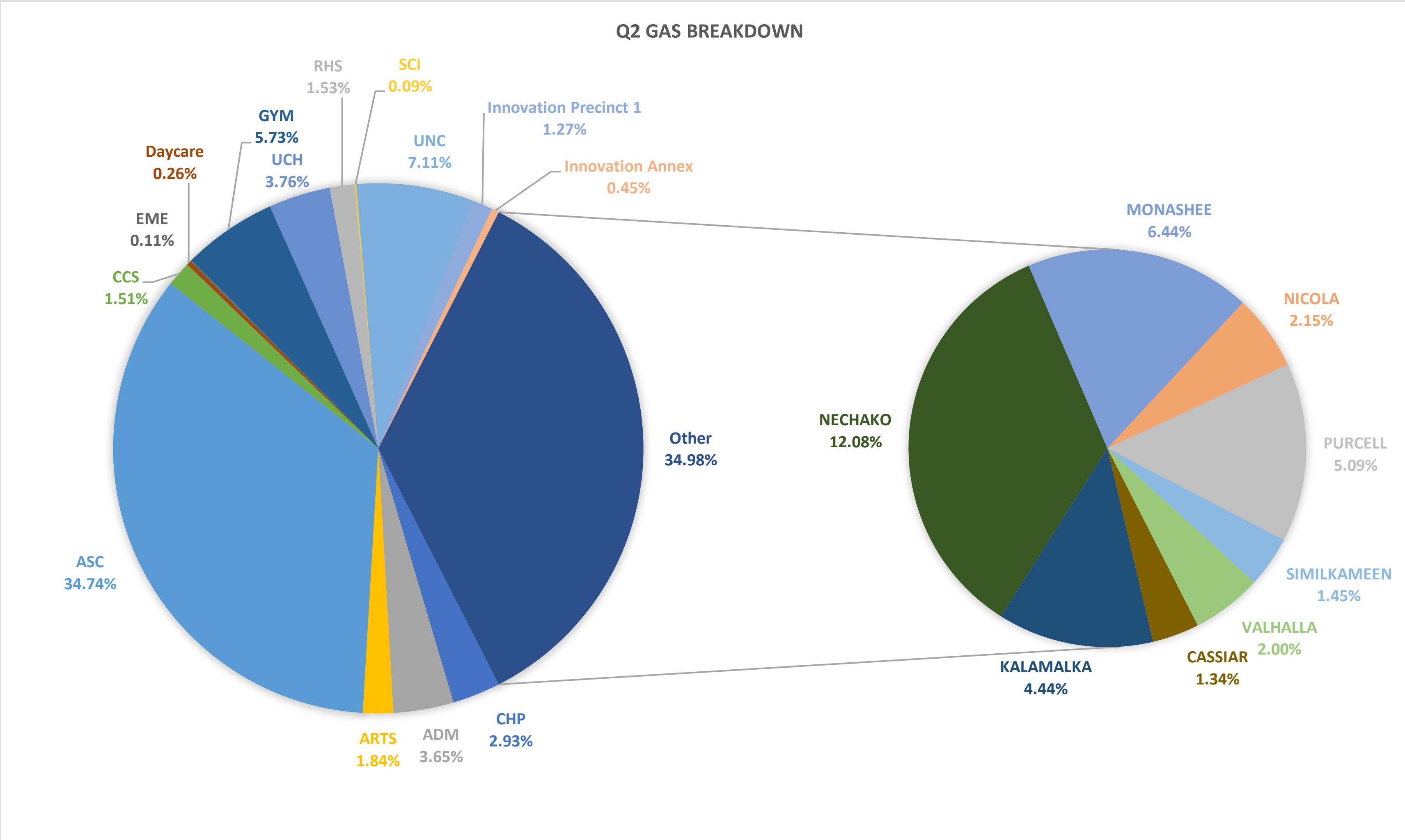

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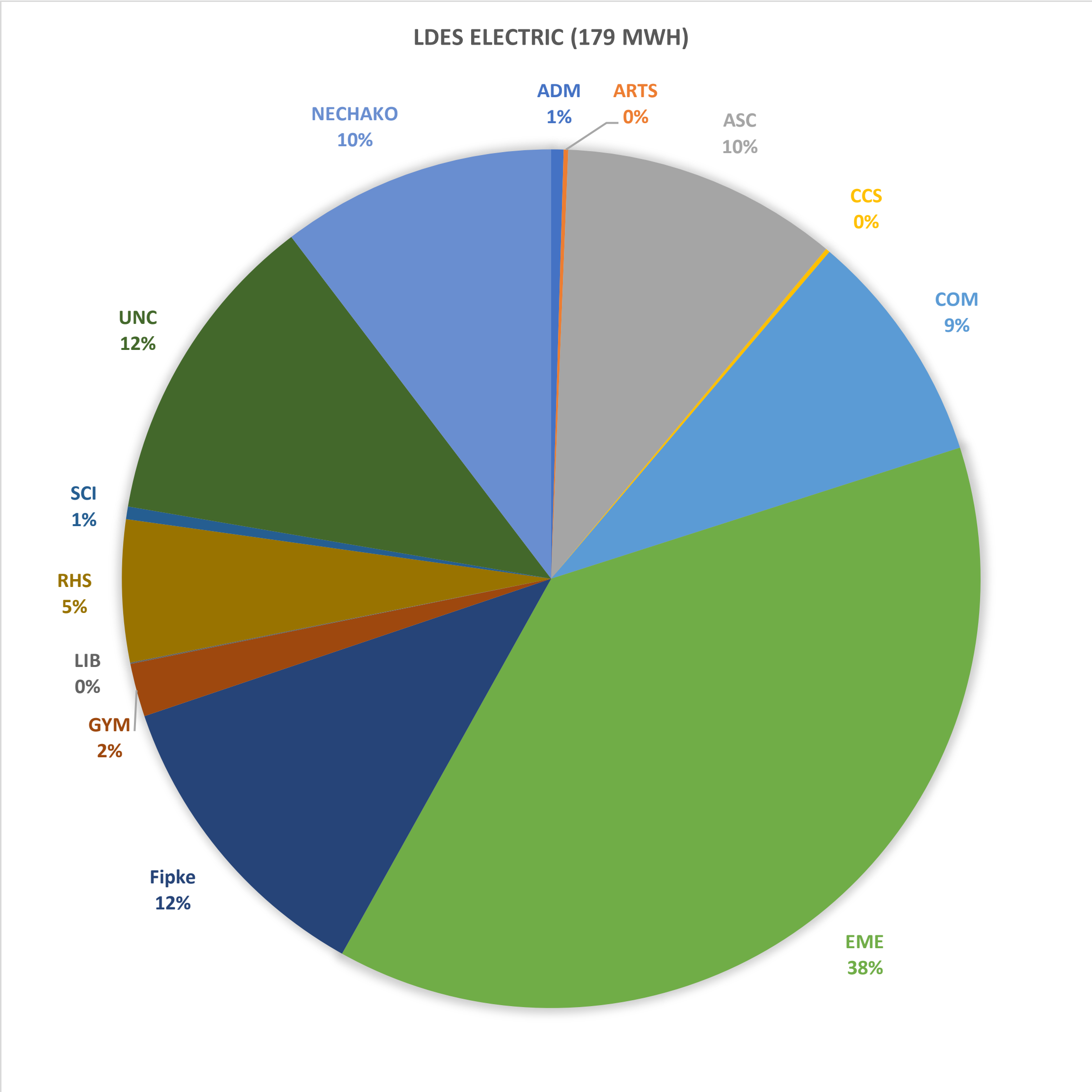

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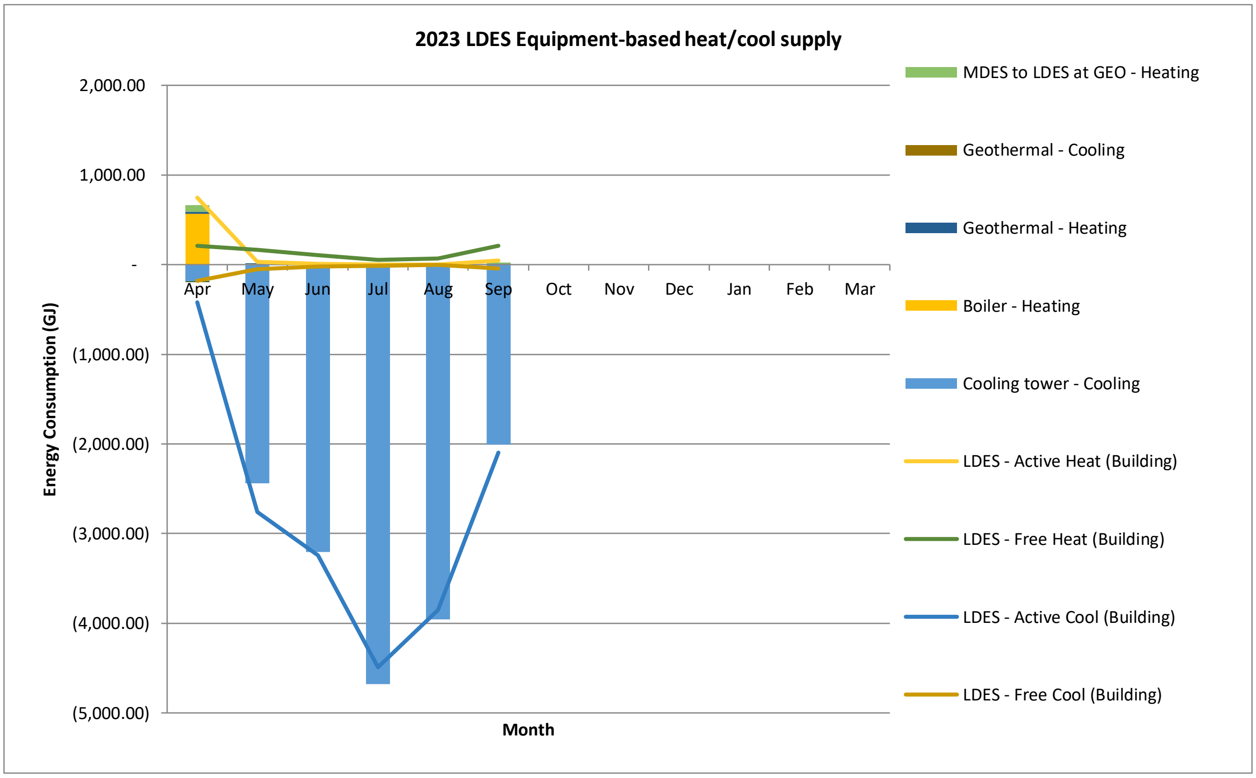

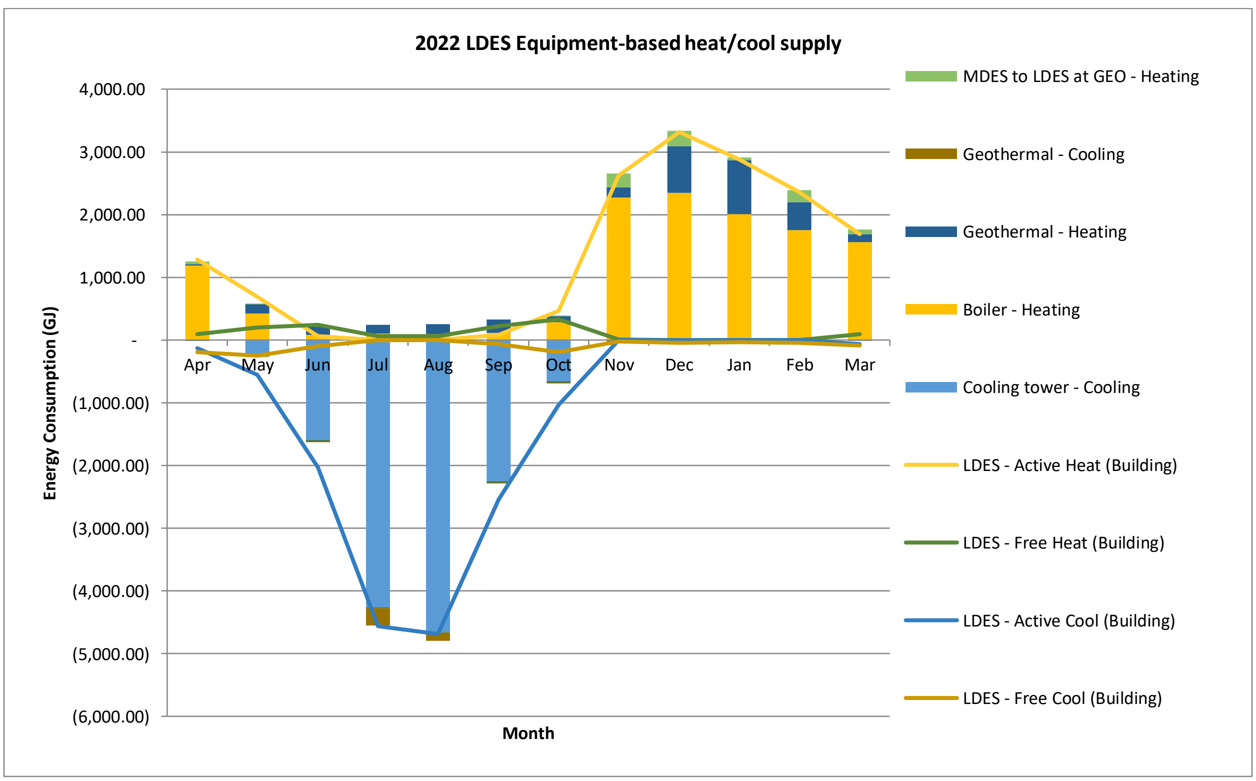

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