

2021 LEED Performance

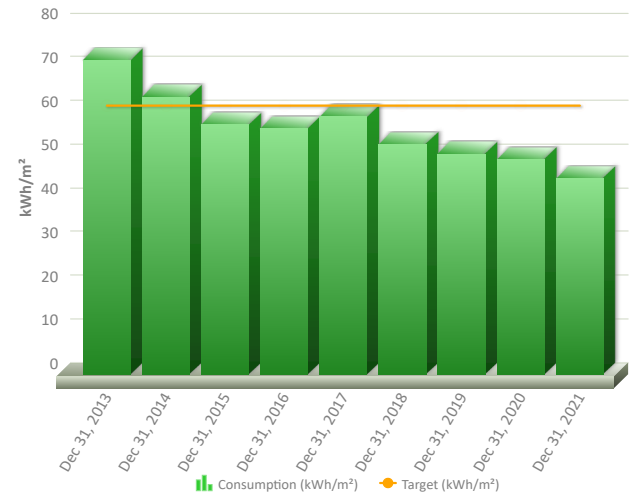
Reliable Controls Corporation - South Annex at 120 Hallowell Road

Since October 2012, Reliable Controls has occupied this LEED platinum-certified facility located at 120 Hallowell Road, in Victoria, British Columbia, Canada. Throughout its history, the building has witnessed a steadily changing (mostly growing) number of occupants as well as many improvements to the operations of its mechanical and electrical systems, specifically the HVAC, lighting, and security systems. The simple, flexible, and sustainable hallmarks of the Reliable Controls BAS means optimizing the building operations is simple to do, and the results are easy to monitor.

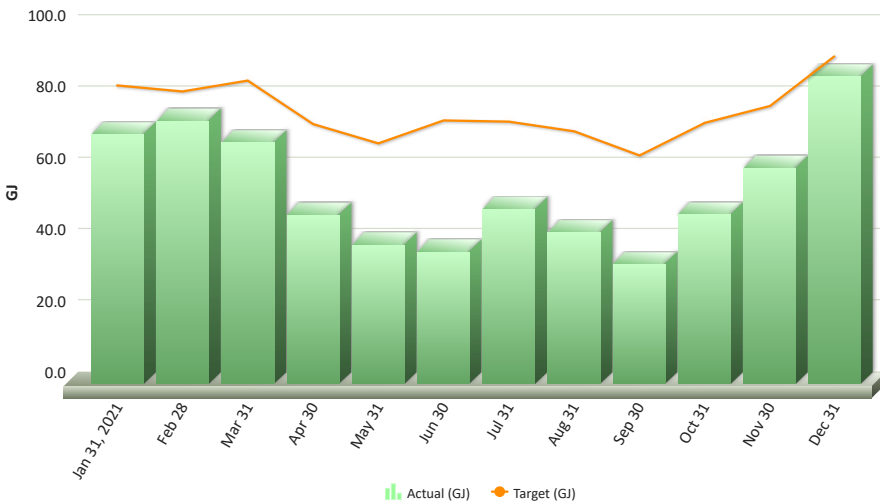
The chart to the right displays a track record of the energy consumed by the annex for each full year of occupancy since 2013, expressed in units of Energy Use Intensity (EUI). A commercial building is considered *green* if its EUI is 110 kWh/m² or lower. As can be readily seen in the chart, the EUI for the Reliable Controls LEED platinum South annex has consistently been well within the green building range and in the year 2021, the EUI was **44.9 kWh/m²**, well below the building's design target of **58.8 kWh/m²**.

In 2021, the occupancy of the South annex was very low, as the Delta and Omicron variants of COVID-19 kept most employees working from home. The British Columbia climate also showed its teeth in 2021, with multiple summer heat waves setting new records, record rainfall in November, and ending with a cold snap in December that dropped the outdoor air temperature to -7 Deg C!

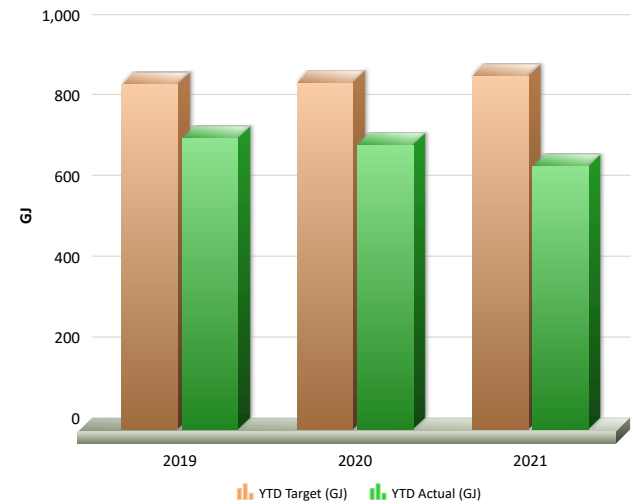
Energy Use Intensity (EUI)



Monthly Energy Consumption

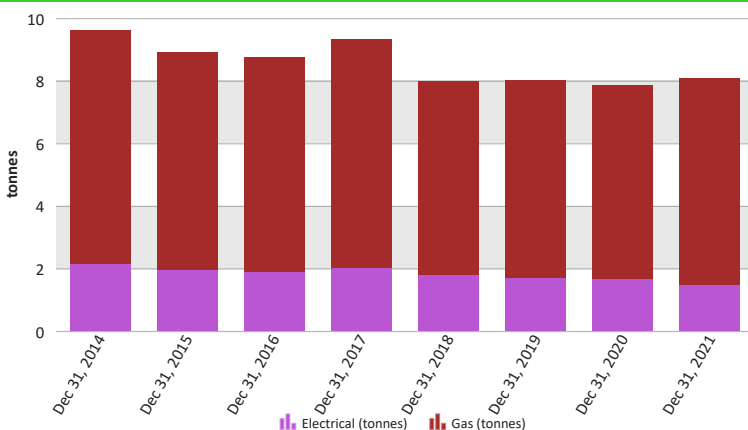


Annual Consumption Target vs Actual



The Reliable Controls BAS calculates a daily energy consumption target in gigajoules (GJ), based on 50% of the ASHRAE standard 90.1 (1999), adjusted for actual heating and cooling degree days. Standard 90.1 is used to predict the energy consumption of an energy efficient building within a specified geographical region. The actual energy consumed by the Reliable Controls South annex in 2021 was **36.5%** of ASHRAE 90.1.

Greenhouse Gas Emissions (CO₂e tonnes)



In the province of British Columbia, over 90% of the electricity consumed is produced by hydroelectric generation. That means using electricity, rather than natural gas, results in far fewer tonnes of greenhouse gas per GJ of energy, in fact, about 95% less.

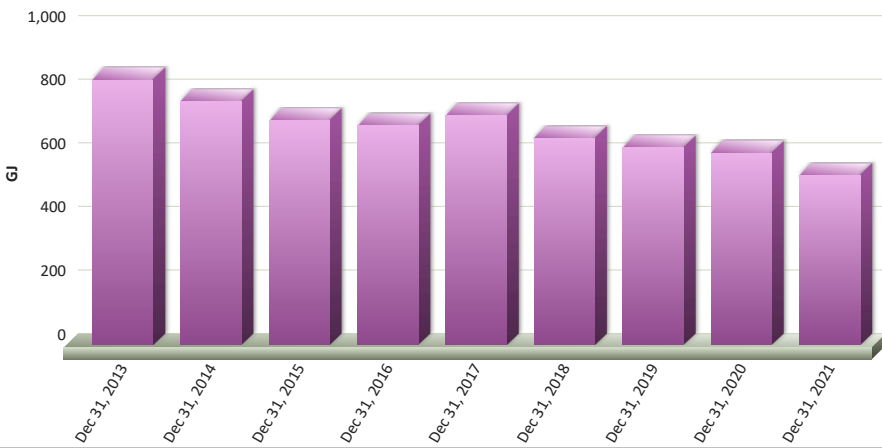
The chart on the left shows the total greenhouse gas emissions from the energy consumed by the South annex, expressed in tonnes of CO₂ equivalent (CO₂e). CO₂e is used by many industries to compare the overall global warming potential (GWP) of the greenhouse gases emitted by different processes.

The South annex achieved a 17.8% reduction in greenhouse gas emissions from 2014 to 2020. In 2021, there was a slight increase in natural gas consumption, as described below.

2021 LEED Performance

Electricity

Annual Electrical Consumption

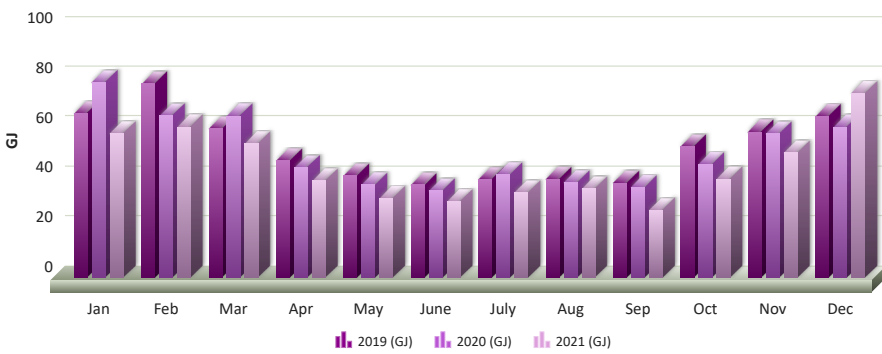


In August 2020, all of the existing T5 fluorescent fixtures in the South annex were retrofitted with new LED tubes and drivers. This change led to an instant, and ongoing drop in electricity consumption, however, the impact has been hidden by occupancy reductions attributable to COVID-19.

The MACH-System receives occupancy data from a fully integrated BACnet card access system. When a space is unoccupied, the heating/cooling equipment serving that space operates in standby mode, and the overhead light(s) remain off. This means that the energy consumption of the South annex is closely linked to the number of occupants.

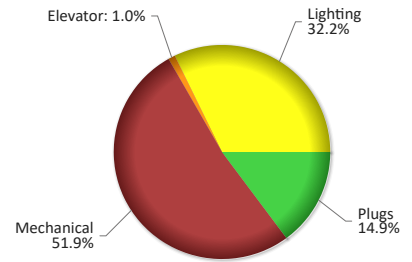
Monthly Electrical Consumption

2019 through 2021

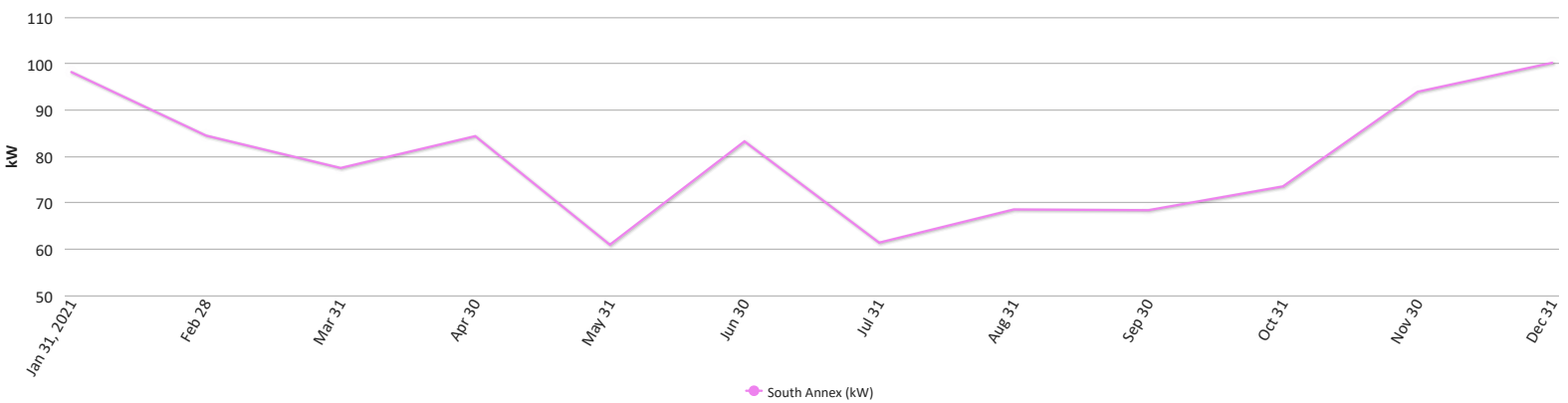


Electrical Consumption Breakdown

2021



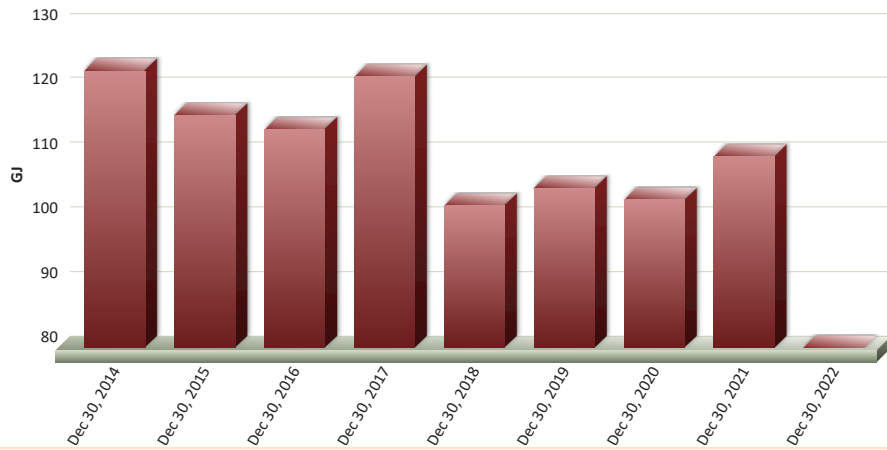
Peak Monthly Electrical Demand



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Natural Gas

Annual Gas Consumption

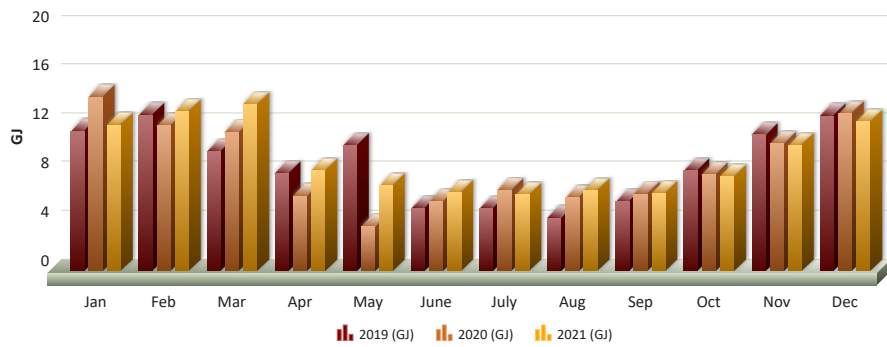


Annual gas consumption is very low for the South annex because all of the radiant floor heating and ventilation heat is generated by electrical energy, using air-source heat pumps with and heat reclaim.

The component to the left shows an uptick in natural gas consumption in 2021. The culprit can be found lurking in the consumption breakdown component below. In 2021, more natural gas than normal was consumed by the boilers being used to provide back-up heat to the building. The back-up sequence happens automatically when the primary heating system (two air-source heat pumps) do not provide enough heat, generally because of maintenance issues.

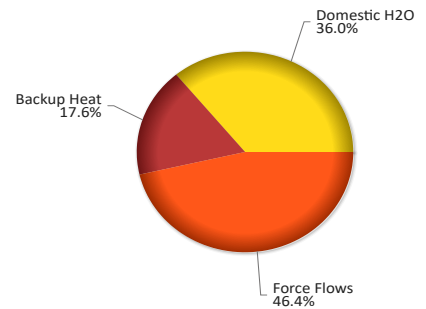
In 2021, back-up heating consumed 2,160 kWh, compared to 564 kWh the previous year. Not a big deal in terms of energy consumption, because the heat would have normally been provided via electricity, however in terms of greenhouse gas emissions, Reliable Controls would prefer to reduce the use of back-up heat as much as possible.

Monthly Gas Consumption 2019 through 2021



Gas Consumption Breakdown

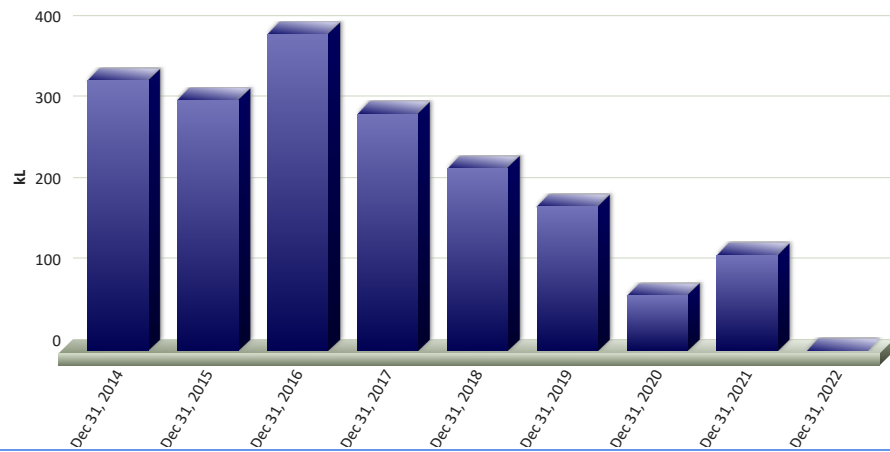
2021



2021 LEED Performance

Water

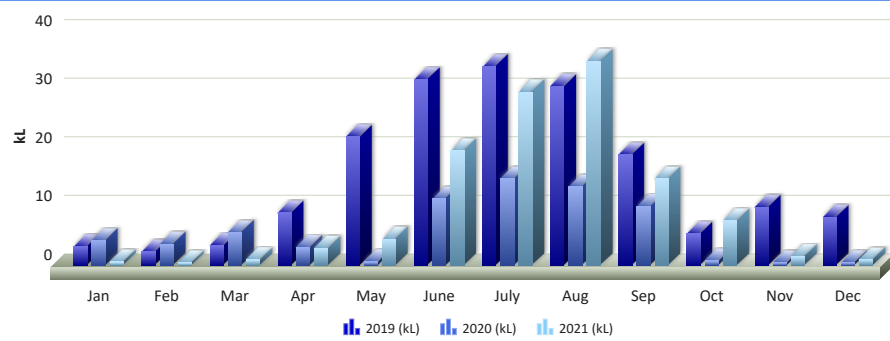
Annual Potable Water Consumption



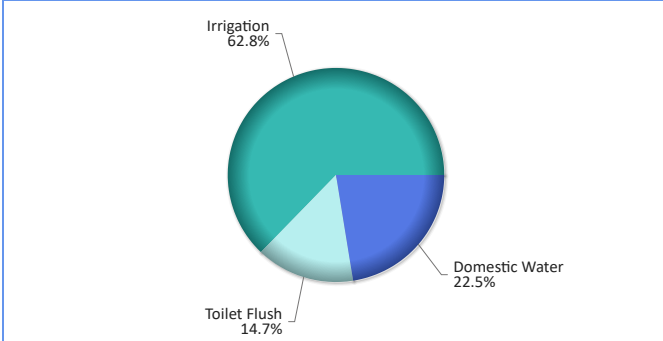
Collecting and using rainwater for landscape irrigation and sewage conveyance can significantly reduce the demand (and expense) of annual potable water consumption. The South annex has two large cisterns used to store rainwater. The water collected in one cistern is used to flush toilets, and the water in the other cistern is used for landscape irrigation during the summer months. In general, the site is planted with drought tolerant local plants. The irrigation schedule is controlled by the building automation system, considering outdoor air temperature and rainfall. Despite these measures, irrigation is the largest single user of domestic water.

In 2019, after several years of continuous improvement, the annual potable water consumption for the South annex finally achieved its design targets. In 2021, water consumption was higher due to additional consumption by the irrigation system, which used more water during a very hot and dry summer.

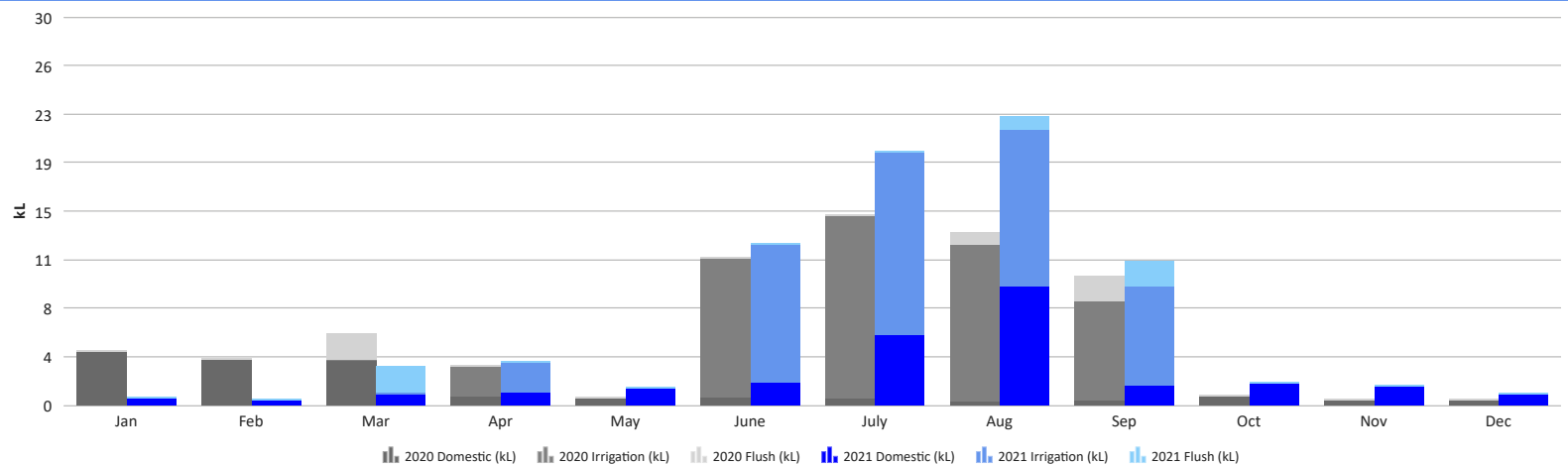
Monthly Potable Water Consumption 2019 through 2021



Potable Water Consumption Breakdown 2021



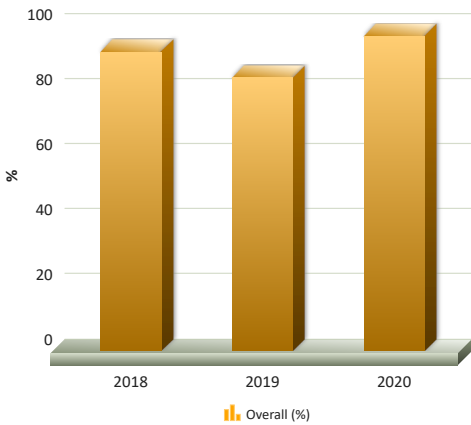
Potable Water Monthly Breakdown 2020 vs 2021



LEED Performance

Occupant Comfort

Overall Satisfaction



The following collection of charts display the results of three *occupant comfort surveys*, carried out in October 2018, June 2019, and February 2020.

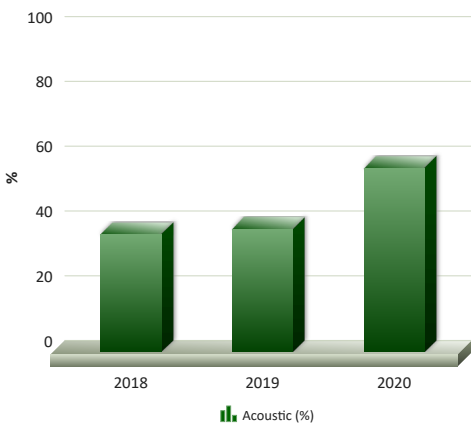
The overall satisfaction reported by occupants working in the South annex varied between surveys, but stayed above the company's 80% comfort KPI. The South annex also exceeded the KPIs in three of its six individual comfort categories in 2020.

The survey results for thermal comfort were skewed somewhat in 2020, when the survey question was changed from **current** comfort to **seasonal** comfort, which is a more useful statistic. In the 2020 winter survey, occupants reported an unacceptably low level of thermal comfort. The most common complaint was that the South annex was just too cold in the winter. To address this concern, the upper limit of the heating setpoint was increased.

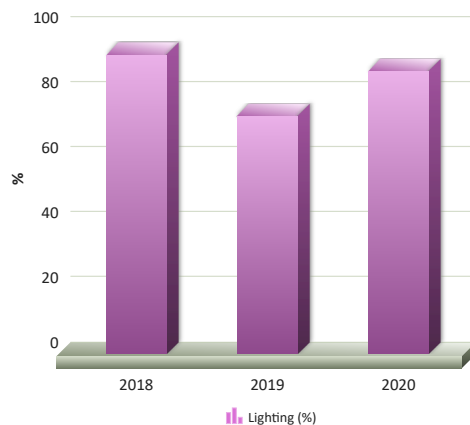
Acoustic satisfaction rose in each of the last two surveys. This was a direct result of physical renovations to private offices, and a memo reminding employees to be mindful of how their conversations in open office areas can have disruptive impacts on others.

Air quality satisfaction fell in each of the last two surveys. This result was disheartening as the South annex is 'top of class' with respect to the quantity of fresh air being circulated. Complaints centered on the odour from the gardener's gas-powered leaf blower. This concern was immediately addressed by supplying the gardener with a battery-powered model. Unfortunately, sometimes the outdoor air is not that fresh!

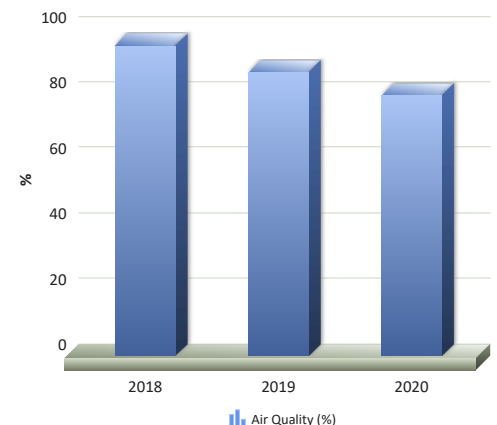
Acoustic Satisfaction



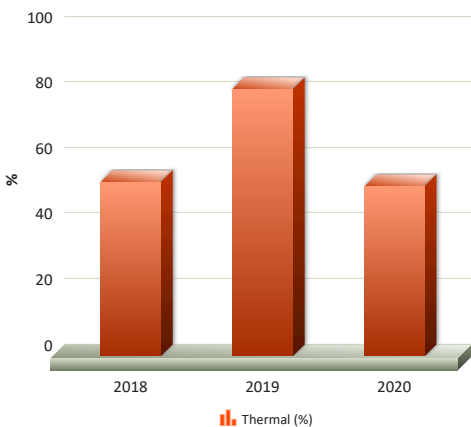
Lighting Satisfaction



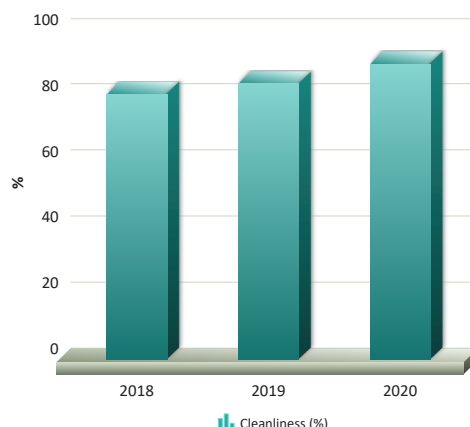
Air Quality Satisfaction



Thermal Satisfaction



Cleanliness Satisfaction



Maintenance Satisfaction

