next

Make buildings count

Monthly insights

April 2022

Building X

Monthly Insights / April 2022

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1.1 Performance overview / April 2022

	Employee Wellbeing	Utilization	Sustainability
Performance against Targets	**Thermal Comfort** **ON TARGET (cat. A)** for average performance, however **383 hours*** occupied rooms where in cat. C or D. **Fresh Air** **ON-TARGET (cat. A)** for average performance however **106 hours*** occupied rooms where in cat. C or D.	**Occupancy /Asset use** Only **6% of the target** usage (50-75%) is reached. **Over Capacity** **88 rooms** showed at a moment in time occupancy over capacity	**Energy Use** **Elevated consumption** in cooling energy was observed. **Expected trend behaviour** is seen on occupied days taking into account measured occupancy and outdoor climate conditions.
Impact of Underperformance	**€10 243,- / a** **Only 10% LFA is measured** **potential missed revenue due to lower ability to perform under measured conditions.**	**€46 796 /p/a**** **576% above target (9 825 AU$/p/a)** **higher office costs per employee (user of space) due to space use below target.**	**453 kWh/month** **only cooling energy** **higher energy consumption compared to target, given measured performance.**
Potential Cause and Recommended Action	**Thermal Comfort** Sensor fault Closer monitoring is required before making adjustments. **Fresh Air** Using meeting rooms multiple hours straight tend to show incidents in cat. C and D.	Certain capacity values need to be **validated.** **Providing visibility** in free spaces can initiate use of the right room. **Post COVID-pandemic** difficulties are experienced in employees willing to return to the office.	Suggested is to increase monitoring of the elevated consumption at floor 27 and 30 before making adjustment in HVAC settings.

* Cumulated hours spend in category C or D of all spaces when occupancy was measured.
** Metrics used for this calculations: max capacity 1798 occupants, target occupancy 75% (1349 occupants) and peak average occupancy of business days was 234 occupants

1.2 Progress analysis / Month-to-month comparison

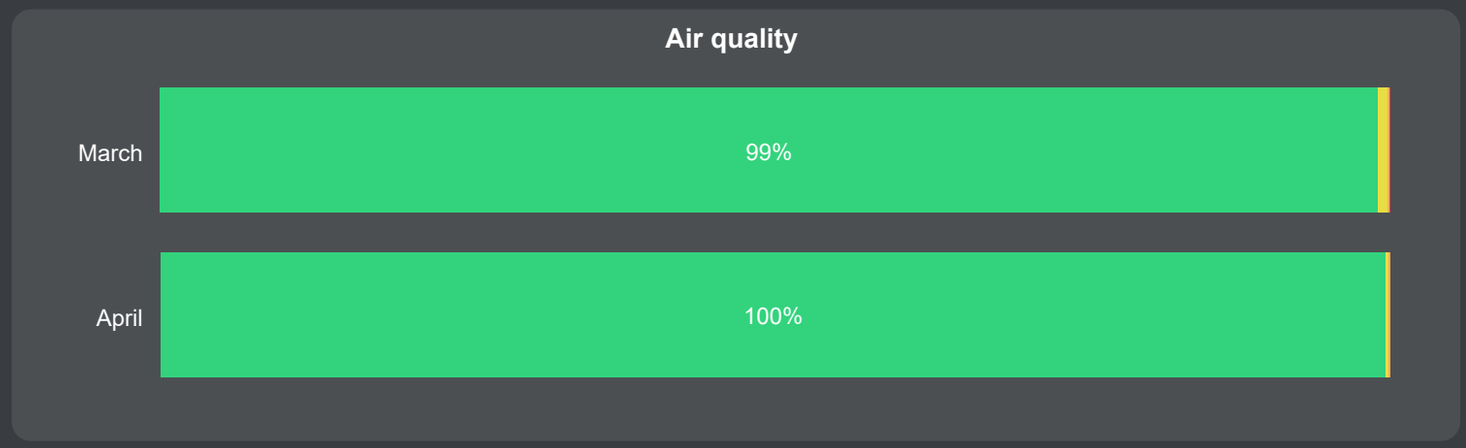
Filters: March - April | Ext. Business Hours

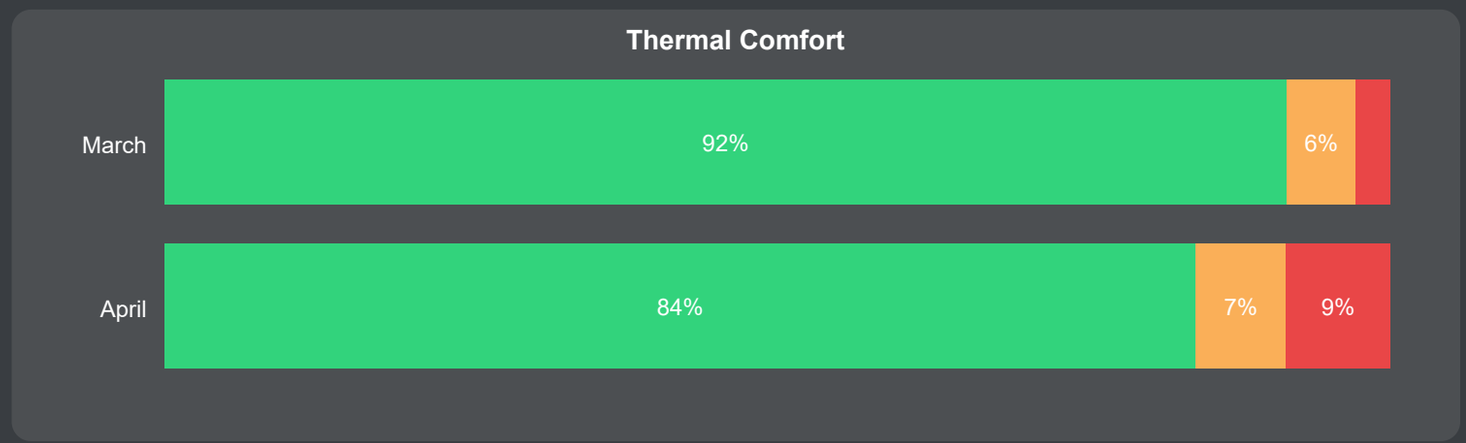
How did each aspect improve compared to previous month?

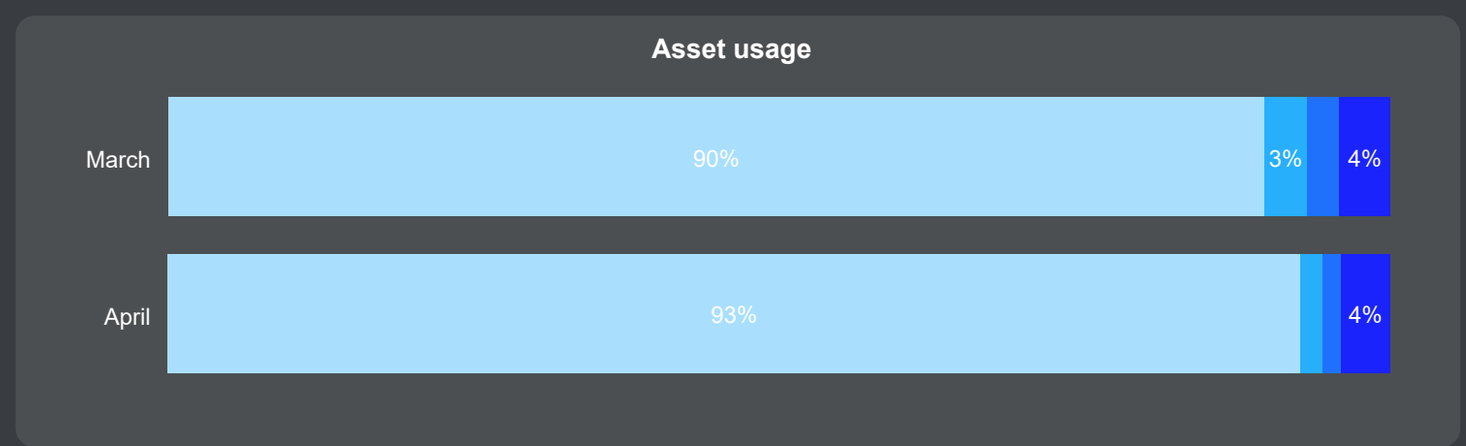
The performance for both thermal comfort and asset usage decreased by roughly 50%.

All data shown on this page is only filtered on Extended Business Hours.

Asset Usage: Holidays can have a large impact in the drop of usage between March and April, therefore the total asset usage in April can be lower than March.







1.3 Wellbeing / Performance analysis

Performance analysis wellbeing metrics on occupied rooms

Filters: April | Ext. Business Hours

Is the building used optimally are we reaching our utilization targets?

Air quality shows a performance of 100% on trend, however combined employees spend 96 hours in a room where air quality was outside of target range (cat. A).

Thermal comfort shows a performance of 91% on trend, however combined employees spend 293 hours in a room where air quality was outside of target range (cat. A).

Which examples or areas for performance improvement could be identified through the data?

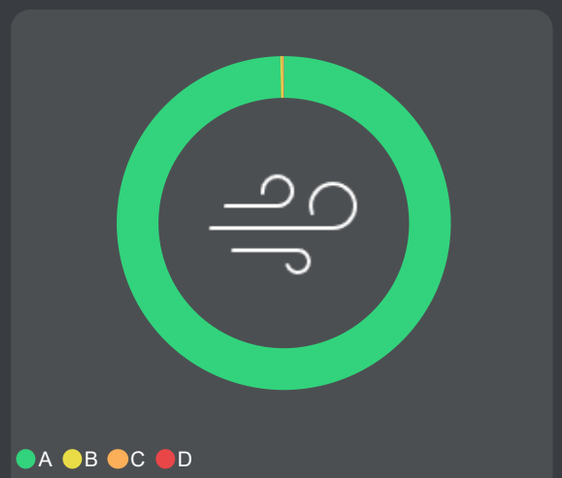
The rooms with trend performance in cat. C or D shows area of improvement. These rooms tend to have these performance since the building is occupancy driven and the HVAC installation operates with a delay of 10 minutes.

Because the building has little occupation it is important to zoom into the incident performances in cat. C & D as done in the deep dive. Where the correlation of underperformance and occupancy is analysed.

What could be the impact, if the identified areas of performance improvement are realized?

Combining hours spend in category C and D in combination with occupancy and the impact on productivity of employees shows us an improvement potential of €10 243,- per annum.

A possible sensor error in room 2 on floor 6 is excluded from this calculation.



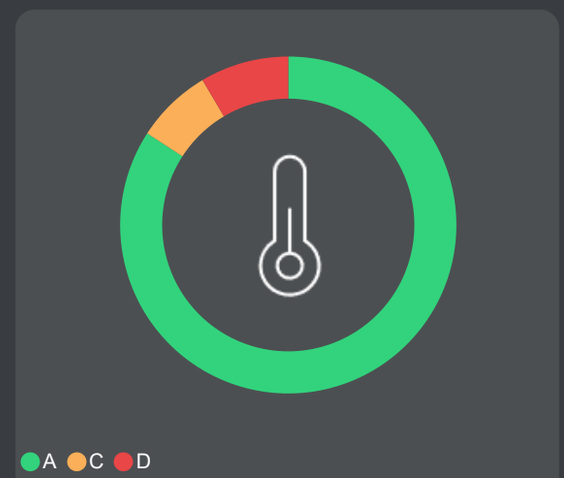
	Incident	Trend
A	12/24	24/24
B	6/24	0/24
C	6/24	0/24
D	0/24	0/24

Hours spend in cat. C or D

106 hours

Improvement potential

€2 750,-
/annum



	Incident	Trend
A	5/62	59/62
C	4/62	2/62
D	53/62	1/62

Hours spend in cat. C or D

383 hours

Excl. 27D51 Multipurpose Room Large

Improvement potential

€7 493,-
/annum

Excl. 27D51 Multipurpose Room Large

1.3 Utilization / Overview of Usage

Cumulated time in use on spaces

Filters: April | Business days

Conference / Phone Booths

Is the usage of these rooms optimal?

According to research the optimal use of conference rooms and phone booths is 50 - 75 percent.

Taking into account the business days, the conference rooms where used only 12% of the time. This shows a gap of 38% of usage towards the optimal range on the day with the highest usage in conference rooms.

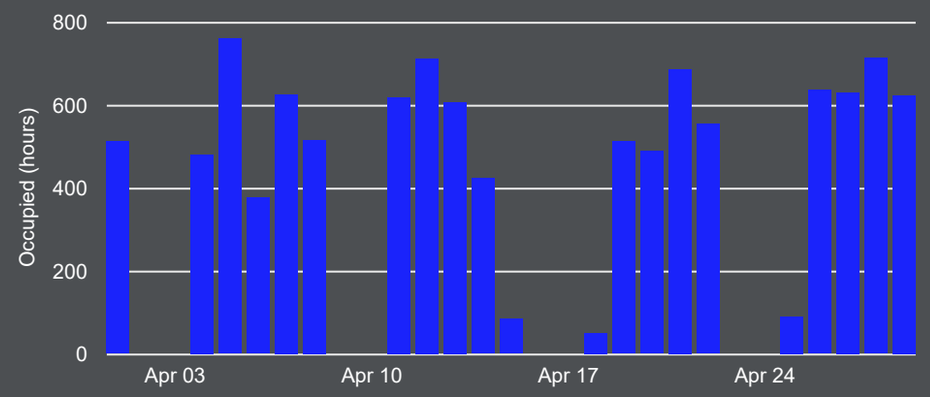
Taking into account the business days, the phone booths where used between 1 - 26% of the time. This shows on average a gap of 40% usage towards the optimal range.

Conference Room **(n=102)**

Daily Peak **760** hours

Daily Avg. **479** hours

Avg. **5** hours / room

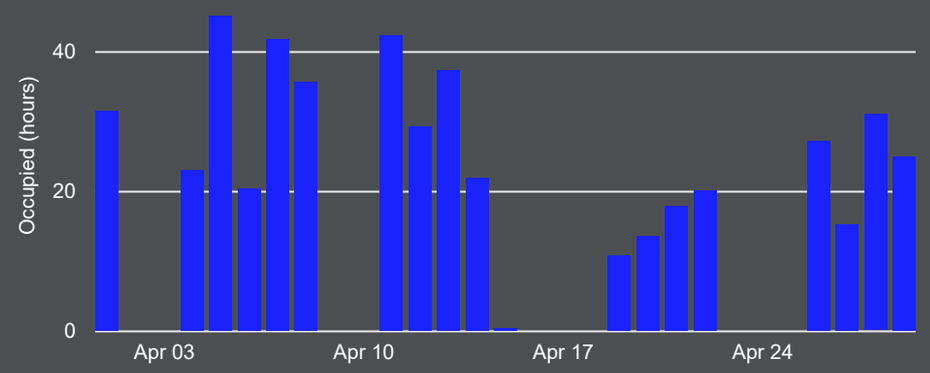


Phone booths **(n=47)**

Daily Peak **45** hours

Daily Avg. **23** hours

Avg. **30** minutes / room



Desks

Which behavioural trends can be observed in desk usage?

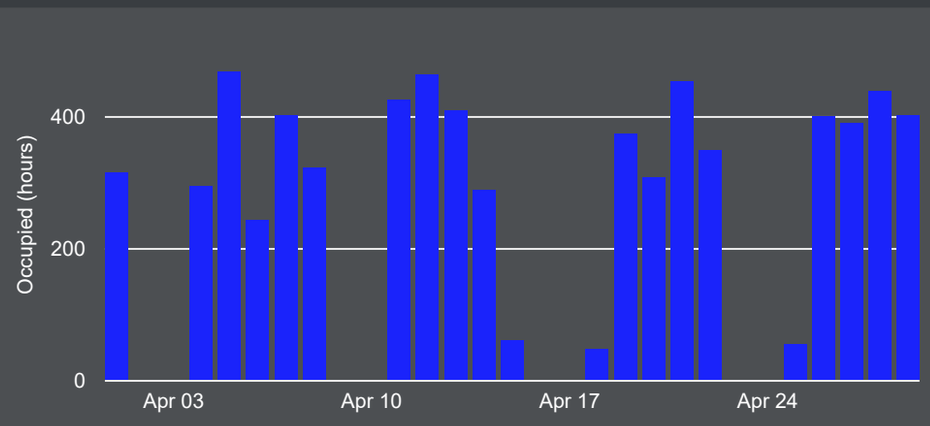
On average only 4% of all desks where used on business days which leaves a large gap to the optimal range (50-75%). Independent of the desk use policy these desks are on daily level not being used optimally.

Desks **(n=643)**

Peak Day **467** Hours

Daily Avg. **328** Hours

Avg. **30** minutes / desk



1.3 Sustainability / Overview of Energy Use

Filters: April | Business days

How sustainable is the energy use of the building and are the targets reached?

Since only the energy consumption of a small subset (electricity consumption of the PAC units and cooling consumption) is measured, there is too little data to make a proper benchmark. These PAC units controls only 10% of the building.

Which examples or areas for performance improvement could be identified through the data?

The peaks at 1 a.m. during business days that was observed in February is resolved.

Both ventilation and cooling show an expected trend Behaviour with one exception for cooling. A spike is observed at the beginning of the evening indicating that the building is being cooled when occupancy decreases to zero. Therefore, cooling energy is consumed while no occupancy is in the building.

This observation is supported by the cat. A performance in thermal comfort in the evening during non-business hours.

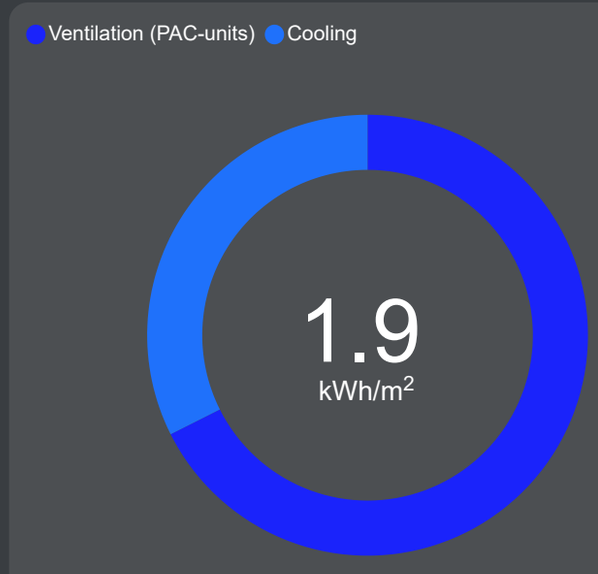
This elevated consumption occurs on all floors.

What could be the impact, if the identified areas of performance improvement are realized?

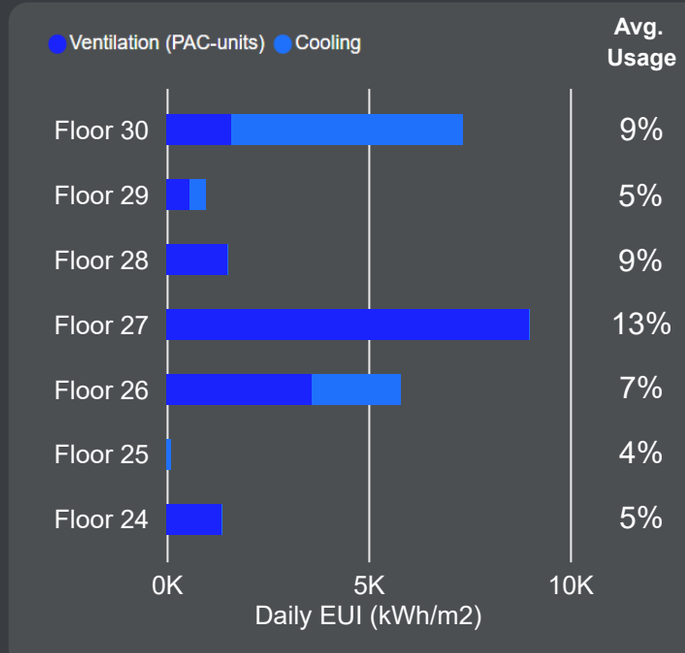
453kWh

over the previous month

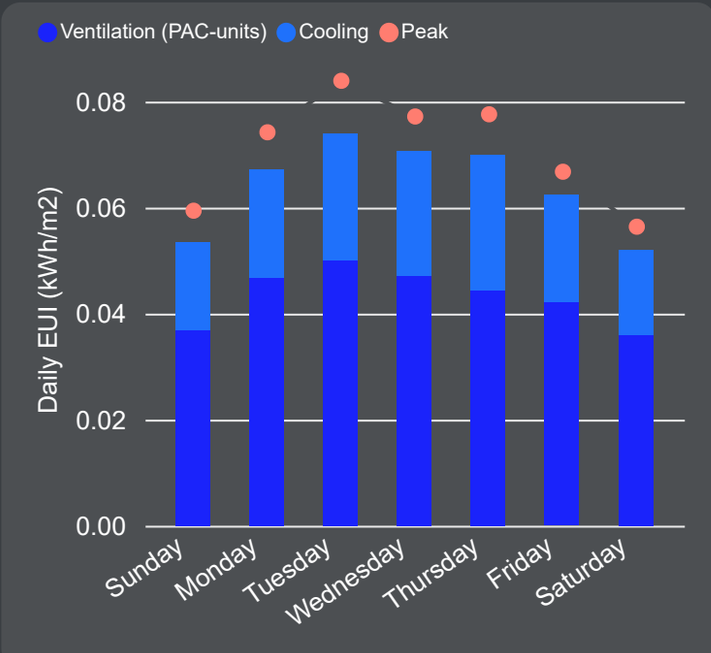
How much energy is consumed?



Where is energy consumed?



When is energy consumed?



2/ Deeper analysis

Performance Gap Analysis,
possible root causes and recommended actions.

2.1 Wellbeing / Thermal comfort - Analysis of Underperformance

Location based incident and trend performance analysis

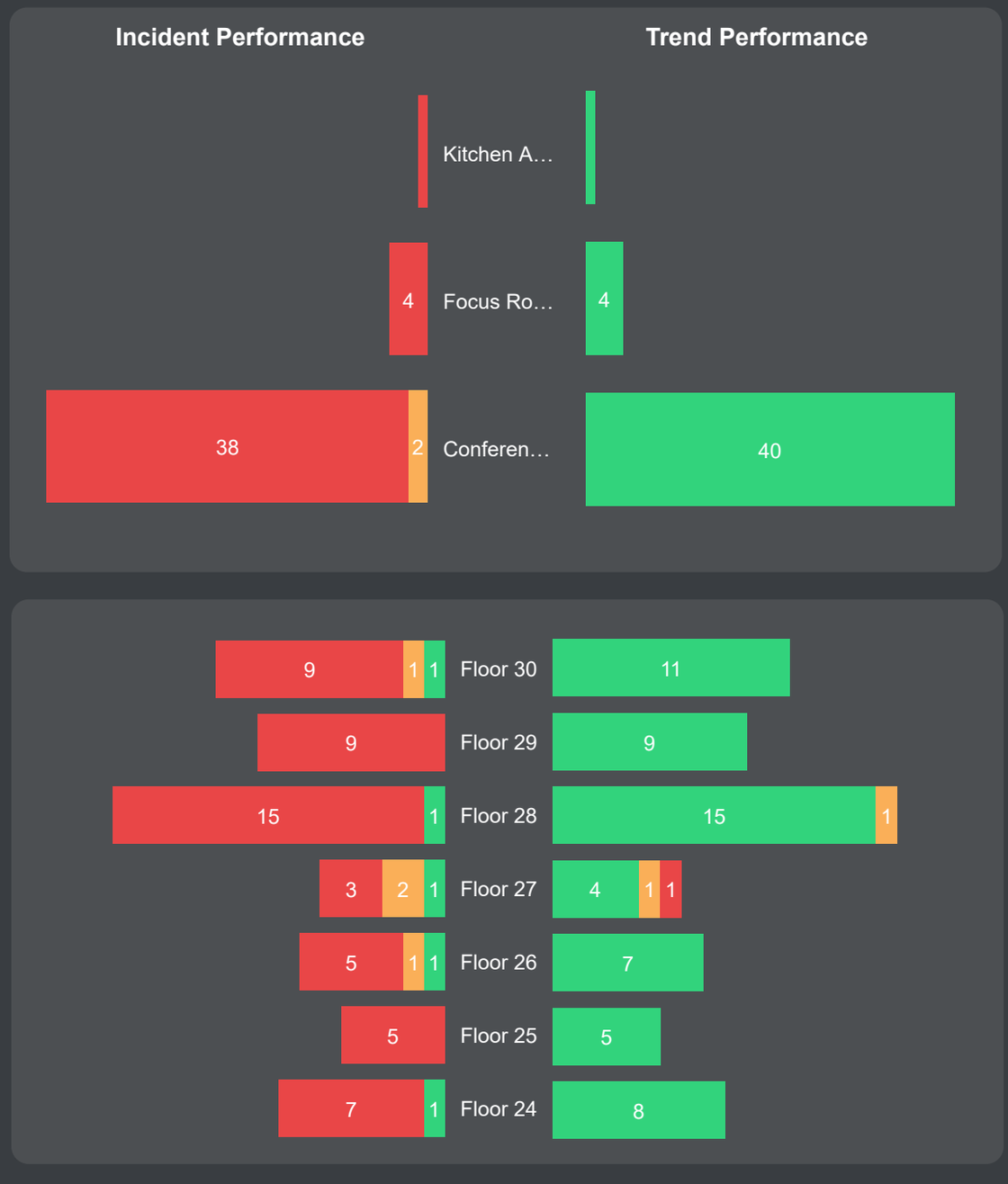
Filters: April | Ext. Business Hours

Are there certain space types or specific floors with higher incidental or structural underperformance?

Not specifically a certain type of space or floor shows structural underperformance, however performance incidents are happening in roughly all sub types and floor levels. Be aware that only a sub selection of building is being measured since only the temperature measurements are available from the PAC-units.

Amongst others, the phone boots are not measured while these could be interesting to investigate since we see the highest (over)utilization rates in these rooms.

Only data of extended business hours is taken into account for this analysis to approach the hours the building is being climatized to the occupants preferences.



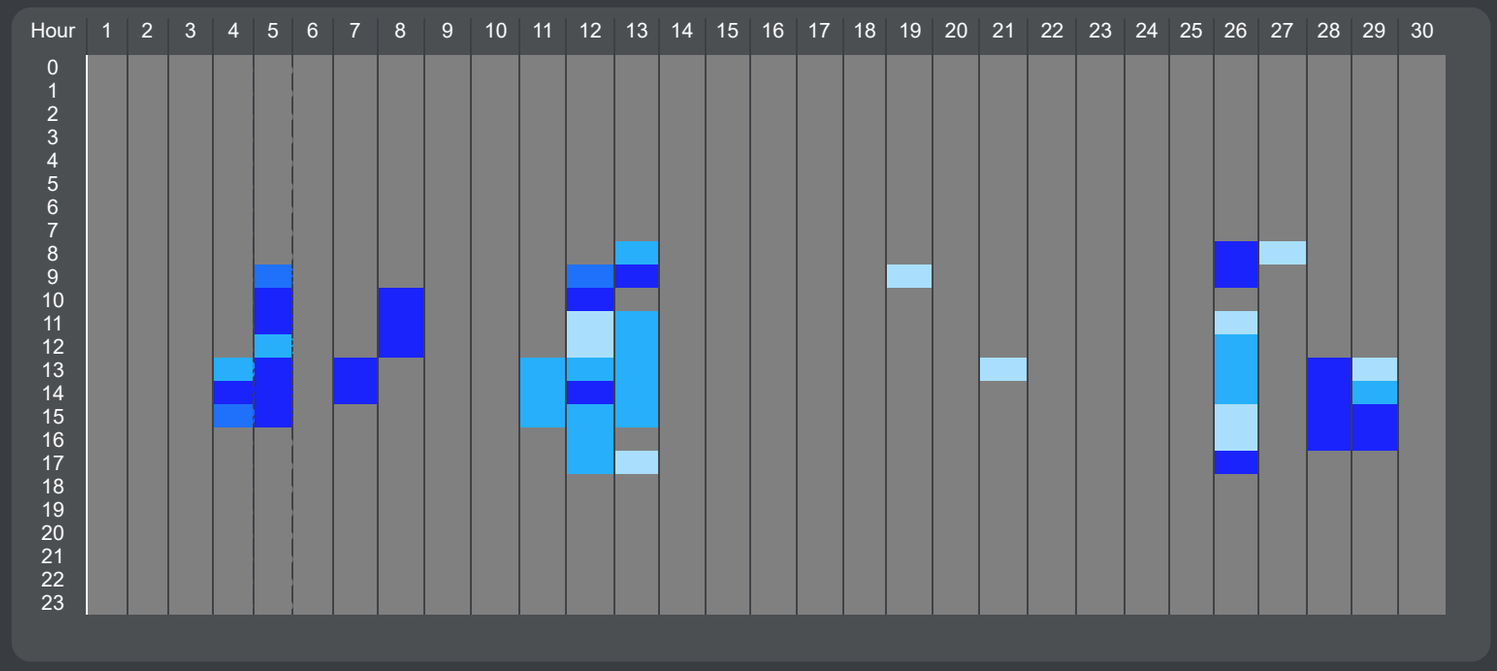
2.1 Wellbeing / Overview of Thermal Comfort Performance

When were issues detected in spaces with trend performance in Category C & D?

Filters: April | All hours

Spaces analysed:

- Room 6 floor 2



Are there certain days of the week with structural underperformance?

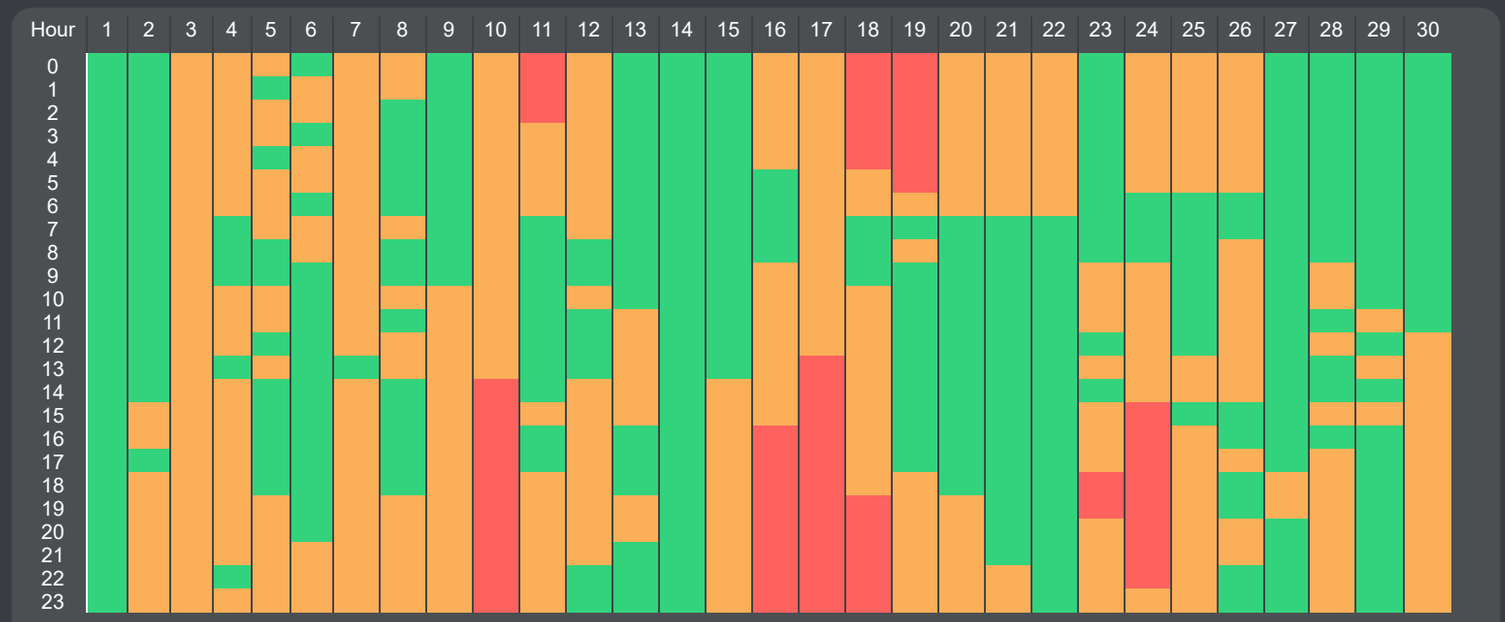
No, there are no specific days that show structural underperformance.

Was there an anomaly? i.e. a specific period or days in the month which cause underperformance?

Yes, while no occupancy is observed in most evenings the perceived thermal comfort is in category A and gradually rises to cat. C.

Utilization can have a major impact on the indoor climate, what expected impact does utilization have on the thermal comfort in these rooms?

It is expected that utilization has limited effect on the thermal comfort in these rooms, since similar asset usage and occupancy have been observed on well performing days and on the worst performing days.



2.1 Wellbeing / Air Quality Performance (Location)

Location based incident and trend performance analysis

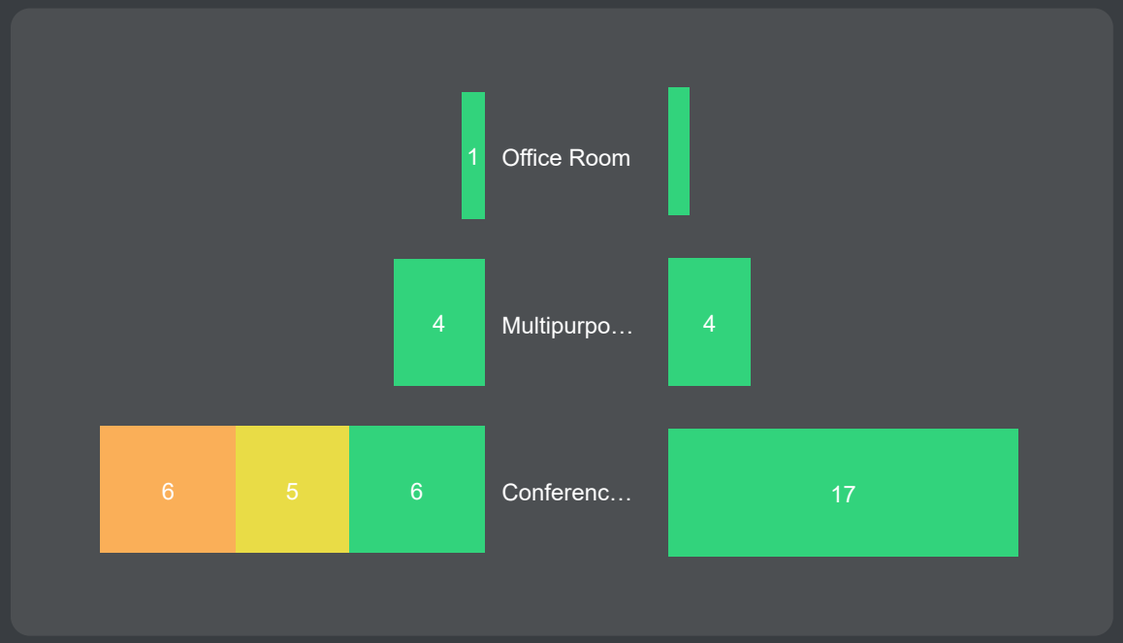
Filters: April | Ext. Business Hours

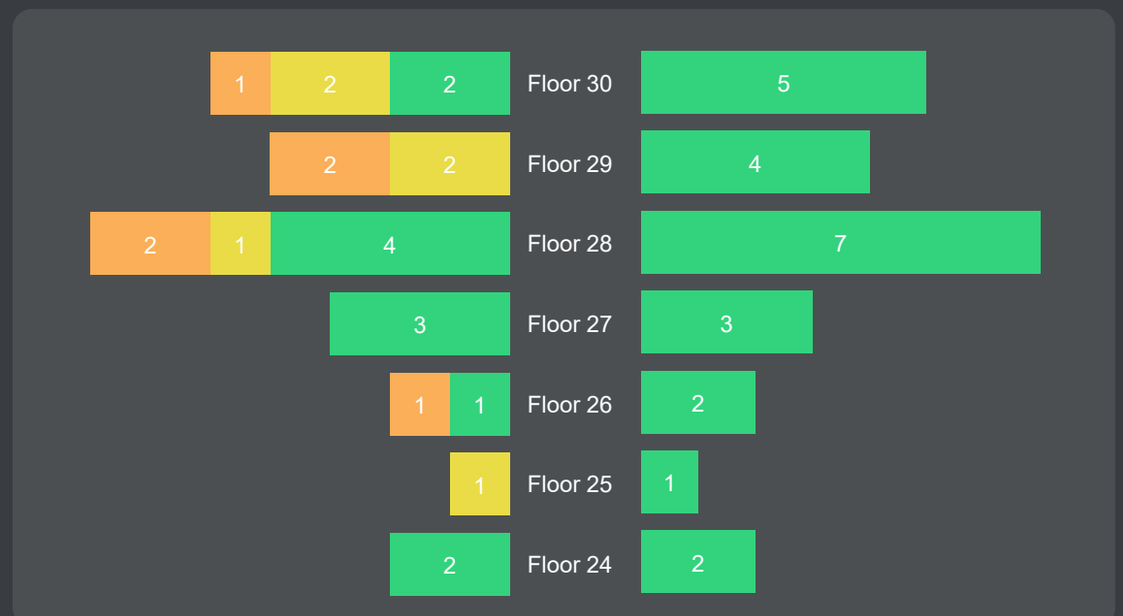
At which locations in the building can ventilation be improved to reduce the CO2 levels?

On this page we analyse the locations within the building showing improvement potential on the performance on indoor CO2 levels by correlating the incident and trend performance with location (room type and floor level).

The graphs show the number of spaces per incident and trend performance category, providing insights in specific type(s) of rooms or floor level(s) perform worse than others or possible fundamental performance issues throughout the measurement period or occurring peaks in performance when rooms are utilized. These insight are to pinpoint the largest improvement potential and supports in taking action for improvement.

Is there any improvement potential?
Negligible, all rooms in all room types and on all floor levels perform very well (performance trend cat. A). The one conference room that shows incident performance in cat. B still resembles an acceptable performance where occasionally CO2 levels between 750 and 900 ppm where observed.





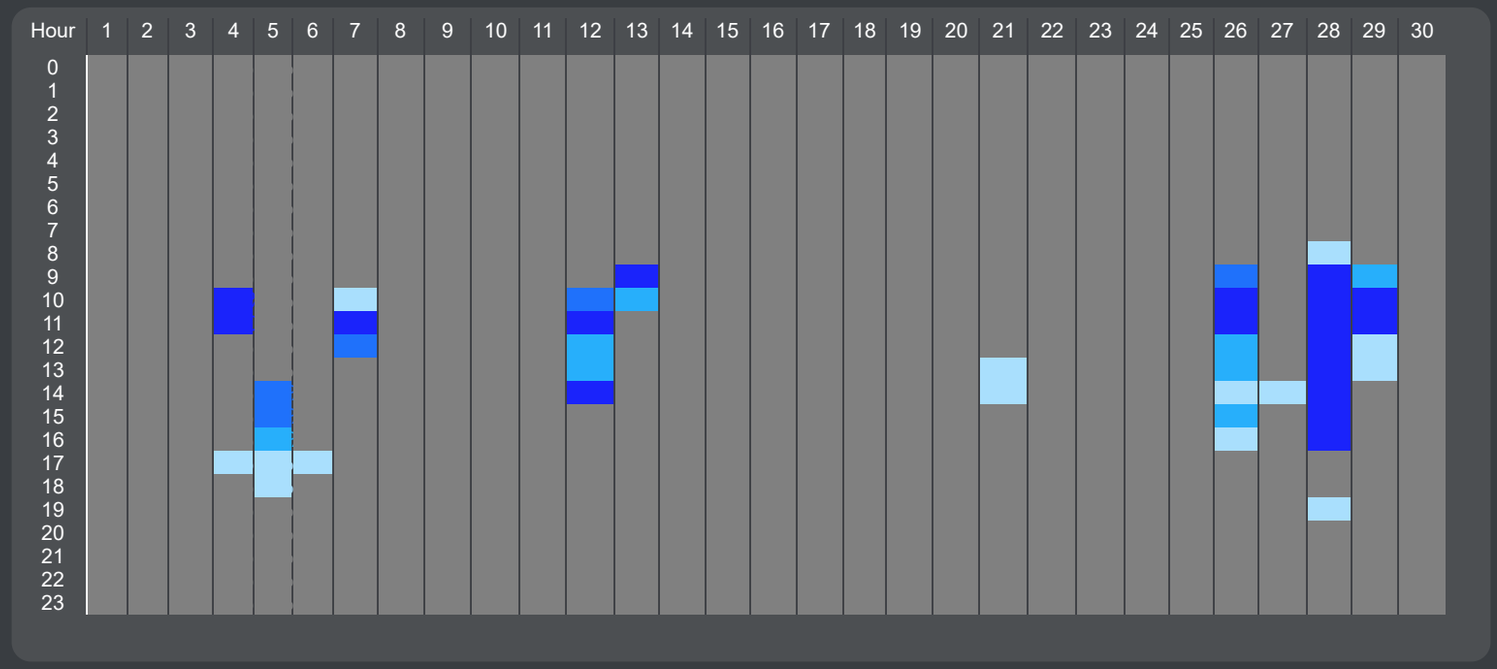
2.1 Wellbeing / Overview of Air Quality Performance

When were issues detected in spaces with trend performance in Category C & D?

Filters: April | All hours

Spaces analysed:

- Room 12 Floor 1



Are there certain days of the week with structural underperformance?

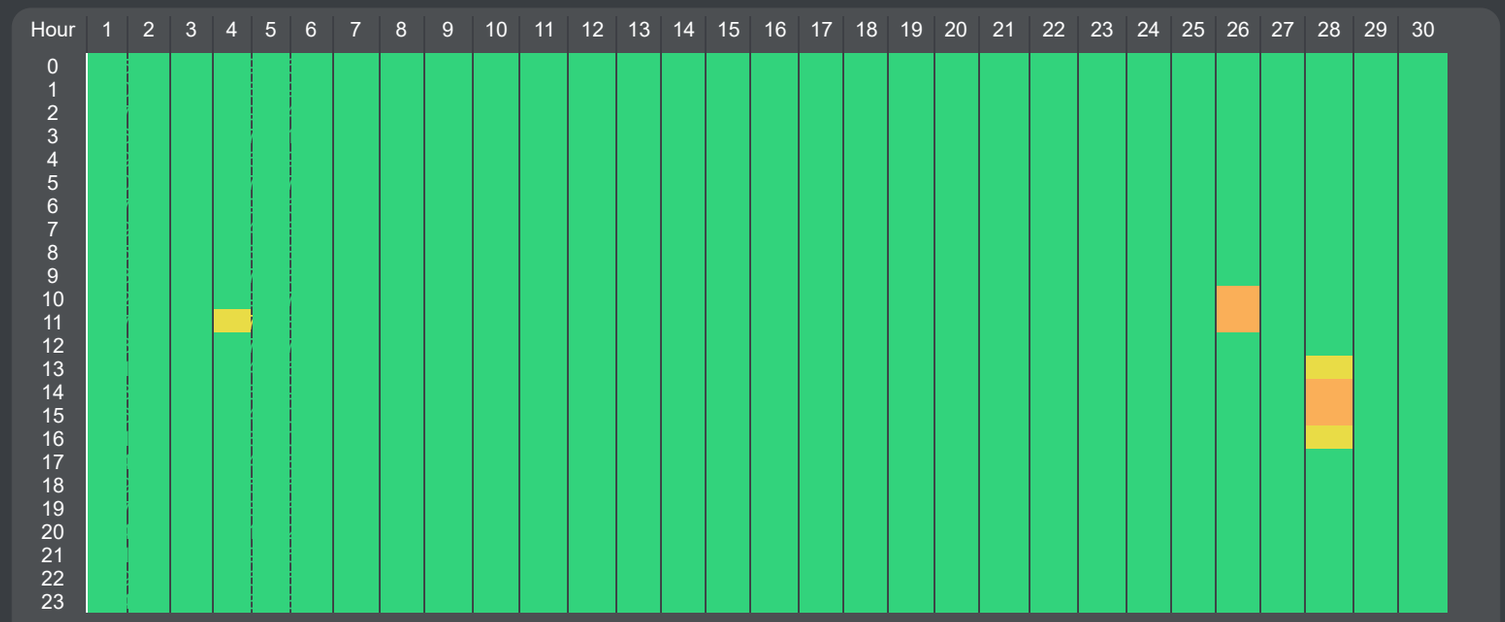
No, there are no specific days that show structural underperformance.

Was there an anomaly? i.e. a specific period or days in the month which cause underperformance?

No, there exists a high correlation between usage of the room and it's CO2 levels. Unfortunately, in all measured rooms the usage was very low in April.

Utilization can have a major impact on the indoor climate, what expected impact does utilization have on the thermal comfort in these rooms?

It is expected that utilization has effect on the Air Quality in this room, since elevated (cat. C) levels of CO2 are measured when this meeting room is used for multiple hours straight.



2.2 Utilization / Asset usage - Analysis of most used space

Room(type) analysis on Asset usage

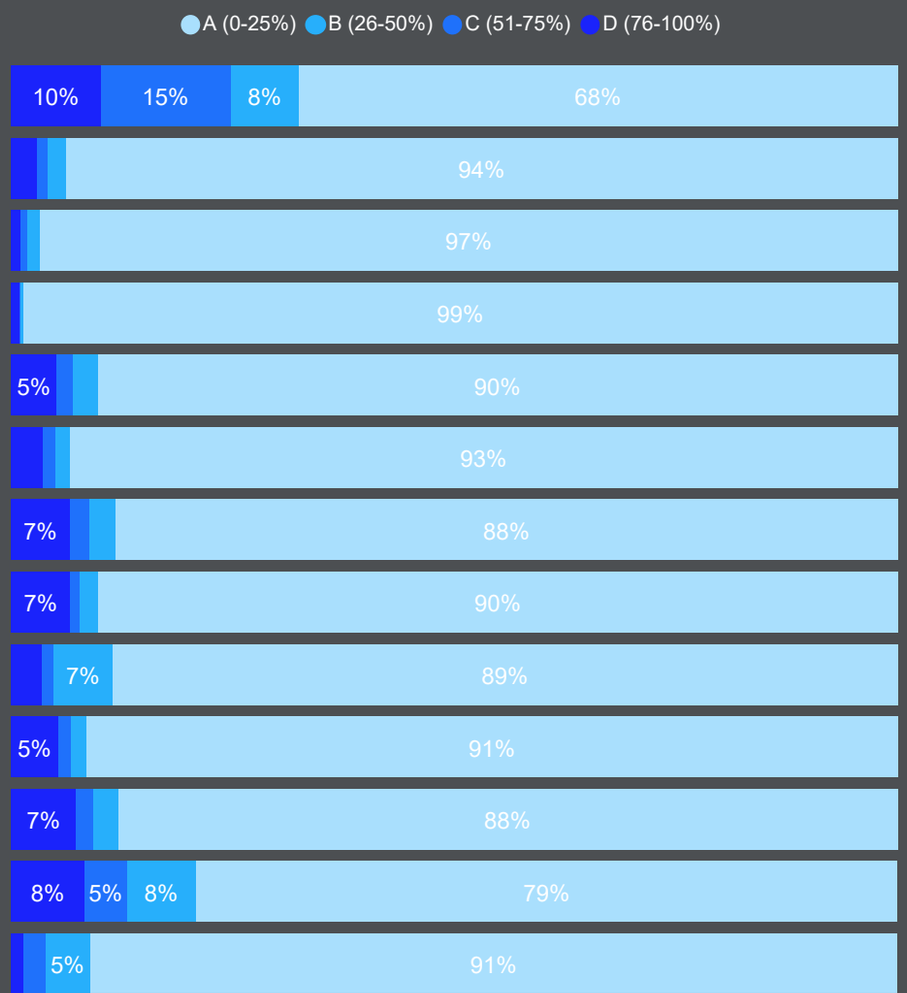
Filters: April | Ext. Business Hours

Are there certain room types or specific rooms with high usage?

The reception area's stand out in terms of amount of usage and continuity of use, however it is likely that there is most of the time usage in the reception area. Therefore, this type of use is not the preferred use to compare with e.g. conference rooms and phone booths.

Rooms where groups of people meet (like: conference and multipurpose rooms) have the highest average usage per unit while individual workspaces (like: desks, phone- and focus rooms) are used almost a third of the time per unit.

Usage of room types (% of time in cat.)



SubType	Amount of usage (hours)	Avg. usage (hours/room)
Reception Area	149	75
Phone Room	531	11
Other Room	49	4
Other Area	77	2
Open Space Area	86	17
Open Desk	7,549	12
Office Room	25	25
Multipurpose Room	89	22
Kitchen Area	201	29
Focus Room	224	16
Conference Room	2,555	25
Cafe Area	143	48
Breakout Area	32	16

10 Most used spaces

Space	Amount of usage (hours)
27G104 Reception	91
28D53 Conference Medium	85
30A50 Conference Medium	73
30A60 Phone Room	72
30A59 Conversation Room	65
27G204 Dining Seating	65
30A51 Conference Small	63
26D51 Conversation Room	62
26G101 Kitchenettevending	59
28G103 Reception	58

10 Least used spaces

Space	Amount of usage (hours)
25B61 Open Meeting Area	0
26B63 Open Meeting Area	0
26C55 Open Meeting Area	0
24D55 Zone	0
25A50 Open Meeting Area	0
25D50 Open Meeting Area	0
25D55 Open Meeting Area	0
28B51 Audiovideo Studio	0
29A54 Open Meeting Area	0

2.2 Utilization / Occupancy - Analysis of over capacity

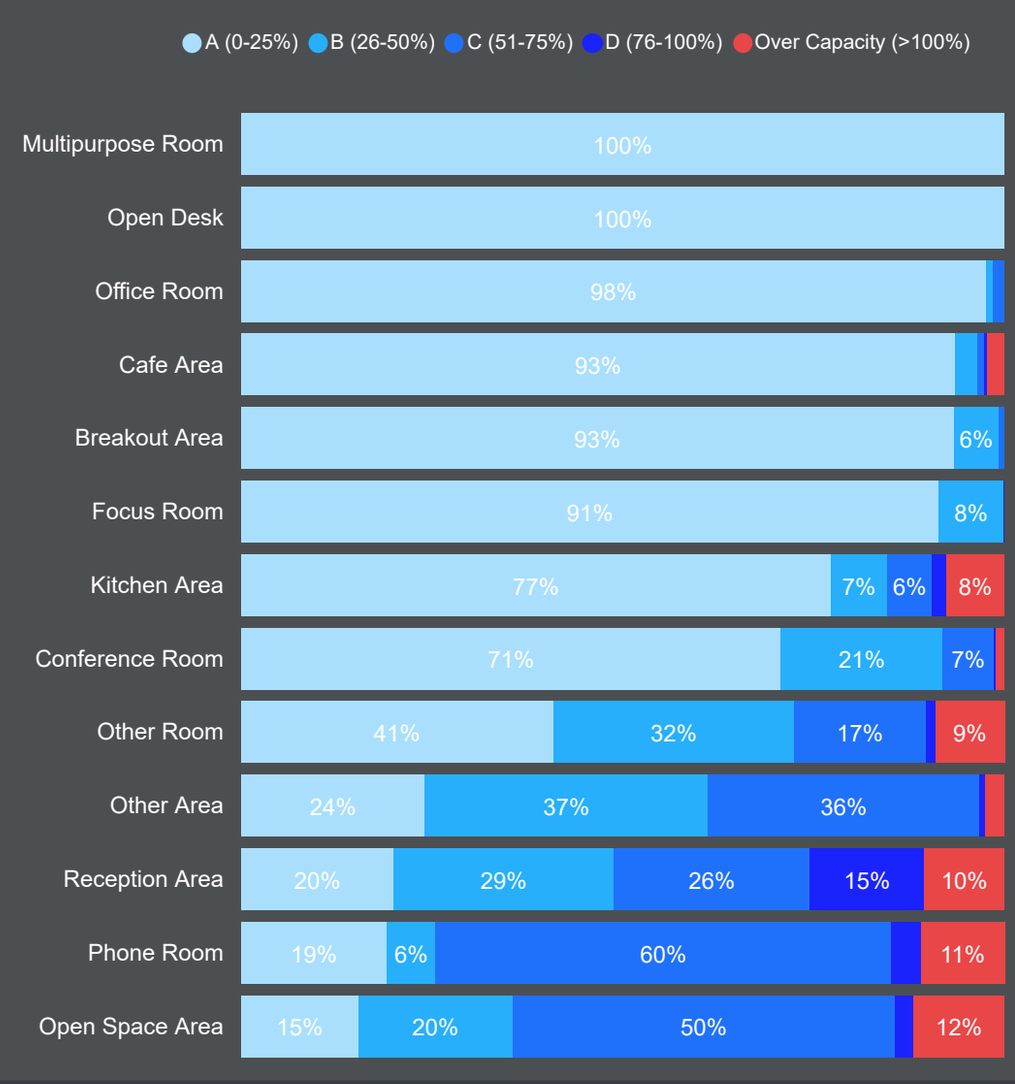
Room(type) analysis on over capacity

Filters: April | Ext. Business Hours

Are there certain room types or specific rooms with overcapacity?

Room like Mpr Support Servery leave room for validation of the capacity settings since major over capacity is measured, however phone booths tend to show the highest amount of time over capacity with up to 3 or 4 persons per room while the capacity is one. Are actually multiple people in a phone booth or is does the sensor reach to outside the phone booth?

Time in category (occupancy in % of capacity)



15 Most over occupied rooms

Space	SubType	Over capacity (days)	Peak occ.
28G203 Meditation	Other Room	10	1000%
28G404 Kitchenettevending	Kitchen Area	12	900%
1 Collaboration Room	Conference Room	13	500%
27G104 Reception	Reception Area	12	500%
24B64 Phone Room	Phone Room	9	400%
27G403 Mpr Support Servery	Other Area	4	400%
28G305 Mpr Support Servery	Other Room	2	400%
30B62 Conversation Room	Conference Room	4	400%
30B63 Conversation Room	Conference Room	3	400%
27G101 Dining Servery	Cafe Area	5	333%
29B58 Phone Room	Phone Room	2	300%
30A55 Phone Room	Phone Room	2	300%
30A56 Phone Room	Phone Room	5	300%
30A57 Phone Room	Phone Room	2	300%
30A60 Phone Room	Phone Room	2	300%
30B58 Phone Room	Phone Room	7	300%
24B56 Zone	Open Space Area	3	200%
24B63 Zone	Open Space Area	5	200%

2.3 Sustainability / Trend analysis

How is the trend performance per use of energy?

Is a normal trend behaviour seen for each type of energy use?

Not a big difference in energy consumption is observed between business hours and non-business hours at both uses. Looking at the trend behaviour, the ventilation does show an expected trend where the energy consumption increases in the early morning, reaches it's peak around noon and decreases again in the evening.

However, the cooling energy remains in a similar range between 9 and 11 kWh with no major differences between business hours and non-business hours with an exception between 6 p.m. and 8 p.m.. An peak is observed which on average is 40% higher than the baseline which is unusual since outdoor temperatures and occupancy decrease in the evening.

What improvement potential is observed?

Two areas of improvement are observed:

- Relative high consumption during non-business hours for both Cooling as Ventilation. This can be caused due to low occupancy since the thermal control is occupancy-based and the ventilation of the PAC units is CO_2 controlled.
- A peak consumption in cooling energy in the early evening (between 6 - 10 p.m.).

Filters: April | Business days