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Application Note

AN-CRE-002

Returning Your Smart Building to Normal After Periods of Low Occupancy

with EcoStruxure™ for Commercial Real Estate

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About this Document

This application note explores best practices for returning your smart building to normal following low periods of occupancy. Special considerations are recommended for returning people to buildings following a global health crisis. All building systems are considered, and the objective is to provide comprehensive guidance to ensure safety, maximum efficiency, and readiness once the building reopens.

EcoStruxure for Commercial Real Estate™

EcoStruxure™ for Commercial Real Estate is Schneider Electric's IoT enabled digital platform for real estate designed to help real estate professionals build and operate sustainable buildings that deliver high asset valuation, lifecycle flexibility, and enhanced human experiences.

For more information please visit: https://www.se.com/ww/en/work/solutions/for-business/real-estate

Application Notes

Application Notes describe the design considerations for engineers who are involved in the planning, design, installation, commissioning or operation of applications within commercial real estate facilities. The documents are intended as guidance only and will reference recognized standards and regulations and industry equipment.

About the Authors

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Disclaimer

This document does not attempt to describe the proposed solution in its entirety. Users are solely responsible for compliance with national and international safety laws and regulations. This document does not replace any specific project documentation.

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1 Situation Overview

The global pandemic of 2020 has created a situation where many commercial buildings have had to run at low capacity for extended periods of time. This scenario also plays out annually on a smaller scale in some countries where many employees take summer holidays or vacation periods at around the same time each year.

The purpose of this paper is to help facility managers and building owners re-start buildings after periods of low capacity to minimize business disruption, promote occupant and employee health and safety and ensure a smooth return to normal. Building occupants should be able to return on their first day as if it was a normal weekend return with normal services up and running, comfort conditions considered, and peace of mind that precautions have been taken for their safety and wellness.

1.1 Manage alarms

Detect and solve any situation a day or more before the return to the office. This includes: process, security, equipment failure, and energy or fluid meter consumption. This can be done using on-site personnel, however, remote monitoring and control software may also be used.

1.2 Check equipment operation

Equipment and/or plants that were stopped must be checked in order of criticality. An experimental restart is recommended a few days prior to the return of occupants.

1.3 Time schedules

Adapt time schedules for all equipment to new time and date of occupancy.

1.4 Check setpoints

Taking into account changes in season and time changes, review setpoints.

2 HVAC considerations

Considering the behavior of the building, some processes such as heating and cooling may need to be started several hours before occupants and employees arrive. Revise BMS software setpoints based on occupancy time schedules which may vary from pre-building closure schedules. In the case of return to work following a health crisis, employee work schedules may be altered to allow for lower occupant density in the buildings, meaning some employees may arrive earlier and others may leave later.

Additionally, double-check that automation programs have taken into account the season and external conditions. Using remote monitoring software with continuous commissioning capabilities can proactively identify issues impacting comfort and well-being. For in-depth information on HVAC considerations for disease control, we recommend reading Schneider Electric blog "Six Steps Hospitals Can Take to Reduce the Risk of Infectious Disease" where these issues are covered.

2.1 Heat production

Return the cascade of boilers back to normal running mode. Weather forecasts can be used to fix setpoints automatically at production level. Savings can be achieved through geothermal energy production.

2.2 Cold production

The proper operation of each chiller must be checked before opening day using alternate sequence. Operation should return to normal running of the cascade of chillers. As in heat production, weather forecasts can be used to fix setpoints automatically at production level, and savings brought by geothermal energy production.

2.3 Exchangers

The proper operation of exchangers must be checked before opening day. Exchangers should be returned to regular automation control of this process.

2.4 Distribution pumps

The proper operation of each circuit must be checked before opening day. Distribution pumps should be returned to regular automation control of this process.

2.5 Air Handling Units (AHUs) and air quality

The proper operation of each AHU must be checked. The US Environmental Protection Agency states that health effects from poor indoor air quality may be felt "soon after exposure or nearly immediately" with symptoms such as fatigue, dizziness, and itchy burning eyes, nose and throat. As proper ventilation and airflow will be important to building occupants and employees following a health crisis, it is critical that this system is operating at full capacity. The pre-occupation scenario should be launched several hours before the reoccupation period.

Advanced analytics platforms and sensors may be used to identify areas with sub-optimal air quality.

2.6 Chilled beams, FCU, radiants, terminal units

Any identified defect must be solved prior to the return of occupants to the building. No individual check required because of low impact to overall operations.

2.7 Comfort conditions

Air quality, temperature, and humidity can all impact comfort levels in a building. There is a low chance of lighting failure. No individual checks required except handling defaults.

Remote operations and continuous commissioning software solutions can help proactively identify issues impacting comfort and well-being in your building and allow for remote and proactive maintenance.

Lastly, consider consider contactless comfort control such as an Occupant App or durable switches to allow for frequent cleaning.

3 Lighting

Lighting is applicable in all zones.

3.1 Zones

Regular lighting control scenarios are active since time schedules have been set correctly for return to normal.

4 Security

Security in the 'return to normal' scenario is very important. In the case of modified working hours and/or restricting building occupancy levels, security systems and personnel may play an important role in maintaining acceptable occupancy levels and ensuring building rules are followed.

4.1 Access control

Complete access control authorizations management in all zones. If any zones will be off-limits in the 'return to normal' scenario, these must be accounted for in the software as well. Special considerations may need to be made to enable contactless entry and for additional screening such as surveys and/or temperature checks.

4.2 Security alarms

Manage security alarms with high priority. It is important to maintain a calm return to normal, so addressing alarms quickly will be important

4.3 Guard tours

Guard tours should resume as usual. If any new building rules will be in place for 'return to normal' operations, it is important for guards to be informed. They will play an important communications role with building occupants and visitors.

4.4 Video Surveillance

Video surveillance should continue.

4.5 Cybersecurity

According to Cybersecurity Ventures Annual Cyber Crime Report, Global cybercrime damages are predicted to cost 6 trillion US$ annually by 2021, representing the greatest transfer of wealth in history, and times of change can be opportunities for cybercriminals. It is important for cybersecurity to continue in the return to normal scenario. At a high level, we recommend using a cybersecurity framework for smart buildings. For an in-depth guide on cybersecurity for your smart building control systems, we recommend reading "A Practical Framework for Cybersecure Smart Building Control Systems."

4.6 Fire security

Fire security systems should be checked to ensure proper working order.

5 Power distribution

Ensuring a reliable power flow is a high priority for engineering and maintenance managers in order to maintain operations of commercial buildings. Power management software is embedded into most modern BMS systems and can be used to make incremental changes to improve energy efficiency, reduce energy costs, and document improvements in energy conservation.

5.1 Power transformation

No specific action required upon return to normal. All daily loads will potentially return to normal. There must be no remaining unsolved defect.

5.2 Power distribution

As above, no specific action required. All daily loads will potentially return to normal. There must be no remaining unsolved defect.

6 Energy and Fluids Metering

Most smart buildings use advanced software to monitor energy consumption and meter fluids in the buildings.

6.1 Meters surveillance and management

Return back to regular days limits including alarms, reports and dashboards.

7 Renewable Energy Production

Many of today's commercial office buildings couple solar photovoltaic energy systems with on-site storage and other forms of energy production such as geothermal to offer greater energy resiliency and flexibility. Upon return to normal, it will be important for these systems to be fully functioning.

7.1 Solar Photovoltaic

Energy production will be used entirely by the building.

7.2 Geothermal

The production will be used entirely by the building.

8 Other considerations

In the 'return to normal' scenario following a global health crisis, some other considerations can be just as important to health and well-being in the building as the functioning of traditional building systems. These considerations must be carefully weighed against your company policies, recommendations of local authorities and employee and union contracts.

8.1 Flexdesk organization

Depending on the situation, flexdesk organization may go back to normal. However, in the case of the Covid-19 pandemic, desks will need to be configured at least 6 feet apart. Many smart building managers will use a combination of sensors and mobile apps to alert occupants and employees of available desks, but in low tech facilities, desks may need to be marked as unavailable with tape or signage.

Workspaces may also need to be updated with plexiglass windows or panels on low-walled cubicles to prevent the spread of viruses.

8.2 Cleaning

A visual inspection tour of the facility should be done prior to re-entry of building occupants. For re-entry after a health crisis, it will be important to clean and sanitize regularly touched surfaces such as elevator buttons, security turnstiles, door knobs, handles, etc. Sanitization of desks and surfaces will need to be done regularly to maintain health within the building.

Occupancy analytics may be used to optimize cleaning runs, and occupant feedback on cleaning and sanitation is paramount to improving occupant satisfaction. This may be provided through an occupant app.

8.3 Restaurant

Food must be re-stocked and all appliances re-started to prepare for arrival day. Care should be taken to clean and sanitize food counters, tables and chairs. Hand sanitizing stations should be set-up and/or refilled. Care must be taken to ensure a safe distance for cafeteria tables and food handling if returning to work after a health crisis.

8.4 IT Rooms

IT Rooms should be returned to normal setpoints.

8.5 Parking

Check to ensure equipment and security solutions are in working order. Ensure proper functioning of lighting, ventilation for extracting air, access control and barriers.

8.6 Digital Signage

Turn on and reactivate digital signage. If building policies and procedures have been updated, ensure that these are reflected clearly on the digital signage.

8. 7 External Areas

8.6.1 Hives and bees

Continue with regular maintenance and tasks.

8.6.2 Patios and outdoor spaces

In the case of a health crisis, patios and outdoor spaces should be reconfigured for maintaining an appropriate distance. Tables and chairs should be spaced 6 feet apart.

8.7 Administrative tasks

Continue with regular administrative tasks to run the building.

8.7.1 Employee communication

Employee communication prior to and during building re-entry will be critical, especially if new rules and/or procedures are to be implemented.

8.7.2 Customer and visitor communication

Customers and visitors may not be familiar with any new procedures following a prolonged building shutdown. It is important for digital signage to reflect any changes to building protocol.

9 Conclusions

'Return to normal' following periods of low occupancy, especially following a global health crisis, can be a manageable process if taken step by step considering each building system. Up-to-date software and control systems can help ease the transition along with a solid plan.

EcoStruxure for Commercial Real Estate is Schneider Electric's open, digital, IoT enabled platform that enables commercial real estate professionals to control, manage and monitor their commercial real estate assets for improved human experiences, sustainability and asset valuation. The platform and its various EcoStruxure Advisor applications and services, edge control applications and connected products can be used manage buildings during periods of low occupancy.

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