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Retrofit and Reopening Recommendations for Offices: A Quick Checklist

Introduction

This resource provides facility managers and building owners with a brief overview of why the COVID-19 pandemic is a compelling time to consider system upgrades. It provides a set of retrofit options, recommended policies, and operating practices for reopening and occupying buildings. The recommendations are derived from an extensive collection of industry standards and professional guidance distilled down to a quick checklist.

A Safe Climate—Indoors and Out

Many offices closed at the start of the pandemic, understanding that minimizing human contact and controlling indoor ventilation can curtail viral spread within buildings. Some offices have opened out of necessity, and they are quickly updating spaces to mitigate the virus. Re-entering offices can be done safely. Businesses can use workplace policies, space alterations, mechanical adjustments, and employee engagement to return to a safer office. How strategies are implemented will depend on the community and building capabilities.

Healthy indoor environmental quality is necessary to offer safer environments and prevent the spread of viruses. However, no one can ensure zero risk. Multiple mechanical strategies can support a lower risk office environment. Given this time of reflection on the indoor work environment, building owners and facility managers should deeply consider upgrades to core technologies that affect both occupants and impact carbon emissions. NBI's blog, *Buildings' Impact on Pandemics,* illustrates the critical relationship between buildings' energy use and pandemics. Building carbon emissions contribute to an adverse climate environment that enhances the opportunity for viral growth while also compromising the greater community's lungs and health through emissions from fossil-fuel power generation.

RESOURCES:

AIA's Re-occupancy Assessment Tool
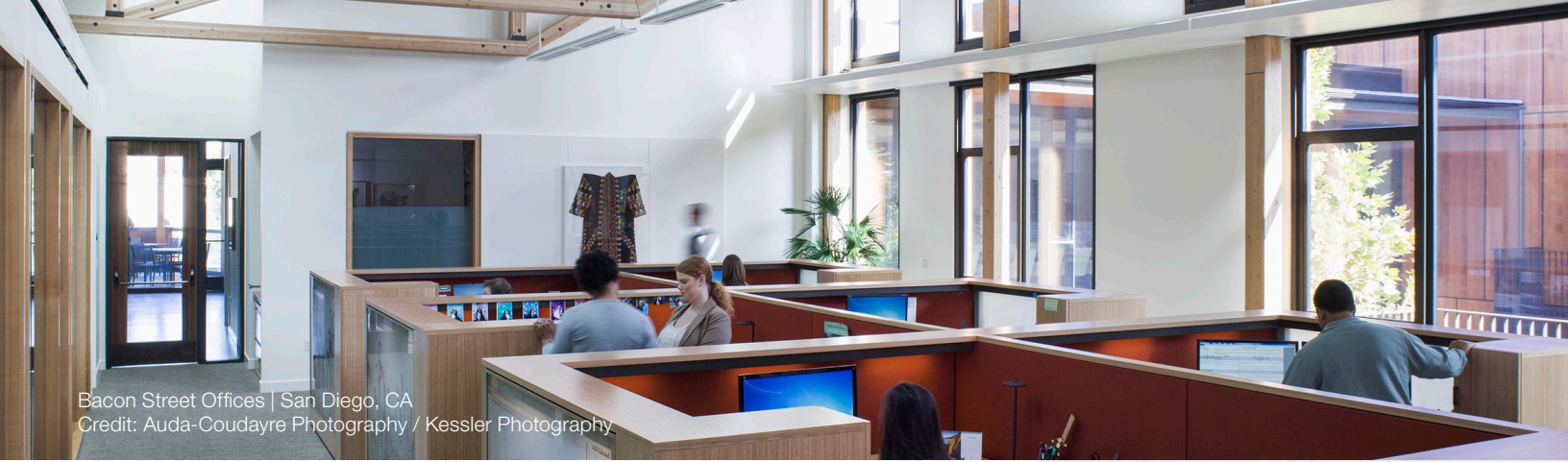
BOMA International's Coronavirus Resource Center

NBI's Recommended Resources in the Time of COVID-19

ASHRAE COVD-19 Response Resources from ASHRAE and Others

AIA's Resources for Architects

NBI's Blog "Buildings' Impact on Pandemics"

Bacon Street Offices | San Diego, CA
Credit: Auda-Coudayre Photography / Kessler Photography

Implementing ASHRAE guidelines for ventilation can increase building energy use by as much as 24% per square foot.[1, 2] The temporary increase in energy may be necessary to protect the occupants, but it can be balanced through attention to commissioning, controls, and improved efficiency through equipment upgrades. With the spotlight on climate and building's role in carbon emissions, there are current and pending regulatory mechanisms to reduce the built environment's impact on climate. Building owners should look for opportunities to create climate-friendly buildings by reducing energy use and the relating greenhouse gas emissions (GHG).

Lower occupancy buildings provide an opportunity to retrofit existing buildings with upgraded systems that meet occupant health needs.

Climate-friendly retrofits also reduce energy consumption and lower a building's GHG emissions, which can futureproof against building performance standards or carbon taxes.[3] By implementing these strategies, not only will workplaces be healthier during the pandemic reopening, but post-pandemic, employers may see reduced sick days, more productive employees, and greater asset value due to the upgrades.

Now's the Time to Upgrade Your Building

Retrofitting building systems to the most advanced and clean technologies has never been more compelling. Building occupants and the world are depending on it. The market for office buildings is likely deeply changed. **Those returning to or seeking new office spaces will be expecting the best of indoor environments.** For owners, these upgrades deliver beneficial air, thermal, and visual features and attest to your attention to the occupants' and the planet's wellbeing—a criterion of many companies—and reduce your operating costs. Office building owners should consider integrated retrofits of the following systems and technologies during this time of reduced occupancy.

1   ASHRAE, Coronavirus (COVID-19) Response Resources from ASHRAE and Others
2   Arons, September 2020, Technology + Technique
3   CodeGreen, May 2019, NYC Carbon Emissions Bill Passed into Law – Local Law 97 – What it Means for Commercial Building Owners

OFFICE BUILDING RETROFIT OPTIONS:

Whole Building: Electrification of all systems, demand control of major systems for grid-integration, and time-of-use responsiveness allowing optimization of online or site renewables, upgraded building automation or energy information systems (BAS/EIS) to help with fault detection features of equipment and to track energy use key performance indicators.

HVAC: Dedicated outdoor air systems (DOAS), heat/energy recovery ventilation (HRV/ERV), heat pump systems and mini-splits, variable refrigerant flow (VRF) systems, commissioning, and testing and balancing (TAB).

Lighting: LED lighting, advanced controls for occupancy, daylight and space optimization at the luminaire level, outdoor lighting upgrades.

Windows: Automated shades—glare and thermal control in conjunction with upper portions dedicated to daylight integration with electric lighting. Window film is potentially a lower cost improvement for low-performance glazing. Major upgrades may include new triple-thin glazing with thermal breaks.

Envelope: Assessment and remediation of air leakage and unsealed penetrations, addition of exterior shading devices, and minimizing thermal conductivity.

Reopening Recommendations

Businesses have three main areas of influence for safely reopening offices: workplace policies, space alterations, and mechanical adjustments. How these strategies are implemented will depend on the community and building capabilities. Reopening phase-in plans allow businesses to return employees to the office in a slow, controlled manner. Once a community is virus-free, or the vaccines are widely administered, most, or all staff can be reunited. Recommendations for reopening are organized below by the three areas of influence and actions for facility managers, companies, and building owners.

Workplace Policies

- Alternate staff workdays
- Require physical distance
- Require masks/face shields
- Make PPE available
- Limited shared amenities
- Provide remote supply shopping options
- Encourage safe transportation options
- Enact travel bans
- Provide paper desk coverings for common work stations

- Limit people in the elevator
- Limit/disallow personal fans and heaters
- Provide training
- Create a new fire evacuation plan
- Verbally and visually communicate plans
- Maintain regimens for common surface cleaning
- Amend lease languages to allow for different thermal comfort setpoints when unoccupied

Space Alterations

- Remove/rearrange furniture
- Indicate one-way hallways
- Provide dedicated entrances and exits
- Expand interior queuing spaces
- Separate visitors and employees
- Eliminate the open office or space out workstations
- Incorporate physical barriers
- Include more hand washing locations
- Consider outdoor programming (outdoor lunch and meetings)
- Provide access to daylight and views
- Provide full height restroom doors

- Install toilet lids and supply disposable/flushable toilet seat covers
- Eliminate direct airflow from one desk to another
- Incorporate stand-alone HEPA filters
- Reduce touch points
- Increased automation and artificial intelligence to limit touch
- Create building re-entry reopening procedures
- Increase security and safety
- Conduct hazard assessment
- Clean HVAC intakes daily
- Disconnect bathroom hand dryers

Mechanical Adjustments

CONTROLS

- ❑ Set temperature above 65° F
- ❑ Maintain humidity between 40% to 60%
- ❑ Consider dismantling demand control ventilation
- ❑ Optimize the building management system
- ❑ Conduct commissioning
- ❑ Monitor air quality

FILTERS

- ❑ Increased filtration media (MERV-13)
- ❑ Consider electrostatic media
- ❑ Offer free-standing HEPA filters
- ❑ Clean and/or replace filters as recommended, or sooner

VENTILATION/EXHAUST

- ❑ Increase active ventilation
- ❑ Increase ventilation rates (ACH)
- ❑ Provide 100% OSA (or minimum ASHRAE 62.1)
- ❑ Run ventilation 24/7 or run ventilation 2 hours before & after occupancy
- ❑ Use displacement ventilation (preferred not from the floor)
- ❑ Create intentionally directional airflow
- ❑ Use passive ventilation
- ❑ Consider disconnecting energy recovery ventilators if they are known to leak
- ❑ Consider air curtains
- ❑ Create negative pressure in restrooms and dining areas
- ❑ Directly exhaust high use spaces
- ❑ Run exhaust fans two hours before opening
- ❑ Elminiate directly recirculating air without filtration
- ❑ Clean heating and cooling coils
- ❑ Coordinate altered space design with ventilation and exhaust