REPORT

LLOYD ECODISTRICT

HEALTHY BUILDING STRATEGIES

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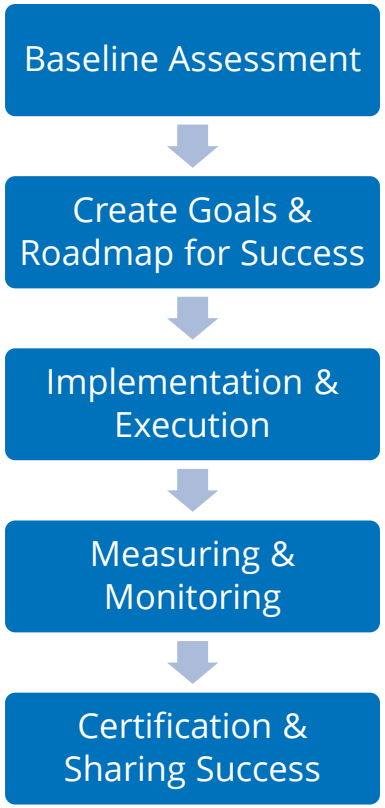
INDOOR ENVIRONMENTAL QUALITY

As the workforce is continuing to come back to the workplace, it is now more important than ever to ensure that your building is safe for your building occupants during this disruption and prior to returning to work. With more emphasis on the demonstration of Health and Wellness strategies within the workplace, it is recommended that you consider at minimum a gap analysis of your facility to support a healthy workplace for your building occupants. This initial first step would involve an assessment of key indoor environmental criteria related to indoor environmental quality (IEQ), water quality, and thermal comfort.

Recent growth in the healthy building movement has directed attention on improving indoor environmental quality and occupant health outcomes in the built environment. The immediate goal is to ensure the quality of the indoor environment will not contribute to negative health outcomes for the occupants.

Outlined on the following pages and illustrated in the graphic below are basic steps on how to address your HVAC systems, your operations, and maintenance protocols and policies.



Healthy Building Assessment

Begin your healthy building audit process by conducting a brief walk-through survey of the building. This will enable your team or auditor to become familiar with the building's construction, mechanical equipment, current modes of operation, and maintenance practices. You should review and discuss any special problems or needs of the facility, and determine if any operational or maintenance problems or practices are affecting the building's base level of indoor environmental quality.

At a minimum, a report or outline should be developed after the site visit that outlines and describes observations from the assessment, focusing on three operational considerations:

1) a safe and healthy return to better than normal,
2) a preparedness for potential future shutdowns, and
3) a future focus on enhanced indoor environmental quality to create spaces for occupants to thrive and to communicate the steps that have been taken to address a safer environment.

You might consider the following as a check list as you develop your own specific audit process.

Air

- ✓ **Fundamental Air Quality**
  - Review of potential outdoor and indoor pollutants
  - Measuring TVOC's & C02
  - Identification of vulnerable occupant requirements
- ✓ **Ventilation Effectiveness**
  - At minimum, a review of air handling unit system setpoints and operation.
  - Review of fresh air rates and delivery
  - Evaluate general movement of contaminated air to clean air
  - Measurement of outside air delivery rates or exhaust rates; confirmation that the ventilation system is operating as intended
  - Evaluation of portable cleaning options (HEPA or UVGI)
  - Evaluate source separation strategies in place including pollution and exhaust

Healthy Building Assessment

- ✓ **Air Filtration**
  - A review of Media Filters in place
  - Review Operations and Maintenance manuals to ensure you are using the recommended MERV rated filters in your air handling equipment
- ✓ **System start-up recommendations:**
  - Review of Air filtration, coil inspection, and flush-out plan
- ✓ **Indoor Air Monitoring**
  - Review of current practices
  - Determine best strategies to measure and track CO2 levels, temperatures, and TVOCs
- ✓ **Envelope and Entryways**
  - Review of pathways and control practices
- ✓ **Air Quality Education for your staff and visitors**

Water

- ✓ **Water System Recommendations**
  - A review of water systems setpoints /settings and operation during the unoccupied period
  - Start-up recommendations
- ✓ **Water Quality Review**
  - Screening level water test
  - Review of water filtration systems
- ✓ **Moisture Management**
  - Review of potential exterior liquid
  - Review of potential interior liquid
- ✓ **Water Quality Education for your staff and visitors**

Thermal

- ✓ **Ensure Thermal Comfort Performance**
  - Review range and variance of temperature and relative humidity
  - Thermal Comfort thresholds and parameters
  - Review thermal zoning
- ✓ **Performance Monitoring and Measuring recommendations**
  - Review of current practices (temperature, humidity, CO2, etc.)
  - Enhanced Thermal Performance and Environment recommendations
- ✓ **Thermal Comfort Education for your staff and visitors**

Healthy Building Assessment

Operation and Maintenance

- ✓ **Space allocation and working policies**
- ✓ **Review Operational and Maintenance Manuals for all air handling equipment to ensure you are following recommended intervals and methods of preventative maintenance**
- ✓ **Ensure that a flush out of ventilation and water systems has taken place when returning a building from dormancy and shutdown**
- ✓ **Plans and Policies Guidance**
    - Infection control practices
    - Handwashing and Social Distancing
    - Green Cleaning and Maintenance Policies
    - Integrated Pest Management Policy
    - Future proofing for Potential next wave of COVID 19
    - Smoking Policies
- ✓ **IAQ Management Plan**
- ✓ **O&M Education**
- ✓ **Recommendations on Occupant Surveys**

At this stage it is important to keep energy efficiency and GHG reduction goals in mind. There are tools and processes available to monitor and measure outside air coming into your building and energy that it takes to run your building efficiently.

Stakeholder Engagement Process

It is critical at this time that a thorough discussion and review of the baseline facilities report is presented to leadership and ownership at this time. The conversation should include a discussion around the findings of the report and opportunities around capital improvements, scheduling, operations, and maintenance. The goal of the session will be to bring transparency and ownership buy-in to the overall process and a work plan with recommended action items to initiate any operational improvements that might occur in accordance with the goals of key stakeholders.

Possible topics to be unveiled may include:

- Facilities assessment findings
- Potential Capital improvements if any
- Recommended Policy and Plan creation and updates to existing
- Recommended operational improvements such as building commissioning
- Recommended internal training and skill building, vendors, staff & others
- Recommended communication strategy for guests, partners, occupants & others

Making Things Stick

The Implementation and Execution stage is when detailed building inventories are developed, policies are drafted, and programs and process are put in place to enable ongoing building performance measurement. Any high-performance green building ensures that these steps are taken so that the building performance and internal team are set up for success with the tools and processes in place for implementing green facility management strategies.

A key element of high-performance buildings is the ability to track its performance and having knowledge of the equipment and products installed and used within the building and surrounding grounds. It is important to develop detailed inventories so that you can track, gauge, and monitor operational success and improvements.

Facility Teams Process

Detailed Inventories Developed

- Exterior building maintenance equipment and tools
- Plumbing fixtures, type flow and flush rate
- Water and Energy Meters (quantity and area surfaces)
- HVAC equipment type
- Refrigerant equipment types
- Lighting fixture and lamps (quantity and type)
- BAS List of Points
- Building and site area breakdown by space or surface type
- Policies and plans created and implemented
- Capital improvements or long lead activities implemented (as approved)
- Project status team meetings are held, and minutes recorded
- Developing IEQ surveys

You Can't Manage What You Don't Measure

The Measuring and Monitoring period is the continuous implementation of strategies set during the Step 3 Implementation and Execution phase. Assessing temperature, humidity, and carbon dioxide data, as well as contaminants, air movement and ventilation through screening and monitoring, will provide a starting point to diagnose existing conditions. From there, ongoing monitoring procedures can be developed, and future adjustments can be made to enhance overall building performance. It is recommended that you conduct annual testing and review of water and air quality and conduct a review of existing and potential pollutants, such as total volatile organic compounds (TVOC's) and C02.

You will want to address how to optimize the ventilation and filtration effectiveness of HVAC systems by reviewing:

- Implementation of targeted barriers or modified entryways, lobbies, corridors, travel paths, workstations
- Filtration review and enhancement
- Testing or monitoring of air and water quality
- System re-commissioning
- Surface testing for pathogens

At this phase, your internal team should be adhering and tracking the following:

IEQ Related Tasks

- ✓ **Completing any facility upgrades or long-lead activities, such as retro-commissioning or ASHRAE Level II Energy Survey and Analysis**
- ✓ **Tracking and managing purchasing and installation of materials that might have an adverse impact on air quality**
- ✓ **Distributing IEQ Occupant comfort surveys and sharing results**
- ✓ **Adjusting and balancing (TAB) of outside air intakes**
- ✓ **IAQ building profile building walkthrough and documentation of findings**
- ✓ **Implementation of low or no-cost operational improvements identified during retro-commissioning**
- ✓ **MERV 13 air filter or higher installation**
- ✓ **HVAC and BAS preventive maintenance tasks; and meter calibration**
- ✓ **ASHRAE 55 analysis, relative humidity**

You Can't Manage What You Don't Measure

Other Recommended Tasks

- ✓ **Adhering to the building's O+M policies and plans**
- ✓ **Conducting alternative transportation and compiling results**

Testing

- ✓ **CO2**
- ✓ **Relative Humidity**
- ✓ **Total Volatile Organic Compounds**
- ✓ **PM 1**
- ✓ **PM 2.5**
- ✓ **PM 10**

As a note it is important to understand that IAQ testing does not confirm elimination of any virus or surface contaminate but does provide an indication of the quality of air that humans will breathe.

Messaging and Story Telling

How do you envision (or re-vision) your building from the viewpoint of Sustainability, Resiliency, Net Positive and Healthy Buildings? As you navigate through the myriad of different certifications to select from, it is important to understand the nuances between them so that you can apply the right certification framework for your individual goals.

Introduction to Certification Frameworks

Many of the green building rating programs approach similar goals differently with varying levels of cost, rigor or documentation involved. They are often customized by the part of the globe in which the program started and then expanded to various regions in the world. Some of these systems are self-tracking, may take a prescriptive approach, or have performance-based requirements that can be addressed in varying ways. This can be very challenging for the consumer, building owner, consultant, or facilities manager to determine which rating systems are the most credible, cost-effective and ascertain the right return on your investment.

Knowing how to gauge and value a certification system is important when answering these questions:

- **How do you consider the most appropriate rating system for your venue?**
- **Is the rating system conducted by a first party, second-party, or third-party?**
- **What is the mission behind the certifying organization?**
- **Is the certification system objective, science-based, progressive and transparent?**
    - *Science-based* — Results and decisions must be reproducible by others using the same standard.
    - *Transparent* — Standards and process for awarding the certification should be transparent and open for examination.
    - *Objective* — Certification body should be free of conflict.
    - *Progressive* — Standards should advance industry practices, not simply reward business as usual.

The Value of Green Building Standards and Frameworks

There are a wide range of economic and environmental benefits to sustainable design, often achieved using standards, ratings, and certification systems. According to a study of LEED certified buildings, the USGBC found that energy, carbon, water, and waste can be reduced, resulting in savings of 30 to 97 percent, respectively. Operating costs of green buildings can also be reduced by 8 to 9 percent while increasing in value up to 7.5 percent. Many sustainable buildings have also seen increases of up to 6.6 percent on return on investment, 3.5 percent increases in occupancy, and rent increases of 3 percent.

Other benefits of green buildings, such as higher productivity and increased occupant health have been attributed to better indoor environmental quality, increases in natural daylighting, and healthier materials and products within green buildings.

In a similar study conducted by the General Services Administration (GSA), twelve sustainable buildings were analyzed from a whole building perspective and found to cost less to operate, have excellent energy performance, and have occupants that are more satisfied with the overall building than the occupants in typical commercial buildings.

The twelve GSA buildings were compared to industry standard performance of energy, water, maintenance and operations, waste, recycling, transportation, and occupant satisfaction metrics.

While these benefits are possible, it is important to note that they are dependent upon factors such as climate, topography, timing, credit synergies, and local building standards.

- More engaged workforce
- Happier tenants and employees
- Higher Productivity
- Increased Occupant Health

Evaluate Emerging Frameworks Pertaining to Healthy Buildings

Understanding the right fit for your organization can be a daunting challenge as many of these emerging frameworks or certifications have value. Here is a snapshot of the leading ones and what they offer.

ARC Re-Entry

Arc Re-Entry builds upon the Arc Platform to assess facility management, evaluate occupant experience, and measure indoor air quality. Arc Re-entry provides iterative management processes and provides scores that can be tracked, benchmarked, and communicated to stakeholders.

Arc Re-Entry expands and adapts Arc's Human Experience tools and metrics to support the management of infectious disease transmission by addressing occupant and facility management surveys along with enhanced Indoor Air Quality metrics. Arc Re-Entry is not a "one time" assessment. It is designed to provide transparency management and support comparisons between intentions, occupant experiences and measured outcomes. Fundamentally, the power of the tool is in its repeated use. This means that it does not have a clearly defined stopping or endpoint. Rather, it should be used if it is needed to improve management and build confidence for re-entry to your facilities and on-going operations.

Areas of focus include Infection control policies and procedures, occupant observations and surveys in addition to measurements of CO2 and TVOC concentrations required as part of the IAQ Evaluation for the projects LEED recertification.

Fitwel Viral Response Module

The Fitwel Viral Response Module builds upon and operationalizes scientific evidence to establish data-driven, cost-effective strategies that mitigate viral transmission, build trust, and create healthy and resilient environments for all occupants. The Viral Response Module focuses on Enhanced Indoor Environments, Occupant Behavioral Change, and ways to build Occupant trust and transparency.

The Fitwel requires a variety of enhanced policies, plans and protocols to verify Strategy Compliance.

Viral Response Module

- Enhanced Stakeholder Collaboration Plan
- Communication Plan
- Paid Sick Leave Policy
- Family Support Policy
- Enhanced IAQ Policy
- Legionella Water Management Plan
- Enhanced Cleaning, Disinfecting and Maintenance Protocol
- PPE Plan
- Contagious Disease Outbreak Preparedness Plan

Evaluate Emerging Frameworks Pertaining to Healthy Buildings

WELL Health-Safety Rating

The WELL Health-Safety Rating for Facility Operations and Management is an evidence-based, third-party verified rating for all new and existing building and facility types focusing on operational policies, maintenance protocols, stakeholder engagement and emergency plans.

The WELL Health-Safety Rating can help guide users in preparing their spaces for re-entry in a post-COVID-19 environment. The rating, which consists of a subset of relevant features from the WELL Building Standard™ (WELL™) adapted for facility operations and management, was informed by the COVID-19 pandemic, but has broader applicability for supporting the long-term health and safety needs of people in a given space.

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The WELL Health-Safety Rating includes 21 features across the following core areas, a minimum of 15 which need to be met:

- Sanitation Procedures
- Emergency Preparedness Programs
- Health Service Resources
- Air and Water Quality Management
- Stakeholder Engagement and Communication
- Innovation

Other Frameworks to Consider

LEED

LEED is one of the best-known rating systems in the world and has been transformational in changing how we think to design, construct, and operate buildings. The value that it brings your asset includes:

- Lower operating costs and increased asset value
- Reduced waste sent to landfills
- Energy and water conservation
- More healthful and productive environments for occupants
- Reductions in greenhouse gas emissions
- Qualification for tax rebates, zoning allowances, and other incentives in many cities
- Nationally recognized #1

LEED topics as associated with new construction or interior buildouts includes Location & Transportation, Water Efficiency, Energy & Atmosphere, Materials, Indoor Environmental Quality along with a variety of innovative strategies.
https://www.usgbc.org/leed

WELL

The International WELL Building Institute (IWBI) is committed to transforming health and well-being with a people-first approach to buildings, organizations, and communities. Since the launch of WELL Building Standard (WELL) in 2014, 2,000+ companies, including over 100 of the Fortune 500, have adopted WELL as an evidence-based roadmap for scaling health across their organization. They focus on 10 Concepts when addressing their rating system from a health centered perspective: Air, Water, Nourishment, Light, Movement, Thermal Comfort, Sound, Materials, Mind, and Community. https://v2.wellcertified.com/en

Fitwel

Employers are aware of the impact health related costs have on their bottom line. According to the Integrated Benefits Institute, productivity losses related to health cost US employers over $225 billion annually. Research by the CDC corroborates these findings, demonstrating how the design and maintenance of the built environment can significantly benefit health, productivity, and overall happiness. Fitwel addresses Health & Wellness. Location, Building Access, Outdoor Spaces, Entrances and Ground Floor, Stairs, Indoor Environment, Workspaces, Shared Spaces, Water Supply, Prepared Food Areas, Vending Machines and Snack Bars, Emergency Preparedness.
https://www.fitwel.org/