BEYOND SMART CITIES

# TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT REFRESHER TRAINING COURSE

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BEYOND SMART CITIES

# SUSTAINABLE INDOOR ENVIRONMENT TECHNOLOGIES

## FOR BUILDING SCIENCE PROFESSIONALS

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BUILDING SCIENCE SPECIALIST CURRICULUM

## WHAT SHOULD YOU LEARN

- Indoor Environmental Quality and Sustainability
- What is indoor environmental quality?
- Why is this important for buildings?
- What are common sources of indoor air contaminants?
- IEQ Improvement

## WHAT IS INDOOR ENVIRONMENTAL QUALITY?

Indoor Environmental Quality (IEQ) encompasses the conditions inside a building—air quality, lighting, thermal conditions, ergonomics—and their effects on occupants or residents.

Strategies for addressing IEQ include those that protect human health, improve quality of life, and reduce stress and potential injuries. Better indoor environmental quality can enhance the lives of building occupants, increase the resale value of the building, and reduce liability for building owners.

## WHAT IS INDOOR ENVIRONMENTAL QUALITY?

Since the personnel costs of salaries and benefits typically surpass operating costs of an office building, strategies that improve employees' health and productivity over the long run can have a large return on investment.

IEQ goals often focus on providing stimulating and comfortable environments for occupants and minimizing the risk of building-related health problems.

To make their buildings places where people feel good and perform well, project teams must balance selection of strategies that promote efficiency and conservation with those that address the needs of the occupants and promote well-being.

## WHAT ARE COMMON SOURCES OF INDOOR AIR CONTAMINANTS?

People smoking tobacco inside the building or near building entrances or air uptakes

Building materials such as paints, coatings, adhesives, sealants, and furniture that may emit volatile organic compounds (VOCs), substances that vaporize at room temperature and can cause health problems

Combustion processes in HVAC equipment, fireplaces and stoves, and vehicles in garages or near entrances

Mold resulting from moisture in building materials

Pollutants from specific processes used in laboratories, hospitals, and factories

Pollutants tracked in on occupants' shoes

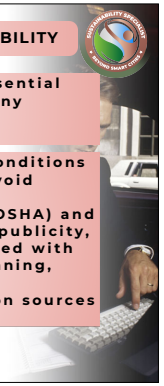
Occupants' respiration, which increases carbon dioxide levels and may introduce germs

The best way to prevent indoor pollutants is to eliminate or control them at the sources. The next line of defense is proper ventilation to remove any pollutants that do enter. Both approaches need to be considered at all phases of the building life cycle.

## INDOOR ENVIRONMENTAL QUALITY AND SUSTAINABILITY

Good indoor environmental quality (IEQ) is an essential objective for new construction or renovation of any building, especially if the parallel objective is a sustainable building environment.

Efforts to create optimal indoor environmental conditions enable owners and managers to anticipate and avoid negative health effects, liability related to the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA), bad publicity, and costly renovations and repairs often associated with IEQ problems. Efforts to improve IEQ involve planning, designing, building, operating, maintaining, and renovating buildings in ways that reduce pollution sources and remove indoor pollutants.

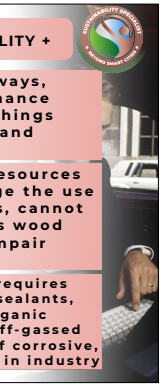


## INDOOR ENVIRONMENTAL QUALITY AND SUSTAINABILITY +

Sustainable practices impact IEQ in a variety of ways, including buying and using cleaning and maintenance products; selecting building materials and furnishings that are manufactured with less toxic materials; and designing for more and better light.

Sustainable practices are intended to conserve resources that benefit human life and health and discourage the use of substances and materials that waste resources, cannot renew themselves (as “natural” resources such as wood can), contaminate air and water, and generally impair quality of life over the long term.

For the building or facilities manager, sustainability requires careful judgment in the selection of paints, solvents, sealants, and cleaning products, which often contain volatile organic compounds (VOCs). The harm inherent in airborne or off-gassed VOCs is well established, as are the negative effects of corrosive, carcinogenic, and irritating chemicals commonly used in industry

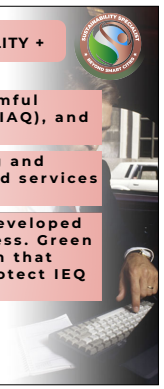


## INDOOR ENVIRONMENTAL QUALITY AND SUSTAINABILITY +

Choosing less hazardous products minimizes harmful impacts to workers, improves indoor air quality (IAQ), and reduces water pollution.

With many competing claims to consider, finding and purchasing environmentally friendly products and services can be a challenge.

However, several reputable organizations have developed third-party certifications to streamline the process. Green Seal, for example, is an independent organization that tests and certifies products and services that protect IEQ and maintain performance standards.



## IEQ IMPROVEMENT

**Managers are increasingly focused on making their buildings sustainable and more efficient by using healthier, less polluting, and more resource-efficient practices.**

- ☑ Improved use of natural light
- ☑ Building orientation to maximize use of sunlight and natural winds
- ☑ Selection of building materials and furnishings free of formaldehyde and other VOCs
- ☑ Greater and more strategic use of live plants indoors and accessibility to nature outdoors
- ☑ Full-building air flushing before occupancy to ensure systems are clean
- ☑ Building automation systems (BAS) that manage the balance of indoor and outdoor air
- ☑ Elimination of toxic indoor and outdoor pest control procedures
- ☑ Use of fewer, less toxic landscaping chemicals and fertilizers

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