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Barry Weaver Consulting, LLC

INDOOR AIR QUALITY (IAQ)

AGENDA

- **What is Indoor Air Quality**
- **How to Improve Indoor Air Quality**



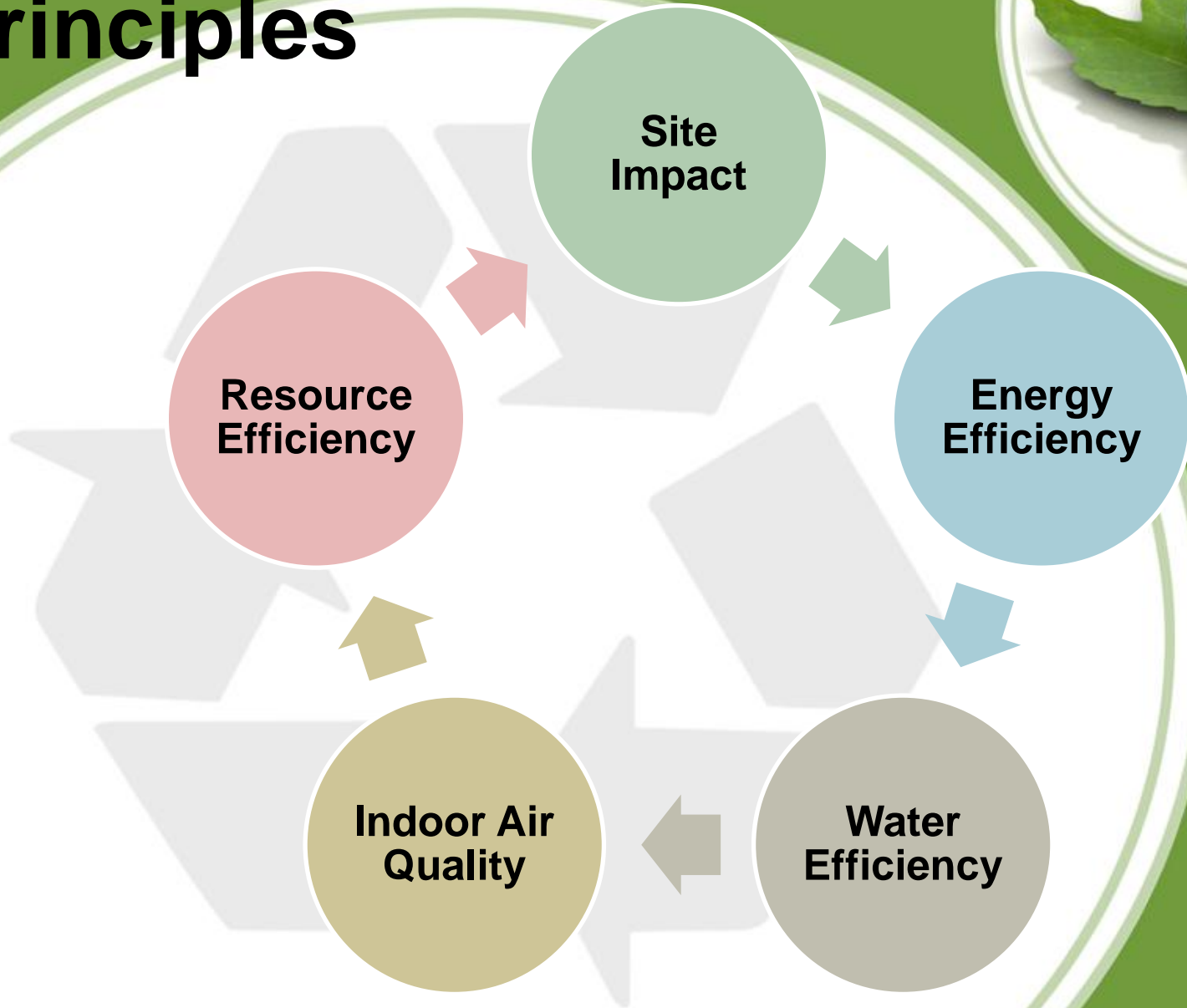
What is Green Building



Green Building is an integrated, whole system, approach that considers the building's life-cycle:

- Efficiently using energy, water, and other resources.
- Protecting occupant health, employee productivity, and resident well-being.
- Reducing costs for operations and maintenance.

What Are Green Building Principles



Indoor Air Quality (IAQ)



IAQ refers to the quality of the air and environment inside buildings, based on pollutant concentrations and conditions that can affect the health and comfort.

Good IAQ is an essential component of Green Building.

Indoor Air Quality



**Pollution
Greater Than
Outside Air**

**IAQ Greater
Risk To
Health Than
Outside Air**

**American spend
90% Of Time
Indoors**

Three Primary Factors



- **Indoor Pollutants** – There are many indoor materials, chemicals, and other sources that emit gases and particles into the air.
- **Air Exchange Rate** - The rate at which outdoor air replaces indoor air can increase indoor pollutant levels.
- **Moisture and Heat** - High temperatures and humidity levels can also increase concentrations of some pollutants.

IAQ Source Control



Source control is most effective way to improve Indoor Air Quality.

Environmental Tobacco Smoke (ETS)



- ETS is the mixture of smoke that comes from the burning end of a cigarette, pipe, or cigar, and smoke exhaled by the smoker.
- It is a complex mixture of over 4,000 compounds. Several are known to cause cancer.
- ETS is often referred to as "secondhand smoke" and exposure to ETS is often called "passive smoking."

Reducing Exposure

- Stop smoking
- Don't smoke inside or permit others to do so.
- If smoking is permitted indoors, designate a sealed smoking area.
- ETS should be exhausted outside.



Volatile Organic Compounds (VOCs)

- VOCs are widely used as ingredients in household products including paints, varnishes, wax, household adhesives, sealants, cleaners, disinfectants, cosmetics, degreasers, fuels, and hobby products.
- VOCs can cause eye, nose, and throat irritations, headaches, dizziness, visual disorders, memory impairment, and cancer.



VOC's



- **Methylene Chloride** - Products that contain include paint strippers, adhesive removers, and aerosol spray paints.
- **Benzene** - Main indoor sources of this chemical are environmental tobacco smoke, stored fuels and paint supplies, and automobile emissions in attached garages.
- **Perchloroethylene** - Chemical most widely used in dry cleaning.

Reducing Exposure

- Select products and materials with no or low-VOC emissions.
- Buy limited quantities.
- Follow label instructions.
- Properly dispose of partially full containers of unneeded chemicals safely.



Formaldehyde



- Pressed wood products made using adhesives that contain urea-formaldehyde (UF) resins including particleboard, hardwood plywood paneling, and medium density fiberboard.
- During the 1970s, urea-formaldehyde foam insulation (UFFI) installed in the wall cavities of their homes as an energy conservation measure.
- Shown to cause cancer in animals and may cause cancer in humans.

Reducing Exposure



- Ask about the formaldehyde content of pressed wood products, including building materials, cabinetry, and furniture before you purchase them.
- Specify wood and agrifiber products that contain no added urea-formaldehyde resins. Do not use laminating adhesives that contain urea-formaldehyde resins.

Carpet



- The styrene-butadiene (SB) latex backing that is used on many carpets is a source of styrene and 4-phenyl cyclohexene (4-PC).
- Vinyl-backed carpets emit vinyl acetate and formaldehyde.
- Health problems usually arise more frequently in individuals with multiple chemical sensitivities.

Reducing Exposure



- Carpet and Pad should meet the Carpet and Rug Institute (CRI) Green Label programs.
- Air out the carpet in a well-ventilated area before installation.
- Specify low-emitting adhesives.
- Ventilate area after installation.

Third-Party Verification



The Carpet and Rug Institute (CRI) launched its Green Label program to test carpet, cushions and adhesives to help identify products with very low emissions of VOCs.



GREENGUARD Indoor Air Quality Certified includes bedding, Building Products, Cleaning & Maintenance Electronic Equipment, Office Equipment, and Furniture.

Third-Party Verification



**Green Seal includes Building Products,
Cleaning Supplies, Fleet Vehicle Maintenance,
Lodging Products, and Paper Products.**



Biological Contaminants



- Include bacteria, molds, mildew, viruses, animal dander and cat saliva, house dust mites, cockroaches, and pollen.
- High temperatures and humidity levels can increase concentrations of some pollutants.
- Contaminated central air handling systems can become breeding grounds for mold, mildew, and other sources of biological contaminants.

Reducing Exposure



- Use exhaust fans that are vented to the outdoors.
- Keeping humidity levels below 50%.
- Clean and dry water-damaged carpets and building materials (within 24 hours).
- Cleaning can reduce dust mites, pollens, animal dander, and other allergy-causing agents.

Basements

- Clean and disinfect the basement floor drain regularly.
- Repair water leaks.
- Provide adequate heat and ventilation.
- Operate a dehumidifier to keep relative humidity levels below 50%.



Stoves, Heaters, Fireplaces, and Chimneys



- **Carbon Monoxide** (CO) is a colorless, odorless gas that interferes with the delivery of oxygen throughout the body. At high concentrations it can cause unconsciousness and death.
- **Nitrogen Dioxide** (NO₂) is a reddish-brown, irritating odor gas that irritates the mucous membranes in the eye, nose, and throat and causes shortness of breath.
- **Particles**, released when fuels are incompletely burned, can lodge in the lungs and irritate or damage lung tissue.

Reducing Exposure



- Install Carbon Monoxide (CO) Detectors.
- Use exhaust fans over gas ranges.
- Never use a gas stove to heat.
- Annually inspect furnaces, flues, and chimneys for cracks or damaged parts.
- Change filters once a month.

Pesticides



- Pesticides used in and around the home include products to control insects, termites, rodents, fungi, and microbes.
- They are sold as sprays, liquids, sticks, powders, crystals, balls, and foggers.
- In 2007, The American Association of Poison Control Centers reported that 2.5 million people were exposed to poisons -- almost 1.3 million of these exposures occurred in children 5 years or younger.

Reducing Exposure



- Implement an Integrated Pest Management Plan (IPM).
- Use non-chemical methods of pest control when possible to reduce the amount and frequency of pesticides used.
- Do not store unneeded pesticides inside.
- Apply only in recommended quantities.
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- Ventilate the area well after pesticide use.
- Dispose of unwanted pesticides safely.

Asbestos



- Commonly found in older buildings, in pipe and furnace insulation materials, asbestos shingles, millboard, textured paints and other coating materials, and floor tiles.
- Elevated concentrations of airborne asbestos can occur after asbestos-containing materials are disturbed by cutting, sanding or other remodeling activities.
- The risk of lung cancer increases with the number of fibers inhaled.

Reducing Exposure



- It is best to leave undamaged asbestos material alone if it is not likely to be disturbed.
- Do not cut, rip, or sand asbestos-containing materials.
- When you need to remove or clean up asbestos, use a professionally trained contractor.

Lead (Pb)



- There are many ways in which humans are exposed to lead: through air, drinking water, food, contaminated soil, deteriorating paint, and dust.
- Lead affects practically all systems within the body.
- The effects of lead exposure young children can be severe. They include delays in physical and mental development, lower IQ levels, shortened attention spans, and increased behavioral problems.

Reducing Exposure

- Leave lead-based paint undisturbed if it is in good condition.
- Have lead-based paint professionally removed.
- Find out about lead in drinking water.
- Eat right. A child who gets enough iron and calcium will absorb less lead.



Radon



- Radon is a radioactive gas formed in the decay of uranium. The radon decay can be breathed into the lung.
- You can't see, smell or taste radon.
- Radon is the second leading cause of lung cancer in America and claims about 20,000 lives annually.
- Radon can be found in ground or well water.

Reducing Exposure

- Test – Radon test kits are available for hardware supply stores.
- A certified technician can identify the appropriate measures to mitigate the radon.
- Solutions can be as simple as sealing crawl spaces and venting crawl space air to the outside.



Design Strategies



- Choose products & materials with zero or low VOC emissions.
- Provide adequate ventilation and a high-efficiency, in-duct filtration system.
- Select materials resistant to microbial growth.
- Use crawl space vapor barrier.
- Use hard surface flooring instead of carpeting.
- Use permanent mats to minimize tracked-in dust.

Summary



- Source control is most effective way to improve IAQ.
- Increasing ventilation or by using air filtration devices can improve IAQ.
- Source control is more cost-efficient since increasing ventilation increases energy demand.

There is only one Earth

