

Guiding Principles for High-Performance and Sustainable Buildings eTraining Series

Course: FEMP 33
Duration: 1.0 hours
Learning Units: 1.0 LU
Prerequisites: None
HSW: Yes
IACET CEUs: 0.1



Guiding Principle IV: Enhance Indoor Environmental Quality

In the course, Guiding Principles for Existing High Performance and Sustainable Buildings, Guiding Principle IV, Enhance Indoor Environmental Quality, you will learn strategies for meeting the compliance requirements and recommended evidence of compliance for Guiding Principle IV.

The Office of Management and Budget (OMB) uses the Guiding Principles to score federal agencies' progress and compliance within the Green Buildings category on annual agency scorecards.

This course focuses on the following fundamentals to meet and document compliance for high performance and sustainable buildings in a federal facility:

- Ventilation and Thermal Comfort
- Moisture Control
- Daylighting and Lighting Controls
- Low Emitting Materials
- Integrated Pest Management, and
- Tobacco Smoke Control.

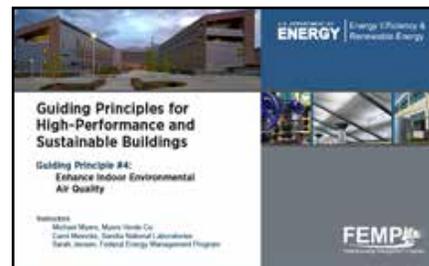
Instructor

The instructor for this course is **Sarah Jensen**, Technical Lead for Sustainability, Federal Energy Management Program. Sarah also co-chairs the Interagency Sustainability Working Group (ISWG) with GSA. She most recently served as deputy director and environmental counsel for the Green the Capitol Office for the U.S. House of Representatives. She received a bachelor's degree in mass communications from James Madison University and a juris doctor degree in energy, environment, and natural resources law from Northwestern School of Law at Lewis and Clark College.

Learning Objectives

By successfully completing this course, you will be able to:

- Identify and implement sustainable operations and maintenance practices to enhance indoor environmental quality;
- Apply tools such as ASHRAE Standards and related assessments to baseline and benchmark facilities, assess existing conditions, identify opportunities for improvement, and establish implementation plans and metrics to comply with the Guiding Principles;
- Recognize decision points and opportunities to implement sustainable strategies to achieve integrated, holistic and cost effective indoor environmental quality improvements; and
- Document meeting the Guiding Principle requirements through conformance with the recommended evidence of compliance.



Guiding Principle IV

4.1 Title Slide

Welcome to the FEMP e-Training series on Guiding Principles for Federal Leadership for High Performance and Sustainable Buildings. This course is on Guiding Principle IV, Enhance Indoor Environmental Quality.

4.2 Navigation Instructions

Each page of this course contains a navigation bar across the bottom.

The course will not move to the next page automatically, so you will need to use these buttons to move within the course. Click the play button or pause button to play or pause the course.

Click the back button to review the previous page.

Click the forward button to go to the next page.

Click and drag the progress indicator to move the course forward or backward.

Click the audio button to turn the audio on or off.

Click the exit button to close the course window.

Click the arrows in the top left corner of the screen to open or close the table of contents.

Click the “Notes From the Field” icon for more information.

Click the magnifying glass icon for “Recommended Evidence of Compliance” information.

4.3 Guiding Principles Overview

Federal agencies must comply with five Guiding Principles for High Performance and Sustainable Buildings.

1. Employ integrated assessment, operation, and management principles
2. Optimize energy performance
3. Protect and conserve water
4. Enhance indoor environmental quality
5. Reduce environmental impact of materials

Each guiding principle has its associated actions and requirements for compliance. In this course, we will cover Guiding Principle 4.

4.4 Guiding Principle IV: Elements

Guiding Principle IV includes actions and requirements for compliance in the following areas:

- Ventilation and Thermal Comfort
- Moisture Control
- Daylighting and Lighting Controls
- Low Emitting Materials
- Integrated Pest Management, and
- Tobacco Smoke Control.

Now, let's get started.

4.5 Ventilation and Thermal Comfort

The first action required under Guiding Principle IV is to optimize Ventilation and Thermal Comfort. This action requires you to meet ASHRAE Standard 55-2004 “Thermal Environmental Conditions for Human Occupancy” and ASHRAE Standard 62.1-2007 “Ventilation for Acceptable Indoor Air Quality.”

The main “take away” from this action is that you have to meet both standards, ASHRAE 55 and ASHRAE 62.

In cases where a building is ENERGY STAR labeled, or is in the process of achieving an ENERGY STAR label, a Licensed Professional (LP) must document that the building meets the ENERGY STAR® requirements.

By meeting the ENERGY STAR requirements, the building will also meet ASHRAE standards.

Click the link to visit the ENERGY STAR website. <http://www.energystar.gov/>

4.6 ASHRAE Standard 55-2004, Or Current

ASHRAE Standard 55-2004 is title Thermal Environmental Conditions for Human Occupancy, and this standard must be met for compliance.

If your building does not meet the ENERGY STAR criteria, you will need to gather information to ensure compliance with ASHRAE Standards 55 and 62.

Ask yourself these questions: Do I have a monitoring system? Do I have staff in the building that knows how to collect the data to meet ASHRAE Standards 55 and 62? Do I have the capability to collect that data? Do I have any other sensors or building automation systems to collect the data?

Take a step back and determine what information you have, what information you need, and how are you going to gather that information you need.

4.7 Sample Comfort Measurement Report

The information collected will need to be synthesized in a report to demonstrate compliance. Here is an example of a brief report that you might generate to meet ASHRAE Standards 55 and 62.

In producing data for the report, examine the spaces you occupy, as well as types of rooms and how they are used. Then, collect information on the room temperatures, humidity, and air exchange rates. Gather this information through building automation systems or hand held instruments.

4.8 ASHRAE Standards 55 & 62.1

The process of documenting compliance with ASHRAE Standards 55 and 62.1 will take time. The information gathered from the building will need to be inspected closely to ensure it will meet 100% of the requirements for Guiding Principle IV. If your building cannot meet ASHRAE Standards 55 and 62.1, then you cannot meet 100% of the this Guiding Principle.

Once again, take a step back and ask yourself: Do I have the equipment in the building that is necessary to monitor indoor environmental quality? Do I have the technical staff expertise to collect the required information and document whether it has met the ASHRAE Standards? Or, should I contract with a third party vendor in order to gather the data and document that the building meets ASHRAE standards?

Federal agencies, however, have a wide range of buildings, including building types, sizes, and uses. The ASHRAE standards are focused on buildings with occupants. In the federal sector, many buildings are more than 5,000 square feet, and have a particular mission, but do not have occupants. If that is the case in your situation, then document that there are not full-time occupants in the building and this Guiding Principle is no longer applicable to your building.

Click on the icon to view the Recommended Evidence of Compliance.

Recommended Evidence of Compliance:

- A registered engineer signs off on proper building documentation of ASHRAE Standards and/or ENERGY STAR label compliance

4.9 Moisture Control – Requirement 1

The next action under this Guiding Principle is moisture control. This Guiding Principle dictates that an agency must provide a strategy that illustrates the use of an appropriate moisture control policy to prevent building damage, minimize mold contamination, and reduce health risks related to moisture. It then goes on to cover facade renovation, dew point analysis, clean up, and other related items.

For the purposes of existing buildings, you need to have a policy in place that shows a plan to address moisture control and a strategy to prevent related building damage. This may be a topic where environmental, safety, and health staff need to assist. A good opportunity to look for this type of building damage is when you conduct an energy audit, commissioning, or building condition assessments. These assessments are required as part of Guiding Principle I.

4.10 Moisture Control

The second part of this principle is the facade renovation. If you are not planning on replacing or renovating the facade, you do not need to worry about this part. This part of the Guiding Principle implies that you have a design manual, design documents, reports, or other information that you would provide to the professional designing the renovation. This documentation should state that you have a plan to address moisture control.

If you have a design manual, examine the portions that discuss moisture control and wall design. Make certain you have a plan to prevent moisture penetration from the outside and that your vapor barriers are in the right locations. These factors will change based on your geographic location and the weather patterns in your area.

The main goal of the Moisture Control action within Guiding Principle IV is that there are adequate moisture control policies and strategies in place. These can be building specific or site-specific: if you have a good policy for your site you can extrapolate it down to the building level.

Click on the icon to view the Recommended Evidence of Compliance.

Recommended Evidence of Compliance:

- Moisture-control strategies, plans or policies
- Documentation that “Moisture Control” is included in any building commissioning, audits and/or assessments.

Notes from the Field:

Agencies with buildings in desert climates may believe that they don't have to worry about moisture control. This is not the case. Desert climates do have moisture control issues because when it rains, it often rains torrentially. This is when cracks in the wall, stucco, roof, or other moisture control problems, become apparent.

4.11 Daylighting and Lighting Controls

The next action in this Guiding Principle is Daylighting and Lighting Controls. The first subject is automated lighting controls, which include occupancy/vacancy sensors with manual-off capability for appropriate spaces. These spaces include restrooms, conference rooms, lunch rooms, break rooms, classrooms, and offices.

Offices can include different types of spaces. There are private offices—which this Guiding Principle focuses on—where you can close the door, with one or two people in the office. These types of offices lend themselves to the effective use of occupancy sensors. There are other types of offices with more people, such as shared spaces, cubicles, or open offices. These types of offices do not lend themselves to the effective use of occupancy sensors.

Document where you use occupancy sensors, and state whether the building's policy allows or exempts the use of occupancy sensors in open office areas.

This action under Guiding Principle IV requires lighting controls for “appropriate spaces.” Determining appropriate spaces will involve interpretation for each building based on a variety of factors.

The second part of this Guiding Principle has two options to meet additional daylighting.

The first option is to achieve a minimum daylight factor of 2%, excluding all direct sunlight penetration, in 50% of all space occupied for critical visual tasks. The Guiding Principle has not been modified to clarify how to measure and meet the 2% requirement. Many things are not defined:

2% of what?

What does direct sunlight penetration mean?

What are critical visual tasks?

So, you need to be aware of these clarification issues with Option 1. Most sites go directly to Option 2 because it is more clearly defined. Option 2 requires that you provide occupant controlled lighting and allow adjustments to suit individual task needs for 50% of regularly occupied spaces.

How do you define occupant controlled lighting? As one example, a simple light switch is considered occupant controlled lighting. For another example, an open office with task lighting would also meet option 2 of this requirement.

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Some rooms may be good spaces to install occupancy sensors, but are not included as “appropriate spaces” by this action in Guiding Principle IV. These rooms include: storage rooms, mechanical rooms, janitor closets, and other types of specialty rooms. Since these rooms do not fit the definition of “appropriate rooms” in the Guiding Principles, installing occupancy sensors in these rooms is optional.

4.12 Document Lighting Controls

It is important to document the locations of lighting controls, switches, and occupancy sensors. This should be done on a room-by-room basis to ensure that these lighting controls are installed in appropriate spaces, as defined by Guiding Principle IV. A spreadsheet, floor plans, or combination of both, is sufficient documentation to demonstrate compliance.

Good documentation includes such information as building identification, room number and type, and relevant features, such as windows, the presence of an occupancy sensor, and whether it is an appropriate space as defined by Guiding Principle IV. Most sites have floor plans or schematics to track space use, and these can be easily used or modified to document compliance with Guiding Principle IV.

Click on the icons to view sample documentation using a spreadsheet and a floor plan. Click on the icon to view the Recommended Evidence of Compliance.

Recommended Evidence of Compliance:

- Document onsite visual inspection/photos of lighting controls.
- Electrical/lighting plans
- Schematic of lighting controls.
- Other documentation
- Justify “inappropriate” spaces

4.13 Low Emitting Materials

The next action item of Guiding Principle IV is to use low-emitting materials. There are a few aspects of this Guiding Principle that can be problematic. The first issue is that this action does not define what low-emitting means. Industry standards can be used as a comparable proxy.

The next part of the principle talks about materials for building modifications, maintenance, and cleaning. In many agencies, several different groups conduct the building modifications, maintenance, and cleaning. If this is the case, you will need multiple documents to prove compliance.

For example, to ensure low-emitting materials compliance in a building modification you will need the specifications that you provided to the contractor that carried out the modification. For maintenance, service contracts or standard operating procedures are required documentation.

For cleaning, the document you provide to your custodial staff on procedures and products used is needed for compliance. Documenting compliance this action within Guiding Principle IV may require a large quantity of piecemeal information from all these separate groups.

The Guiding Principles also discuss particular materials and products that are included in “low-emitting” materials. These include: composite wood products, adhesives, sealants, interior paints and finishes, solvents, carpet systems, janitorial supplies, and furnishings. At a minimum, make certain these products and materials covered when reporting on low emitting materials.

Recommended Guidance for complying with this action is to make certain you have all the documentation on building modification, maintenance, and cleaning. This will help demonstrate that you meet industry standards and ANSI standards that define low emitting materials.

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Using these standards is beneficial in the long run. If the industry definitions of low emitting materials change over time, your specification will automatically change along with them, saving you major revisions in your documentation.

Click on the icon for more specific information regarding Industry and federally certified “Low-emitting materials” and standards. Click on the icon to view Recommended Evidence of Compliance.

Recommended Evidence of Compliance:

In Environmentally Preferable Purchasing (EPP) plan, include specifications for:

- Contracts
- Bid documents
- Other purchasing/construction specifications.

4.14 Integrated Pest Management

This action of Guiding Principle IV states that you should use integrated pest management techniques as appropriate to minimize pesticide use, and you should use EPA-registered pesticides only when needed.

The Guiding Principle does not list the format the plan needs to be in, nor does it define what pest management is. To comply with this principle, you need an Integrated Pest Management Plan or strategy in place to demonstrate how you accomplish integrated pest management. This includes the individuals or organizations within your agency that will enact it. Your strategy can be site-wide, which can be extrapolated down to the building level. Click on the icon to view Recommended Evidence of Compliance.

Recommended Evidence of Compliance:

Provide Integrated Pest Management Plan or strategy used on site.

Notes from the Field

The Guiding Principle does not list the format the plan needs to be in, nor does it define what pest management is. Different sites handle it different ways. LEED has a very good format for conducting and implementing an integrated pest management plan. As mentioned previously, you want complete documentation that can be used for multiple purposes. So, if you have LEED certification, you can use the relevant integrated pest management sections to comply with this requirement.

4.15 Tobacco Smoke Control

Tobacco smoke control is the last action in Guiding Principle IV. This principle prohibits smoking within the building and within 25 feet of all building entrances, operable windows, and building ventilation intakes.

There are usually many procedures, policies, and rules already in place that cover tobacco smoke control due to local, city, and state laws. This is a relatively simple requirement to meet to achieve compliance with Guiding Principle IV.

Recommended Evidence of Compliance is to demonstrate that you have a tobacco smoke control plan in place. Additionally, any photographs of signs that you may have in place will work as well.

Sites with multiple buildings can show the plans for smoking policies for no smoking in the buildings and no smoking on the campus. Click on the icon to view Recommended Evidence of Compliance.

Recommended Evidence of Compliance:

- Provide environmental tobacco smoke control policy for the building or for the site/campus.
- Document no smoking with photos of signage.
- Provide details of the building’s no smoking areas.

4.16 Guiding Principle IV: Course Summary

This course covered Guiding Principle IV, Enhance Indoor Environmental Quality. We covered the following:

- Ventilation and Thermal Comfort
- Moisture Control
- Daylighting and Lighting Controls
- Low Emitting Materials
- Integrated Pest Control, and
- Tobacco Smoke Control

Thank you for your interest and commitment for Federal Leadership in Sustainable High Performance Buildings. We hope that you will also take the other e-Trainings in this series on the Guiding Principles.

Now, please take a moment to click on the link at the top of your screen to complete the quiz and a short course evaluation. This will provide you with continuing education credits and provide FEMP with valuable feedback to continue to improve training offerings.

End of Guiding Principle IV Course