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MODULE 10

# Sustainable Sites

KRISHNAJI PAWAR - CEO & FOUNDER

LEED AP(BD+C),GSAS CGP,GCP,ISO 14001

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# LEED GREEN ASSOCIATE EXAM REFRESHER

This chapter explores sustainable sites in LEED categories, focusing on factors for site design, construction, and maintenance. It emphasizes the importance of considering environmental, economic, and community aspects when determining strategies for green building projects.

# Learning Objectives

- Introduction and Course Outline
- Knowing the Process of LEED Credentialing
- Basic Concepts of Sustainable Design
- Organizational Fundamentals
- LEED Green Building Rating System
- LEED Certification Process
- Getting a LEED Green Associate Credential
- Integrative Strategies
- Location and Transportation
- Sustainable Sites

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# INTRODUCTION

- Discusses strategies and technologies within LEED categories, starting with Sustainable Sites (SS).
- Focuses on factors applicable to site design, construction, and maintenance.
- All SS components should consider environmental, economic, and community aspects.
- Assesses site attributes and conditions to determine sustainable development approach.
- Considers existing imperviousness, open space, and region's climate.
- Determines development and preservation strategies.
- Encourages collaboration to reduce heat gain from the sun for the entire site, including rooftop areas.

# SUSTAINABLE SITES

The SS category within the LEED rating systems breaks down into three factors to help evaluate a potential project site:

- Site design and management
- Rainwater management
- The heat island effect





# SITE DESIGN AND MANAGEMENT



- Site selection and management are crucial components in green building projects.
- Sustainable landscaping techniques, including native and adaptive plantings, and water-efficient irrigation systems are recommended.
- Native plantings are naturally occurring vegetation, while adaptive plantings adapt to new surroundings.
- Plant selection should improve soil nutrients and deter pests, reducing chemical use in water infrastructure.
- Reducing potable water used for irrigation decreases water requirements and maintenance costs.
- Minimizing impervious surfaces and optimizing exterior lighting schemes are also crucial.
- Impervious surfaces contribute to stormwater runoff and reduce groundwater recharge.

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# STRATEGIES FOR SUSTAINABLE SITES

- Preserve open space and sensitive areas: Maximize open space by reducing building footprint and increasing FAR. Use a tuck-under approach for parking.
- Minimize hardscape: Avoid impervious surfaces that contribute to stormwater runoff and pollutants.
- Use native landscaping: Utilize native and adaptive vegetation and high-efficient irrigation systems to reduce water usage and provide habitat for local species.
- Prevent light pollution: Project exterior light down, maintain minimal light levels at night, and consider areas not occupied at night.
- Protect and restore habitat: Dedicate protected areas for the project's life and create a conservation management plan.





# SUSTAINABLE SITE OPERATIONS AND MAINTENANCE STRATEGIES



- Develop a sustainable management plan including integrated pest management (IPM) and exterior surface cleaning.
- Address energy and water usage to reduce pollution.
- Implement conservation programs to protect species and habitats.
- Maintain site lighting to prevent light pollution.
- Set timers for automatic shutdown of fixtures when higher light levels are needed.

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# RAINWATER MANAGEMENT

- Minimizing impervious surfaces like asphalt and concrete reduces rainwater runoff, affecting surface water quality and groundwater recharge.
- Nonpoint source pollutants like oil and fertilizers contaminate rainwater flowing along impervious surfaces, affecting water quality and aquatic life.
- Pervious surfaces like concrete, porous pavement, or open-grid pavers reduce pollution of surface water.
- Oil separators can be used in urban areas to remove oil, sediment, and floatables.
- Other strategies to reduce runoff include wet or dry ponds, on-site filtration methods, and green roofs.
- The Rivers Casino project team designed the site to treat all surface water before leaving the site.
- Rainwater management benefits include preserving natural ecological systems, economic savings, and social equity.





# RAINWATER MANAGEMENT STRATEGIES FOR SUSTAINABLE SITES



- Minimize impervious areas using open-grid pavers, porous paving, pervious concrete, and green roofs.
- Control rainwater using rain gardens, dry ponds, and bioswales to slow runoff and clean water.
- Incorporate rainwater management into site design with multipurpose features like streets with bioswales.

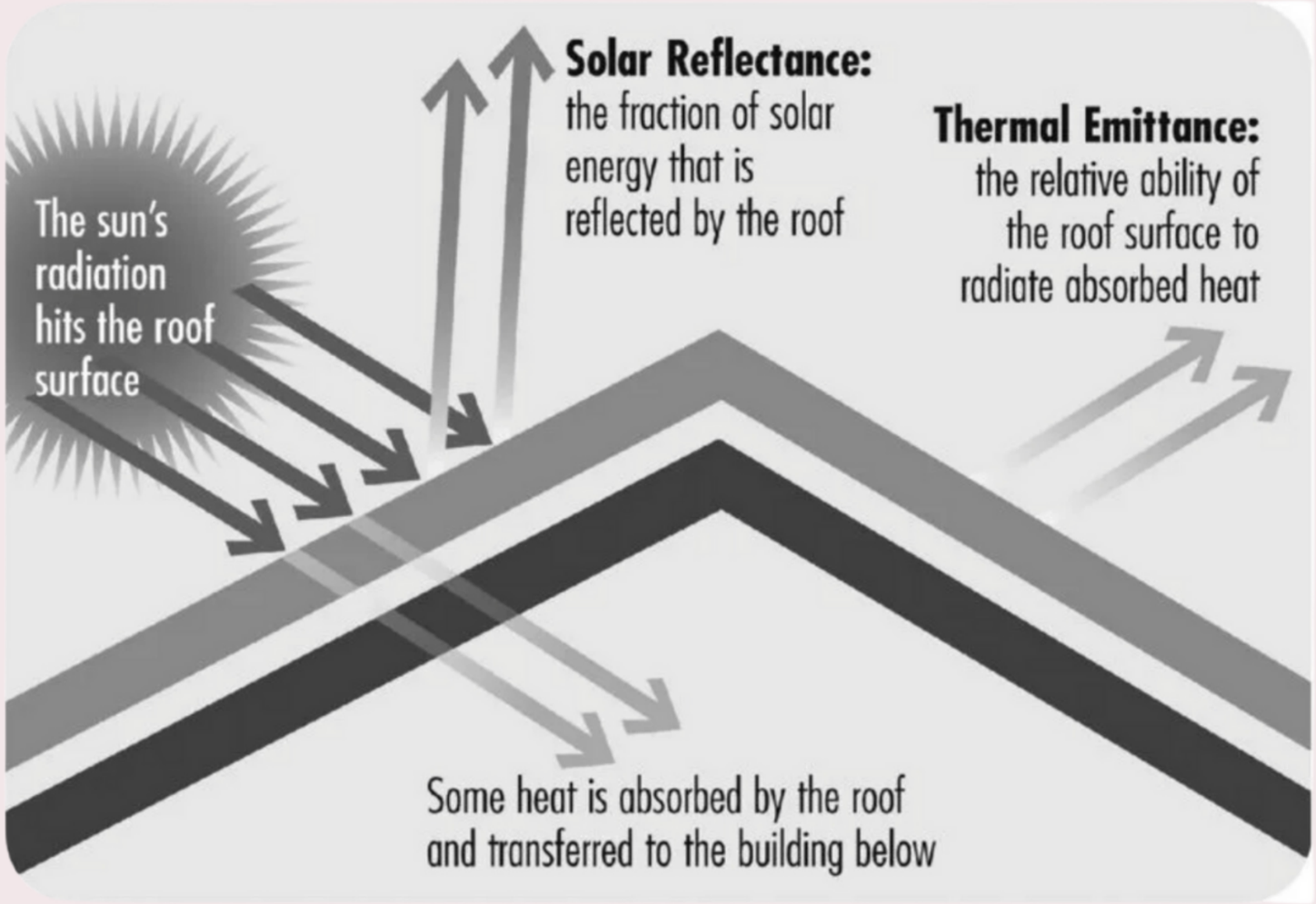
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# HEAT ISLAND EFFECT

- Heat island effect is a phenomenon where heat is emitted from black surfaces, attracting sunlight to darker ones.
- In urban areas, this effect is more significant.
- Green building projects can reduce heat island effect and overall temperature by using materials with high solar reflectance or reflectivity index (SRI).
- Lighter roofing materials reduce energy use by eliminating the need for mechanical systems to compensate for heat gain.
- Light-colored materials for surface paving, walkways, and rooftops distribute light more efficiently, reducing the number of light fixtures required.



# HEAT ISLAND EFFECT +








# HEAT ISLAND EFFECT STRATEGIES FOR SUSTAINABLE SITES




- Use reflective roof materials for cost-effective exterior lighting.
- Reduce paved surfaces exposed to sunlight by reducing hardscape and implementing light colored areas.
- Ensure parking is underground to minimize sunlight exposure.
- Plan urban forests or green roofs to reduce heat island effect through evapotranspiration and shading.

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# CONTACT US


+91 6363032722

info@beyondsmartcities.in

learn.beyondsmartcities.in

#55,HMR  Layout ,Bengaluru ,India




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GREEN BUILDING SPECIALIST
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