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CERTIFIED SUSTAINABLE DEVELOPMENT PROFESSIONAL - CSDP OVERVIEW

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WORLD'S TOP SPECIALISTS

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MODULE
3A

What is Sustainable Development?

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CERTIFIED SUSTAINABLE DEVELOPMENT PROFESSIONAL CSDP OVERVIEW

Sustainable development is a holistic approach to growth that aims to meet present needs without compromising future generations' ability to meet their own needs. It emphasizes the interdependence of economic growth, environmental stewardship, and social equity, often referred to as the "triple bottom line."

Learning Objectives

- Introduction
- Getting Started with CSDP
- **What is Sustainable Development?**
- Sustainable Development: Definitions & Applications
- Environmental Issues Associated with Sustainable Development
- Alternative Energy & Carbon Reduction
- Certified Sustainable Development Specialist Certification
- Summary and Resources
- CSDP Practice Test V.4.1_Test Your Knowledge!



INTRODUCTION

Definition and Pillars of Sustainable Development

- Sustainable development is a holistic approach to growth that aims to meet present needs without compromising future generations' ability to meet their own needs.
- The concept was popularized by the Brundtland Commission in its 1987 report "Our Common Future."

The Pillars of Sustainable Development

- **Economic Sustainability:** Focuses on efficient resource management to foster economic growth without depleting natural resources or harming the environment.
- **Environmental Sustainability:** Involves the protection and preservation of natural resources and ecosystems.
- **Social Sustainability:** Addresses the impact of development on social equity, community well-being, and cultural preservation.

Interconnectedness of the Pillars

- The interconnected nature of the three pillars can be illustrated through the analogy of a three-legged stool.
- Prioritizing economic growth at the expense of environmental degradation can lead to resource depletion, undermining future economic prospects and social equity.

SUSTAINABILITY CONCEPTS OVERVIEW +

Economic Sustainability:

- Focuses on creating resilient, adaptive economic systems.
- Balancing economic growth with environmental protection and social equity.
- Shifting to a circular economy can aid in waste reduction and foster economic sustainability.

Interconnectedness of Sustainability Concepts:

- Environmental degradation can lead to social inequity, while economic instability can undermine both.
- Holistic approaches to global challenges can be developed through interdisciplinary collaboration and collective action.



SUSTAINABILITY CONCEPTS

- Balancing economic, environmental, and social considerations to create a resilient society.
- Emphasizes the triple bottom line: economic prosperity, environmental stewardship, and social equity.
- Lifecycle thinking considers the environmental and social impacts of a product or service throughout its lifecycle.
- Both concepts aim to promote responsible and efficient use of resources for a more sustainable future.



ENERGY EFFICIENCY AND SUSTAINABILITY CONCEPTS

Energy Efficiency in Sustainability

- Involves optimizing energy use to minimize waste and environmental impact.
- Achieves desired outputs with minimal energy input through energy-efficient technologies, practices, and behaviors.
- Energy conservation involves reducing energy consumption by using less energy to achieve the same output.
- Energy management involves monitoring and optimizing energy use to improve efficiency.
- Energy efficiency reduces greenhouse gas emissions, mitigates climate change, and conserves natural resources.



ENVIRONMENTAL IMPACT

OVERVIEW

- Environmental impact refers to the effects of human activities on the environment, including ecosystems, natural resources, and ecological balance.
- Key factors include emissions, solid and fluid waste disposal, deforestation, habitat destruction, and pollution.
- Emissions, including carbon dioxide, nitrogen oxides, sulfur dioxide, and particulate matter, contribute to climate change by trapping heat in the atmosphere.
- Solid and fluid waste disposal, including plastics, paper, food scraps, and other materials, can lead to pollution and harm to wildlife.
- Fluid waste, such as wastewater from industrial processes or sewage treatment plants, can contain harmful substances that can contaminate water sources and harm ecosystems.
- Factory production, for example, emits pollutants into the air, generates solid waste, and discharges wastewater containing chemicals, affecting aquatic life.
- Understanding these factors can help implement sustainable practices and reduce ecological footprint, ensuring a healthy and thriving planet for future generations.



COMMISSIONING PROCESS IN BUILDING CONSTRUCTION



- Commissioning ensures all systems and components are designed, installed, tested, operated, and maintained according to owner's-project requirements (OPR) and design intent.
- The OPR document serves as a roadmap for the design and construction team, guiding them in meeting the owner's expectations.
- The commissioning process begins during the design phase and continues through construction, occupancy, and beyond.



KEY STAGES INCLUDE PLANNING, DESIGN REVIEW, CONSTRUCTION OVERSIGHT, FUNCTIONAL TESTING, AND ONGOING MONITORING.

- Planning stage: The commissioning team develops a commissioning plan and reviews the OPR to align with the owner's requirements.
- Design review stage: The team evaluates design documents to identify potential issues and ensure all systems meet the OPR.
- Construction oversight stage: The team monitors the installation and testing of building systems to verify their correctness and functionality.
- Functional testing: The team tests each system and component to ensure they operate according to the design intent and OPR.
- Ongoing monitoring: The team tracks the performance of building systems over time to ensure efficient operation.



DESIGN PROCESS OVERVIEW

- Involves defining project scope, goals, and objectives, understanding end user needs and constraints.
- Team formation involves diverse skill sets and backgrounds for a holistic problem-solving approach.
- Team dynamics are crucial for effective communication and collaboration, fostering a culture of open communication, trust, and respect.
- Documentation requirements capture and communicate design decisions, rationale, and outcomes.
- Documentation includes design briefs, sketches, prototypes, specifications, and other documents.

The design process is systematic and collaborative, leading to the development of high-quality, user-centered solutions.



WATER USAGE EFFICIENCY IN SUSTAINABLE BUILDINGS



- Sustainable buildings aim to minimize environmental impact by maximizing resource efficiency, including water usage.
- Water-saving fixtures and appliances, such as low-flow toilets, faucets, and showerheads, can significantly reduce water consumption.
- Water recycling and reuse systems, such as greywater recycling systems, can reduce reliance on freshwater sources and minimize water waste.
- Rainwater harvesting systems can capture and store rainwater for non-potable applications, reducing demand for municipal water supplies and decreasing stormwater runoff.
- Promoting water conservation behaviors among occupants through education and awareness campaigns can further reduce water consumption and contribute to long-term sustainability.

INDOOR ENVIRONMENTAL QUALITY (IEQ) OVERVIEW

- IEQ encompasses the overall indoor environment, including thermal comfort, ventilation, lighting, and air quality.
- Thermal comfort is influenced by air temperature, humidity levels, and air movement. ASHRAE standards guide comfort, considering factors like clothing insulation, activity level, and metabolic rate.
- Proper ventilation removes pollutants and odors, providing fresh air for occupants. ASHRAE recommends a minimum ventilation rate for different spaces.
- Air conditioning regulates indoor temperature and humidity levels, improving energy efficiency and comfort. Regular maintenance is crucial for optimal performance and air quality.
- Proper design, maintenance, and operation practices can enhance IEQ and occupant well-being.



UNDERSTANDING THE BUILDING ENVELOPE

- The building envelope is a crucial component of any structure, serving as a barrier between interior and exterior environments.
- It regulates heat transfer, controls moisture infiltration, and provides structural support.
- Key elements include the roof, walls, windows, doors, and foundation.
- Factors influencing the building envelope include insulation, air tightness, and moisture control.
- Thermal imaging surveys can identify areas of heat loss or gain, indicating insulation deficiencies or air leakage.
- Building envelope commissioning tests the performance of the envelope components to ensure they meet design specifications and building codes.
- Understanding the building envelope helps in designing energy-efficient, durable, and comfortable buildings.





NET-ZERO ENERGY BUILDING CONCEPTS

- Net-zero energy building concepts aim to generate as much energy as they consume annually, achieving a net-zero energy balance.
- Key aspects include energy efficiency through high-performance insulation, energy-efficient appliances, and advanced building systems.
- Renewable energy generation, such as solar panels, wind turbines, or other renewable energy sources, is also a key component.
- Innovative design strategies like passive solar design, building orientation, shading, and ventilation optimization are used to enhance energy efficiency and renewable energy generation.
- The Bullitt Center in Seattle, Washington, is an example of a net-zero energy building, combining solar panels, geothermal heating and cooling, and advanced energy-efficient technologies.



LIFE CYCLE ANALYSIS (LCA)

- LCA evaluates the environmental impacts of a product or activity throughout its life cycle.
- It includes stages from raw material extraction to disposal, each with associated environmental impacts.
- LCA provides a holistic understanding of environmental consequences.





BENEFITS OF LCA

- Identifies opportunities for improvement in environmental performance.
- Enables comparisons between different products or processes for informed decision-making.
- Identifies unintended consequences or trade-offs when implementing changes to improve environmental performance.



Example: Comparing Different Packaging Materials

- LCA helps companies make informed decisions about packaging choices.
- Overall, LCA is a valuable tool for assessing and improving environmental performance.

LIFE CYCLE ANALYSIS OVERVIEW

- Systematic approach to evaluate environmental impacts of a product or service from raw material extraction to disposal.
- Breaks down product life cycle into stages: raw material acquisition, manufacturing, distribution, use, and end-of-life.
- Each stage has unique environmental impacts like resource depletion, greenhouse gas emissions, and waste generation.
- Provides a comprehensive view of the environmental footprint of a product or service.
- Identifies opportunities to reduce environmental impacts, such as optimizing manufacturing process or switching to renewable resources.
- Helps identify areas for recycling or reuse to extend product life and reduce need for new materials.



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