Step-WISE

Frederick University

Soft Skills: Mitigation and Adaptation Actions and Strategies

Paris Fokaides (FredU)

p.fokaides@frederick.ac.cy

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Contents

01 | Title Slide

This project has received funding from the European Union's LIFE Programme for Research and Innovation under Grant Agreement no. 101120859

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Training Unit Overview

01

Soft Skills: Mitigation and Adaptation Actions and Strategies

02

Objective: Explore actionable climate mitigation, adaptation and sustainable urban mobility strategies that urban areas can adopt to combat climate change and reduce emissions.

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Presented by: Paris Fokaides

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Training Duration: 45 to 60 minutes

02 | Introduction

This project has received funding from the European Union's LIFE Programme for Research and Innovation under Grant Agreement no. 101120859

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The Need for Urban Climate Mitigation & Adaptation

Urbanization: Rapid urbanization globally is making cities central to both causing and addressing climate change.

Greenhouse Gas Emissions: Cities contribute to more than 70% of global carbon emissions, primarily from buildings, transportation, and waste.

Vulnerability: Urban areas are also highly vulnerable to climate impacts, such as flooding, heatwaves, and extreme weather events.

Why This Matters: City rapid growth is top priority to be addressed for climate change, and adaptation and mitigation strategies are needed to reduce emissions in this sector

03 | Learning Outcomes

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Training Outcomes

Mitigation Actions & Strategies:

- Understand the Role of Urban Areas in Climate Change
- Identify Key Mitigation Strategies
- Recognize the Importance of Green Spaces
- Integrate Climate Action into Urban Planning and Governance
- Evaluate the Benefits of Sustainable Practices

Adaptation Actions & Strategies:

- Understand the Role of Adaptation in Resilient cities
- Identify Key Climate Risks and Vulnerabilities specific to Cities

- Adaptation Strategies in Context of Climate Adaptation
- Adaptation Strategies to Address Urban Climate Challenges (Nature-Based Solutions and Infrastructure)
- Integration of Climate Adaptation Measures into Urban Planning and Governance

Sustainable Urban Mobility Actions & Strategies:

- Identify key sustainable urban mobility strategies
- Evaluate the impact of sustainable mobility solutions on
- Design policies and infrastructure
- Integrate sustainable urban mobility strategies into broader climate action plans

04 | The Role of Urban Areas in Climate change

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Contributions and Vulnerabilities

Contributing to Climate Change:

Energy Use in Buildings: Heating, Cooling, lighting and appliances contribute to energy consumption and emissions in cities

Transportation:
Personal vehicles and freight contribute significantly to carbon emissions and air pollution.

Waste Management:
Improper waste disposal, particularly in landfills, generates methane, a potent greenhouse gas.

Urban Vulnerability to Climate Change:

Heatwaves:
Cities experience higher temperatures due to the urban heat island effect.

Flooding:
Increased rainfall and rising sea levels put cities at risk.

Health Risks:
Poor air quality and heat stress impact public health, particularly in low-income communities.

05 | Mitigation Actions & Strategies

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Mitigation – Buildings Energy Efficiency

Why Focus on Buildings?

Major Contributor to Emissions:
Buildings are responsible for around **40%** of global energy consumption and **36%** of energy-related CO2 emissions.

Key Strategies for Energy Efficiency:
Retrofitting Existing Buildings:

- Improve insulation and install energy-efficient heating and cooling systems.

Building New Energy-Efficient Buildings:

- Adopt passive design strategies (e.g., natural ventilation, solar gain).
- Use sustainable materials and energy-efficient technologies.

Benefits:
Reduced Carbon Footprint: Lower energy consumption directly reduces emissions.
Economic Savings: Lower energy bills for households and businesses.
Improved Building Comfort: Better insulation and energy systems enhance occupant comfort.

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Mitigation - Urban Renewable Energy

Harnessing Renewable Energy in Cities:

Energy Transition:
Urban areas can lead the transition from fossil fuels to renewable energy sources like solar, wind, and geothermal.

Key Strategies:

Solar Power:
- Rooftop panels installation for reduction grid dependency and carbon emissions
- Community solar power initiatives in multi family housing areas

Geothermal Energy:
- Utilization of geothermal heat pumps to provide sustainable heating and cooling for buildings.

Wind Energy:
- Urban wind turbines on rooftops or in less populated areas.

Benefits:
Reduced Carbon Footprint: Renewable energy reduces reliance on fossil fuels, significantly cutting emissions.
Cost Savings: Long-term savings from reduced energy bills, and potential revenue from energy generation.
Energy Security: Increases local energy resilience and reduces reliance on imported energy.

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Mitigation – Waste Management

Addressing Waste to Mitigate Climate Change:

Waste's Contribution to Climate Change:
Landfills are major sources of methane, a potent greenhouse gas.
Waste Statistics: Over 10% of global greenhouse gas emissions come from waste management, with methane accounting for a significant portion.

Key Strategies for Sustainable Waste Management:
Increase Recycling Rates: Develop and improve citywide recycling programs to divert waste from landfills.
Composting: Encourage organic waste separation and composting to reduce landfill methane emissions.
Waste-to-Energy (WTE) Technologies: Utilize waste incineration or biogas facilities to generate energy from waste materials.
Capture Methane: Install systems to capture methane from landfills or wastewater treatment plants and convert it into usable energy.

Benefits:
Reduced Greenhouse Gas Emissions: Less methane released into the atmosphere.
Energy Generation: WTE technologies provide an additional source of renewable energy.
Resource Conservation: Recycling and composting reduce the need for raw materials.

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Mitigation – Case Examples

London's RetroFit Program: Over **8,000 homes** retrofitted with energy-efficient technologies, reducing emissions and cutting energy costs by **30%**.

Masdar City, UAE: A sustainable urban development powered largely by renewable energy sources, including solar and wind.

Sweden's Recycling Success: Sweden recycles 99% of its waste and uses waste-to-energy technologies to provide power to homes.

06 | Adaptation Actions & Strategies

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Adaptation - City Infrastructure

City Infrastructure:

- City Infrastructure is mainly responsible for proper water and heat management.

Why Focus on Infrastructure?

Key Strategies for Improving Infrastructure:

- Investing in flood prevention systems, such as flood barriers, and flood-resistant buildings
- Retrofitting older buildings (insulation) and infrastructure (mobility)

Benefits:
Flooding Prevention: Preventing cities from flooding due to extreme rainfall.
Extreme Weather: Protecting citizens from heatwaves.

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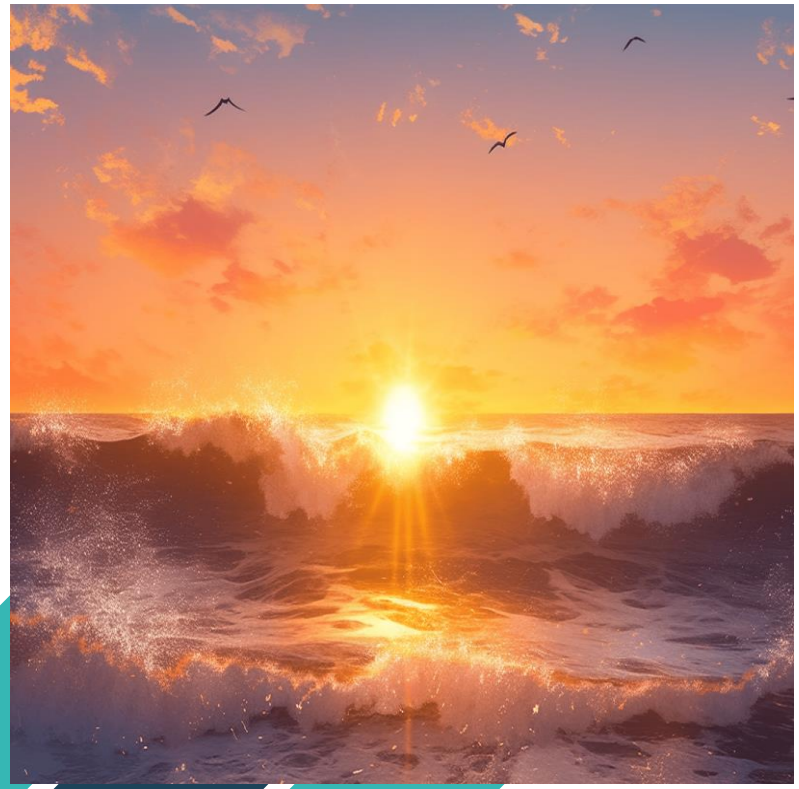
Adaptation – Natural Methods



Natural Processes to Mitigate Climate Risks

Key Strategies:

- **Green Roofs:** Traditional roofs that allow vegetation to grow on top to allow rainwater to be absorbed, creating a habitat for wildlife, and lowering urban temperatures.
- **Urban Forests:** forests in the city that protect from heatwaves allow a habitat for wildlife and reduce air pollution.
- **Green Spaces:** Parks with vegetation that promote social gatherings, leisure and recreational activities.

Benefits:

Managing Stormwater: control and use of stormwater run-off.
Reduced Risk of Flooding: Using proper water management methods to reduce city flooding.
Promoting Biodiversity: Protecting local greenery and domestic fauna.

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Adaptation – Heat Protection

Protecting Cities from Extreme Heat

Increasing Temperatures:

- Urban areas are suffering from high temperatures, up to 5° C to 10° C warmer than rural areas.

Key Strategies for Urban Cooling:
Adding Vegetation: Planting more trees for shade and cooling.
Green Roofs: Installing green roofs can help buildings cool down.
Building Material: Utilizing reflective material in buildings.

Benefits:
Lower Temperatures: Installing heat protection methods will help urban areas cool down.
Reduced Energy Demand: The less use of cooling will reduce energy demand and ease the strain on the power grid.
Increased quality of life: Adding more vegetation and reducing extreme ambient temperatures can increase quality of life

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Adaptation – Water Management

Managing Water Resources:

Water Risk:

- Increased rainfall and rising sea levels alert cities to improve their water management to prevent flooding and urban damage.

Benefits:
Water Efficiency: Efficient use of water.
Water Vulnerability: Reduction of city vulnerability to water scarcity or flooding.

Key Strategies in Water Management:
Water Management System: Development of drought and flood risk management systems
Water Recycling Systems: Utilizing permeable surfaces and rainwater harvesting.

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Adaptation – Community Engagement & Education

Engaging and Educating the Community for Climate Change:

Citizen Engagement:

- Citizens are important in integrating adaptation strategies and mindfulness in society.
- Citizen input provides a holistic approach in strategy development.

Key Strategies:

- **Involving Citizens:** Involving citizens in the planning and implementation of adaptation strategies
- Engaging citizens in adaptation efforts.

Benefits:

- Equitable, inclusive, and effective solutions.
- Builds a sense of ownership and collective responsibility for resilience
- Ensures adaptation measures are widely accepted and successfully implemented

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Adaptation – Case Examples

Hydraulic models for flood protection strategy, Prague Czech Republic: That consists of the implementation of fixed and mobile barriers and safety valves in the canalization network along the Vtlava River.

Hamburg, Germany: the Green Roof Strategy has a goal to install 100 hectares of green roof surfaces in the metropolitan city, while providing financial support until 2024.

Greater Sydney Heat Smart City Plan, 2025-2030: The Plan outlines six key directions and 40 recommendations for building a heat resilient city and protecting citizens from extreme heat.

AquaTEK program (Milan, Italy): Installation of drip irrigation system coupled with soil moisture monitoring with goal the 22.4% water withdrawal decrease of farms.

Community Managed Marine Conservation, Kuruwitu, Kenya: Association that engaged local fishers on how to improve fishing practices, leading to the creation of the Locally Managed Marine Area in Kenya.

07 | Sustainable Urban Mobility Actions & Strategies

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SUM – Public Transportation

Improving Public Transportation:

Public Transportation:
Urban areas can benefit from a well-developed, efficient, and affordable public transportation system.

Key Strategies:
Infrastructure:

- Integrating buses, trains, and trams in the mobility infrastructure.
- Develop more routes of transportation.
- Increase stations for transit.

Benefits:
Increase Accessibility: Renewable energy reduces reliance on fossil fuels, significantly cutting emissions.
Reduce Air Pollution: Decrease in the number of personal vehicles can reduce carbon emissions.
Reduce Traffic Congestion: Reduction of personal vehicles can have a positive impact in traffic flow.

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SUM – Alternative Modes of Transport

Alternative Modes of Transport:
Promoting the development of alternative modes of transport in urban areas can encourage citizens to walk and cycle, reducing the use of carbon-intensive transportation.

Utilizing Alternative Methods of Transport

Key Strategies for Alternative Modes of Transport:
Investing in Infrastructure:

- Building and improving sidewalks and pedestrian crossings
- Increasing the safe dedicated bike lanes

Benefits:
Reducing Reliability of Cars: Different methods of transportation reduce reliability of cars.
Carbon Emission Reduction: Reducing the use of cars will reduce carbon emissions.
Improving Public Health: Reducing carbon emissions improves air quality and quality of life having a positive impact on health.

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SUM – Electro Mobility

Electro-Mobility for Sustainable Urban Mobility:
Why EVs Matter:
Electronic vehicles can promote fossil-free transportation, promote electric options, and reduce the carbon footprint of urban transport.

Benefits:
Mobility Transition: Integrating electro-mobility can aid the slow transition from fossil-fuel vehicles to electric ones.
Decarbonization of Transportation fleet: The transition to electric vehicles will diminish the carbon emissions released during transportation.

Key Strategies for Promoting EV Adoption:
Incentives for EV Purchases:
Offer subsidies, tax rebates, and reduced registration fees for EV buyers.
Charging Infrastructure: Develop an extensive network of charging stations, especially in urban centers and residential areas.
Public EV Fleet: Transition municipal fleets (e.g., buses, service vehicles) to electric vehicles.

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SUM – Future Mobility

Investing in Future Mobility:

Future Mobility Technologies:
Future mobility technologies will enhance sustainability by reducing emissions, promoting electric transport, optimizing energy use, and enabling eco-friendly urban travel solutions.

Key Strategies for Future Mobility:
Autonomous Vehicles: Technology that allows for self-driving cars that replace human drivers.
Car-Sharing Program: Dedicated vehicles under a program where through an application, citizens can share.
Ride-hailing services: Car and taxi ordering applications and programs.

Benefits:
Reduced Emissions: Future mobility methods contribute at reducing the need for individual vehicles and utilizing carbon-free fuels.
Transportation System Efficiency: Smart traffic management, improved public transit, and AI-driven mobility solutions reduce congestion and optimize travel.
Reduced Number of Private Cars: Programs such as car-sharing can help reduce the number of privately owned vehicles.

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SUM – Public Policy

Public Policies for Urban Mobility
Mobility Policies:
Mobility policies are key drivers of sustainable urban development, aiming to reduce environmental impact while promoting efficient, equitable, and low-emission transportation solutions.

Key Strategies for Public Policies:
Incentives: Financial incentives that promote public transportation to citizens (tax benefits, discounted prices, loyalty programs)
Regulations: Regulating fuel efficiency and emissions for private vehicles.
Prioritization: Prioritizing sustainable mobility with congestion pricing and/or car-free-zones

Benefits:
Citizen Engagement: Policies can provide guidelines and encourage citizens to sustainable urban mobility.
Reduced Carbon Footprint: Implementation of sustainable urban policies will have a positive impact on GHG emission reduction.

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SUM – Case Examples

Koprivnica, Croatia: Aimed at improving traffic safety, and reducing noise and air pollution by promoting walking and cycling as well as increasing the use of public transport and electric vehicles.

Seoul, South Korea: Public transport was promoted in South Korea, by:

- Reorganization of bus routes and addition of colour code,
- Integrating exclusive median bus lane system with bus stops,
- Utilizing electric & CNG buses with low-floor buses for the transportation-vulnerable,
- And improving the bus management system (BMS) & bus information system (BIS).

Victoria, British Columbia: 'Fort Street Revival' aimed at promoting a green, clean, walkable and safe city by promoting alternative modes of transportation, improve mobility in the centre of the city, and reduce motor vehicle pollution.

Los Angeles, USA: The city has invested in over 2,000 public charging stations, and more incentives for EV adoption are being implemented.

08 | Integrating Climate Action into Urban Planning

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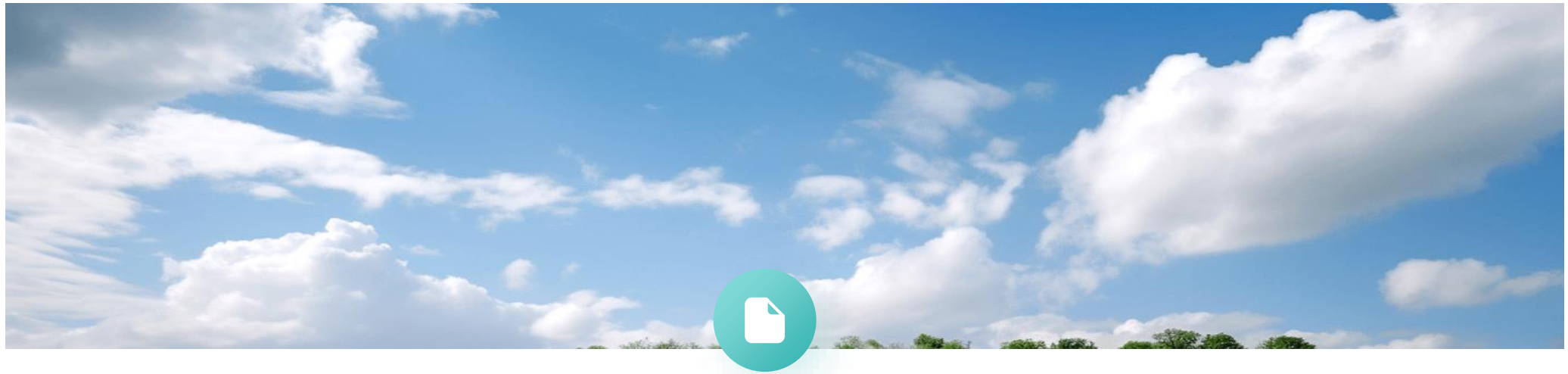
Urban Governance



Embedding Sustainability into Urban Governance:

Urban Planning and Climate Mitigation:

- Urban planning plays a critical role in determining how cities manage their growth and environmental impact.
- Effective urban planning integrates climate action from the beginning, ensuring that cities are designed to be energy-efficient, resilient, and sustainable.

Importance of Community Involvement:

- Engage local communities and stakeholders in the planning process to ensure that climate goals are aligned with local needs and priorities.

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Urban Governance

Embedding Sustainability into Urban Governance:

Key Strategies for Climate-Resilient Urban Planning:
Zoning Regulations: Adjust zoning laws to encourage energy-efficient buildings, renewable energy integration, and green spaces.
Incentivizing Green Building Standards: Implement standards like LEED or BREEAM to guide new building projects in terms of sustainability.
Sustainable Transportation Infrastructure: Plan and invest in transportation systems that reduce car dependency, such as efficient public transit and pedestrian-friendly spaces.

Case Example:
Freiburg, Germany: Known for its "eco-city" planning approach, Freiburg incorporates renewable energy use, sustainable mobility, and green spaces in its urban development.

09 | Case Study: Vancouver

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Case Study: Vancouver

Vancouver's Green Building and Urban Planning Policies

Vancouver's Green Building Policies:
Vancouver's goal is to become the greenest city in the world by 2020 and achieve net-zero carbon emissions by 2050.

Key Areas of Focus:
Green Building Code: Vancouver's green building standards promote energy-efficient designs, with incentives for developers to build sustainably.
Renewable Energy: Significant investment in renewable energy technologies such as solar and geothermal for residential and commercial buildings.
Transportation: Vancouver is focusing on promoting public transit, cycling, and electric vehicles.

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Case Study: Vancouver

Vancouver's Green Building and Urban Planning Policies

Urban Planning and Climate Resilience:
Flood Resilience: Due to its coastal location, Vancouver has integrated flood risk management into urban planning, building resilient infrastructure to cope with rising sea levels and storms.
Green Spaces: Expanding urban parks, green roofs, and community gardens to mitigate the urban heat island effect and improve local biodiversity.

Results: Vancouver has successfully reduced its per capita greenhouse gas emissions and continues to be a leader in urban sustainability.

10 | Key Strategies

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Summary

Summary of Climate Change Measures for Cities:

Energy Efficiency in Buildings: Retrofit existing buildings, improve insulation, and upgrade heating, cooling, and lighting systems to reduce energy consumption.

Sustainable Transportation: Invest in public transportation, promote walking and cycling, and transition to electric vehicles to reduce transportation-related emissions.

Waste Management: Increase recycling rates, encourage composting, and utilize waste-to-energy technologies to reduce landfill methane emissions.

Green Spaces: Integrate more parks, green roofs, and urban forests to capture carbon, manage stormwater, and improve the urban environment.

Climate-Resilient Urban Planning: Incorporate sustainability into urban planning processes, focusing on energy-efficient designs, renewable energy integration, and climate adaptation measures.

Collaboration and Governance: Foster collaboration between local governments, businesses, and communities to implement and scale up climate action effectively.

11 | Benefits of Sustainable Practices

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Adopting Benefits

Why Adopt Sustainable Practices in Urban Areas?:

- Environmental Benefits
- Social Benefits
- Economic Benefits

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Adopting Benefits

Slide 11

Why Adopt Sustainable Practices in Urban Areas?:

2

Environmental Benefits:

Reduced Greenhouse Gas Emissions: Sustainable practices like energy-efficient buildings, renewable energy, and electric vehicles help lower urban carbon footprints.
Improved Air Quality: Green spaces, sustainable transportation, and waste management practices reduce air pollution and improve public health.
Conservation of Resources: Efficient use of resources like energy, water, and materials reduces environmental impact and preserves natural resources for future generations.

3

Social Benefits:

Improved Public Health: Clean air, more green spaces, and active transportation reduce health risks related to pollution and sedentary lifestyles.
Enhanced Quality of Life: Sustainable urban environments offer improved living conditions, including access to green spaces, better air quality, and reduced noise pollution.
Increased Community Engagement: Sustainability initiatives often involve communities in decision-making, fostering a sense of ownership and responsibility for local environments.

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Adopting Benefits

Slide 11

Why Adopt Sustainable Practices in Urban Areas?:

3

Economic Benefits:

Cost Savings: Lower energy bills, reduced waste management costs, and the potential for economic savings from energy-efficient buildings and transportation systems.
Job Creation: The green economy creates new job opportunities in industries such as renewable energy, construction, waste management, and public transportation.
Attracting Investments: Cities that adopt sustainability strategies are more likely to attract investments from businesses and investors focused on environmental responsibility.

Case Example:
Portland, USA: The city has reduced its carbon emissions by **22%** since 1990 while experiencing economic growth. It has created thousands of green jobs and improved public health outcomes.

12 | Barriers to Implementing Strategies

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Challenges and Solutions

Challenges in Urban Climate Mitigation and Solutions:

Financial Constraints:

Challenge: Limited budgets and high upfront costs of implementing sustainable infrastructure.
Solution: Utilize green financing, such as green bonds and climate funds, to secure investment for sustainability projects. Seek public-private partnerships to share costs and risks.

Lack of Infrastructure:

Challenge: Cities may lack the necessary infrastructure for sustainable transportation, energy systems, or waste management.
Solution: Invest in long-term infrastructure planning that integrates sustainability into all urban development projects. Focus on incremental implementation, starting with pilot projects and expanding gradually.

Resistance from Stakeholders:

Challenge: Local businesses, residents, or political leaders may resist change due to perceived inconvenience or costs.
Solution: Engage stakeholders early in the planning process. Demonstrate the long-term economic, environmental, and social benefits of climate action through data, case studies, and public outreach campaigns.

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Challenges and Solutions

Challenges in Urban Climate Mitigation and Solutions:

Resistance from Stakeholders:

Challenge: Local businesses, residents, or political leaders may resist change due to perceived inconvenience or costs.
Solution: Engage stakeholders early in the planning process. Demonstrate the long-term economic, environmental, and social benefits of climate action through data, case studies, and public outreach campaigns.

Policy and Governance Issues:

Challenge: Lack of political will or weak governance structures may hinder the implementation of climate mitigation strategies.
Solution: Strengthen local governance by developing clear, actionable climate plans with measurable targets. Foster collaboration between local authorities, businesses, and community organizations.

Case Example:
Berlin, Germany: Berlin faced challenges with integrating renewable energy into its existing grid but overcame them by investing in smart grid technologies and collaborating with local stakeholders.

13 | Workshop: Develop Your Own Strategy

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Strategy Workshop

Slide 13

Interactive Group Activity

Instructions:

Step 1

- Choose a city
- Identify its main challenges (high emissions , air pollution, no green space, etc.)

Step 2

Develop a set of climate mitigation strategies tailored to the city's context.
In areas such as:

- EE in Buildings
- Sustainable transportation
- Waste management
- Green spaces

Step 3

Identify key stakeholders for each strategy

Step 4

Highlight potential barriers to implementation and propose solutions to overcome them.

14 | Self-Assessment and Quiz

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Self Assessment

Slide 14

Review and Reinforce Key Concepts

Exercise 1: Urban Mitigation Strategy Reflection

Instructions: Reflect on the strategies discussed in the training and answer the following questions:

- Which mitigation strategy would have the most significant impact on your city or region, and why?
- What are the key challenges you foresee in implementing this strategy, and how could these be overcome?

Objective: Encourage participants to think critically about applying the strategies to their own cities and reflect on local challenges.

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Self Assessment

Slide 14

Review and Reinforce Key Concepts

Exercise 2: Climate Mitigation Quiz

Instructions: Answer the following multiple-choice questions:

1. Which of the following is a key benefit of implementing energy-efficient buildings in urban areas?
   a) Increased transportation emissions
   b) Reduced carbon emissions
   c) Higher energy costs

2. What is the primary role of green spaces in urban climate mitigation?
   a) Improve air quality
   b) Increase traffic congestion
   c) Reduce renewable energy use

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Self Assessment

Slide 14

Review and Reinforce Key Concepts

Exercise 1: Urban Adaptation Strategy Reflection

Instructions: Reflect on the Adaptation strategies discussed in the training and answer the following questions:

- Which adaptation strategy would have the most significant impact on your city or region, and why?
- What are the potential challenges you foresee in implementing this strategy, and how could these be overcome?

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Self Assessment

Slide 14

Review and Reinforce Key Concepts

Exercise 2: Resilience Strategy Matching Quiz

Instructions: Answer the following multiple-choice questions:

1. Which adaptation strategy is the most effective for reducing the urban heat island effect?
   a) Green roofs
   b) Flood barriers
   c) Sustainable mobility

2. Which strategy would be most suitable for managing stormwater during heavy rainfall?
   a) Permeable surfaces
   b) Electric vehicle infrastructure
   c) Nature-based solutions

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Self Assessment

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Review and Reinforce Key Concepts

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15 | Conclusion and Next-Steps

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Conclusion

Slide 15

Wrapping Up and Moving Forward

Recap of Key Points:

- Urban areas play a central role in climate mitigation due to their high emissions and vulnerability to climate change impacts.
- Practical strategies include improving energy efficiency in buildings, promoting sustainable transportation, enhancing waste management, and increasing green spaces.
- Successful climate action requires collaboration between local governments, businesses, and communities, alongside strong governance and financing mechanisms.

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Conclusion

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Wrapping Up and Moving Forward

Encouraging Participants to Take Action:

Consider how the strategies discussed can be applied to your own city or region.

Engage with local stakeholders and policymakers to start integrating climate action into urban planning.

Next Steps:

Continue learning by exploring case studies of cities implementing successful climate strategies.

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Thank you

Amisha Panchal (IES)
Amisha.Panchal@iesve.com

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