Metropolitan Planning in the Context of Climate Change Mitigation in Riyadh, Kingdom of Saudi Arabia

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Overview

Saudi Arabia Geography & Climate

- 2.15 million square kilometers in size and a population of 30.7 million.
- 82% of population lives in urban areas.
- 2% of land area is used for farming.
- Arid climate with very low rainfall—annual average of 70.5 mm, and scarce water resources.
Overview

Climate Change Effects in Saudi Arabia

• Climate change modeling predicts higher than average warming by 2041, with summer temps increasing up to 2.7°C in the northwestern region.
Overview
Carbon Emissions in Saudi Arabia

• Per World Bank, 2010 CO2 Emissions (tonnes) = 464,481,000
• 100% of energy within KSA currently comes from fossil fuel.
• Cost of petrol and electricity is among the lowest in the world.
Overview
Saudi Arabia- Climate Change Mitigation

• To mitigate climate change, Saudi Arabia:
  – Joined many international initiatives including:
    • Active UNFCCC participant as a Developing Country.
    • Ratification of Kyoto Protocol (since 2005).
    • The Global Methane Initiative.
    • The Carbon Sequestration Leadership Forum.
    • The Initiative on Building Efficiency and Reduction of CO2 Emissions.
  – Plans to diversify energy production to include Generation IV Nuclear Reactors and renewable energy sources such as solar and wind.
Riyadh Challenges

• Riyadh is growing fast:
  – 1.4 million residents in 1987, 5.6 million today, 7.2 million projected by 2024.
  – Primarily low to medium density development of about 90-100 persons per hectare.
• No public transportation system.
• 50% of water supply comes from desalination plants
• 100% of electricity generation comes from oil-powered plants.
Riyadh Initiatives

1. King Abdulaziz Public Transportation Project and Transit Oriented Development

- 170 km metro with 85 stations, Bus Rapid Transit and other routes with a total of 2,000 buses, and Transit Oriented Development around major stations.
- Projected to reduce more than 2.2 million journeys made by private vehicles daily and more than 30 million km driven on the road network daily.
- Estimated GHG emission reduction 1.5 million tonnes/year.
Riyadh Initiatives


- Program to stop deterioration of native vegetation cover around Riyadh.
- Over 99,200 plants installed, 146,000 seeds planted.
- Based on number of trees planted, estimated CO2 emission reduction of 198,000 kg per year.
Riyadh Initiatives

3. Development Program of Wadi Hanifa and Its branches

• Wadi Hanifa is a 120 km valley that cuts through the western side of Riyadh.
• Restoration of the watercourse and native vegetation began in 2004.
• Restoration of tributaries continues today, including the planting of 3,350 native trees and 10,500 aquatic plants.
• Estimated green house gas emission reduction of 6,700 kg CO2 per year.
Riyadh Initiatives

4. Air Quality Management

- Riyadh recently installed 17 air quality monitoring stations throughout the city.
- Emission reduction strategies will be developed based on monitoring results.
Currently Riyadh uses 900,000 cubic meters per day of desalinated water, with a high carbon footprint.

To reduce the need for further desalinated water, treated wastewater is used to irrigate 470 farms with a total area of 17,800 hectares, and the program is being expanded to include irrigation in urban areas.
Rehabilitation of closed landfill sites to reduce methane emissions using methane extraction mechanisms.

Waste management plan to require recycling by all residents, including separation and treatment of organic waste, thereby reducing methane emissions in future landfills.
Thank you