

International Conference on Carbon Capture, Storage & Utilization 2026: Pathways to Net-Zero (ICCCSU 2026)

Conference Proceedings

February 23, 2026 - UAE

High-Voltage Eco-Corridor: A Proposal for Urban Ecological Carbon Capture

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Abstract

Urban residential areas generate continuous low level diffuse CO₂ emissions from traffic, buildings, and neighbourhood industries—sources that conventional industrial CCUS systems cannot directly address. This proposed study introduces the High Voltage Eco Corridor, a conceptual linear ecological carbon-capture and research corridor to be established beneath high-voltage transmission lines. It aims to address a gap in CCUS application by exploring ecological solutions in underutilized urban-edge infrastructure, particularly in arid and semi-arid regions. The project plans to integrate deep-rooted, low-lying, high-sequestration plant species with soil-carbon monitoring, microclimate sensors, EMF–plant interaction studies, and biodiversity assessments. Data on vegetation growth, soil quality, and ecological performance will be collected to evaluate potential carbon capture and co-benefits. Anticipated outcomes include increased soil and biomass carbon, enhanced biodiversity, improved microclimate regulation, and actionable datasets to guide urban planning. By proposing a scalable, low-cost approach, the Eco-Corridor is designed to complement industrial CCUS strategies and contribute to climate mitigation, urban resilience, and sustainable land use. While piloted in the UAE, the model is intended to provide transferable insights for cities worldwide.

Keywords: CCUS, Urban Carbon Capture, Ecological Restoration, Biodiversity, Arid Urban Environments, Micro-Climate Regulation, Soil Carbon Sequestration, Green Infrastructure, Transmission Corridor Ecosystems, Sustainable Urban Planning