Capital of a Viksit Bharat: Reimagining Delhi's Environment and Ecology for 2047

Executive Summary

The National Capital Territory of Delhi stands at a decisive juncture as India approaches the centenary of its independence in 2047. While the city has experienced rapid economic expansion and infrastructural modernisation, this progress has been accompanied by severe environmental degradation. Air pollution levels are among the highest globally, biodiversity has diminished significantly, urban heat islands have intensified, and the Yamuna River and other water bodies have experienced sustained ecological decline. These environmental stresses threaten not only the city's ecological balance but also public health, economic productivity, and long-term climate resilience.

This policy framework, aligned with the vision of Viksit Bharat@2047, seeks to reimagine Delhi as an eco-friendly, climate-resilient, and biodiversity-rich green city. Drawing on global best practices such as Singapore's City Biodiversity Index and Vancouver's integrated green infrastructure systems, the strategy proposes a phased transformation that is measurable, participatory, and governance-led. By embedding ecological restoration within urban planning, enhancing public engagement, and deploying technology-enabled monitoring systems, Delhi can reposition itself as a global exemplar of sustainable metropolitan development.

1. Global and National Context

Cities across the world, including Singapore, Stockholm, and Vancouver, demonstrate that high-density urbanisation can coexist with exemplary environmental quality when supported by strong governance, nature-based solutions, and a culture of public participation. Singapore's City Biodiversity Index (2024) evaluates ecological health across 23 indicators, ranging from species richness to the economic valuation of ecosystem services. Similarly, Stockholm has integrated district-level climate budgets to align emissions reductions with biodiversity enhancement.

In India, the Ministry of Environment, Forest and Climate Change (MoEFCC) State of Environment Report (2024) stresses the urgency for large cities to expand their green cover to at least 30 per cent of their geographical area to maintain ecological stability. While Delhi performs above the national urban average in access to renewable energy, it lags behind in air quality improvement, waste recycling, and water body restoration.

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Table 1: Comparative Global–National–Delhi Environmental Performance (2024)

Indicator	Singapore	India (Urban Avg.)	Delhi (Current)	Global Benchmark
Per Capita Urban Green Space (sqm)	66	12	21.34	≥ 30
Forest & Tree Cover (%)	47	24.6	23.06	≥ 33
PM2.5 Annual Mean (µg/m³)	14	58	92	≤ 10 (WHO)
Renewable Energy Share (%)	35	17	13.86	≥ 50
Waste Recycling Rate (%)	59	30	14	≥ 70

Sources: WHO (2024), CPCB (2024), ISFR (2023), UN-Habitat (2024)

2. Delhi's Environmental Status: Challenges and Opportunities

The environmental challenges confronting Delhi are multifaceted. Air quality is critically poor, with annual mean PM2.5 levels exceeding nine times the WHO safe threshold. Heat stress is intensifying due to the urban heat island effect, with mean temperatures increasing by 1.4°C over the past five decades. Biodiversity loss has been accelerated by habitat fragmentation, encroachment on ecological corridors, and the introduction of invasive species. The Yamuna River, once a lifeline for the city, has become biologically impaired in large stretches, while per capita water availability has dropped to just above the World Health Organization's recommended minimum.

While these challenges are significant, they present opportunities for a transformative agenda. By restoring degraded habitats, expanding urban forests, decentralising waste management, enhancing renewable energy adoption, and integrating biodiversity considerations into all urban planning decisions, Delhi can shift towards ecological resilience. Emerging technologies such as remote sensing, GIS-based biodiversity mapping, and

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environmental digital twins provide powerful tools for monitoring, planning, and adaptive management.

3. Strategic Framework for a Green Delhi

To enable systematic tracking of ecological performance, the Eco-friendly Green City Index (EGCI) is proposed as a comprehensive tool, assessing environmental health, ecosystem vitality, energy and resource efficiency, climate change performance, and environmental governance. Each of these domains will be measured through clearly defined indicators, scored on a scale of zero to four, and reassessed every three to five years to guide policy adjustments.

4. Implementation Pathways to 2047

The transformation of Delhi's environment will require phased action. Between 2025 and 2030, governance reforms will be prioritised, including the establishment of a Delhi Environmental Authority and baseline ecological mapping. This phase will also initiate pilot restoration projects in the Yamuna floodplains and the Aravalli Ridge. The period from 2030 to 2040 will focus on expanding the urban forest network, scaling up renewable energy to at least 35 per cent of the city's energy mix, and achieving universal scientific waste processing. By 2040–2047, Delhi will aim to achieve 33 per cent forest and tree cover, zero untreated wastewater discharge, universal compliance with green building norms, and a position among the world's top 20 biodiversity-resilient cities.

Table 2: Phased Roadmap for Delhi's Environmental Transformation

Phase	Key Focus Areas	2047 Targets Linked to Phase
2025–2030	Governance, baseline mapping, pilot restorations	Policy integration, data system readiness
2030–2040	Urban forest expansion, waste & energy transition, digital twin	Renewable energy ≥ 35%, 100% waste processing
2040–2047	Forest cover ≥ 33%, biodiversity leadership, zero untreated discharge	Top 20 global biodiversity cities

5. Policy Action Directions

Effective transformation will depend on coherent governance, targeted interventions, and sustained community engagement. Governance reform should include the creation of a Delhi Environmental Authority mandated to integrate the EGCI into all policy evaluations. Biodiversity restoration will

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require native species plantations and the rehabilitation of ecological corridors. Climate resilience will be addressed through the installation of green roofs, creation of wetlands, and establishment of shaded corridors to mitigate heat stress. Resource efficiency will be improved via building retrofits, strict water reuse targets, and expanded renewable energy adoption. Pollution control measures will include stringent vehicular emission norms and decentralised waste processing. Finally, public engagement will be fostered through environmental education and citizen science programmes that build ownership and accountability.

Table 3: Policy Action Matrix for Green Delhi

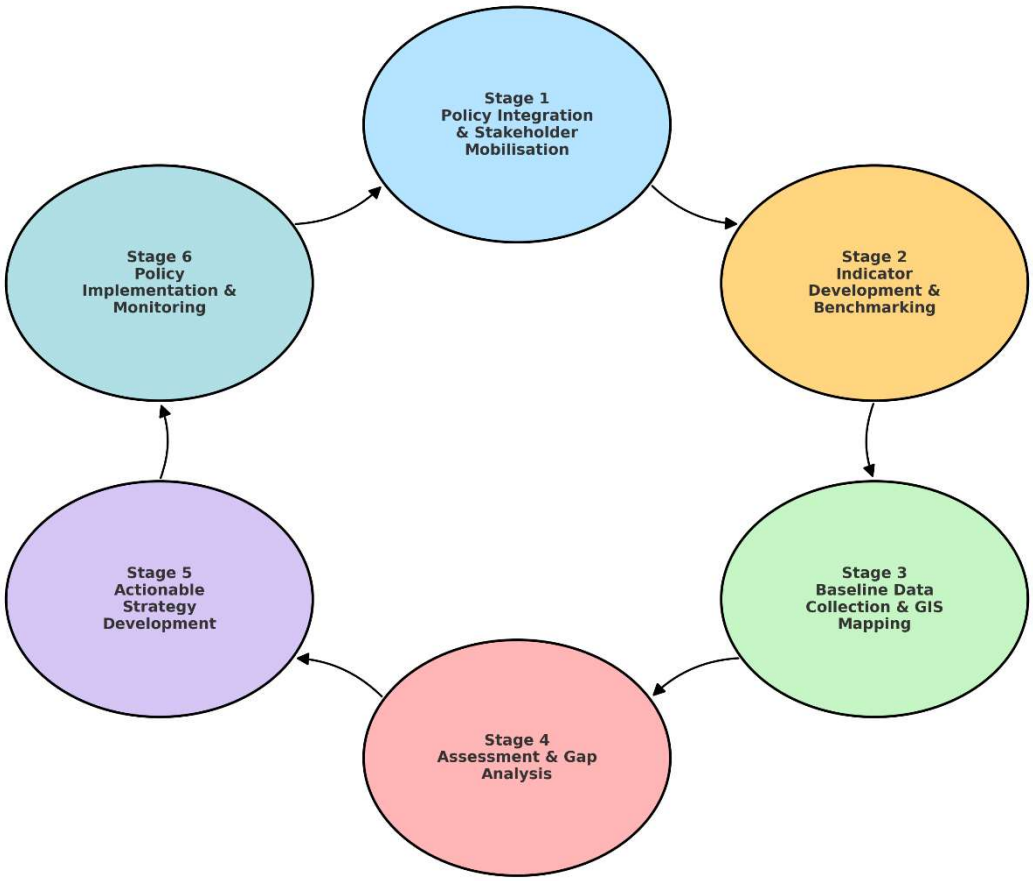
Policy Domain	**Action**	**Expected Impact**
Governance Reform	Establish Delhi Environmental Authority; mandate EGCI-based policy evaluation	Coordinated policy execution
Biodiversity Restoration	Native species plantations; habitat corridor rehabilitation	Increased ecological connectivity
Climate Resilience	Urban cooling through green roofs, wetlands, and shade corridors	Reduced heat stress
Resource Efficiency	Water reuse targets; building retrofits for energy efficiency	Lower resource footprint
Pollution Control	Stricter vehicular emission norms; decentralised waste processing	Cleaner air and reduced landfill
Public Engagement	City-wide environmental education; citizen science programmes	Increased community stewardship

6. Strategic Flow from Policy to Impact

The pathway from policy formulation to measurable ecological impact is represented in the following model. This illustrates the cyclical and integrated nature of the process, emphasising that governance, implementation, and monitoring must operate as an interconnected loop.

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Figure 1: Strategic Flow for Green Delhi 2047



7. Alignment with Global Goals

The framework directly advances Sustainable Development Goal 11 on sustainable cities, Goal 13 on climate action, and Goal 15 on life on land. By embedding these principles into Delhi's development plans, the city will align with both the Viksit Bharat@2047 vision and international climate and biodiversity commitments.

8. Expected Outcomes by 2047

By 2047, Delhi will have achieved equitable access to at least 33 per cent forest and tree cover, reduced PM2.5 concentrations to below 35 µg/m³, sourced half of its energy from renewables, ensured universal wastewater treatment, and restored the Yamuna to ecological health. The city will have a dedicated Delhi Green Observatory, enabling real-time environmental monitoring and evidence-based policy making.