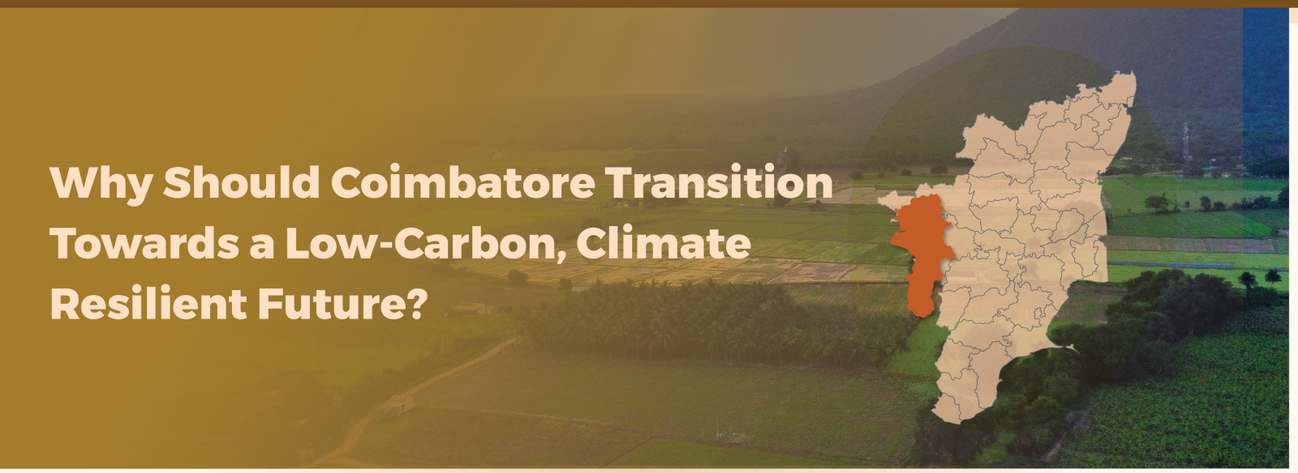
Why Should Coimbatore Transition Towards a Low-Carbon, Climate Resilient Future?



DISTRICT HIGHLIGHTS

4th Largest contributor to Tamil Nadu's GDP

3 Key industrial sectors
Textile, Pump Manufacturing, IT

3.23 Lakh MSMEs second only to Chennai in Tamil Nadu

40% of GDP is contributed by industries, with another 4% by transport

67% Total coconut production

CLIMATE PROFILE

1510 mm Annual Rainfall

20.7 °C - 35.2 °C
Annual Temperature Range

0.9°C to 3.5°C
Projected increase in maximum summer temperature by 2090

8% - 32%
Rise in southwest monsoon rainfall by 2090

Risk of Heat Stress
Vulnerable to landslides and susceptible to forest fires

GHG Emissions (2022)

4202 $ktCO_2e$
Gross and net emissions are same since carbon removal is negligible

Key Contributors (% of Gross Emissions)

- 36% Road Transport
- 12% Residential Energy
- 10% Industrial Energy (incl. CPP)
- 10% Cement Production
- 11% Forest Land

TRANSFORMATION POTENTIAL

- **2087 $ktCO_2e$** Annual Mitigation Potential by 2050
- **(-715) $ktCO_2e$** Annual Sequestration Potential by 2050
- **Climate-resilient Multifunctional Green Spaces**
- **100% RE** for Captive Power in Industries
- **Blended Finance and Community Ownership Models** to sustain the interventions
- **Robust Public Transport Ecosystem** for sustainable and shared intra-city mobility

Low-carbon Interventions and Ecosystem Livelihood Co-benefits

Blue-Green Ecosystem

-715* $ktCO_2e$

Intervention

- Enhance the carbon stock density of existing forest cover
- Agroforestry in waste/fallow lands

Resilience & Co-benefits

- Strenghtens heat and disaster resilience
- Enhances water security and soil quality
- Supports biodiversity and climate-resilience with integrated nature-based green-blue infrastructure

Economic and Livelihood Improvement

- Promote eco-tourism and local entrepreneurship
- Support climate-resilient agriculture
- Create green jobs and expands diversified income

Industrial Decarbonisation

508* $ktCO_2e$

Economic and Livelihood Improvement

- Improve efficiency and operational performance
- Minimise/minimised supply chain disruptions
- Skilling and reskilling of workforce for RE based O&M

Resilience & Co-benefits

- Boosts energy access and health outcomes
- Improves air, water and soil

Intervention

- Replace all diesel and coal based captive power plants of 306 MW installed capacity, with an equivalent RE capacity of 153 MW by 2050
- Electrify all heating processes in Industries by 2050

Sustainable Public Transport

106* $ktCO_2e$

Intervention

- Addition of 2000 intra-city electric buses by 2030/2035
- Promotion of NMT Transport and Public Bicycle Sharing Infrastructure

Resilience & Co-benefits

- Resilient transport access
- Cooler cities and cleaner air

Economic and Livelihood Improvement

- Boosts sustainable mobility
- Green jobs, especially for women
- Better health, last-mile access

NMT: Non-motorised Transport PBS: Public Bike Sharing *Denotes mitigation potential

What Does Climate-Resilient Development Deliver?

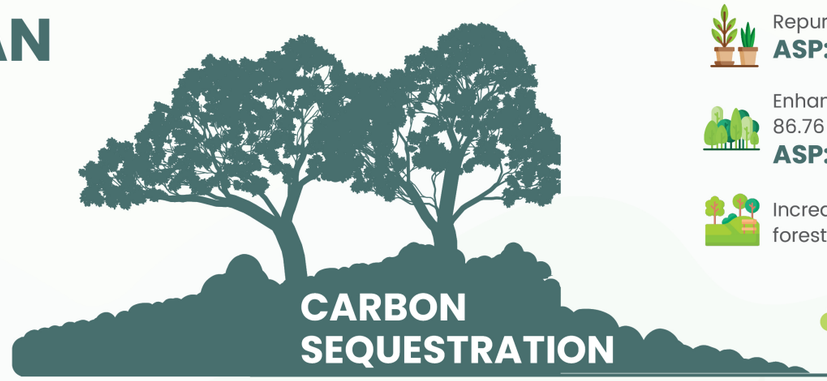
- Strengthened adaptive capacity of the community
- Ecosystem restoration and nature based solutions reducing disaster risks from landslides and urban flooding
- Improved thermal comfort and climate-resilient living conditions
- Lowered human-wildlife conflict through habitat-sensitive planning
- Institutional capacity and local governance for integrated climate resilience
- Reduced health risks from heat, waterborne and vector diseases
- Enhanced community disaster preparedness and response
- Bankable Green Projects | Access to Global Climate Finance | Green Jobs | Livelihood Security

COIMBATORE DECARBONISATION ACTION PLAN

Coimbatore can reduce up to 74% of its projected 2050 (3645 $ktCO_2e$) emissions through deep electrification, fuel switching, and targeted non-energy interventions including enhancing sequestration and waste management.

Total Emissions (2022): 4,202 $ktCO_2e$
Gross Emissions (BAU 2050): 3,645 $ktCO_2e$

- **Annual Growth in Emissions (2005 to 2022) : 1.8%**
- **Per Capita Emissions (2022): 1.06 tonnes CO_2e per capita**
- **Emission Intensity Reduction in 2022 w.r.t 2005: 76%**



Repurposing of 66,996 ha to horticulture, agro/social forestry
ASP: 590 $ktCO_2e$/yr by 2050

Enhancing of carbon stock density by ~5.5% from current 82.25 t/ha to 86.76 t/ha through reforestation and sustainable forest management
ASP: 126 $ktCO_2e$/yr by 2050

Increasing green spaces through climate-resilient bioparks, urban forests, and floating gardens can reduce heat stress

ASP: 716 $ktCO_2e$
(20% of Gross Emissions*)

Electrification of Industrial Heating Processes

Replace furnace oil (FO), petcoke, and coal with industrial electric heating like green hydrogen plasma generators could cut 215 $ktCO_2e$ emissions in the district by 2050. **AMP: 215 $ktCO_2e$**

RE-based Captive Power Generation

Shift from the current ~306 MW fossil-based captive power generation to an equivalent ~153 MW renewable energy capacity by 2040. **AMP: 293 $ktCO_2e$**

Abating IPPU Emissions

- With time, process emissions in the cement sector can be reduced with material substitution (such as limestone calcined clay cement (LC3) and fly ash)
- Technological solutions for carbon capture utilisation (CCU) system

508 $ktCO_2e$
(14% of Gross Emissions*)

INDUSTRY

9,325 $ktCO_2e$
Scope 2

ELECTRICITY

Electricity demand stood at **6,456 GWh in 2022**, led primarily by the industrial sector, including CPP (40%), residential sector (39%) and service sector (19%)

Electricity consumption is expected to increase almost three-fold owing to electrification and other deep decarbonisation efforts under AES 2050

To decarbonise the electricity sector, an additional ~6 GW of RE capacity (solar rooftop, utility-scale, wind, agro-PV, etc.) should be assessed and installed between 2040 and 2050

Efficiency & Conservation in Space Cooling

Adopt **~36.2 lakh 3-5 star ACs,** primarily by 2040, and inculcate behavioural change (temperature control settings starting at 26°C) would **save 11-12% of electricity demand. AMP: 365 $ktCO_2e$ (Scope 2)**

Electrification & Fuel Switching

Adopt 60 lakh LED bulbs, 42 lakh BLDC fans, and other 3-5 star appliances by 2030, along with 100% electrification of the service sector and phasing out HSD in DG sets by 2050. **AMP 229 $ktCO_2e$ (Scope 2)**

Clean Cooking Fuel

Transition from LPG to PNG, with gradual adoption of ~4.5 lakh electric cook stoves could save 58% emissions in the residential sector by 2050.
AMP: 376 $ktCO_2e$

Green Building Practices

Heat mitigation measures—such as urban green cover, reflective roofing, and cool surfaces—can reduce ambient temperatures by 1-2°C and lower cooling energy demand by 5-15%

376 $ktCO_2e$
(10% of Gross Emissions*)

594 $ktCO_2e$
Scope 2

BUILDINGS
Residential, Commercial and Services

Sustainable Agriculture and Livestock Practices

Replace existing ~4820 diesel pumps with off-grid solar pumps for irrigation by 2030, and electrifying ~7500 tractors and tillers by 2050 | **AMP: 93 $ktCO_2e$**

Capacity building to promote sustainable modernisation of agriculture

Replace synthetic nitrogen fertiliser and urea use with 75% organic fertiliser and 25% nano-urea | **AMP: 51 $ktCO_2e$**

90% balanced rationing and 75% methanogen-inhibiting feed additives for livestock by 2050 | **AMP: 60 $ktCO_2e$**

38 mini weather monitoring stations (rainfall and temperature)

204 $ktCO_2e$
(6% of Gross Emissions*)

AGRICULTURE

Electrification of Fleet

100% penetration of electric vehicles in 2W, 3W, 4W and buses, and 80% penetration of Heavy Goods Vehicles (trucks, trolleys) in new sales by 2050.

Clean Mobility Infrastructure

Installation of ~525 charging stations and development of other allied clean mobility infrastructure will support the electrification of the fleet in Coimbatore by 2050

- **Two Wheelers** ~20 lakh
- **Three Wheelers** 27,000
- **Four-Wheelers** 6.5 lakh
- **Buses** 11,000
- **Heavy Goods Vehicles** 29,000

788 $ktCO_2e$
(22% of Gross Emissions*)

TRANSPORT

210 $ktCO_2e$
(6% of Gross Emissions*)

WASTE

Domestic Wastewater

Improved wastewater treatment by 2040 **AMP: 166 $ktCO_2e$**

- Urban: 201 MLD centralised sewage treatment and 100% UGD connection
- Rural: Twin pit septic tanks for 1.7 lakh households, 38 FSTPs at the Firka level and advanced DEWATS for campuses >2500 m², resorts, restaurants etc

Industrial Wastewater

ETPs and a continuous treated effluent monitoring system for 20 MLD industrial wastewater by 2050 and strict adherence to zero liquid discharge **AMP: 28 $ktCO_2e$**

Municipal Solid Waste

100% segregation at source and processing of municipal solid waste with zero landfilling through 38 rural and 32 urban recycling centres and 32 urban composting units **AMP: 16 $ktCO_2e$**

AMP stands for Annual Mitigation Potential
ASP stands for Annual Sequestration Potential

*Percentage (%) of 2050 Gross Emissions

Scope 2 denotes indirect greenhouse gas emissions that relate to purchase of electricity, steam, heat or cooling.