

Why Transform Ramanathapuram into a Carbon Neutral and Climate Resilient Hub?



Credits: Pamban Bridge in Ramanathapuram; Source: Ramanathapuram District Administration

DISTRICT HIGHLIGHTS

5 Ramsar Sites - Gulf of Mannar Biosphere Reserve and 4 Bird Sanctuaries: Chitrangudi, Kanjirankulam, Sakkarakottai and Therthangal



GDDP: **49.8%** by service sector, 30.65% by industries with **~12,000 MSMEs**

Wetlands cover **18.05%** of the district's geographic area (highest in Tamil Nadu)



Contributes **14%** of TN & **2.6%** of India's marine fish catch - vital for livelihoods and exports

CLIMATE PROFILE

976 mm
Annual rainfall

22.77°C to 34.7°C
Annual temperature range

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

33% - 82%
Rise in SW monsoon rainfall by 2090
17% - 43%
Rise in NE monsoon rainfall by 2090

GHG EMISSIONS (2022)

1,999 ktCO₂e
Gross and net emissions are same since carbon sequestration is negligible

Key Contributors (% of Gross Emissions)



TRANSFORMATION POTENTIAL

Potential to be carbon neutral by 2045



Rameswaram as **eco-spiritual & carbon neutral hub** - attracting global recognition



1,064 ktCO₂e
Annual mitigation potential by 2050 across interventions

(-944) ktCO₂e
Annual sequestration by 2050



Blended Finance and Community-Ownership Models, to sustain low carbon interventions



Gulf of Mannar: Preserving ecosystems, sustaining resilient livelihoods.

Low-Carbon Interventions and Ecosystem-Livelihood Co-benefits



Blue-Green Ecosystem

-944 ktCO₂e*

Intervention

- Enhance the carbon stock density of the existing forest
- Agroforestry in waste/fallow lands
- Restoration of mangroves, seagrass and seaweed

Resilience & Co-benefits

- Strengthens coastal climate resilience and heat resilience.
- Enable sustainable fishing and climate-resilient agriculture
- Enhances water security and water salinity management

Economics and Livelihood Improvement

- Promotes ecotourism and green entrepreneurialships
- Strengthens fishers livelihood through value-added product development.
- Expands access to climate insurance, farmers's institution, market access
- Support livelihood opportunities for women and youth
- Improves energy access.



Sustainable Tourism

87 ktCO₂e*

Intervention

- Addition of 600 electric public buses, 6,000 electric 3Ws (autos) and 48,000 electric 4Ws (taxis) by 2050
- Adoption of 72,000 electric cookstoves in hotels/restaurants by 2050

Resilience & Co-benefits

- Reduced indoor and outdoor pollution
- Improved air quality
- Better energy access

Economics and Livelihood Improvement

- Decent working conditions
- Enhanced access to affordable and shared mobility



Sustainable Fisheries

125 ktCO₂e*

Intervention

Electrification of ~3300 mechanised and motorised fishing vessels by 2050

Resilience & Co-benefits

- Zero exhaust emissions - cleaner coastal air and water
- No diesel spills, safer marine ecosystems

Economics and Livelihood Improvement

- Resilience to fuel price shocks
- Improved efficiency and operational performance
- Community ownership of solutions

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

What Does Climate-Resilient Development Deliver?

Stronger community adaptive capacity

Climate-resilient communities with reduced risks from heat, drought, extreme weather and enhanced thermal comfort

Smarter water management (restoration, recharge, efficiency, reuse, reduced salinity)

Climate-informed planning, governance, and disaster readiness

Conservation and restoration of ecosystems, supporting tourism

Climate-informed planning, governance, and disaster readiness

Bankable green projects, access to climate finance, green jobs, and livelihood security

RAMANATHAPURAM

Path to Decarbonisation



Ramanathapuram has the potential to become carbon neutral by 2047, and achieve a net negative of ~262 ktCO₂e by 2050 – all the while transforming itself into a sustainable tourism hub. Some key interventions that could support this through sectoral decarbonisation and enhancement of the district's sequestration potential are as follows:

Total Emissions (2022): 1,999 ktCO₂e

- Annual Growth in Emissions (2005 to 2022) : 3.9%
- Per Capita Emissions (2022): 1.40 tonnes CO₂e per capita
- Emission Intensity Reduction in 2022 w.r.t 2005: 66%

INDUSTRIES

AMP: 226 ktCO₂e
(12.94% of gross emissions)

Replace existing ~87 MW fossil-fuel-based Captive Power Plants (CPPs) with equivalent renewable energy capacity of ~156 MW (solar, wind and GH2) by 2050

AMP: 209 ktCO₂e

Replacement of HSD by biodiesel in diesel generators for backup supply/renewable-based backup supply support

AMP: 17 ktCO₂e

Explore electrification of heating processes in industries to reduce fossil fuel consumption (Furnace Oil, HSD, etc.)

TRANSPORT

AMP: 118 ktCO₂e
(6.76% of gross emissions)

Promote 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

Install ~400 charging stations and development of other allied clean mobility and sustainable transport in Ramanathapuram by 2050

Stock of EVs in 2050



Fishing Boats

AMP: 125 ktCO₂e
(7.16% of gross emissions)

Electrify ~3,300 mechanised and motorised fishing vessels by 2050



CARBON SEQUESTRATION

ASP: 944 ktCO₂e
(54.08% of gross emissions)

- Repurposing 996 ha of barren/fallow lands to horticulture, agro/social forestry **ASP: 876 ktCO₂e/yr**
- Enhance Carbon Stock Density by 5.5% from the existing ~82.25 tCO₂/ha to 86.25 t/ha through reforestation/afforestation and sustainable forest management **ASP: 13.36 ktCO₂e/yr**
- Restoring 304 ha of mangrove forests **ASP: 28 ktCO₂e/yr**
- Enhancement of seagrass and seaweed by 20 sq km **ASP: 26 ktCO₂e/yr**



AGRICULTURE

AMP: 477 ktCO₂e
(27.32% of gross emissions)



ELECTRICITY

AMP: 816 ktCO₂e
(Scope 2)

Electricity Generation: ~2,497 MU (2023-24), about 71% of which is driven by solar power, followed by gas turbines at ~29%.

Electricity consumption: 625 MU (2023-24)
Led primarily by:



PEG Units – that contribute 28% (559 ktCO₂e) of gross emissions – are expected to retire by 2033 as per their economic lifecycle, fully abating the related emissions.

Electricity demand is expected to nearly triple from 1,000 GWh in 2022 to 2,839 GWh by 2050 under AES

A holistic assessment for setting up an additional RE capacity of at least 0.7 GW, supplementing the existing RE capacity of 1.05 GW, could meet future electricity demand while abating Scope 2 emissions



BUILDINGS (Residential, Commercial and Services)

Scope 1

Transition from LPG to PNG, and gradual adoption of ~0.72 lakh electric cook stoves by 2050

AMP: 29 ktCO₂e

Install a biogas plant of ~15,000 m³/day capacity by 2050

AMP: 28 ktCO₂e

Scope 2

Adopt ~4 lakh 3-5 star ACs and 4.2 lakh refrigeration units, primarily by 2040.

AMP: 106 ktCO₂e

Add 7.3 lakh LED bulbs, 5.76 lakh BLDC fans, and 0.5 lakh LED street lights by 2030

AMP: 30 ktCO₂e

AMP: 57 ktCO₂e
(3.26% of gross emissions)

(Scope 2)
136 ktCO₂e

Electrify 1,400 tractors and tillers with EVs by 2050 **AMP: 5 ktCO₂e**

Convert 5,837 diesel pumpsets to solar pumps by 2050 **AMP: 16 ktCO₂e**

90% balanced rationing and 75% methanogen inhibiting feed additives for livestock and 90% manure management through biogas plants by 2050 **AMP: 71 ktCO₂e**

Increase multiple aeration water regime from 20% to 77% for rice cultivation by 2050 **AMP: 178 ktCO₂e**

Replace synthetic nitrogen fertiliser and urea with 75% organic fertiliser and 25% nano-urea **AMP: 207 ktCO₂e**

39 mini weather monitoring stations (rainfall and temperature)

Capacity building to promote sustainable modernisation

WASTE

AMP: 61 ktCO₂e
(3.53% of gross emissions)

(Scope 2)
5 ktCO₂e

Improved wastewater treatment by 2040 **AMP: 48 ktCO₂e**
Urban: 71 MLD centralised sewage treatment and 100% UGD connection

Rural: Twin pit septic tanks for 1.7 lakh households and 38 FSTPs at Firka level

Install 1 MW of waste-to-energy plant, requiring ~30 tons of waste per day, by 203 **AMP: 5 ktCO₂e**

Setting up of ETPs and a continuous treated effluent monitoring system for 4 MLD industrial wastewater by 2050, and strict adherence to zero liquid discharge **AMP: 5 ktCO₂e**

100% segregation at source and processing of municipal solid waste with zero landfilling through 38 rural and 8 urban recycling centres and 8 urban composting units **AMP: 8 ktCO₂e**

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

Scope 2 denote indirect GHG emissions from purchase of energy (electricity, heat, steam etc).

■ Domestic sector (434 MU) ■ Commercial sector (108 MU) ■ Industrial sector (44 MU)
■ Miscellaneous (14 MU) ■ Agriculture (2 MU) ■ Public works (23 MU)