



ENERGY EFFICIENT HABITAT

Enabling Champions for Climate-Resilient Tamil Nadu

Reference Handout for Builders



CLIMATE CHANGE IS IMPACTING REAL ESTATE IN TAMIL NADU

Today, there is enough evidence that climate change is a real phenomenon. Tamil Nadu, being a coastal state, is on the frontlines of climate change. The region is routinely impacted by floods, droughts and cyclones that cause catastrophic economic losses (approximately \$300-500 million per climate disaster)¹. Future projections clearly indicate an increased probability of extreme temperature spells that would be expected to be very detrimental for public health².

While the global average rise in temperature might be 2.0°C, the extreme temperatures in dense cities might see 4-6°C increases by the mid-century. Buildings need to provide shelter to people during these conditions. Rise in sea level rise will cause large parts of the coastline to be flooded, and real estate will be affected by this. Extreme heat would mean rising demand for air conditioning in the buildings. Power outage would mean buildings need to rely on natural ventilation to keep the indoors in acceptable conditions, or on solar power.



Thus, the way buildings are designed, built and operated will determine future emissions, well-being of the occupants and adapting to climate change. Hence cities are likely to adopt climate-focused regulations related to real estate development.

Buildings in TamilNadu are responsible for 8% of the total GreenHouse Gas (GHG) emissions which is projected to only grow³. The Government of Tamil Nadu is crafting many solutions to leapfrog the State to a greener, cleaner, more resilient State with its TamilNadu Climate Change Mission (TNCCM). One of the focus areas of the Tamil Nadu Climate Change Mission is to develop low-emission buildings in cities and villages with a focus on resilience.

GREEN BUILDINGS CAN HELP TAMILNADU MITIGATE AND ADAPT TO CLIMATE CHANGE

To mitigate climate change, we must design and construct climate responsive buildings with low embodied energy resulting in low GHG emissions.

In order to adapt to climate change, buildings should be designed to protect people from

- heat stress by blocking heat through shading, walls, windows and roofs

¹ [Climate Adaptation in Tamil Nadu, India \(wri.org\)](#)

² [Inner 01 Dec copy \(tn.gov.in\)](#)

³ [Inner 01 Dec copy \(tn.gov.in\)](#)

- rising flood levels by raising the habitable floor level
- power outage by providing autonomy of critical functions

Green buildings help with both climate adaptation and resilience. The approach to a green building design includes integrating appropriate site planning, best practices for construction, climate responsive design principles, water and energy conservation strategies, waste reduction measures, using materials with low embodied energy and even educating the users.

Buildings have a large life span of more than 50 years. By designing and constructing green buildings, the real estate sector can pave the way for a low emissions and resilient habitat in the future. Additionally, this will help meet the objectives of Tamil Nadu Climate Change Mission (TNCCM) as well as India's emissions target.

PRINCIPLES OF GREEN BUILDING DESIGN AND CONSTRUCTION PRACTICES

Level 1: Simple and easy strategies to consider for a green building design

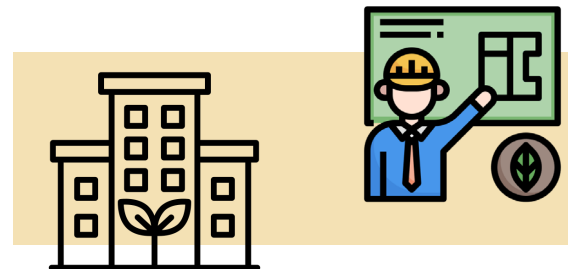
Green building design need not be complex. There are many simple strategies that can be implemented to ensure energy and resource conservation which aids in climate change mitigation. Consider the following design strategies early in the design stage for successful implementation during construction.

Site planning

- Don't build in or near floodplains
- Build the lowest level on a stilts

Civil

- Place the windows on the north and south facade. Avoid windows on east and west as much as possible. Limit window area to 40% or less of the wall area.
- Ensure windows are shaded completely by external shading devices. It is easier to shade north and south facing windows compared to east and west facing windows.
- Consider cross ventilation for good thermal comfort
- Consider white china mosaic tiles, or light colored tiles or a cool-roof coating on the terrace.
- Consider light colored paint for exterior wall surfaces
- Use cement containing slag or fly-ash instead of OPC
- Consider flat slab construction for large column free spaces
- Use fly-ash or AAC (Autoclaved Aerated Concrete) blocks for wall construction instead of regular bricks
- Provide dedicated space for waste segregation for the building with separate bins for wet waste, paper, plastic, cardboard and e-waste



Mechanical, Electrical & Plumbing (MEP)

- Install LED light fixtures
- Install 3-STAR rated air conditioners
- Install BLDC ceiling Fans
- Install water cooled chillers over air cooled chillers
- Install motion sensors for corridor and restroom lighting
- Install sub meters for lighting and air-conditioning
- Install flow restrictors or aerators for wash basin taps in the restroom
- Install low flow 3 litre/6 litre dual flush for WCs
- Install low flow 1 litre/flush for urinals
- Provide rainwater recharge pits on the property
- Keep the pumps and generators above the flood line

Level 2: Consider a green building certification to build credibility

Green building rating systems such as Excellence in Design for Greater Efficiencies (EDGE), Leadership in Energy and Environmental Design (LEED), Green Rating for Integrated Habitat (GRIHA) and Indian Green Building Council (IGBC) Suite of rating systems are voluntary programs available for all building typologies for a fee. The intent of all these different programs is to create better buildings by reducing GHG emissions, enhancing human health while conserving resources.

A certified green building demonstrates environmental stewardship. Such buildings stand apart from the crowd and help build credibility for both the organization as well as the finished building.

Benefits for commercial buildings include higher resale value, lower operational cost, increased occupancy rates and commanding higher rents⁴.

While any level of rating will give credibility, aim for a LEED Gold or GRIHA 3 star or IGBC Gold level of rating as a Level 2 approach to achieve considerable savings, especially if you have been implementing Level 1 strategies.

Level 3: Consider high-performance goals

Level 3 approach is about aiming high and developing exemplary buildings.

Aim for the highest certification level for any of the green building programs such as LEED, IGBC, GRIHA and EDGE.

This might include additional strategies such as

⁴ Cushman & Wakefield. (2021). [Green Is Good: Sustainable Office Outperforms in Class A Urban Markets.](#)



