

State Bank of India's Energy Efficient Housing Program (EEHP)

State Bank of India's Energy Efficient Housing Program (EEHP) is envisaged to promote mass adoption of energy efficient passive building designs and technologies for residential projects in India. The program involves KfW credit line of USD 277 million to support builder/ construction loans and sub-loans to home buyers for energy efficient buildings. An investment grant component of EUR 10 million is proposed to incentivize higher level of building energy performance.

A consortium of Ernst & Young LLP (EY) and Alliance for Energy Efficient Economy (AEEE) was appointed for providing technical assistance for the credit line and the investment grant.

\$ 277 million
Loan

€ 10 million
Investment Grant

Building Components

Active Elements

- HVAC
- Lighting
- Equipment

Passive Elements

- Orientation
- Wall Optimisation
- Window to Wall Ratio (WWR)
- Window Optimisation
- Shading

Building components can be broadly categorized into active and passive elements both of which affect energy footprint. These measures intrinsically reduce the energy consumption of active components for providing adequate thermal and visual comfort in buildings.

The Eco-Niwas Samhita (ENS) prescribed by the Bureau of Energy Efficiency, Ministry of Power stipulates minimum energy efficiency performance standards for both passive and active components of residential buildings. For the passive components, ENS code prescribes thermal transmittance value for roof and Residential Envelope Transmittance Value (RETV). As per **ENS Part II**, RETV for building envelope (except roof) in all climate zones except cold, should comply with the maximum value of 12 W/m². Thermal transmittance of roof should comply with the maximum U-value of 1.2 W/m²·K (**ENS Part I**).



What is RETV?
Residential Envelope Transmittance Value (RETV) is the net heat gain rate through the building envelope of dwelling units (excluding roof) divided by the area of the building envelope (excluding roof) of dwelling units.

RETV is affected by:

- building orientation
- aspect ratio
- u-value of walls and windows
- window to wall ratio (WWR)
- window shades

What is U-value?
It is the rate of heat transfer through a material, divided by the difference in temperature across that material. U-value of a wall, roof or glazing indicates its ability to transfer heat through conduction.

Builder Finance Loan Criteria (Tentative)

Criteria 1

Optimized Building Façade: RETV - 10 W/m²

Criteria 2

Optimized Building Roof: U-value - 1 W/m²·K

Strategies to lower RETV



Wall Optimization

- Wall assembly with U-value $\leq 0.8 \text{ W/m}^2/\text{K}$ are recommended.
- 200 mm thick aerated autoclaved concrete (AAC) blocks is a widely adopted wall construction material with low u-value
- Wall insulation using materials such as XPS, PU foam etc. can lower RETV of the building



Window Optimization

- Single glazed windows with reflective film coating (low-cost intervention) can help reduce heat transfer to indoors and improve RETV performance.
- Optimising window to wall ratio
- Double glazed windows



Building orientation and layout

- Longer building facades oriented in North-South direction have better RETV performance.
- Building layouts that minimise the ratio of total envelope area to carpet area have better RETV performance.



Window shading devices

- Window shades designed as per sun path can help reduce solar heat gains and improve RETV performance.

Benefits of Energy Efficient Housing Program



Benefits to Home buyer

- Concession on usual rate of interest for a home loan
- Thermally comfortable interior spaces
- 15-20% energy and monetary savings during the lifetime operations



Benefits to Government

- Reduced load on grid due to energy efficient residential buildings
- Reduced burden on power plants for electricity production



Benefit to Builder/Developer

- Concessional rate of interest
- Additional/higher concessions for achieving higher energy efficiency
- ENS code compliant building
- Unique selling proposition for the home buyers



Benefits to the Environment

- Reduction in emissions due to lower electricity demand
- Promotion of sustainable materials and lifestyle

