Eco Niwas Samhita 2021

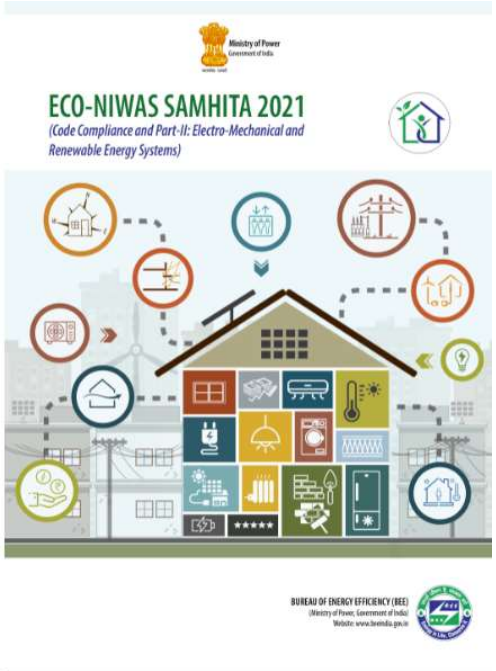
(Code Compliance and Part-II: Electro-Mechanical & Renewable Energy Systems)

19.07.2021

Two Parts of ENS: Envelope & Active Measures

EcoNiwas Samhita 2018
Part 1: Building Envelope

EcoNiwas Samhita 2021
Code Compliance and Part 2



ECO Niwas Samhita 2018 – Part 1

ECO Niwas Samhita Part 1 was launched on 14 December 2018 on the occasion of National Energy Conservation Day 2018

- For **"Residential buildings" with plot area ≥ 500m^2** and **"Residential part of Mixed-land use building projects" with plot area ≥ 500m^2**
- Provisions include
  - Minimum performance standards for residential building envelope
    - **residential envelope transmittance value (RETV)**
    - **thermal transmittance value (U_{cold})** for cold climate
    - **thermal transmittance value (U_{roof})** for building envelope for all climate
    - Minimum **openable window-to-floor area ratio (WFR_{op})**
    - Minimum **visible light transmittance (VLT)** for non-opaque building envelope components

Proposed Components of ENS CC & 2

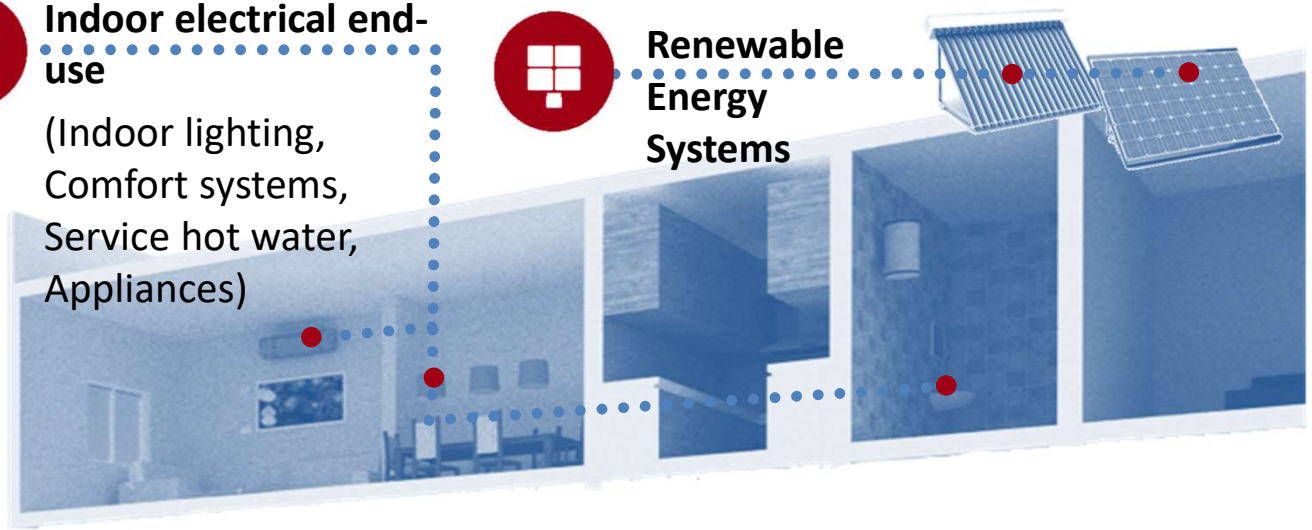
Code Compliance

(Mandatory System, Prescriptive System, and Point Based System).

Indoor electrical end-use

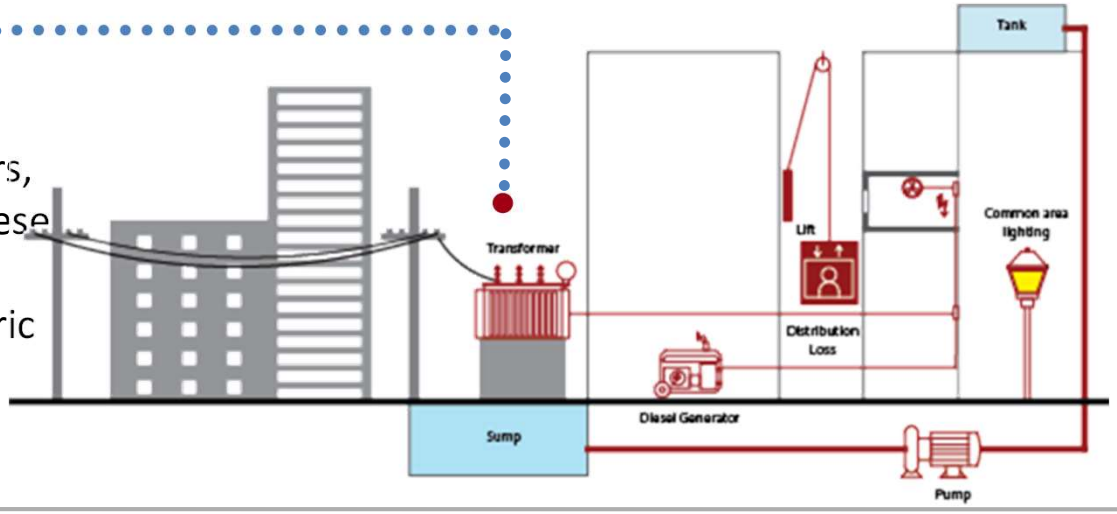
(Indoor lighting, Comfort systems, Service hot water, Appliances)

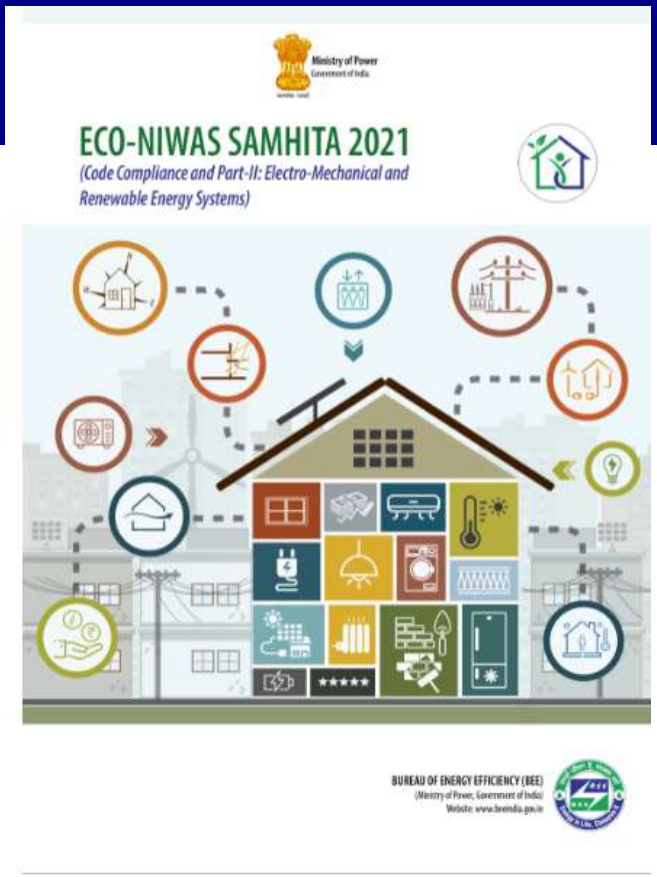
Renewable Energy Systems



Building Services

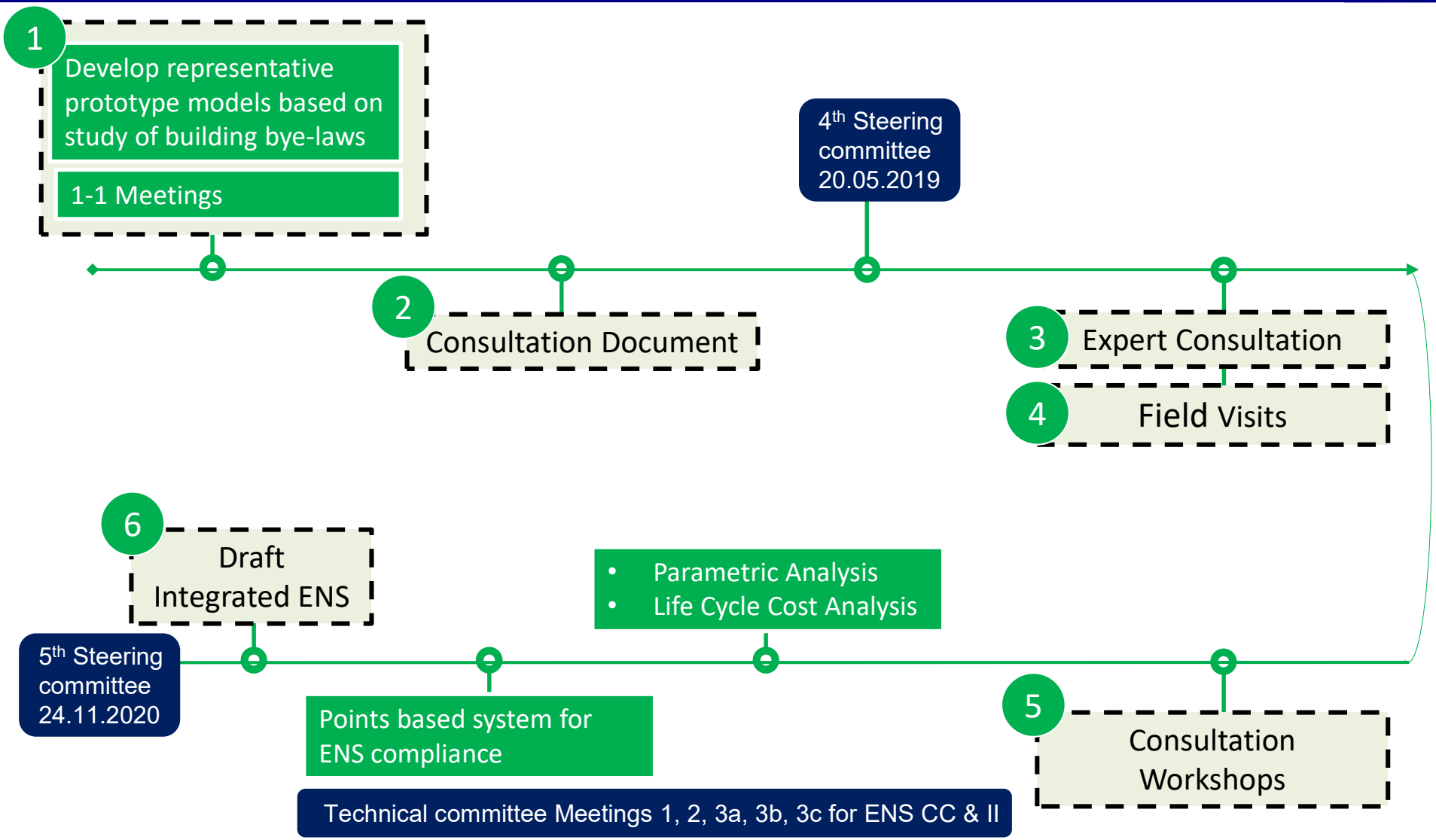
(Common area lighting, Elevators, Pumps, Power back-up, Transformers, Power distribution loses, Diese Generator sets, Car Parking Basement Ventilation, Electric Vehicle Supply Equipment)



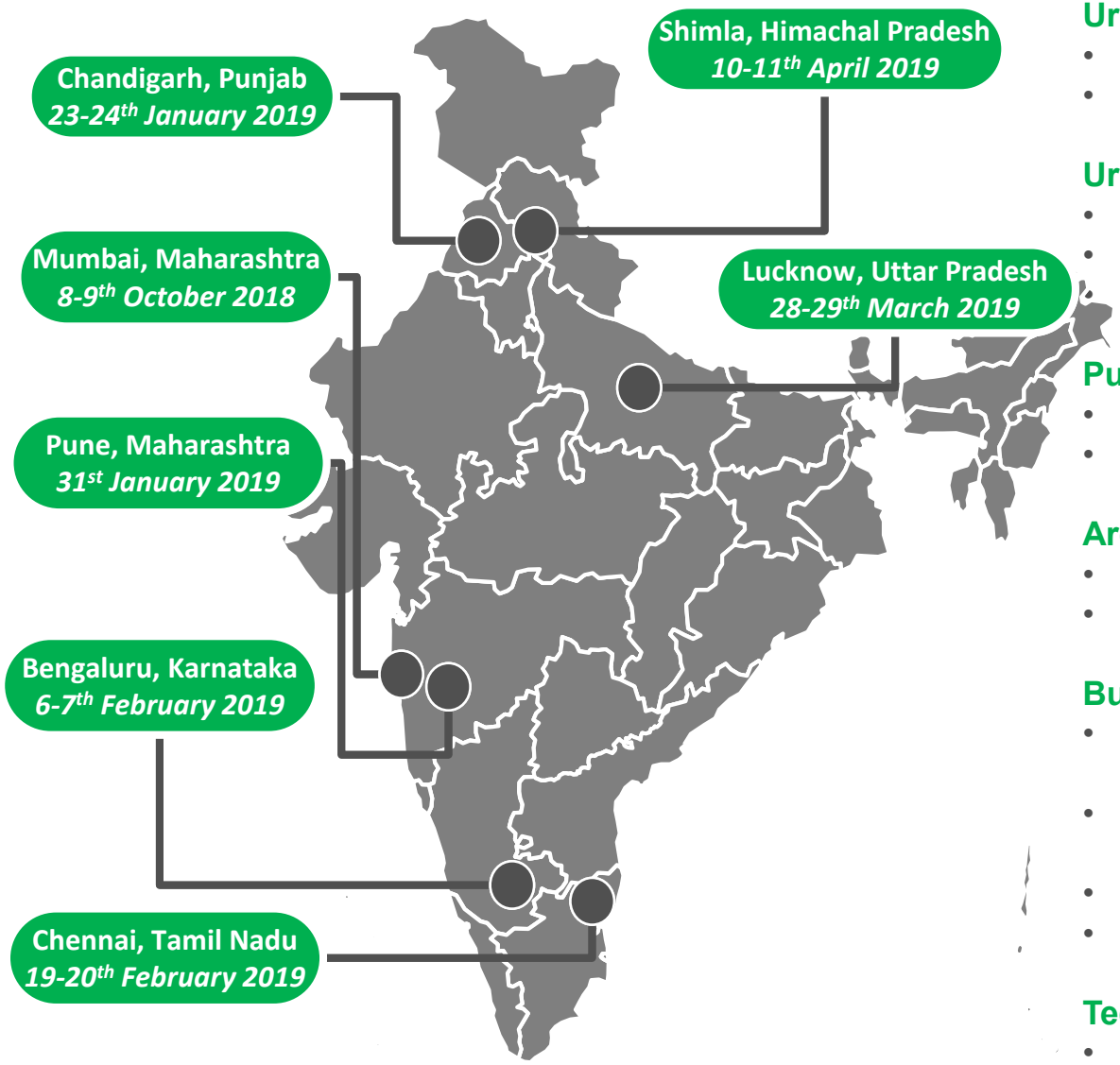


ENS 2021 DEVELOPMENT PROCESS – SINCE MID 2018

Sequence for code development



1. One-on-one Meetings: Stakeholders & Locations



Urban Local Bodies (6)
- Municipal Corporations
- Municipalities

Urban Development Departments/Authorities (7)
- Local Development Authorities
- State Urban Development Authorities
- Town planners

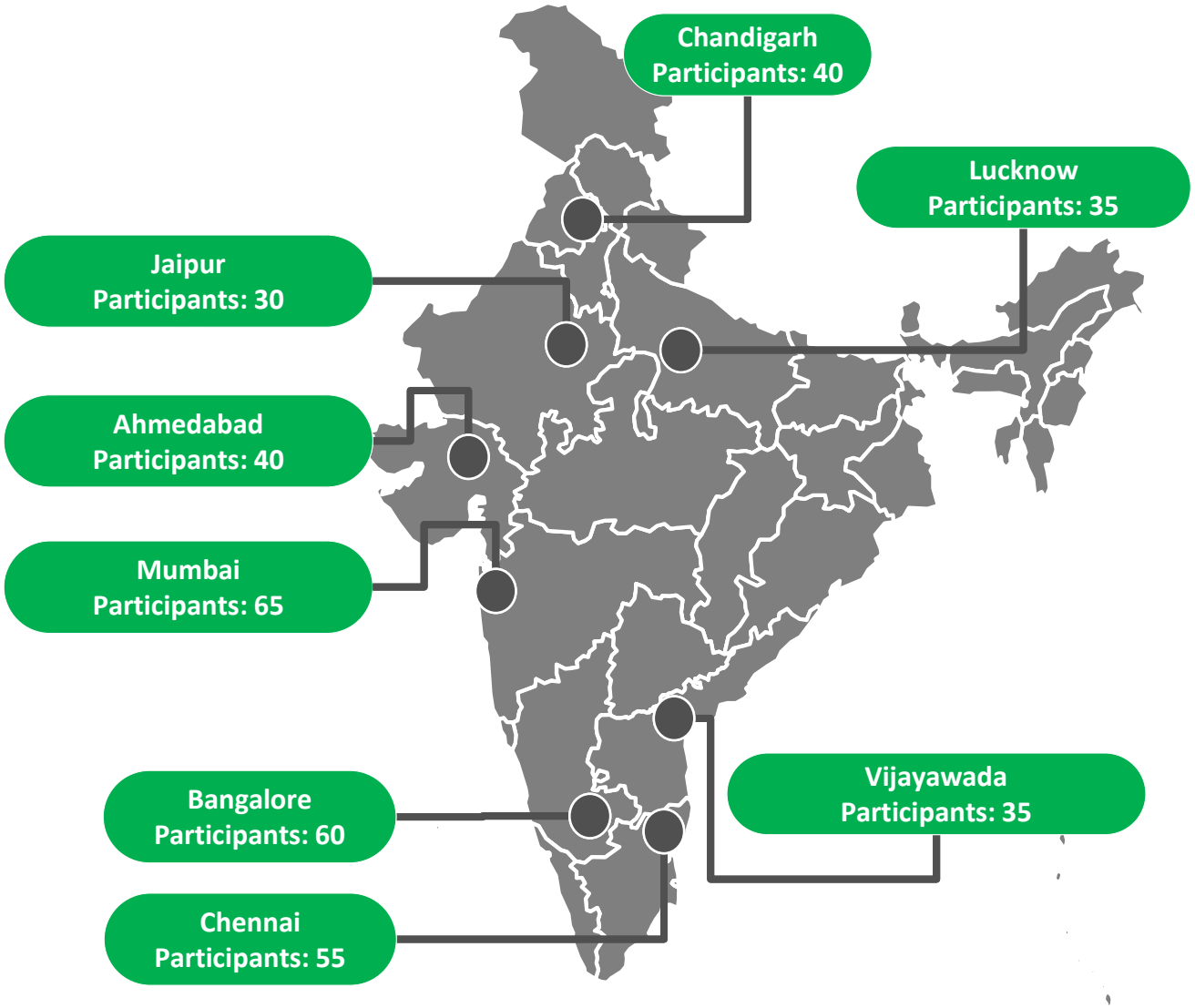
Public Works Departments (4)
- Central
- State

Architecture departments (4)
- School of Architecture and Planning
- Council of Architects

Builders and Builders Associations (15)
- CREDAI - Confederation of Real Estate Developers Association of India
- NAREDCO - National Real Estate Development Council
- BAI - Builders Association of India
- MBVA - Marathi Bandhkam Vyavsaik Association

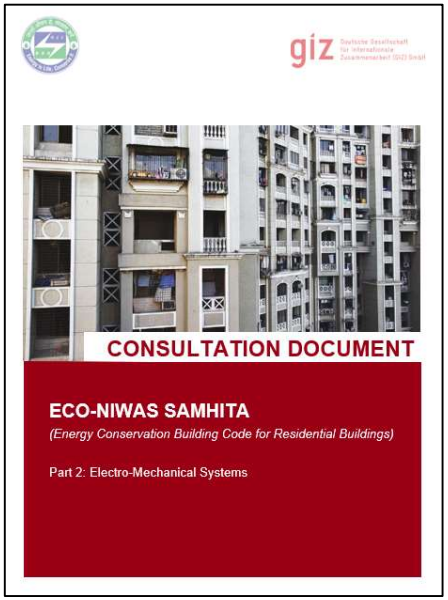
Technology Providers (4)
- MEP consultants, ISHRAE

2. Consultation Workshops: No. of participants & Locations



Participants included people from following professions:

- State designated agencies
- Urban Development Departments/Authorities
- Public Works Departments
- Architects
- Green building consultants
- Contractors
- Builders and Builders Associations
- Technology Providers
  - MEP consultants
  - ISHRAE/ASHRAE



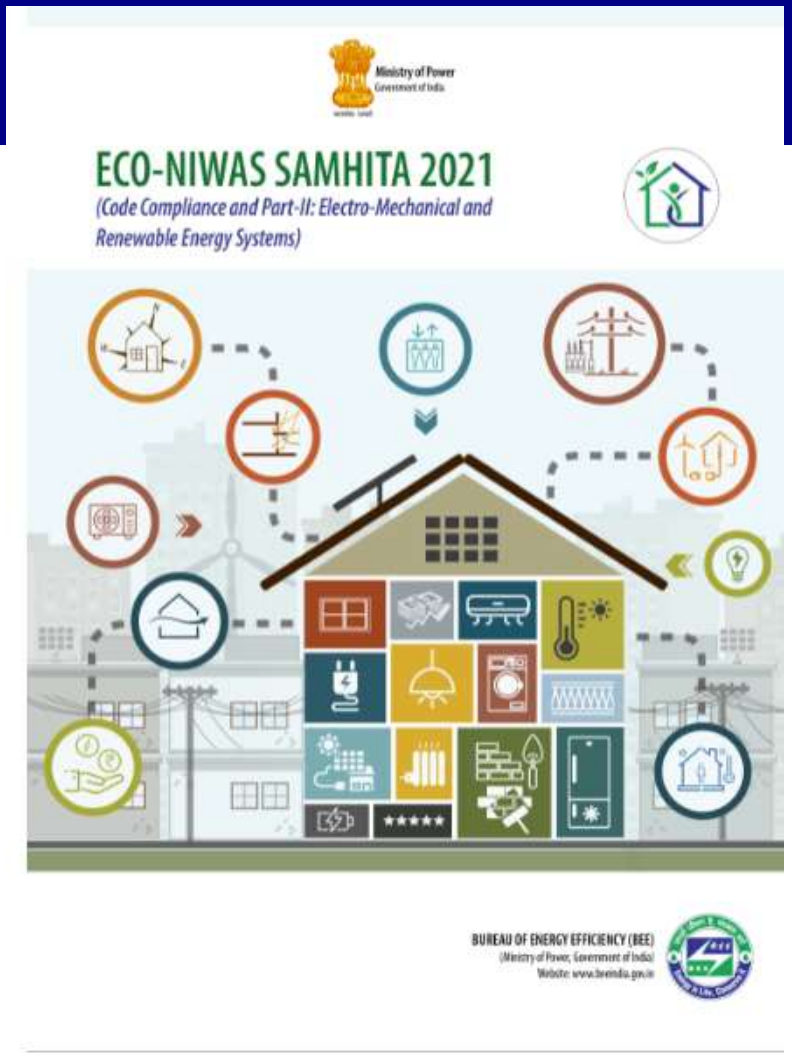
3. Field Visits: 11 Site Visits

11 site visits were selected – climate, prototype

- To map the BAU scenario
- Existing technologies deployed
- BAU design considerations
- Design and operational practices
- Mapping of equipment inventory

4. Committee meetings

Sl no	Type of meeting	Date	Discussion topic
1	4th Steering Committee	20-5-2019	Outline of ENS part 2, compliance framework, integration of part 1 & part 2
2	5th Steering Committee	24.11.2020	Final Code document and approval
1-1 meetings, Consultation Workshops, and Expert Consultations were conducted between May 2019 to Nov 2019			
2	1st Technical Committee	8-11-2019	Methodology and technical aspects for defining the Minimum Efficiency Performance Standard (MEPS) for electro-mechanical and renewable systems
3	2nd Technical Committee	16-1-2020	Point system for integration of ENS part 1: Envelope and ENS part 2: Electromechanical & renewable energy system
4	3rd Technical Committee-Part 1	5-6-2020	Point system, code compliance
5	3rd Technical Committee-Part 2	6-7-2020	Point system and compliance for Envelope,HVAC
6	3rd Technical Committee-Part 3	17-7-2020	RETV weightage for different blocks in the project, compliance for comfort cooling section, Comparison of capital cost per point for achieving compliance



ENS 2021 OVERVIEW

Scope

- ***Eco-Niwas Samhita 2021***

Code Compliance and Part II – Electro-Mechanical and Renewables Systems

The code applies to –

  - Residential buildings built on a plot area of ≥ 500 m^2
  - Residential part of ***Mixed land-use building*** projects, built on a plot area of ≥ 500 m^2.

Also applies to:

- Additions
- Alterations

Code Compliance

Components	Minimum Points	Additional Points	Maximum Points
Building Envelope			
Building Envelope	47	40	87
Building Services			
Common area and exterior lighting	3	6	9
Elevators	13	9	22
Pumps	6	8	14
Electrical Systems	1	5	6
Indoor Electrical End-Use			
Indoor Lighting		12	12
Comfort Systems		50	50
ENS Score	70	130	200

- Minimum Points
- Additional Points
- Maximum Points

Additional Score

Renewable Energy Systems Components	Minimum Points	Additional Points	Maximum Points
Solar Hot Water Systems		10	10
Solar Photo Voltaic		10	10
Additional ENS Score		20	

Code Compliance

Project Category	Minimum ENS Score
Low rise buildings	47
Affordable Housing	70
High rise buildings	100

Low Rise Buildings: A building equal or below 4 stories, and/or a building up to 15 meters in height (without stilt) and up to 17.5 meters (including stilt).

Affordable Housing Projects:

- for Affordable houses are Dwelling Units (DUs)
- for Economically Weaker Section (EWS) category
- For Lower Income Group (LIG) category

High Rise Buildings: A building above 4 stories, and/or a building exceeding 15 meters or more in height (without stilt) and 17.5 meters (including stilt).

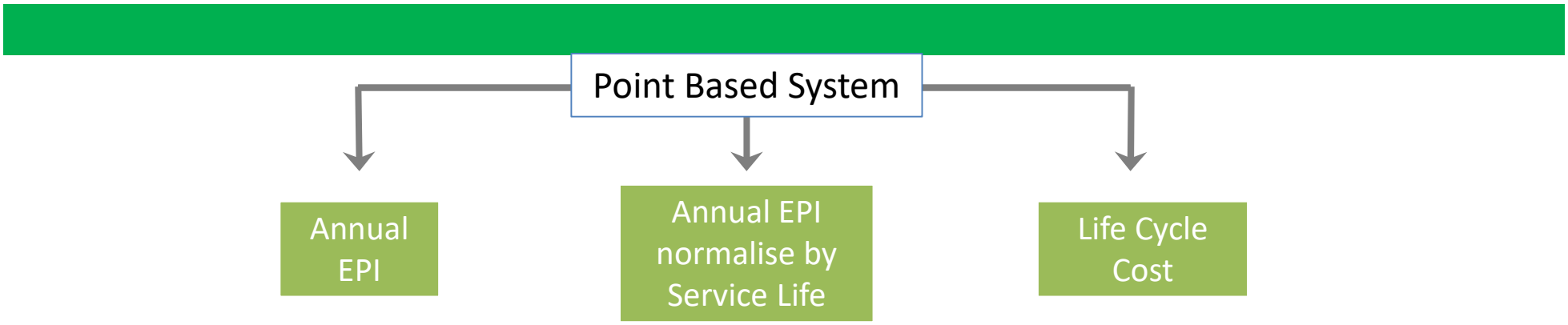
Advantages of Point system

A point system is a simpler approach to give weightage to building components that are important from energy efficiency and compliance perspective. Each point doesn't necessarily represent percentage energy savings.

Singapore started with the prescriptive compliance, the code evolved and adopted the point-based model as a method of compliance thereby combining trade-off and prescriptive requirements.

Ease of comprehending by the citizens	• Easy to comprehend by citizens for both overall energy performance of a residential building and incorporated component level energy efficiency
Trade-off	• Trade-off among components is possible but on a stepped EE improvements giving limited flexibility to owner to show compliance • Easy to deter possibility of gaming
Compliance	• Low expertise is required for doing and checking the compliance • Require simpler tool for showing compliance • Will have only one compliance approach
Future revision	• Easy to accommodate additions and removal of components from code. • Easier for states to make any revisions/amendments

Point Based System



The Savings Potential derived from above metrices for different Prototypes has further led to definition of MEPS for part-II building components and proposal for Integrated ENS

Applicable Components

		Mandatory	Prescriptive	Point System/EPI Ratio
1	**Envelope**			
1.1	RETV		✓	✓
1.2	Building Envelope Cold (Uenvelope)		✓	✓
1.3	U-value Roof		✓	✓
1.4	WFRop	✓		
1.5	VLT	✓		
2	**Building Services**			
2.1	Common area & Exterior Lighting		✓	✓
2.1.1	Outdoor Lighting		✓	✓
2.1.2	Corridor Lighting		✓	✓
2.1.3	Basement Lighting		✓	✓
2.2	Lifts		✓	✓
2.3	Pumps		✓	✓
2.4	DG Set	✓		
2.5	Electrical Systems	✓	✓	✓
2.6	Power Factor Correction	✓		
2.7	Electric Vehicle Supply Equipment	✓		
2.8	Energy Monitoring	✓		
3	**Indoor Electrical End Use**			
3.1	Indoor Lighting			✓
3.3	Comfort Systems			
3.3.1	Ceiling Fans			✓
3.3.2	AC			✓
3.3.3	VRF			✓
3.3.4	Chillers			✓
4	**Renewable Energy System**			
4.1	Solar HW			✓
4.2	Solar PV			✓

Chapter 4: Mandatory Requirements

1. Building Envelope: All mandatory requirements as mentioned in ENS Part I
2. Power Factor Correction: 0.97 at point of connection in all 3 phases or State requirement, which ever is stringent.
3. Energy Monitoring
   - Common area lighting (Outdoor lighting, corridor lighting and basement lighting)
   - Elevators
   - Water pumps
   - Basement car parking ventilation system
   - Electricity generated from power back-up
   - Electricity generated through renewable energy systems
   - Lift pressurization system

4. Electrical Vehicle Charging Station: If installed, it shall be as per revised guidelines issued by MoP for Charging Infrastructure.

5. Electrical Systems:

Distribution losses shall not exceed 3% of the total power usage in the ENS building

Voltage drop for feeders < 2% at design load.

Voltage drop for branch circuit < 3% at design load.

Chapter 5: Prescriptive Requirements

Prescriptive Requirement – set of check list

1. Building Envelope:
    1. VLT and WFR – as per ENS Part 1
    2. RETV (for all climate except cold) – max 12 W/m2
    3. Thermal Transmittance for cold – max 1.3W/m2K
    4. Roof – 1.2W/m2K

2. Common Area & Exterior Lighting: Either LPD or Efficacy and use of Photo Sensor

Common Areas	Maximum LPD (W/m^2)	Minimum luminous efficacy (lm/W)
Corridor lighting & Stilt Parking	3.0	All the permanently installed lighting fixtures shall use lamps with an efficacy of at least 105 lumens per Watt
Basement Lighting	1.0	All the permanently installed lighting fixtures shall use lamps with an efficacy of at least 105 lumens per Watt

If Exterior Lighting is more than 100W, Lamp efficacy shall be 105 l/W or as per table

Exterior Lighting Areas	Maximum LPD (in W/m^2)
Driveways and parking (open/ external)	1.6
Pedestrian walkways	2.0
Stairways	10.0
Landscaping	0.5
Outdoor sales area	9.0

3. Elevators, if applicable:
   - Lamps: 85l/W
   - Automatic switch off control
   - IE4 motors
   - VFDs
   - Regenerative drives
   - Group Automatic operation
4. Pumps, if applicable: Min Eff -70% or BEE 5 Star
5. Electrical System, if applicable:
   - Distribution loss less than 3%
   - Dry Type Transformer - as mentioned in table
   - Oil Type Transformer – BEE 5 Star

Chapter 6: Point System Method

Components	Minimum Points	Additional Points	Maximum Points
Building Envelope			
Building Envelope	47	40	87
Building Services			
Common area & exterior lighting	3	6	9
Elevators	13	9	22
Pumps	6	8	14
Electrical Systems	1	5	6
Indoor Electrical End-Use			
Indoor Lighting		12	12
Comfort Systems		50	50
ENS Score	70	130	200

i. Minimum points: are the set of points which are compulsory to achieve for each component to show compliance for ENS

ii. Additional Points: are the set of points which are awarded for adopting additional or better energy efficiency measures in a respective component. These points are trade able with other components to achieve the total score mentioned in section 3.1.2 for ENS compliance.

iii. Maximum points are the total points available for each component.

Chapter 6: Point System Method

1. Building Envelope (87 Max Points out of which 47 are essential)

- Thermal Transmittance of Roof (7 Points)
- RETV (80 Points)

Thermal Transmittance of Roof	
Minimum: **Thermal transmittance of roof shall comply with the maximum Uroof value of 1.2 W/m2·K.**	**Up to 4 Points**
Additional: **1 Point for every reduction of 0.23 W/m2·K in thermal transmittance of roof from the Minimum requirement prescribed under §6.1(a).**	Maximum 3 Points

RETV	
The RETV for the building envelope (except roof) for four climate zones, namely, Composite Climate, Hot-Dry Climate, Warm-Humid Climate, and Temperate Climate, shall comply with the maximum RETV of 15 W/m2.	**44 Points**
For RETV less than 15 and upto 12 W/m2, score will be calculated by following equation: **74 – 2 x (RETV)** (@2 points per RETV reduction)	Up to 50 Points
Additional: **For RETV less than 12 and upto 6 W/m2, score will be calculated by following equation:** **110 – 5 x (RETV)** (@ 5 points per RETV reduction)	Up to 80 points
Additional: **For RETV less than 6 W/m2**	80 Points

Weightage area RETV equation

- **Weighted Average of Envelopes of different buildings blocks allowed for better flexibility**

A proposed building development comprises three residential building blocks. The individual RETV of the each residential building computed are as follows :

- $RETV_{bldg1}$ = 15 W/m^2 , Envelope Area (EA_{bldg1}) = 11,760 m^2
- $RETV_{bldg2}$ = 12 W/m^2 , Envelope Area (EA_{bldg2}) = 11,424 m^2
- $RETV_{bldg3}$ = 9 W/m^2 , Envelope Area (EA_{bldg3}) = 12,600 m^2

$$= \frac{(RETV_{bldg1} \times EA_{bldg1}) + (RETV_{bldg2} \times EA_{bldg2})/ + (RETV_{bldg3} \times EA_{bldg3})}{(EA_{total})}$$

$$RETV_{\text{Weighted average}} = \sum (RETV_{bldg.} \times EA_{bldg.})/EA_{total}$$

- = ((15 x 11760) + (12 x 11424) + (9 x 12600))/35,784
- = 11.93 W/m^2 ←RETV to be used for point calculation

2. Common Area and Exterior Lighting (9 Points)

Common Areas	Maximum LPD (W/m^2)	Minimum luminous efficacy (lm/W)
Corridor lighting & Stilt Parking	3.0	All the permanently installed lighting fixtures shall use lamps with an efficacy of at least 85 lumens per Watt
Basement Lighting	1.0	All the permanently installed lighting fixtures shall use lamps with an efficacy of at least 85 lumens per Watt

Exterior Lighting Areas - at least 85 lm/W and maximum LPD requirements given in Table	Maximum LPD (in W/m^2)
Driveways and parking (open/ external)	1.6
Pedestrian walkways	2.0
Stairways	10.0
Landscaping	0.5
Outdoor sales area	9.0

Additional Points (6 points)	
Corridor lighting & Stilt Parking	1 Point for installing 95 lm/W Or 2 Point for installing 105 lm/W
Basement Lighting	1 Point for installing 95 lm/W Or 2 Point for installing 105 lm/W
Exterior Lighting Areas	2 Points for Installing photo sensor or astronomical time switch

3. Elevators (22 Points)

Minimum: **Elevators installed in the ENS building shall meet all the following requirements:** i. Install high efficacy lamps for lift car lighting having minimum luminous efficacy of 85 lm/W ii. Install automatic switch-off controls for lighting and fan inside the lift car when are not occupied iii. Install minimum class IE 3 high efficiency motors iv. Group automatic operation of two or more elevators coordinated by supervisory control	**13 Points**
Additional: i. Additional points can be obtained by meeting the following requirements: ii. Installing the variable voltage and variable frequency drives. (4 points) iii. Installing regenerative drives. (3 points) iv. Installing class IE4 motors. (2 points)	9 Points

4. Pumps (14 Points)

Minimum: **Either hydro-pneumatic pumps having minimum mechanical efficiency of 60% or BEE 4 star rated Pumps shall be installed in the ENS building.**	**6 Points**
Additional: **Additional points can be obtained by meeting the following requirements:** i. **Installation of BEE 5 star rated pumps (5 Points)** ii. **Installation of hydro-pneumatic system for water pumping having minimum mechanical efficiency of 70% (3 Points)**	8 Points

5. Electrical Systems (6 Points)

Minimum: i. **Power transformers of the proper ratings and design must be selected to satisfy the minimum acceptable efficiency at 50% and full load rating. The permissible loss shall not exceed the values listed in Table 8 for dry type transformers and BEE 4-star rating in Table 9 for oil type transformers.**	**1 Points**
Additional: **Additional points can be obtained by providing all oil type transformers with BEE 5 star rating.**	5 Points

6. Indoor Lighting (12 Points)

Minimum: All the lighting fixtures shall have lamps with luminous efficacy of minimum 85 lm/W installed in all bedrooms, hall and kitchen.	**4 Points**
Additional: Additional points for indoor lighting by installing all lighting fixtures in all bedrooms, hall and kitchen shall have lamps luminous efficacy as per following: i. 95 lm/w (3 Points) ii. 105 lm/W (8 Points)	Upto 8 Points

7. Comfort System (50 Points)

– Ceiling fans

Minimum: i. All ceiling fans installed in all the bedrooms and hall in all the dwelling units shall have a service value as given below: • For sweep size <1200 mm: equal or greater than 4 m3/minute·Watt • For sweep size >1200 mm: equal or greater than 5 m3/minute·Watt i. BEE Standards and Labeling requirements for ceiling fans shall take precedence over the current minimum requirement, as and when it is notified as mandatory.	**6 Points**
Additional: Additional points for ceiling fans by installing in all the bedrooms and hall in all the dwelling units as per following: i. 4 Star ii. 5 Star	 1 Points 3 Points

Chapter 6: Point System Method

Weighted Average of different Comfort Systems installed in a building allowed for better flexibility

$$Points\ achieved\ for\ AC = \frac{\sum(Installed\ tonnage\ of\ particular\ system\ \times\ points\ claimed\ as\ per\ Energy\ efficiency\ level)}{\sum Total\ tonnage\ installed\ in\ the\ dwelling\ unit}$$

Minimum: **i. Unitary Type: 5 Star** **ii. Split AC: 3 Star** **iii. VRF: 3.28 EER** **iv. Chiller: Minimum ECBC Level**	**20 Points**
Additional 9 points for : **i. Split AC: 4 Star** **ii. VRF: Not Applicable as on date, however, whenever Star labelling of BEE is launched, Star 4 will be applicable** **iii. Chiller: Minimum ECBC+ Level as mentioned in ECBC 2017**	9 Points
Additional 21 points for : **i. Split AC: 5 Star** **ii. VRF: Not Applicable as on date, however, whenever Star labelling of BEE is launched, Star 5 will be applicable** **iii. Chiller: Minimum SuperECBC Level as mentioned in ECBC 2017**	21 Points

8. Solar Water Heating (10 Points)

Minimum: **The ENS compliant building shall provide a solar water heating system (SWH) of minimum BEE 3Star label and is capable of meeting 100% of the annual hot water demand of top 4 floors of the residential building.** **or** **100% of the annual hot water demand of top 4 floors of the residential building is met by the system using heat recovery**	**5 Points**
Additional: **Additional points can be obtained by installing SWH system as per as per following:** **i. 100% of the annual hot water demand of top 6 floors of the residential building (2 points)** **ii. 100% of the annual hot water demand of top 8 floors of the residential building (5 points)**	Upto 5 Points

8. Solar Photo-Voltaic (10 Points)

Minimum: **The ENS compliant building shall provide a dedicated Renewable Energy Generation Zone (REGZ) –** • **Equivalent to a minimum of 2 kWh/m2.year of electricity; or** • **Equivalent to at least 20% of roof area.** **The REGZ shall be free of any obstructions within its boundaries and from shadows cast by objects adjacent to the zone.**	**5 Points**
Additional: **Additional points can be obtained by installing solar photo voltaic as per following:** **i. Equivalent to a minimum of 3 kWh/m2.year of electricity or Equivalent to at least 30% of roof area (2 points)** **ii. Equivalent to a minimum of 4 kWh/m2.year of electricity or Equivalent to at least 40% of roof area (5 points)**	Upto 5 Points

Other Chapters

- Chapter 7: Terminology and Definitions

- Annex A: Embodied Energy
- Annex B: Best Construction Practice
- Annex C: Retrofitting of Residential Buildings
- Annex D: Improved Air Cooling
- Annex E: Smart Home

EXAMPLES OF CODE COMPLIANCE

Examples for Point System

Building Envelope	Uroof		3	4
	RETV		44	36
	or		or	
	Ucold		44	36
Building Services	CA Lighting	CAL>Corridor	1	2
		CAL>Outdoor	1	2
		CAL>Basement	1	2
	Lifts		13	9
	Pumps		6	8
	Electrical Sys		1	5
Indoor End Use	Ind Lighting		4	8
	Comfort Sys	CS>Fans	6	3
		CS>AC	20	21
		CS>Central AC	20	21
RE Systems	Solar HW		5	5
	Solar PV		5	5

Minimum Points

Additional Points

Minimum, if opted

Point System - A building opting for all 3 sections and getting 100 points

Building Envelope	Uroof		3	4	3	U - 1.2 W/m2.K	47
	RETV		44	36	44	**RETV:** 15 W/m2	
Building Services	CA Lighting	CAL>Corridor	1	2	1	3.0 W/m2 LPD & at least 85 lumens/W	23
		CAL>Outdoor	1	2	1	LPD as per table & at least 85 lumens/W	
		CAL>Basement	1	2	1	1.0 W/m2 LPD & at least 85 lumens/W	
	Lifts		13	9	13	85 lumen/watt, Automatic, class IE 3 motors, Sequencing	
	Pumps		6	8	6	BEE 4 star rated/Hydropneumatic 60% eff	
	Electrical Sys		1	5	1	Max PD Loss 3% , Transformer: BEE 3 star rated	
Indoor End Use	Ind Lighting		4	8	4	Luminous efficacy of minimum 85 lm/W	30
	Comfort Sys	CS>Fans	6	3	6	BEE 3 star rated	
		CS>AC	20	21	20	BEE 3 star rated	
		CS>Central AC	20	21			
RE Systems	Solar HW		5	5			
	Solar PV		5	5			

Total 100 points

Point System - A building opting for 2 sections only (Building envelope and Services) w/o RE

Building Envelope	Uroof		3	4	3	2	U – 0.74 W/m2.K	49
	RETV		44	36	44		**RETV:** 15 W/m2	
Building Services	CA Lighting	CAL>Corridor	1	2	1	2	2.5 W/m2 best LPD, 105 best LE	51
		CAL>Outdoor	1	2	1	2	0.75 W/m2 LPD, 105 best LE	
		CAL>Basement	1	2	1	2	installing controls	
	Lifts		13	9	13	9	85 lumen/watt, Automatic, class IE 5 motors, Sequencing, VVVF, Regenerative drive	
	Pumps		6	8	6	8	BEE 5 star rated, Low flow fixtures	
	Electrical Sys		1	5	1	5	Max PD Loss 3% , Transformer: BEE 5 star rated	
Indoor End Use	Ind Lighting		4	8				
	Comfort Sys	CS>Fans	6	3				
		CS>AC	20	21				
		CS>Central AC	20	21				
RE Systems	Solar HW		5	5				
	Solar PV		5	5				

Total 100 points

Point System - A building opting for 2 sections only (Building envelope and Services) with RE

Building Envelope	Uroof		3	4	3	U - 1.2 W/m2.K	47
	RETV		44	36	44	**RETV:** 15 W/m2	
Building Services	CA Lighting	CAL>Corridor	1	2	1	2	2.5 W/m2 best LPD, 105 best LE	43
		CAL>Outdoor	1	2	1	2	0.75 W/m2 LPD, 105 best LE	
		CAL>Basement	1	2	1		1.0 W/m2 LPD & at least 85 lumens/W	
	Lifts		13	9	13	9	85 lumen/watt, Automatic, class IE 5 motors, Sequencing, VVVF, Regen drive	
	Pumps		6	8	6	8	BEE 5 star rated, Low flow fixtures	
	Electrical Sys		1	5	1		Max PD Loss 3% , Transformer: BEE 3 star	
Indoor End Use	Ind Lighting		4	8				
	Comfort Sys	CS>Fans	6	3				
		CS>AC	20	21				
		CS>Central AC	20	21				
RE Systems	Solar HW		5	5	5	5	meeting 100% hot water demand of 2 floor	10
	Solar PV		5	5				

Total 100 points

Point System - A building opting for all 3 sections with RE

Building Envelope	Uroof		3	4	3	U - 1.2 W/m2.K	47	
	RETV		44	36	44	**RETV:** 15 W/m2		
Building Services	CA Lighting	CAL>Corridor	1	2	1	3.0 W/m2 LPD & at least 85 lumens/W	23	
		CAL>Outdoor	1	2	1	LPD as per table & at least 85 lumens/W		
		CAL>Basement	1	2	1	1.0 W/m2 LPD & at least 85 lumens/W		
	Lifts		13	9	13	85 lumen/watt, Automatic, class IE 3 motors, Sequencing		
	Pumps		6	8	6	BEE 4 star rated/Hydropneumatic 60% eff		
	Electrical Sys		1	5	1	Max PD Loss 3% , Transformer: BEE 3 star rated		
Indoor End Use	Ind Lighting		4	8				
	Comfort Sys	CS>Fans	6	3				
		CS>AC	20	21	20	BEE 3-star AC	30	
		CS>Central AC	20	21				
RE Systems	Solar HW		5	5	5	meeting 100% hot water demand of 2 floor	10	
	Solar PV		5	5	5	PV on 10% roof area		

Total 100 points

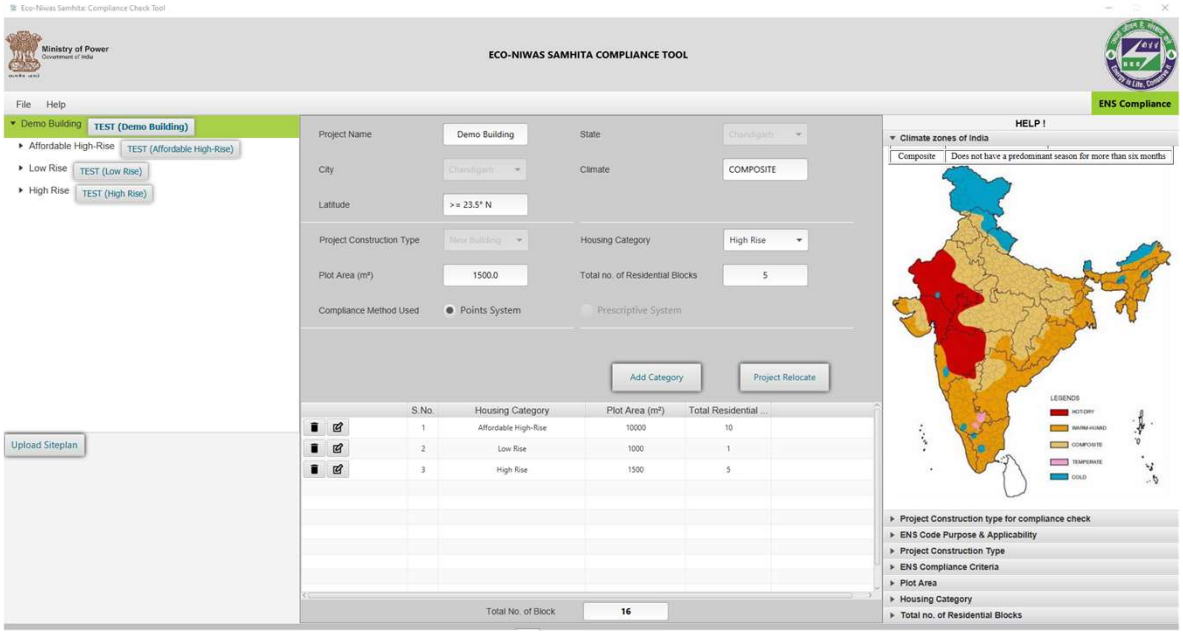
ECONIWAS SAMHITA

Compliance Tool

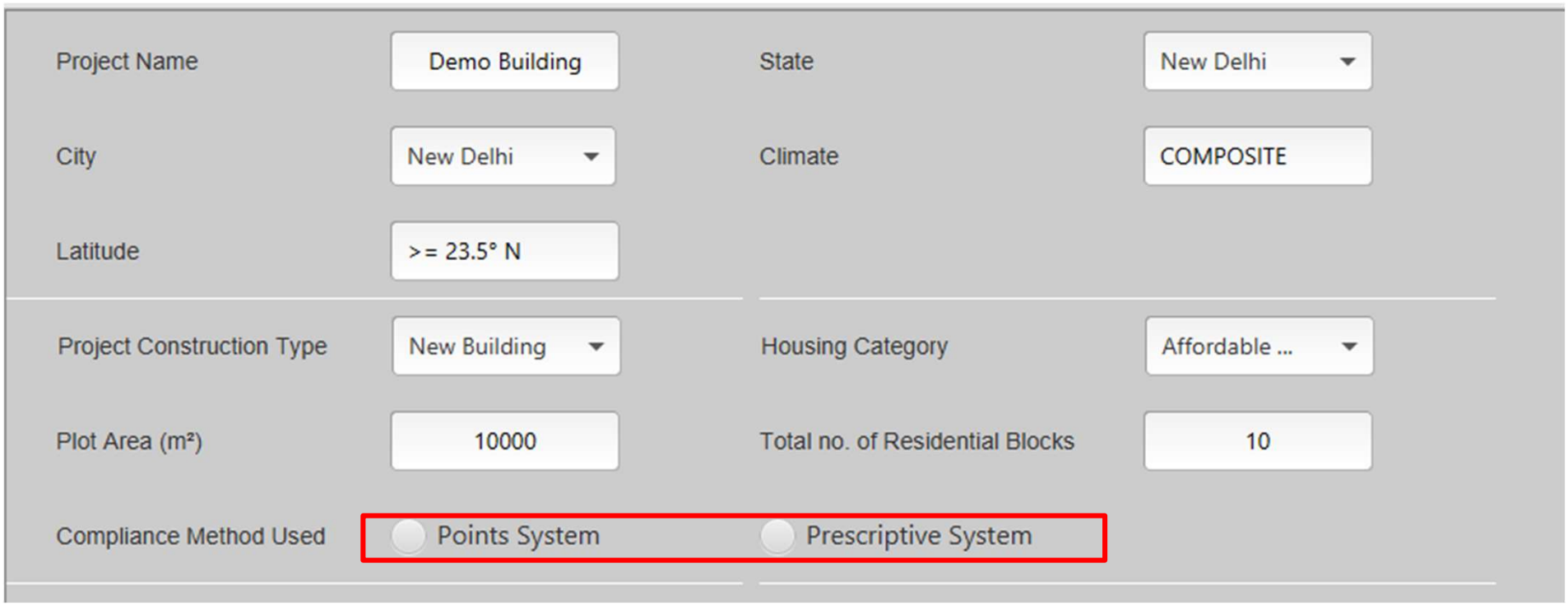
Introduction

- *Quick design and compliance checks on the benchmarks of ECONIWAS SAMHITA.*
- *5 key features in consideration:*
  1. *User friendliness*
  2. *Responsiveness*
  3. *Adaptability*
  4. *Dynamism*
  5. *Resourcefulness.*

- *Compliance for Both Prescriptive and Points Based Systems.*
- *Categories included:*
  1. *High rise*
  2. *Low Rise*
  3. *Affordable*
  4. *Mixed Use*



ECONIWAS Samhita Compliance Tool - KEY FEATURES



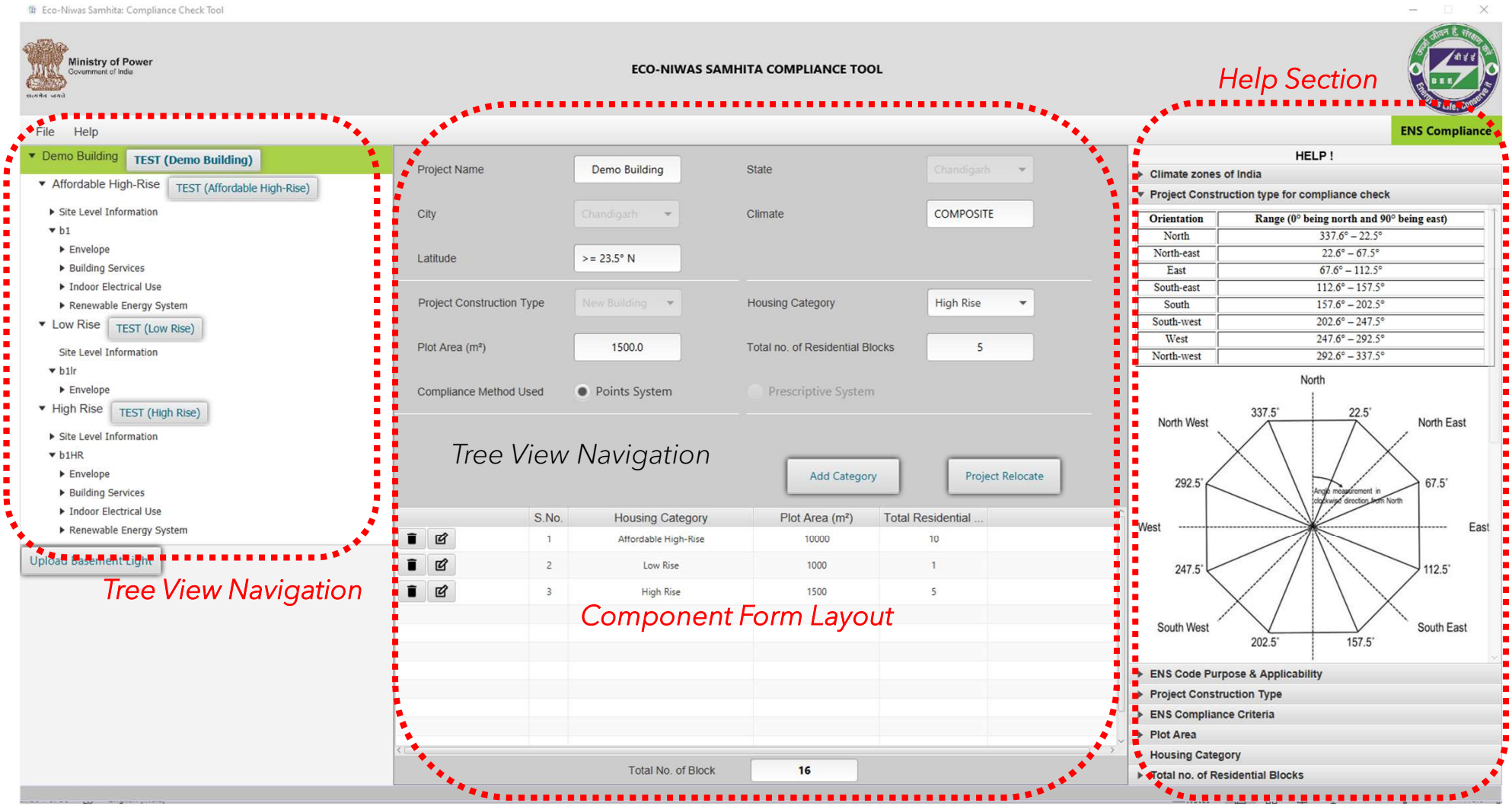
- *Easy project definition.*
- *Provisions for point system as well as prescriptive system approach for compliance evaluation.*

- *Provisions for multiple housing category addition for compliance evaluation*

	S.No.	Housing Category	Plot Area (m²)	Total Residential Block
	1	Affordable High-Rise	10000	10
	2	Low Rise	1000	1
	3	High Rise	1500	5

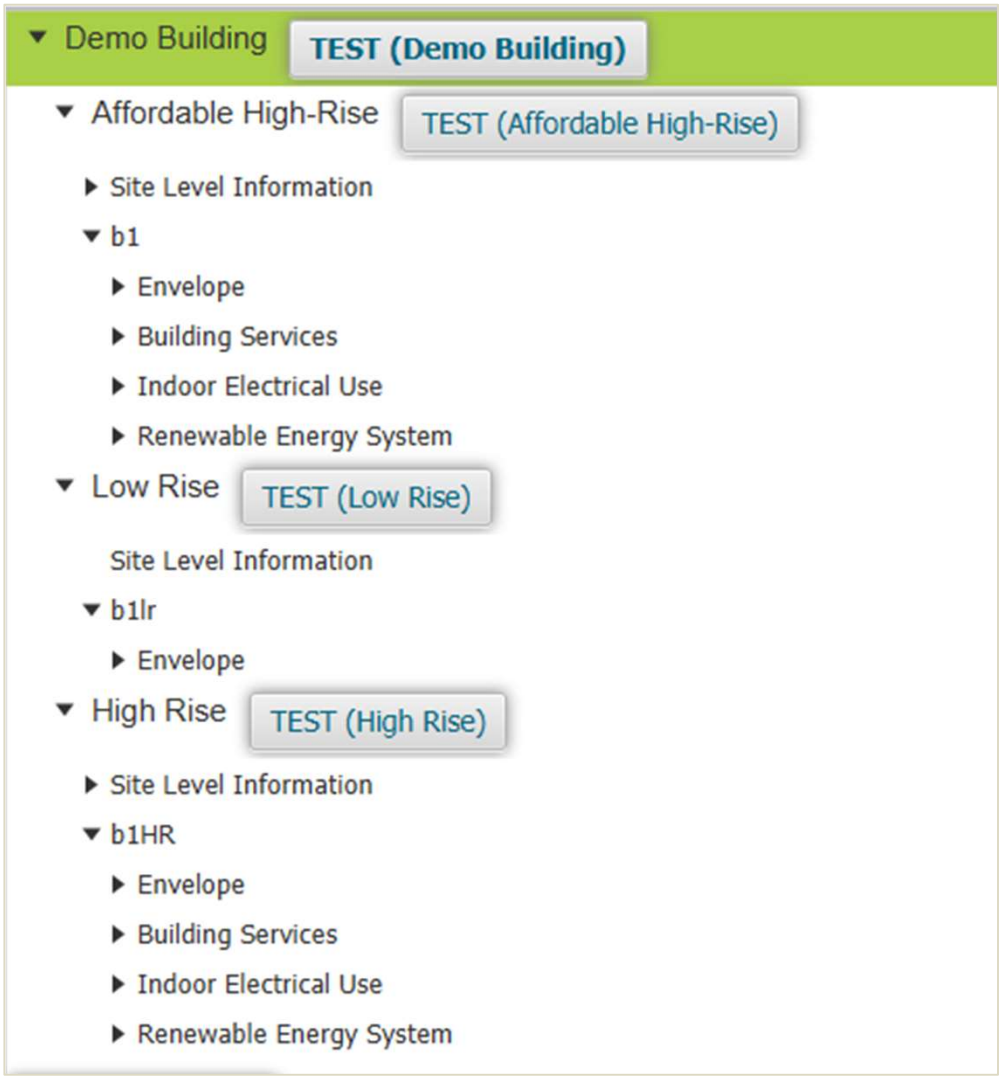
Total No. of Block **16**

Landing page

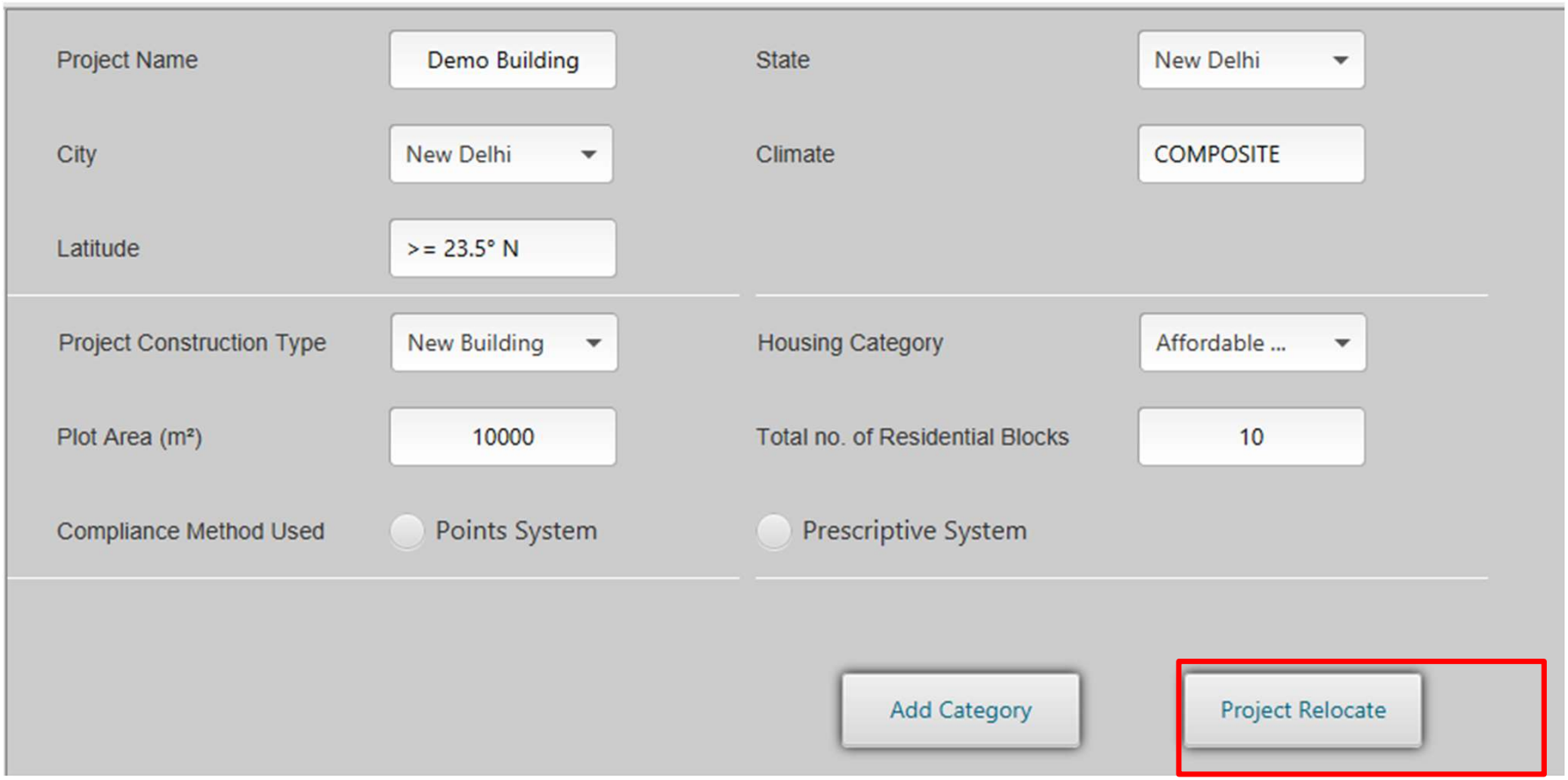


Key Features

- *Easy to navigate tree-view structure*

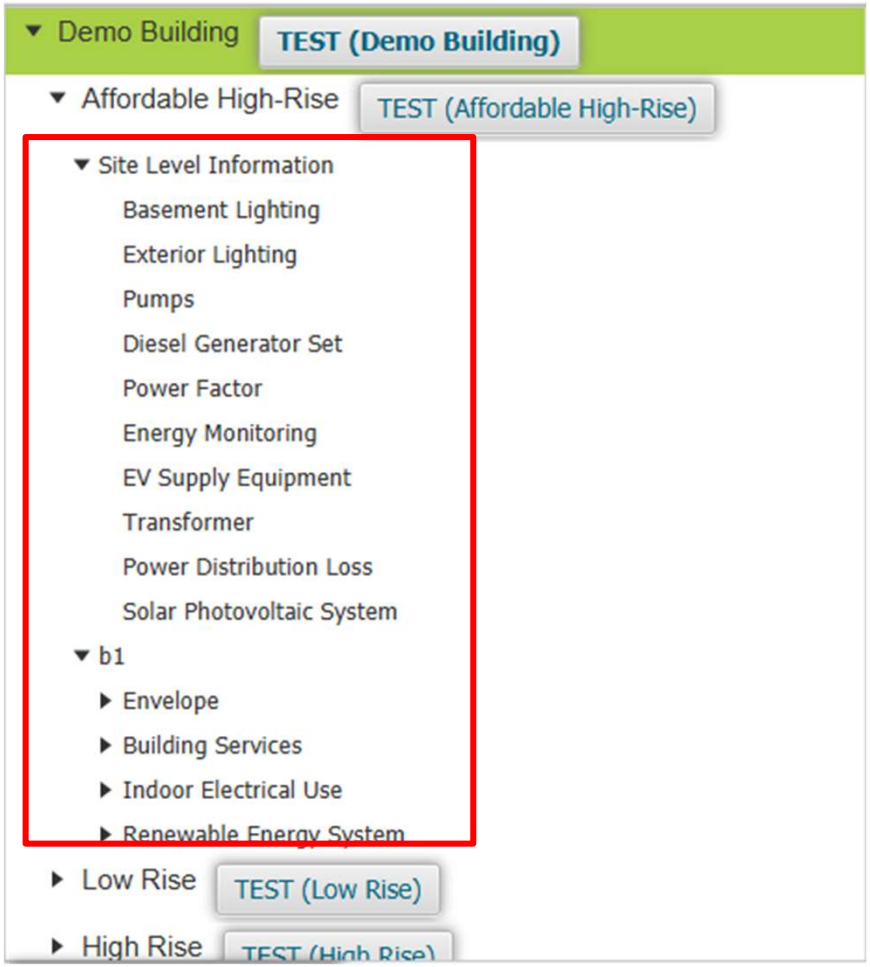


ECONIWAS Samhita Compliance Tool - KEY FEATURES



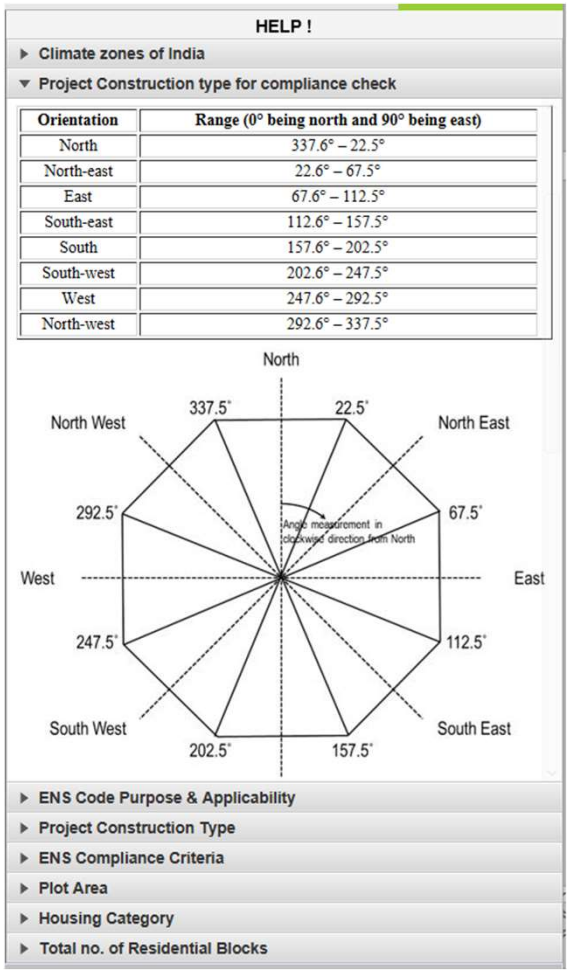
- *Project relocation feature for multiple domain use*

Key Features

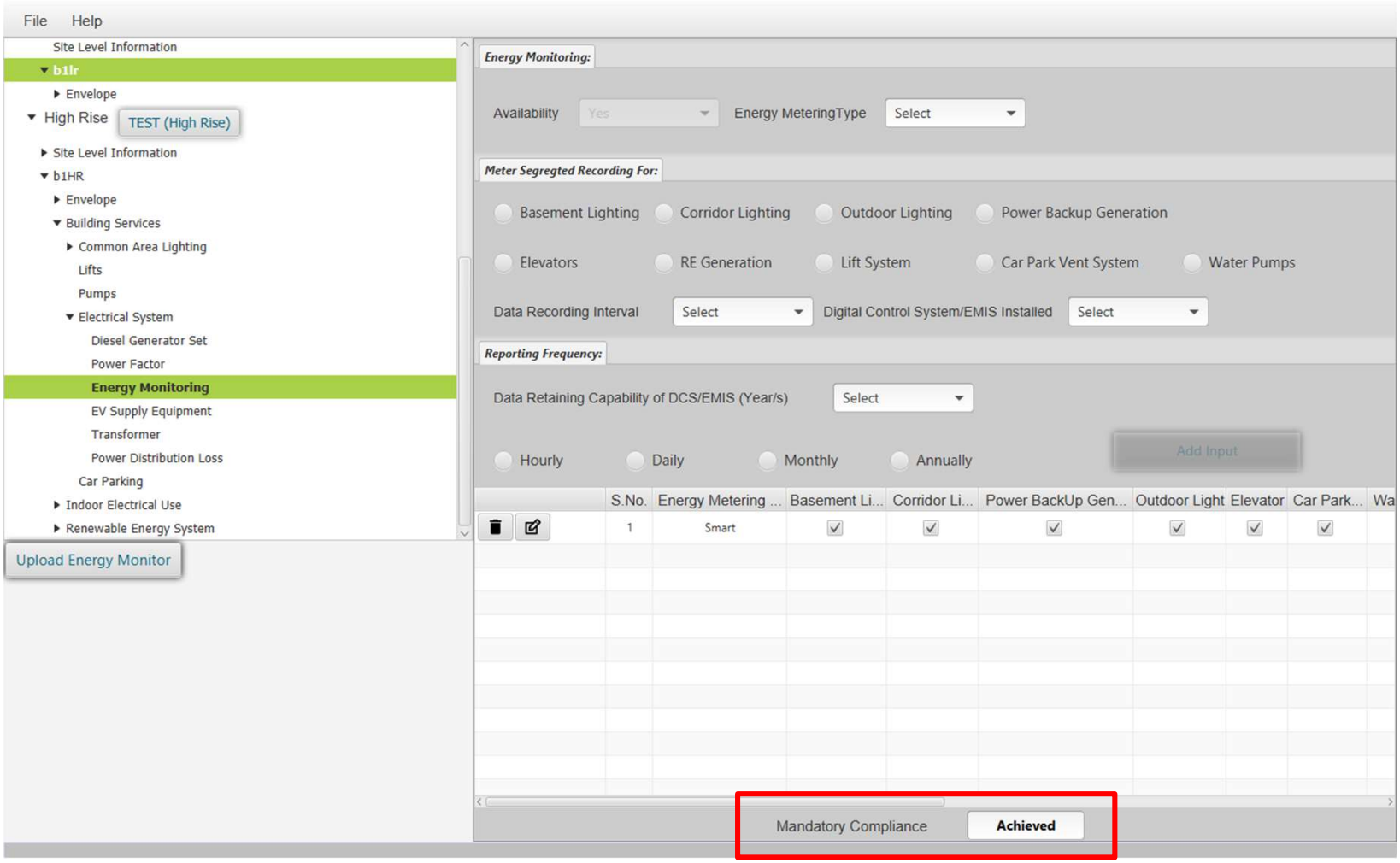


- *Segregated site level & block level inputs for ease in information flow*

- *Comprehensive help panel on each form for easy user referencing*

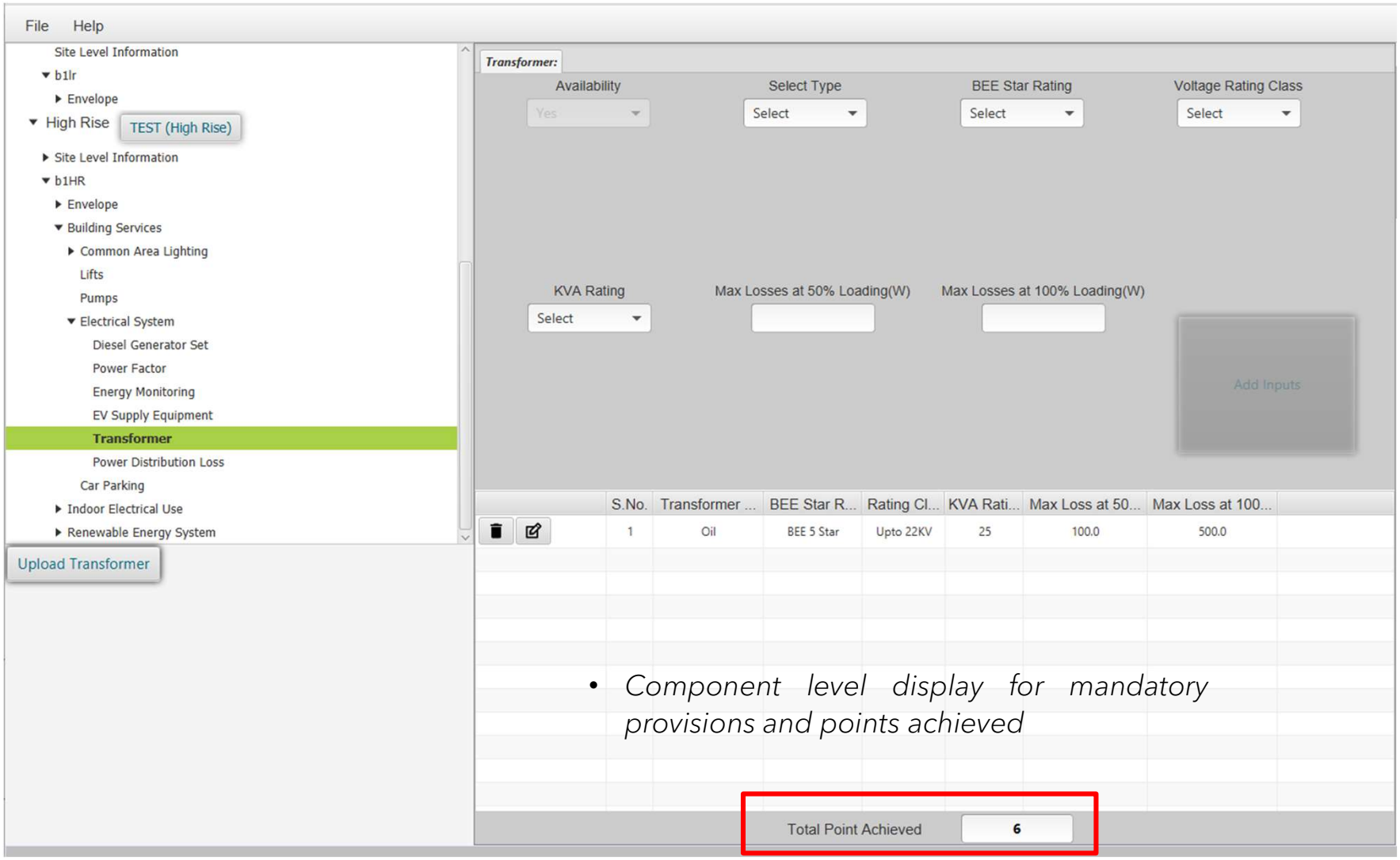


Key Features



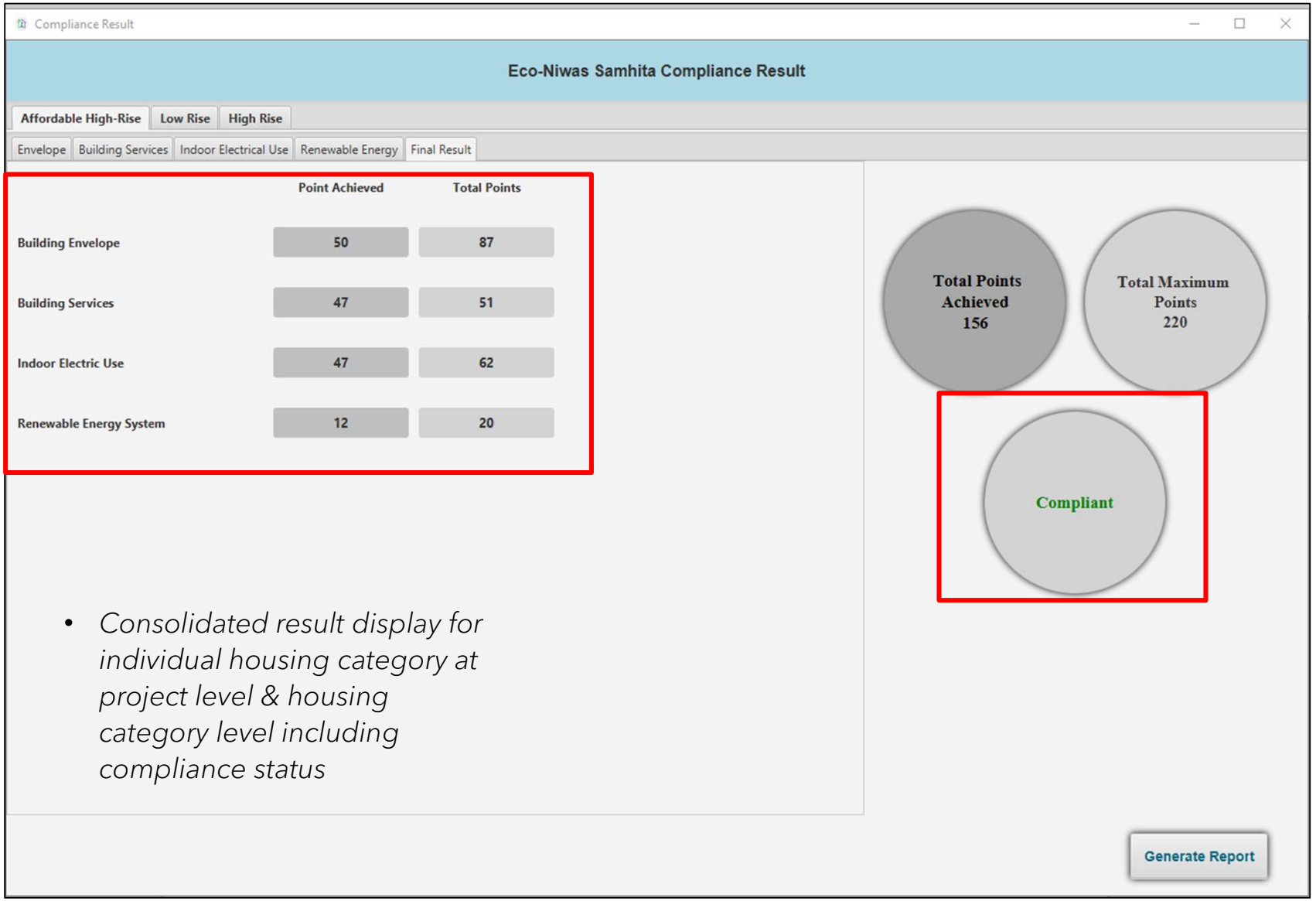
- *Component level display for mandatory provisions and points achieved*

ECONIWAS Samhita Compliance Tool - KEY FEATURES



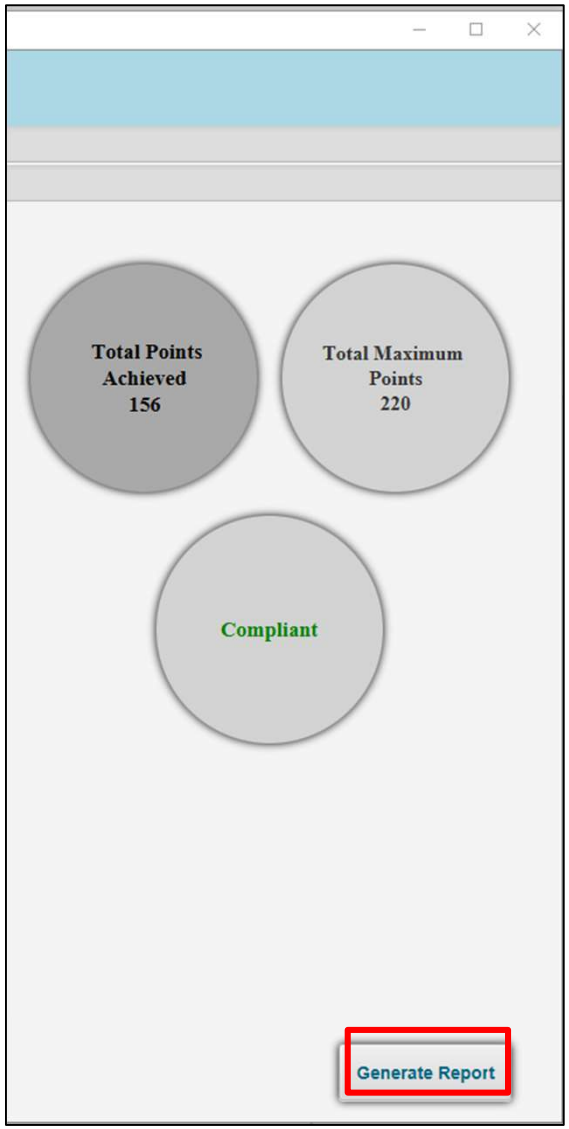
- *Component level display for mandatory provisions and points achieved*

Key Features



- *Consolidated result display for individual housing category at project level & housing category level including compliance status*

Key Features



Eco-Niwas Samhita: Compliance Check Report

ECO-NIWAS SAMHITA (ENS) COMPLIANCE EVALUATION REPORT

Project Information

Project Name	Demo Building
State	Chandigarh
City	Chandigarh
Climate	COMPOSITE
Latitude	>= 23.5° N
Building Construction Type	New Building
Compliance Method Used	Point System

Housing Category Information

Housing Category	Plot Area(m²)	Total No. of Residential Blocks	Total Basement Area(m²)	Total Exterior Light Area(m²)	Total Roof Area(m²)
Affordable High-Rise	10000	10	1000.0	1000.0	1000.0
Low Rise	1000	1	1000.0	1000.0	1000.0
High Rise	1500	5	100.0	100.0	100.0

Eco-Niwas Samhita: Compliance Check Report

Consolidated Compliance Status of the Project:

S.No.	Housing Categories	Total Points	Maximum Points	Minimum Points	Compliance Status
1	Affordable High-Rise	156	220	70	Compliant
2	Low Rise	53	87	47	Compliant
3	High Rise	82	220	100	Non Compliant

Eco-Niwas Samhita: Compliance Check Report

1. Affordable High-Rise : Compliance Result

1.1. Building Envelope:

S.No.	Component	Mandatory Requirements	Calculated value	Points Achieved	Maximum Points
1	RETV(W/m².K)	NA	14.59	44	80
2	U-Value Roof(W/m².K)	NA	0.53	6	7
3	WFRop	Achieved	32.0	NA	NA
4	VLT %	Achieved	60.0	NA	NA

1.2. Building Services:

S.No.	Component	Mandatory Requirements	Calculated value	Points Achieved	Maximum Points
1	Exterior Lighting	NA	--	3	3
2	Basement Lighting	NA	--	2	3
3	Corridor Lighting	NA	--	3	3
4	Lift	NA	--	22	22
5	Pump	NA	--	11	14
6	Diesel Generator Sets	Achieved	--	NA	NA
7	Power Factor Correction	Achieved	--	NA	NA
8	Energy Monitoring System	Achieved	--	NA	NA
9	Electric Vehicle Supply Equipment	Achieved	--	NA	NA
10	Transformer	NA	--	6	6
11	Power Distribution Loss	Achieved	--	NA	NA
12	Car Parking Basement Ventilation	Achieved	--	NA	NA

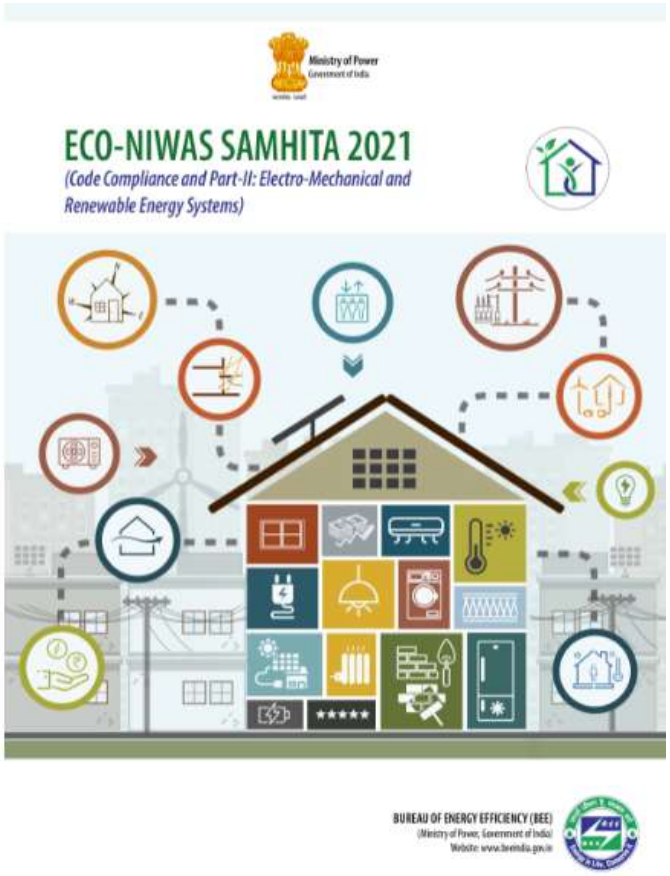
1.3. Indoor Electrical End Use:

S.No.	Component	Mandatory Requirements	Calculated value	Points Achieved	Maximum Points
1	Indoor Lighting	NA	--	12	12
2	Ceiling Fan	NA	--	7	9
3	Cooling Equipment	NA	--	28	41

1.4. Renewable Energy System:

S.No.	Component	Mandatory Requirements	Calculated value	Points Achieved	Maximum Points
1	Solar Hot Water Requirements	NA	--	7	10
2	Solar Photovoltaic System	NA	--	5	10

- *Provisions for PDF output reporting for each input and corresponding output*



ECONIWAS SAMHITA 2021

EcoNiwas Samhita Compliance Tool

Thank You

Bureau of Energy Efficiency
Ministry of Power, Government of India

Implemented by:

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Bureau of Energy Efficiency
16.07.2021