

GRIHA LD V 2015 & GRIHA V 2015



February 2016



GRIHA rating variants

SVAGRIHA

GRIHA

GRIHA LD

Built-up Area
0 – 2499 sqm

Built-up Area
=> 2500 sqm

Site Area >=
50 hectares

GRIHA LD V 2015

GRIHA LD

All projects with **total site area** greater than or equal to **50 hectares**

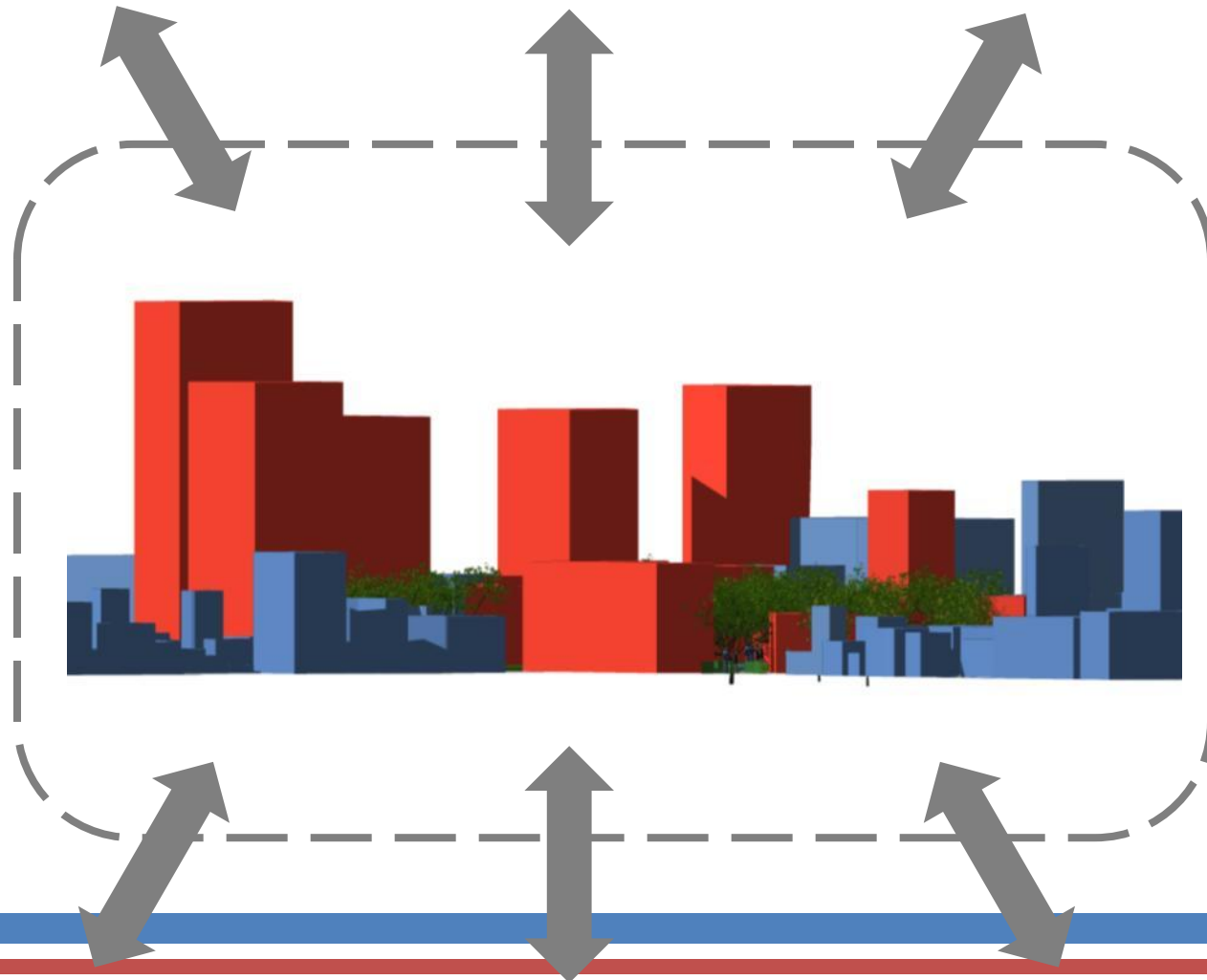
(125 acres) can be rated under GRIHA LD rating system

Benefits of GRIHA LD rating

- Branding and recognition of the environmental performance of the development
- Addresses fundamental issues around development through carbon footprint analysis, carrying capacity etc.
- Consolidated environmental performance evaluation:
 - The project team can monitor actual performance against projected targets
- It is flexible in approach:
 - Focuses on macro-level parameters
- Designed for future modifications in local regulations:
 - The rating of each phase is kept independent of the other.

Key Concept: Self Sufficiency

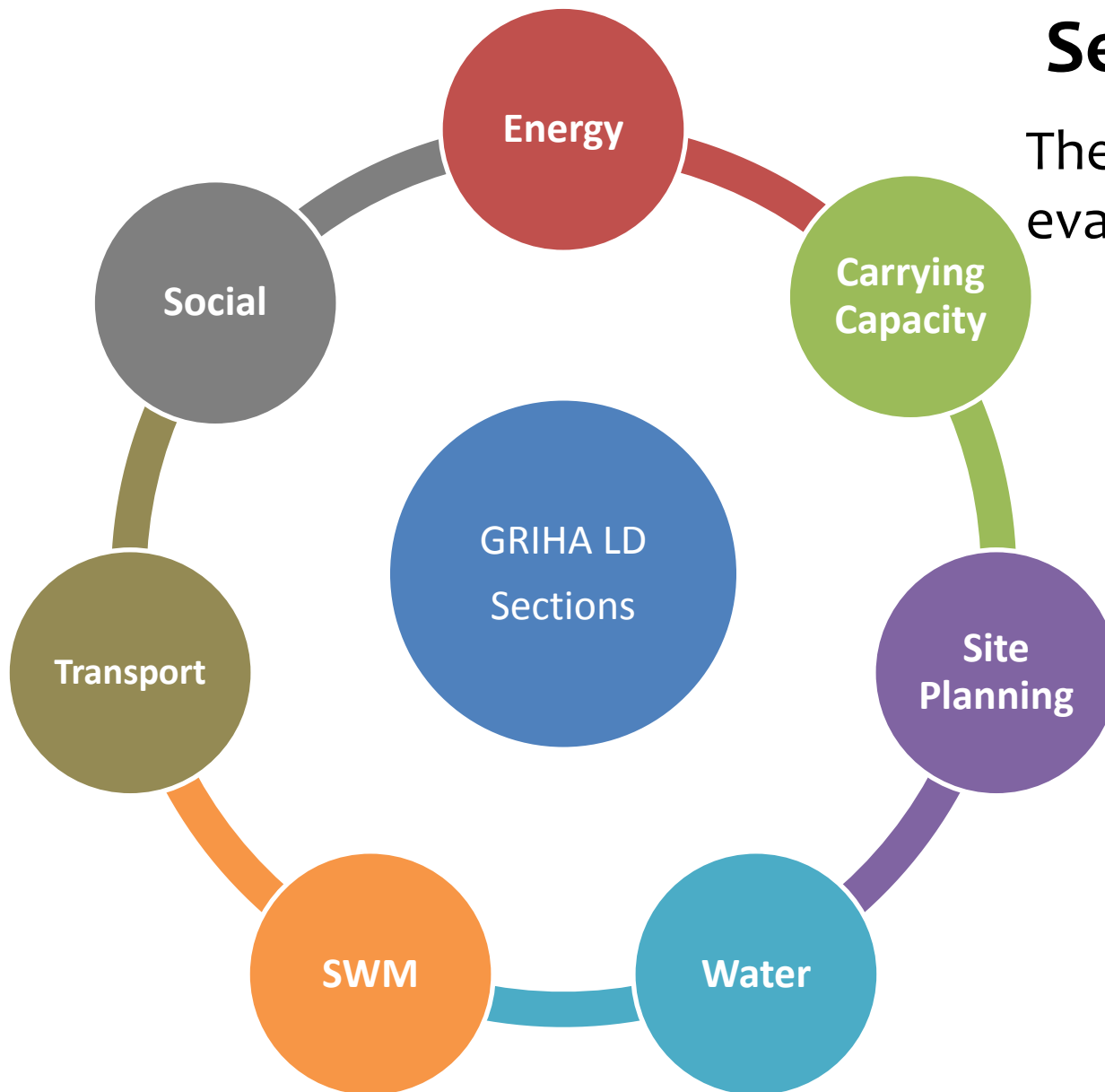
GRIHA LD lays special emphasis on concept of NET-ZERO – ENERGY, WATER and ORGANIC WASTE



Sections and Impacts

The impact in each section is evaluated in two parts:

- Self Sufficiency
- Development Quality



Overall weights

Sub-sections	Score available to each section	Overall Weights	Score out of 100
Energy self-sufficiency	100	0.18	18
Water self-sufficiency	100	0.23	23
Organic solid waste treatment	100	0.12	12
Site Planning	100	0.08	8
Energy	100	0.09	9
Water	100	0.12	12
Solid Waste Management	100	0.06	6
Transport	100	0.06	6
Social	100	0.06	6
Total		1	100

Rating Scale

Score	Rating
25 – 40	1 star
41 – 55	2 star
56 – 70	3 star
71 – 85	4 star
Above 85	5 star

The rating of the projects will be done in parts:

– **Masterplan Rating** –

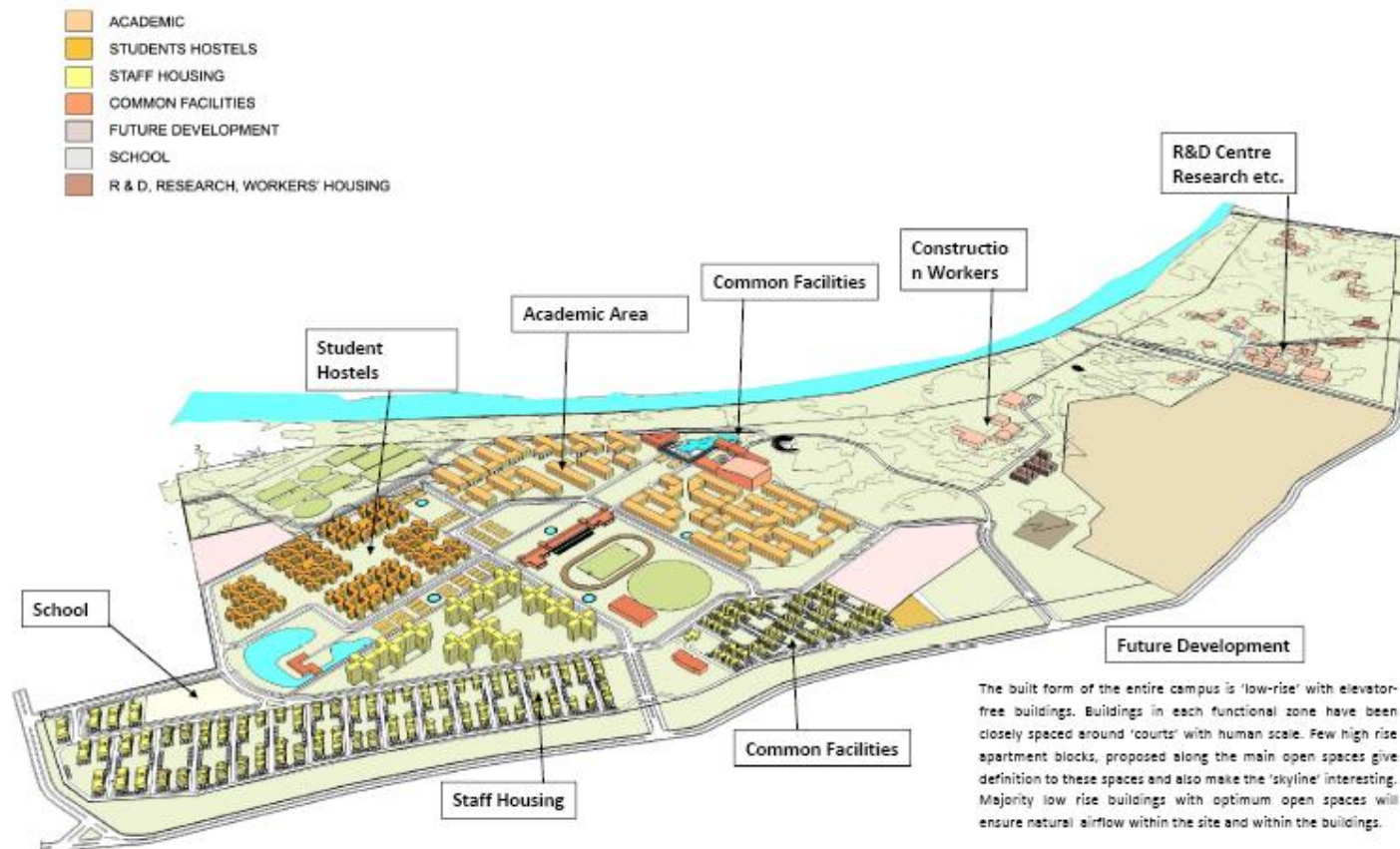
- One time overall rating for the entire proposed development

– **Rating of Each Subsequent Phase** –

- Each phase will undergo its own evaluation and rating as construction progresses

First GRIHA LD rated project

- IIT Gandhinagar – 5 star GRIHA LD Masterplan rating



Key Self-Sufficiency numbers of IIT Gandhinagar

- **Energy reduction:** 37% below GRIHA LD base case
- **Water reduction:** 30% below GRIHA LD base case
- **Organic waste reduction:** 100%
- **Renewable energy installation proposed:** 500 kWp

GRIHA V 2015

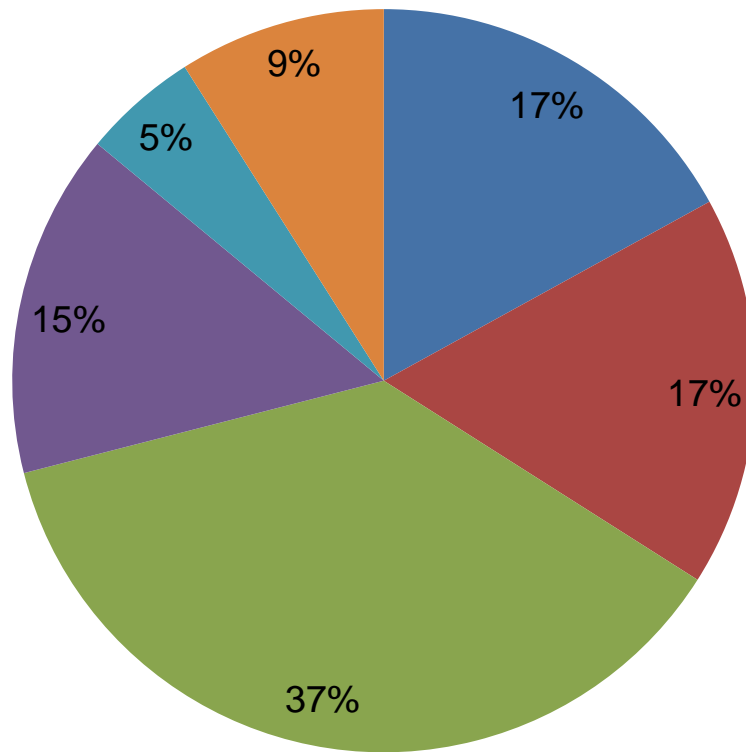
Overview of Changes in GRIHA V 2015

- Change in Rating Structure
- Revised Point Weightages

Change in Rating Structure

- The GRIHA V 2015 has 30 criteria + Innovation.
- Total points = 100 (+ 4 for innovation)

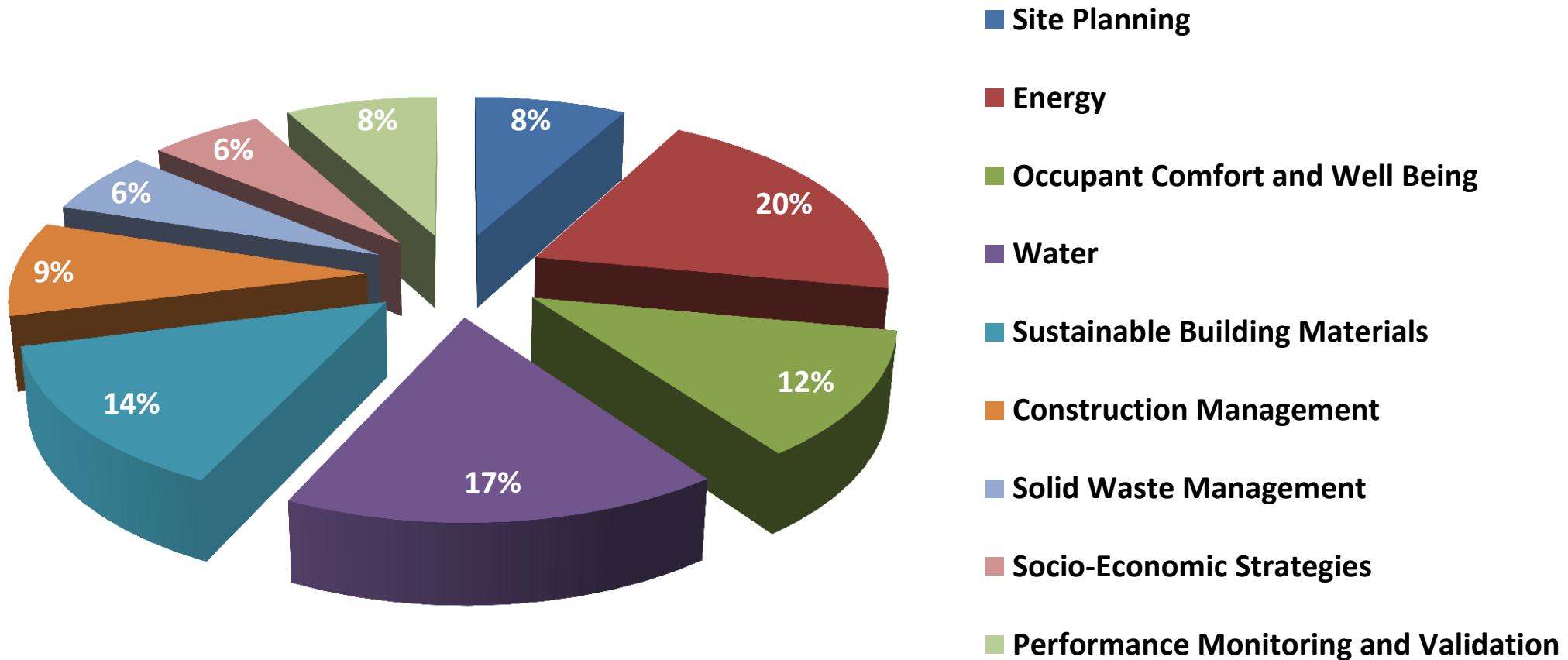
GRIHA V 3 – point weightages (previous version)



- Materials and construction technology
- Site Planning
- Energy (end use) and Renewable Energy
- Water
- Waste Management
- Health and well being

New Point Weightages

Based on AHP survey



Overview of Changes in GRIHA V 2015

- Change in Rating Structure
- Revised Point Weightages
- **Shift towards Sustainable Building Rating System**

Socio-Economic Strategies

- New criteria on Socio-Economic strategies included
- Shift from “Green” building rating system to “Sustainable” building rating system

Sections	Cr. No.	Criterion Name
Socio-Economic Strategies	24	Labour safety and sanitation
	25	Design for Universal Accessibility
	26	Dedicated facilities for service staff
	27	Increase in environmental awareness
Performance Monitoring and Validation	28	Smart metering and monitoring

Overview of Changes in GRIHA V 2015

- Change in Rating Structure
- Revised Point Weightages
- Shift towards Sustainable Building Rating System
- **No points for Mandatory Appraisals**
- **New Rating Thresholds**

New Rating Thresholds

- GRIHA V.3 had 28 points for Mandatory clauses
- In GRIHA V.3, projects could achieve GRIHA 1 star rating at 51 points

New Rating Thresholds	GRIHA Rating
25 – 40	1 star
41 – 55	2 star
56 – 70	3 star
71 – 85	4 star
86 or more	5 star

$$51 - 28 = 23$$

Overview of Changes in GRIHA V 2015

- Change in Rating Structure
- New Rating Thresholds
- Shift towards Sustainable Building Rating System
- No points for Mandatory Appraisals
- Revised Point Weightages
- **Non-Linear point distribution**

Non-Linear Point Distribution (example)

Reduction in Landscape water requirement in design case versus base case	GRIHA V 2015	GRIHA V3 (previous)
30%	1	1
40%	2	2
50%	4	3

Overview of Changes in GRIHA V 2015

- Change in Rating Structure
- New Rating Thresholds
- Shift towards Sustainable Building Rating System
- No points for Mandatory Appraisals
- Revised Point Weightages
- Non-Linear point distribution
- New Criteria

New Criteria

- Criterion 12: Maintaining good indoor air quality
- Criterion 26: Dedicated facilities for service staff
- Criterion 27: Increase in environmental awareness
- Criterion 28: Smart Metering and Monitoring

Overview of Changes in GRIHA V 2015

- Change in Rating Structure
- New Rating Thresholds
- Shift towards Sustainable Building Rating System
- No points for Mandatory Appraisals
- Revised Point Weightages
- Non-Linear point distribution
- New Criteria
- Restructured Criteria

Criterion 21: Use of low-environmental impact materials in building interiors

Appraisals:

21.1.1: Project demonstrates that at least **25% / 50% / 75%** of ***all materials*** (calculated by surface area) used for building interiors* meets the GRIHA criterion low-impact material requirements – **1 / 2 / 4 point(s)**

Following materials will be accepted as low-environmental impact:

- *Stones from the same state as the project or a neighbouring state*
- *Composite wood based products*
- ***FSC Chain of Custody certified products***
- *Manufactured products with at least 5% recycled content*
- ***Products with EPD (cradle to gate) analyzed and published as per ISO 21930***
- ***Products with water footprint (cradle to gate) analyzed and published as per ISO 14046***

* false ceilings/internal partitions/paneling/in-built furniture/flooring/internal door & window panels & frames

Criterion 5: Air and Water Pollution

Appraisals:

5.1.1: Adopt at least 3 measures (from Criterion 9 in GRIHA V.3 pollution during construction – **Mandatory**

- Provision of 3 meter high barricading around the construction area
- Wheel washing facility at the vehicular entrance of the site
- Covering of fine aggregate and excavated earth on site with plastic/geotextile sheets
- Water sprinkling on fine aggregate (sand) and excavated earth
- All diesel gensets on site to have proper chimneys with their outlet facing away from the site

5.1.2: Develop and implement a spill Part of Criterion 2 in GRIHA V.3 of spill from hazardous materials like bitumen, diesel etc.) on site – **1 point**

Overview of Changes in GRIHA V 2015

- Change in Rating Structure
- New Rating Thresholds
- Shift towards Sustainable Building Rating System
- No points for Mandatory Appraisals
- Revised Point Weightages
- Non-Linear point distribution
- New Criteria
- **Restructured Criteria**
- **Technical Revisions in the criteria**

Some Key Criteria with modifications



Site Planning

Criterion 2: Low-impact design

Maximum Points: 4

Appraisals:

2.1.1: Demonstrate reduction in environmental impact through design by adoption of various passive design and low-impact site planning strategies.

No. of strategies adopted	Points
2	1
3	2
4	4

Some

Required

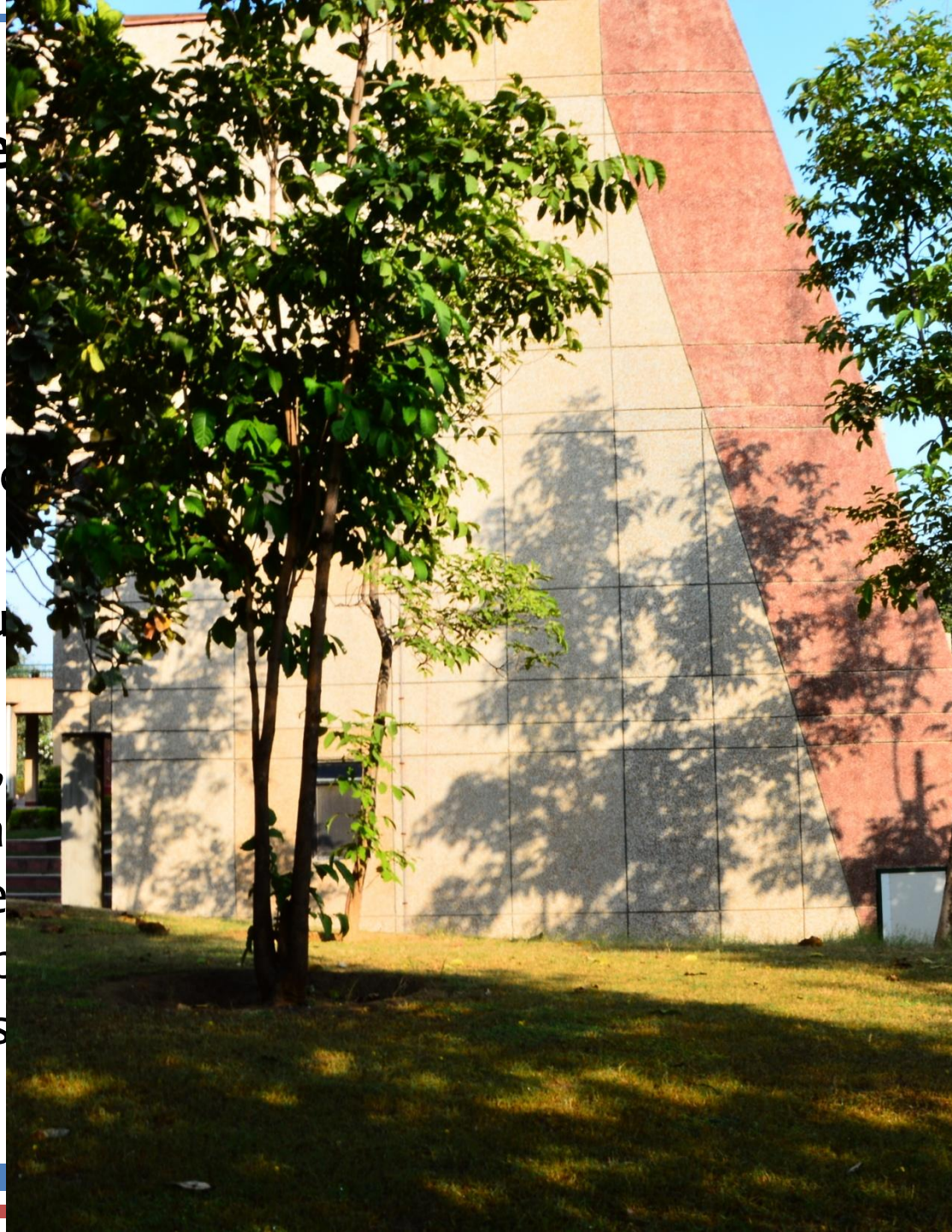
Strategy:

Use of trees to

Analysis Requ

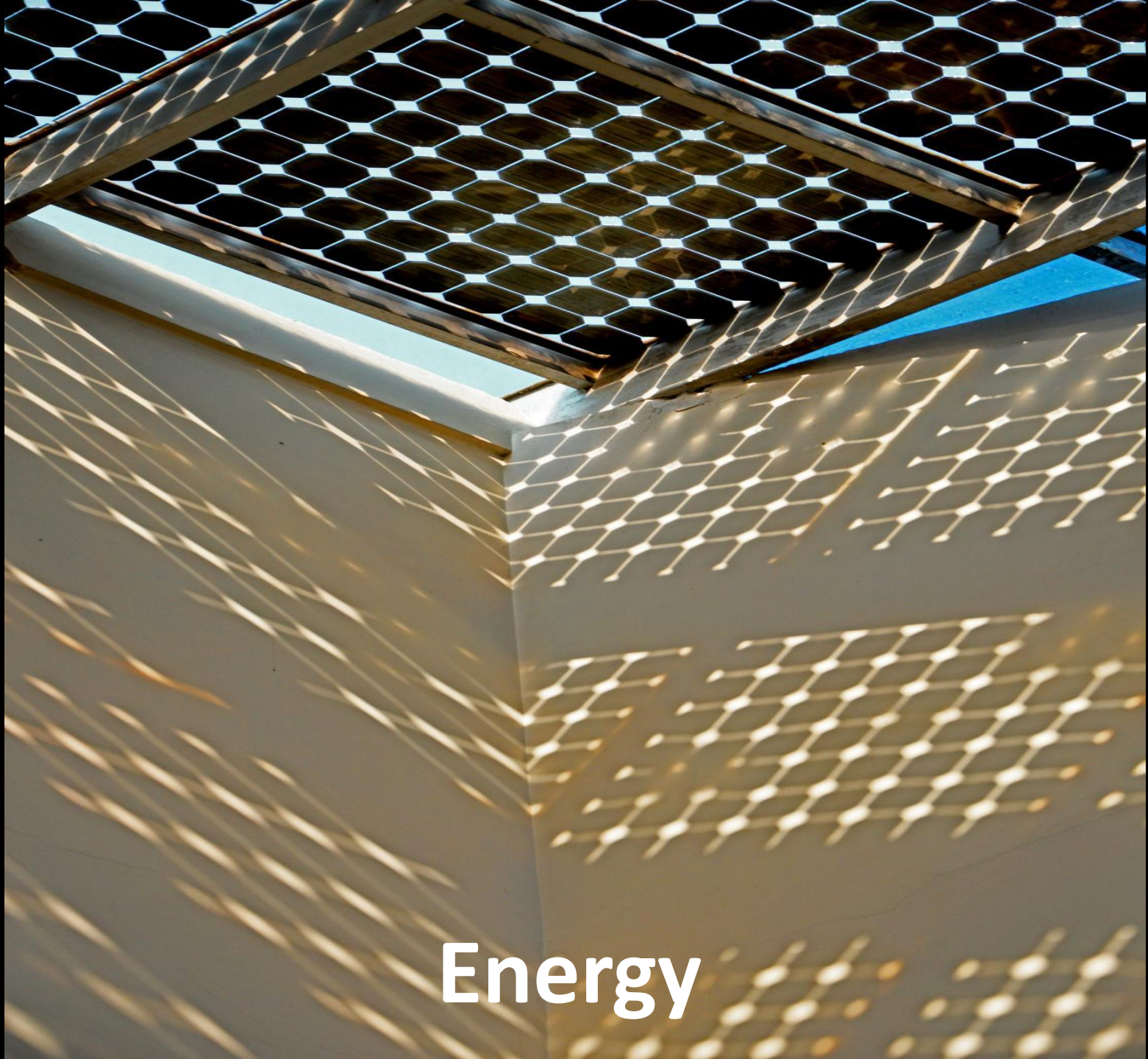
Demonstrate,
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*Various strategies and the respective analysis required are listed in the
GRIHA V 2015 Manual*



Energy

Criterion 8: Energy Efficiency

Maximum Points: 13

Appraisals:

8.1.1: Ensure that the project meets the mandatory requirements of ECBC & all fans must be BEE star rated – Mandatory

8.1.2: Total heat gain through building envelope should meet the GRIHA thresholds* – 2 points

GRIHA Thresholds for Building Envelope Peak Heat Gain Factor (W/sqm)	
Climate	Threshold
Composite/Hot & Dry	40
Warm and Humid	35
Moderate	30

8.1.3: Demonstrate that 100% of outdoor lighting lamps meet the luminous efficacy requirements of GRIHA – 1 point

All lamps must demonstrate luminous efficacy of at least 75 lumens/watt.

- 8.1.4: Demonstrate (through simulations) that project EPI is below GRIHA benchmark# - Mandatory
- 8.1.5: Additional reduction in EPI will be awarded points as mentioned below:

Reduction from EPI benchmark	Points
10%	2
20%	3
30%	5
40%	7
50%	10

Energy Performance Index Benchmarks (EPI) – (kWh/ m²/year)

Climate Classification	Day time occupancy	24 hours Occupancy
	5 Days a week	7 Days a week
Commercial/Institutional/Academic/Hospital buildings		
Moderate	75	225
Composite / Warm and humid / hot and dry	90	300
Residential buildings/Hostels		
Moderate	50	
Composite / Warm and humid / hot and dry	70	

Criterion 9: Renewable Energy Utilization

Maximum Points: 7

Appraisals:

9.1.1: **On-site/Off-site renewable energy system** installation to offset a part of the **annual energy consumption of internal artificial lighting and HVAC systems** as mentioned in the table below

Daytime Commercial Buildings	Residential Buildings	24 X 7 occupied buildings	Points
2.5% (only On-site)	-	0.5% (only On-site)	Mandatory
5%	5%	1%	1
10%	10%	3%	2
15%	15%	5%	4
20%	20%	7%	5
25%	25%	10%	7

9.1.2: Off-site renewable energy system to offset 100% building energy demand – Mandatory **+7 points**



**Occupant comfort
& Well-being**

Criterion 11: Achieving indoor comfort requirements (visual/thermal/acoustic)

Maximum Points: 6

Appraisals:

11.1.1: Demonstrate compliance with either of the two Paths to demonstrate reduction in heat gain through fenestrations and provision of sufficient daylight in indoor living areas – Partly Mandatory

Alternative 1:

- WWR \leq 60%
- SRR \leq 5%
- All fenestrations must comply with one of the following:
 - SHGC requirement of ECBC-2007/Weighted Façade average SHGC (for each orientation) meets SHGC requirements of ECBC-2007
 - Shading as per SP -41
 - Shading to ensure that the window is completely shaded for the duration between 10:00 am on 1st April to 15:00 on 30th September
- At least 25% of living area should achieve Daylight Factors as mentioned in SP 41
- More than 50%/75% of living areas meet DF as per SP 41 – 2 / 4 points

Alternative 2:

- Demonstrate that the mean DA requirements (300* lux or more) are met over the total living area for at least 25% of total annual analysis hours (annual analysis hours – 800 to 1800 each day) – Mandatory
- Demonstrate that the mean DA requirements (3000 lux or more) are never exceeded over the total living area for across the total annual analysis hours (annual analysis hours – 800 to 1800 each day) – Mandatory
- Demonstrate that the mean DA requirements (300* lux or more) are met over the total living area for at least 50%/75% of total annual analysis hours (annual analysis hours – 800 to 1800 each day) – 2/4 points

* For residential typologies, the DA limit is 100 lux

11.1.2: Artificial lighting design to fall within limits (minimum and maximum) as recommended space/task specific lighting levels as per NBC and to meet a minimum uniformity ratio of 0.4 – Mandatory

11.1.3: Demonstrate that project can achieve the thermal comfort requirements of NBC 2005 OR ASHRAE 55 OR requirement of **Indian Adaptive Comfort Model** as mentioned in Appendix 1 – Mandatory

11.1.4: The indoor noise levels should be within the acceptable limits as specified in NBC 2005 and key noise source on site (like DG sets, chiller plants etc.) should have sufficient acoustic insulation as per NBC 2005 norms - 2 points

Criterion 12: Maintaining good IAQ

Maximum Points: 4

Appraisals:

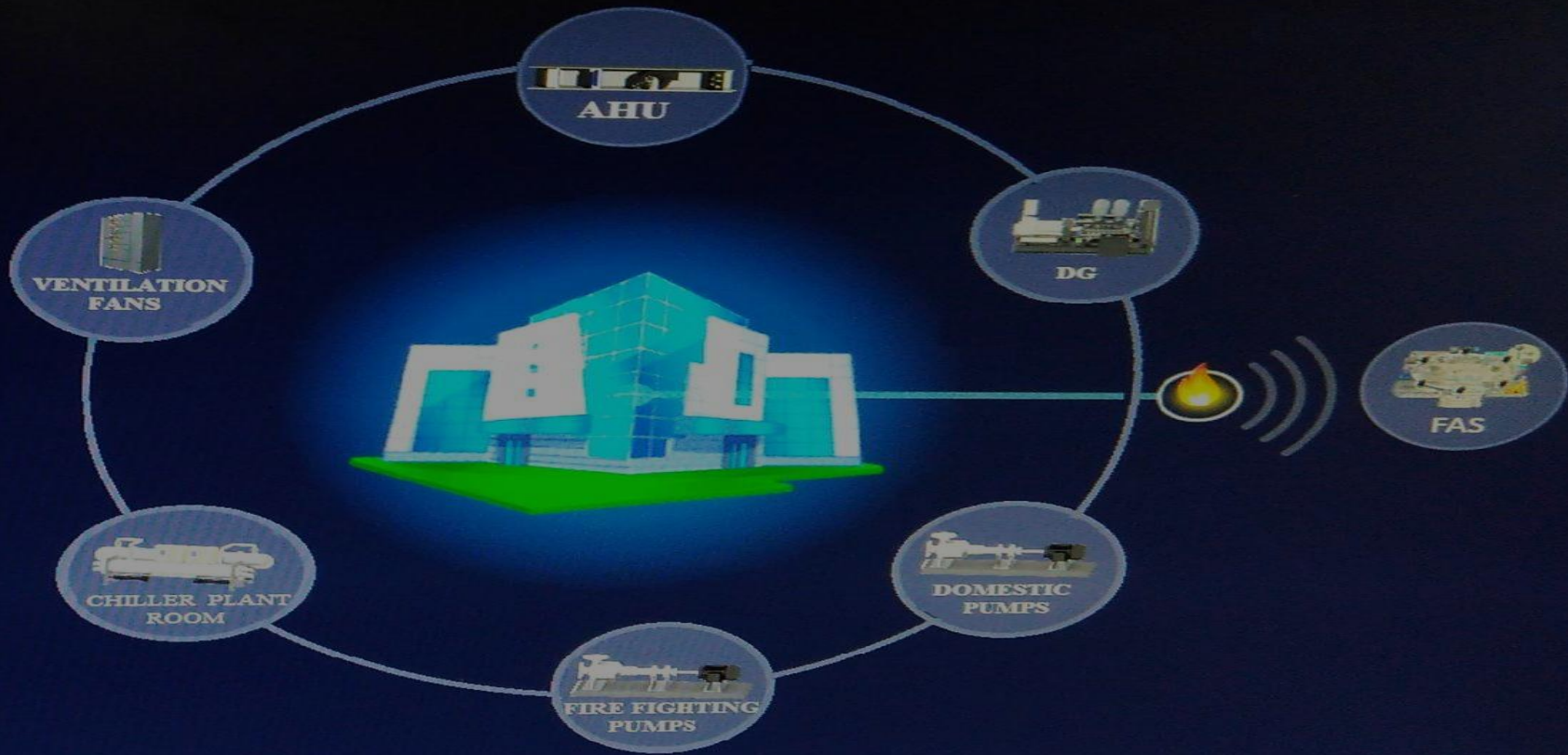
- 12.1.1: Meet the minimum requirements of
 - CPCB National Ambient Air Quality Standard (NAAQS) for quality of fresh air (for PM 10, Ozone and CO₂); and
 - ASHRAE Standard 62.1–2010, Sections 4–7, Ventilation for Acceptable Indoor Air Quality (with errata), or a NBC-2005 for quantity of fresh air – **2 points**
- 12.1.2: Monitoring the CO₂, temperature and RH at the occupied spaces or at AHUs for the air conditioned spaces – **2 points**
- **Non-applicability:** Appraisal 12.1.1 is not applicable for non-AC spaces/residential spaces with operable windows

DASHBOARD

SCHEDULE

TRENDS

ALARM



Performance Monitoring & Validation

Criterion 28: Smart metering and monitoring

Maximum Points: 8

Appraisals:

28.1.1: Comply with following Basic metering requirements of GRIHA – Mandatory

Basic Metering Requirements	
Energy	Water
<p>Ensure regular monitoring of project’s energy consumption by installing digital meters* at the following point sources at the project level for:</p> <ul style="list-style-type: none">• Utility grid• On-site renewable energy system• Diesel Genset, Gas Genset etc.• Each building level	<p>Ensure regular monitoring of project’s water consumption by installing digital meters* at the following point sources at the project level for:</p> <ul style="list-style-type: none">• Municipal Supply• Bore well• Treated water outlet from STP• Captured rainwater• Each building level

28.1.2: Comply with Extended metering requirements as mentioned in the table – **2 points**

Extended Metering Requirements	
Energy	Water
<p>Sub-meter* the following points to monitor energy consumption:</p> <ul style="list-style-type: none">• Commercial/Institutional:<ul style="list-style-type: none">• HVAC central plant- AHU, Cooling tower, Chillers (BTU meters) and/or distributed units (split/window ACs)• Lighting (Indoor and outdoor)• UPS• Residential:<ul style="list-style-type: none">• For Basement Parking Lighting, Community/Recreation center, Water pumping, Outdoor Lighting• Lifts and common areas	<p>Sub-meter* at the following points to monitor water consumption:</p> <ul style="list-style-type: none">• Irrigation• Cooling Tower• STP/WTP/ETP• Each apartment/commercial tenant

28.1.3: Installation of **one-way communicable# Smart metering* and monitoring system** capable tracking energy and water consumption through a web hosted portal and also capable of the following, for at least all meters mentioned in 28.3.1 – **3 points**

- *Hourly data reporting in near-real-time (no more than 15 minute delay)*
- *Energy mix breakdown and consumption patterns*
- *Water consumption patterns from various sources*
- *Ability to set energy & water consumption targets, alarms and pricing*
- *Ability to compare historical trends and benchmark data*
- *Real time monitoring with user interface which operates even in mobile devices*

28.1.4: Connect to **GRIHA Benchmarking platform (linked to smart metering) to allow for two way communication** on the following: – 3 points

- Monthly energy consumption (with fuel mix) and water consumption (with source split) with GRIHA IT platform
- Receive, average energy and water consumption (normalized for building typologies, location and area) for display to building occupants to assess building energy and water efficiency

- The projects' registration for GRIHA V 2015 will begin in March 2016
- The fees structure remains unchanged
- Projects can continue to register with GRIHA V 3 till June 2016

Thank You

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