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‘Sacrilizing’ Landscape’

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ABSTRACT

Alchemizing lore and developing a comprehensible understanding of context in design is an approach followed in architecture practice since time immemorial. Imagery and hope although being the fundamental drivers of divine landscape, the achievement of ecological and contextual responses in design is explored through studio work with students and in a competition project. This paper aims to decipher and use the learning from the philosophies of mythology of sacred landscapes for an architectural design to achieve sustainability goals. The design is inspired and inherited from mythology worked through its program, architectural elements, imagery and sensory experiences. The process of *‘lore through learning’* demonstrated by the reimagining of sacred landscapes and mythology in contemporary design and then the learning is taught in studio work. The purpose to be achieved is to embody traditional philosophies in the practices of contemporary design developments.

Keywords: Sacred landscapes, Sustainability, Water sensitive design, Mythology, Imagery, Landscapes.

1. PAINTING A PICTURE

The stories passed down to us from our families and in ancient texts are represented in the art, sculpture, literature and theatre practices of our ancient nation. Whether, it is the golden city or ‘*sonar lanka’* of Ramayana or the gateway to heaven or ‘*devbhumi dwarka*’ of Lord Krishna these imageries are embedded in our collective consciousness. This vivid tapestry is often built on sacred geometry as a visual language that architects employ to convey form and function as well as the relationship between man and the universe.

“A traditional belief system of reverence for landscape features, referred to as sacred geography in popular literature, is common to most cultures in the Indian subcontinent. Recent writing in environmental ethics suggests that the notion of sacred geography or reverence for nature could possibly create a context for conservation.”[1] This expression of sacred landscapes could well be interpreted as an ecological response. Baindur believes that the sacralization even reverence of ecology in our mythology is an indication of environmental conservation.

This study focuses on the reinterpretation of the phenomenon of ‘lore to learning’ by aggregating effects of landscape and design to influence social, aesthetic and environmental qualities of a proposed development. It also investigates sustainability and conservation in conjuncture to the cultural significance of sacrilizing landscape and design.

In Indian lore certain objects, plants, animals and features are regarded as sacred. The recent popularity of ‘*vastu shastra’* in designing with the best possible configuration of geography, context, sunlight and heat, wind directions and water conservation are aligned with contemporary design approaches. There is however a need to re-establish a sacred essence to make sustainability culturally relevance. The continued association of identity and place can be achieved by revisiting these stories in program, architectural elements, imagery and sensory experiences.

1.1. Meta-Physical Spatial Interpretation

The Indian subcontinent has seen its habitats, cities, water bodies and even forests and mountains as the manifestation of metaphysical spaces. Just as property is ancestrally transferred so are culturally relevant associations with places. As a result generations have cultivated a protective attachment to many places and monuments that are deemed sacred. The belief that cosmology can be imbued into geometry bringing in prosperity and other divine energies, or at the least peace and harmony is a lasting association. Thus the

untapped potential of cosmic geometry, the creation of myths and legends and the associations in the minds of the natives is ripe for spatial interpretation.

In their chapter on *Faith and Place*, authors Singh and Rana rationalize that sacred landscapes coalesce both the absoluteness and the relativeness of places. A sense of identity, belonging as well as a place in the divine cosmic order is communicated through reproduction of rituals. Further elaborating "from the local scale, and here we may first experience the sacred message through the spirit of place, its *genus loci*, and the power of place: place speaks, place communicates."[2]

1.2. Relevance, Resilience and Response

Sacrilizing spaces are relevant through history as can be treated as an ancient ecological response. Often revered rivers and trees are left undamaged even as human settlements have increasingly put pressure on resources and land. However, simply transferring a story or a form would not impart a migration of the associations of the lore, and hence won't contribute to the ecological conservation. Baindur adds "the impact would be an emphasis and a reawakening of the ethical discourse of restraint that has to run parallel to the sacred stories of the land. [1]

The perseverance of the human-nature relationship is interdependent on the resilience of the design, built structure and landscape and the ecological ethics attached to it. Baindur notes "idea of sacred geography can be relevant to ecological ethics."[1]

2. SACRED SCAPE : A PROJECT REVIEW

In late 2020 Government of Telangana set up an international competition to design the Urban Centre of Excellence (UCE) in a sprawling 45 acres campus on the outskirts of Hyderabad. The design brief had an emphasis on sustainability with a requirement of 20 acres of open/green space. [3]

My approach, to the project was steeped in the 'lore to learning' and as the team at Map Architects attempted to invoke a sacred scape, we found the story of the *Samudra Manthan* very relevant. The lore goes such, Manthan, or the churning of the ocean, was done to extract the divine gifts from the Primodial Ocean and shared amongst the *Devas* and the *Danavas* who took part in a tug of war contest to attain immortality. If one were to look at the *Manthan* from spiritual perspective, then refers to the process of introspection and realization and balance and the shared benefits of resources. As such all the gifts attained from the original *Manthan* are revered and sacred.

2.1. Sacred Scape Concept: *Manthan* [5]

The concept of *Manthan*, or the re-intepretation of the act of churning that endows the world with ratnas/ value and *amrit/* longevity is an ideal representation of the functions of the Telangana State Centre of Excellence. The symbolism of sacredscape is placed on the idea of modern day excellence captured in the treasures of knowledge and merit inspired by design and sustainability strategies.

The goal at the onset was to embody in design of shared knowledge, innovation and sustainability. By using the planning strategies for net zero energy and water; this campus will endorse the churning of energy and resource to be an endeavour for value –creation in contemporary built environment. As it was in the mythology of the '*ratnas*' can be re-interpreted as sustainable usage of resources, innovation and renewable power.

The various social, economic and cultural '*ratnas*' that gets churned out of this campus is derived from its net zero/ liveability/wellness strategies. It is represented in its landscape and natural terrain usage, zoning and connectivity ideals along with building design and operations.

2.2. Interpretation of the lore

This mythology which is discussed in the three scriptures- *Vishnu Purana*, *Bhagavad Purana* and the *Mahabharata* is also a metaphor for churning of the milk for the separation of butter/ larger returns. The story that is painted is of *Mount Mandar* being used as the churning rod and *Vasuki*, the cosmic snake used as the rope would yield a number of valuables.

Further the world turtle *Kurma*, which supports all the worlds on his back is the base for the cosmic churning. The story that unfolds is thus of a dynamic celestial dance between forces of nature than can be converted to gifts from the planet and creation itself for the benefit of all mankind.

Fig.1.: Cosmic Polar array Ref: Artist Nita Kembhavi, Samudra *Manthan* Series ©, 2019 [6]

2.3. Sacrilizing the Design with Sacred geometry

The sacred geometry of the golden ratio is explored to represent the act of *Manthan* of the various programs and functions. It is incorporated in the polar grid that

houses all formal functions amidsts its development in plan and form, and finally in its kinetic elements like the wind turbine that generates its own ***amrit* – windpower**. In theme with excellence the design uses sacred geometry as a tool to the development of a structure that is perfect like the golden ratio in almost every sense. ***Manthan*** represented in site plan, massing, green-blue program and build up areas.(brown)

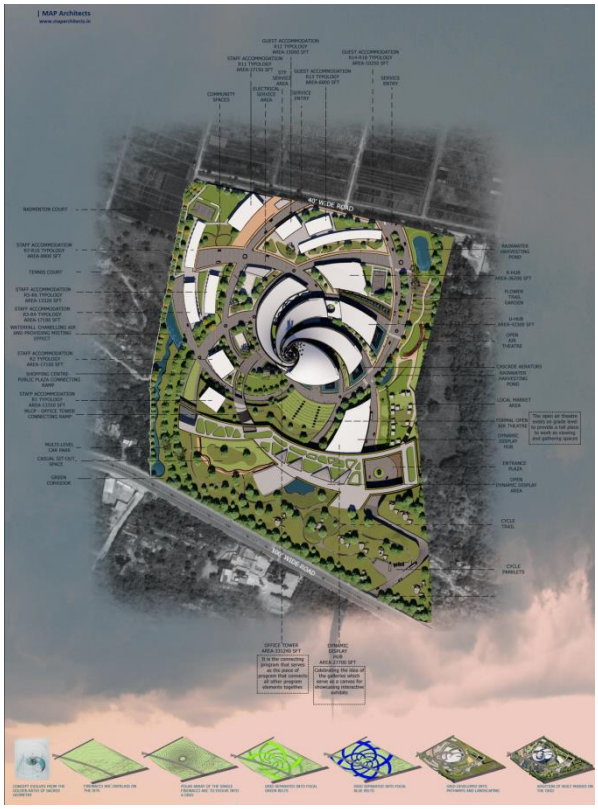

Fig.2.: Site plan with areas By Author/ map architects

2.4. Sacrilizing the ideals of Sustainability

In the modern age the *ratnas'* from *Manthan* can easily be substituted with the goals for sustainability. Incorporating strategies for reducing carbon emissions with the use of alternative power generation namely wind energy and solar power. Also the concept of net zero water building is designed to: minimize total water consumption, maximize alternative water sources and minimize wastewater discharge from the building and return water to the original water source.

Here is an analogous interpretation of *ratnas'* that is interpreted in a modern day avatar in the project.

Table 1. Ratna vs *Manthan* interpretation by Author

Ratna	Meaning	Interpretation
Chandra	moon	power saving illumination in design strategy
Parijata	Tree positive energy	ground cover preservation and strategies
Airavata	King of elephant/ water renewal	Micro-climate initiatives in arid conditions
Kamadhenu	Divine Cow/ mother earth	Soil erosion mitigation
Kalpavriksha	Wish fulfilling tree	Use of renewable resources/ replenishment
Uccaihshravas	king of the horses/ power	produce renewable power
Goddess Lakshmi	Prosperity/ earth resources	Creation of economic prosperity
Panchajanya	**divine conch wind/ sound of creation**	**The conversion of wind energy to power**
Kausthubha and Chintamani	clear gem to convert anything to gold	Transparency , clarity of purpose, idea incubation
Dhanvantari	healer	Vastu shastra, wellness design
Amrita	nectar of immortality	Resilience and design durability

2.5. Sacrilizing the Landscape

The design and function opportunities in the transitional spaces are interpreted as a rising three dimensional polar grid.

Fig.2a. Site massing as a 3d polar grid By Author/ map architects

The site planning takes into account its topography is a unique opportunity to collect rainwater water and reuse it. The massing of the fingers narrows as it grows in height to capture the Westerly wind flow to generate power and residential low rise buildings utilize the southern and western sun for solar generation.

Fig.2b: Site massing as a 3d polar grid By Author/ map architects

Public spaces accommodate a diversity of activities, and provide interest and amenity for people. A hierarchy of land-use spaces and formal and informal spaces generates activity and function. Nature-based solutions can address urban challenges exacerbated by impacts of climate change.

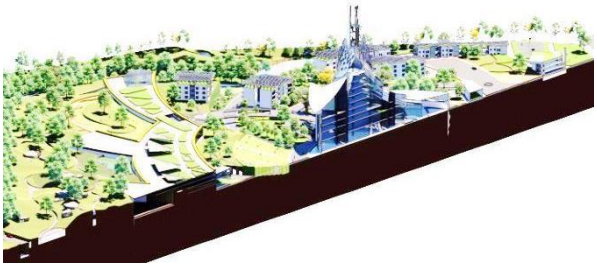

Fig.2c: User engagement with the topography By Author/ map architects

The topography of the site is uniquely developed to follow the natural slope of the site and encompass functions within it at minimal cut-fill. While the multi-level car park (MLCP) has kiosks and bazaar space along with a concert space above it, these large gathering spaces engage with the community and the landscape in a respectful manner.

Encouraging wellness activities along the stepped gardens and cycling tracks create an opportunity to experience the natural site.

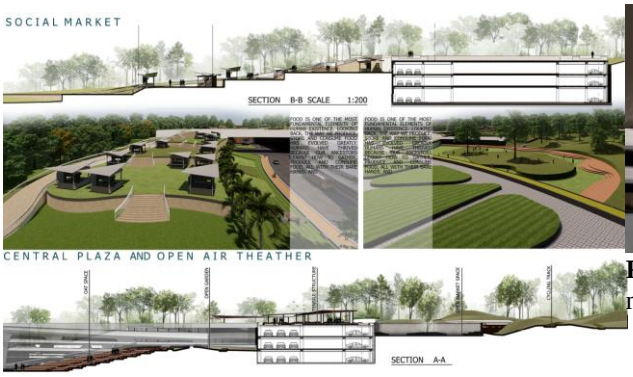

Fig.2d: Steeped garden spaces By Author/ map architects

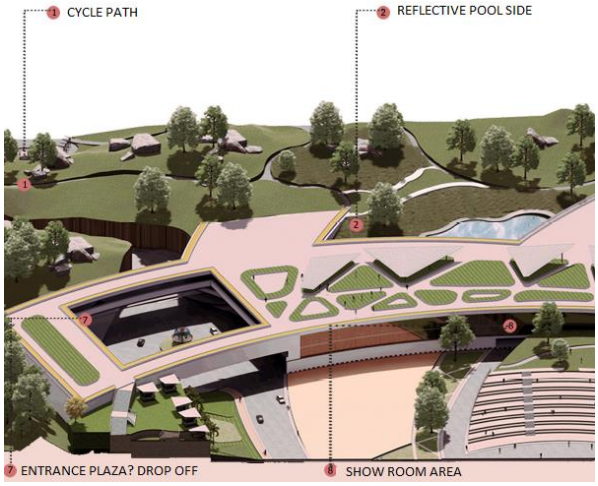

Fig.2e: User engagement with the topography By Author/ map architects

The southern portion of the site with the rocky outcrop is left with minimal development and is programmed as a public innovation park accessed through walks and bike riding. The walking path overlook into the OAT areas.

Fig.2f. Open Air theatre (OAT) spaces By Author/ map architects

Right from the entrance one feels connected to the *Manthan* building. The Entrance Plaza / Drop-Off is a formal porch drop off entrance lobby attached to the MLCP

Fig.2g: The Entrance Plaza / Drop-Off by Author/ map architects

The topographic extension tucks away an atrium and showroom as well as retail spaces with a direct visual connect with the sacred geometrical landscape and build form**.**

Fig.2h: Showroom visually arresting users to the sacred geometry By Author/ map architects

Fig.2i: Atrium in the MLCP has a play of light shadow and natural rock formation on one side as part of the architecture. By Author/ map architects

The **covered Pavilion** cum stage and theatre have tensile structures and these l**arge roof top lawn spaces will be used for educational purposes** showcasing sustainable and native plants. Taking advantage of the highest point on the site the western edge is a thick natural tree belt to maximize shading and comfort from the afternoon sun. Along with an artificial waterfall that serves as a unique water management device that uses moving water to create a misting effect for thermal cooling for the whole southern and western face of the whole site

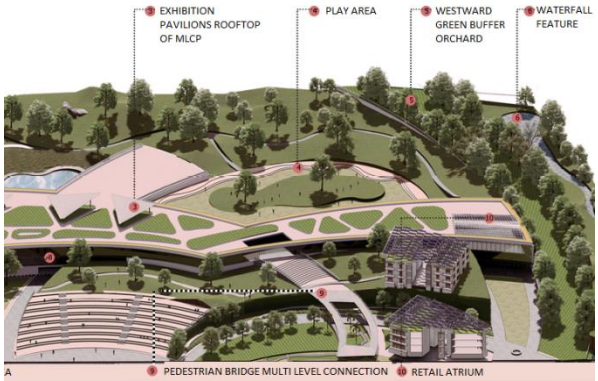

Fig2j: landscape features and multiple functions like concerts, exhibition, roller rink, innovation plaza By Author/ map architects

Fig2k: Pedestrian bridge connecting to the tower from the MLCP above the driveway is this curved pedestrian bridge. Visually it also integrates the residences and the campus. By Author/ map architects

2.5. Sacrilizing the program

Landscaping provides excellent means to create pocket of programs in its parks, roof gardens, etc. The crisis of space can be easily dealt with by creating a cost-effective and sustainable development of active and natural landforms.

The campus is guided by its formal and informal landscaped areas that are programmed to be active at various times of the day based upon daylight comfort. Walking and active spaces are contrasted with contemplation and lounge spaces along with community spaces like playgrounds and bonfire yards

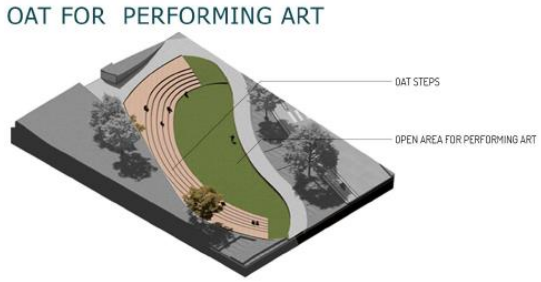

Fig.3a: User engagement with the institute and Campus

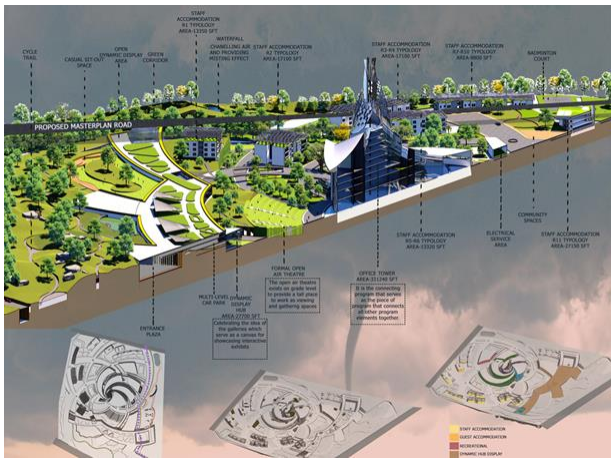

Fig.3b: Site Section with circulation core placement By Author/ map architects

The program was developed around the fingers of built mass with buffers of green and water bodies. Primarily it was divided into the institute, residential units and guest areas.

Table 2 Project Details by Author

Site	**Value**	
Location:	Hyderabad, Telangana State	Geographic 17.452 N
No of Floors	9	No of Stilts 1 No of Basements 1
Building Height	Building Height – 45m	Turbine Height 20-25
Area		
Gradient		Site profile
Total Occupancy 6850 including visitors		
Manthan Tower	6227 /w visitors	as per the input and NBC -16
Residential buildings	322 w/ visitors	”
Guest accommodation	300 /w visitors	”

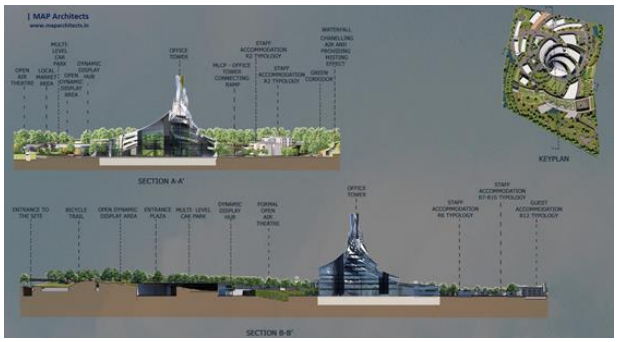

Fig.3c: Programme distribution By Author/ map architects

The program development endeavors to churn out innovation and knowledge sharing through its integrative program approach. Sacredscape design has a significant effect in ordering the program to provide a conducive, productive living environment.

3. SACRED SUSTAINABILITY

At an altitude of545 Meters above mean sea level, the site has a daily temperature of 14° F. The design weather data for Summer is 0.4 % and winter is - corresponding 99.6 % annual cumulative frequency of occurrence.

The process of attaining sustainable goals from best practices and design guidelines and then converting the resultant savings and benefits into ecological ethics is enumerated below.

Table 3 Project energy goals by Author

	Value	**Guides**
EPI of the entire *Manthan* building	140-160 kWh/Sq.mts. /Annum	ASHRAE Standards 90.1 – Energy standards of building
HVAC Overall Plant Efficiency	0.6 kW/Ton	ASHRAE Standards 62.1 – & 62.2 ventilation for indoor air quality
Light Power Density	0.55 watts/ sq.ft	IGBC Rating Standard

Smart AHUs	0.026 kw/ton	ASHRAE Design Guide
Façade maximum allowable heat gain	1 watts/ st.ft	National Building Code 2016

Design Standards

- Energy Conservation Building Code – Mandate in Telangana State
- NFPA standards
- UL/FM approved Products
- Indian standards (IS)
- Local fire authorities
- CPHEEO (Central public health and environmental engineering organization guidelines water supply, drainage and solid waste management guidelines).
- UPC - Uniform Plumbing Codes and Manuals
- Indian Standard (IS)
- SP- 35 Manual
- Telangana Electrical Code
- Indian electricity rules (1956) amended
- National electrical code – 2011
- IGBC Rating Standard

3.1. Designing the *Manthan* Institute building

The institute building is envisioned as a kinetic building that exists as a machine. It houses within itself a double helix wind turbine that generates power.

Much like the lore this building churns out sustainable gifts by its form and function. The fingers of the building progressively narrow towards the center creating a wind tunnel and horizontal design fins direct the wind to this cosmic churner.

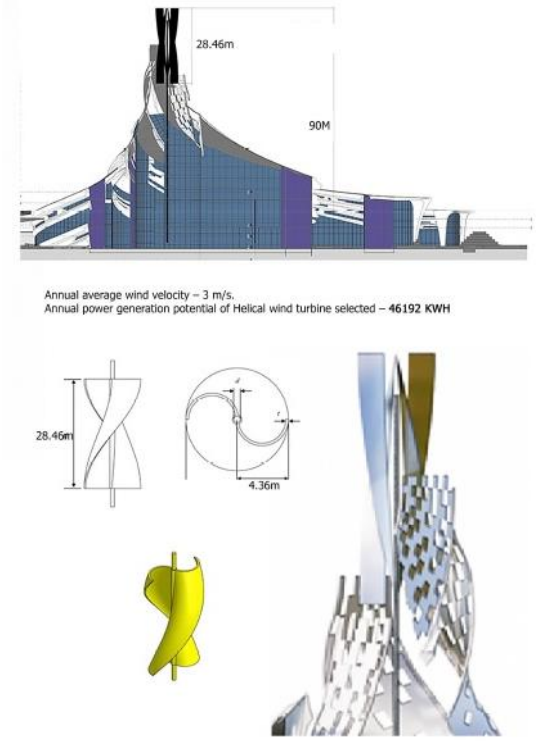

Fig.3d. Churning *manthan* double helix wind turbine

Site and wind direction analysis further informs the heights of the various fingers and the in-between spaces are developed as horizontal wind directional elements.The form merges with the double helix turbine flawlessly to create a composite building with a slowly moving/ churning top half.

Fig.3.e Doubly curved surfaces draw the wind in

The tower stacks hierarchically to loop around the summits to finally embrace the wind turbine above.

Fig.3.f Landscape development with the polar array

The landscaped spaces are multi-functional, cost-effective and provide a wide range of benefits, from improving public health to reducing energy costs and pollution to regenerating urban spaces. The building is set on the polar arrayed- arc of the golden ratio and is also tied to the site development based on the same grid.

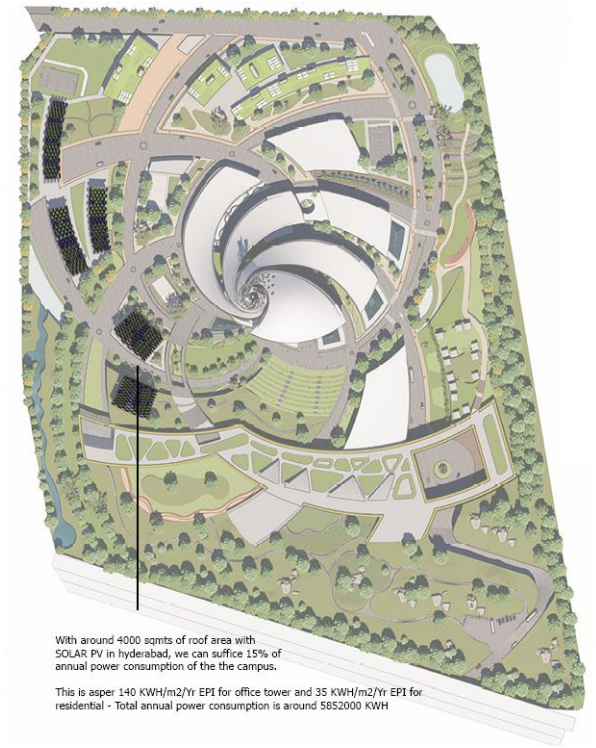

Fig.3.g Site development with the polar array

3.2. Designing the Climatic response

The Aim is maintaining a healthy balance in our surroundings including air quality, ecology, and natural resources utilization.

Fig.3.h : Aerators And Mist Cooling used in peak summers to reduce outdoor temperatures on façade reducing HVAC loads.

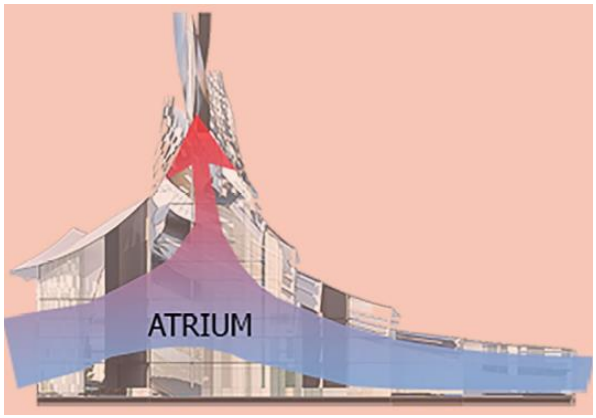

Fig.3.i Atrium used to create pressure and wind movement

From the weather analysis above annual 100% thermal comfort can be attained with concepts listed below other than air-conditioning:

- ATRIUM MIST COOLING in peak summers to reduce the indoor ambient temperatures as an alternate to HVAC.
- For residential facades towards shaded balcony and terraces, Similar clay jalis or porous pots filled with water (by gravity) no pump and no wastage of water.
- SOLAR CHIMMNEYS can be integrated on opposite or diagonally opposite sides of spaces with porous pots for cross ventilation and better air changes to avoid humidity build-up and stuffiness.

3.4 Working with the climatic response

Weather data analysis of variation between Dry bulb and Wet bulb temperatures in summer months shows clear potential of two stage evaporative cooling (sensible + Latent) for spaces during March to May
The wind is most often from the *south* for *3.1 months*, from February to May with a peak percentage of 54% on April 15. From October 10 to February 10, with a peak percentage of 61% on January 1.

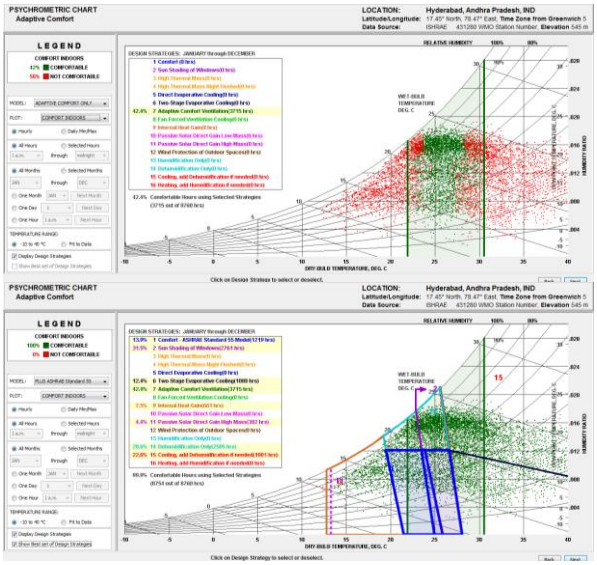

Fig.3.j Pschychometric Chart Adaptive comfort analysis

Annually 42% of time occupants will be comfortable by adaptive comfort of CLO value 0.5, Air velocity improved with ceiling fans (<=1 m/s air velocity indoors) and sedentary activity level.
The design analysis for buildings compliant with ECBC 2017.

3.5. Electrical design proposal for sustainability

Design Electrical load is calculated to be 4 t0 4.5 watts per sqft. The lighting power density less than 0.5 watts per sqft as per IGBC requirement. The electrical design is thus very sustainable and uses renewable energy efficiently.

Fig.3.k Onsite roof top solar PV system

To further make the design sustainable artificial lighting shall be used with occupancy sensors. There is also provision for 100% backup power for DG sets placed in the Ground level. (2nos 1000kVA + 2nos 630 kVA) that adds to the wellness factor of the project. Fulfilling the IGBT based uninterrupted power supply PS is envisaged for ELV system (CCTV & Access Control security, car parking management and visitor management).

Hybrid system of harmonic filter and capacitor bank for improvement of power factor by10 % is envisaged. The common area lighting is proposed to cater to emergency lighting requirement as per NBC 2016 with 90 min Backup. Earthing as per IS 3042 and lightning protection System as per NCB2016 / IEC 62305 is also proposed to make the system efficient. The colour & temperature of light fitting will be as per IGBC rating.

The onsite roof top solar PV system is additionally designed beyond IGBC requirement with the total generation of 400-450kW (15-20% of the total demand)

3.3 System Philosophy & Water distribution Scheme

Manthan is operating at net zero water, collect annual water use data for each water flow:

- Potable water use
- Non-potable water use (from freshwater sources)
- Alternative water use
- Wastewater treated on-site and returned to original water source
- Stormwater infiltrated to the original water source through green infrastructure.
- Sum all freshwater use and alternative water use to calculate the building's total annual water use

Proposed to have Three sets of WTP each for Residential use, Guest and Dormitory & third one is for the *Manthan* tower along with miscellaneous blocks.

Bio-hybrid ; eco-STP with territory treatment as natural process is proposed. Quality of STP treated water to be 8-10cycles of HVAC demand. Sewage system is designed to be a double stack system consists of a separate line for soil pipe (Black water from water closet and urinals. Another separate line for waste pipe (Grey water from wash basin, FT etc)
Waste water from kitchen /breakout space are taken in separate lines to grease separator and then connect to STP. This rigorous accounting of water usage feeds back into the system. The estimated waste water generated from the entire campus is around 330KLD. The project hopes to be able to recycle most of the water on site back into its system.

Storm Water Management

The rain water harvesting system is designed is based on the metrological data obtained from Indian Metrological department. The rain water harvesting has been designed with the intensity of rain fall is 100mm/hr for 30min of duration. Rain water harvesting system for the Roof of all buildings and surface water run- off would be discharged to the proposed artificial recharge pond and same can be
re used for landscape purpose – Estimated capacity of the recharge pond is **2495cum**. This rain water harvesting system consists of catch basins connected to the RCC box drains of suitable size designed based on the run-off quantity and to collect the requisite water to the recharge pond located at the lowest gradient. Hence

ZERO rain water discharge from the campus is envisaged.

Table 4 Project RWH area by Author

Considered Areas for Rain water harvesting	
Description	**Area in Sq.mtr**
Total Terrace area	10600
Garden area [Unpaved]	34851
Other Hardscape & Driveway	16022
Total Area	**61473**

4. METHODOLOGY

With its layered requirements of research on urban systems, capability development and showcasing of future tech and its socio-cultural aspects of exhibition and knowledge exchange; this campus is envisaged as the next level user and visitor experience space with information, participation and connectivity of the whole campus its functions and its sustainability indexes on ready time dashboards and mobile devises.

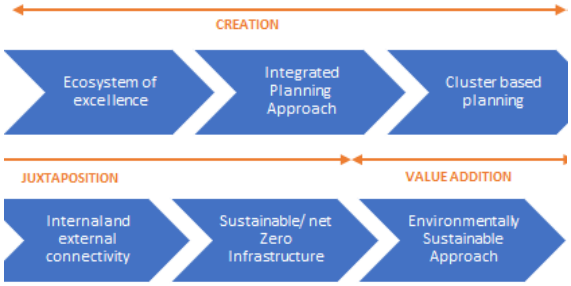

Fig 2: Design stages by Author

5. RESULTS AND DISCUSSION

This campus **minimizes energy use** and **generates renewable energy** for its annual source energy consumption and works on the principle of Zero discharge from site. The optimal mix of renewable energy of both wind and solar technologies for this **net zero concept** campus along with building technology incorporating sustainable ideals at conception makes this a Campus that truly beholds the values of the institute.

The design of the energy saving system has, 40% overall energy savings, high quality indoor air quality and cooling as well as cooling plat efficiency

6. CONCLUSION

The form is developed hierarchically to loop around summit to galleries and the wind turbine above. The building is set on the polar arrayed- arc of the golden ratio and is also tied to the site development based on the same grid.

Site and shadow analysis further informs the heights of the various fingers while the in-between spaces are developed as terraced comfort gardens.

Along with urban agriculture and indigenous planting the landscape takes into account the principles of landscape design include the elements of unity, scale, balance, simplicity, variety, emphasis, and sequence as they apply to line, form, texture, and color.

This is to achieve the goal of helping communities create sustainable and resilient agricultural practices, maintain ecosystems, and strengthen the capacity to respond to climate change: decarbonization, electrification, efficiency and digitalization

7. REFERENCES

[1] M. Baindur, "Nature as Non-terrestrial: Sacred Natural Landscapes and Place in Indian Vedic and Purāṇic Thought "; *Environmental Philosophy*, vol. 6, Jan 2009. pp. 43–58 Website: [accessed 4/29/2023] https://www.researchgate.net/publication/279475512

[2] Rana P.B. Singh. and P.S.Rana, "Faith and Place: Hindu Sacred Landscapes of India"; Timothy Edensor, Uma Kothari and Ares Kalandides (eds.) *The Routledge Handbook of Place*. London: Routledge, ca. pp. 75-87, DOI:10.4324/9780429453267 May 2020. : [accessed 4/29/2023]

[3] National institute of Urban Management, "RFP for setting us Urban Centre of Excellence, Hyderabad, Telangana"; Website: [accessed 8/21/2020] https://nium.org.in/rfpurban/

[4] Rana P.B. Singh . "Indian Cultural Landscape vis-à-vis Ecological Cosmology: A Vision for the 21st Century."Annals: *National Association of Geographers of India*, NAGI (ISSN: 0970-972X, NAGI) New Delhi, vol. 33 (2), December 2013: pp. 36-62.

[5] Map Architects, TSUCE Competition Submission; Map Architects Project Archives. Jan 2021 Website: [accessed 4/29/2023] https://maparchitects.in/project/tsuce/

[6] Nita Kembhavi,"Cosmic Polar array"; SAMUDRA MANTHAN Series ©, 2019 Website: [accessed 4/29/2023] https://www.nitakembhavi.com/samudramanthan/