Institute of Rural Research and Development

Plot No.34, Sector 44, Institutional Area, Gurgaon, INDIA

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Architect: Ashok B Lall

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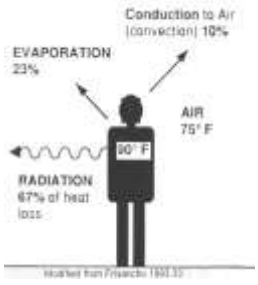

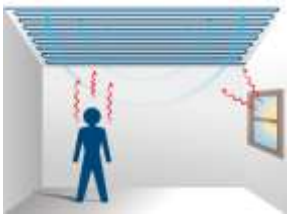

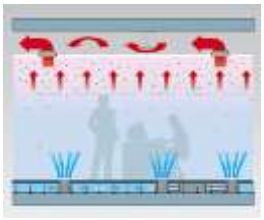

Radiant Cooling
(Sensible Cooling Load)

Ceiling Fans
(Air Movement)

Cool air circulation
(Fresh Air + Latent Load)

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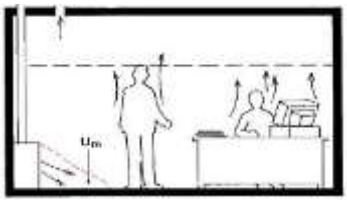
Cool Air Supply from bottom



Displacement Ventilation

Return Air from top

Controls for Radiant Cooling

Radiant Cooling Pipes

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DESIGN FEATURES

- Use of Energy simulations while sizing HVAC Systems
- Chilled water pipes inside all floor slabs
- Supply of air at bottom and return from top
- Variable air volume system
- Heat recovery

OPERATIONAL BENEFITS

- Operational cost 50% lower
- Chiller operates once in two days
- Payback 1.5 years
- Equal cooling in all areas – no hot pockets

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Nalanda University, **Bihar**

dbHMS VĀSTU SHILPĀ CONSULTANTS Nalanda

NET-ZERO

Dream or Necessity?

- Project on completion will consume
  - Water - 82.7 Crore Litres/Yr equivalent to water for 6000 People
  - Electricity - 161 Lakh Units of electricity equivalent to 21,000 People
  - Waste Generation - 8000 Kg of waste/day
- Current Situation in Bihar
  - Water - Only Ground Water Source available
  - Electricity - Bihar is energy deficient
  - Sewage Treatment - Not available
  - Waste Treatment - Goes to landfilling
- What Net-Zero can add
  - Water - No burden on location & demonstrate how it should be done
  - Electricity - No burden on state & demonstrate how it should be done
  - Waste Treatment Capacity - No burden on state & demonstrate how it should be done

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NET-ZERO

Water Strategy

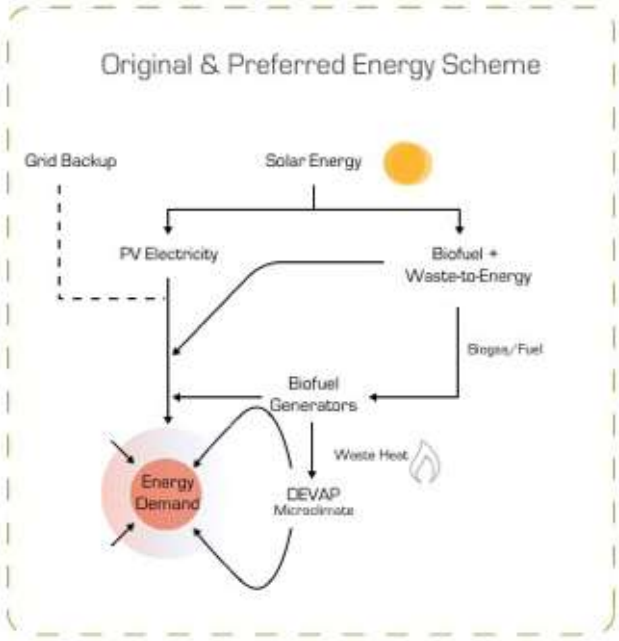
Water Strategy

NET-ZERO
Electricity Strategy

Reduce:
- Appropriate Orientation
- Optimized windows
- Insulated envelop

Thermal Comfort
- Active Passive integrated system
- 60% lower air conditioning load

Total Site:11.2 Mwp
- P.V. – 58%
- Bio Fuel – 42%



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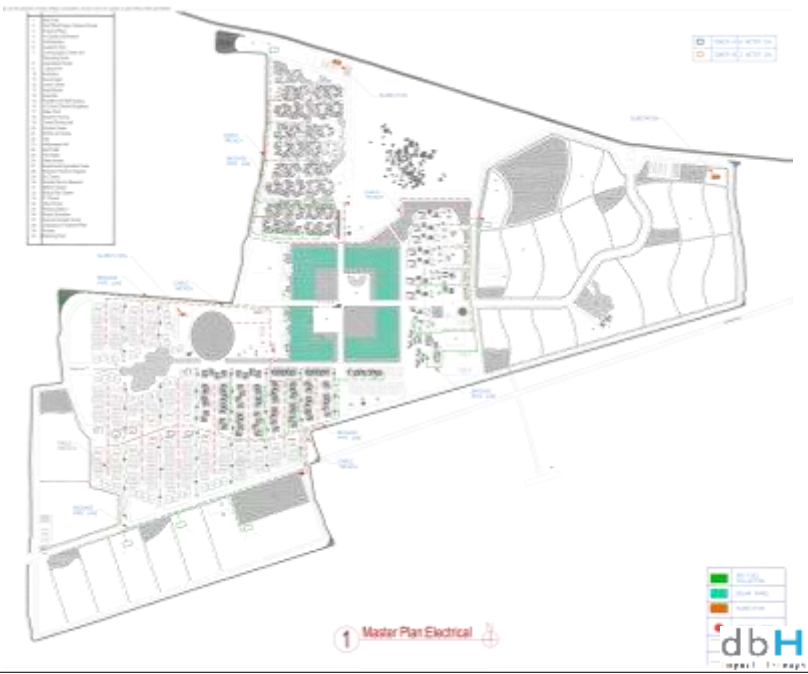
Electricity Strategy



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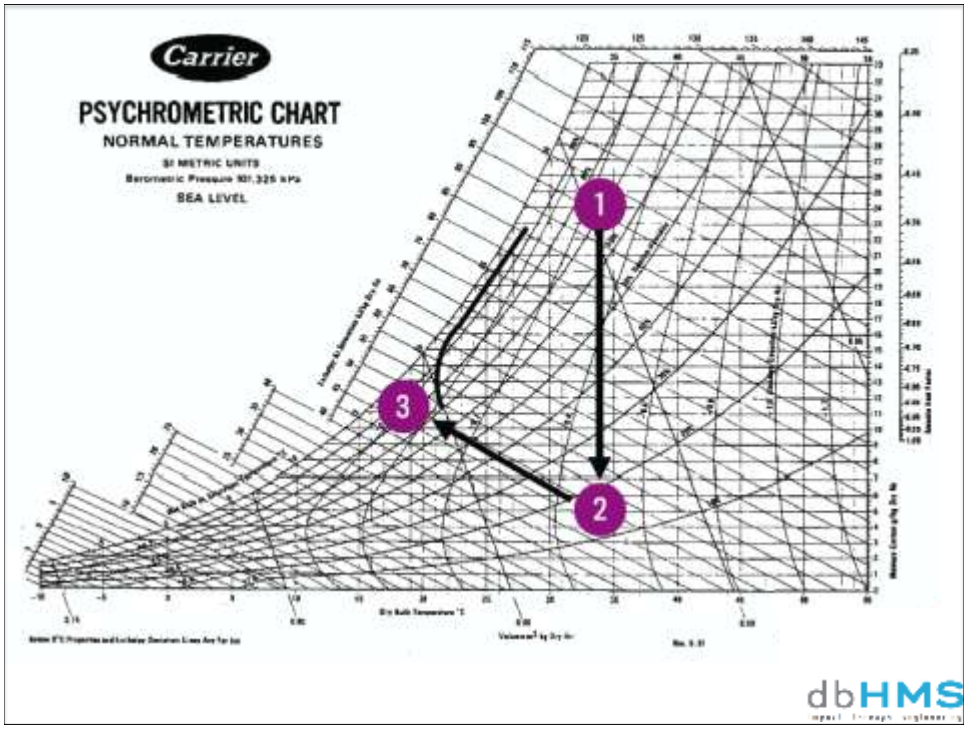
Carrier
PSYCHROMETRIC CHART
NORMAL TEMPERATURES
SEA LEVEL
1
2
3
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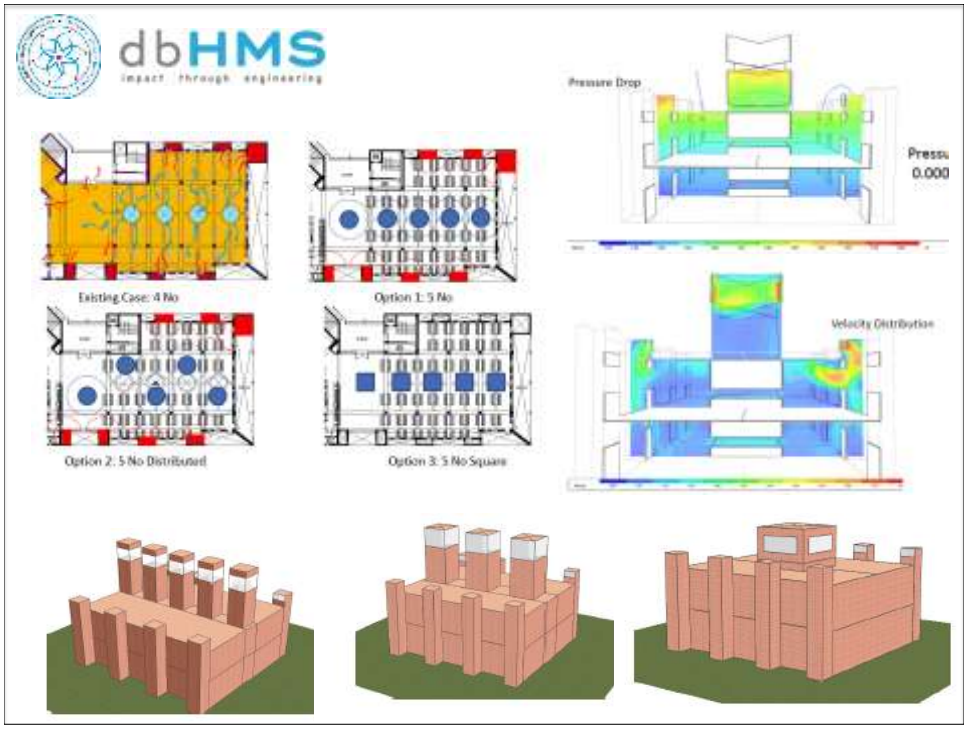
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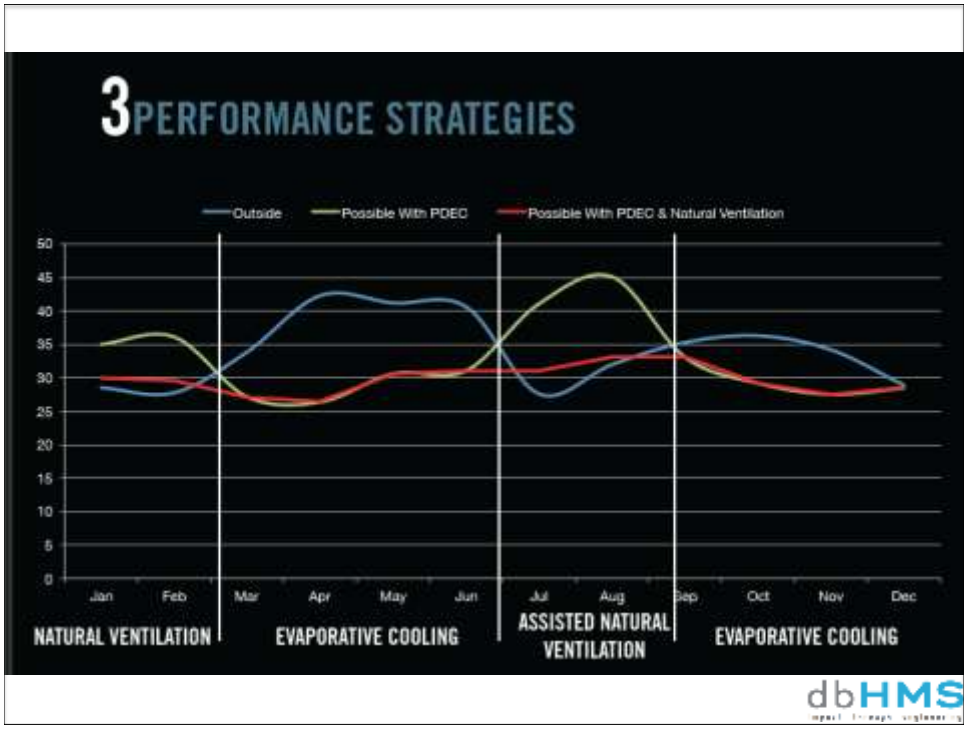
impact through engineering
Existing Case: 4 No
Option 1: 5 No
Option 2: 5 No Distributed
Option 3: 5 No Square
Pressure Drop
Velocity Distribution


3PERFORMANCE STRATEGIES
Outside
Possible With PDEC
Possible With PDEC & Natural Ventilation
50
45
40
35
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
NATURAL VENTILATION
EVAPORATIVE COOLING
ASSISTED NATURAL VENTILATION
EVAPORATIVE COOLING
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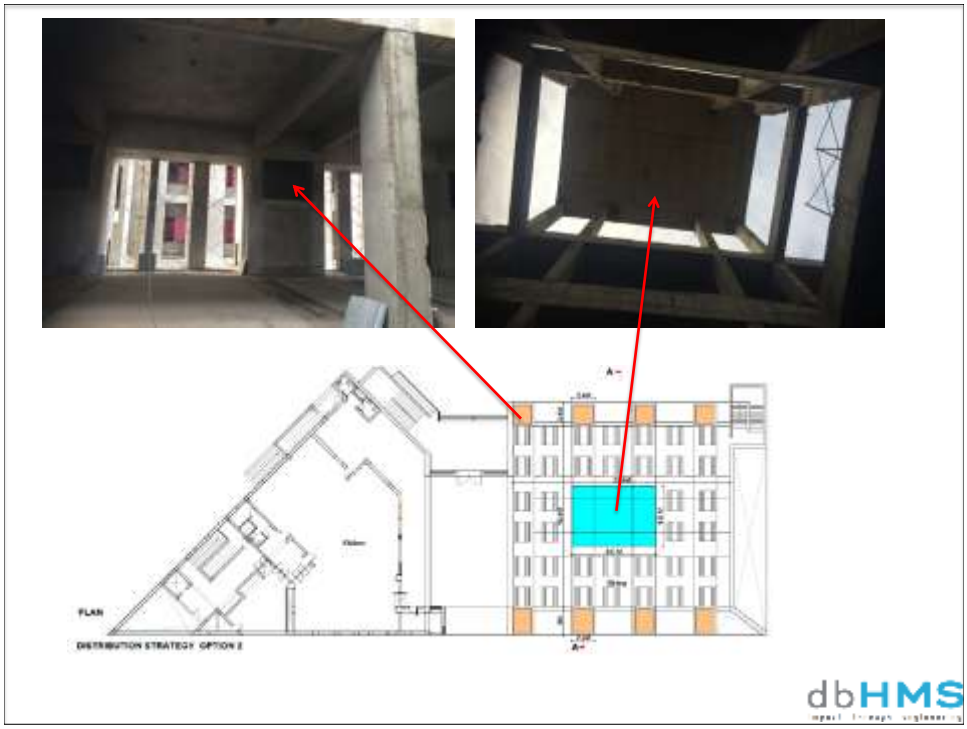
FLAN
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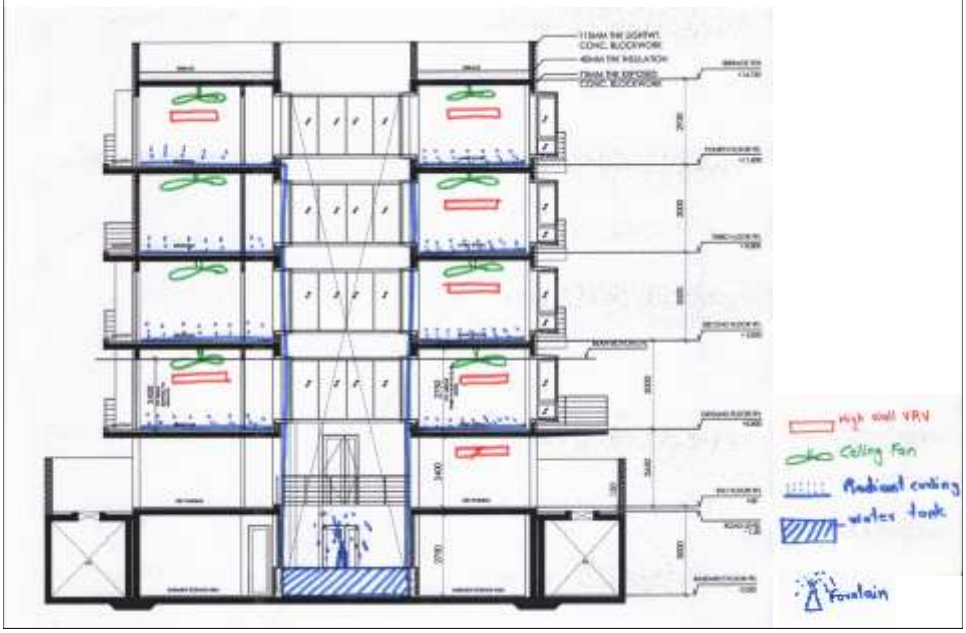
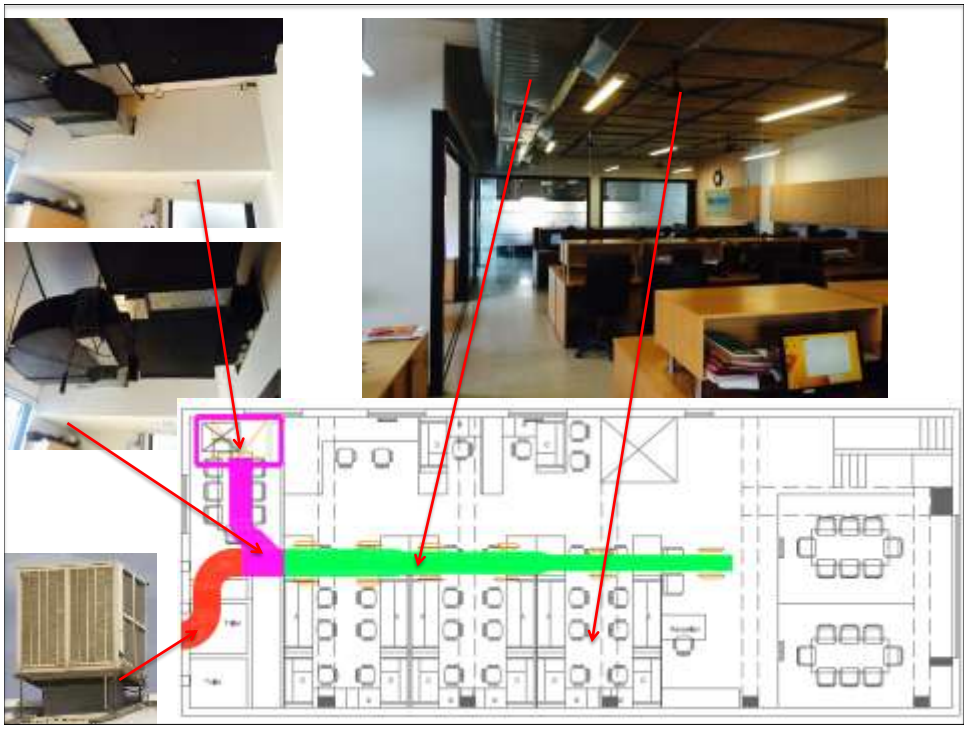
Residence at Defense Colony, New Delhi

Architect: Ashok B Lall



dbHMS Office, Noida



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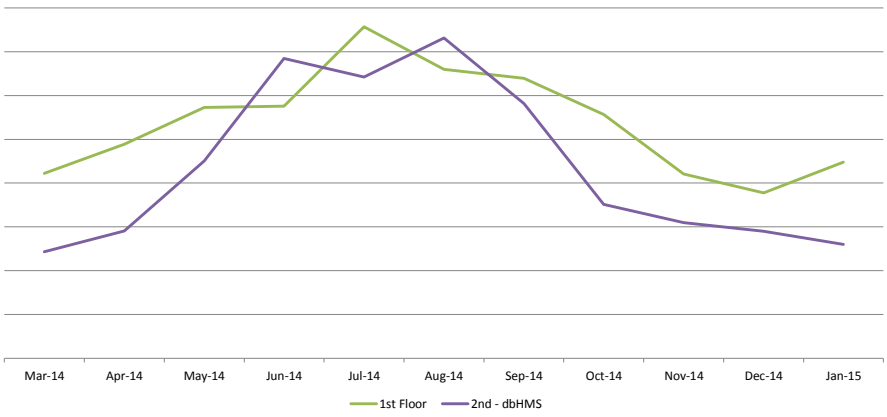

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