

I n n o v a t i
o n

in

Sustainable Building Systems

National Conference
on Green Design

Delhi, 2nd March, 2012



with great power

comes great responsibility

...what's ITC?

- market capitalisation of over US \$ 33 billion, turnover of US \$ 7 billion
- rated among the World's Best Big Companies, among India's `10 Most Valuable Brands‘
- employs over 26,000 people; 4,23,000 shareholders, 60+ locations across India
- "a commitment beyond the market“ : "Enduring Value. For the Nation. For the Shareholder.“
- Triple Bottomline
 - Leadership in business: leading FMCG marketer, the second largest Hotel chain, the clear market leader in Paperboard and Packaging industry and foremost Agri-business player
 - Environmental stewardship: Carbon, water and Solid waste recycling positive
 - Social responsibility: ‘Let’s put India first’ : e-choupal – transforming lives and landscapes

“At ITC, we believe that businesses exist to subserve larger societal goals”

– Y C Deveshwar,

Chairman

...*who am I?*

- Electrical Engineer by discipline
 - Naturally, *energy* is my business
- Large and heavy industrial experience
 - I understand *specific resource consumption*
 - and *stakeholder engagement*
- 4+ years in sustainable building development
 - Enough time spent to *graduate now!*
 - Just started practicing 😊
- I do real estate building projects for ITC
 - So, I continuously resolve paradoxes of *balancing time, cost & quality!!*

Innovation ... begins, like everything else, in the beginning

- “I discover that the best innovation is sometimes the *project*, the way you organise the *project*... The whole notion of how you build a *project* is fascinating” *- adapted from Steve Jobs*
- To *sustain* is to *endure*, to *tolerate*, to *last*
- To *last* is to *innovate*
 - millions of years of evolution shows us that

.....Sustainability and innovation are deeply related

Only home in nowhere

*Earth from space, by William Anders,
Apollo 8, 1968*

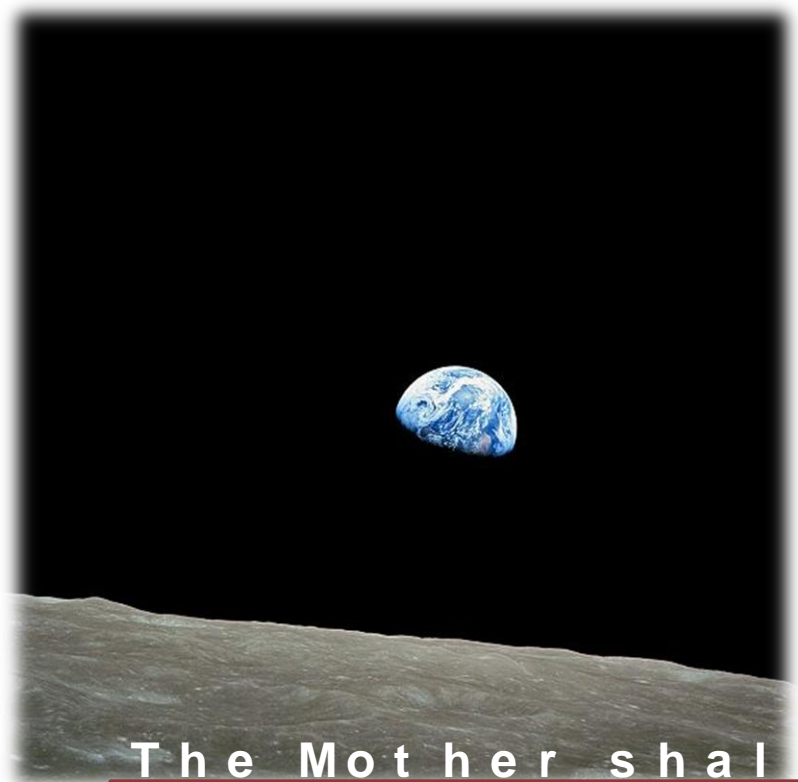
Jobs again!

- Deciding what **not** to do is as important as deciding what to do



The Great Mother does not take sides here... she protects only the BALANCE of life.

- Neytiri, Avatar



The Mother shall
sustain, question
is about the

...t h e R O O T S, 7^s t c e n t u r y C E

- According to Vitruvius, a good building should satisfy the three principles:
 - ***Firmitus*** or **Durability** : It should stand up robustly and remain in good condition.
 - ***Utilitus*** or **Utility** : It should be useful and function well for the people using it
 - ***Venustas*** or **Beauty** - It should delight people and raise their spirits.

Designing how others shall live !

Can scale be sustainable?

DESIGN DRIVERS



..poochhne mein kya jaata hai??

Case Study 1

...WHAT CAN'T BE *MEASURED* CAN'T BE IMPROVED

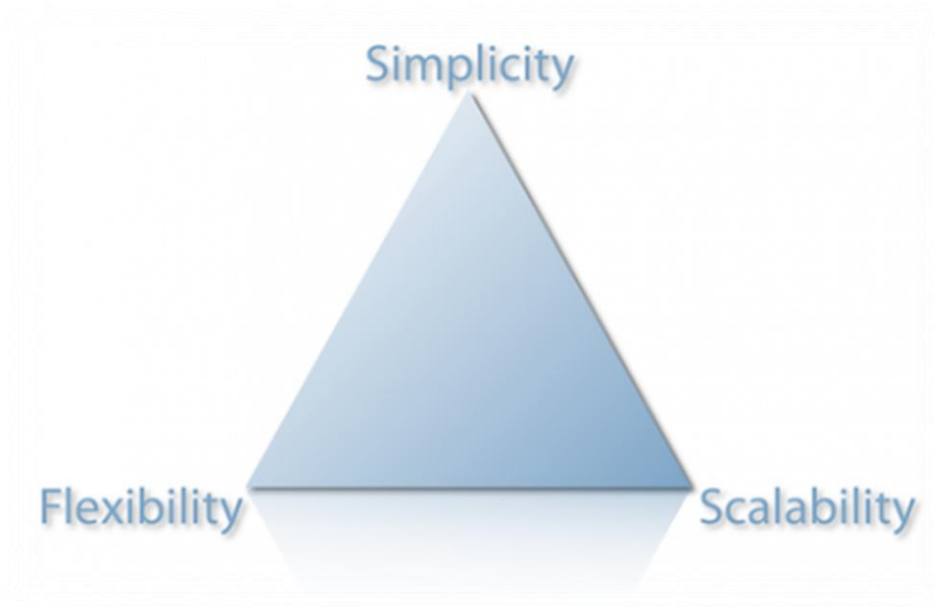
BUILDING PERFORMANCE INDICES.....

• towers, angular or e

- Redevelopment of a 100 year old campus
- Class-1 office building in ECBD
 - 4 m floor to floor height
- 10,000+ workstations
- 2.3 million sq ft built up area
- 2 towers each of 4B+G+11
 - connected by a sky-bridge food-court of 2500 seats
- 2500 car parking
- LEED Platinum target
 - feasibility of 93 points out of 110, as per IGBC LEED-CS

*you get what you **ask** for.....*

- Creativity
 - Sustainability tourism!
- Compassion
 - Green inside, residences outside
- Climate
 - Use Bangalore
- Courage of conviction
 - Stretch limits
- Cost effectiveness
 - Sustainability isn't costly



...to begin with,
do you know the
balancing act?

Prerequisites
of design
proposal to us

Innovation *is* what innovation *does*

- Building has to perform
 - *at start, year after year*
- Performance parameters identified in design contract
 - *to be validated at the end of each design stage*
 - *main designer (W S Atkins) shall 'guarantee' listed parameters at the end of schematic design*
- All design services with one firm – integrated, coordinated solutions

....Proof of pudding is in eating it

... *answers* are as good as *questions*



Passive right

• 2x2x200mx54m North-South facade

...collage, reassambléd

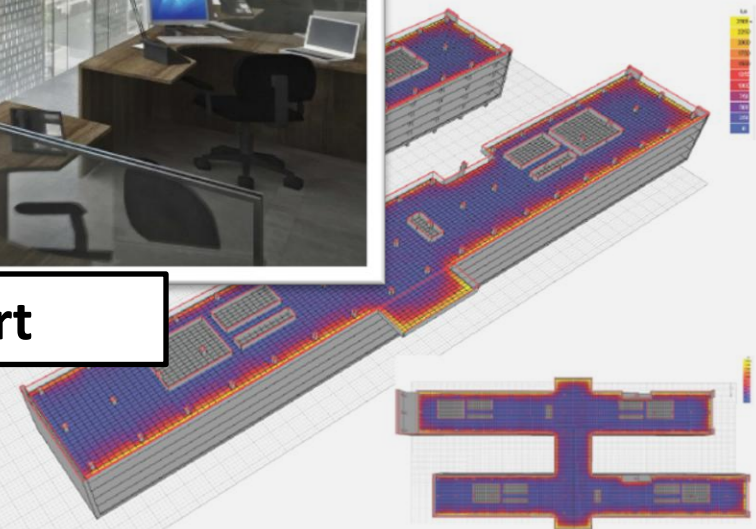
Terrace
Garden



Occupant comfort



Naturally ventilated Food court



Day light simulation

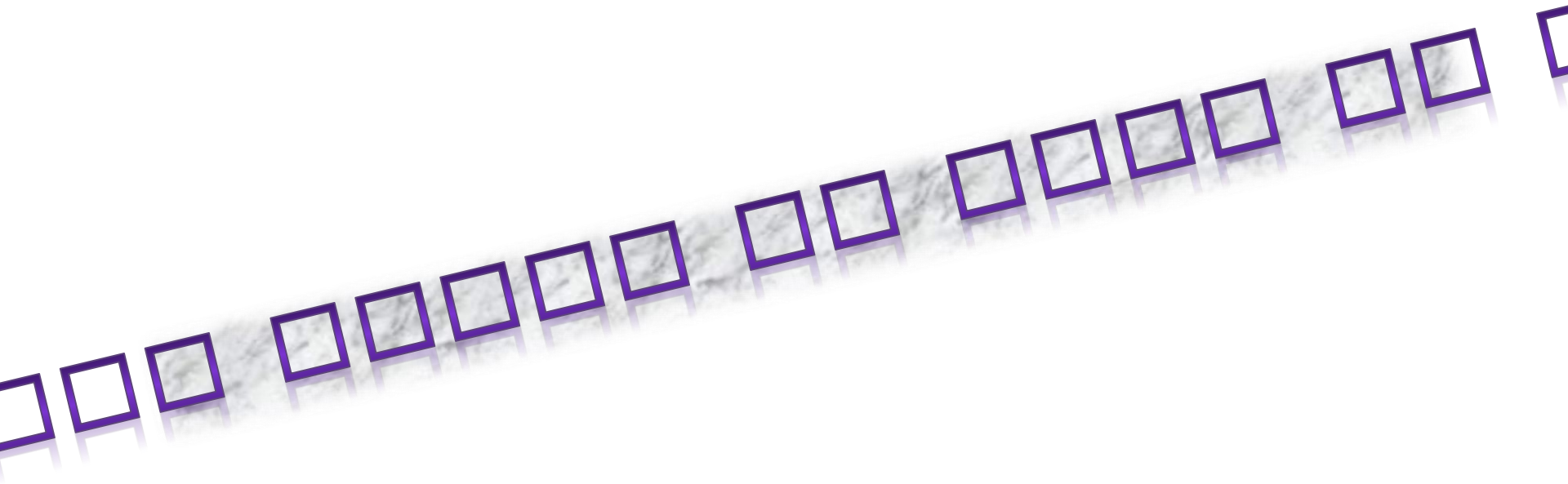
.... elephants can dance.. 😊

- Energy Performance Index* (*calcn. \.*)
 - 78 kWh/sq.m/annum, at 24 deg C design temperature, daylight aided (*>270 lux average*)
 - Business as usual is about 200 kWh/sq.m/annum
 - Energy conservation building code, 2007 recommends 120 kWh/sq.m/annum in temperate zones (*office bldg.*)
 - Contract performance guarantee requires 95 kWh/sq.m/annum
 - If we can endure 32 deg C for 6% of annual hours, EPI can be as low as 52 kWh/sq.m /annum
 - Non air-conditioned office buildings in Bangalore like climate (*before AC-s were born and ASHRAE was unheard of!!*) is about 40 kWh/sqm / annum
- *Total estimated maximum demand : 6.8 MVA for 1 million sq ft of usable office space*

*8.5 hours, 5 days a week office operation

...and can sing too!!

- Water demand
 - As per NBC – 720 kLD
 - Demand placed to BWSSB
 - 418 kLD in dry months
 - 252 kLD in wet months (using collected rainwater)
- Zero discharge
 - Recycle waste water used in landscaping, flushing and cooling tower
 - Plan to set up bio converter for solid waste management
- No queuing on the approach road



Case 2

... *STAKEHOLDER ENGAGEMENT : “IN YOUR SHOES!”*

NO MAN IS AN ISLAND

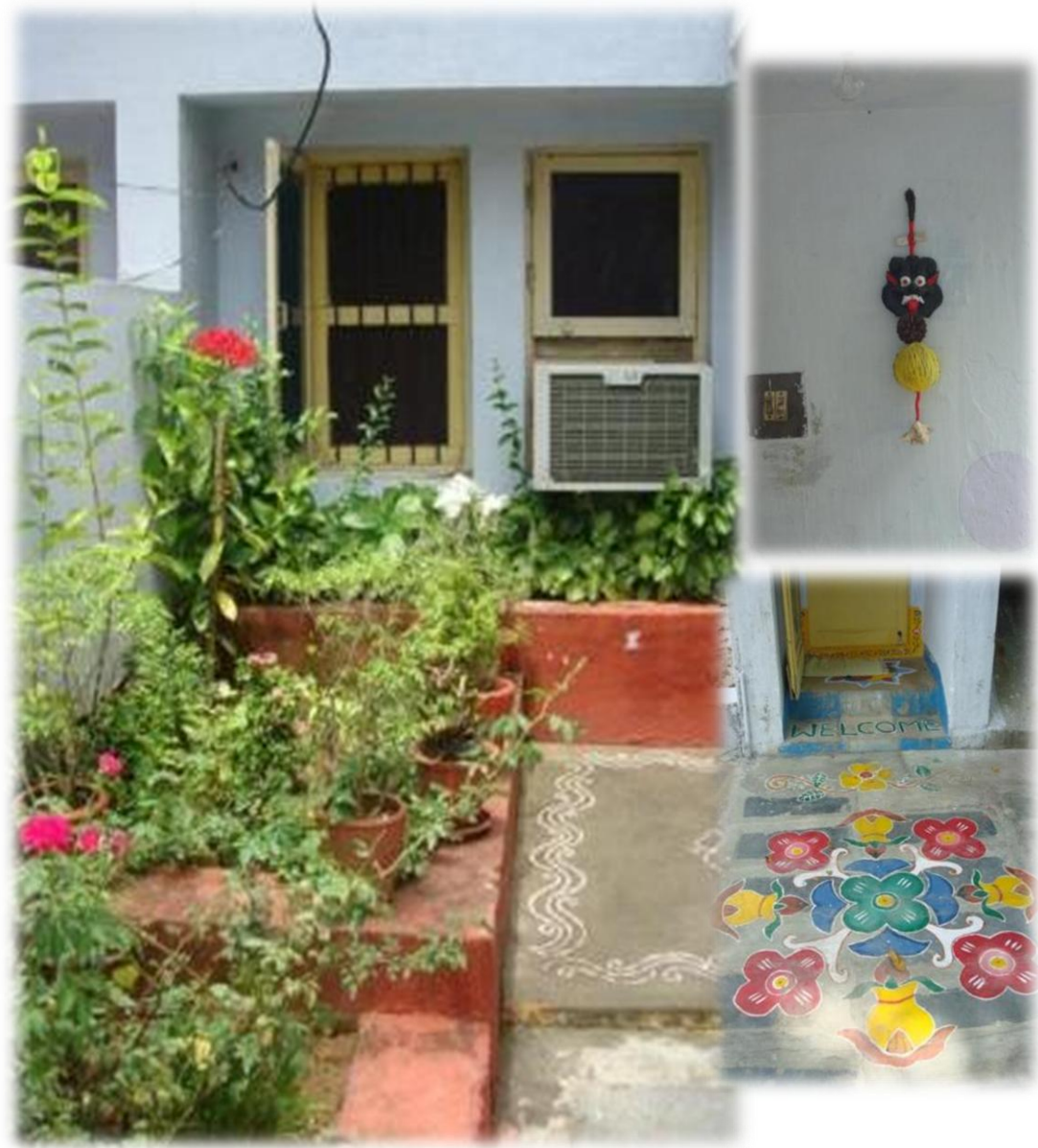
I T C Township, Bhadrachalam, AP

- Captive township
 - for managers and unionized employees
- Master Planning for 1600+ home units
 - 43 acres land, sloped 17 m along 1.2 kms length
- Multiple segments
 - 2 BHK, 950 sq ft (BUA) to Duplex villa, 3500 sq ft
 - Self contained, all amenities within
- Pilot project for 'Large Scale Sustainable Development' program of MNRE (\\.)
 - GRIHA 4 star target

..we asked ourselves, again!

- Residential community to conform the following:
 - S**ustainable, comprehensive habitat
 - H**onorable & sensitive to the neighborhood
 - A**ffordable, cost-effective construction
 - R**esponsive to climate & context
 - P**laceholder development wrt creativity, benchmarking

How are you
today?



FRONT YARD

Hyper extension of inner spaces
Beautification and Personalization

**Stacking
them up!**



LOW RISE TO HIGH RISE



LOW DENSITY
1/6TH ACRE PER DWELLING UNIT



HIGH DENSITY
1/20TH ACRE PER DWELLING UNIT

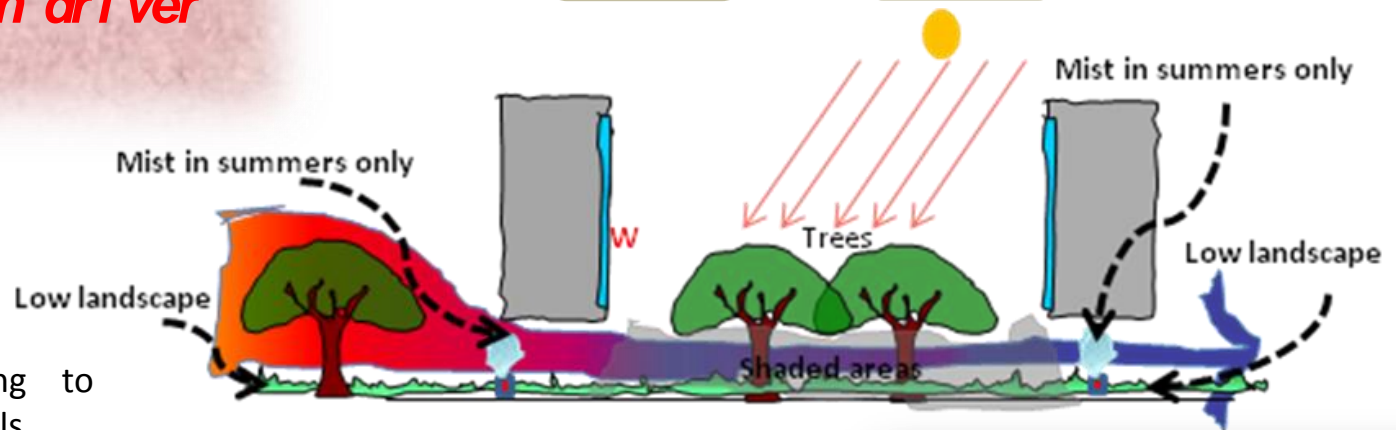
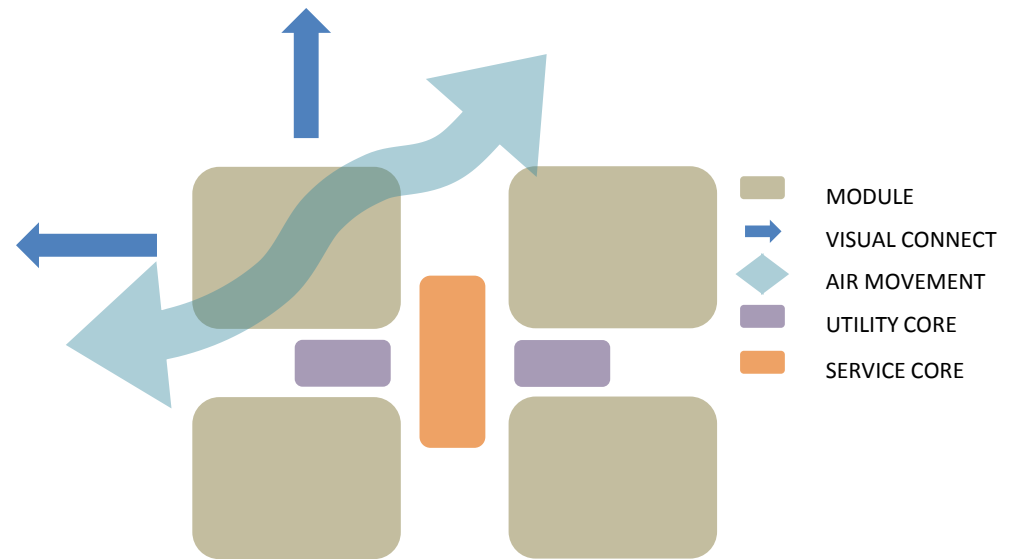


GROUND CONNECT - COMMUNITY SPACES AT HIGHER LEVEL

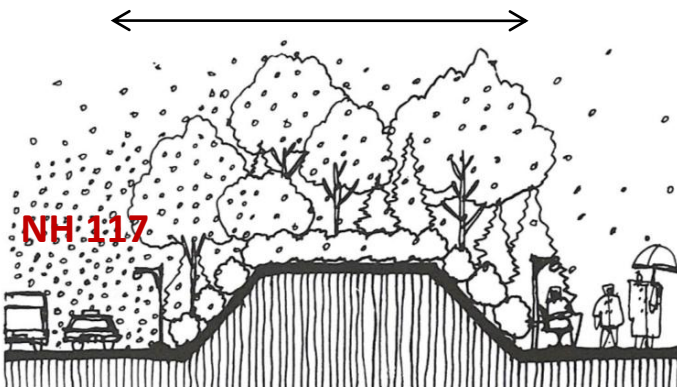
Working with Nature

- ADEQUATE CROSS-VENTILATION
- MINIMISE HEAT GAIN
- OPTIMISE DAYLIGHTING

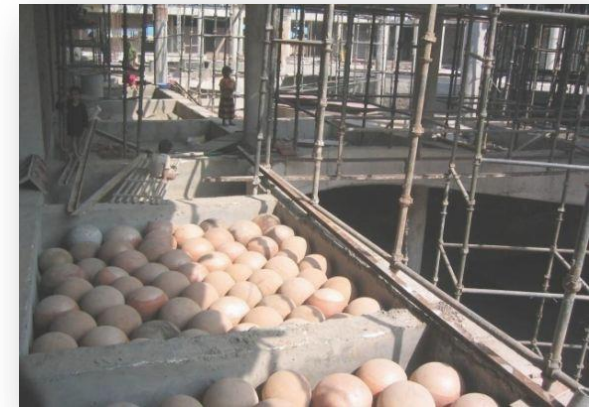
Extreme climate is the prime design driver



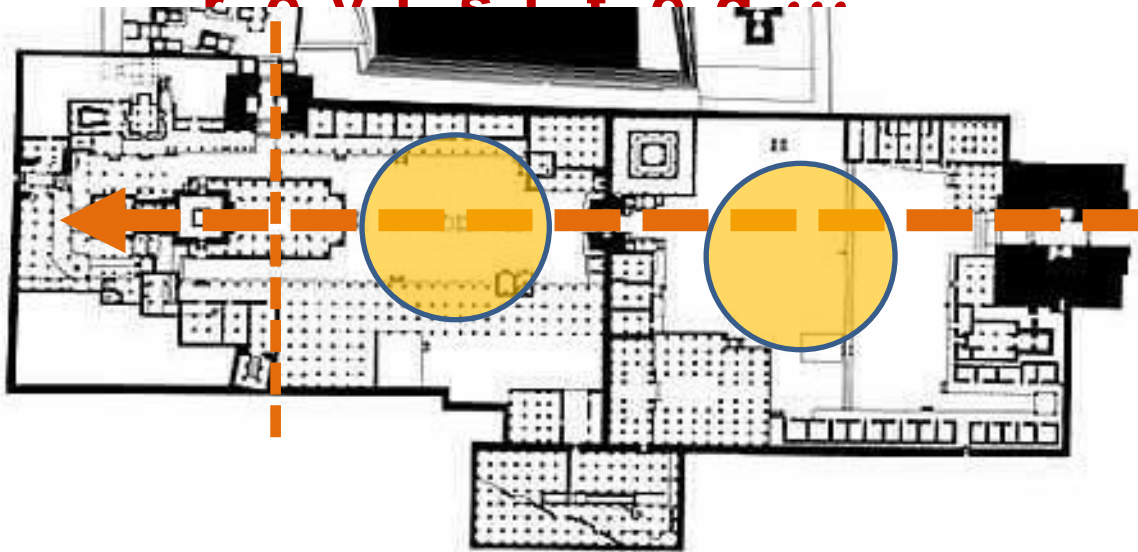
Earth Mound/ Planting to reduce dust & noise levels



Roof insulation with earthen pots

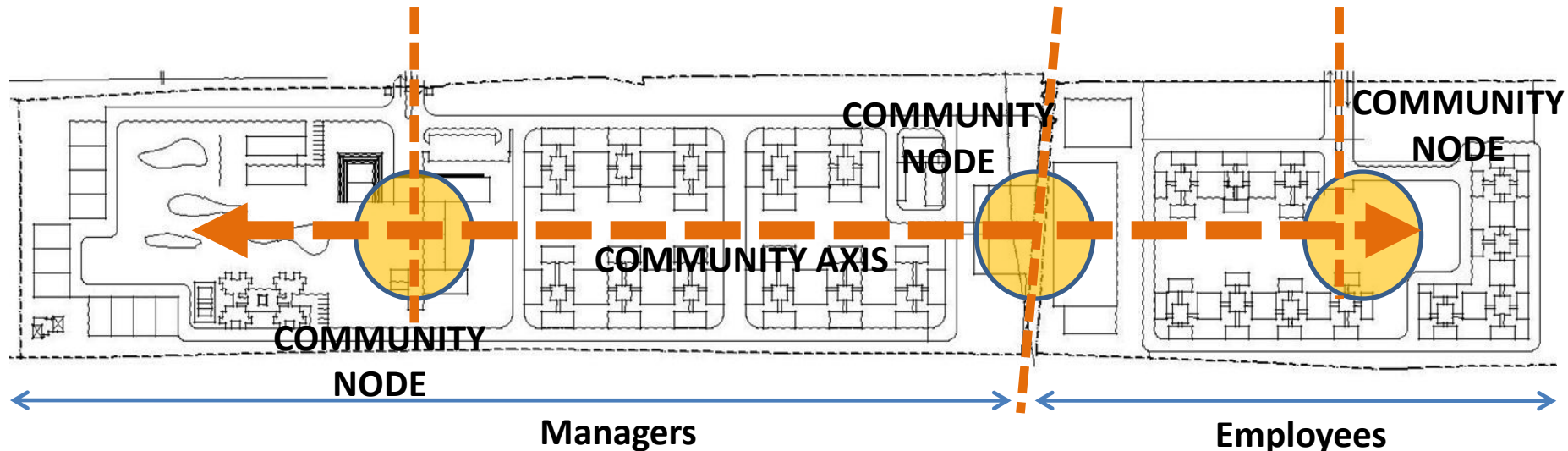


Ancient wisdom, revisited



Planning principles of Indian Temple complexes –

- Linear organization of spaces
- Disparate Visual & Physical axis
- Layering for sequential unfolding of spaces



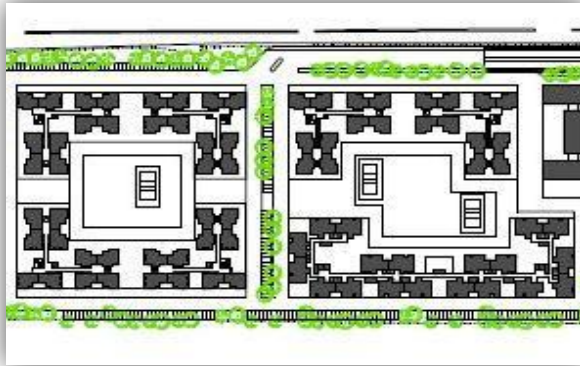
NET OF LIVELIHOOD

SELF
SUFFICIENT
COMMUNITY WITH
ALL THE
BASIC
AMENITIES
WITHIN
THE SITE

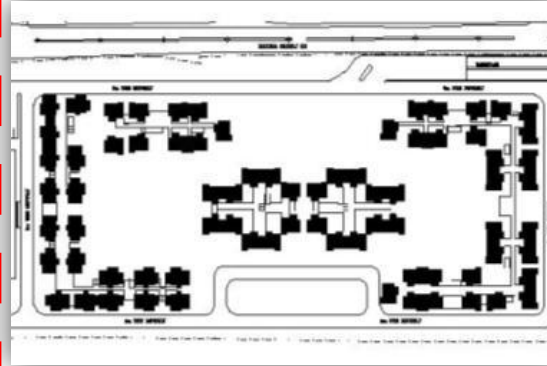
DESIGN
TO CATER
TO ALL
THE
ASPIRATIONS AND
NEEDS OF
THE
PEOPLE



THREAD & BEAD



CLUSTER



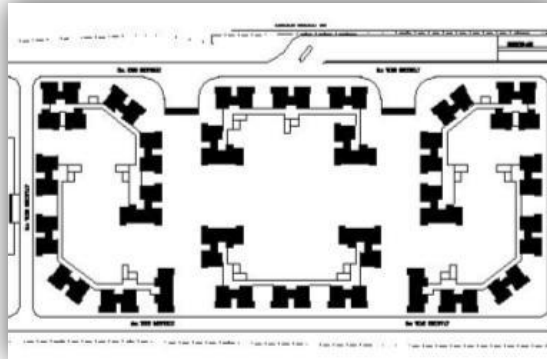
DIAGONAL



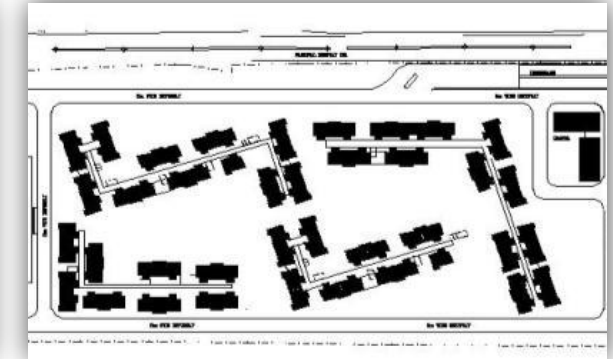
LINEAR



PRECINCT



COURTYARD



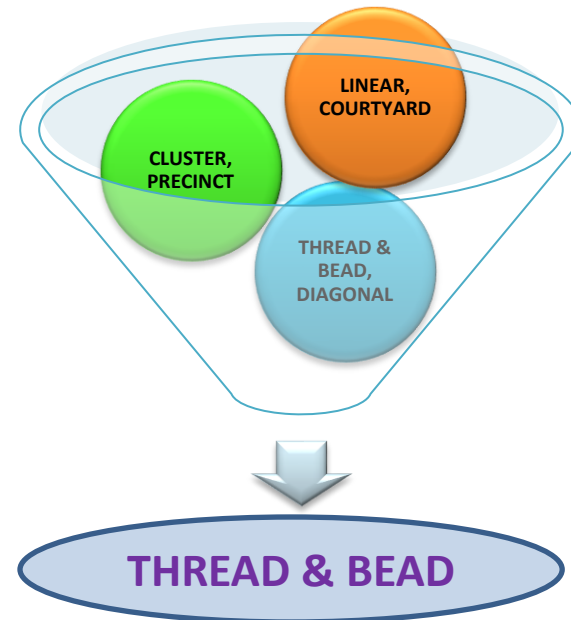
EVALUATION CRITERIA

Architectural

- Equity
- Community Spaces & Scale
- Passive Right
- Modularity & Flexibility
- Floor Efficiency
- Privacy

Engineering

- Structural
- Cross Ventilation
- Ease Of Construction
- Utilities Distribution



... the FINAL plan




Space matrix
Neilsoft
TERI
Auroville
Inde Design

... the FINAL plan




Spacematrix
Neilsoft
TERI
Auroville
Inde Design



Where can we place a dead body in the colony?

A group of men are seated at long blue tables in a meeting room. One man in a light-colored shirt is pointing towards the left side of the frame. The room has blue walls and a whiteboard in the background.

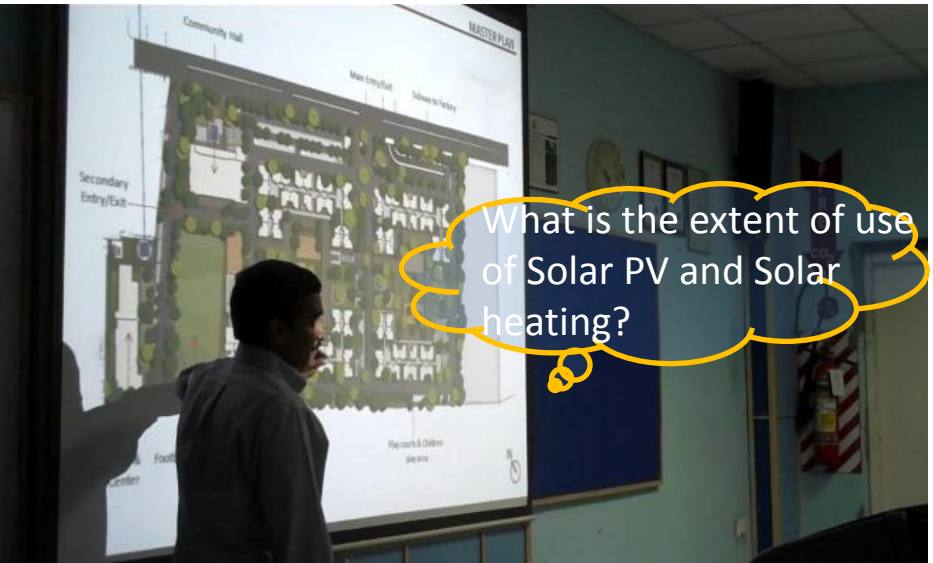
EMPLOYEE UNION



Are you recycling the waste water and possible use? Can we not use it for car wash?

A group of women are seated in a meeting room, facing a large screen. A person is standing at the front, pointing at the screen which displays a diagram or map. The room is dimly lit, with the screen providing the main source of light.

LADIES



What is the extent of use of Solar PV and Solar heating?

A man is standing in front of a large screen displaying a detailed site plan or map. The map includes labels for 'Community Hall', 'Main Entry/Exit', 'Secondary Entry/Exit', 'Footpath', 'Play area & Children play area', and 'Master Plan'. The man is looking at the screen and speaking.

MANAGERS



SUSTAINABILITY WORKSHOP

A group of people are seated around a large U-shaped wooden table in a meeting room. They are engaged in a discussion, with some looking at laptops. The room has a modern design with a white ceiling and large windows.

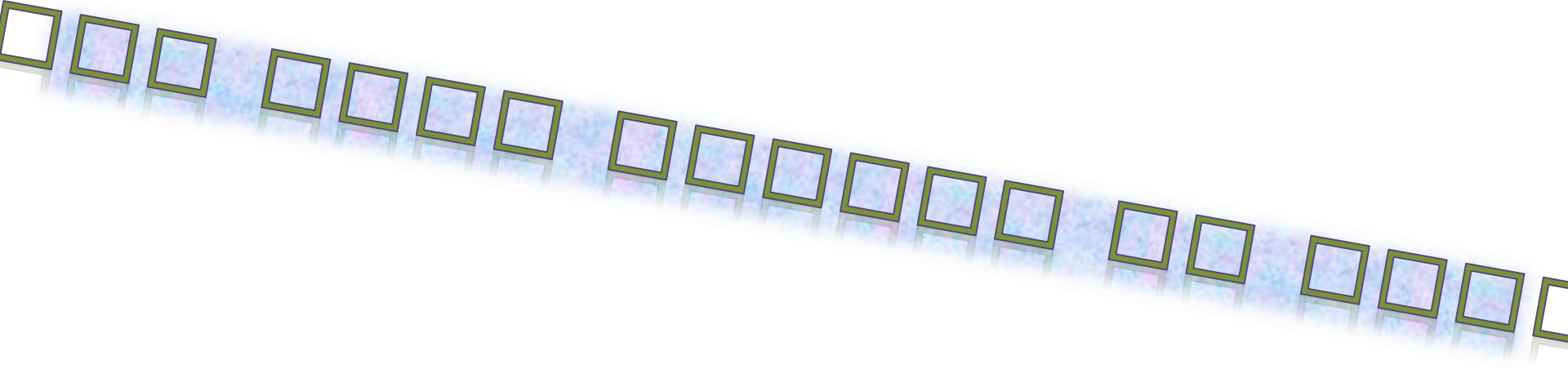


- Large thermal mass,
- mutual shading,
- connectivity without lift for 100+ families,
- shaded car free walkways,
- community spaces inside apartment blocks at upper levels,
- EQUITY in views, no PREFERRED location

Energy, Water & Waste

- Total maximum electrical demand
 - 6 MVA for 25 million sft built-up area
- Water demand
 - Domestic + Flushing
 - Present demand ~ 2000 kLD
 - as per NBC approx 1212 kLD
 - As per concept design, 835 kLD in hot, dry days
 - Landscape demand
 - Business as usual (good practice) 6 l/sq.m./day
 - Target here 2 - 3 l/sq.m./day by using xeriscaping, home grown clonal plantation
 - FSC certified forest planned inside township
 - Savings estimated – 340 kLD
- Existing colony already has waste segregation (dry & wet) practice
 - to be continued in new campus
 - No solid waste disposal beyond ITC boundaries

though captive, every household to be metered for energy and water



Parting points

.... *LEARNINGS*

....balance, *if you don't, Nature will*

- We have to agree that economic development of humankind is inevitable
 - All exposed bricks in millions of sq ft – who will build? – lack of labour & skill levels is a concern ; where on earth will the bricks come from?
 - Green roof, walls – maintainable design? – use of valuable FAR
 - CFL – where to dispose mercury or e-ballasts?; LED – conversion per unit of raw materials
 - Styrofoam bears ‘carcinogenic’ tag in developed economies
- Activism vis-a-vis development – fine line – populism gets claps and awe – but most expect personal growth in economic terms only
- Rating systems vis-a-vis ‘tricks of the trade’
 - Coming out of ‘dilwa denge’, ‘karwa denge’ syndrome
 - How to get a point shall not be the subject of a responsible sustainability discussion!

Innovation isn't necessarily research

- Traditional wisdom calls for balance - require Master Jugglers (*call them design leads*)
- Existing, affordable design solutions to be exhausted first – craving for 'new' always doesn't work
- 'Savings' in energy works far superior in cost than on-site renewables – offsite wind energy wheeling working far reasonable
- Balance of Time, Cost, Quality essential for innovations to be effective in projects



...the cost



Business as usual

- Regulations catching up with 'recommendations'
- International geo-political push and vigil on national and regional rules
- Property buyers' attention and concern over operational costs
- 'Quality of life' drives property purchase decisions
- Brand image enhancement

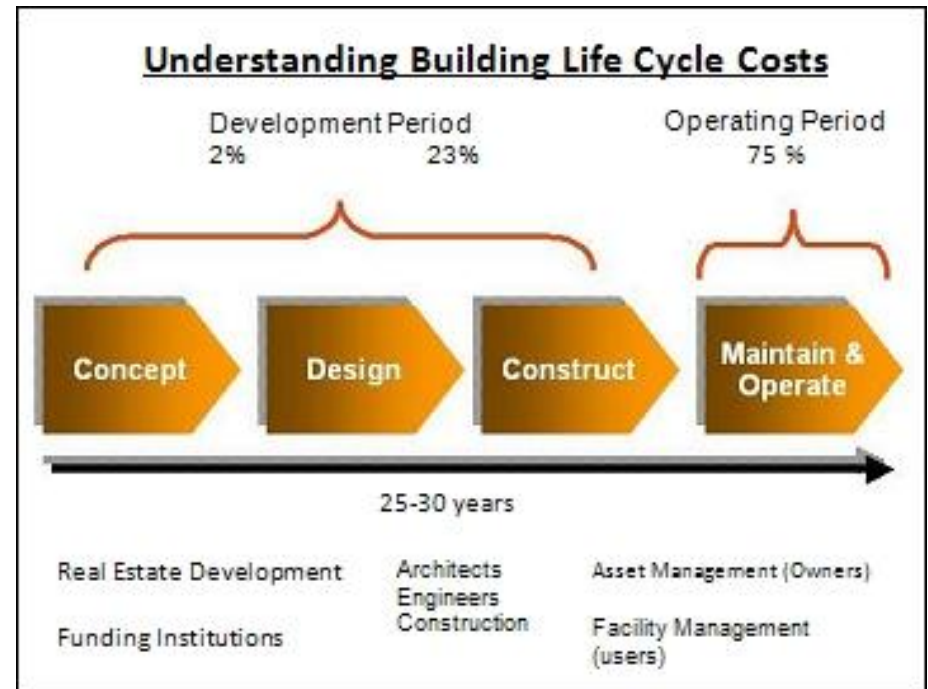
Green buildings

- Technologies and materials more accessible
- Volumes lowering the cost of innovation
- Competitiveness of 'new' products
- Awareness increasing across
 - Sectors (commercial, residential)
 - Stakeholders (owners, developers, buyers, contractors, designers)

differential decreasing fast.....

..lifecycle cost assessment

- Operational cost
 - Energy costs
 - Water costs
 - Diesel (or backup fuel) cost
 - Landscape upkeep costs
- Maintenance cost
 - Less material type -> low inventories
 - Easy access
 - Less maintenance team
- 'Money' costs
 - Subsidies
 - CDM
 - Lower interest rates
- ...and the Capital costs



- *Then the payback assessments*

*every man is a piece of the
continent,
a part of the main*

- Simple is sustainable
- To arrive at simplicity, complexities have to be resolved (*Jobs!!*)
- Design and engineering run concurrently
 - Multiple multidisciplinary workshops – Video, web meetings
- Owners alone can leapfrog the sustainable building design innovation agenda
 - Builders and operators
 - Empire State Building renovation : LEED Platinum, driven by rental loss
([website](http://www.esbnyc.com/sustainability_energy_efficiency.asp): www.esbnyc.com/sustainability_energy_efficiency.asp)
- Every rightly designed building is sustainable
 - And why should you build wrong designs?

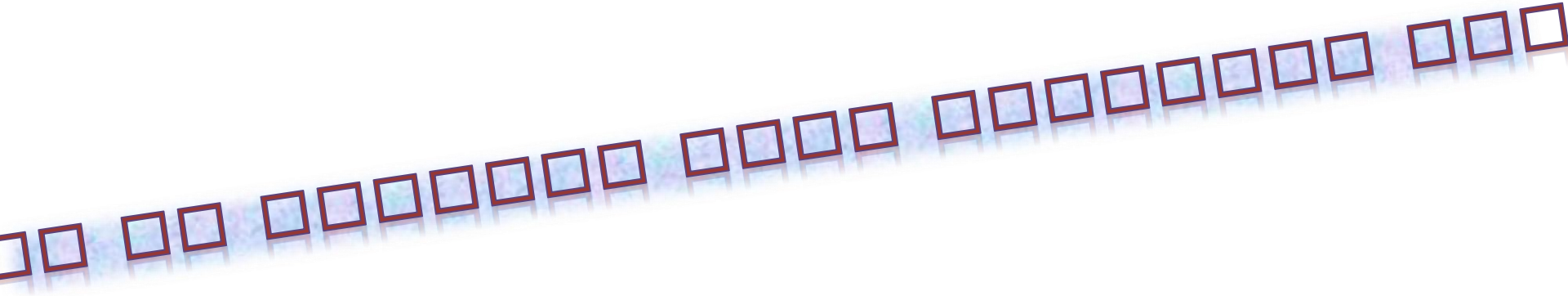
*Sharpen the axe for 6 hours, cut in the balance 2!
Give enough time, money and involved attention to design*

no al l opat hy pl ease! ! !

...or why prescriptions doesn't always work

- Sustainable design is 'natural' sciences validated by design analysis
- One size doesn't fit all
- Prescriptive guidelines are antithesis of innovative solutions
 - essential for popular consumption
 - analysis should be the route for exceptional cases
 - WWR of 73% gave us EPI of 78 kWh/sq.m/annum
 - much below ECBC recommendations
 - but doesn't qualify the building for GRIHA ☹

*To know about ITC's sustainability report,
visit: www.itcportal.com*



Thanks for listening!!!!

..... KEEP WALKING!!