2nd International Conference and Exhibition on Building Energy Efficiency – ANGAN (Augmenting Nature by Green Affordable New-Habitat)

"Making the Zero-Carbon Transition in Buildings"

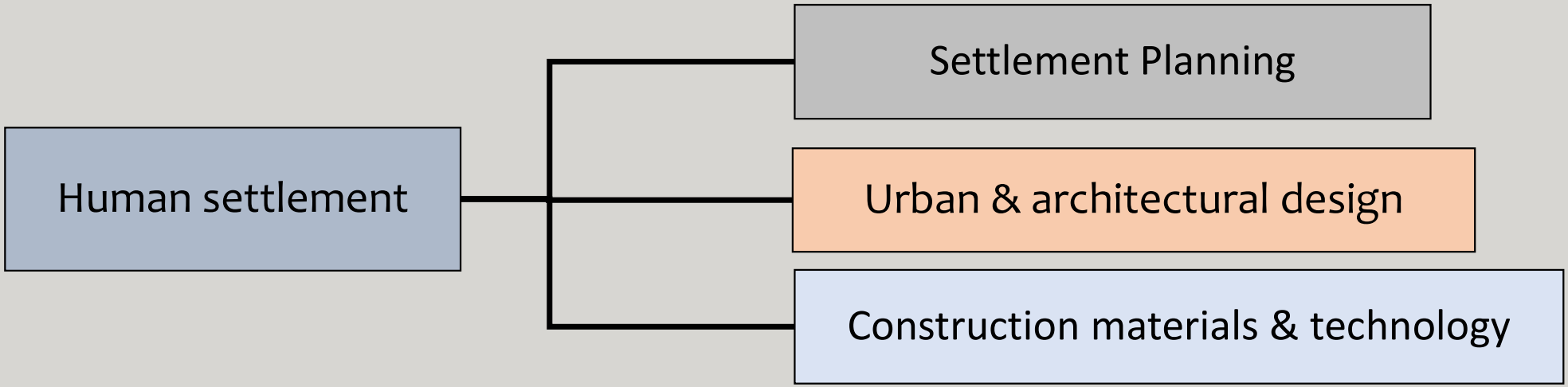
Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India and Indo-Swiss Building Energy Efficiency Project (BEEP)

"Reengineering Traditional & Indigenous Design, Materials, and Construction Practices"

16th September 2022 New Delhi, India.

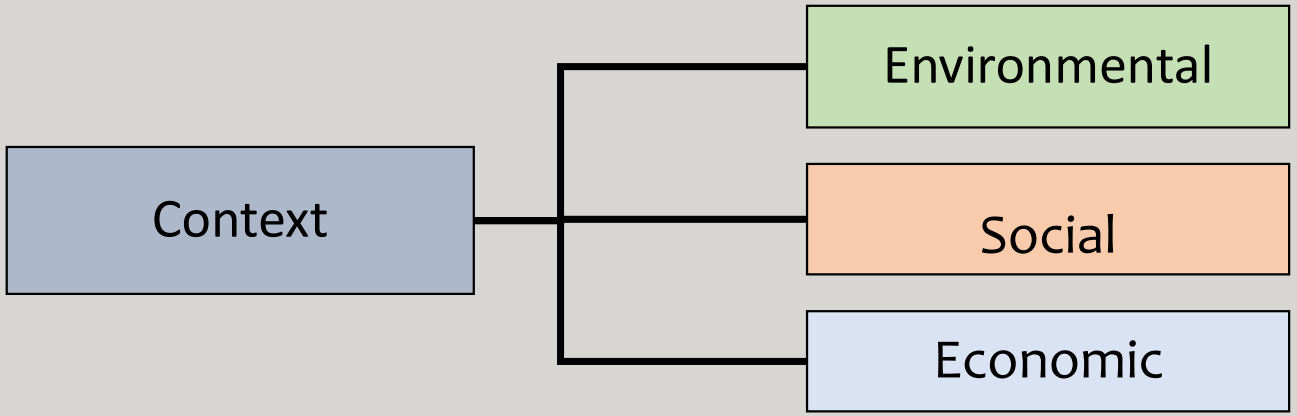
Suhasini Ayer, Auroville Design Consultants - Auroville

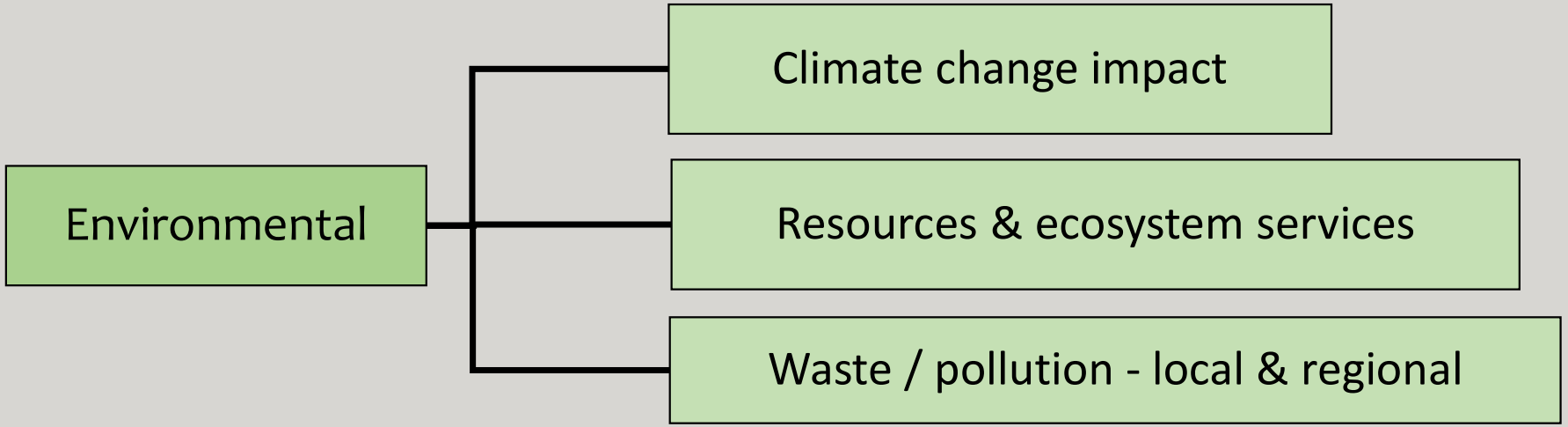
“Reengineering Traditional & Indigenous Design, Materials, and Construction Practices”

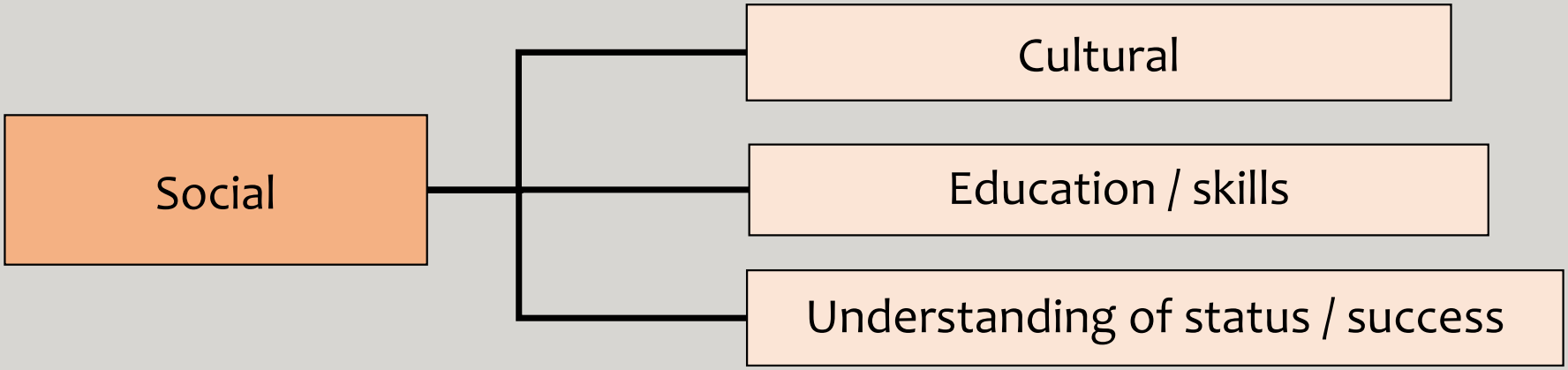


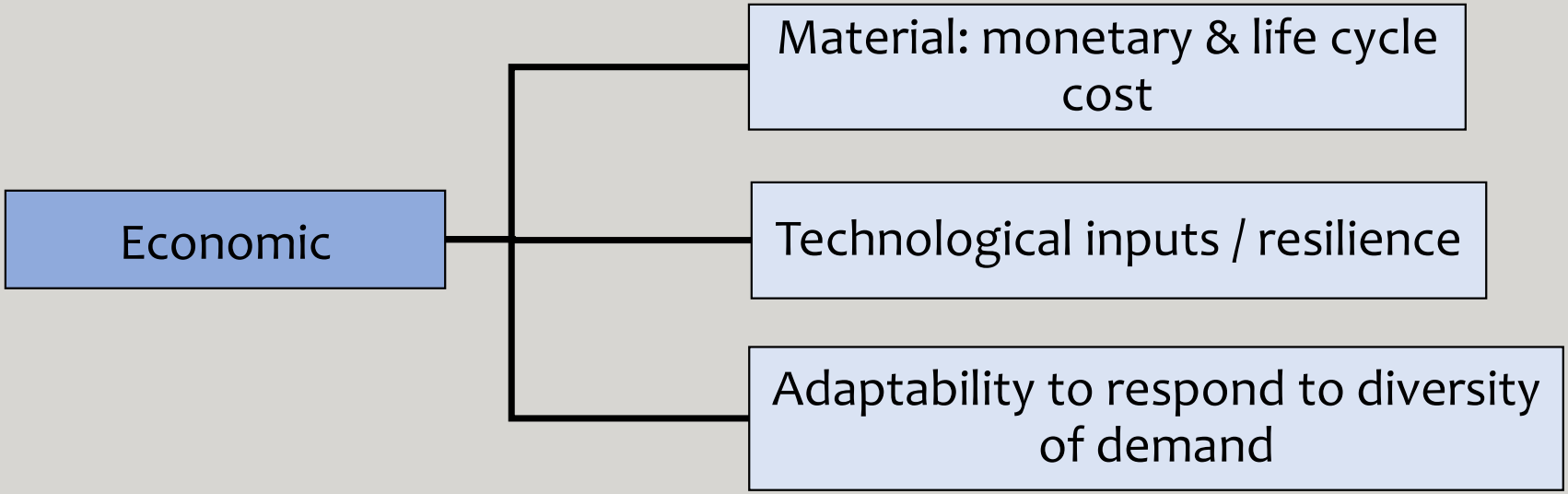
SECTORS	GOALS AND ACTIONS
LAND	• Minimum disturbance of natural topography • Retain indigenous trees • Secure top soil from the areas to be built to ensure fertility is retained to re-spread when the construction is done
WATER	• Integrate flow channels • Retain high percolation areas as no- build zones • Create bio swales and collection ponds for surface and roof run off to supply potable water • Wet area design for low water use and low flow fixtures
CLIMATE	• Integrate solar passive building design principles for hot-humid coastal climate • Building layout integrated with landscape to avoid heat islands effect • Aim for maximum comfort levels with minimum operational energy use
BUILDINGS	• Efficient functional layout to achieve maximum usable space • Efficient building envelope design for maximum volume for minimum surface area (reduced building material use) • Use of building materials and technology that lowers the embodied energy • Resilient materials and technology to reduce repairs and replacement
ENERGY	• Functional layout of spaces in keeping with climate • Minimize operational energy use with appropriate building design (shading / lighting) • Net positive with grid connected PV use and low consumption devises
WASTE	• Recycle all sewage for reuse as irrigation to lower potable water demand • Solid waste segregation to compost biodegradable on-site for gardens and non-biodegradable for maximum recycling
LIFE STYLE	• Climate appropriate life style with clothing, food and timing of metabolic activity • Sharing of electro-mechanical appliances to reduce waste generation • Use products that are local with cradle to cradle cycles

Reviving, repurposing and restoring traditional bld materials using adaptive design principles to respond to **climate change and social challenges**




Environmental
Climate change impact
Resources & ecosystem services
Waste / pollution - local & regional


Social
Cultural
Education / skills
Understanding of status / success


Economic
Material: monetary & life cycle cost
Technological inputs / resilience
Adaptability to respond to diversity of demand

WALLS – POURED EARTH CONCRETE

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- Reuse of construction and demolishment waste
- Use of existing tools and technology
- Progressive skill upgrading
- Resilient walling material
- Improved construction speed
- Cost effective compared to plastered brick walls
- Lower embodied energy compared to plastered brick walls

WALLS – WASTE CUDDAPHAH

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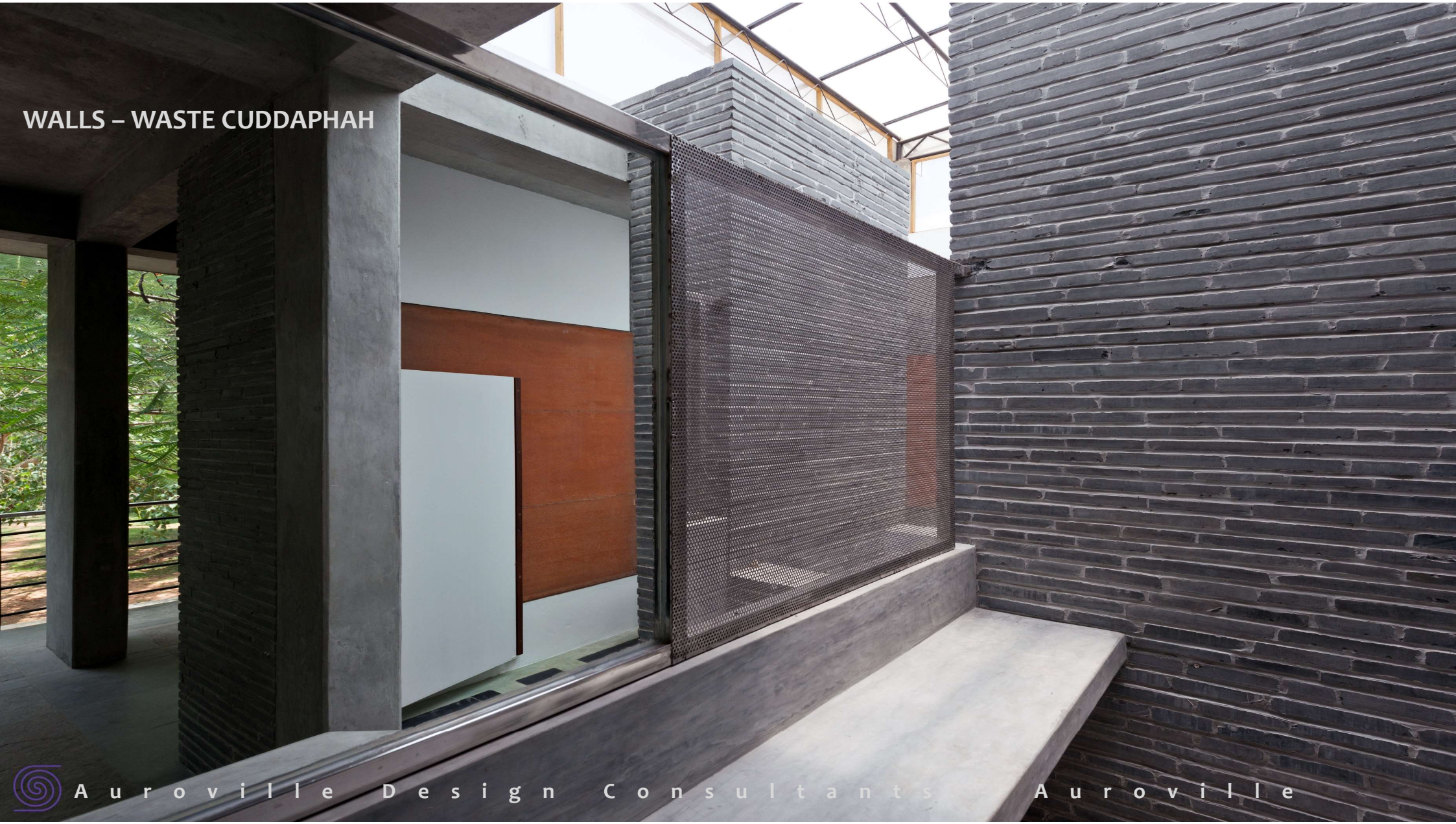

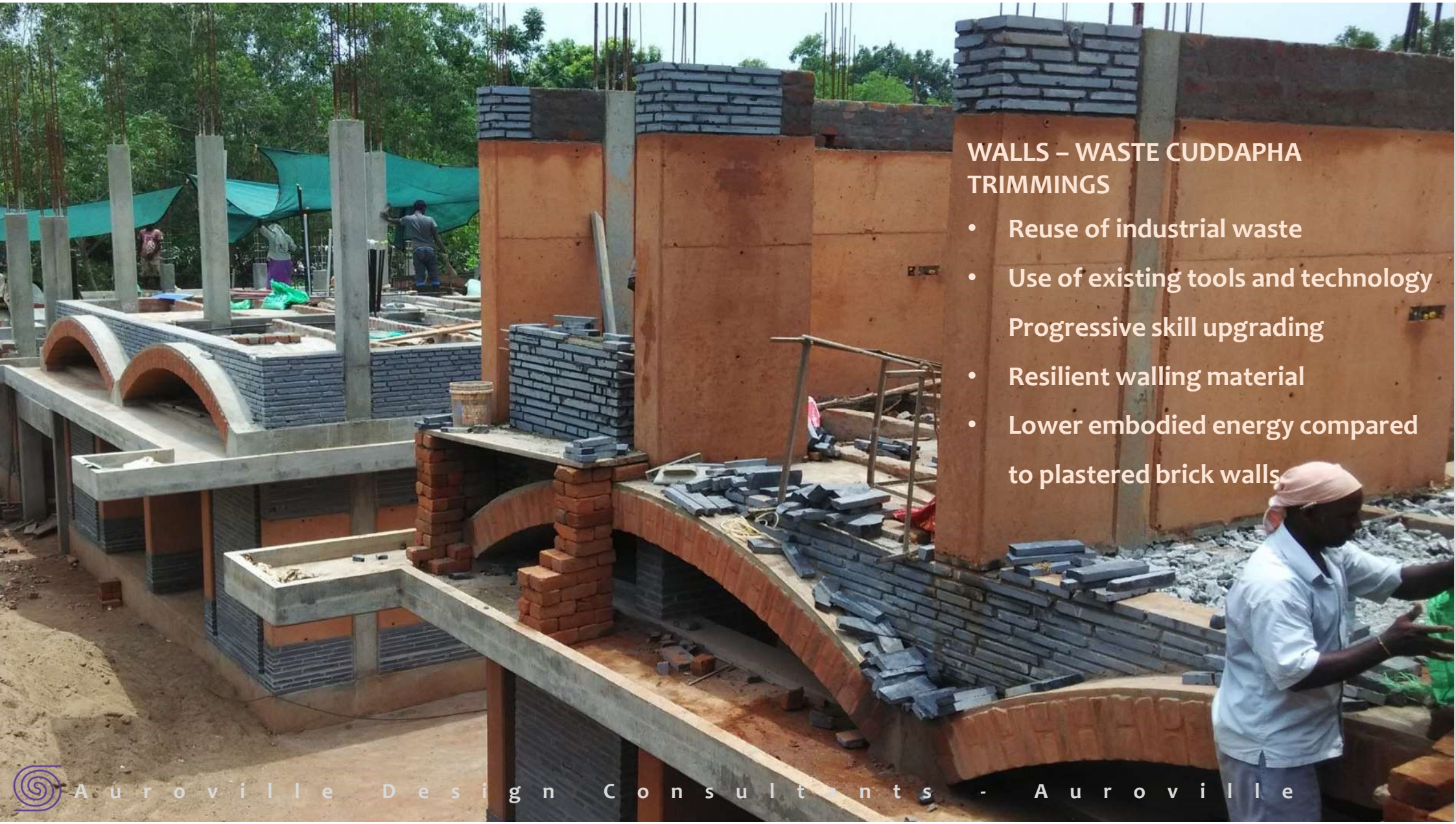

WALLS – WASTE CUDDAPHA TRIMMINGS

- Reuse of industrial waste
- Use of existing tools and technology

  Progressive skill upgrading
- Resilient walling material
- Lower embodied energy compared to plastered brick walls

ROOFING – SEGMENTAL ARCH VAULT

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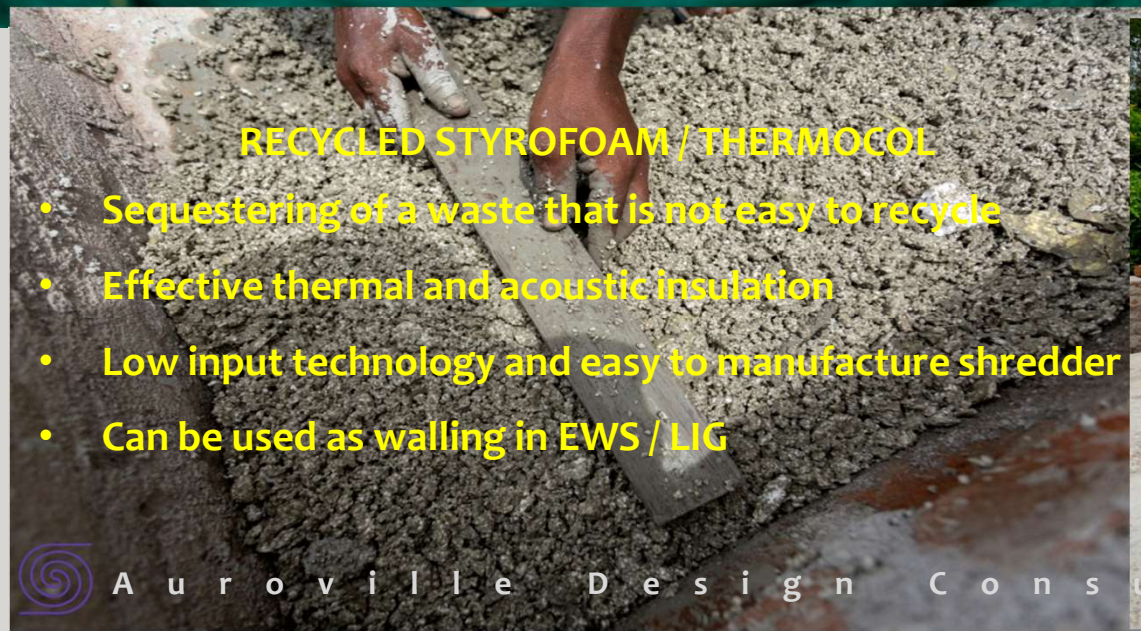
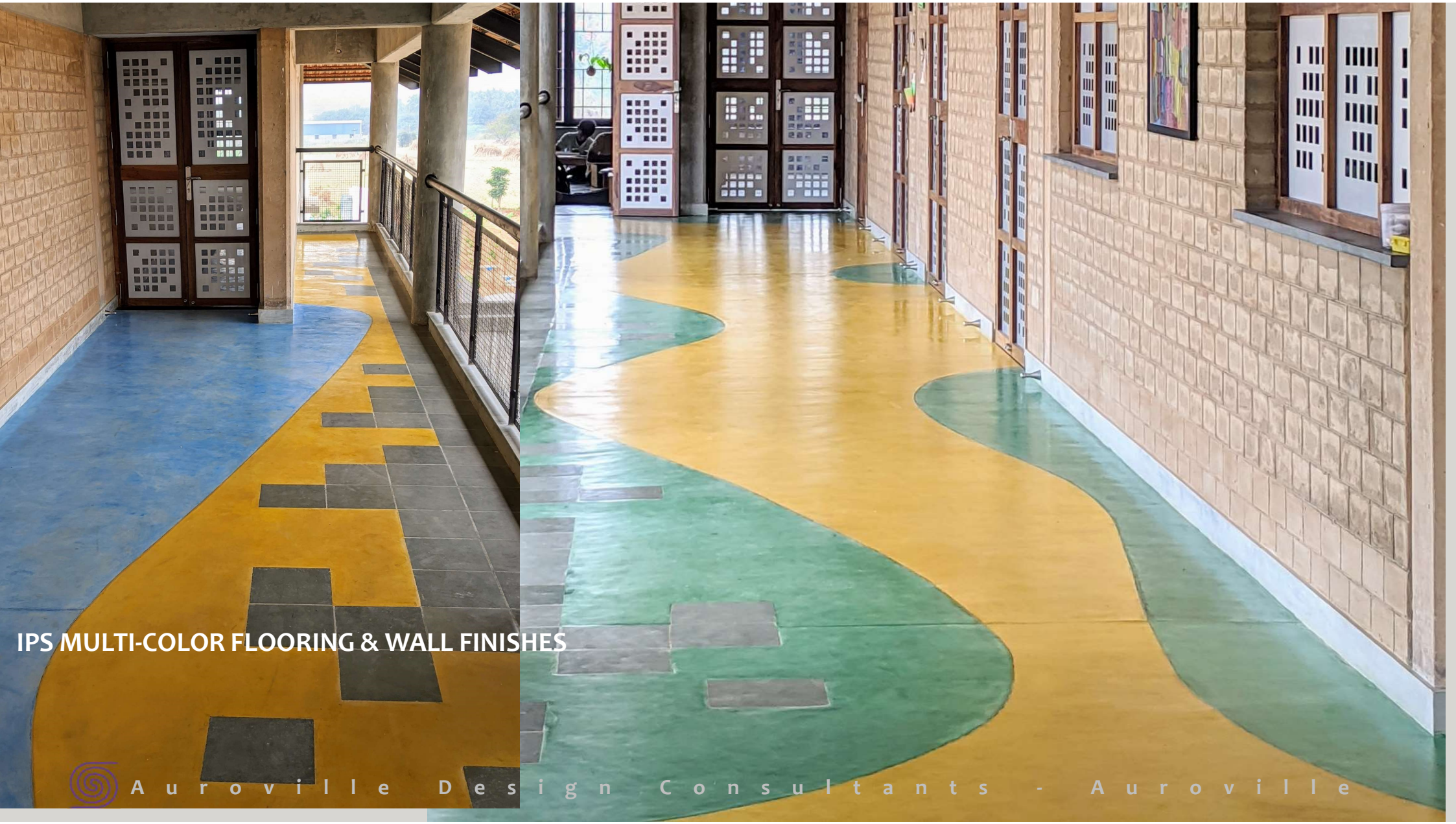
- Made from low temperature kiln bricks, cottage industry
- Reduced use of steel and cement
- Used as intermediate floors
- Skill upgradation for owner built houses for EWS / LIG
- Lower embodied energy compared to RCC slabs


RE-USE OF WASTE STYROFOAM AS SOUND / HEAT
INSULATION BTW FLOORS AND ON THE ROOF



RECYCLED STYROFOAM / THERMOCOL

- Sequestering of a waste that is not easy to recycle
- Effective thermal and acoustic insulation
- Low input technology and easy to manufacture shredder
- Can be used as walling in EWS / LIG



IPS MULTI-COLOR FLOORING & WALL FINISHES

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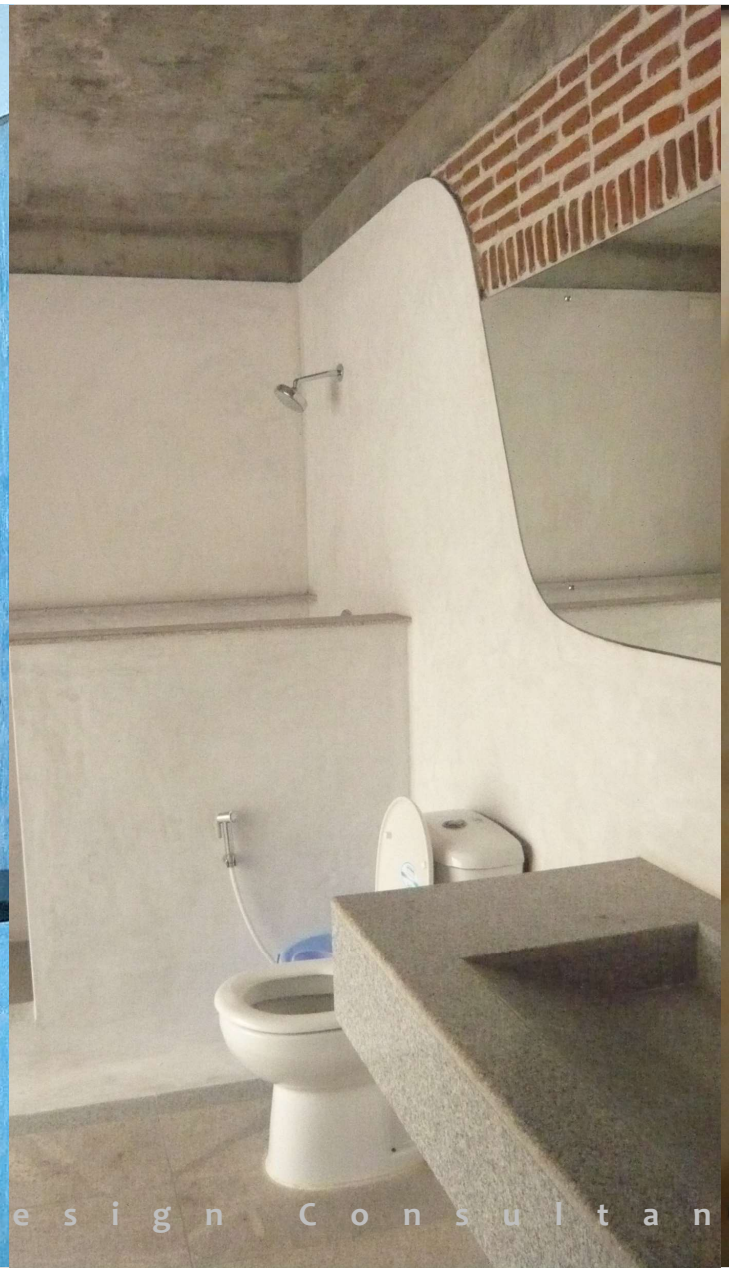
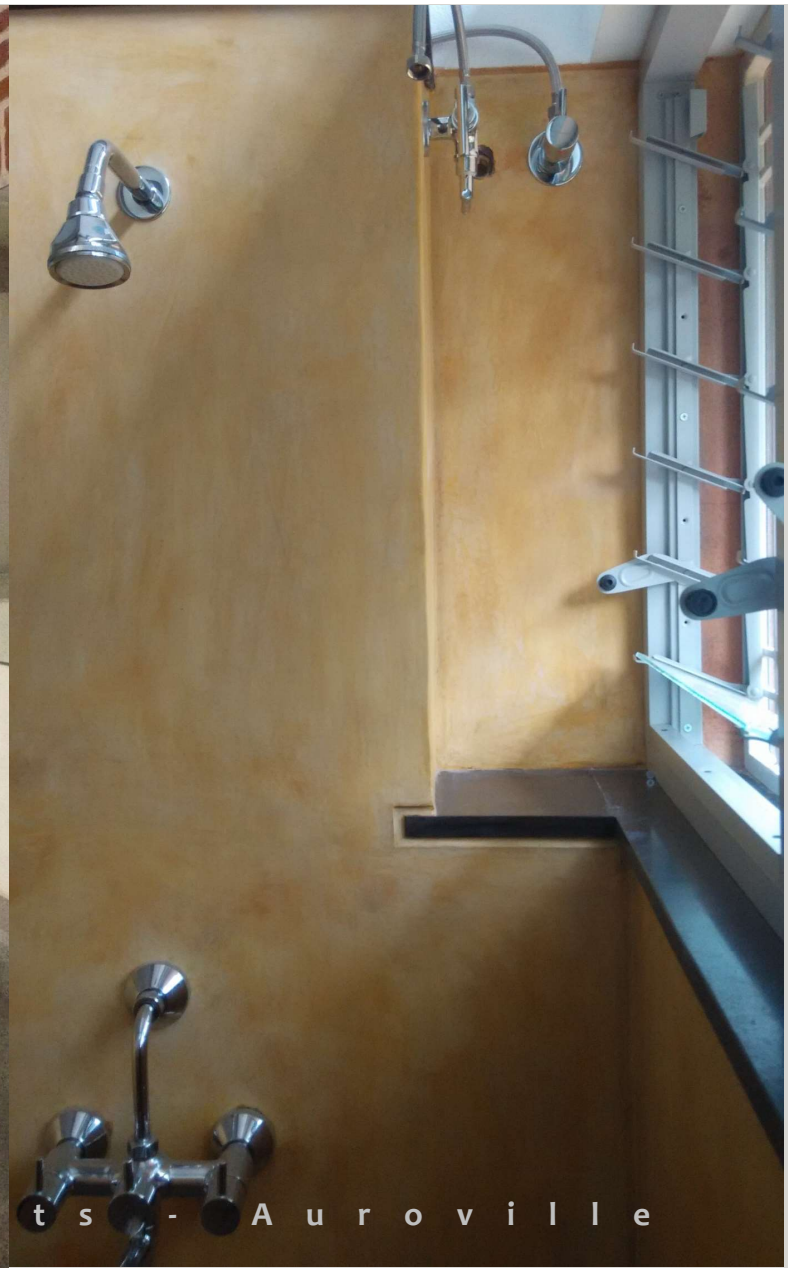
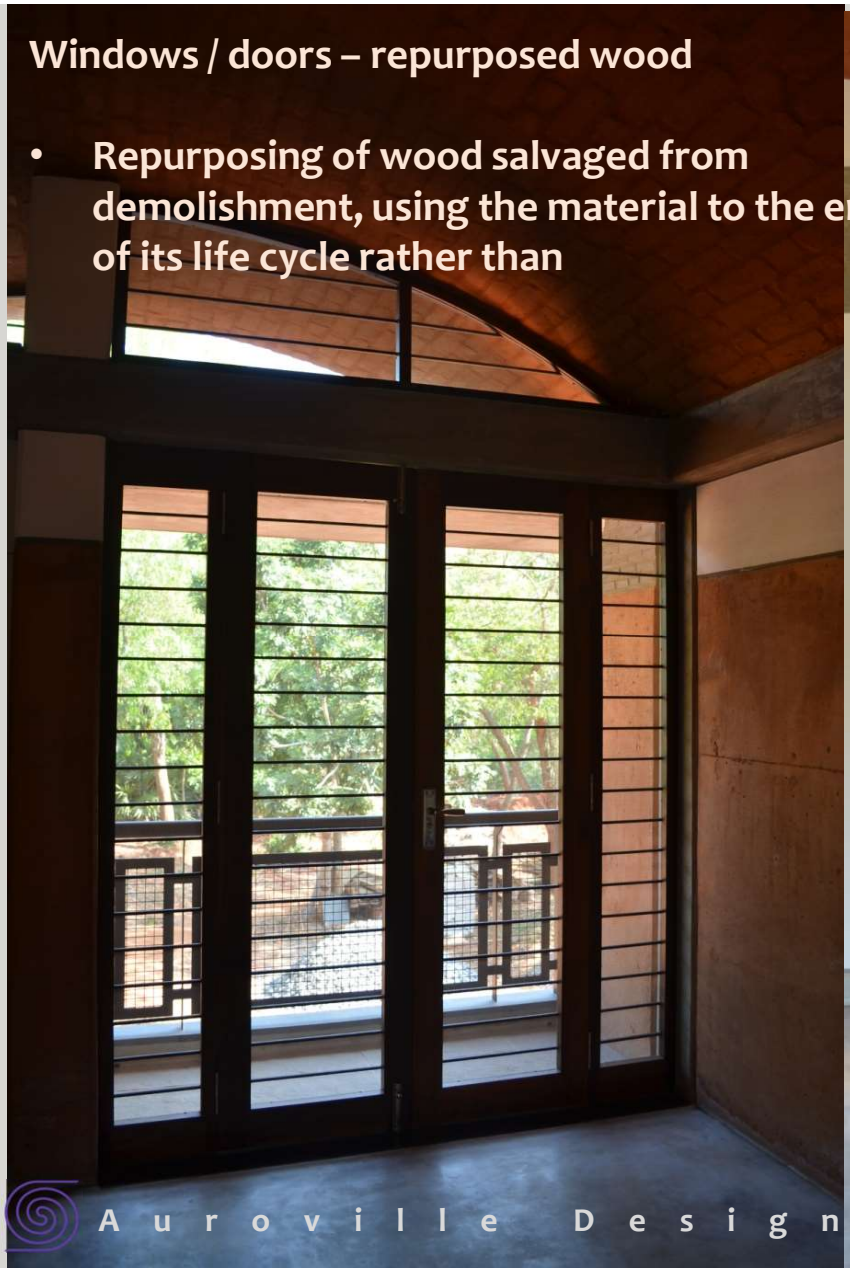
- Lower embodied energy compared to ceramic and other flooring tiles
- Easier to maintain and more climate appropriate
- Skill upgradation, useful for owner built houses for EWS / LIG





Windows / doors – repurposed wood

- Repurposing of wood salvaged from demolishment, using the material to the end of its life cycle rather than



Thank you