SDG7 AND SUSTAINABLE BUILT ENVIRONMENTS
ENERGY OPTIMISED, INCLUSIVE, PRODUCTIVE AND HEALTHY SPACES FOR MARGINALISED COMMUNITIES

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Criticality of Built Environments

- Raising temperatures
- Disasters that are frequent with increased intensities
- Building systems are inefficient and not resilient

- Build materials and construction techniques not adaptive
- Poor mitigation of indoor air pollution and heat from active sources
- Uncomfortable indoor conditions

- High cost to cooling and other energy needs
- Recurring costs for repairs and renovation
- High expenditures for healthcare and reduced days of productivity
Approach of SDG7 enabled Built Environments

Energy Optimisation

Sustainable Energy

Sustainable Built Environments

Better Health and Wellbeing

Productivity Increase

Reduced Operational costs

Aspirational

Design and Technology as a catalyst combined with appropriate capital, training, linkages and policy environment
Ecosystem for Built Environments

Integrated Built Environments – Contextualised in Layouts, Materials, Construction Methodology

End User Financing – Inclusive, Patient, Flexible and Accessible

Socio-cultural considerations - Customisation based on participatory inputs for typology and segmentations
Focused Sectors

**Housing and Shelter**
Across tenure type (displaced to permanent), climate and disaster resilience for urban and remote contexts

**Workspaces**
Micro-businesses, animal husbandry, handicraft and agricultural built workspaces focused on increasing productivity, income, savings, resilience and aspirations

**Public Institutions**
Healthcare, Day-care, educational spaces, rural infrastructure like libraries, kitchens, community halls etc for resilient and long term assets for community

- Seen: Construction Worker Housing in Bengaluru, KA
- Seen: Cool roofing integrated with Task lighting for home based tailors, KA
- Seen: Village level Clinics in heat stressed communities, KA
Housing and Shelter
Across tenure type (displaced to permanent) for urban and remote contexts

Increased Heat Stress (and Cold Stress) due to use of Unsustainable Materials
- Heat trapping materials
- Lack of proper ventilation
- Cooking and other activities also increase indoor heat stress and air pollution with lack of ventilation

Lack of Access to Reliable Energy
- Increased power-cuts in summers and monsoons.
- Voltage fluctuations disallowing use of critical cooling appliances

Poor access to Inclusive Financing and Conducive Subsidies
- Groups with no security of land require access to affordable housing subsidized by government or private employers
- Few long term, low interest, high risk loan portfolios for large capital investments of resilient housing or cool roofing solutions
Housing and Shelter
Across tenure type (displaced to permanent) for urban and remote contexts

Solution Matrix
A. Improved (Cool) Roofing
   • Surface finishes
   • Insulated Panels
   • Improved Slabs

B. Complete New construction or Upgrades for Energy Optimisation & Climate Resilience
   • Homes (Portable and Permanent)
   • Home based workspaces

C. Efficient Equipment & Sustainable Energy Integration
   • Lighting and Fans
   • Air conditioning and active cooling
   • Others – Water, Cooking etc
Productive Workspaces
Across Micro-businesses, animal husbandry, handicraft and agricultural

Loss of Health and Wellbeing
- Excessive heat or cold stress
- Increased indoor air pollution where active heat sources like forges, kilns etc
- Extreme drudgery due to poor ergonomics, manual labour and inefficient layout or poor lighting
- Hazardous conditions resulting in injuries

Loss of Productivity
- Hours and days lost due to extreme temperatures worsened by poor infrastructure
- Production reduction due to spoilage and damages caused by ad-hoc storage
- In livestock, increased mortality rates and production loss

Loss of Income
- Recurring repairs and upgrades in built environment
- Increased cost due to energy inefficiencies
- Increased expenditure to safeguard against losses
- Income loss due to health and productivity
Productive Workspaces
Across Micro-businesses, animal husbandry, handicraft and agricultural

Solution Matrix
A. Optimal Natural Light and Thermal Comfort

B. Efficient Layouts and Ergonomics for Work
With Branding and Signages for Optimal Footfall

C. Efficient Heating and Mechanised Appliances Integrated with Clean Energy

D. Disaster Resilience and Futuristic in Design and Application

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Public Institutions
Across Healthcare

Lack of and Gaps in Infrastructure
50% of all health centres are yet to be set up
Guidelines for setting up energy optimised centres are nascent and need to be developed into training modules for every level of governance

Wellbeing and Productivity of Medical Staff
Lack of access to basic services increase drudgery of staff
Cold and Heat stress decrease wellbeing in staff
Recurring repairs and energy gaps further affect staff productivity

Not inclusive to climate, community, cultures
Health centres are rarely designed with climate and local construction practices
Lack of community ownership in maintenance, repair and upkeep
Universal accessibility features like ramps, grab bars etc. are not considered as part of the centre design affecting access
Public Institutions
Across Healthcare

Solution Matrix
A. General Care Facilities
for last mile services at village, block, district levels

B. Maternal and Child Care Facilities
for Delivery, Pre-natal waiting rooms etc

C. Speciality Care for Cancer, TB, Eye-care etc
for Consultations, Recovery, Palliative Care

D. Pandemic and Emergencies Health Infrastructure
Portable and Quick to Deploy during Emergencies

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Other Public Institutions
Day-care, educational spaces, rural infrastructure like libraries, kitchens, community halls etc.

Bridge Schools, Anganwadis, Community Centres

Before

After

Bridge Schools in Bangalore, KA | Anganwadi in TN | Community Kitchens in KA, Library and AV Rooms in Manipur
Phase 2: Ecosystem for Built Environments

- Incubation and Capacity Building within the Construction Ecosystem
  - Masons, contractors, fabricators, carpenters and other tradespersons

- Financing and Policy schemes, subsidies and guidelines
  - Tech, finance, end user segmentations and capacity building
The roof accounts for **70% of heat gain** in a building, making it a critical element of intervention for designing **heat-resilient structures**.