URBAN ARCHITECTURE FOR RURAL EAST AFRICA:
A Sustainable Solution

For Development Efforts in East Africa

Dr. Craig Baltimore, SE

Cal Poly at San Luis Obispo

Department of Architectural Engineering

CAL POLY ARUP

San Diego 2010

Order of Presentation

Introduction

Lessons Learned

Implementation of Knowledge

Past Experience

Current Project

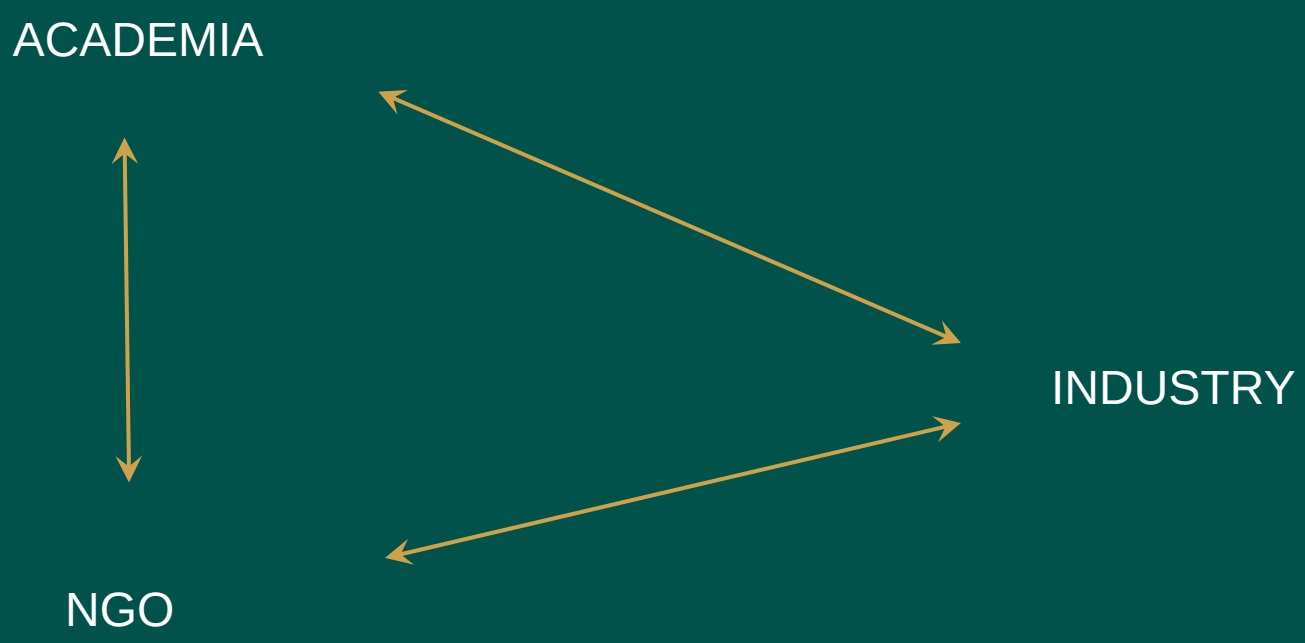
Questions

Introduction

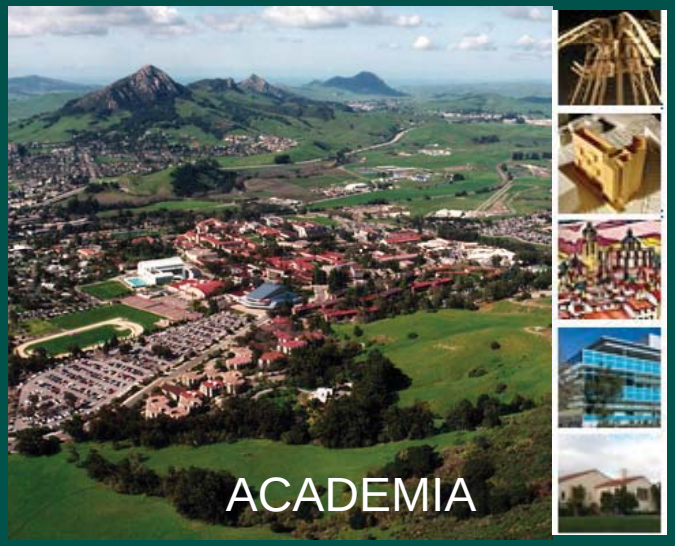
Knowledge Transfer on Their Terms

Not Ours

Collaboration Between



Introduction



- Architectural Engineering
- Architecture
- City & Regional Planning
- Construction Management
- Landscape Architecture

CAL POLY

The Mbesese Initative

ARUP

CAL POLY ARUP

San Diego 2010

Lessons Learned

First Develop Relationships
First Discover the Culture
Second Determine Resources
Third UNDO Western Thinking
(labor vs machines)
Inquire and Problem Solve for
Long Term
Recognize You Are in for the
LONG Haul
Implement
Assess

Implementation of Knowledge Transfer

A Sustainable Solution

for

Urban Spaces

of

Rural Areas

Implementation of Knowledge Transfer

A Sustainable Solution

is defined as adaptation of technology to the resources (materials, skills, and culture) of a local population, and in such, allow the technology to be incorporated directly into the culture where betterment of life; self-empowerment; and growth can occur without continued outside influence. In the bush area of rural East Africa the resources and minimal (compared to the standards of a developed nation)

A Sustainable Solution

adaptation technology

resources local

incorporated culture

betterment of life; self-empowerment; growth

without continued outside influence

Implementation of Knowledge Transfer

San Diego 2010

Urban Spaces
of
Rural Areas



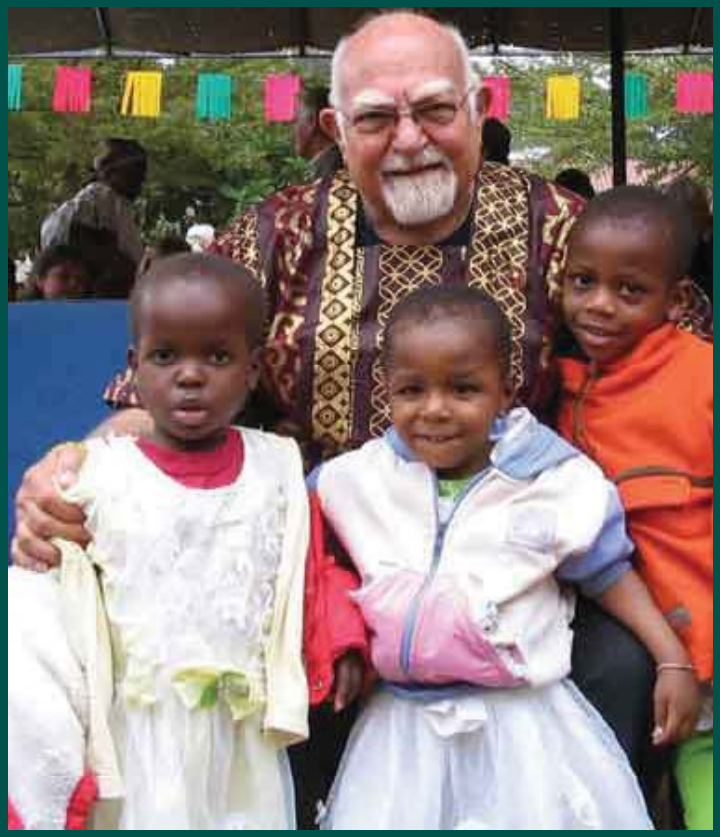



CAL POLY ARUP

Past Experience - Kenya

Nyumbani

- Republic of Kenya
- Kiswahili word for “home”
- Est. 1992
- Children’s Home
- Diagnostic Laboratory
- Village Project



Past Experience - Kenya

Nyumbani Village

- Eastern Province
- AIDS Affected Community
- “Two Forgotten Generations”
- 1,200 Target Capacity
- 1,000 Acre Site
- Sustainability Model

CAL POLY ARUP

San Diego 2010

Past Experience - Kenya

Nyumbani asked for specific help (find solutions)

Senior Project

- Cement Stabilized Soil Blocks
- Impact Loading
- Medical Supplies

Past Experience - Kenya

- DESIGN+ HOPE
  - Cal Poly Arch. Student: Matthew Ridenour & David Aine
  - Cal Poly Arch. Eng. Students
  - Church from O.C., Calif.
  - Namanga, Kenya
  - Rural Maasai people in Malai Tisa, Kenya (20,000 pop.)
  - 2 hr. Walk to Nearest Clinic

Current Project - Tanzania

- United Republic of Tanzania
  - Kilimanjaro Region
  - District of Same
- Catholic Diocese of Same
  - Primary Schools
  - Secondary Schools
  - Medical Clinics
  - Orphanage
  - AIDS Education

CAL POLY ARUP

San Diego 2010

Current Project - Tanzania

Where do you start ?

Undoing what you know !

Current Project - Tanzania

- Establish Relationships
  - Western Ways don't work.
    - ~~Schedule and Tasks~~
    - ~~Money and Materialism~~
  - Rural African Ways
    - Trust and Friendship
    - No clocks
- Determine Resources
  - Materials
  - Skill Sets
  - Lots of Labor
  - Little Machinery
- Discover the Culture
  - What is important?
  - What is the need?
  - What is success?
  - What is happiness?

Build a sustainable Polytechnic School

- To Serve
  - Local Area
    - Rec. Fields
    - Commerce
  - Extend Rural Area
    - All Religions
    - Non-Commuter
- To Demonstrate
  - We May Be Poor
  - But Look What We Can Accomplish
  - Source of Learning
  - Source of Pride
- To Educate

The Same Polytechnic

- Degree Programs
  - Accounting & Finance
  - Administration & Management
  - Agriculture Technology
  - Auto Mechanics
  - Computer & Electronic Repair
  - Construction Management
  - Development & Social Work
  - Hotel Management & Hospitality
  - Nursing
  - Teacher Certification

- **Educate in Terms of Life In Rural East Africa**

Year 1 & 2

Relationships

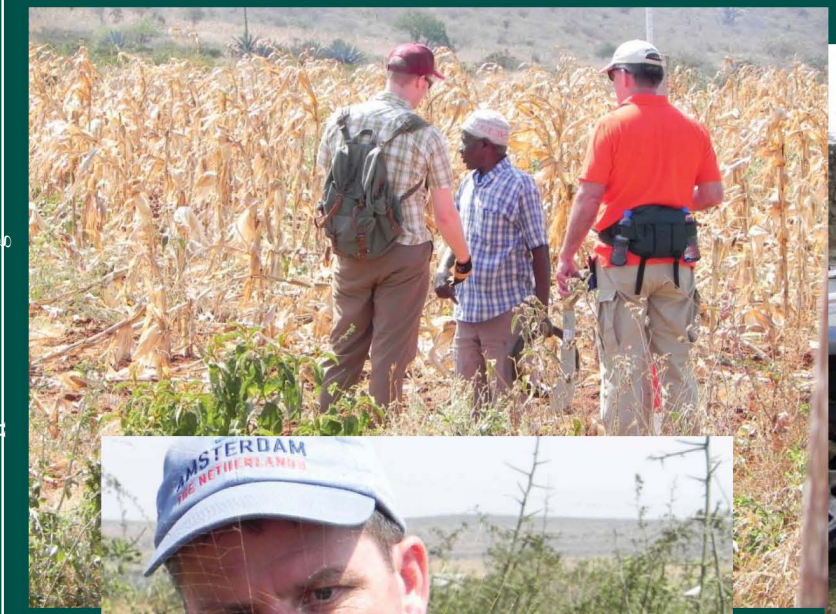
Defining and Understanding Culture

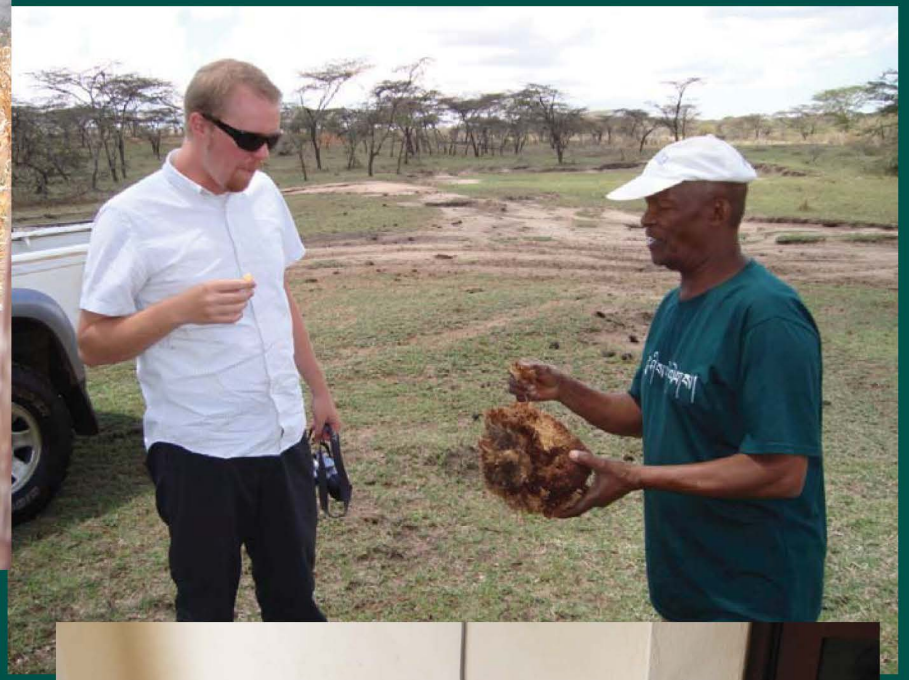
Resources

San Diego 2010

CAL POLY ARUP

The Same Polytechnic





Design Team

- Cal Poly at SLO
- Arup

Design Goals

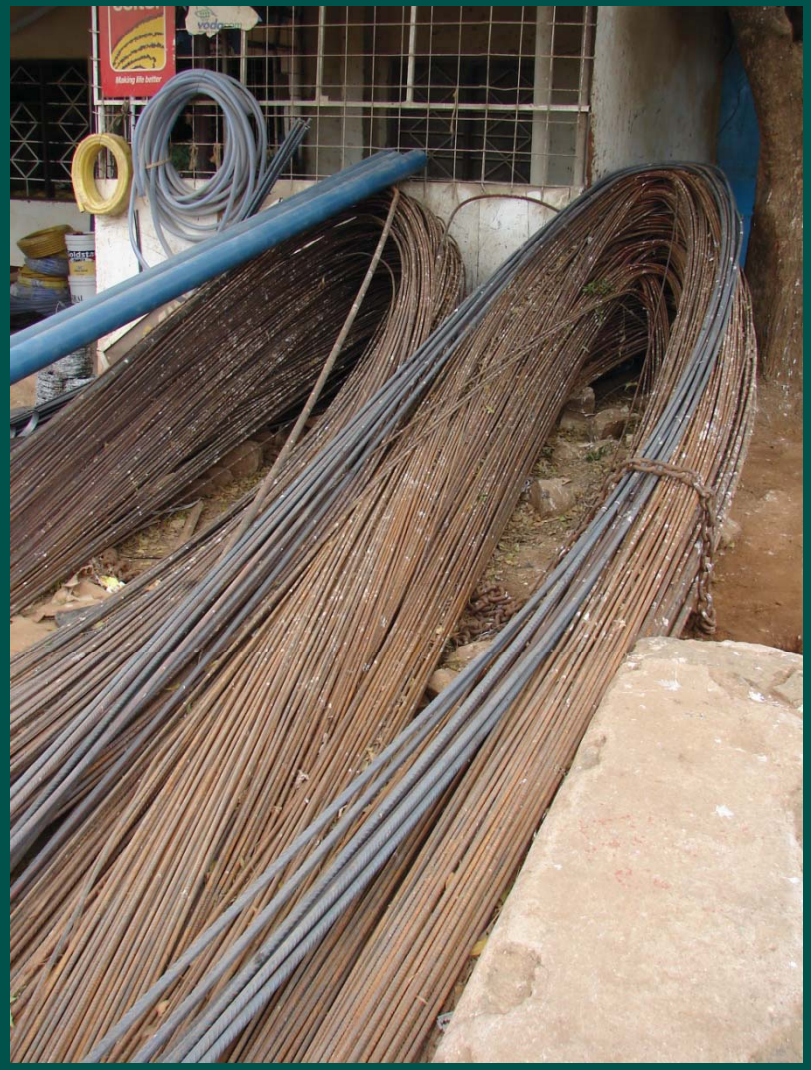
- Performance
  - Serviceability
  - Life Safety
  - Thermal Comfort
  - Energy Efficiency
  - Energy Independence
- Constructability
- Affordability
- Replication Model

Design Challenges

- Available Building Materials
  - Masonry units
  - Cement
  - Aggregate
  - Reinforcement
  - Steel
  - Timber

Design Challenges

- Available Building Materials
  - Masonry units
  - Cement
  - Aggregate
  - Reinforcement
  - Steel
  - Timber



Design Challenges

- Available Building Materials
  - Masonry units
  - Cement
  - Aggregate
  - Reinforcement
  - Steel
  - Timber

Design Challenges

- Work Force
  - Reasonable skill level
  - Available tools
  - Labor cost

Design Challenges

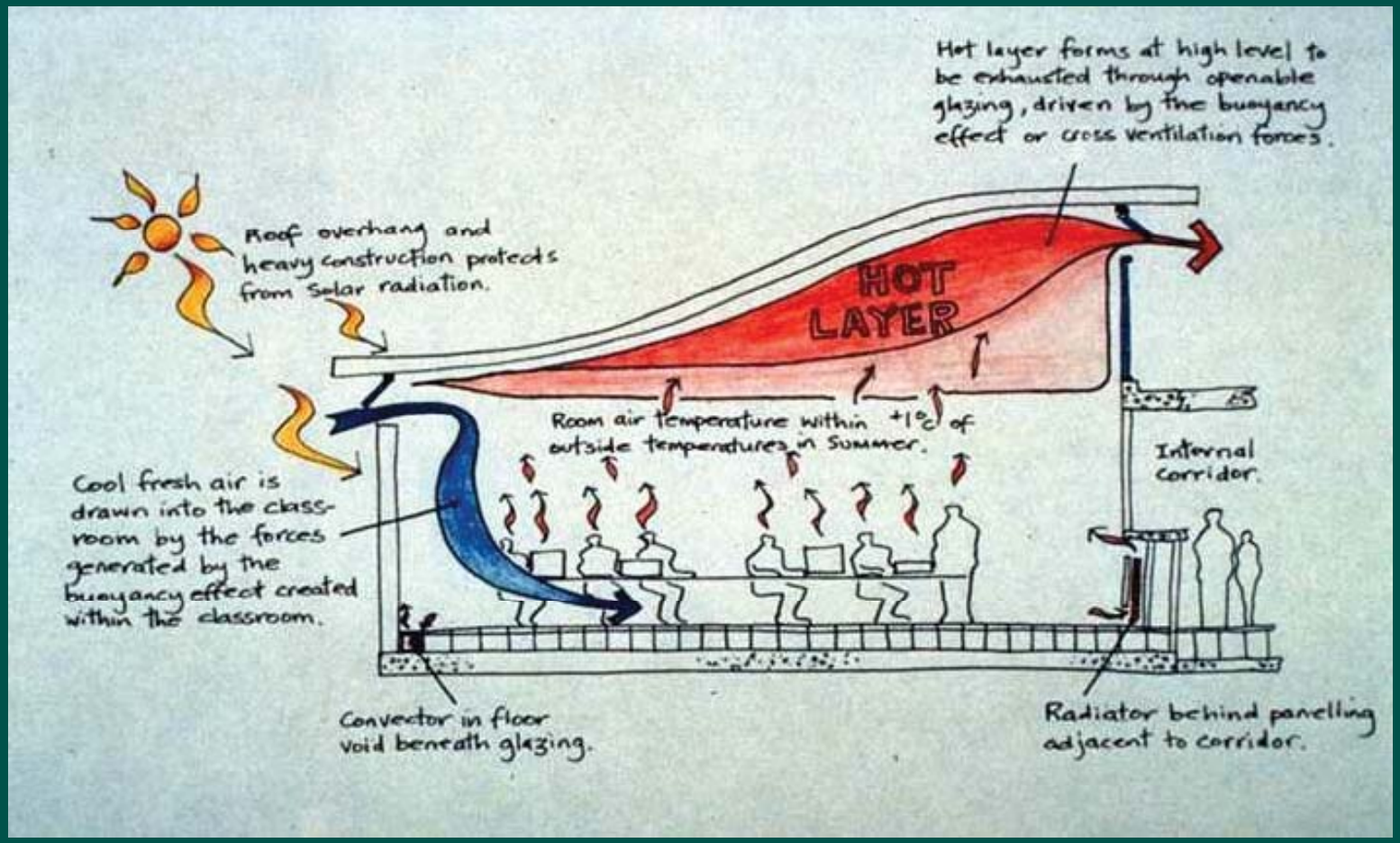
- Work Force
  - Reasonable skill level
  - Available tools
  - Labor cost

Design Challenges

- Climate
  - Arid/Semi-Arid Land
  - Dry & Rainy Seasons
  - High Temperatures
  - Humid Conditions
  - Solar Radiation

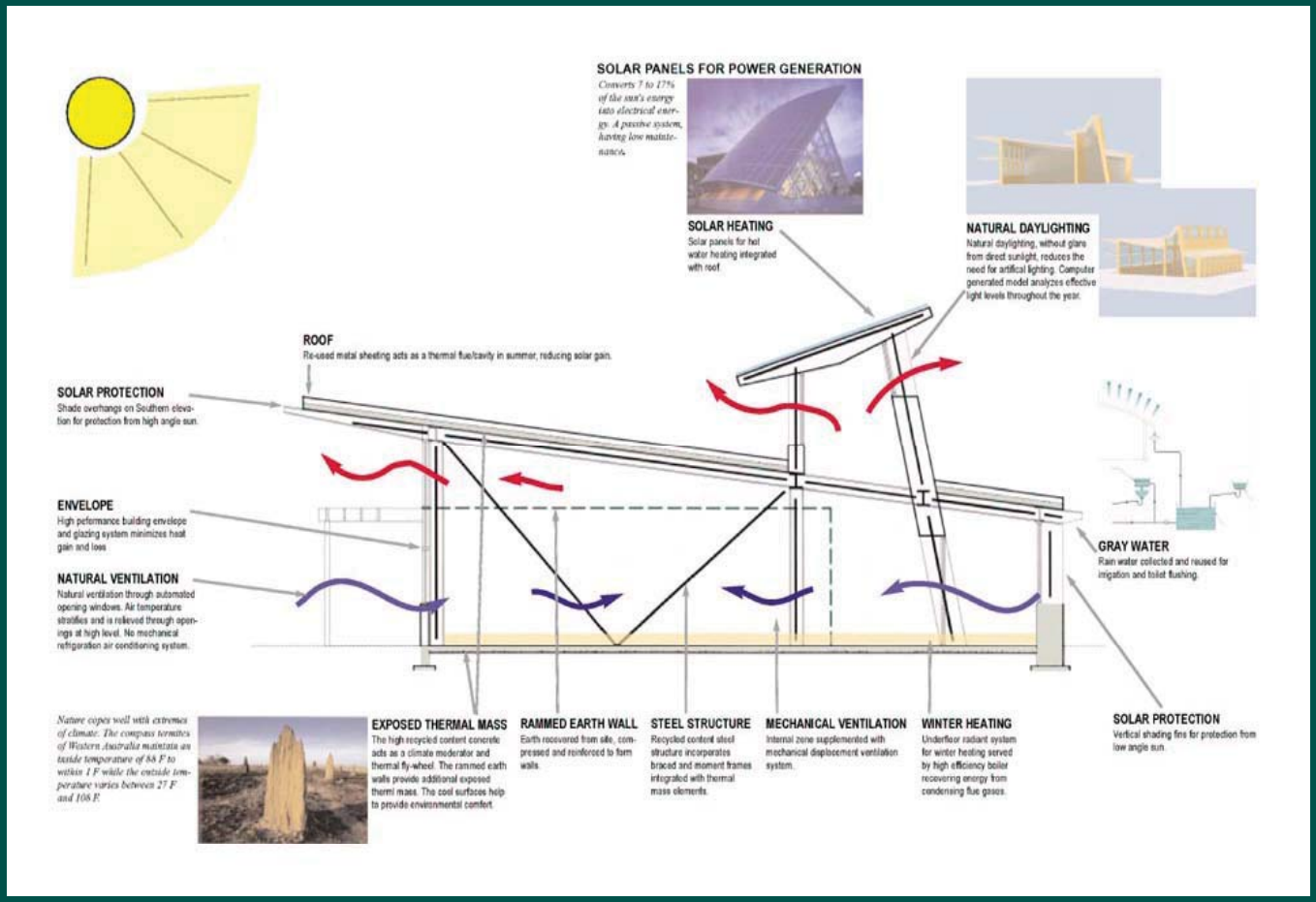
Proposed Systems

- Natural Ventilation – Thermal Comfort



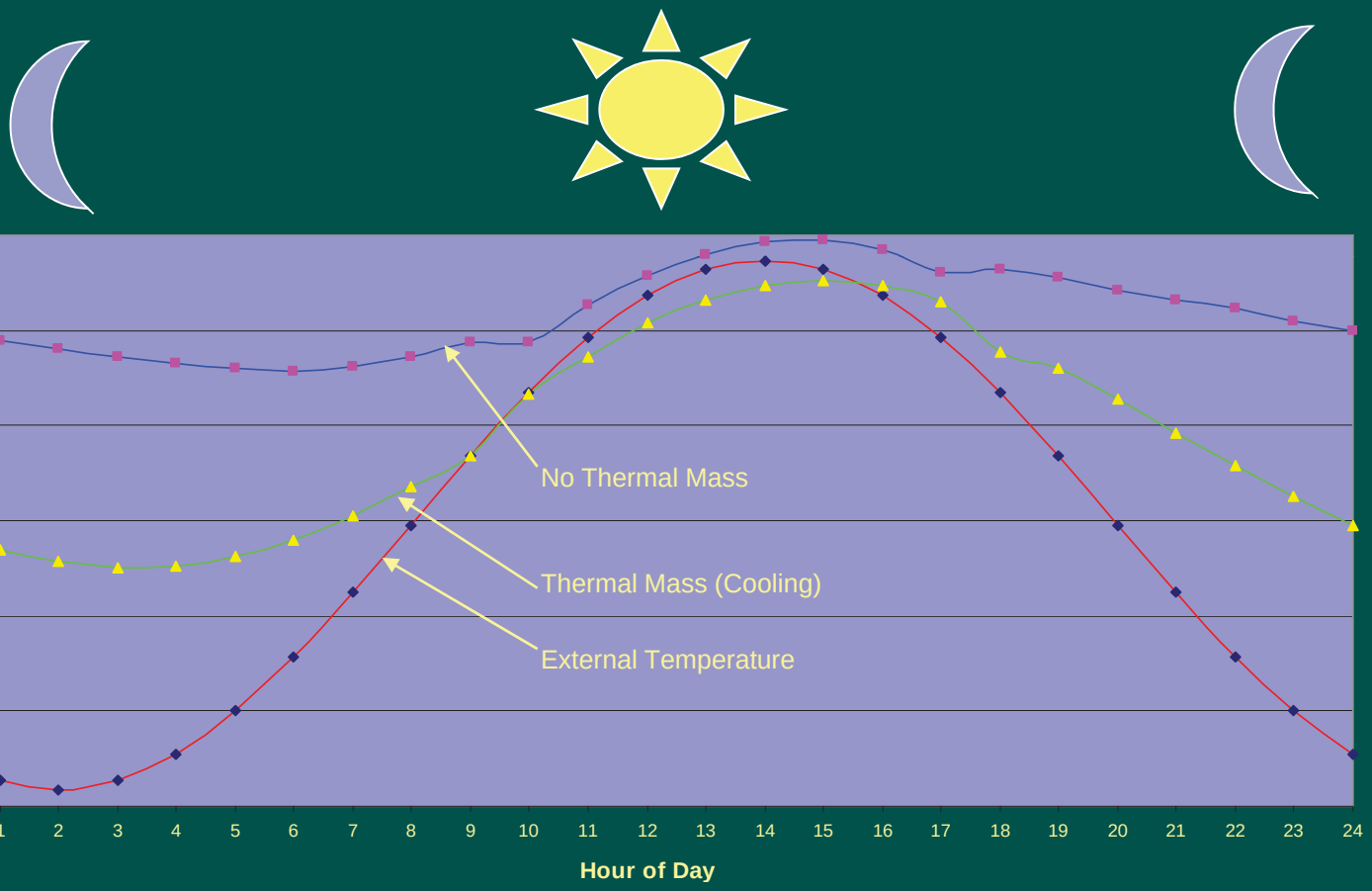
Proposed Systems

- Natural Ventilation – Thermal Comfort



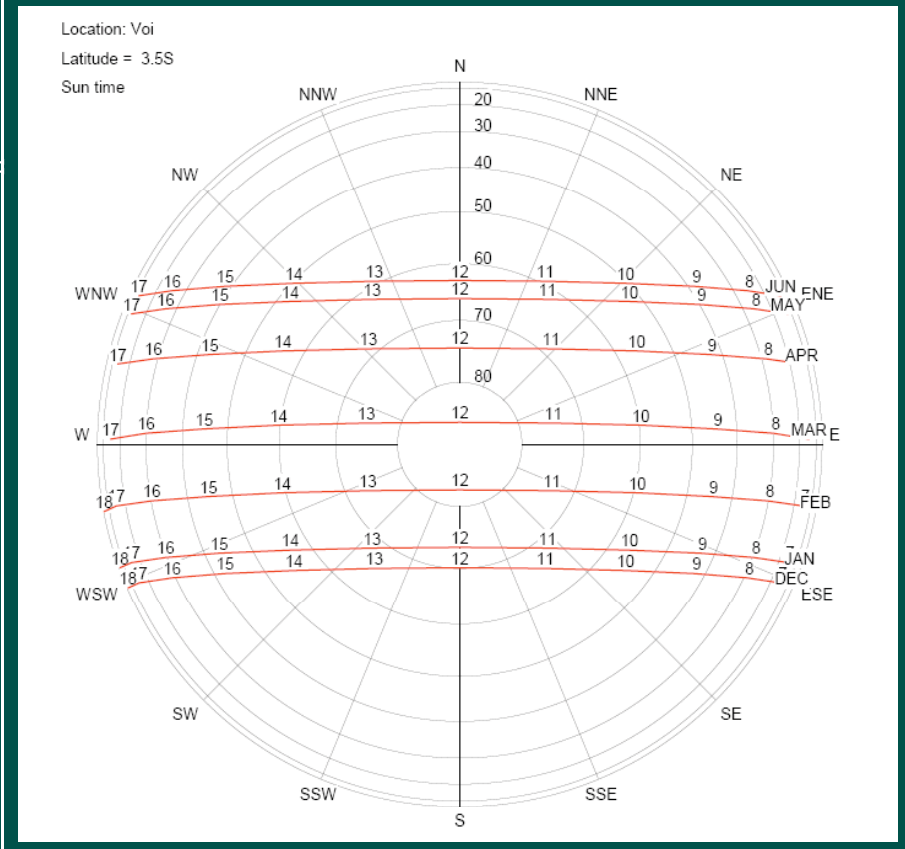
Proposed Systems

- Thermal Mass – Thermal Comfort



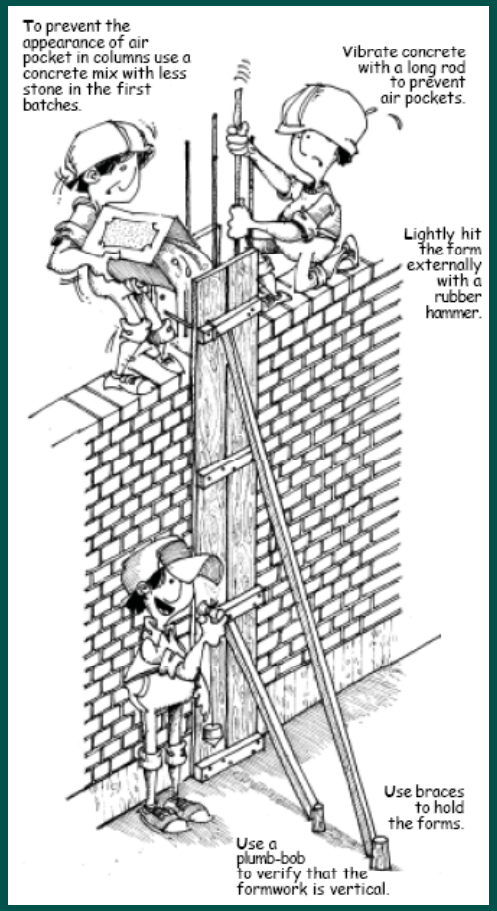
Proposed Systems

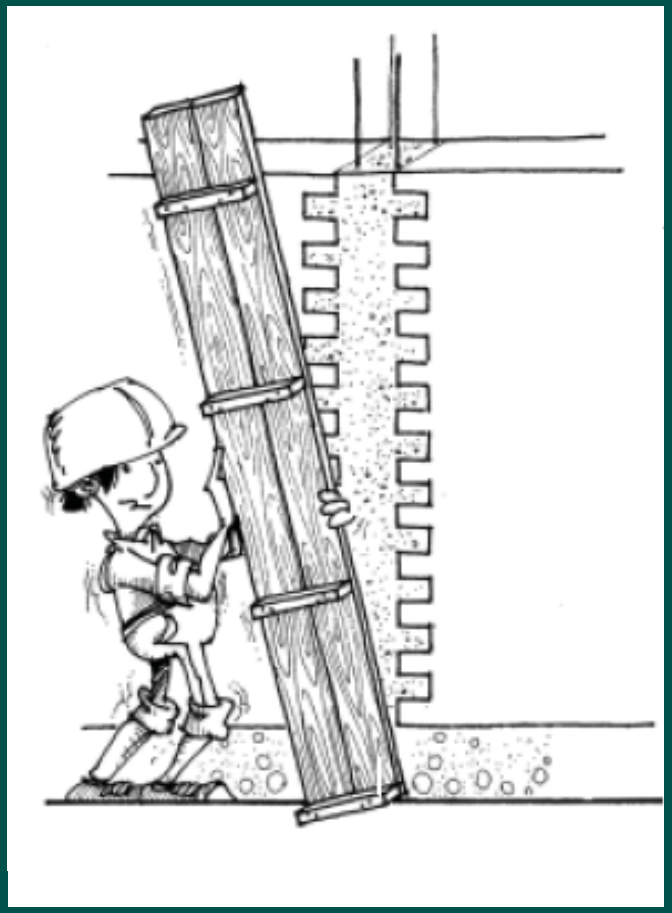
Daylight – Energy Efficiency



Proposed Systems

Confined Masonry





Forward Progress

- Conceptual Design
  - Space programming
  - Site survey
  - Master planning
  - Design narratives

Questions