

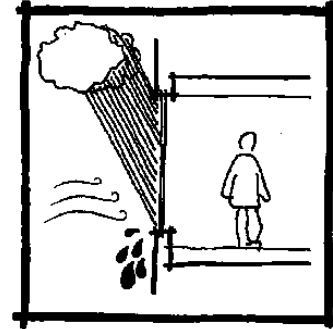
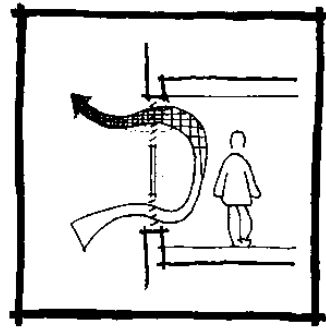
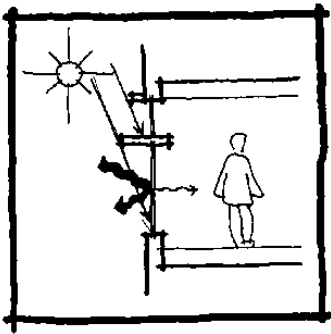
Green Design Innovative Building Envelope Systems

Gautam Bhasin
Arup

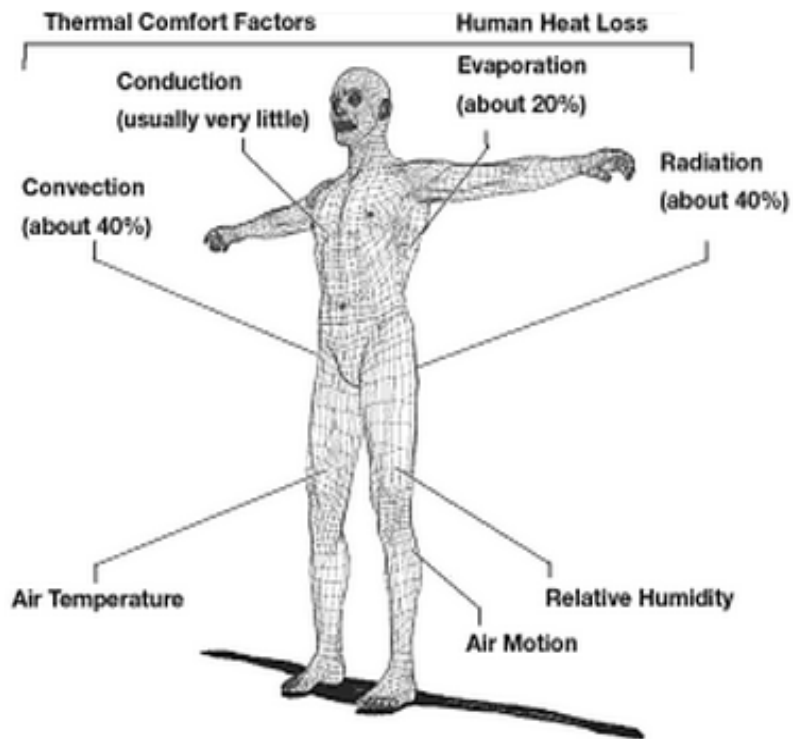


ARUP

Enclosure

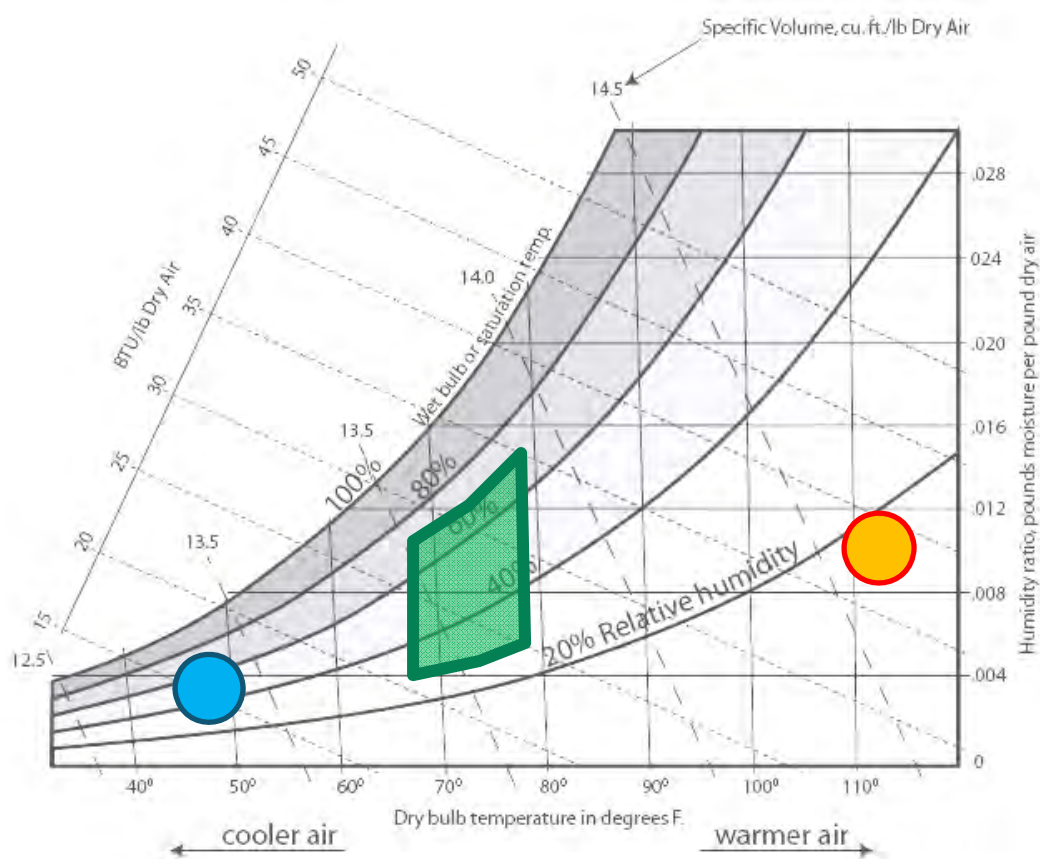


Identifying Comfort



- **Conduction**
- **Convection**
- **Radiation**
- **Evaporation**
- **Air Motion**
- **Relative Humidity**

Mapping Comfort



- **Temperature – 20 to 25 °C**
- **Humidity – 30 to 70 % RH**
- **Humidification / Dehumidification**
- **Heating / Cooling**

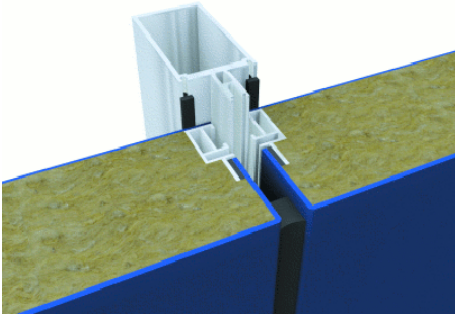
ARUP

Other Conditions

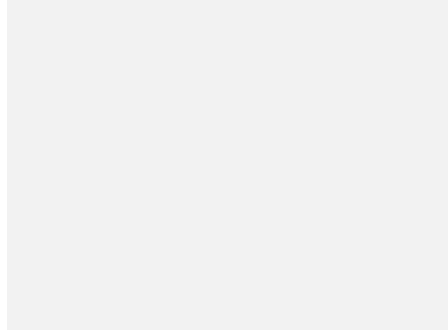


- **Metabolism / Activity Level**
- **Clothing / Insulation**
- **Air Movement**
- **Equipment**





Thermally
Efficient
Composites

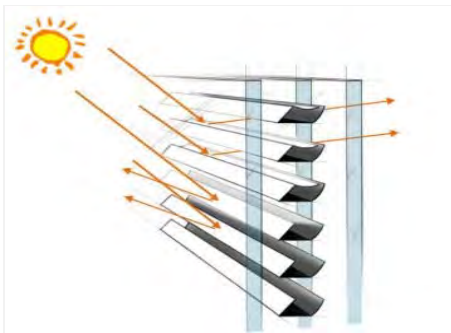
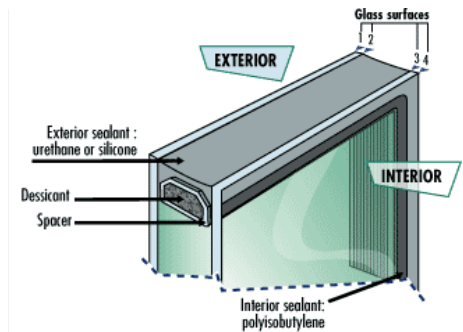


Inert Infill in
Glazing Units

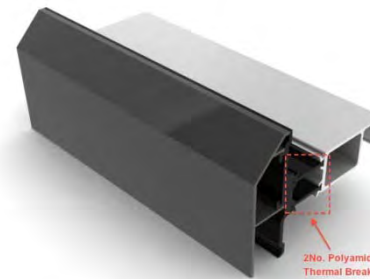
Warm Edge
Spacers



Third
Generation of
Glass Coatings



Self Shading
Glazing Units



Thermally
Bridged
Window
Systems

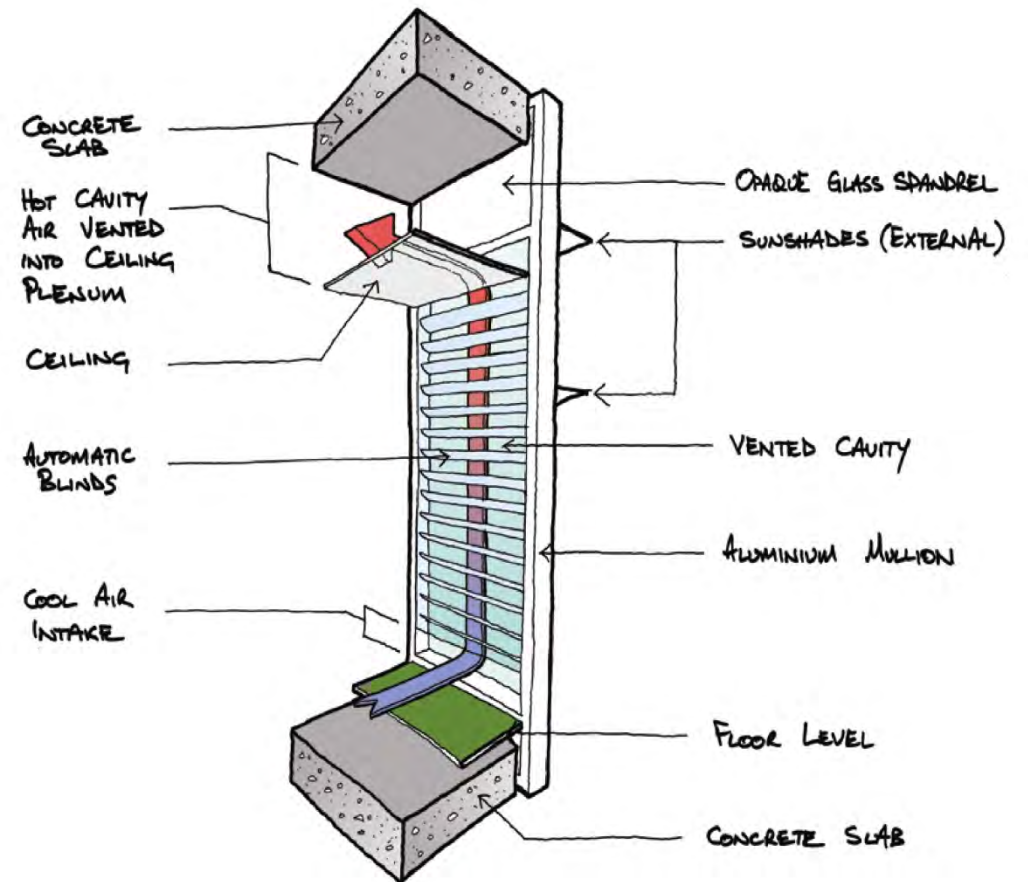
Reactive vs **Pro**active

Examples



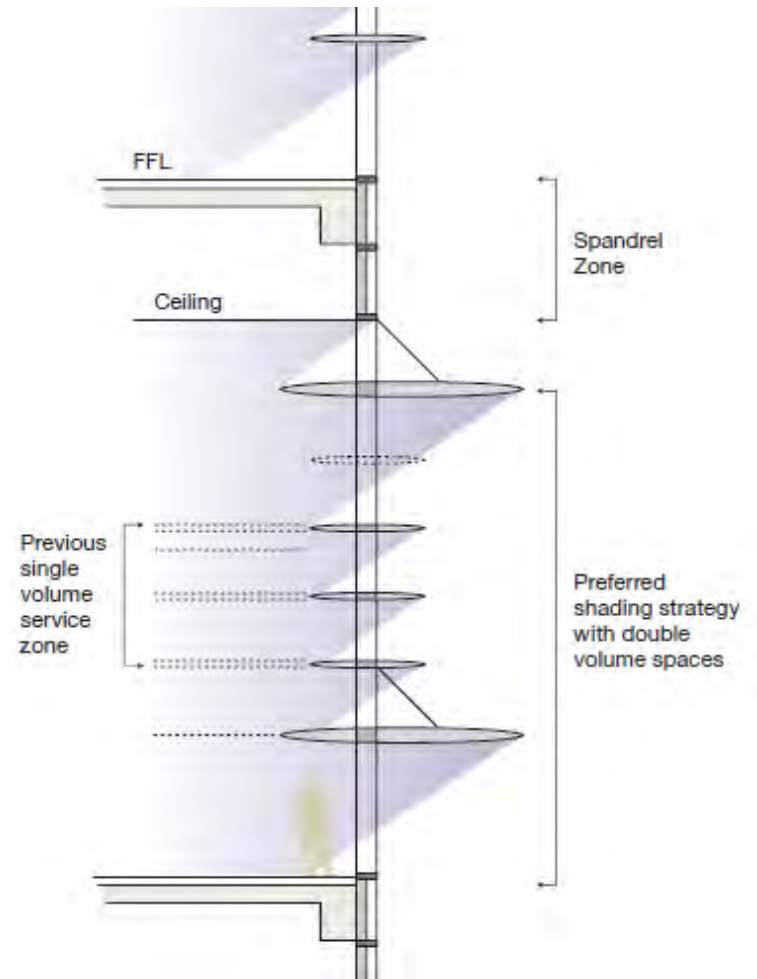
ARUP



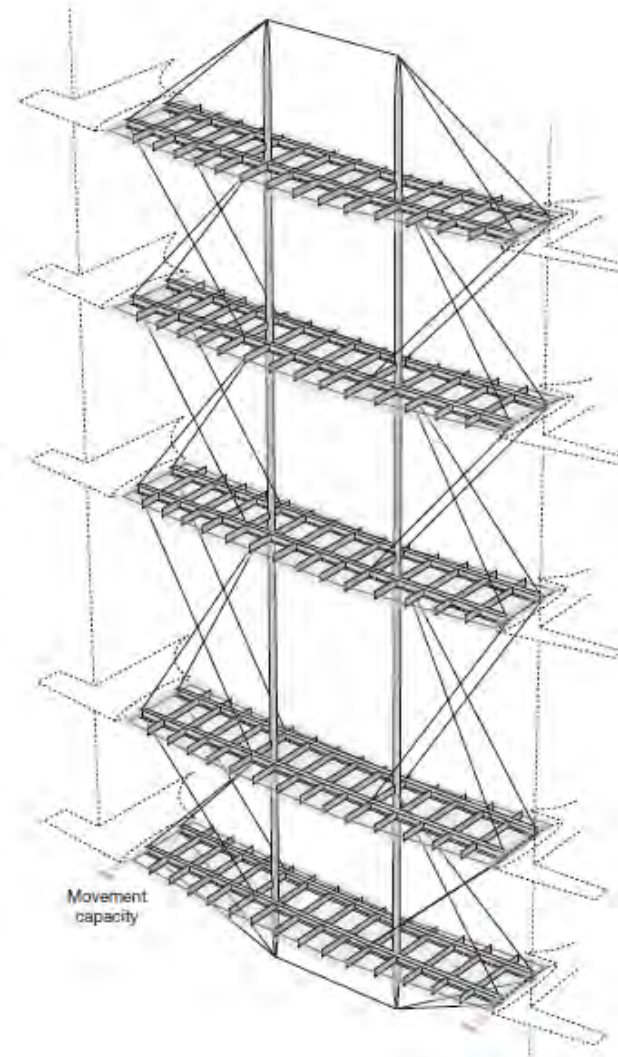


ARUP





ARUP

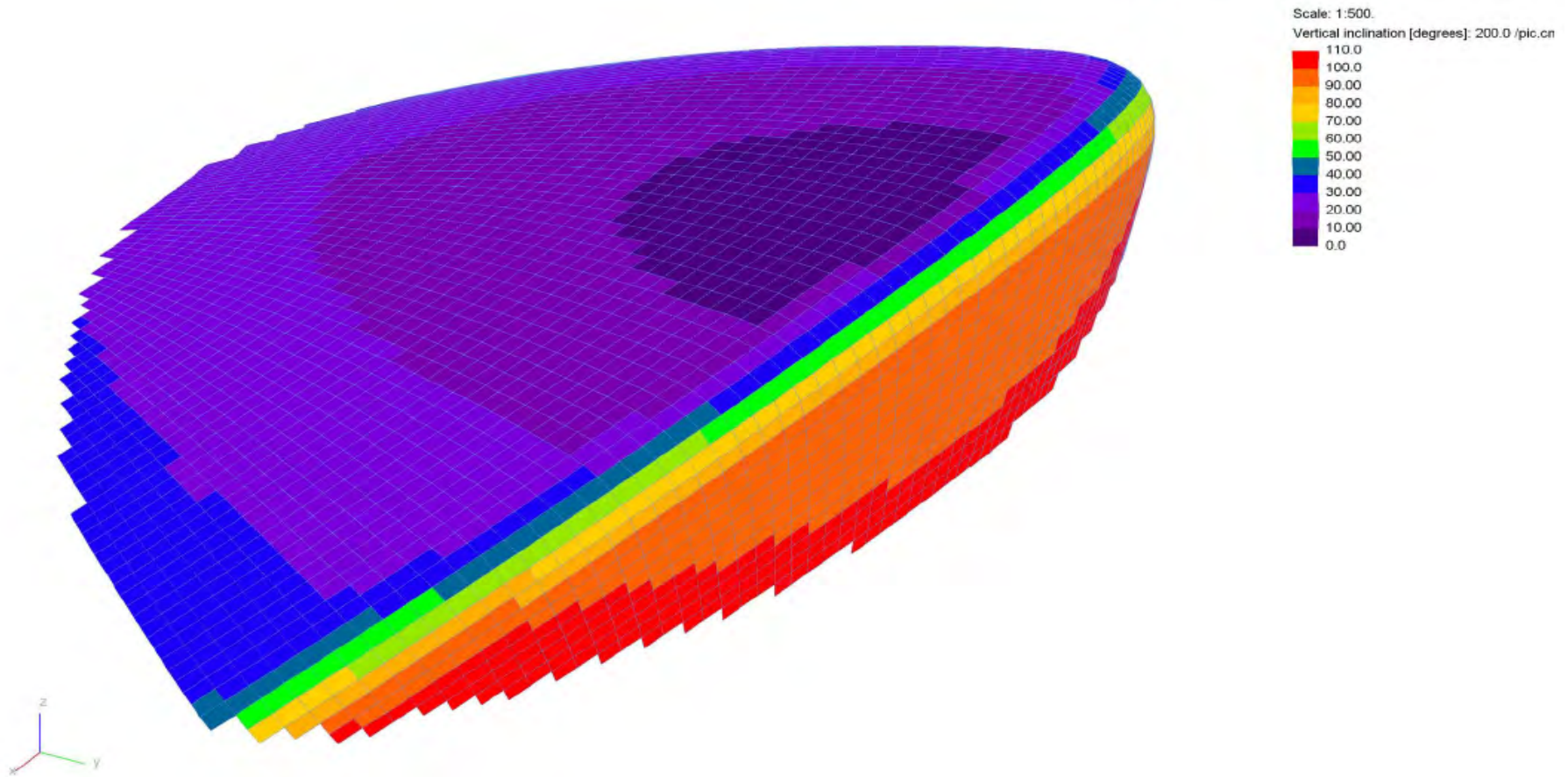


ARUP



2. Panel Analysis

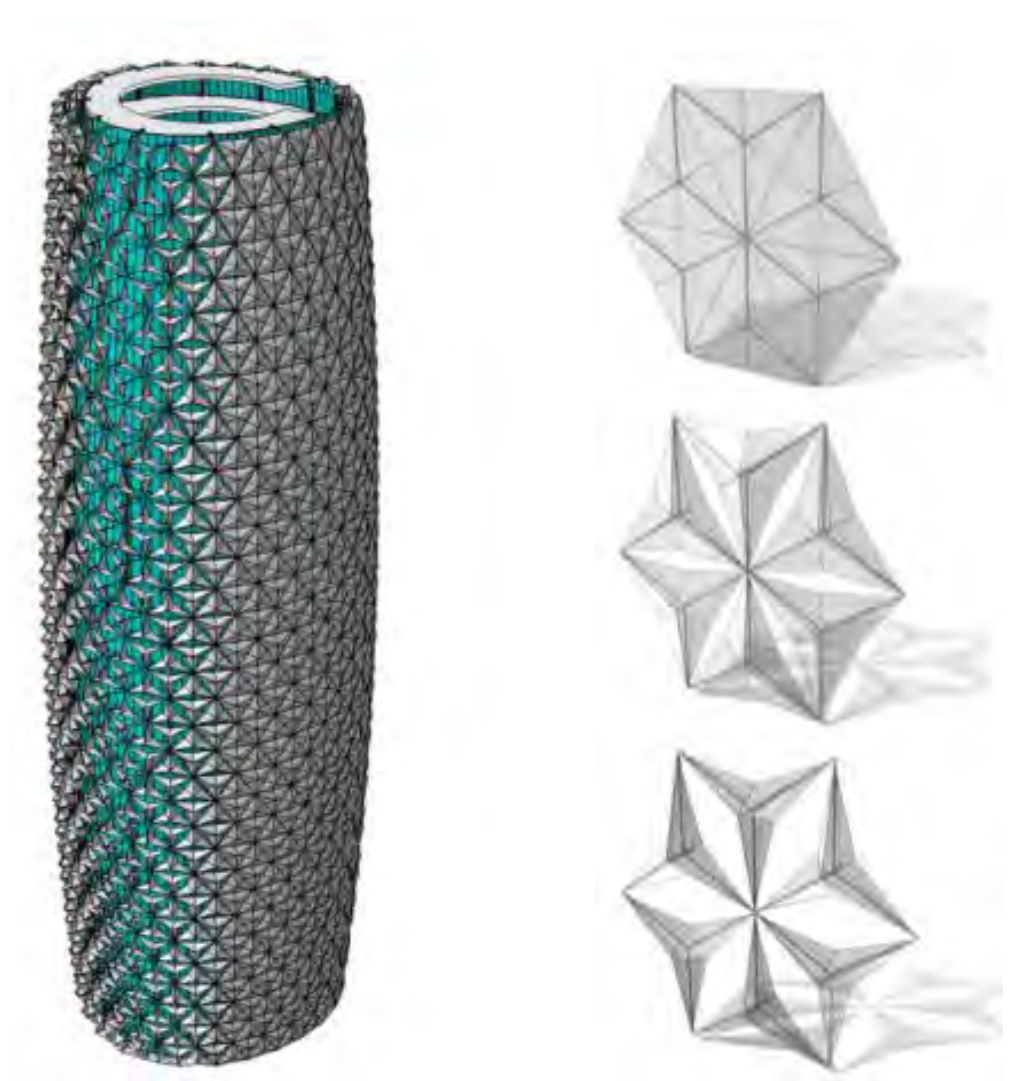
2.4 Angle of Inclination

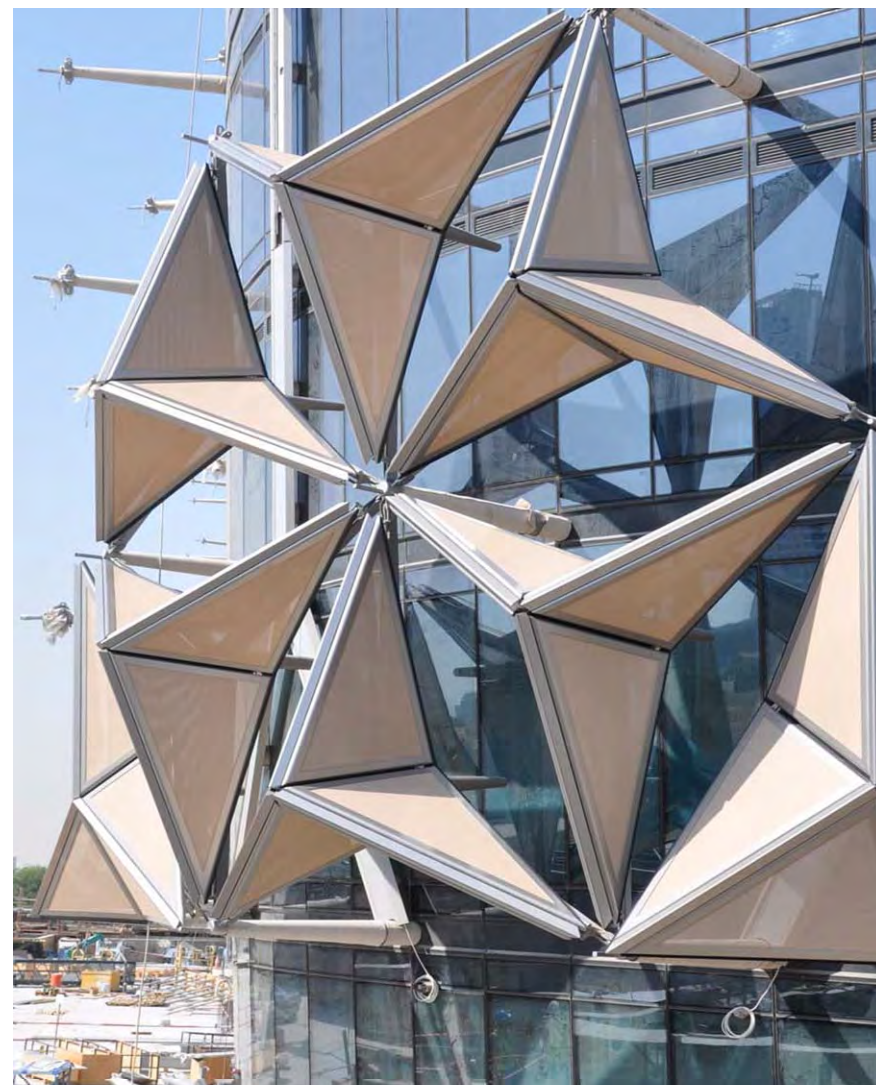
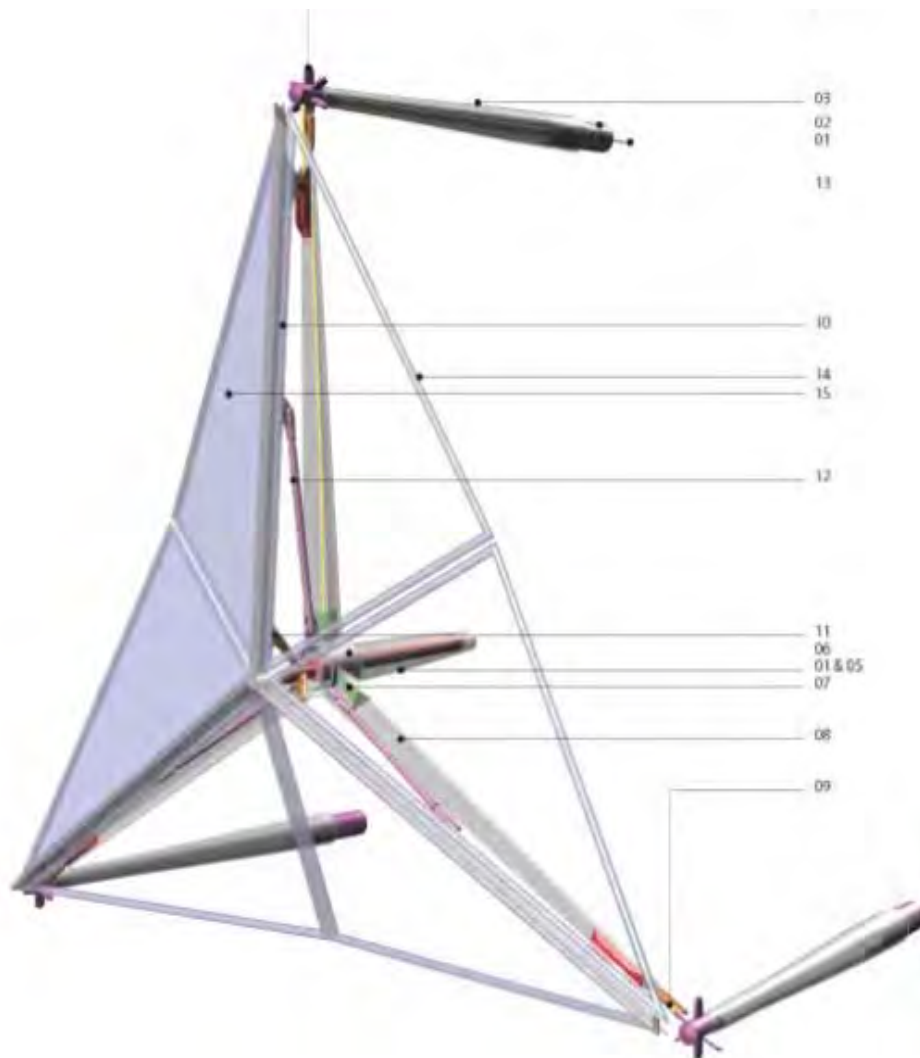


ARUP



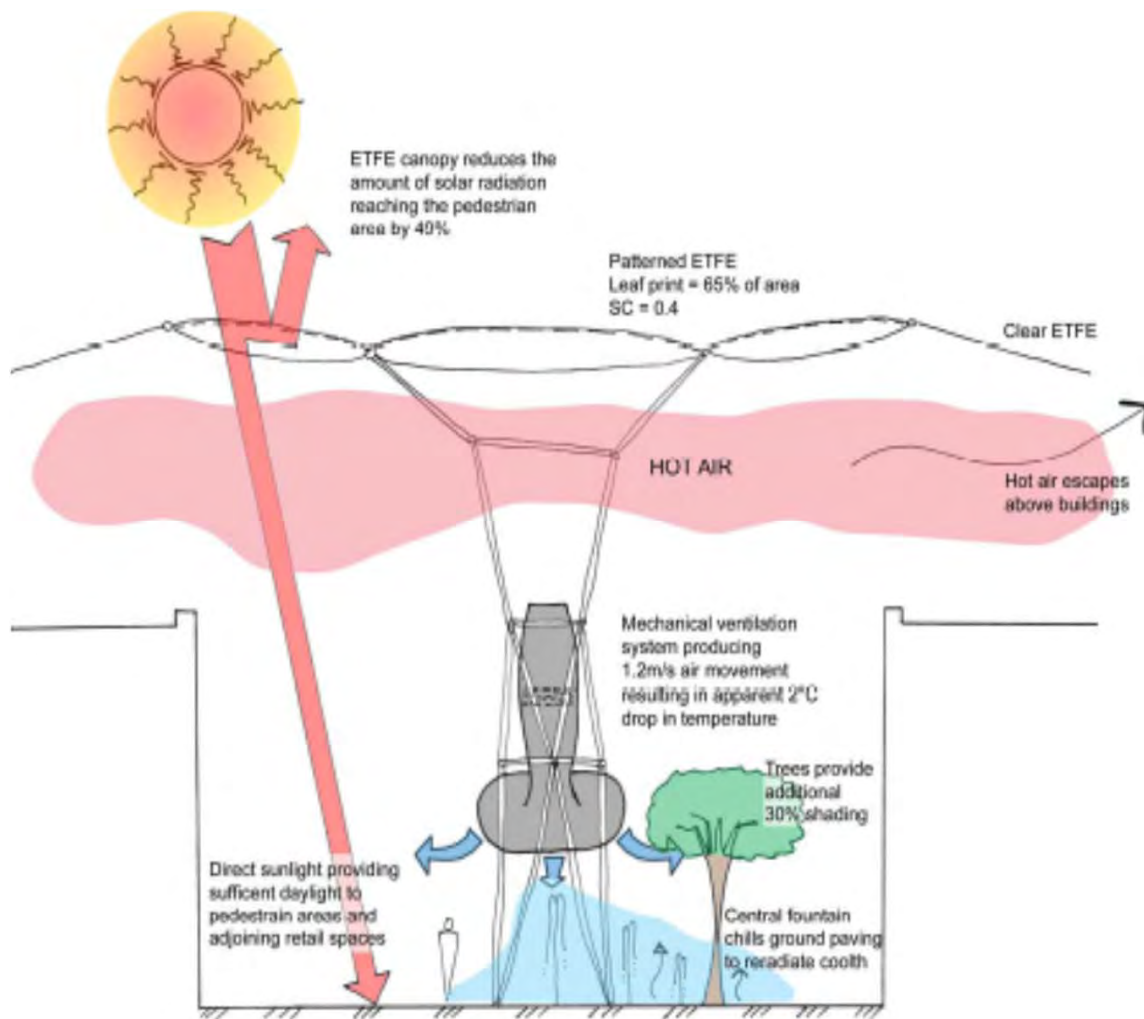
















ARUP

- Holistic Design Intent
- Responsive Architecture
- Integrating New Technologies

Thank You !

