

## First things first .....

The very first requirement of a hospital is that it shall cause neither human nor **ecological** harm

- *WHO*

# Impacts of Climate Change on -

1. Health of **consumers**
2. Buildings that deliver healthcare - **sustainable buildings**
3. And beyond.....**co-benefits** of addressing climate change

# Structure of my talk

In 2 sections, addressing the 2nd point - **sustainable buildings**

1. Physical design for mitigating climate change scenarios  
..... **Tangible issues**
2. Sustainability as better patient and staff outcomes  
..... **Intangible issues**

## Facts.....

(WHO paper)

- Hospitals use about twice as much total energy as traditional office space
- Their carbon footprint = 25% of total public sector emissions (NHS)
- Their toxic emissions undermine the very communities they are meant to serve
- Health impacts of ongoing global warming will put even more strain on the healthcare sector

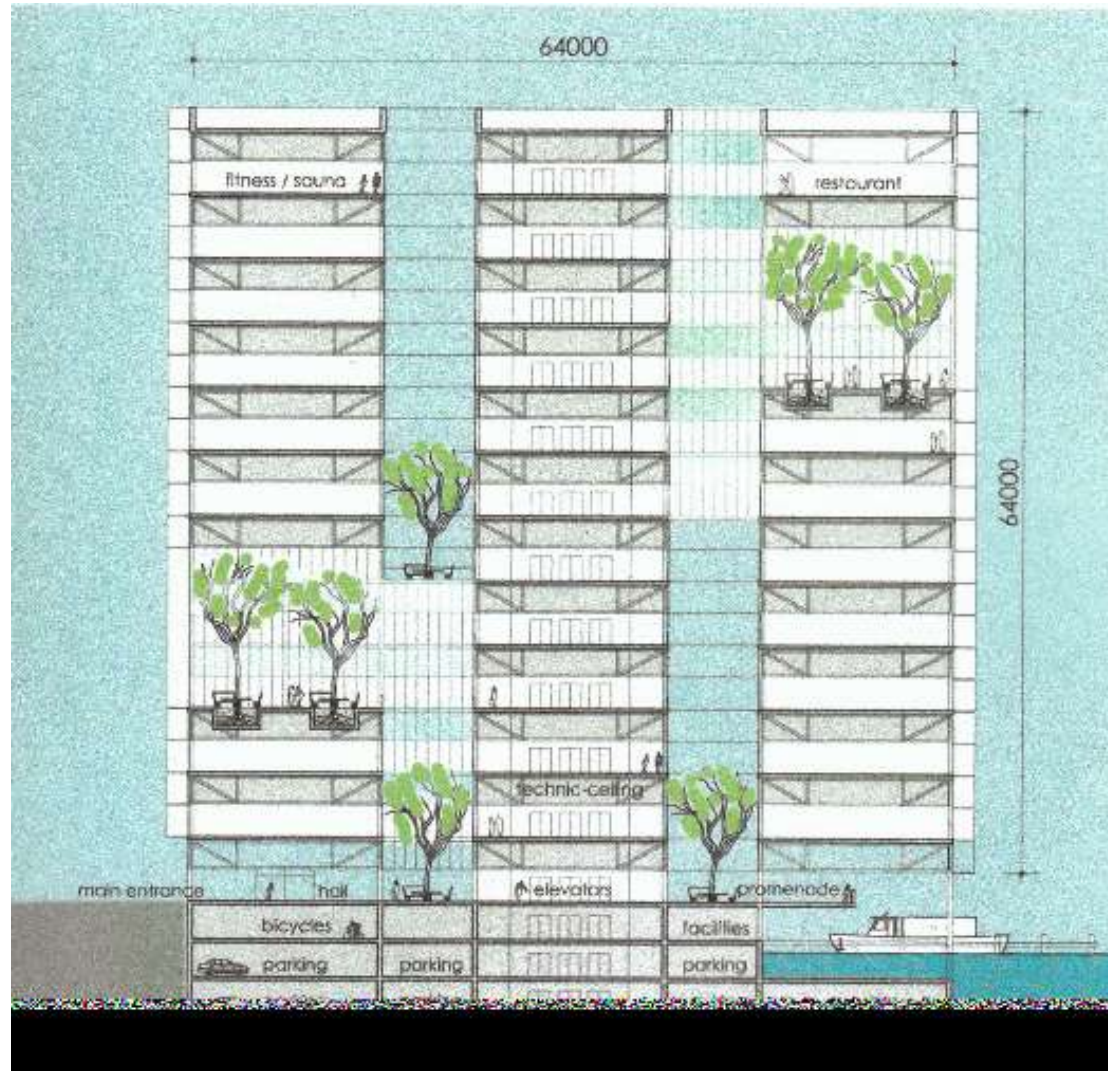
# 1 Fundamental Site/Campus layout

- Informed by climate of site
- Maximum advantage of natural light
- Implications on Models of Care - Reiterative briefing
- Central energy plant
- Waste management
- Transportation
- Regenerative campus layout

# 1 Fundamental Design of Buildings

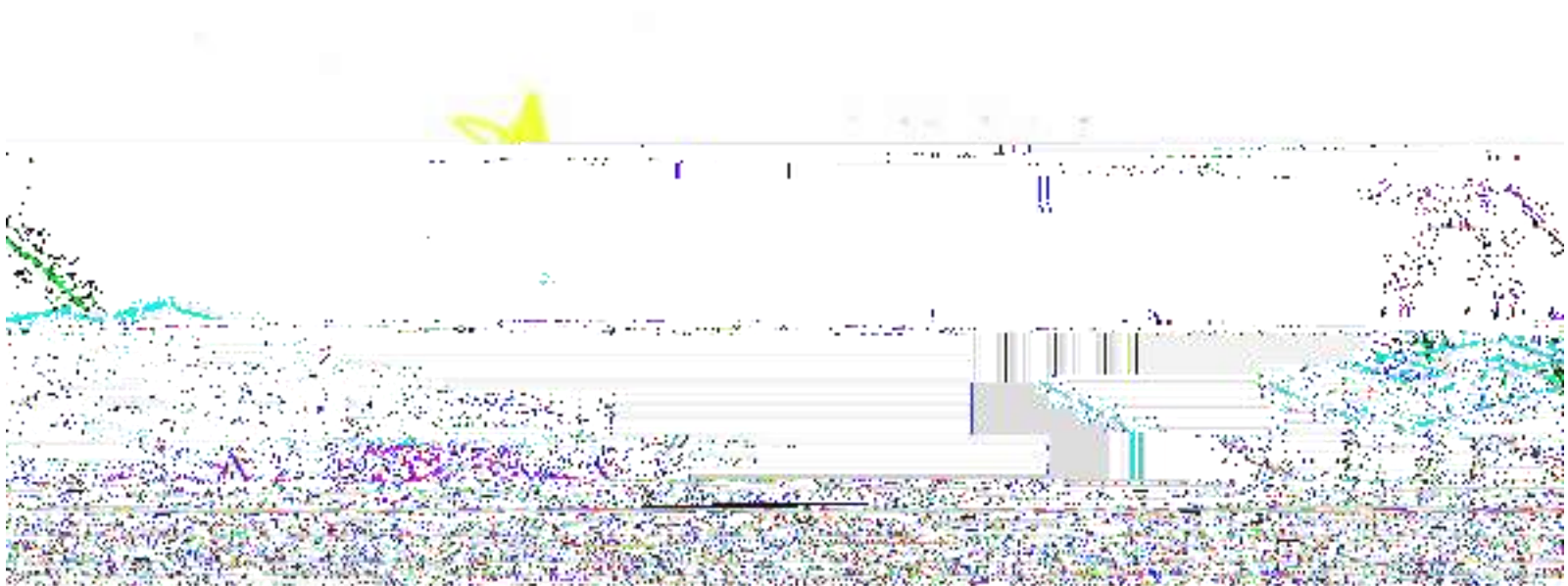
- Can't really be 'applied' to existing buildings - heavily compromised
- Conceived with sustainability in mind
- Start from a fundamentally different design approach
- Appropriate Brief - design and operational
- Engineering issues - integrated, design drivers

# 1 Innovative Built Form - conceptual section

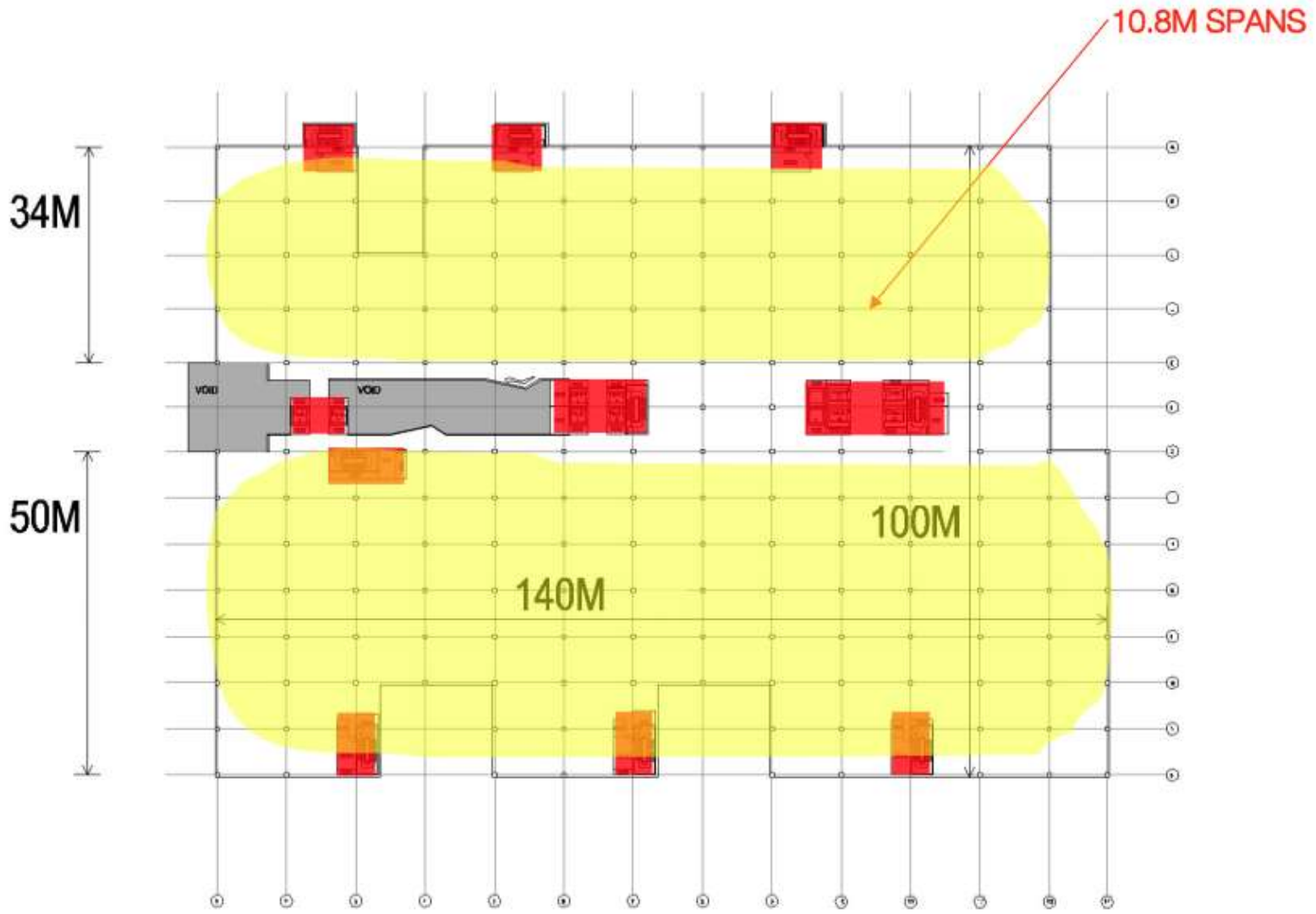


Mitigating Climate Change - Sustainable Hospitals

# 1 Innovative Built Form - breakdown of mass



# 1 Innovative Built Form - large flexible floors

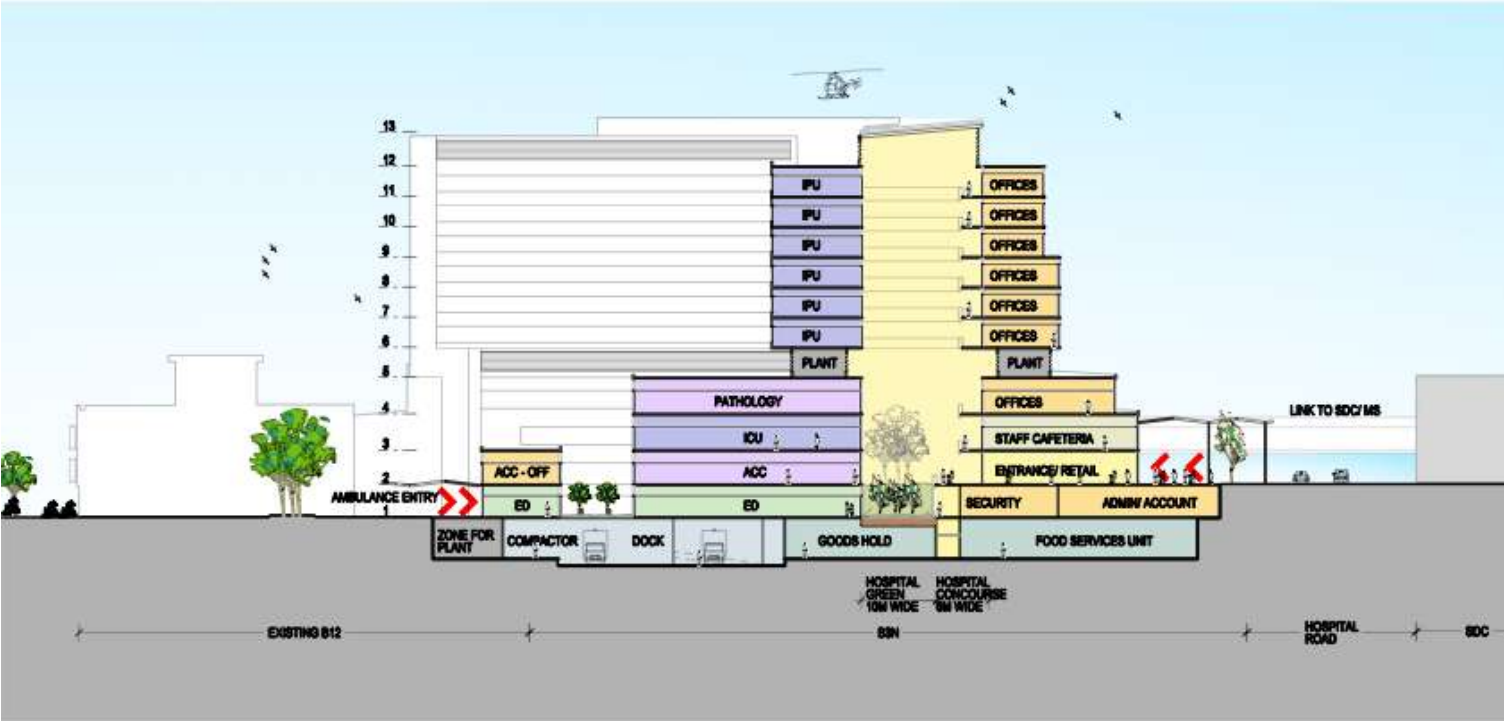


# 1 Innovative Built Form - integral green



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# 1 Innovative Built Form - atrium

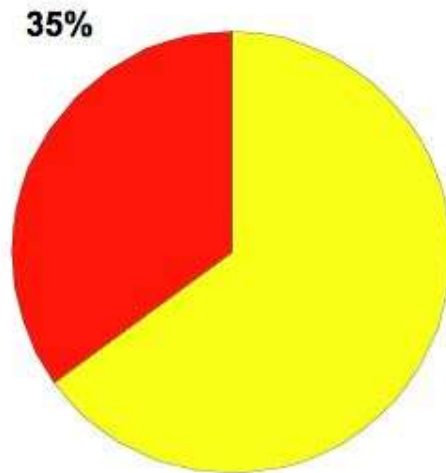


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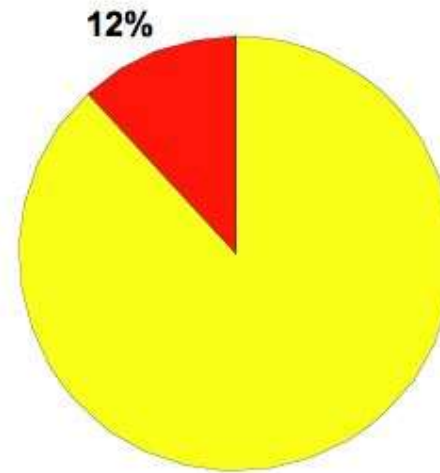
# 1 Mechanical and Electrical Engineering

## Engineering Services

Electrical, Mechanical, Communications, Hydraulics



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Area

# 1 Engineering Systems

- Bring together architectural, mechanical and central plant systems to deliver desired outcomes
- Holistic design - including response to service delivery, both clinical and non-clinical
- Recurrent costs as important as capital cost
- Ultimate Goal - Carbon neutral

# 1 BCA 2010

## Section J - Energy Efficiency

- New initiatives, widened scope
- Greenhouse reduction, not only energy efficiency
- Building, including its services, to be capable of obtaining energy from renewable sources
- Building fabric requirements
- Monitoring: Record use of energy in various elements

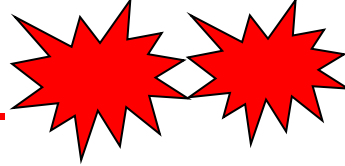
# 1 Building elements

- Orientation
- Massing, narrow footprints
- Atria
- Courtyards
- Green roofs and walls
- Façade design - glazing, overhangs, sunscreens
- Openable windows
- Thermal insulation
- Rainwater capture



**All these need +++\$\$\$**

# 1 “Wicked” Problems.....



- Narrow plan **vs** deep plans (travel distances)
- Adherence to HFBGs **vs** innovative design
- Increased Travel and Plant allowances **vs** area audits
- ‘Loose fit’ layouts for future flexibility **vs** area audits
- Use of stairs **vs** security and safety
- Water re-use **vs** infection control
- Beyond the BCA - eg natural light to staff workspaces
- Transportation - walk/cycle **vs** carpark

# 1 Implications - Recognition and Acceptance

## Non-negotiable principles established at inception

- Appropriate technical and design expertise
- Realise impacts on models of care - *eg nursing*
- Apply to all spheres of activity - *incl medical equipment*
- Change management - *start early*
- On-going monitoring of energy utilisation
- Increased capital cost
- Decreased recurrent cost

## 2 Patient and Staff Outcomes.....intangible issues

A holistic sustainable asset must recognise -

- Patient centered environment = Faster healing
- Staff satisfaction = Greater productivity
- Collaborative environment = Interconnect people
- Technology = In all aspects, benefits all users

## 2 Clinical Services Delivery..... intangible issues

- Achieve improved efficiency and effectiveness
- Integrated, collaborative manner - across departments
- Recognise changing consumer expectations
- Cost-effective - respond to the shrinking \$\$\$\$

All of which require organizational change

### 3 Co-benefits of reducing climate footprint

- Health - reduction in diseases, chronic (problematic)
- Economic - protections against volatility of energy prices
  - reduced hospital admissions
- Social - use leverage of place in society, advocacy
  - adopted in all spheres of living
- Risk Control - less vulnerability to disruptions during natural disasters

## Lastly.....

- Get our own house in order - address all problems simultaneously
- Acknowledge the high cost of short-sightedness and inaction on environmental issues
- Take a moral leadership role in mitigating efforts