حكومة دبي
GOVERNMENT OF DUBAI

بلدية دبي
DUBAI MUNICIPALITY

BIM & Sustainability

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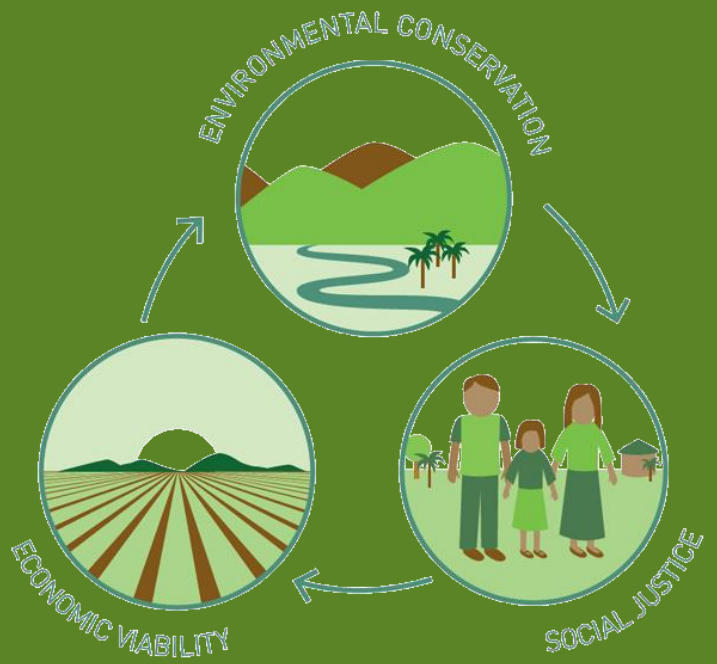
Topics

- Sustainability
- BIM
- How can BIM enhance sustainability:
  - Design phase
  - Construction phase
  - Operating phase

What is Sustainability?

Sustainability

- Meeting the needs of the present without compromising the ability of the future generations to meet their own needs!
  - People
  - Profit
  - Planet



Why sustainability?

We need to build sustainably to:

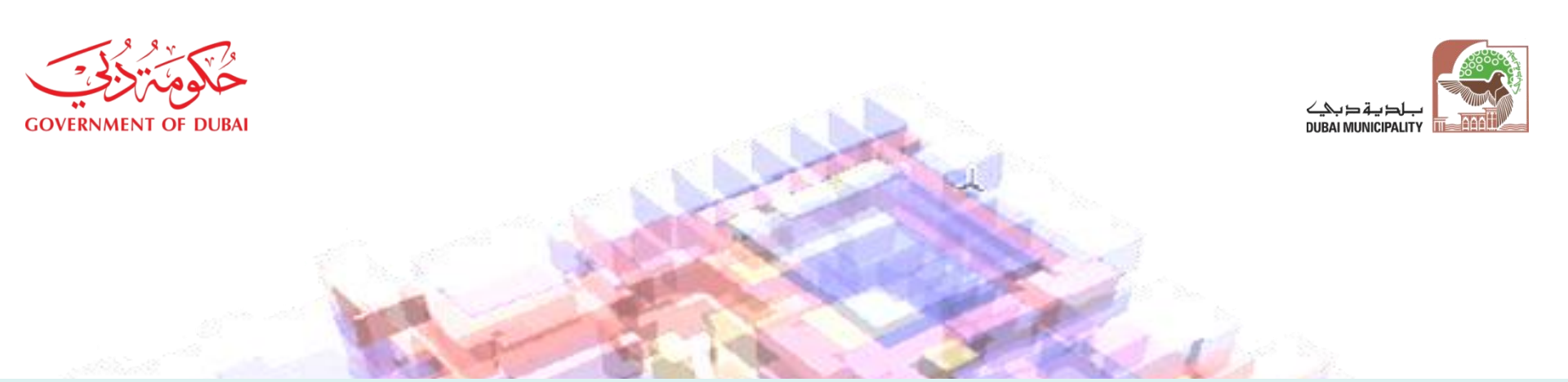
1. Preserve our environment
2. Reduce the buildings' costs
3. Increase efficiency & durability
4. Provide healthy environments for people

** Source: "Building Design and Construction: Forging Resource Efficiency and Sustainable Development", United Nations Environment Program-Sustainable Buildings and Climate Initiatives (UNEP-SBCI)*

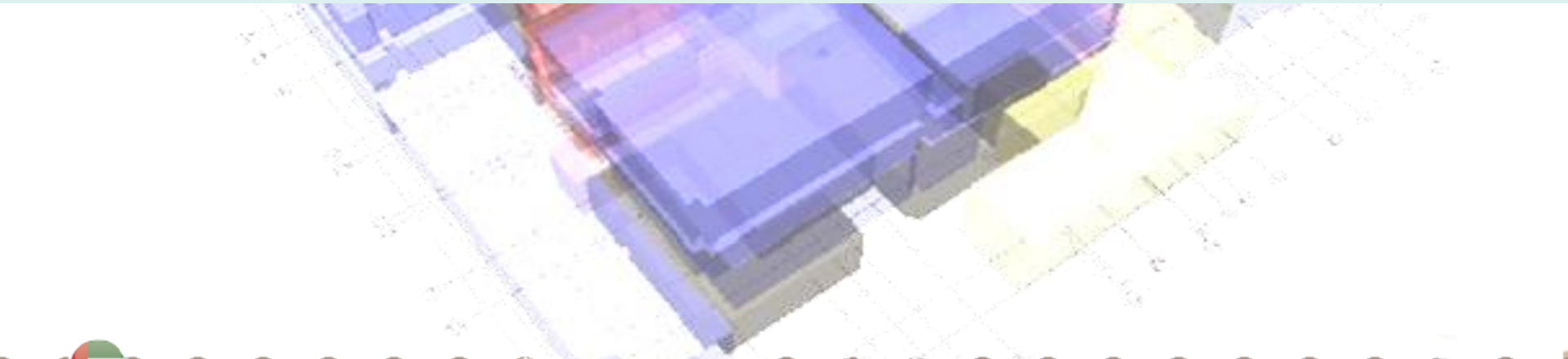
How can a building be sustainable?

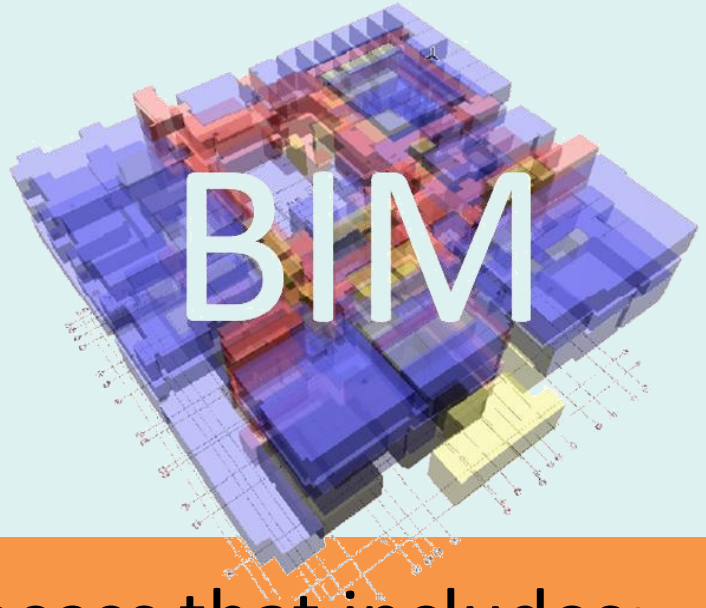
Sustainable buildings are designed and constructed to perform effectively while:

1) **Minimizing** energy requirements
2) **Reducing** water consumption
3) **Reducing** carbon footprint
4) Using materials that have low environmental impact
5) Reducing wastage
6) Conserving the natural environment
7) Safeguarding human health and wellbeing.



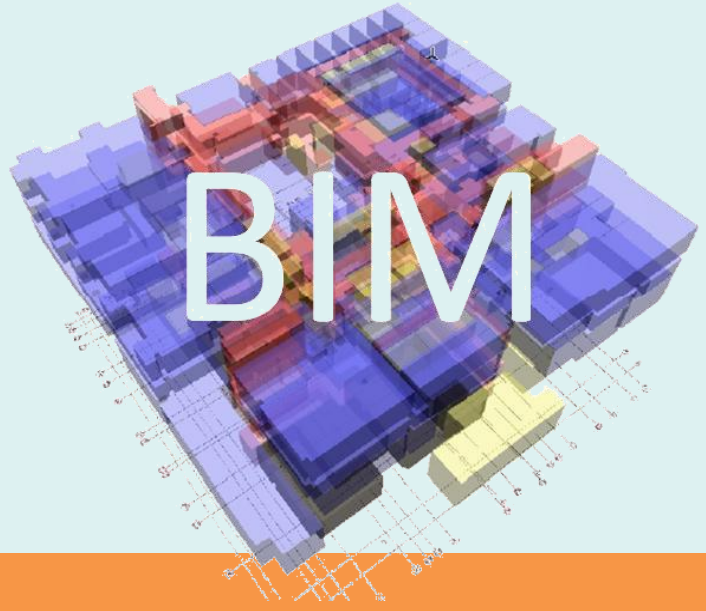
Building Information Modeling BIM





Design process that includes:

- ✓Collaboration of disciplines
- ✓Digital model
- ✓Analysis & comparisons
- ✓Information & properties of all building components



Know how's :

1) How to better put a building together?

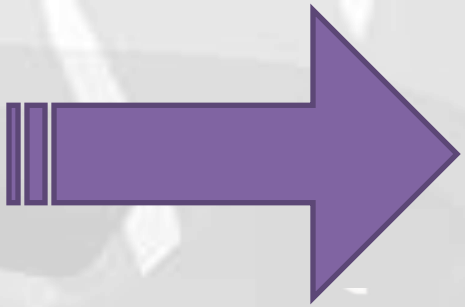
2) How building should perform?

3) How it might be taken apart?

Bim advances sustainability?

Through collaboration &integrated analysis & information Bim has the potential to deliver faster a more innovative, cost effective buildings.

HOW? Lets see!

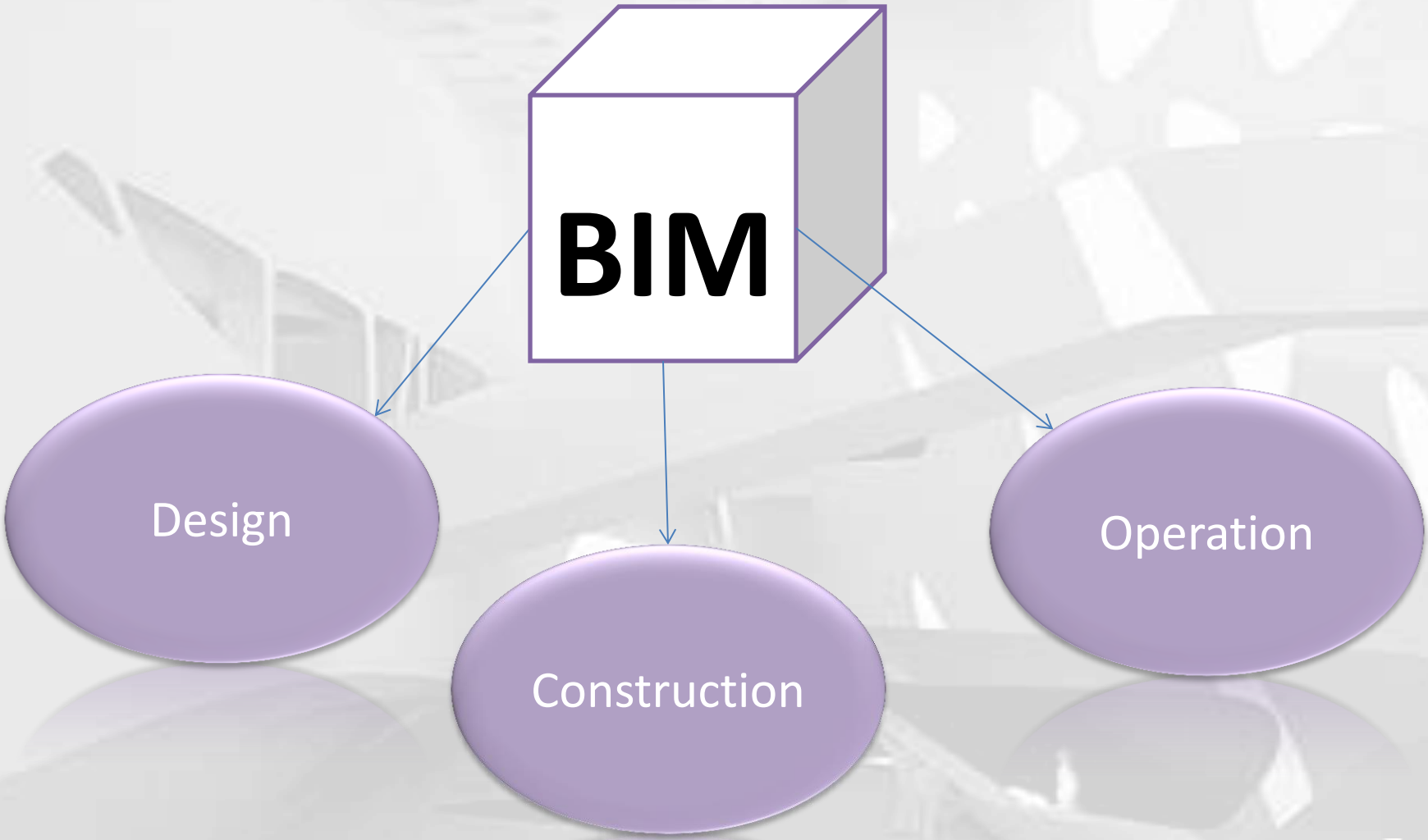


Sustainability of a building is influenced by:

- Building performance
- Environmental, economical & social impacts

BIM advantages include:

- Ability to analyze
- Ability to evaluate green buildings
- Access to information to make sustainable decisions


BIM
Design
Construction
Operation

Design Phase

1. Coordination & Collaboration
2. Visualization
3. Performance Analysis & Evaluation

1) Coordination & Collaboration

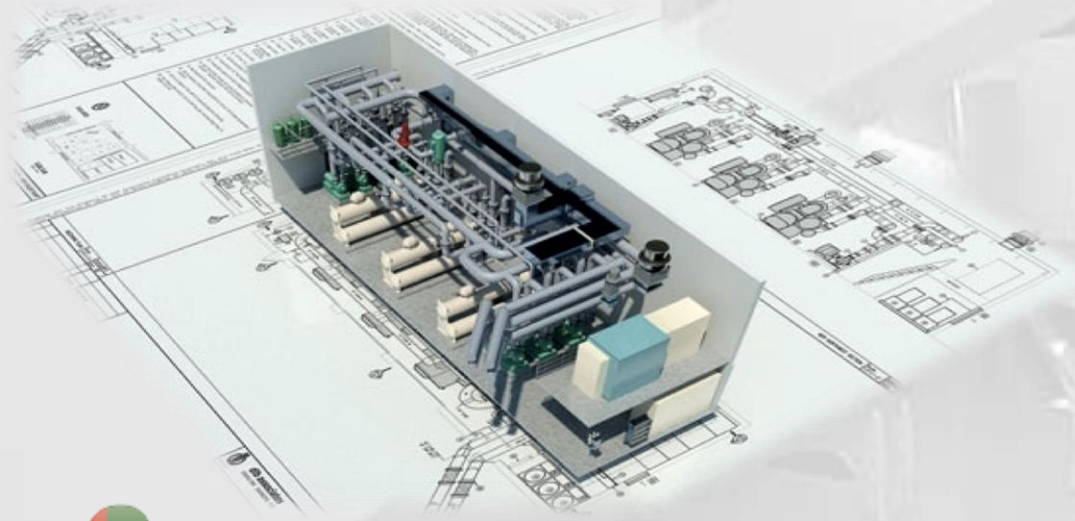
How?

- Integrate Sustainable aspects with BIM processes.(All team members on board from the beginning.)
- Access to information
- One central model = Clash detection (No Ad hoc solutions on site)
- Team member makes a change, all other disciplines are aware and can adjust their parts accordingly

2) Visualization

How?

- Design options
- Better engineering decisions
- Clear picture for the owner
- Design changes without delay of time or increase of cost



3) Performance Analysis & Evaluation

- Merge of Design & Analysis = optimize building performance
- Better quality of data = minimum errors and miscalculations

*https://arch.usc.edu/news/digital-leader-architecture-merges-virtual-reality-big-data

3) Performance Analysis & Evaluation, Cont.

Energy modeling	Reducing energy needs and analyzing renewable energy options that can contribute to low energy costs
Building orientation	Reduce energy costs
Building massing	Analyze building form and optimize building envelope
Sustainable materials	Reduce materials needs and use recycled materials
Site and logistics management	Reduce waste and carbon footprint
Day lighting analysis	Reduce energy costs
Water analysis	Reduce water needs in a building
Economic analysis	Forecast financial impacts

Construction Phase

1. Continuous analysis for environmental effects
2. Thorough design details
3. Material take-offs

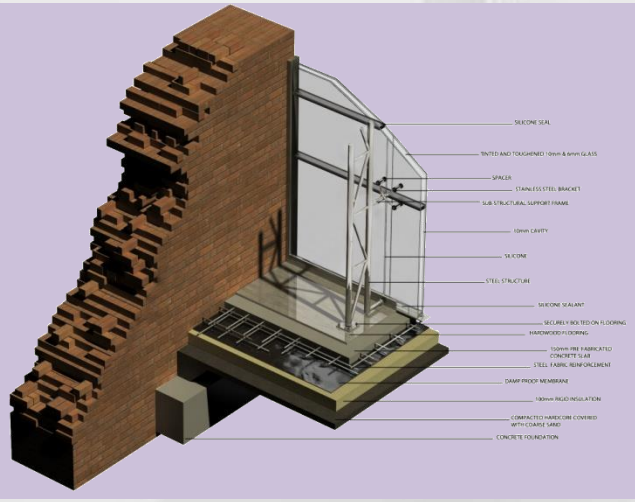
1) Continuous Analysis

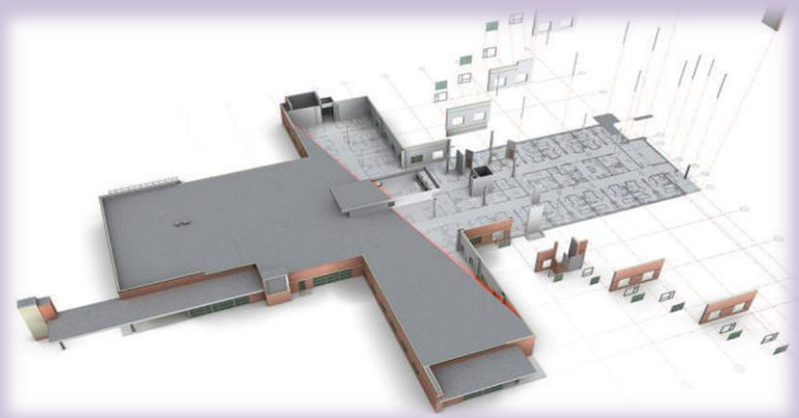
- Construction effects on the surroundings and environment measuring:
  - Energy use
  - Noise pollution
  - Any environmental effect
- Propose methods to lower results

2) Design details

- Drawing in 3D allows sections and details to be made ready for construction

- By minimizing construction defects, the ongoing operational costs are reduced & end up with a faster, safer construction





3) Detailed material take-offs

- Offsite fabrication eliminates
  - over ordering
  - reduces waste
  - allows off cut materials to be reused or recycled
- Components will fit together on site and they have been fabricated using a co-ordinated model
- Fewer deliveries to and less waste removal from site reducing

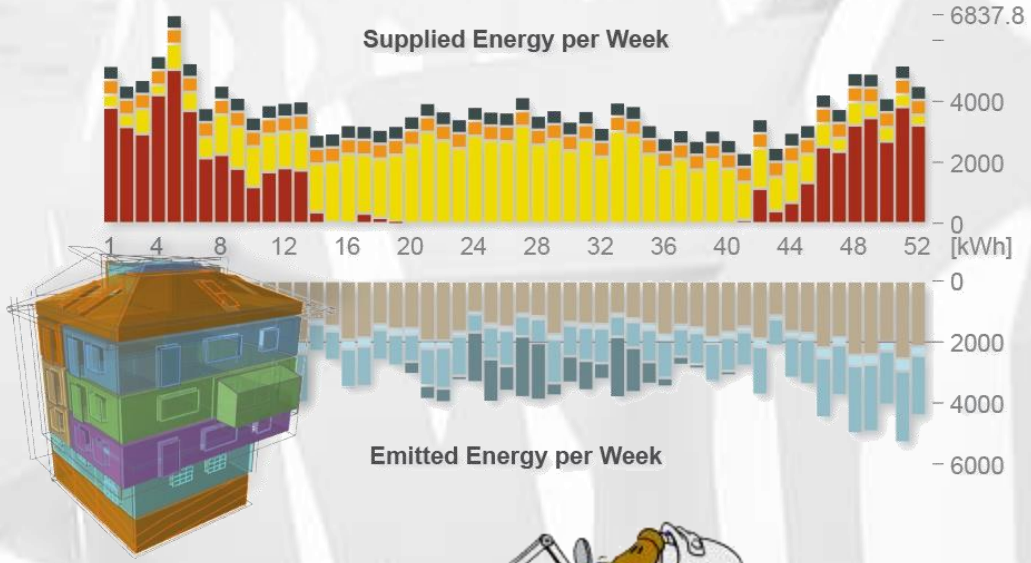
Transportation → fuel consumption → carbon emissions → road congestion → noise pollution

Operation Phase

1. Monitoring & recording building performance
2. Updated alterations & changes to the building
3. Seasonal commission and maintenance
4. Access to sustainable information

1) Monitoring & recording building performance

- Monitoring & recording building performance in terms of:
  - Water / wastewater
  - Energy
  - Carbon Emission



- Comparison of actual X intended
- Better decisions for improvements after the results
- Reduce resource & waste consumption (recycling)

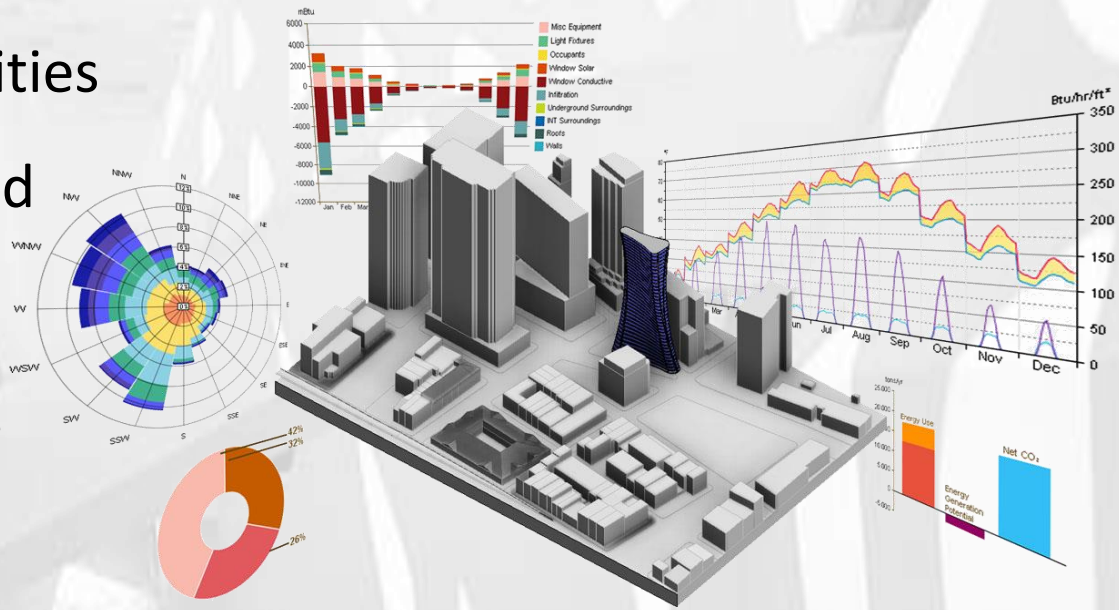
2) Updated alterations & changes to the building

- Additions/ adjustments made to building can be easily tracked and recorded.

- Traditionally, any alterations or changes would repeatedly need surveys and on site investigations which cost time and money.

3) Seasonal commission & maintenance

- Plan maintenance activities that can be synchronized minimizing cost and disruption of occupants



4) Access to information

- Engage occupants and management with access to sustainability information and dashboards in their buildings


OWNERS
ARCHITECTS
BUILDERS
CONTRACTORS
PLANNERS
Building Information Modeling
CIVIL ENGINEERS
MEP SYSTEM ENGINEERS
STRUCTURAL ENGINEERS