



## Accelerating 0-emission building sector ambitions in the MENA region

Regional Workshop  
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# PASSIVE DESIGN APPROACH

## LOW ENERGY BUILDINGS IN THE MENA REGION

- **Hypothesis**

The best way to save energy...

...is not to need the energy in the first place

# PASSIVE DESIGN APPROACH

## LOW ENERGY BUILDINGS IN THE MENA REGION

Why is passive design important?

The life span of building components \*1

	<u>Lifetime (years)</u>	<u>Cost</u>
1.Subgrade structure / superstructure	70 - 100	~ 45%
2.Exterior Wall	25 +	~ 20%
3.Mechanical Devices	20 - 25	~ 25%

\*1 Typical life expectancy of building components

# PASSIVE DESIGN APPROACH

## LOW ENERGY BUILDINGS IN THE MENA REGION

### Integrated design synthesis

#### CLIMATE

Employed as a resource to enhance energy performance

#### USE

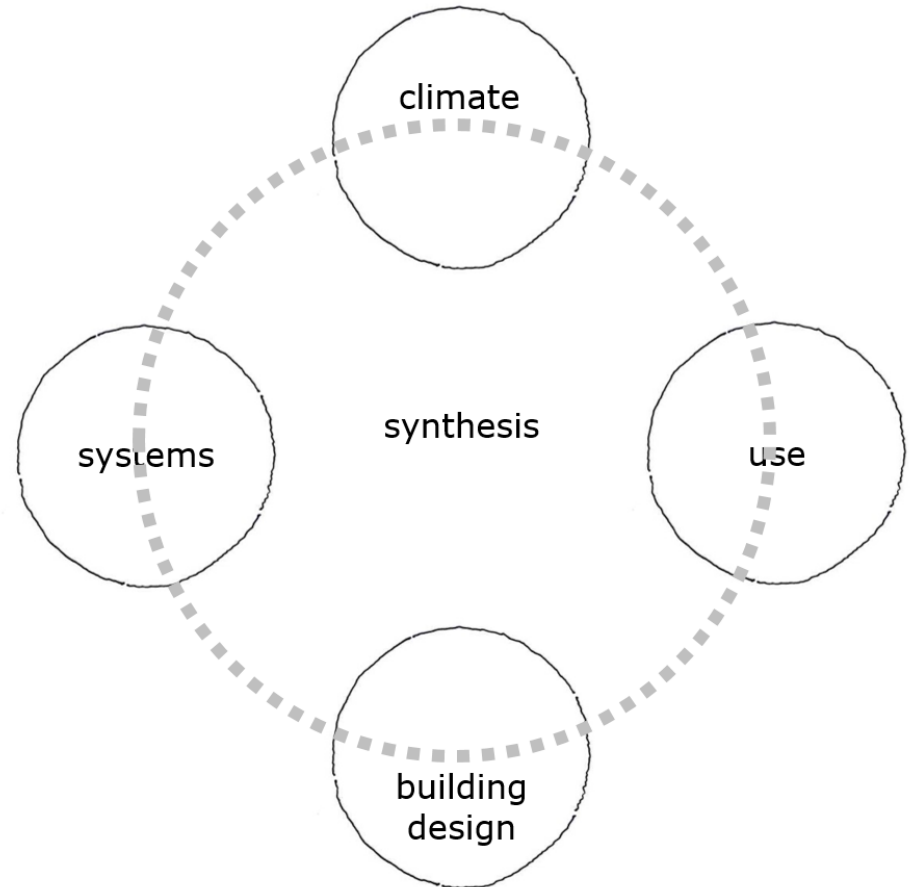
Consideration of, schedule and comfort criteria as malleable

#### BUILDING DESIGN

and site design (orientation and landscape) to create small loads

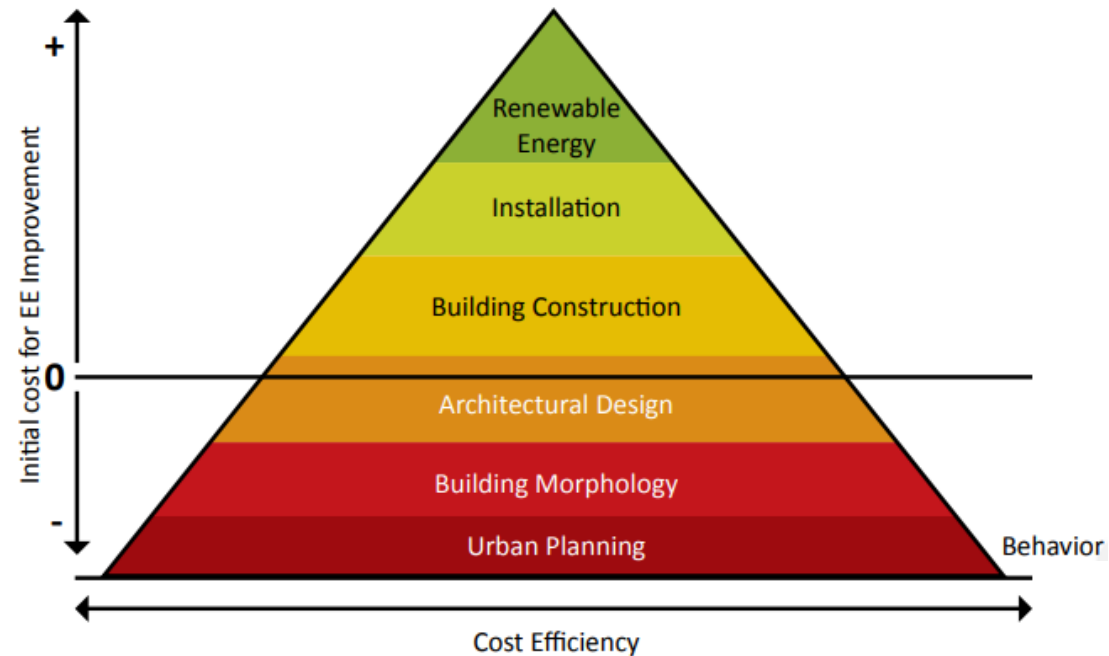
#### SYSTEMS

designed to be efficient



# PASSIVE DESIGN APPROACH

## LOW ENERGY BUILDINGS IN THE MENA REGION



### Strategy for cost effective energy efficient buildings

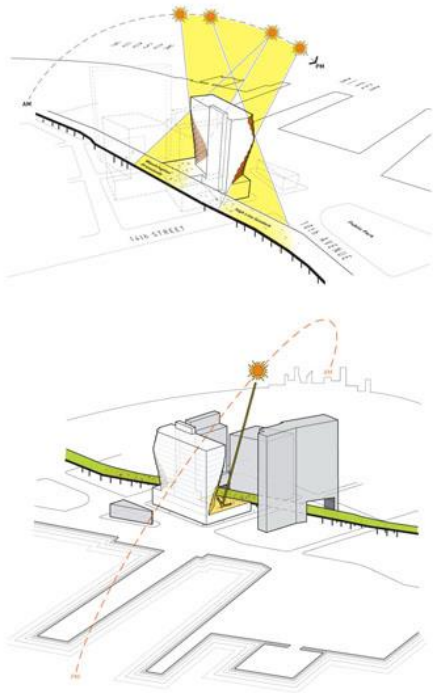
Source: MED-ENEC Energy Efficient Building Guideline for MENA Region  
November 2013. Funded by the European Union [www.med-enec.eu](http://www.med-enec.eu)

# BEST PRACTICE

## LOW ENERGY BUILDINGS IN THE MENA REGION

### Main parameters of passive building design

- Massing and orientation (sun, wind, light)



Studio Gang: Solar Carve Tower,  
High Line New York



Sloping the roof at 25 % towards the north orientation  
= 16 % less incident solar radiation

...this allows opportunities to integrate ventilation and  
daylight strategies

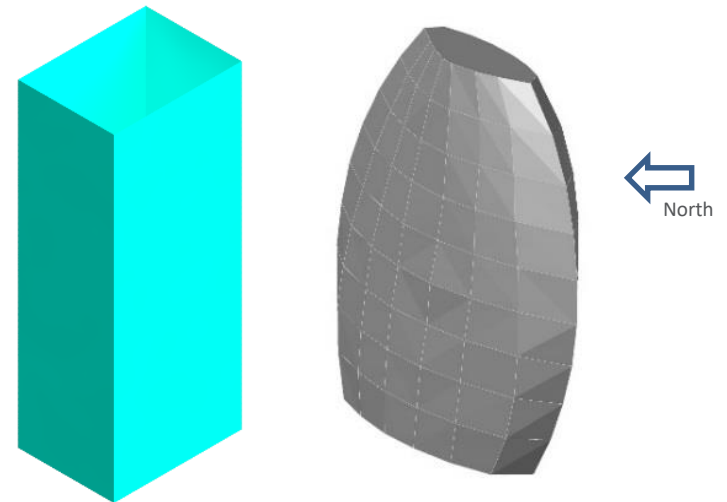
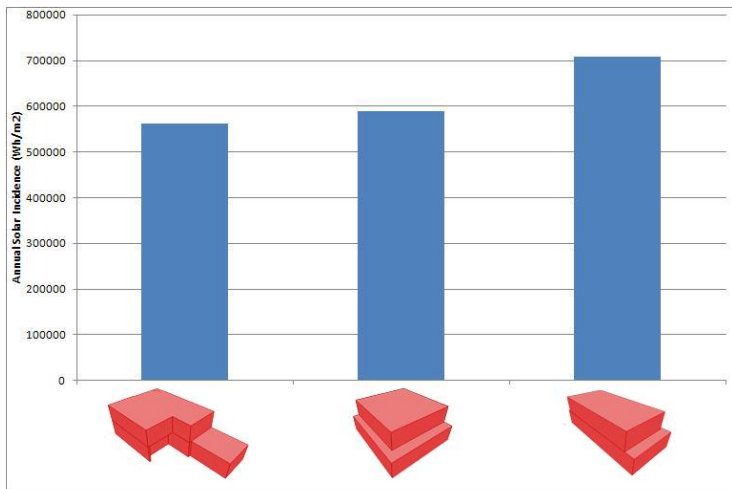
# BEST PRACTICE

## LOW ENERGY BUILDINGS IN THE MENA REGION

### Main parameters of passive building design

- Massing and orientation (sun, wind, light)

Designing a shape that “shades itself” reduces incident solar radiation by 22%



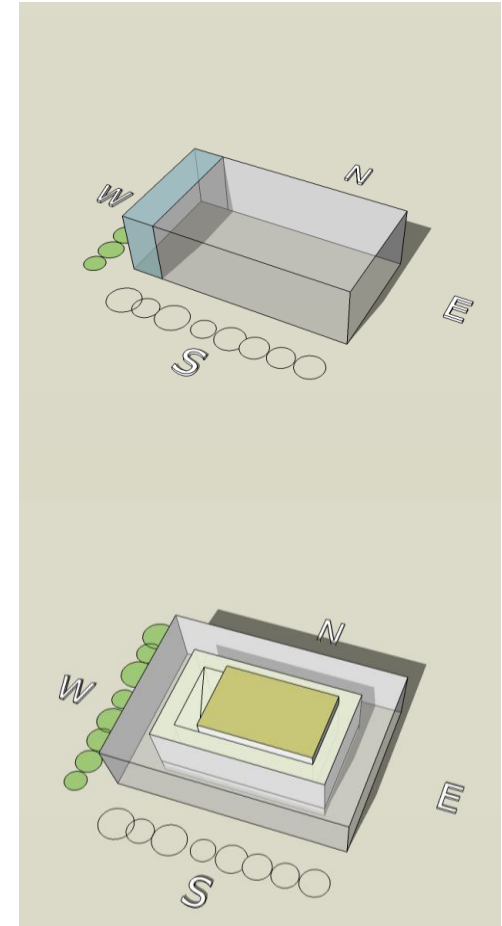
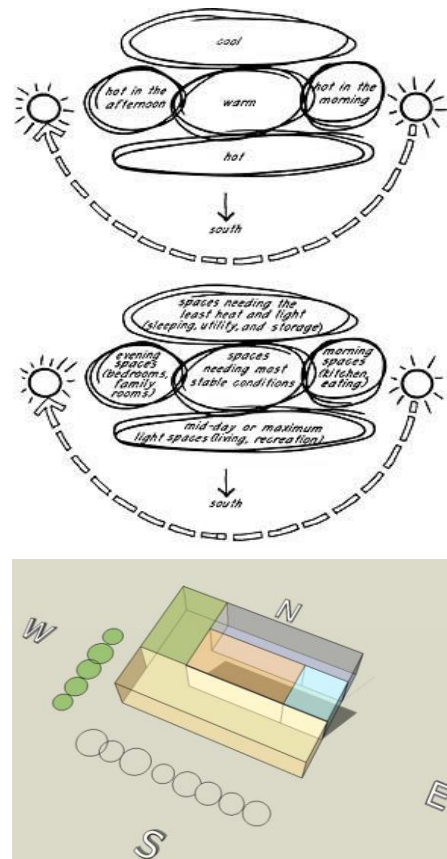
Enhanced optimized designs can achieve a 38% reduction of incident solar radiation

# BEST PRACTICE

## LOW ENERGY BUILDINGS IN THE MENA REGION

### Main parameters of passive building design

- Thermal zoning



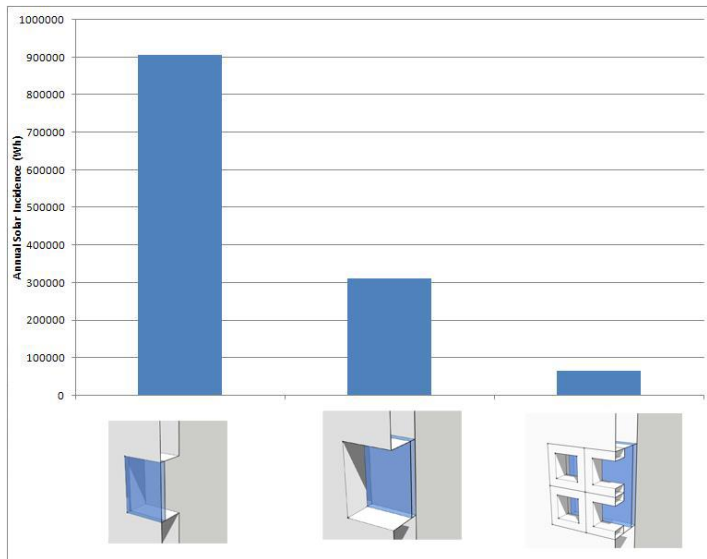


# BEST PRACTICE

## LOW ENERGY BUILDINGS IN THE MENA REGION

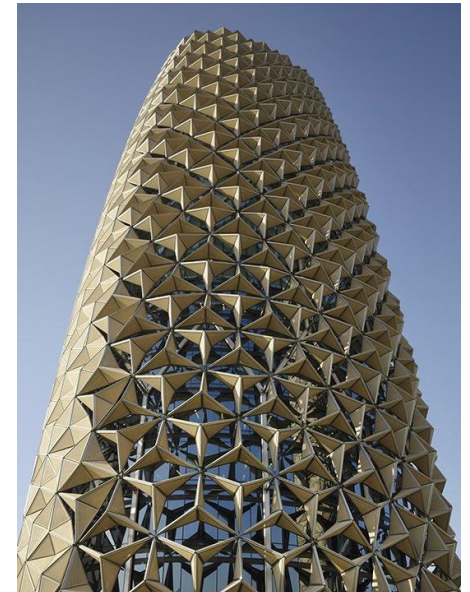
### Main parameters of passive building design

- Envelope design (window wall ratio, materials)



Window location and shading can significantly reduce insolation

Simple materials and systems



Sophisticated materials and technologies

# BEST PRACTICE

## LOW ENERGY BUILDINGS IN THE MENA REGION

- **Recommendations**

- Consider local conditions (climate, building typology, materials)
- Learn from older buildings in the regional context



- Apply the integrated design approach (developer, architect, engineer, expert, contractor)
- Integrate passive design strategies (incurring no additional costs and providing significant saving potential) – then complement these with "active strategies"...

# BEST PRACTICE

## LOW ENERGY BUILDINGS IN THE MENA REGION

**Thank you for your attention**