

# HEAT WAVES IN URBAN AND BUILDING DESIGN

## PASSIVE COOLING OF A BUILDING



The passive cooling of a building can be obtained, in outline, by means of the follow strategies:

By driving back the heat coming from outside before it reaches the area to be conditioned or by reducing the quantity of heat present inside a building ( thermic control)

- Light- coloured surfaces of the building
- Cool roofs
- Green roofs
  
- Big thermal inertia
- Shielding
- Trees with deciduous leaves
- Solar control glasses

By dispersing the surplus heat through natural thermic wells ( natural or dissipative cooling) (?)

The main methods of natural cooling are of the thermic well in use

- Microclimatic cooling achieved by letting fresher air into the room
- Crossing ventilation
- Free and Night cooling
  
- Radiative cooling achieved by dispersing the heat stored up in the building into the clear night sky.
- Cool roofs

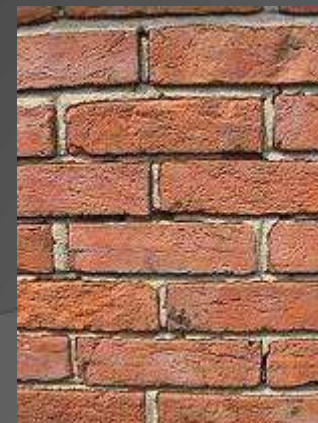
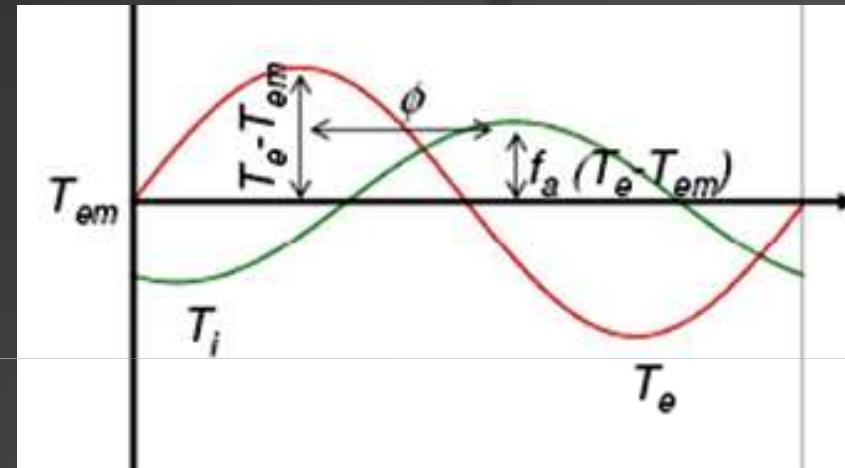
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## THERMAL INERTIA



This is an important concept in **bioclimatic houses**: if they have a low thermal inertia, they will quickly react to solar radiation, heating quickly along the day (we refer to winter), but they will also get cold quickly at night: the delay between heat supply and temperature change is small. On the other hand, considering houses with a big **thermal inertia**, solar radiation will not quickly increase house temperature, because heat is being stored so that it will be slowly released at night, preventing a quick temperature drop; besides, temperature fluctuation is dampened so that less extreme values will be reached.

Then, there are two phenomena associated with thermal inertia in housing: **delay** (time of the inside peak temperature in respect to the time of the outside peak temperature), and **dampening** (inside temperature fluctuation is not as big as outside).

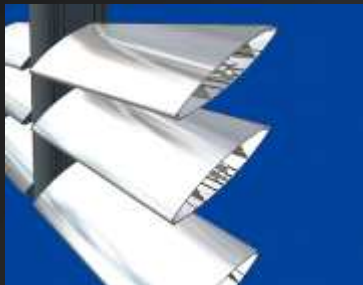
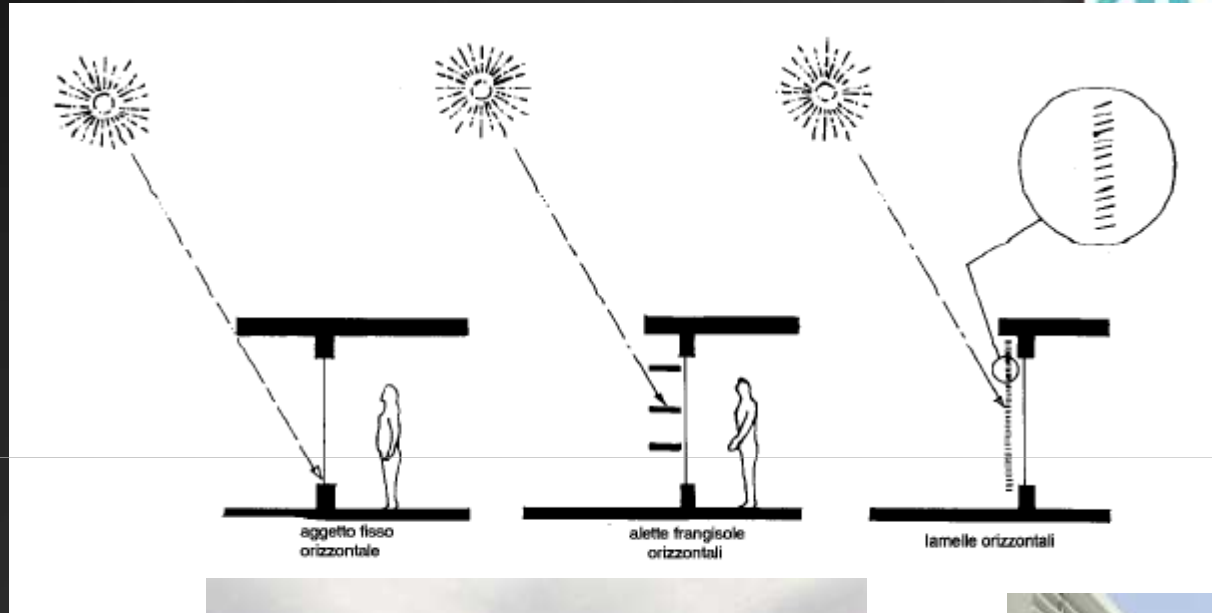


# HEAT WAVES IN URBAN AND BUILDING DESIGN

## SUN SHIELDINGS



art  
Adapting to  
Climate change  
in Time



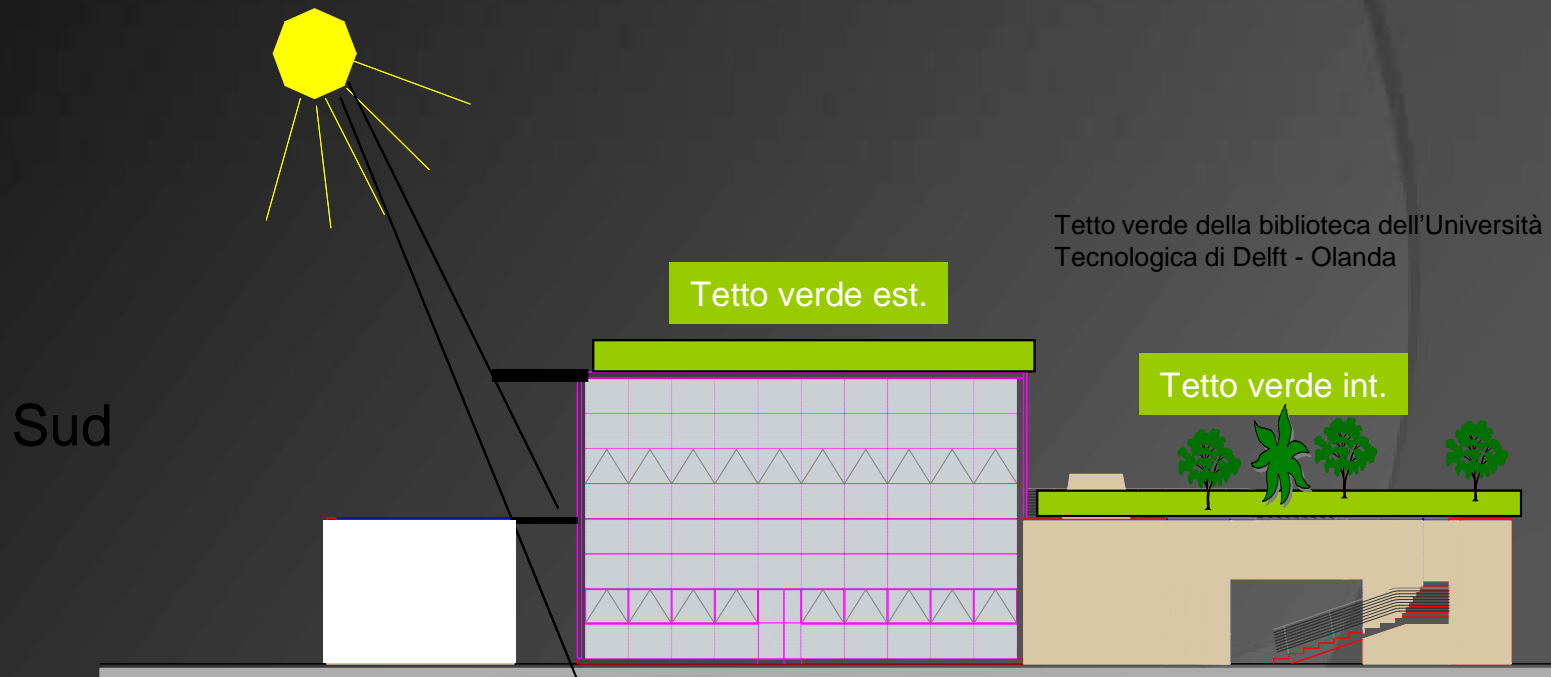
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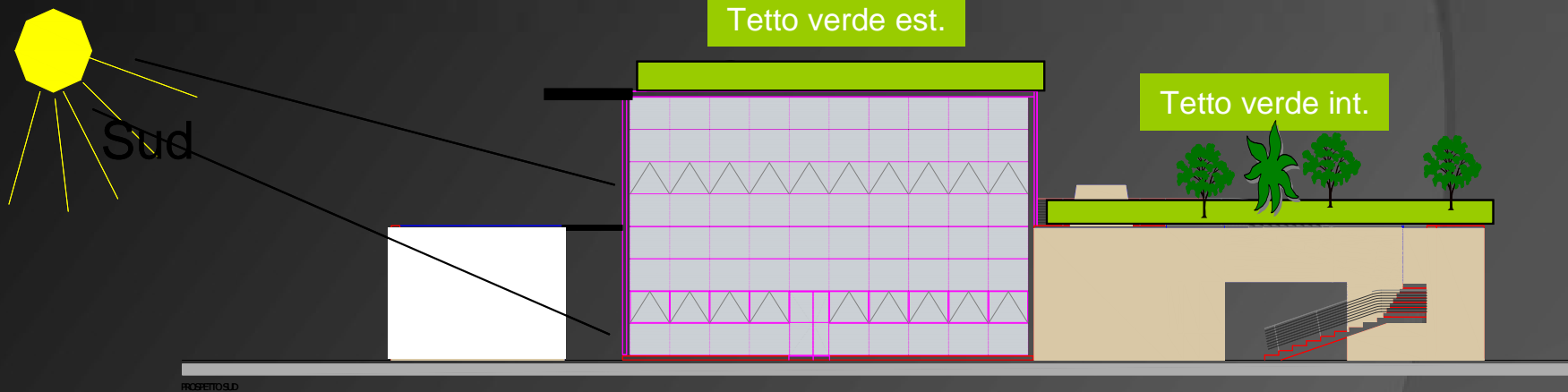
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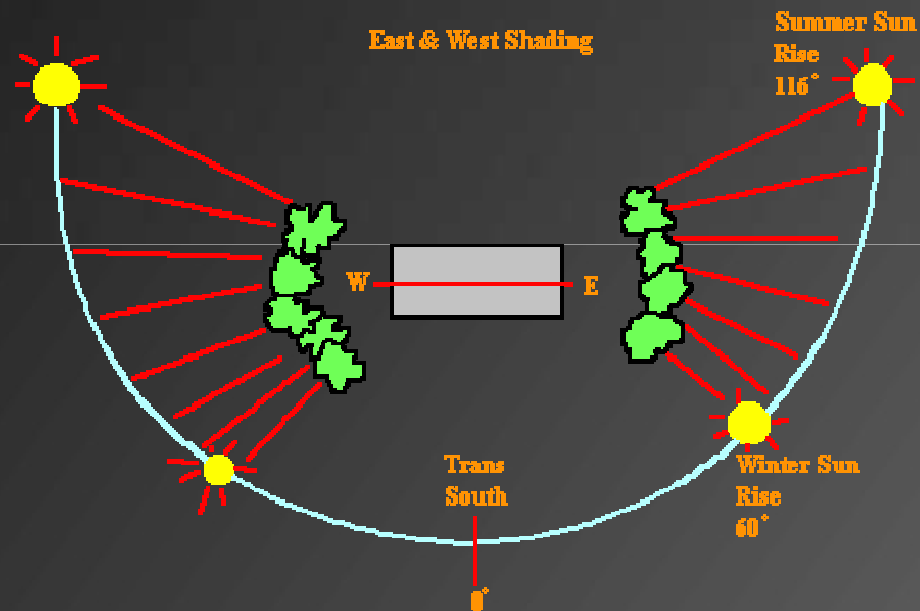
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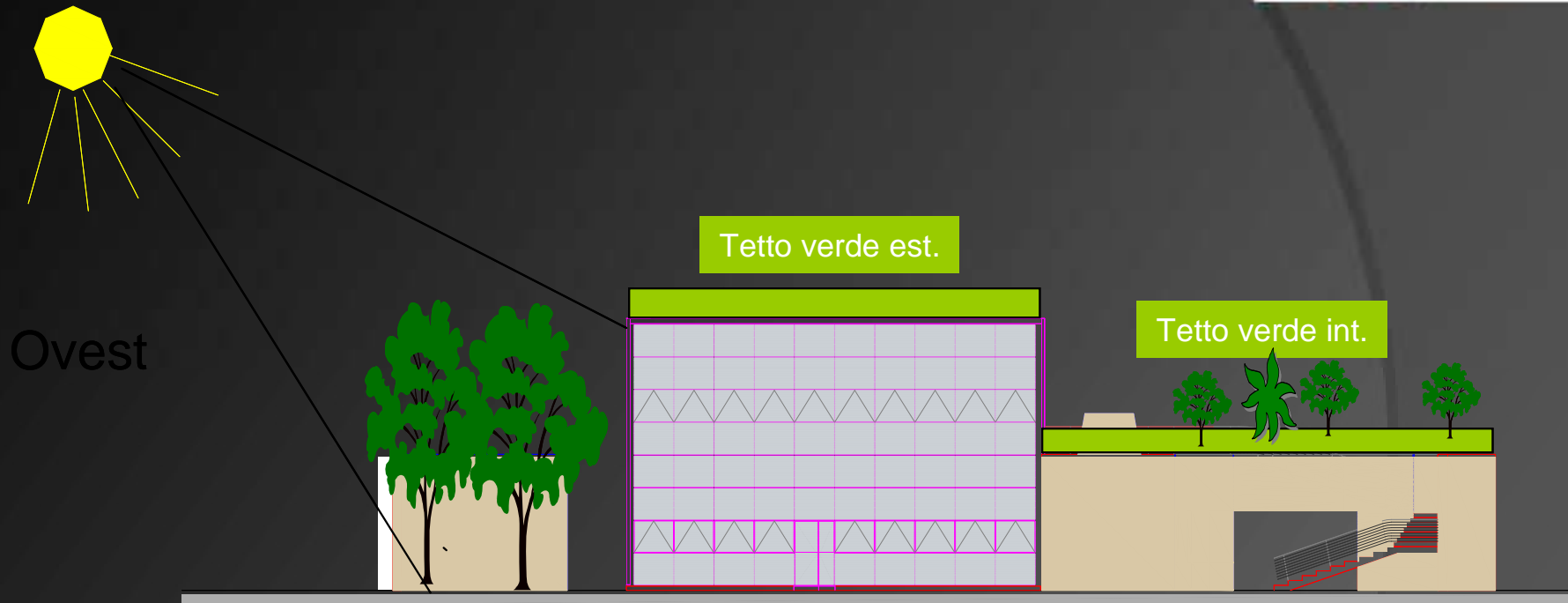
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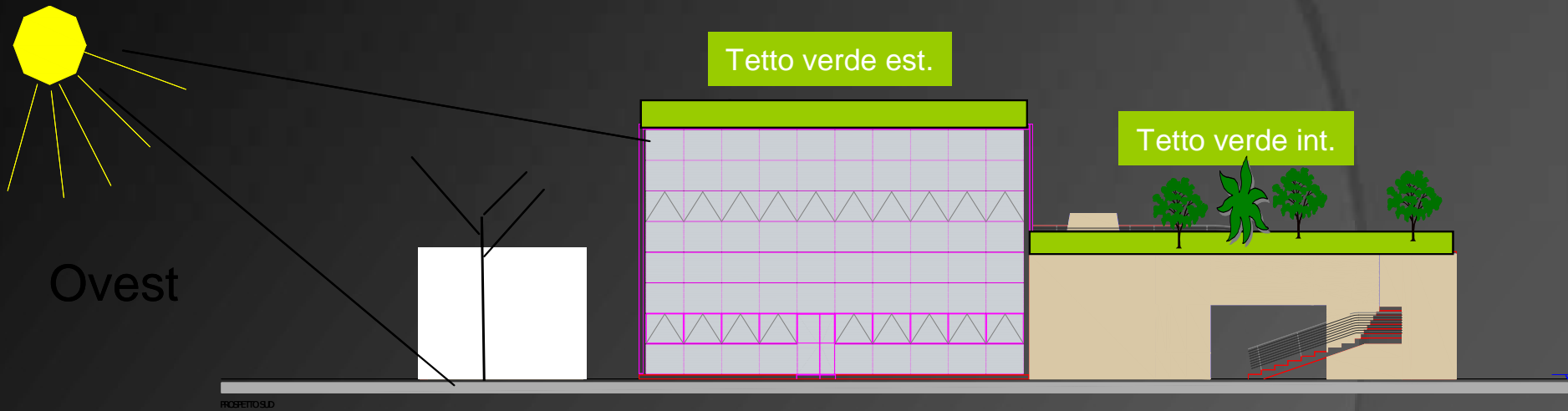
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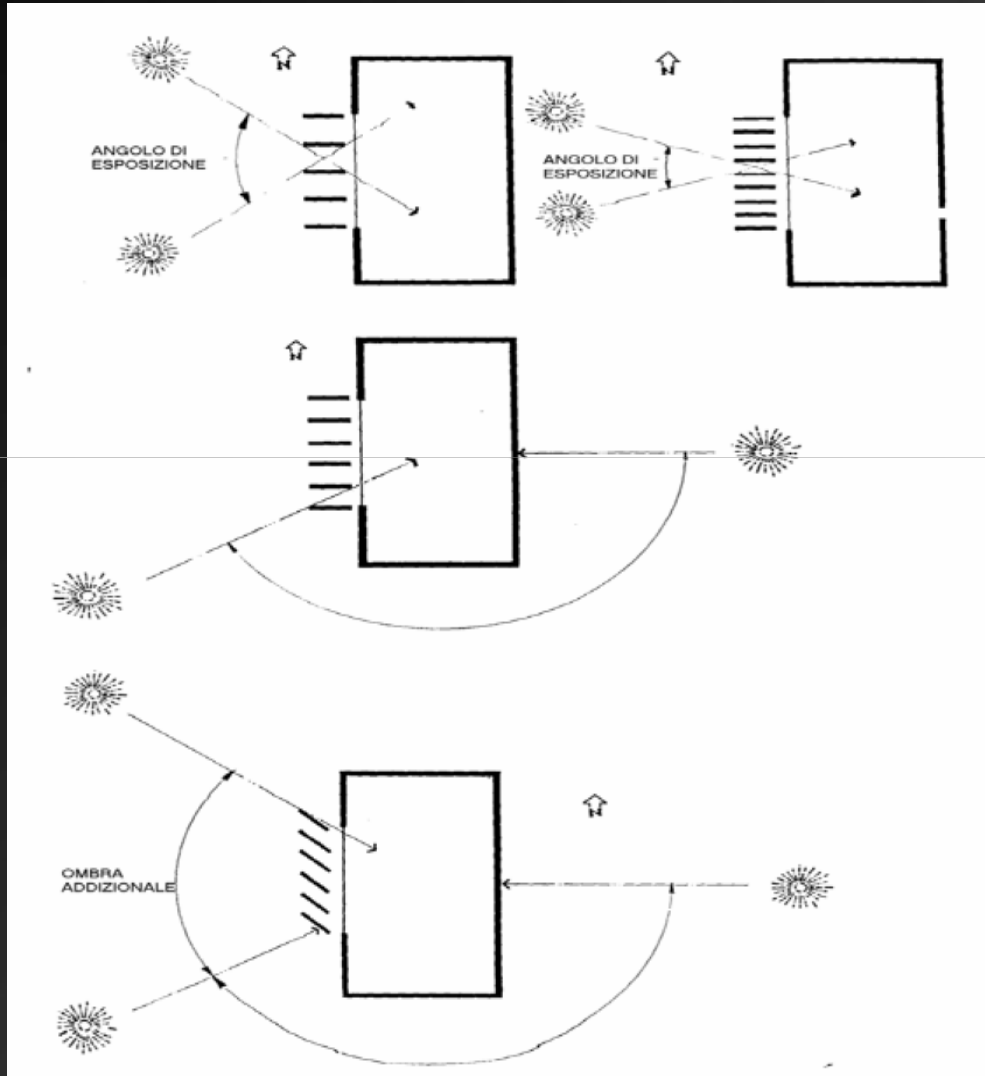
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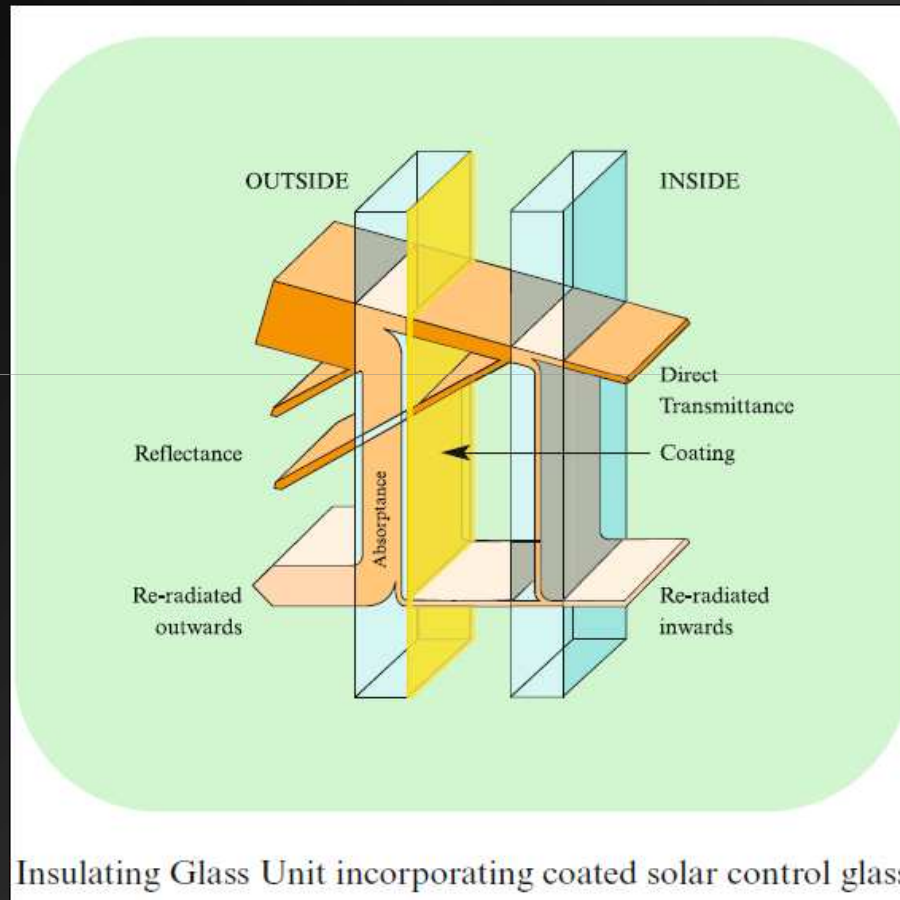
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## SUN SHIELDINGS



# HEAT WAVES IN URBAN AND BUILDING DESIGN

## SOLAR CONTROL GLASS



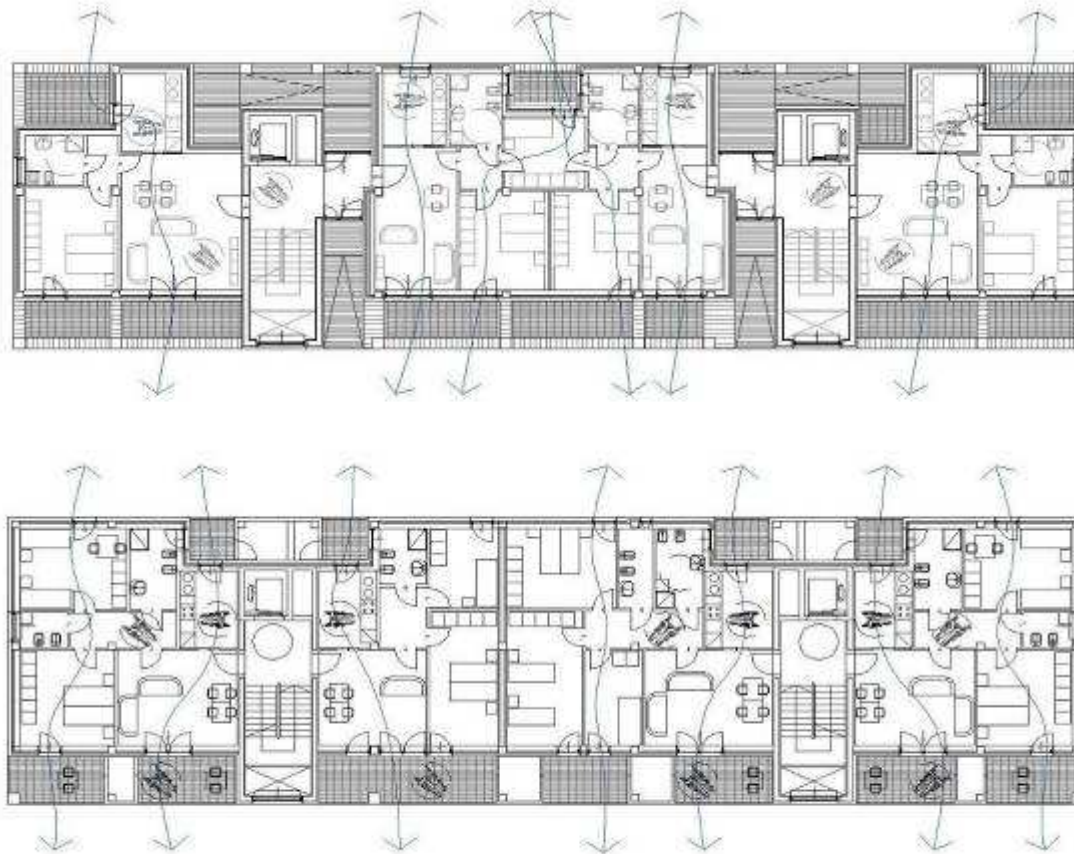
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## SOLAR CONTROL FILMS



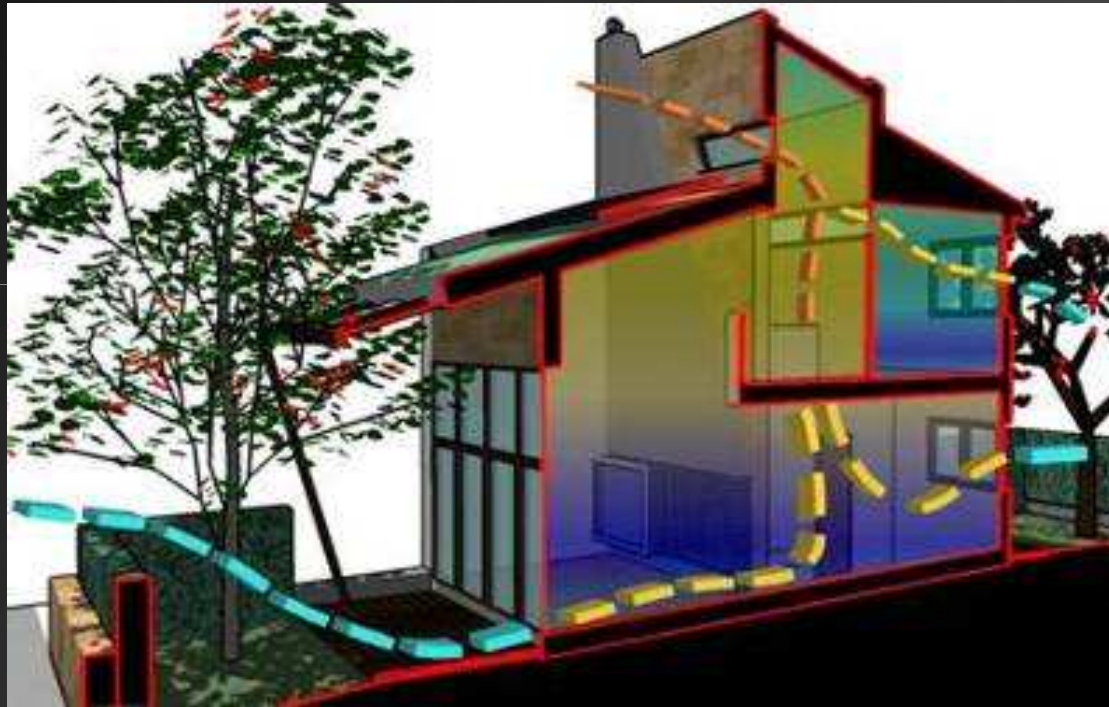
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## CROSSING VENTILATION



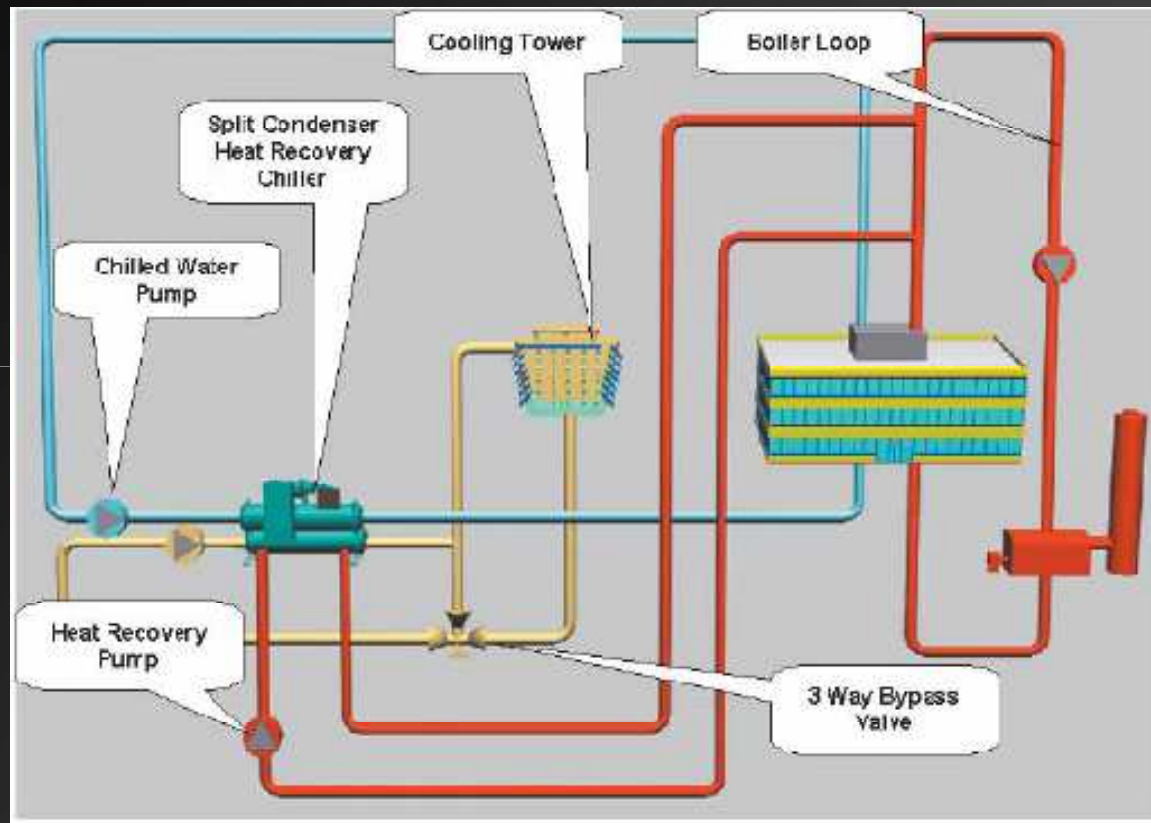
# HEAT WAVES IN URBAN AND BUILDING DESIGN

## FREE COOLING



# HEAT WAVES IN URBAN AND BUILDING DESIGN

## HEAT RECOVERY CHILLERS



# HEAT WAVES IN URBAN AND BUILDING DESIGN

## FREE COOLING WITH MECHANIC VENTILATION

