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Sustainable Development
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efficiency for sustainable housing”
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Energy

efficiency for **Sustainable**

HOUSING

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Efficiency Energy in houses

What is the Efficiency Energy in houses ?

The extent to which the energy consumption per m² of floor area of the building measures up to established energy consumption benchmarks for that particular type of building under defined climatic conditions.

Efficiency Energy in houses

Factors influencing the energy efficiency of houses

Energy management

■ Site analysis

Homes should be sited to take advantage of natural features of the terrain which offer energy conservation help.

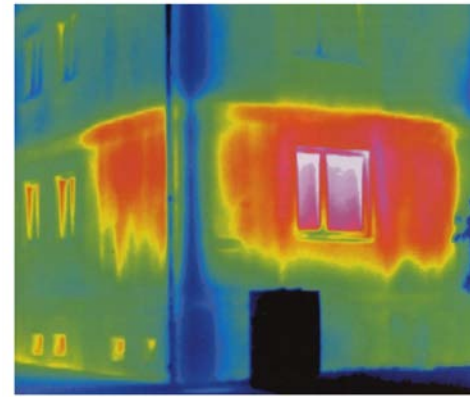
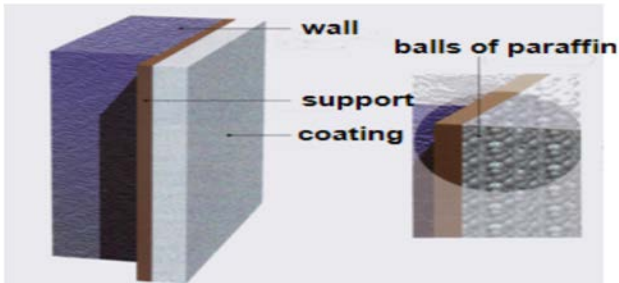
■ Home Orientation

the optimal configuration is generally a form elongated in the east-west direction.

■ Thermol insulation

New insulation materials:
thinner and able to store energy

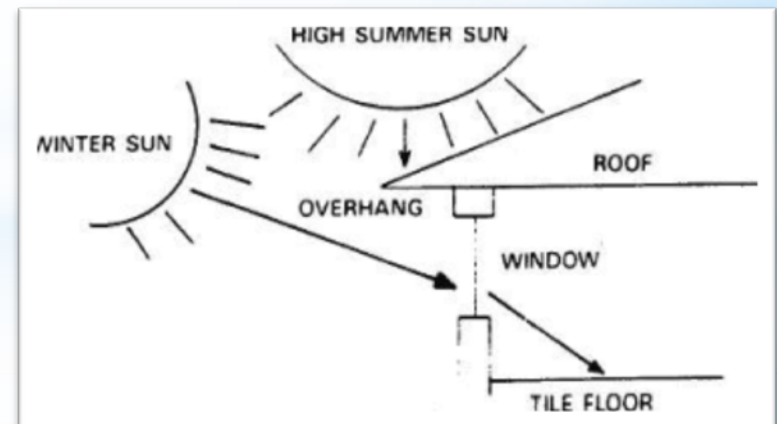
- nano porous silica
- phase change materials



Effective treatment of thermal bridges (junctions between walls, metallic structures, aluminium frames) : this can yield up to 30% reduction of thermal losses

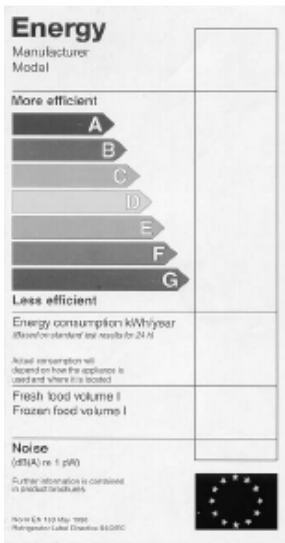
■ Configuration

Using the sun's heat in the winter and avoiding it in the summer helps to cut down on heating and cooling costs.



■ Equipment (lighting, consumer appliances) are more & more energy efficient

Consumer appliances :
Appliances complying with the energy performance labels are from 10 to 40% more efficient



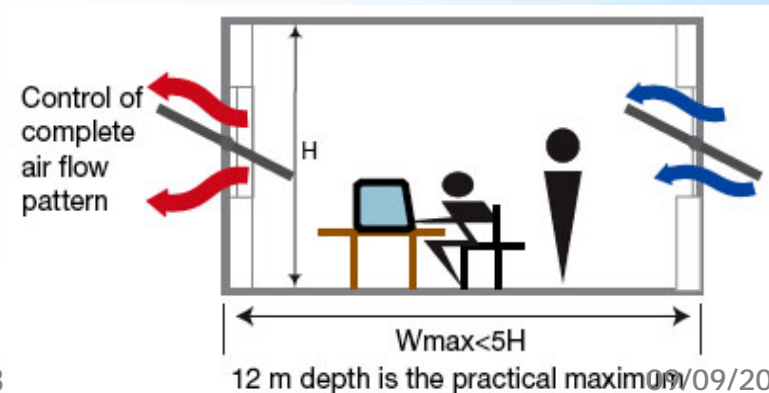
Lighting efficiency with LEDs :
from 20 toward 150 lumen / W



■ Ventilation

The energy required for ventilation can be minimized by:

- ✓ A building design that maximizes natural ventilation;
- ✓ Effective window design;
- ✓ Use of mixed mode ventilation;
- ✓ Using efficient mechanical ventilation systems



Cross Ventilation

■ Cooling

Energy used in typical air-conditioned office buildings is approximately double that of naturally ventilated office buildings. The need for air-condition or the size of the systems installed can be reduced by:

- ✓ Controlling solar gains through glazing;
- ✓ Reducing Internal Heat Gains;
- ✓ Making use of thermal mass and night ventilation to reduce peak temperatures;
- ✓ By providing effective natural ventilation;
- ✓ Reducing lighting loads and installing effective lighting controls.

■ Heating

Heating demand can be reduced by:

- ✓ Limiting the exposed surface area of the buildings
- ✓ Improving the insulation of the building fabric
- ✓ Reducing ventilation losses
- ✓ By selecting efficient heating systems with effective controls

Efficiency Energy in houses

Factors influencing the energy efficiency of houses

Waste management

- Recover the used cooking oil in suitable drums: this Oil can be used to Produce biodiesel

- Recover of Urbain Waste that can be used as biomass to Produce Electricity.

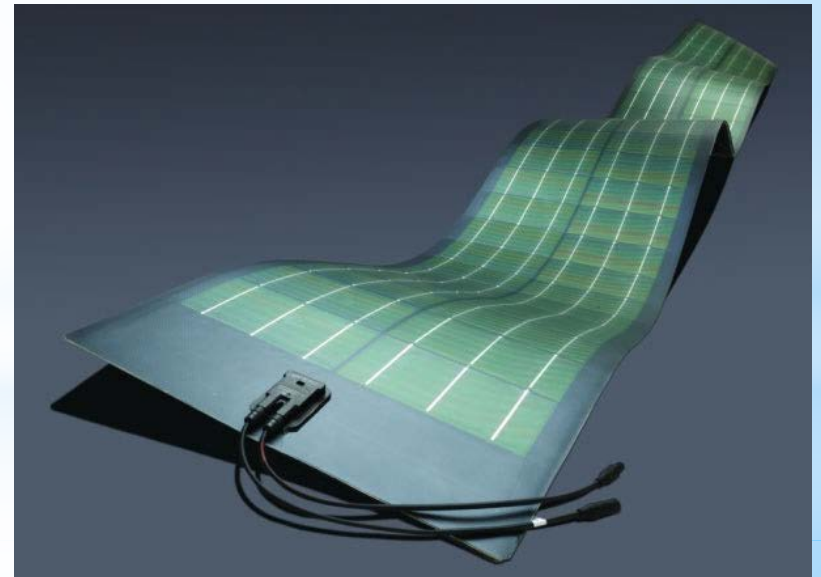
Efficiency Energy in houses

Factors influencing the energy efficiency of houses

Self Production of Electricity

Photovoltaic to Produce Electricity

- BIPV system



- Photovoltaic insulation

Usually based on amorphous silicon.

Enables simultaneously sealing the roof and generate electricity.



- Rigid PV modul (mono or polycrystallin)

Tunisia case

PROSOL ELEC

BASED ON SUBSIDIES AND CREDIT OVER 7 YEARS

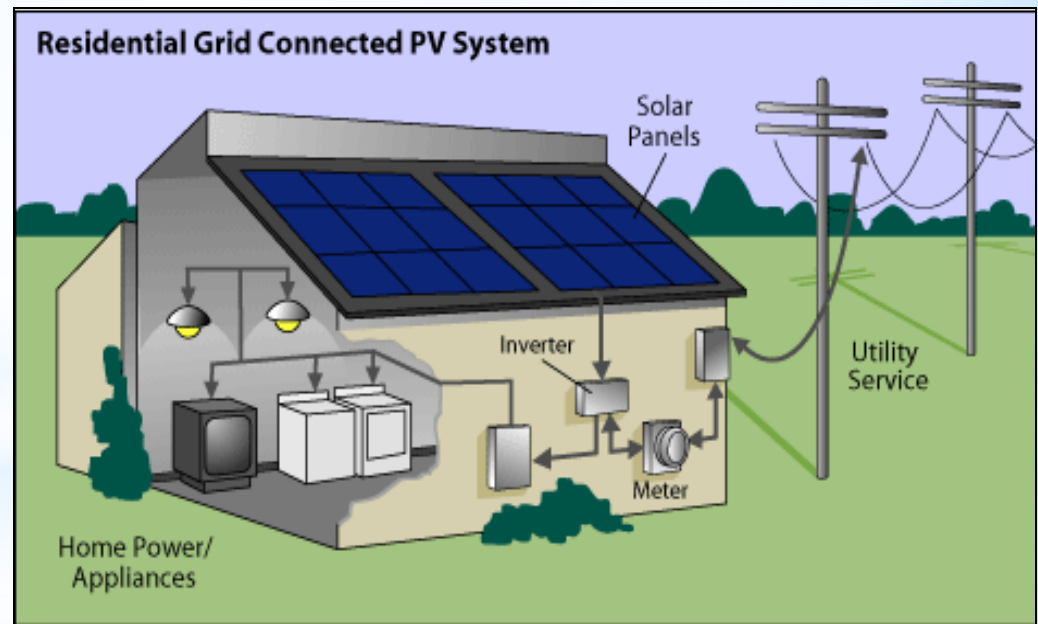
supported by ANME and STEG respectively

❖ PV connected to STEG network

❖ Rural PV

❖ Solar pumping

- PV connected to conventional electricity network
 - ✓ PV module in series and parallel.
 - ✓ One or more inverters.
 - ✓ Meter
 - ✓ DC and AC box
 - ✓ Protection systems



Differents apportunties and Measures for improving Energy Efficiency in houses

Energy efficiency measures are meant to reduce the amount of energy consumed while maintaining or improving the level of comfort in the building;

Among the benefits arising from energy efficiency investments in buildings are:

- ✓ Reducing energy use for space heating/cooling and water heating;
- ✓ Reducing electricity use for lighting, office machinery and domestic appliance' ;
- ✓ Lower maintenance requirements;
- ✓ Enhanced property value.

Conclusion

- Technological improvements in buildings design and appliances offer new opportunities for energy savings;
- Many of these technologies are yet to be adapted in Tunisia and other developing countries, suggesting a huge potential for savings;
- Resistance to change and the cost of implementing energy savings means that unless a policy and regulatory framework is set up, it is unlikely there will be any change.

***THANK YOU
FOR YOUR ATTENTION***