

MED-ENEC PILOT Experimental solar & bio climatic laboratory for the National School of Architecture in Rabat, Morocco



BOUZOUBAA MOHAMMED

Description of the project

- Location: Campus of the National School of Architecture (ENA), Rabat
- Residential: 180m² living area
- New construction: building will be used as a showcase project for the students at ENA



The main energy concept of the pilot project:

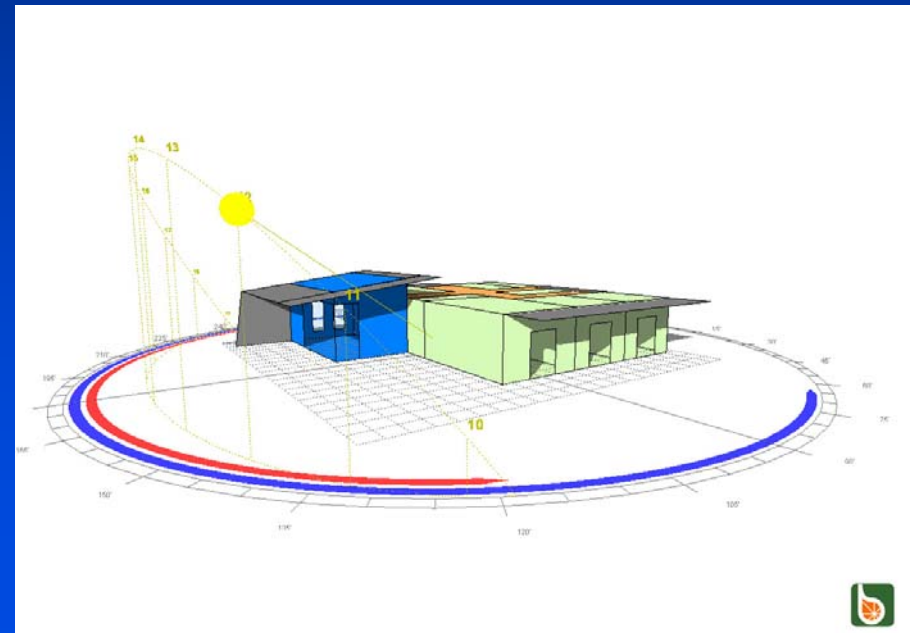
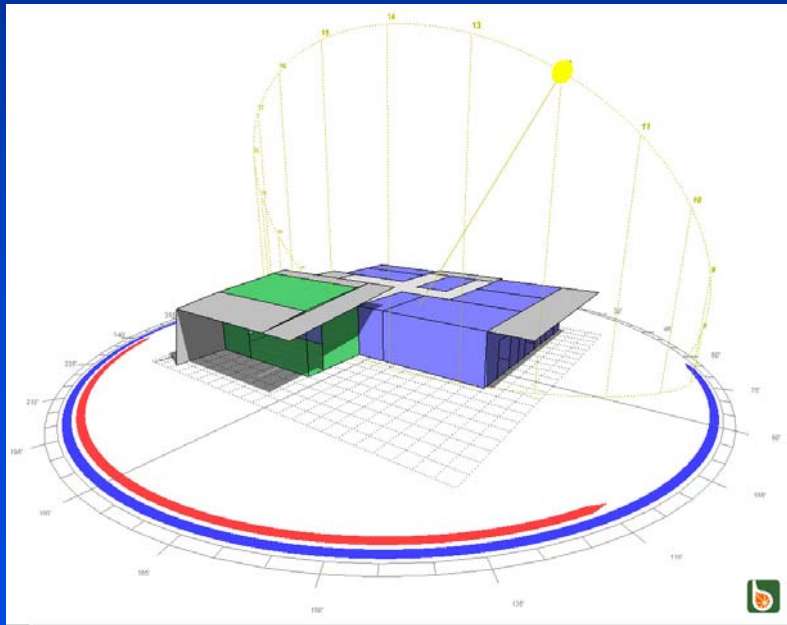
– Passive energy saving

- Double brick walls insulated with cellulose: $U=0,26 \text{ W}/(\text{m}^2\text{K})$
- PS insulation ceiling: $U=0,22 \text{ W}/(\text{m}^2\text{K})$
- PS insulation floor: $U=0,92 \text{ W}/(\text{m}^2\text{K})$
- Double glazing: $U=1,49 \text{ W}/(\text{m}^2\text{K})$

– Overhang shadowing of glazed surfaces

– Adobe walls for as buffering thermal mass

- Summer Solstice 12h
- Winter Solstice 12h



Passive measures lead to strong reduction of energy demand

		Building without energy efficiency measures	Building with energy efficiency measures
Room heating needs	kWh/(m ² a)	143	8
Room cooling needs	kWh/(m ² a)	60	20-30
Hot water production*	kWh/a	3390	0

- Originally planned lay out:
 - Reversible heat pump
 - Uncovered solar collector as heat source (winter) and heat emitter (summer)
 - Radiant cooling ceiling
 - Solar water heater
- Disadvantages:
 - Heat emission collector will not work with full sun
 - Dry cooling tower needed
 - Can also function as ambient heat source in winter

- Reversible heat pump
- Dry cooling tower
 - Winter: as ambient air heat source
 - Summer: as heat emitter
- Radiant cooling ceiling or (oversized) fan coil units
- Solar water heater (mostly winter)

- Energy efficient lighting
- CFL / LED
- Co-operation with Osram

