Figure 1: *Case study; Latifa Hospital: Massing and Orientation*

The building has a reinforced concrete structural frame with foundations on piles and block work for the external envelope and internal partitions. The base structural bays are 7.20m x 7.20m for a 4.5 floor-to-floor height. Ceilings are set at 3 meters, except in wet areas where they are at a standard 2.70 meters. The external walls are made of a double block work with a 40 mm cavity filled with a pre-compressed isolation polystyrene board and a layer of bituminized fiber for dampproofing. The windows and doors are provided with sealed double glass with solar control coating to regulate the UV light and reduce heat gain while providing sufficient and uniform daylight. Double glazing windows are the common hospital window type, solar control reflective insulating glass type, and bronze color, 6 mm. with direct transmittance 21%, total solar transmittance 26%; shading coefficient 0.30% and U value 1.4 w/m2. K.

METHODOLOGY

In order to develop effective energy conservation guidelines, the nature and magnitude of the energy usage in the existing hospital was determined through direct collaboration with the hospital facility personnel.

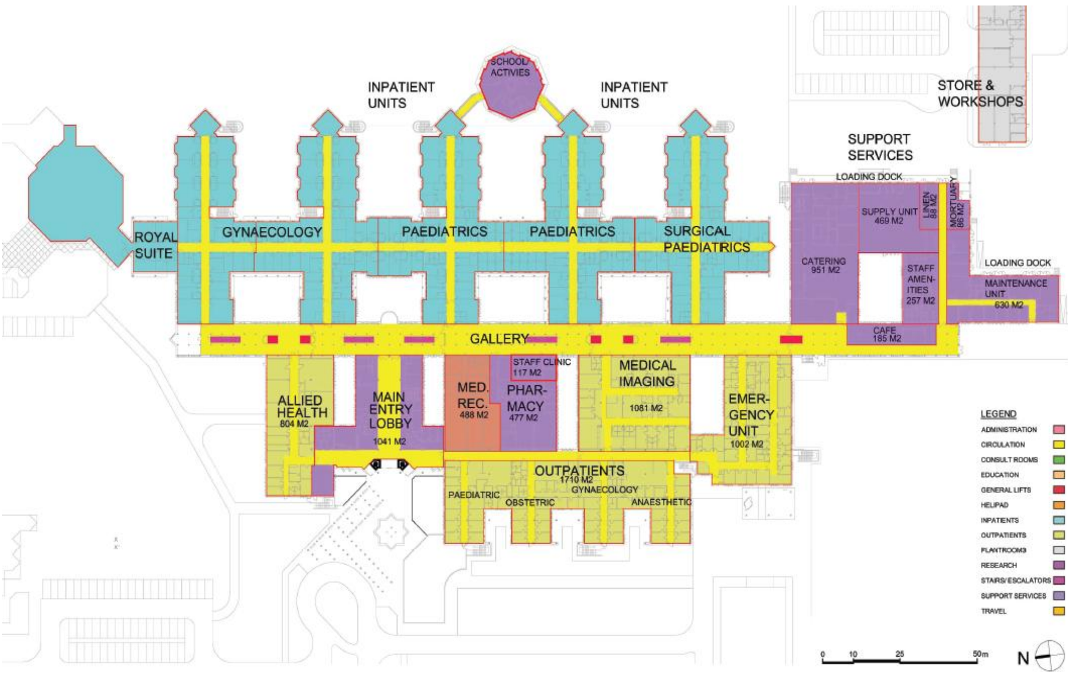

Figure 2: *Ground Floor Zones Layout*

Dubai weather data to find out the ratio of solar thermal energy supplied to the auxiliary energy needed for the stable 63 °C supplywater temperature. The solar thermal system attained a total yearly thermal energy production of 212,224 KWh which contributed 46 % of the total energy consumption for hot water production in the hospital and therefore it is recommended that the share of solar thermal should further be increased to attain energy efficient and cost competitive hot water production.

CONCLUSION

This paper has explored energy saving opportunities while retrofitting an existing healthcare facility in Dubai, UAE through a simulation scheme. The simulations findings resulted in a number of recommendations for energy efficient and cost competitive retrofitting solutions in the climatic context while pointing out indicative impact of occupants' behavior on energy consumption of cooling system.

The findings are in three different areas. First, for the façade construction, choosing a lighter color has huge impact reaching up to 2 % energy savings with least cost incurred, adding wall and roof insulation yields up to 3.4 % energy savings although they incur additional cost as well, proper window type can yield up to 0.7 % of energy savings with minimal cost addition and the optimum WWR is a found between 20-25 % for healthier indoors with little extra energy cost. Secondly for HVAC system operation and efficiency, keeping the cooling set points within acceptable comfort can achieve 0.27 % energy savings with no extra cost and replacing the existing HVAC with a more efficient cooling system can achieve up to 5.9 % energy savings with extra cost of system. Finally integration of 18 solar thermal collectors in the building as a means of renewable and environmental friendly source of energy contributed to 46% energy saving for hot water production economically competitive rates and therefore is recommended for a higher energy share.

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