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Project Energy Efficiency HVAC Air Systems in a Residential House

Script

Prof. Manuel Ruiz de Adana

UNIVERSIDAD DE CÓRDOBA

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1. INTRODUCTION

Buildings are responsible for 40% of energy consumption and 36% of CO2 emissions in the EU. Students enrolled in VIPSKILLS Course have to develop skills related with the energy efficieny in buildings. These skills are related to energy efficiency in HVAC air systems and skills related to simulation of HVAC energy systems in residential houses.

This document present a case study where students have to apply energy efficieny skills to reduce the energy consumption in a residential house.

2. OBJECTIVES

The student has to apply skills and competences related to Energy Efficiency in Residential Houses. Three main objectives are proposed:

- Analyze energy efficiency of HVAC air systems.
- Calculate primary Energy Consumption of different HVAC air systems in a residential house, both for heating and cooling.
- Estimate CO2 emissions related with different HVAC air systems in a residential house.

3. METHODOLOGY

To achieve the proposed objectives the student has to apply a methodology based on this workflow:

- Analyze the geometrical and constructive characteristics of the proposed residential house.
- Identify zones of the residential house to be heated or cooled.
- Analyze the climatic zone where the residential house is located.
- Analyze different HVAC air systems commercially available. Select the at least three different systems for a residential house.
- Model the selected HVAC air systems in an energy simulation tool (HULC) and simulate the HVAC air system in an annual base.
- Analyze the annual results in terms of energy demand, primary energy consumption and CO2 emissions.
- Apply energy efficiency strategies to reduce energy consumption and CO2 associated emissions.
- Simulate optimized HVAC air systems solutions.
- Analyze and compare the energy results to select the best HVAC air system option.

4. DESCRIPTION OF THE RESIDENTIAL HOUSE

A residential house with one floor is located in the city of Cordoba. The residential house has a “L” shape. Figures 1 and 2 show different views of the residential house.

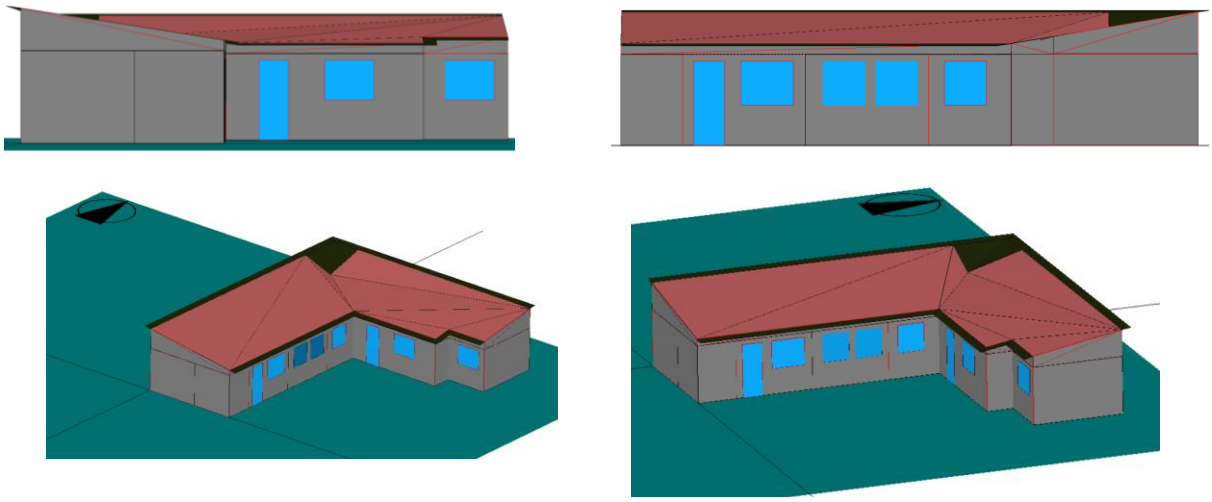

Figure 1. Views of the residential house.

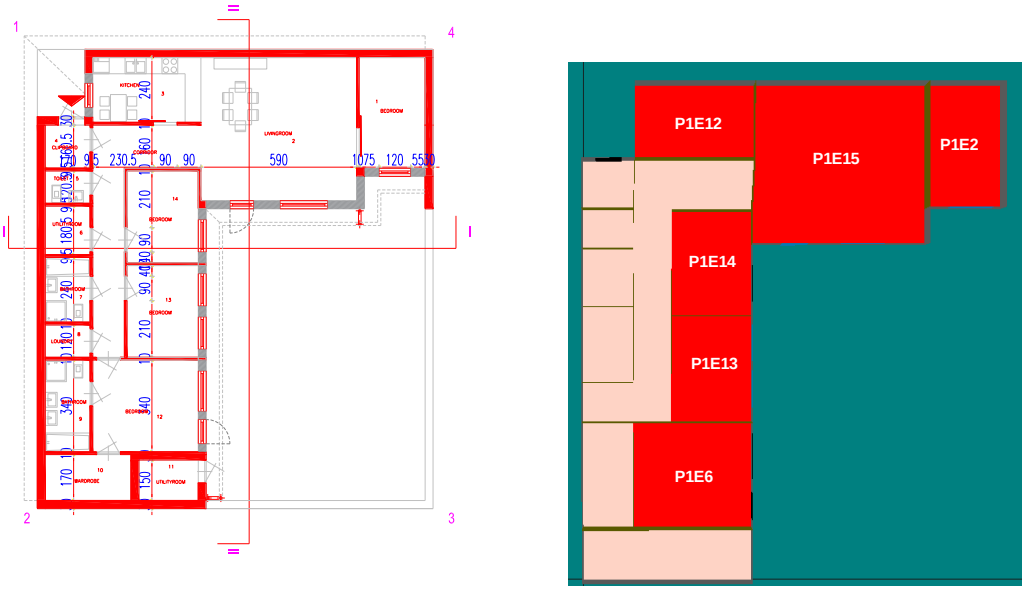

Figura 2. Plan of the residential house in AUTOCAD and HULC.

Details of the house are given in the AUTOCAD file house1.dwg

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