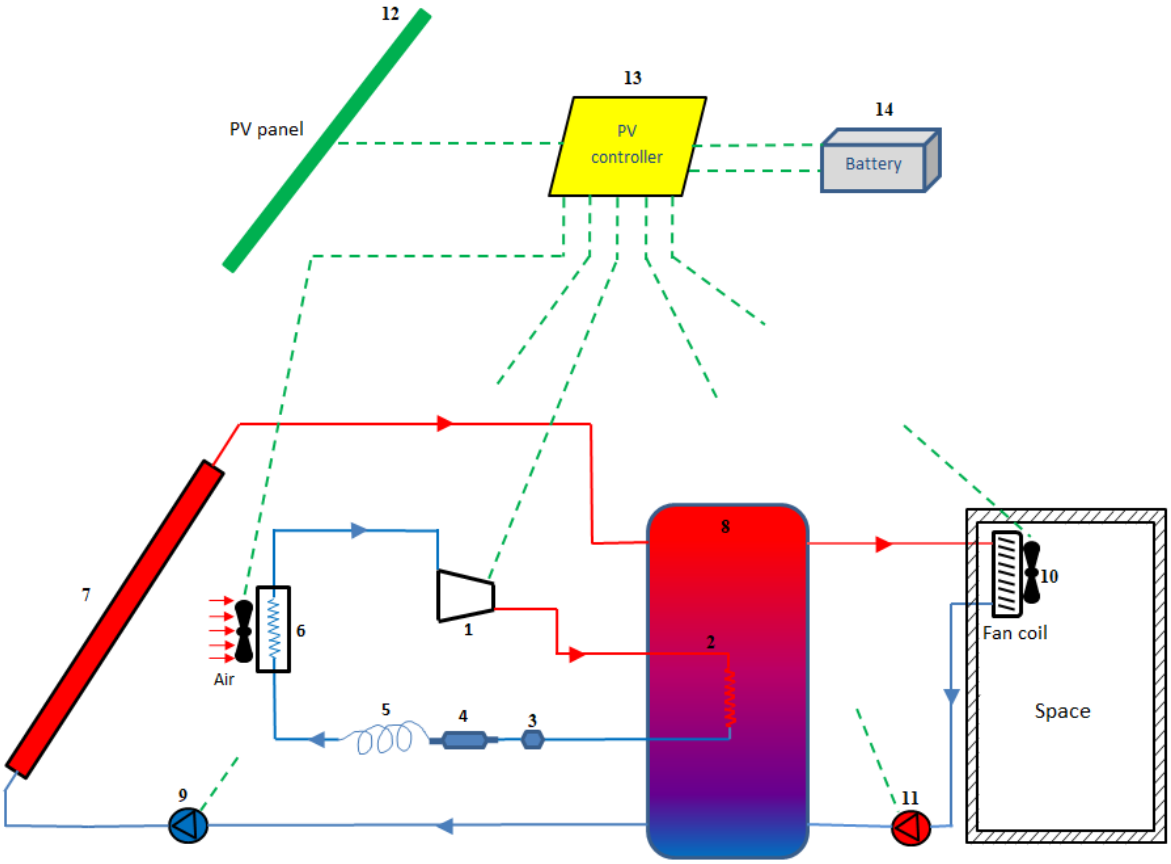

Figure 1: Solar assisted heat pump, parallel connection, with PV panel supply electricity for the hybrid system used for heating applications.

Table 1: Components of the system	
Number	description
1	compressor
2	condenser
3	Sight glass
4	Filter and dryer
5	Capillary tube
6	Fin-tube evaporator
7	Flat plate collector
8	Hot Water Storage Tank
9	Collector Water circulation Pump
10	Fan coil for space heating

11	Fan Coil Water circulation Pump
12	Photovoltaic Panel
13	Inverter
14	Batteries

the work will be implemented on six cases

1- Use only the electrical heater as a heat source to heat the space
2- Use solar collector with electrical heater as a heat source to heat the space
3- Use the heat pump only as a heat source to heat the space.
4- Use the heat pump with PV panel
5- Use the heat pump with solar collector to heat the space as a hybrid system to heat the space
6- Use the heat pump with solar collector and the PV panel as a hybrid system to heat the space

The Study comprise

1- Thermal performance of the of the System.
2- Economic analysis of the systems.
3- A comparison analysis will be done between the cases
4- The exact details of the study, such as the size of the system, are given during the implementation of the work
5- The project involving solving the problem and learning the program.