

ELP305 Design and Systems Laboratory

Semester 2, 2021-2022

Tribe E

3. SUNERGY Design

The GitHub repository that our tribe is using is linked [here](#)[1].

In the following document, we give a brief on how the off-grid energy solution is expected to look like after assembling the various components. We also give design blueprints and wiring diagrams wherever required, making necessary but plausible assumptions about the geography and architecture of the house.

NOTE: Some specifications have been changed after taking the design into consideration. These updated requirements/specifications are available in the GitHub repository.

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3.1 CAD/Assembly

The following image is the 3-D diagram of the designed house.



Fig 3.1.1: Front View

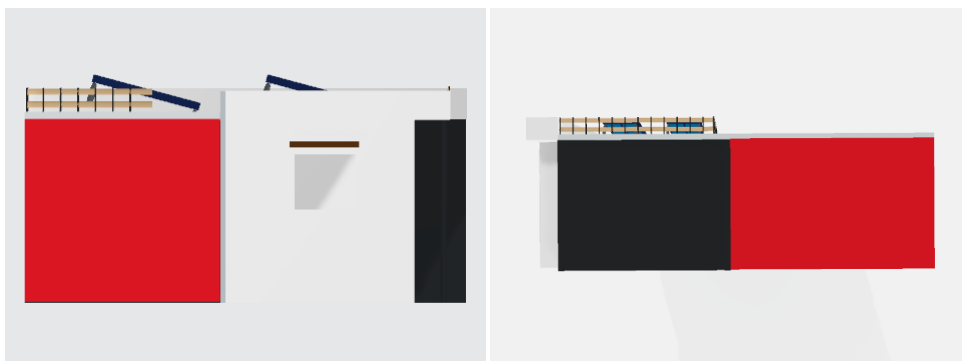


Fig 3.1.2: Side View and Back View (L to R)



Fig 3.1.3: Isometric View

The components of our energy solution are detailed as follows:

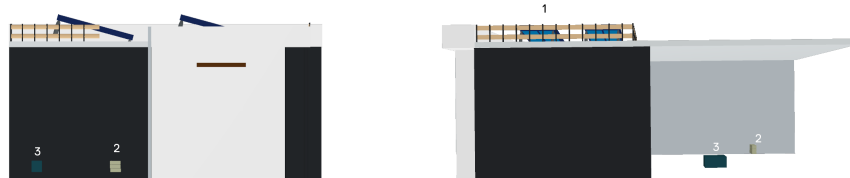


Fig 3.1.4: Component Labels

Label 1 - Solar Panels

Solar panels to take the solar energy and give a DC current.

Label 2 - Inverter

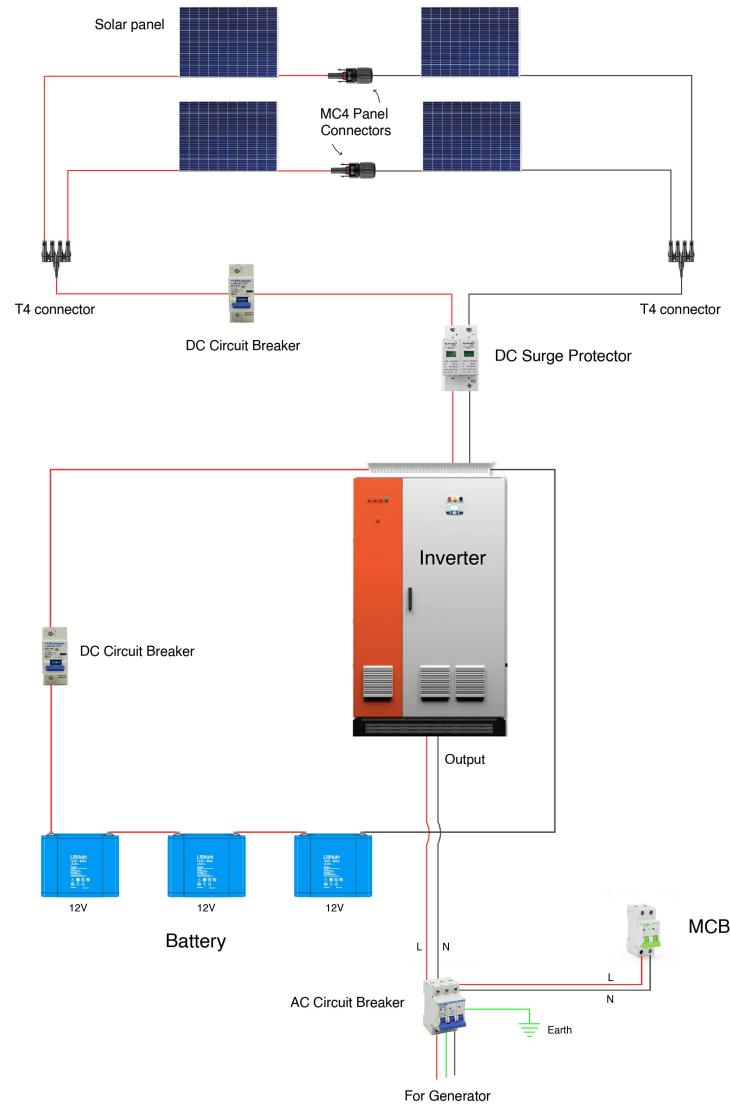
Takes the solar DC current and supply it power supply as well as store it in battery.

Label 3 - Battery

Stores the solar converted electrical energy for further use when solar power cannot be harnessed e.g. Night.

3.2 Wiring Diagram

The next step is to realize the design using all the components mentioned in the specifications by appropriately connecting them. The diagram below shows the connections for the same.



The solar panels are connected in a 2x2 fashion using the MC4 Panel Connectors. These are then connected to a DC Circuit Breaker using T4 connectors. The wires then go via a DC Surge Protector to the inverter which is connected to a series combination of 3 batteries of 12V each. The output of the inverter then goes to an AC circuit breaker which has also been connected to the generator for backup. This is finally connected to the MCB inside the house.

3.3 Documentation Statistics

Word Count	# unique words	# repeated words	# sentences	# characters	# characters w/o spaces	# syllables
434	922	1715	11	3592	3204	941
Avg # words per sentence		Avg # characters per sentence		Avg # characters per word		Avg # syllables per word
40		327		7.4		2.16

The above results were obtained using <https://wordcounter.net/> [7].

3.4 Document Readability indices

Readability Index	Score
Flesch Reading Ease score	61

Readability Index	Score
Dale-Chall Readability score	8.8
Flesch-Kincaid Grade level	7
The Coleman-Liau Index	14
Automated Readability Index	11
SMOG Formula score	12
Spache Readability score	4

The above scores were obtained using Visual Studio Code extension called Readability Check [8] by jemcclin.

3.5 References

- [1] [GitHub - Off Grid Energy Design - Tribe E](#)
 - [2] [600 Watt Solar Panel Wiring Diagram & Kit List](#)
 - [3] [Application of DC600V/20kA Photovoltaic Surge Protector for Solar Power System/PV Solar SPD](#)
 - [4] [Factory Customized High Efficient T4 Solar Connector](#)
 - [5] [How to Connect a Portable Generator to the Home Supply - 4 Methods](#)
 - [6] [Solarverter PRO PCU Installation | Luminous India](#)
 - [7] [WordCounter - Count Words & Correct Writing](#)
 - [8] [Readability Check - Visual Studio Marketplace](#)
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