SMART SOLAR POWER INVERTER

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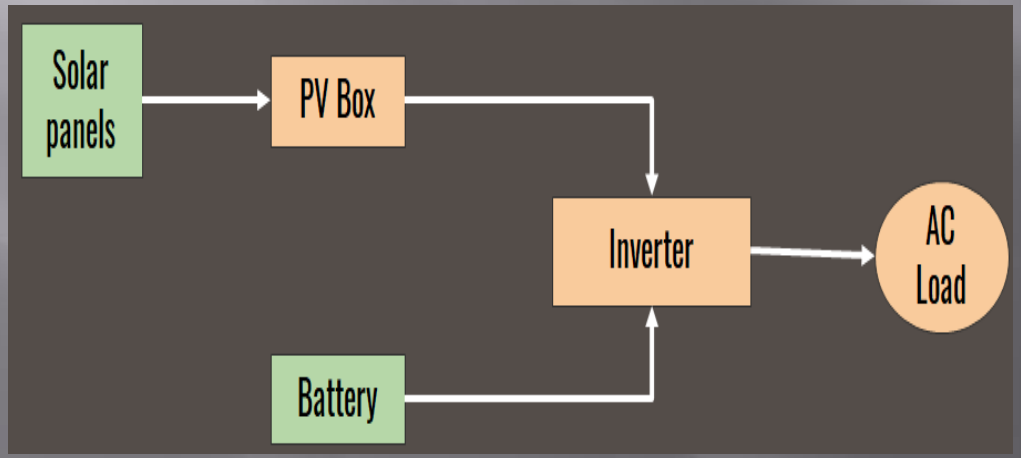
DESIGN TECHNIQUE

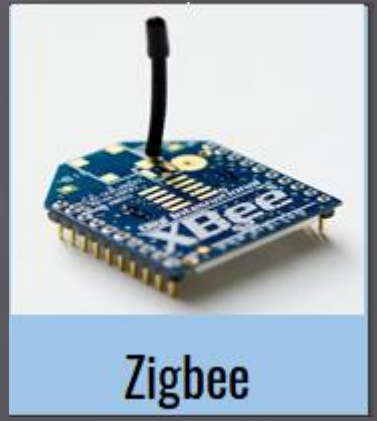
Smart Inverters

POWER ELECTRONICS



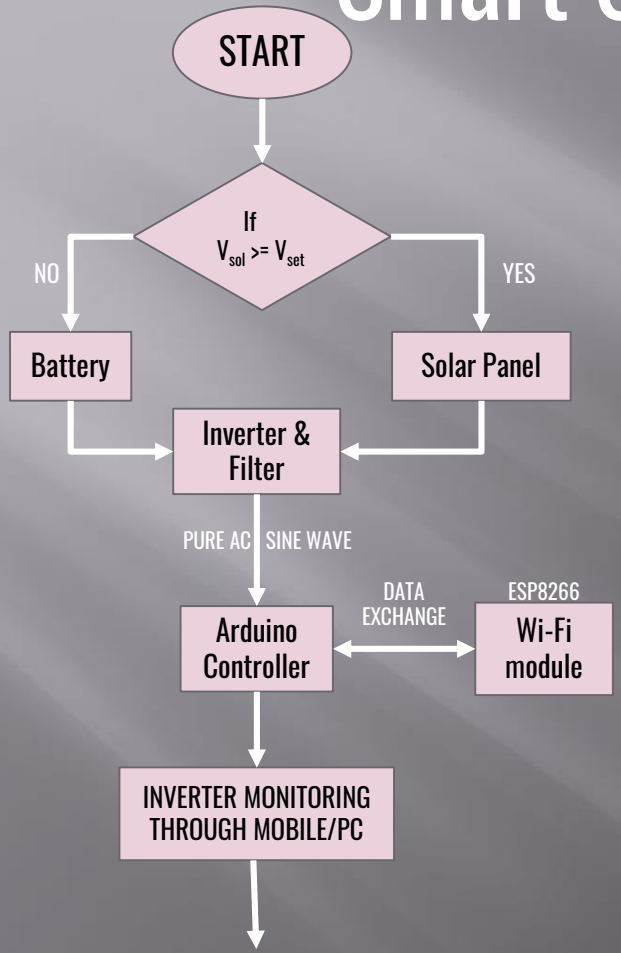
WIRELESS DATA COMMUNICATION

Wifi module



Zigbee

Smart Solar Monitoring System

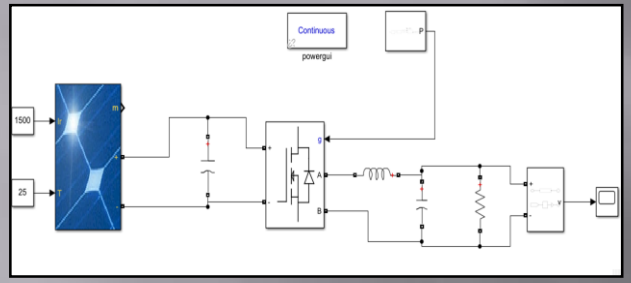


	VOLTAGE	LOAD OPERATING	POWER RATING	WORKING TIME (Hours)
Voltage through Solar.	V_{sol} = 12V (green light)	Load 1	500W	10 hrs
Voltage through Battery. (V_{sol}<V_{set})	V_{sol} < 12V (Red light)	Load2	1000W	4 hrs
Voltage through Solar. (V_{sol}>V_{set})	V_{sol} > 12V (yellow light)	Load3	1500W	3 hrs

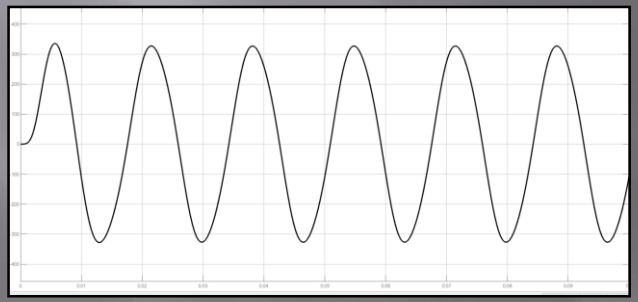
Result

MATLAB/SIMULINK is used to execute the solar power inverter and pure single phase sine wave is obtained.

The circuit diagram consists of the solar panel, inverter circuit, filter etc.

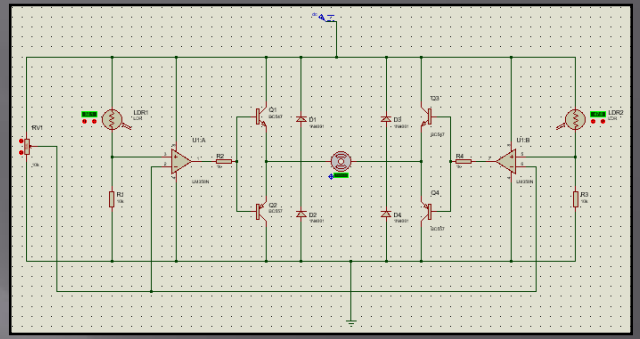


Circuit Diagram of Single phase solar power inverter

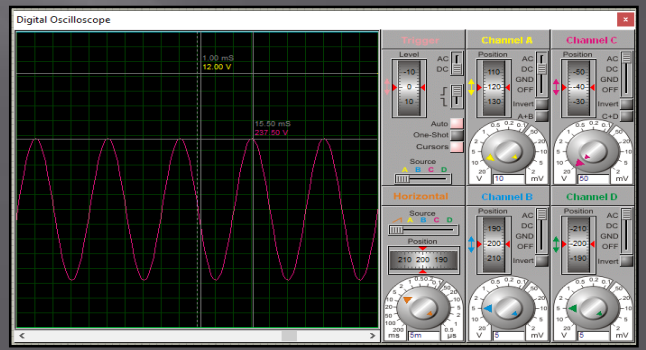


Output sine waveform

The simulation was executed in Proteus using two light dependent resistors (LDR) which indicates the ambient intensity of solar light power MOSFET is connected which makes an h-bridge circuit.



Solar tracking power MOSFET inverter circuit.



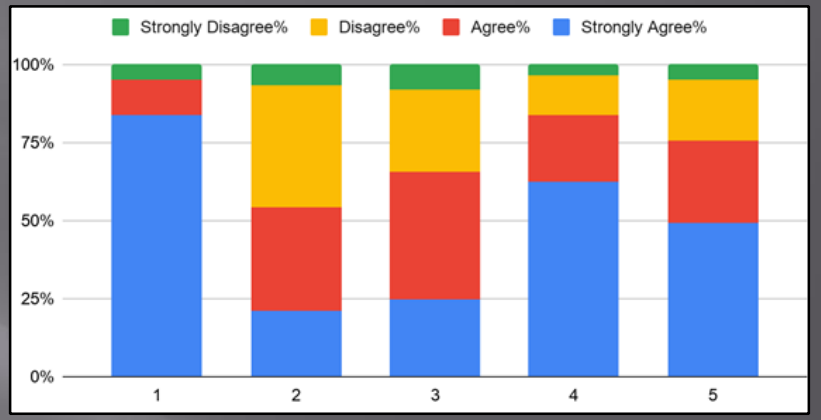
Input and Output Waveforms

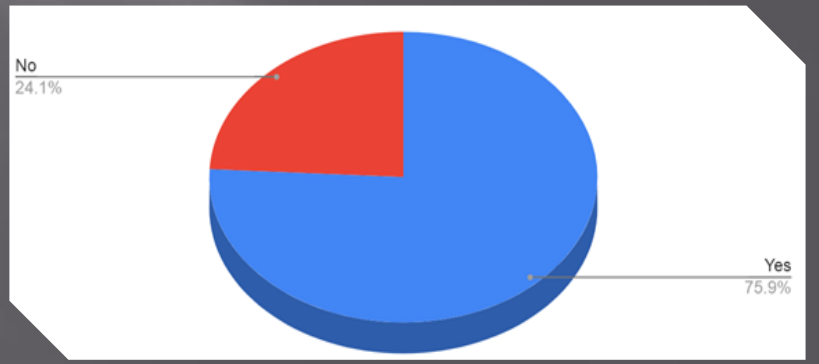
S.no	Parameters	Lithium ion batteries	Super capacitor
1.	Energy storage	Can store more energy	Comparatively less
2.	Charging time	Slow	Very fast
3.	Discharge rate	Low	High
4.	Temperature	Moderate	Wide range of operating temperature (-40F to 150F)
5.	Size	Small size	Comparatively large size
6.	Life span	between 500 and 10,000 cycles	100,000 to a million cycles

Analysis

The survey conducted among 65 people included students (65 to 70%), professionals (15 to 20%), and residents (15 to 20%).

Qt. No.	QUESTIONS	Strongly Agree%	Agree %	Disagree %	Strongly Disagree%
1	Solar energy is an alternative power source from sunlight.	83.60%	11.50 %	0%	4.90%
2	Many people are not aware of solar energy as an alternative power source.	21.30%	32.80 %	39.30%	6.60%
3	Solar energy equipment is not easily acquired.	24.60%	41.00 %	26.20%	8%
4	Organizations should include alternative power source in their maintenance policy	62.30%	21.30 %	13.10%	3%





Conclusion

The overall research focuses on how we can have an optimum utilization of solar based power inverters in terms of harnessing solar power through these inverters and give an real-time update on any smartphones with regard to power update, battery levels, remaining charge time left, time to full charge, switching of power input to batteries from solar power for domestic power in the absence of sufficient solar energy.

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THANK YOU!