

# Assignment

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Subject = Research Methodology

Semester = 3rd

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## 1. Mini literature review

With Smart Grid, there is need for the research, analysis and evaluation, especially communication system and power system. This research provide a Radio enabled Smart Grid testbed, which is able to provide real time emulation of the real Smart Grid systems. A prototype with USRP N210, data acquisition and actuator module and Real Time Digital Simulator is implemented, which show that the proposed testbed is able to provide an average of 9.7ms round trip communication latency and validate real time Smart Grid applications such as voltage stability control.

Reference = You, Minglei and Liu, Qitao and Sun, Hongjian (2018) 'A cognitive radio enabled smart grid testbed based on software defined radio and real time digital simulator.', in 2018 IEEE International Conference on Communications Workshops (ICC Workshops). Piscataway, NJ: IEEE.

It is possible making cities smarter by use of Information and Communication Technology .for collecting and analysing large amounts of data generated by several sources, such as sensor networks, wearable devices, and IoT devices spread among the city. The integration of different technologies and different IT systems, needed to build smart city applications and services. In the Smart City context, this paper intends to investigate the Smart Environment pillar, the aspect related to the implementation of Smart Energy Grid for citizens in the urban context. The innovative characteristic of the proposed solution consists of using the Blockchain technology to join the Grid, exchanging information, and buy/sell energy between the involved nodes (energy providers and private citizens), using the Blockchain granting ledger

Reference = Alessandra Pieroni#, Noemi Scarpato\*, Luca Di Nunzio+, Francesca Fallucchi#, Mario Raso° # Dept. of Innovation and Information Engineering, Guglielmo Marconi University, Via plinio 44,Rome, 00193, Italy.

The paper analyzed how WSN is influenced in our day-to-day life and various drawbacks were facing on the basis of application mode. Owing to these issues, an advanced smart grid mechanism is proposed with photovoltaic system using wireless sensor network with IOT. It consumes less power and the solar panel attached in the circuit is get monitored by the IOT module. There is adjustment is done by attaching and detaching as per the load management. The results received were organized in the web page by means of web browser. Finally, on the result section attained results prove that our proposed mechanism implementation achieves effective electricity by means of solar panel using photovoltaic. Thus shows this mechanism is far better than traditional methodologies and in future it can be further improved as per the technological improvement with our lifestyle.

Reference = McDaniel, P. and McLaughlin, S. (2009) Security and Privacy Challenges in the Smart Grid. IEEE Security & Privacy, 3, 75-77.

In many important energy conversion systems, the power electronic converters are proven to have high failure rates. In this paper, an advanced design tool for reliability of the power electronics converters has been presented. The proposed Design For Reliability (DFR) tool is based on the physics-of-failure mechanisms, it takes the customer specified mission profiles as the input. As the outcomes of the DFR tool, the thermal loading, the power losses, the efficiency of the critical components and also the power converters can be obtained through the DFR tool. The application of the DFR tool is demonstrated on a single-phase transformerless PV inverter.

Reference = Yang, Yongheng; Sularea, Vasile-Simion; Ma, Ke; Blaabjerg, Frede, Proceedings of the 41th Annual Conference of IEEE Industrial Electronics Society, IECON 2015

Home Energy Management Systems (HEMS) have been widely used for energy management in smart homes. Here The main focus of HEMS is to schedule the operation of appliances in such a way that it gives us optimized performance in terms of Peak to Average Ratio (PAR), Electric Cost (EC) minimization , execution time and User Comfort (UC).

Reference = A Ghasem A and R Hylsberg J, "Appliance Scheduling Optimization for Demand Response International Journal on Advances in Intelligent Systems", vol 9 no 1 & 2, year 2016

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**2. Citation Comparison:** The Journal I considered is “Advanced design tools for the reliability of power electronics -- case studies on a photovoltaic (PV) system” by Yang, Yongheng; Sularea, Vasile-Simion; Ma, Ke; Blaabjerg, Frede published in 2015 [https://vbn.aau.dk/ws/files/226629669/Advanced\\_Design\\_Tools\\_for\\_the\\_Reliability\\_of\\_Power\\_Electronics.pdf](https://vbn.aau.dk/ws/files/226629669/Advanced_Design_Tools_for_the_Reliability_of_Power_Electronics.pdf)

By typing Keywords in Google Scholar the original Article does not appear in searched list.

By typing the title of the selected Article in Google Scholar it shows that the Article have 210 Citations

Yes The Authors published further work in the field in which few links are given below

<https://ieeexplore.ieee.org/abstract/document/7911099/>

<https://ieeexplore.ieee.org/abstract/document/7418680/>

<https://www.tandfonline.com/doi/abs/10.1080/15325008.2015.1031296>

The highly cited paper in the result have more citation than the paper which I have selected, The highly cited paper title and link are given “Reliability of capacitors for DC-link applications in power electronic converters” <https://ieeexplore.ieee.org/abstract/document/6748007/>

The Highly cited paper have 589 citations and published in 2014. One before the paper which I have selected but is not cited in my Article.

Yes I think it should be cited in my article because it is highly cited paper and may be a good reference and beneficial for my article if I cited it in my article.

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## 2. Research Proposal :

### Power Generation From Speed Breaker

#### INTRODUCTION

Energy plays a key role in the development of countries. Most developed countries are energy sufficient and often exports energy to earn foreign exchange

Pakistan suffers a lot due to the big difference between generation and consumption of energy.

Power generation from speed breaker is environment friendly as it causes no pollution.

This latest technology uses the kinetic energy of automobiles for production of power in speed breaker.

As an alternate source of energy it helps in building the economy of a country.

#### PROBLEM STATEMENT

It usually refers to the shortage of oil and additionally to electricity or other natural resources.

An energy crisis may be referred to as an oil crisis, petroleum crisis, energy shortage, electricity crisis.

Most of Electrical energy are lost due to street lights, road signals and sign boards on the road.

Economical problems

Pollution problems

#### OBJECTIVES

To deal with the growing consumers demand.

This project enables low budget and economical power production.

Energy production throughout the year

No Manual labour required during generation.

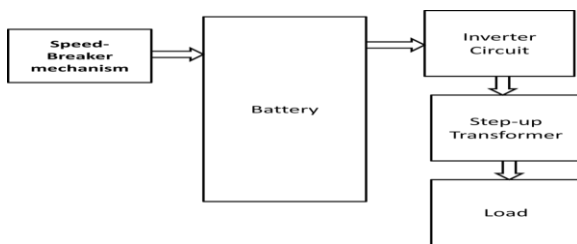
Easy Maintenance .

Pollution free power generation.

Does not consume any non-renewable resources

## METHODOLOGY

It utilizes both mechanical and electrical techniques for power generation. It consists of a dome shape which represents the speed breaker. Whenever the vehicle passes over the dome, the speed breaker moves downwards due to the action of the mass of the vehicle on the springs, Since the rack is welded on to the base of the dome, the compression of the spring causes linear motion of the rack and pinion and arrangement. Small motion in the larger pinion can cause high rotation in the smaller pinion. Since the dynamo and gear are connected, the rotation of gear becomes the source of mechanical energy for the dynamo. The dynamo converts the mechanical energy into electrical energy. This output energy can be amplified and stored using electrical devices. Output energy depends upon mass and speed of the vehicles.



## APPLICATIONS And target market

This power can be used in the following:

Street Lights.

Road Signals.

Sign boards on the roads.

Lightning Of the bus stops.

Lightning of the check post on the highways etc.

## REFERENCES

[1] International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 2, Issue 2, March 2013

[2] P. E. Yearbook, "Hydrocarbon Development Institute of Pakistan," Ministry of Petroleum and Natural Resources, Government of Pakistan, p. 39, 2001.

[3] D. Zaidel, A. Hakkert, and A. Pistiner, "The use of road humps for moderating speeds on urban streets," Accident Analysis & Prevention, vol. 24, pp. 45-56, 1992.

[4] F. K. Afukaar and J. Damsere-Derry, "Evaluation of speed humps on pedestrian injuries in Ghana," Injury Prevention, vol. 16, pp. A205-A206, 2010.

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