



**A Report  
on  
Technical Workshop**

**“Energy Economics of Rural Electrification”**

**Date: 22nd March, Saturday, 2014  
Venue: GNLU Campus, Gandhinagar**



*Presented By: Dr. Indrajit Patel, Mrs. Usha Banker & Mrs. Jagruti Shah*



**Gujarat Technological University,  
Ahmedabad**

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**Technical workshop of Vishwakarma Yojana at GNLU, Gandhinagar**

(22nd March, 2014)

Gujarat Technological University had organized a One Day Technical Workshop of Vishwakarma Yojana Phase-II (Part - II) for Electrical Engineering branch on “**Effective Solutions & Design proposals for problems related to Electricity Networks in Villages**” held on 22nd March, 2014 at GNLU Campus, Gandhinagar.

Ms. Usha Banker, Deputy Director - GTU welcomed experts, all invitees & participants in the workshop. Ms. Neha Vaghela presented a bouquet of flowers to expert speakers Mr. Alpesh Pandya (Certified Energy auditor), MD of Aatman Corporation, and Prof. Kashyap Mokariya, Assistant Professor in Dr. S. S. Gandhi College, Surat

Total 7 Nodal officers from VGEC-Chandkheda, Sir BPTI-Bhavnagar, VPMP Polytechnic-Gandhinagar, GP-Junagadh, Sakalchand Patel College of Engg- Visnagar, Parul Inst-Vadodara, GP-Bhuj & 130 Students of respective colleges had attended the workshop.

Mrs. Usha Banker, Deputy Director briefed all participants about core themes of workshop. Technical Session has been grouped in Two core themes:

- (I) Energy Conservation Techniques and Energy Audit for Villages.
- (II) Energy efficient devices, Rural Electrification & Methods of energy economics.



## Technical Session I

The first Session was conducted by Mr. Alpesh Pandya from Aatman Corporation. He has 18 Years of Industrial experience. He is a certified Energy Auditor from Govt. of India, Authorized Energy Auditor Govt. of Gujarat (GEDA). In his presentation, he presented Energy Scenario, Energy Audit steps, methodology and instruments needed for energy audit.






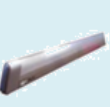


He explained rural electrification and building electrification for lighting scheme and replacement of less efficient lamps, fans, and domestic devices with energy efficient one. Street lighting and home lighting was also covered. He explained the main resources of energy like coal, oil and gas, which have taken three million years to form, are likely to deplete soon. In the last two hundred years, we have consumed 60% of all resources. For sustainable development, we need to adopt energy efficiency measures. Today, 85% of primary energy comes from non-renewable and fossil sources (coal, oil, etc.). These reserves are continually diminishing with increasing consumption and will not exist for future generations.

He also briefed about gap between energy demand and generation, possible fuels are used in transportation and various industrial processes and in power plant; if these sources are depleting in the same manner then at the life of human beings, vehicles and industries is not easy to live but impossible. The population is increased many times hence there will be a need of new houses, complexes, transportation etc. Every day the gap between energy demand and generation is increasing, so to bring this gap energy should be conserved.



## ENERGY SAVING OPPORTUNITIES USE OF EFFICIENT LIGHT SOURCES

Conventional	Efficient	Emerging Trend
Incandescent Bulb 	CFL 	LED 
Mercury Bulbs 	MH / HPSV 	LED 
Tube Lights (T8/T12) 	Tube Lights (T5) 	LED 

He presented various solutions for energy conservation in villages and explained all parameters to student in context with villages. He briefed that as India is a developing country & its energy demand is ever increasing and doubled in last decade. The production of energy is still not meet energy demand, hence the gap between energy generation and energy demand continuously increasing. India is a major energy producer and consumer. India currently ranked as the eleventh greatest energy producer of the world, according for about 2.4% of the world's total energy production, and as the sixth greatest energy consumer of the world, according for about 3.3% of the world's total annual energy consumption.

Students from Electrical Engineering branch asked various questions regarding electrification problems in villages at the end of the session. Ms. Usha Banker thanked Mr. Alpesh Pandya for his valuable guidance share with the students.

### Technical Session II

The Second Session was conducted by Prof. Kashyap Mokariya from Dr. S S Gandhi College, Surat. He has 12 years of Experience. He got a best Innovation award on 14<sup>th</sup> Feb 2014 from GTU.

Shri K L Mokariya explained four methods of calculating mechanical loading and efficiency of motor which students has to perform with their guide at their respective villages motors

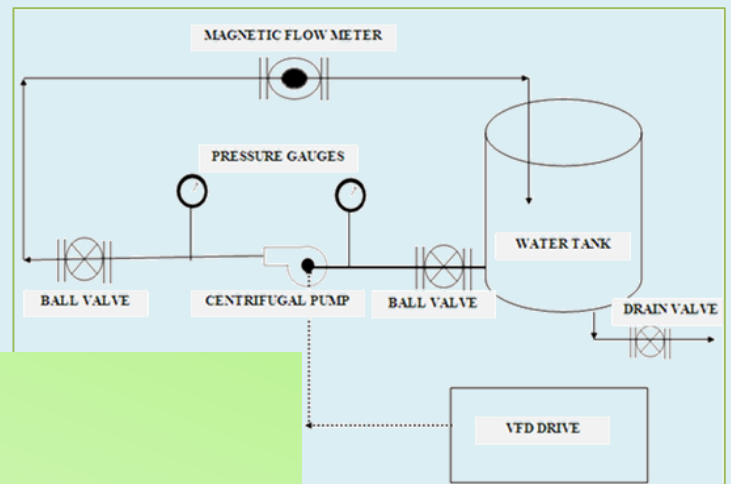
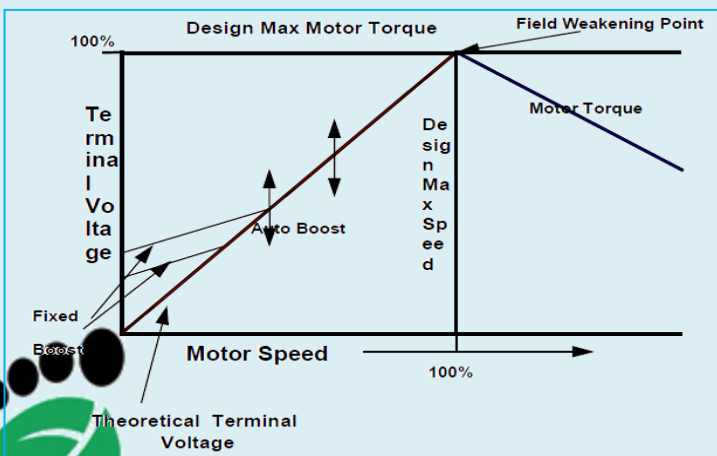




and calculate mechanical loading and efficiency accordingly. Students were given proper understanding when to operate motor in star mode, delta mode, delta-star, star-delta mode and even when to use soft starters for saving energy. If by efficiency measurement the efficiency of the motor is poor than if it is replaced by energy efficient motor than what will be the payback period it was explained by case study just as case study for efficiency calculation.



Design and Operation of very low cost single phasing preventer was explain to students and they were encouraged to design a classroom timer for 1 hour, low cost water level controller etc. Sources of low power factor was explained and methods to improve power factor was discussed with benefit of power factor improvement. Readymade tables were given and explained to students such that when they go at their villages they can have directly the ans of capacitor KVAR needed for particular rating motor and they were asked to compare the answers to their design equation that they have studied in their syllabus for deciding KVAR of capacitor. To give industrial exposure to these final year students hardware design of



automatic power factor controllers with detailed programming using Programming Logic Controller was explained and students were encouraged to do power factor improvement after study of bills and measuring power factor at site and do similar design using microcontroller to reduce the cost. Concepts of Variable Frequency drive and its construction, hardware implantation and programming with results comparison of throttling and VFD were shown to students and energy saving feature with power factor improvement by VFD was explained to students and students were encouraged to work for pumps in their area for energy saving.



Students were also encouraged to arrange seminar for energy conservation in rural areas with prior permission of respected authorities to promote the use of energy efficient devices at remote area.



Ms. Usha Banker thanked all Students, Nodal Officers, Experts & team of GTU for making Programme success for Vishwakarma Yojana.

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**On Behalf of GTU**

Dr. Indrajit Patel  
Ms. Usha Banker & Ms. Jagruti Shah

