## INDUSTRIAL ORIENTED PROJECTS

### Automatic Liquid Processing System

“The vegetables and fruits are being wasted in agriculture fields and markets due to the unfair treatment and poor financial conditions of the farmers. So, in order to eliminate the wastage and convert them into useful products, they were converted into packaged foods by processing them accordingly. This project “Automatic Liquid Processing System” converts these perishable agric products into usable food and makes them available for longer periods. Also the process designed here is automated and has various advantages over the traditional ones.

Automation is the recent trend in industries that eliminates all human and unnecessary errors. Specially processing industries uses automation to a greater extent to have well finished and qualitative output.

“The biggest benefit of automation is that it saves labor, however, it is also used to save energy and materials and to improve quality, accuracy and precision” added Veda Narayana and his team members.

“The project implemented is reliable, faster, robust and most economical system to process liquids in the liquid processing industries. The major tasks in these industries are cleaning jars, preparing solutions and packing them into the bottles. Though the methods are traditional, the style of implementation makes this process unique among others and if implemented will yield good results in industries both economically and qualitatively” shared Chiranjeevi and his team members.

Maruthi Ram along with his teammates, final year students of EEE, indicated that "To meet today's strict requirements, plants especially those process liquids, must satisfy the highest hygienic design standards to avoid product degradation and contamination during plant operation. This project can meet those industrial standards and stands as beckon for the **INDUSTRIAL ORIENTED PROJECTS** at LBRCE."

## AUTOMATIC SOLAR TRACKING SYSTEM USING PLC

This project mainly deals with tracking of maximum solar energy from the sun by varying the solar panel position as per the changing direction of sun. The tracking is done by programmed light intensity sensors of the panel throughout the day. Speed and direction of the motor are controlled by Programmable Logic Controller (PLC), and this motor is attached to solar panel.

## SOLAR ASSISTED BICYCLE

Our project mainly deals with ordinary bicycle which is converted in to Electric bicycle using a PMDC Motor which is running through batteries and the batteries are charged using a solar panel.

Here mainly we use a controller as it controls the voltage across the motor with the help of throttle which is a type of accelerator. Here the main motto is to convert solar powered electrical energy in to mechanical energy with the help of PMDC motor.

Using this solar powered bicycle, we can attain a maximum speed of 25KMPH and an average speed of 21KMPH.We can travel a distance of 30Km on a plane road. In addition, in the absence of sunlight a "24V DC generated Fan" is used in order to charge the battery through Controller. Thus "Solar electric bicycle" is converted in to "Hybrid Electric Bicycle".

## EXHAUST HEAT RECOVERY SYSTEM USING THERMO-ELECTRIC GENERATOR

In internal combustion engines efficiency is around 30 % roughly 30% of the fuel energy is wasted in exhaust gases and 30% in cooling water and 10% are unaccountable losses. Efforts are made to catch this 30% energy of exhaust gases. If this waste heat energy is tapped and converted into usable energy and the overall efficiency of an engine can be improved. Thermoelectric modules which are solid state devices that are used to convert thermal energy to electrical energy from a temperature gradient and it work on principle of See beck effect. A thermoelectric generator (TEG) using the exhaust waste heat from an automobile has the potential to replace the existing alternator system in an automobile, and thus improve fuel economy and reduce emissions. To evaluate the performance and the effects of using a TEG in an automobile, an automotive exhaust thermoelectric generator system (AETEG) model has been developed.

## Conclusion

1. An Automobile Exhaust Thermoelectric System was designed and developed for the waste heat recovery of an automobile engine.
2. The system was retrofitted to the exhaust line of a 4 stroke, 3 cylinder Maruti 800 cc SI engine and measurements were taken to study the performance of this system.
3. It was found that to get improved efficiency of this system, thermal management is very important. Double stacked type cold side heat sink gives better temperature gradient across the TEG. Counter flow type arrangement enhances the effective heat transfer. Also insulation used for the area not covered by TEG modules avoids the heat losses.
4. At high vehicle speeds, the total power that could be extracted was increased. More power could also be extracted by improving the exhaust gas heat exchanger. However with the current design the hot junction temperatures at or above 250oC were allowed for the given material of TEG (Bi-Te) and results were obtained.
5. Results show that voltage, current, power developed and efficiency of the system increase with the increase in engine speed. At the engine speed of 3970 RPM, the power generated was 15.12W and efficiency of the system was 5.0708%.
6. Hence the AETEG system traps the waste heat of exhaust gases from engine & generates useful power which can be used to charge the car battery, to power auxiliary systems and minor car electronics.
7. As AETEG reduces the wastage of energy, it improves the overall efficiency of vehicle. AETEG system can be profitable in the automobile industry.