**Friday, October 21, 2016, 06:30PM - 07:30PM**

**Session T; Poster Presentations, Crystal Hall B**

**Session Chair: Mumtaz Hasan Malik, University Of Management and Technology**

**T.01 Shuang-Ying Wu, Ke Wang, Lan Xiao, Zu-Guo Shen, Chongqing University, China, *Numerical investigation on combined heat losses of phase change solar cavity receiver with back-side wind* –** Based on the thermal boundary condition of only bottom wall heated by constant temperature, three-dimensional numerical study on combined heat losses of phase-change cylindrical cavity receiver applied in the solar dish thermal power system under back-side wind conditions were performed. The considered parameters were wind speed V, wind incidence angle α, cavity tilt angle φ and the emissivity of inner cavity wall ε. The comparisons between back-side wind conditions (α=-90~0º) and front-side (α=0~90º) wind conditions were conducted. Results reveal that convection induced by back-side wind is stronger than natural convection, but weaker than that of front-side wind conditions except for head-on wind (α=90º) with low speed. For different wind speed, the average convection heat loss Nusselt number Nuc for α=-90 ~ -30º presents different change trend and varies in a smaller range than that of front-side wind. Besides, the variation of Nuc with α for different φ is more complex when compared with that in front-side wind conditions. The effect of ε on Nuc in back-side wind conditions is more significantly determined by φ compared with front-side wind cases.

**T.02 Tehrina Ismail, University of Engineering and Technology Lahore, Pakistan, *Dynamic Modeling and Operation Strategy for a Microgrid with Wind, Hydrogen Fuel Cells and Photovoltaic Resources*** – This paper presents dynamic modeling and operation strategy for a microgrid with wind, photovoltaic and hydrogen fuel cells resources. The general idea behind microgrid with these resources is to develop a system to operate all three sources optimally to meet load demand. Super capacitors have been used to harvest additional energy to be available in grid.The stored energy comes in action when load demand is more than power available from renewable resources to meet load demand. Themajor constraint in the operation of a microgrid is continuous supply meeting the power quality standards. The use of super capacitor not only improves the efficiency of a system but play an important role in maintaining a quality based continuous supply.The system has been modeled and operation strategy is being suggested for optimal utilization of resources and smooth operation of microgrid. The results have consolidated the concept using the simulation in MATLAB/SIMULINK and present the effectiveness of the presence of advance storage medium.

**T.03 Zahid Tauqeer Ahmed, University of Management and Technology, Pakistan, *Micro climate & Energy Conservation –*** Greenhouse effect, heat up the environment and reradiate that heat to the ambient air which is transmitted to the building exterior fabric and ultimately resulting in heat gain in the building interior spaces. An investigative analytical study shall also be carried out to study the thermal performance and the bioclimatic characteristics of not only the typically used exterior wall section details but also the associated exterior spaces as well. Conclusion shall be derived in the form of design strategies and recommendations to help improve current building construction practice, energy conservation paired with some inexpensive but effective soft landscaping techniques integrated with indigenous passive cooling techniques to remedy the situation. Finally, a conscious attempt to try to revive, learn, modify and integrate key features of vernacular architecture of Pakistan wherever appropriate

**T.04 Meraj Qureshi, Lahore School of Economics, Pakistan, *Development of Energy Management System for Beverages Industry* –** Energy is an important parameter in the emergence of the developing countries. Due to the ever increasing demand of Energy, there is a great demand of fossil fuels which degrades Environment. Industrial processes consume nearby 51% of world total energy. In order to conserve energy, the International Organization of Standardization (ISO) introduced Energy Management System (EnMS) ISO: 50001 in 2011. This system aims to reduce the overall energy consumption of an organization through systematic audits. In this study EnMS was developed for a beverages industry which includes the development of baseline studies, development of checklists, energy manual, procedures and thermographic analysis. The main sources of energy used are electricity, LPG and Diesel oil. Baseline data shows that 60% of the energy, mainly electricity, is consumed by the production lines while remaining 40% is utilized by the utilities. Electricity distribution panels were physically sound but thermographic analysis shows losses of energy in the form of heat. The rating of the system was found to be 87.6%.

**T.05 Sana Sadaf, University of Agriculture Faisalabad, Pakistan, *Evaluation of mustard oil for the synthesis of biodiesel: Characterization and Optimization study*** – The present investigation deals with the evaluation of mustard oil biodiesel as an alternative and renewable fuel to compensate the energy requirements in the world. The mustard oil was esterified before the production of biodiesel due to high free fatty acid content. About 94 % of free fatty acids have been esterified at optimized conditions for esterification process (1:3.3 methanol to oil molar ratio, 0.8 % catalyst; 60Â°C temperature and 280 min of contact time). The pretreated oil was subjected to trans-esterification process for biodiesel production. Important influencing parameters have been optimized and study results indicated that 98 % biodiesel yield was obtained in 70 min of reaction time. Physico-chemical properties such viscosity, density, acid value, calorific value, cloud and pour point, saponification value, iodine value and cetane number were also analyzed with standard procedures and all the characteristics were found in good agreement with recommended ASTM standards. The composition of synthesized biodiesel was determined by GC-MS. The results indicated that alkali catalyzed trans-esterification is an efficient method to synthesize good quality biodiesel.

**T.06 Syeda Mehwish Bukari, National U of Science Technology Islamabad, Pakistan, *Economic* *Viability of the Photo voltaic systems in Pakistan –*** The Energy is an imperative segment in the today’s world. Renewable energy is becoming more popular because of the variation in oil prices. Among renewable resources, solar energy is a clean source of energy and abundant in supply. The costs of the PV cells are also diminishing gradually .This paper presents the economics analysis of on grid connected photovoltaic system for a commercial building "planning commission" in Pakistan. RET screen software has been used for the analysis. The software is easy to use and has the potential of simulating the net present value and simple payback period as well as estimating the greenhouse gas reduction potential of renewable energy projects over their entire operational life. Under the existing tariff conditions in the country, the PEC PV system is examined on financial parameters i.e. NPV, IRR, Net benefit-cost ratio &amp; payback period. The preliminary analysis of the simulation results showed that the project is economically favorable to the society with 284.02MWh electrical power delivered to the load and with payback period of seven years.

**T.07 M Usman Talib, M Numan Talib, Hafiz Husnain Javed Brula, GIKI Swabi, Pakistan, *Its time to bridle ditzy attitude for Pakistan & natural resources –*** This paper apprises the reader of the novel and efficient methods to produce power using the energy residing in the wind and sunlight, with the aid of PVC and wind turbines to meet energy desires in our beloved country Pakistan. These both methods, though seem pretty distinct, are actually the derivatives of the sunlight (wither directly or indirectly).These ways of producing energy are much easy, favorable and lucid to comprehend ,also they produce nothing dangerous regarding the human health or environmental deterioration, and that’s why are deemed appropriate to adopt. Renewable energy resources are such that their fountainheads don’t erode or vanish along with being environment friendly. Wind is driven atop the surface of the earth due to the temperature difference in its different parts, so it is also indirectly related to sunlight intensity. Wind is the source of kinetic energy of the wind turbine, which is afterwards converted to electricity. On the other hand, PVCs make use of the photovoltaic effect. Pakistan is bestowed regarding the natural resources, as there is oodles of this kind of resources which are to be benefitted from.

**T.08 Amna Mujeeb Khan, Rabia Aziz, Irfan Ahmed Shaikh, U of the Punjab Lahore, Pakistan, *Application of Fenton Process for the Removal of Color and COD from Textile Effluent using Discarded Bleaching Wastewater –*** The research was conducted to develop a novel approach to make Fenton reagent cost effective. The wastewater from the semi-bleaching section of textile industry was taken as a source of H2O2. Different experiments were established to estimate the decolorizing and COD removal efficiency of semi bleach wastewater along with FeSO4 from the textile effluent containing (CI Reactive Orange 122, CI Reactive Red 195 and CI Reactive Black B) dyes as model pollutants. In this study, the efficiency of treatment on two variables was evaluated, first-one is initial pH and the other is FeSO4 dose. The optimal operating conditions for pH and FeSO4 dose were observed as 3.0 and 300 mg/L respectively, resulted in sufficient color degradation from textile effluent in as much as between 90% and 98% color removal was achieved. With the increase or decrease in the dose of FeSO4, the reagent becomes incapable to remove color probably because of hindrance effect of FeSO4.For CI Reactive Orange 122 and CI Reactive Red 195 dyes excellent color removal has been reported but in case of CI Reactive Black B, the color removal efficiency decreased with the increase in the concentration of dye. This treatment process also resulted in slight decline in chemical oxygen demand (maximum 60%). The overall experimental results unveils that the use of the discarded semi bleach as a source of H2O2 in Fenton process is effective and has potential to remove color and COD from all Reactive dyes.

**T.09 M Afzal Dogar, Muhammad Arfin Khan Lodhi, U of Management and Technology Lahore, Pakistan, Texas Tech U Lubbock USA, *Energy from salt gradient solar pond: Efficiency and cost effectiveness*** – Solar energy generated by salt gradient solar pond (SGSP) is one of the promising techniques for providing energy for many applications. Pakistan is of the most solar-radiation abundant countries on the planet, but the region also has limited water resources. The proposed SGSP in Pakistan has an area of 100 x 100 m2, and the predicted temperature of the storage zone is kept below 100 oC. This renewable and sustainable heat source can be employed in desalination; the energy cost of desalinated water constitutes over 50% of operating costs. Efficiency and Cost Effectiveness and the various aspects of solar radiation that are relevant to this technology will be explained.

**T.10 Nadia Sharif, Neelma Munir, Faiza Saleem, Shagufta Naz, Lahore College for Women University, Pakistan, *Ulothrix microalgae as a potential biodiesel producing algal strain* –** The current focus of third generation biofuel research is to discover new algae strains with high growth rate and oil yield. There is limited information about Ulothrix microalgae fatty acid profiling. Cultivation was done at a temperature range of 20o-45oC and pH of 6-9. Microwave Assisted Extraction was used for oil extraction and the transesterified oil was analysed with GCMS. Results revealed that the Bold Basal Culture medium is more suitable for its cultivation at optimum temperature of 38 oC and at pH of 7.2. Dry oil content was 62 % and biodiesel yield from oil was 97%. GCMS confirmed the presence of Palmitoleate (16:1), Stearate (18:0), Oleate (C18:1), Linoleate (18:2) main methyl esters. The high percentage of oil content and the unsaturated fatty acids composition suggested that Ulothrix sp. is a promising feedstock for biofuel**.**

**T.11 Qaiser Abbas, U of Management and Technology Lahore, Pakistan, *Energy obtained from salt gradient solar pond: Waterlogging and salinity*** – For the useful conversion of solar energy solar ponds are probably the simplest technology available. Solar ponds have been used for many applications like conversion of solar energy into thermal and electrical energy. These conversions are economically viable and technically feasible particularly in Pakistan. Pakistan is an agricultural country and swirly facing waterlogging and salinity problem, which is a drag to economy. Almost 43% of the area in Indus Basin Irrigation System (IBIS) is classified as waterlogged having depth to water table less than 3m. To demonstrate the technical and economic feasibility of solar pond in Pakistan results are taken from the ground water quality of villages near Hudiara drain Lahore. It is propose to construct salt gradient solar ponds in villages near Hudiara drain Lahore by using saline water. In this way we can construct series of solar ponds by utilization of energy obtained from salt gradient solar pond in pumping out the underground saline water and storing that water for next solar pond, whose energy can be used again to repeat the same cycle. So this is the way we can get rid of water logged and saline land and salt gradient solar ponds will be source of free energy.

**T.12 Azhar Ali, U of the Punjab Lahore*,* Pakistan, *Reuse of textile waste water after treatment with Fenton oxidation process*** – This paper is aimed to treat the textile wastewater in order to reuse it for different purposes especially in agriculture and in cleaning and washing. Textile industry is one of the growing sectors in Pakistan and we are facing a high load of water pollution due textile industrial effluent. Advanced oxidation process (Fenton method) is used for treatment because this method is proved to be most effective in lowering the BOD, COD, TOC, Turbidity, color removal, hardness etc. Results revealed that high efficiency of color removal was achieved including wastewater parameters such as total dissolve solids, total suspended solids, chlorides, sulfates, chemical oxygen demand (COD) &amp; Hardness about 95%, 60%, 80%, 90%, 30%, 70% &amp; 50% respectively on optimum dose. After treatment the treated water was used to remove rust from metal and cleaning of washroom flushes due to its acidic nature, washing of floor, removal of bicarbonates and dyes from floor. The reuse of the treated water can reduce about 50% of wastewater generated by overall industry. Removal of nitrates and phosphates will be also a very important parameter because it can cause eutrophication if released into water bodies without treatment.

**T.13 Munawar Iqbal, U of Lahore, Pakistan, *Template free zinc vanadate flower synthesis, characterization and photocatalytic activity under UV irradiation* –** Three-dimensional zinc vanadate flower (3D-ZVF) was synthesized through template free self-assembly route and characterized by X-ray diffraction, Scanning electron microscopy, Energy dispersive x-ray, Atomic force microscopy, Particle size analyzer and UV-visible spectroscopy. The possible growth mechanism was proposed and photocatalytic activity (PCA) of ZVF was evaluated by degrading cetirizine dihydrochloride (C-HCl).C-HCl degradation was studied as function of catalyst dose, pH, UV exposure and C-H Cl initial, which are optimized using Response surface methodology (RSM). The C-HCl (10 mg/L) degradation of 87% was achieved under 120min UV exposure using0.5 g/L catalyst dose at pH 6.Satisfactory correlation was observed between the experimental and predictive values. The ZVF was found out to be capable for C-HCl degradation. Moreover, RSM was proved to be a powerful tool for the optimization of influencing variables with reliable statistical analysis. As the as-synthesized ZVF might be a potential candidate for the degradation of emerging pharmaceutical pollutants, therefore, our future study would be focused on PCA of synthesized ZVF under solar light irradiation.