

SEMINARON

**ENERGY EFFICIENCY AND CONSERVATION MEASURES
IN AGRICULTURE AND INDUSTRIAL SECTORS OF PAKISTAN**

(REPORT)

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In Collaboration With

Government of the Punjab,
Agriculture Department (Field Wing)
21 Davis Road, Lahore

SEMINAR REPORT

ENERGY EFFICIENCY AND CONSERVATION MEASURES IN AGRICULTURE AND INDUSTRIAL SECTORS OF PAKISTAN

A Seminar on “Energy Efficiency and Conservation (EE&C) Measures in Agriculture and Industrial Sectors of Pakistan” was held on 14th October, 2015 at Inter Disciplinary Research Center for Biomedical Materials (IRCBM) conference room, COMSATS Institute of Information Technology (CIIT) Lahore. The seminar was organized by the Energy Research Center, COMSATS Institute of Information Technology Lahore in collaboration with the Government of the Punjab, Agriculture Department (Field Wing). The seminar was attended by renowned experts on energy technologies, researchers, industry representatives, agriculturists, members of academia, representatives from the ENERCON and the Punjab Energy Department. A List of participants of seminar is at **Annexure A**.

2. The proceedings of seminar were initiated with the recitation from Holy Quran. Mr Khalid Saeed, Head Energy Research Center (ERC), CIIT Lahore, welcomed the participants and briefly explained the prevailing issues in the energy sector in Pakistan, the adverse impact of the on-going energy crisis on the country's economy and the importance of demand side management to reduce the existing gap between energy supply and demand. Quoting from the experiences of a number of countries, he highlighted the need for mainstreaming the issues of energy conservation and efficiency in the national discourse and energy policy. The present seminar, he said, was an effort to sensitize the policy makers and practitioners to incorporate the energy conservation and efficiency improvement programs in a more effective manner. Addressing the participants, Dr. Saleem Farooq Shoukat, Head Research and Academics, CIIT briefed them about the importance of research programs assigned by the COMSATS. He congratulated the Energy Research Centre for holding the seminar on a very important and relevant current issue and hoped that the free and open discussions among all the stake holders represented in the seminar will help arrive at the recommendations and

conclusions to help cope with the crisis due to mismanagement of available energy resources.

3. Following experts/ speakers addressed and gave their presentations on topics related to energy efficiency and conservation measures in industry and agriculture as detailed below.

Expert Name	Title of Presentation /Lecture
Dr SobiaBaig, HoD, Electrical Engineering Department, CIIT Lahore	Energy Efficiency Improvements – Industry Academia Relationship
Mr. Iftikhar Ahmad Randhawa, Chief Engineer Power, Energy Department, Punjab Government	Energy Efficiency and Conservation in Punjab
Engr. ArjamandQayyumAhmad, Engineer PITCO Pvt Limited Pakistan	Best Practices for Steam Systems in Textile Processing Industry
Engr. AsadMahmood, Technical Manager, ECF, ENERCON .Ministry of Water and Power, Government of Pakistan.	Energy Efficiency and Conservation Programs in Pakistan – Lessons Learnt
Engr. Aamir Ahmad, EngroEximp Agriculture Products Pvt Limited.	Energy Management at EngroEximpAgri-products
Dr Rafiq-ur-Rahman, Agriculture Expert	Efficient Use of Tractor and Implements
Mr Khalid Mahmood, Director Agriculture Engineering, Government of Punjab.	Efficiency and Performance Analysis of Tube Wells in Faisalabad Region
Dr Tariq MahmoodSandhu, HOD, Architecture Department CIIT Lahore.	Energy Efficient Buildings in Hot Climate.
Mr Hamid Malhi, Progressive Farmer	Energy Efficiency Issues in Tube wells: Farmers Perspective
Haji Muhammad Ramzan, Secretary Pakistan Kissan Association	Farmers problems on high energy costs of tubewells
Mr. Ahmad Khalid, National Instruments Islamabad	Creating Megawatts of Energy Conservation Through Energy Management
Dr Shahbaz, ERC ,CIIT ,Lahore	Global Experiences in Energy efficiency and Conservation Measures

4. Detail of lectures and presentations given by speakers are summarized below:

1. Dr SobiaBaig briefed the seminar about importance of energy efficiency and conservation measures (EE&C) and its contribution to the national economy, CIIT staff and labs. facilities, CIIT initiatives on energy efficiency and conservation measures and future plan for establishing linkages between industry and academia /CIIT and provide services to industry. It was indicated that economic loss due to power

shortage is 7% of the GDP per annum (14.3 billion US\$ in 2011). The power loss from generation to consumer end is about 20% and there is good scope for improving EE&C measures in industry and domestic sectors which are the main consumers of electricity. The results of CIIT pilot study in collaboration with National Instrumentson power monitoring of CIIT academic blockwere also shared with the participants that concludes that 20% power loss is incurring from transformer to consumer end and the power factor can be improved from 60% to 80% plus.It was emphasized that ideas of smart grids may be promoted and power monitoring of industry and other sectorsbe initiated on urgent basis.Saving of power is much more valuable than making new investments on generation.

2. Mr.Iftikhar Ahmad Randhawa shared the initiatives on energy efficiency and conservation measures (EE&C) taken by the Energy Department in Punjab. He informed that there is a great potential of energy savings by introducing EE&C measures i.e. 27% (domestic), 20% (industry), 29% (agriculture), 40% (street lighting). Overall 22% of the electricity can be saved which means the shortfall of 4400 MW in Punjab (2014) can be reduced significantly by promoting EE&C measures in industry and domestic sectors. It was also told that a project on energy efficiency and conservation measures costing Rs. 1200 million has been approved by PDWP and Punjab Energy Efficiency and Conservation Authority (PEECA) established which shall be responsible for planning, implementation of EE&C measures in the province. He emphasized the need for standardization of energy efficient equipment, conducting energy audit of industry and promoting renewable energy technologies.
3. Mr.AsadMahmood, Technical Manager, ENERCON delivered a talk on ENERCON role in energy efficiency and conservation programs in Pakistan. He explained the history of establishment of ENERCON, its functions and programs on EE&C measures, and energy conservation policy 2013 etc. He told that an Energy Efficiency and conservation Bill2015 has been formulated and was under process for approvalby the National Assembly . TheNew initiatives taken by ENERCON on EE&C measures include:energy efficiency awards, energy audit of industrial thermal and electrical equipment i.e. boilers and motors, efficient repair and maintenance of vehicles, standardization of energy efficient equipment and its promotion, training of manpower and capacity building of engineers and technologist as well as awareness campaign. It was told that

an energy efficiency cell has been created under ENERCON to monitor the electricity efficiency and conservation measures in industry during summer 2015 and study impact on energy savings. An energy conservation officer shall be appointed in every department to monitor the programs on energy efficiency and conservation. The energy audit shall be conducted in collaboration with DISCOs and Industrial Chambers. Free Thermography of boilers, furnaces and steam distribution system is being done on request basis. Also a building energy code launched in collaboration with Pakistan Engineering Council & Ministry of Housing in February 2014 being developed.

4. Engr. Arjamand Qayyum of PITCO Private Limited, gave a presentation on energy efficiency in textile sector. He stated that textile industry was the main industry in Pakistan; with major share in exports and there are more than 1000 industrial setups at Lahore, Karachi and Faisalabad. In textile 90% of the energy required is thermal energy to be used as process heat and its efficient usage shall reduce cost of production. The share of steam is 60%-70%, heated oil 15%-20% and 10%-15% by direct firing. The energy conservation measures should focus on decreasing the demand for thermal energy by improving system efficiency including the processes and by reducing costs, through better management of resources, shall also improve efficiency. Technical recommendations to improve boilers efficiency and relevant processes were also explained in detail. Overall 30% energy savings was estimated to be possible through EE&C measures in textile sector.
5. Mr. Aamir Ahmad, Engineer Engro Eximp Agriculture Products Pvt Limited gave a presentation on Energy Management of Engro Plant. He told that Engro group is manufacturing fertilizer, chemicals, food and agriculture products and also producing power from biomass. The Engro plant is consuming 6 MW of electricity and 4.5 MW is produced from rice husk and plant is not dependent on WAPDA electricity. Engro has got services of a firm to improve the energy efficiency and save electricity consumption in their industry and experience gained can be shared to other industries as well. M/s Engro proposed that collaboration between industry- research and academia is crucially desired as such they are willing to benefit from ENERCON and CIIT expertise.
6. Dr. Rafiq-ur-Rahman, an Agriculture Expert, delivered a talk on efficient use of tractors and implements. He told that there are 8 lac tractors in Pakistan which are operated without observing energy efficiency measures. It has been estimated that these tractors consume

diesel oil costing Rs. 32 billion per annum of which 30% (Rs.10 billion) can be saved by following guidelines for efficient use of tractors and implements. About 48 million US\$ can be claimed as carbon credit from saving of diesel oil. The issues in selection of tractor and implements by farmers without consulting engineers, fragmented land holdings, small farm sizes and poor lay out plans and techniques for energy efficient use of tractors along with poor repair and maintenance were also highlighted. It was proposed that farmers be trained through engineering extension advisory services as well as trainings programs on efficient use of tractors and machinery.

7. Mr. Khalid Mahmood, Director Agriculture Engineering Faisalabad presented data on energy consumption by electrical and diesel tubewells and losses identified by various agencies. He also produced the results of his study on 110 tube wells in Faisalabad Division. It was informed that a minimum of 40% efficiency can be improved by using energy efficient components and by selecting suitable sizes of pumps and other components. It was indicated that the selection of appropriate pumping system is a big issue as farmers do not have access to engineers or a body which could guide and provide services on tube well installation and efficient use of ground water. Major reasons for poor efficiency of pumps identified are:

- Improper design of tubewell
- Higher rated power source
- aging pumping equipments
- Improper maintenance and repair
- Transmission efficiency
- Inadequate knowledge of operation of tubewell

The financial implications of rehabilitation of 1500 electrical turbine tube wells was also presented and it was reported that the investment cost shall be recovered in 4 years depending upon the depth of water table. It was also proposed that Agriculture Department (Field Wing) is ready to undertake energy audit of tubewells given the resources and equipment to them.

8. Dr. Shahbaz gave an overview of energy efficiency measures at global level. He explained that 20-30% savings in energy consumption was possible through standardization of equipment and by promoting EE&C measures in Pakistan. He informed the seminar that USA saved \$500 billion in 2014 by using energy efficiently; Also jobs for 0.83 million technical manpower for repair and maintenance of buildings were created. Today USA is consuming energy with 60% efficiency and has reduced 1.1 Gigga tons of green-house gas emissions (2014). Pakistan is 300%, 667%, 423%, 204%, 467% and 5.57% time less energy efficient

compared with USA, UK, France, Canada, Germany and India respectively. India was 21% less energy efficient in 1972, but Pakistan is 6% less energy efficient compared to India now. Therefore, Pakistan needs a comprehensive strategy for promoting energy efficiency measures to save worth 15 billion US\$ loss of energy every year.

9. Dr Tariq Mahmood Sandhu presented the concept of energy efficient buildings. He opined that shortage of power was one of the most pressing problems and everyone was directly affected by it. The energy losses occur due to poor quality of building designs built without any regard for the local climatic conditions and the subsequent energy requirements for efficient and comfortable usage of these buildings. To cope with the problem it is imperative to discover energy efficient ways to construct buildings with “zero-energy building envelop” as it is being done in modern world. Our homes, offices, schools, hospitals, restaurants, and stores consume a lot of energy—and money. We spend more than 15% of the annual income each year to power our homes and commercial buildings; consume more than 55% of the electricity, contributing to almost 45% of the nation's carbon dioxide emissions. And 25% of this energy on an average. If we cut the energy use of buildings by 20%, we could save approximately 25% of the energy bills, reduce greenhouse gas emissions, and create jobs. The construction of zero energy buildings is possible, with eco friendly environment, comfortable temperature, healthy air and luxurious indoor and outdoor views. It will help to reduce energy consumption in buildings and improve the efficiency. The focus shall be on discovering practical and zero energy materials buildings.
10. Mr Hamid Malhi explained the problems of farmers related to agriculture tube wells which the farmers are facing today. He pointed out that no government agency is providing services for selection of suitable design and size of pump, repair and maintenance of pumps and provide trainings for efficient use of ground water. The tube wells are being installed without observing the ground water table depths, draw down and distance between tube wells. It was proposed that there must be a regulatory body to supervise and regulate the tube wells installation and monitor the ground water resource utilization efficiently. Mr Malhi endorsed the findings of Mr Khalid Mahmood and suggested to

Government to take initiatives for addressing the issues of tubewells and resolve farmer's problems.

11. Haji Muhammad Ramzan, Secretary, Pakistan Kissan Association and a progressive farmer, shared his views about agriculture tube wells and farmers problems. He endorsed the findings of Mr Hamid Malhi and Mr Khalid Mahmood while highlighting /sharing problems of farmers seminar participants. He also proposed to provide solar and bio gas tube wells to farmers at subsidized rates.

12. After detailed deliberations the following recommendations were made by the Seminar::
 1. There is a need for promoting the energy efficiency and conservation measures in Pakistan. The provincial governments, research and academia in collaboration with ENERCON and industry /end users should plan, develop and implement projects on EE&C measures with priority of industry, transport and domestic sectors which are the main consumers of energy.
 2. R&D and testing labs equipped with state of the art equipment may be established by provinces as well as by universities to offer testing services on energy efficiency and conservation measures to clients / industry etc.
 3. Energy Research Centre and the EE Department of CIIT ,in collaboration with ENERCON, offered to serve as a hub for EE&C labs and developing linkages with stake holders for offering services to industry and other customers.
 4. The Energy Department, Punjab Government, may be approached to consider establishing energy efficiency related lab facilities at CIIT Lahore campus under their approved project for PEECA.
 5. The concept of energy efficient tube wells may be promoted to help poor farmers in savings of energy expenditures. Energy efficient tube wells to serve as show case models may be constructed with support of ENERCON and Punjab Government.
 6. Energy Audit of all electrical tubewells installed in Punjab may be conducted by Agriculture Department (Field Wing) for which the Energy Department Punjab may provide required funds. The CIIT Lahore campus shall also collaborate in dissemination of technologies, training of end users /farmers and promotional activities.
 7. Regular trainings programs on energy efficient tube wells installation and operation may be developed and implemented by provincial government functionaries.

8. The provincial governments may establish regulatory body to regulate the installation, operation and maintenance of tube wells in provinces so as to avoid over lapping of ground water abstraction and ensure energy efficient use by tubewells.

List of Seminar Participants

Sr.No.	Name and Address	Designation
1	Mr. Khalid Saeed	Head, Energy Research Centre
2	Engr. Dr. Zikr-ur-Rehman	Agriculture Engineer
3	Mr. Aamir Ahmed	General Manager EngroEximp
4	Mr. AsimZeb	Assistant Manager EngroEximp
5	Mr. Nawazish	Research Associate (EE)
6	Mr. IjazArshad	Progress Officer
7	Mr. TanveerHussain	Assistant Agriculture Engineer
8	Mr. Muhammad TahirIqbal	Assistant Agriculture Engineer
9	Dr. Naim Rashid	Assistant Professor
10	Ms. NaimaKhurshid	Lecturer, MS
11	Dr. Irshat Sultana	Assistant Professor, Physics
12	Dr. RizwanRaza	Assistant Professor, Physics
13	Mr. Hafiz Muhammad Hamid	Director General Moist Noon
14	Mr. WaheedMohiuddin	General Manager
15	Mr. Ateeq Ahmad Khan	General Manager
16	Mr. Asadullah	Agriculture Engineer
17	Mr. Muhammad Ilyas	Manager
18	Dr. Muhammad Saleem	Assistant Professor

19	Dr. AamirRazzaq	Assistant Professor
20	Mr. IqbalBhalli	Director Agriculture Engineering
21	Mr. Abdul GhaffarAlvi	Deputy Director Agriculture Department
22	Mr. Muhammad Shoaib	Agriculture Engineer
23	Ms. Kanwal Bilal	Lecturer
24	Dr. Muhammad Shahbaz	Assistant Professor
25	Dr. Muhammad GhaffarDoggar	Principal Scientific Officer
26	Mr. AftabBaig	Sr. Admin Assistant
27	Mr. AsadMahmood	Manager Technical ENERCON
28	Dr. SobiaBaig	Head (EE)
29	Dr. SaleemFarooqShaukat	Head Academics and Research
30	Dr. MujtabaJaffery	Assistant Professor
31	Dr. RobinaFarooq	Professor
32	Mr. UmerFarooq	Lecturer
33	Dr. AsadUllah Khan	Head (Chemical Engineering Department)
34	Dr. Tariq Sandhu	Head (Architecture department)
35	Dr. YasirRafique	Assistant Professor, Physics
36	Dr. Saadat Anwar	Head IRCBM
37	Mr. Hamid Malhi	Chairman/CEO progressive farmer
38	Dr. Asif Hassan	Assistant Professor, Physics
39	Mr. ShahidHussain	Assistant Agriculture Engineer
40	Mr. Haji Rahim	Pakistan Kisan Association
41	Mr. Noor Ahmed	Pakistan Kisan Association
42	Mr. Jawad Malik	M/S Punjab Biomass Energy
43	Dr. RafiqurRahman	Agriculture Engineer/ Retired Director General
44	Mr. Khalid Mahmood	Director Agriculture Engineering Faisalabad
45	Mr. SajidNaseer	Assistant Agriculture Engineer
46	Mr. Hafiz M. Naeem	Assistant Agriculture Engineer
47	Mr. Muhammad Faheem	Assistant Agriculture Engineer
48	Mr. AsadUllah	Assistant Agriculture Engineer

49	Mr. Naveed Ahmed	Director, Noon Sugar Mills
50	Mr. Sohail Ahmed	Manager, Kohinoor Power
51	Mr. M. Shoaib	Assistant Agriculture Engineer
52	Mr. M. Ayub	Assistant Agriculture Engineer
53	Mr. M. Ramzan	Assistant Agriculture Engineer
54	Mr. Ahmad Khalid	Engineer, National Instruments
55	Mr. ArjumandQayyum	Senior Engineer, PITCO
56	Mr. Abdul Haq	Assistant Agriculture Engineer
57	Mr. FarhanShafique	Architecture dept, CIIT Lahore
58	Ms. AnilaBarkat	MS Scholar, EE department
59	Mr. Iftikhar Ahmad Randhawa	Chief Engineer, Power
60	Mr. Ehsan Ahmad	Noon Sugar Mills
61	Dr. Aqeel Ahmad Bazmi	Associate Professor, Chemical Engineering Department
62	Mr. MubeenAhsan	Agricultural Engineer, Talagang
63	Mr. Karamat Ali	Assistant Agricultural Engineer, Faisalabad
64	Mr. Muhammad AkramKasuri	Agricultural Engineer, Faisalabad

Photo Gallery





