WORLD ENVIRONMENT DAY, 2008

FOREWORD

By

ENGR. CH. GHULAM HUSSAIN*

Allah Almighty, created the universe with exalted propensity of equilibrium called the natural phenomenon. For myriads of years this equilibrium went well for it catered alright for the human race thus far. But after World War-I in general and World War-II in particular, needs of the burgeoning population, took astronomical strides and they started searching for resources to match their ever increasing requirements.

These efforts, to quote a few, enabled them, (i) construct canal systems and in its wake brought menace of water-logging and related problems of health hazards and drainage for reclaiming wetlands, (ii) introduce speedy transport for transporting men and materials and brought in traffic hazards with exorbitant mono-oxide gas emissions and (iii) generate emissions of high percentage of hazardous carbon dioxides.

Disturbance of the natural equilibrium by the development activities of human beings started causing Global warming interalia other natural phenomenal upsets. By the end of the century Global warming could result in melting away of the glaciers astoundingly generating unprecedented floods and raising sea level of about 7 metres with devastating consequences which are not hard to be conceived.

Cognizant of the hazards looming large for the very existence of the life on earth the United Nations in its convention at Stockholm in 1972 urged upon the comity of Nations to launch Environment Protection and conservation programmes in their respective countries.

In Pakistan Environment Protection Ordinance was enacted in 1983 to start with, followed by National Conservation Strategy (NCS) in 1992. Its culmination came in 1997 with enactment of Pakistan Environment Protection Act specifying National Environment Quality Control Standards as a Bench Mark.

In 2001, the Government of Pakistan formulated the National Action Plan to arrest the ever increasing degradation of Environment due to man-made unfriendly environmental Projects. However, it is a pity that these objectives remained un-addressed both at institutional and individual levels.

Pakistan Engineering Congress, in pursuit of one of its cardinal objective of promoting Science and profession of Engineering, has taken upon itself to hold World Environment Day every June where technical papers are invited and presented. This year theme of the World Environment Day was proposed as " Kick the Habit, Towards a Low Carbon Economy " and the event was held on June, 7, 2008 at the Mashhadi Hall of Pakistan Engineering Congress Lahore.

Following six technical papers were presented and discussed on the occasion related to the topic.

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Adverse effects of Energy Generation by fossil fuel burning and possible counteractive measures to offset these effects were proposed in these papers :

(i) Clean Development Mechanism by Muhammad Asif, Principal Chemist Kot Addu Power Co. Limited.

(ii) Hydel Power Generation : A Low Carbon Energy Prospect for Prosperous Pakistan by Engr. Dr. Allah Bakhsh Sufi, Chief Engineer (WRPO) WAPDA, A Dastagir and Zahid ul Haq.

(iii) Re-Utilization of Solid Waste Carbon Saves Economy by Muhammad Khalid Iqbal, Tahira Shafiq, Khursheed Ahmad, CEPS, PCSIR Laboratory, Lahore.

(iv) Low Carbon Economy a Pakistan Perspective by Muhammad Daniel Saeed Pirzada Pakistan Institute of Nuclear Sciences and Technology, Islamabad.

(v) Isotopic and Chemical Characterization of Coal from Selective Areas of Pakistan by A. Mashiatullah, T. Javed, R. M. Qureshi, Z. Shah, Z. Latif and Habib-ur-Rehman of Isotope Application Division, PINSTECH, Islamabad.

(vi) Enercon and Low Carbon Economy by Engr. Asif Masood, Manager (Technical) ENERCON / ECF

Rather than to discuss the next of these papers which may not do justice to the papers presented, it is left to the readers to go through the volume for themselves.

All the proceedings of the World Environment Day 2008, from the address of welcome by the President, Pakistan Engineering Congress, Engr. Husnain Ahmad, address by Chief Guest Engr. Syed Raghib Abbas Shah, Member (Water), WAPDA and key note address by Dr. Allah Bakhsh Sufi with the papers presented at the Seminar form part of this volume.

There would be many more topics for the technical papers which can be attended to in this specific field at the future moots and it is expected that learned engineers and scientists having deep insight in the Environmental issues would share it with the public at large and the Public Sector.

There has been a great demand from the Engineering Congress Members for publication of the above papers in a memorable volume.

Papers published in this volume are open for written discussion where Engineers and Scientists are invited to take part. This is an important issue which merit continuous attention of the professionals as well as decision makers. Depending upon the volume of discussion on papers received, the Congress would also like to publish a discussion Volume in the intervening period 3 months before the next World Environment Day on June 2009.

WORLD ENVIRONMENT DAY 2008

ADDRESS OF WELCOME

By

ENGR. HUSNAIN AHMAD
PRESIDENT
PAKISTAN ENGINEERING CONGRESS

The Honorable Chief Guest

Engr. Syed Raghib Abbas Shah Sahib, Member (Water), WAPDA
Distinguished Engineers, Scientists, Ladies & Gentlemen "Assalam-o-Alaikum"

I am glad to deliberate and interact with the galaxy of engineers and scientists on the event of World Environment Day 2008. With its specific theme "Kick the Habit, Towards a Low Carbon Economy".

In more than century and a half since 1850, human activities have increased the amount of Carbon dioxide in the atmosphere of the earth from historical 290 parts per million or less to slightly more than 380 parts per million in 2007. An unprecedented increase of 60 PPM of CO_2 emission has been recorded since 1970 to 2007. Until recently the increase was commonly attributed to the burning of fossil fuels. Now there is clear evidence that it may be due to inequal degree to another source, the worldwide destruction of forests. Brazil and Indonesia which were at 17th and 21st position respectively a decade ago are now at 8th and 4th position respectively within a decade due to burning of forests. USA is the major guilty nation with contribution of 25% of all CO_2 emission into the atmosphere. The other major sources contributing CO_2 into the atmosphere are the Power Houses running on fossil fuels and vehicles exhausting noxious gases.

Although Carbon dioxide is only a trace gas present in the atmosphere having concentration of about 0.37% by volume, it plays a pivotal role in controlling the climate of the earth because it absorbs radiant energy at infrared wave lengths. Heat trapped in this way has a large potential for altering the world's climate substantially.

The mankind, therefore, faces a historic dilemma. The human activities that are increasing Carbon dioxide content of the atmosphere, promise to bring a general warming of the climate, which is evident today. An increase in the average world temperature will probably enlarge the area of the arid zones and melting of glaciers. Low-lying coastal areas will submerge, unprecedented floods and drought will occur and ultimately it will significantly affect agricultural production. The most obvious corrective action would be a major reduction in the consumption of fossil fuels by encouraging alternate renewable energy sources. Equally important is the measures to lower the rate at which the forests of the world are being shaved off by logging, by the expansion of agricultural and grazing lands (The rainforests in Brazil are being destructed to produce bio-fuel while in Indonesia to raise palm oil trees), by toxification and by other consequence of industrial development.

There is an urgent need to transition to a resource efficient low carbon economy to address the climate change caused by the burning of fossil fuels. The vast majority of fuels currently used worldwide contain carbon, which when burned to release energy, is released into the atmosphere as Carbon dioxide and other environmentally damaging "greenhouse gases". An urgent action is required to transition to solutions which minimize environmental impact and are sustainable.

Failure to deliver such action will have catastrophic consequences for mankind, both economically and physically. It will affect the basic elements of life for people around the world – access to water, food production, health, and the environment. Hundreds of millions of people could suffer hunger, water shortages and coastal flooding as the world warms. We can avoid the worst impacts of climate change, if we take strong action now. But if we fail to act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year. In contrast, the costs of action – reducing greenhouse gas emissions to avoid the worst impacts of climate change – can be limited to around 1% of global GDP each year.

The stark reality of global warming is clear like daylight. It is high time to start taking concrete steps towards a less carbon economy. To kick start a habit of developing economy on low carbon based infrastructures, avoiding destruction of forests, reducing and alternating the use of fossil fuels and encouraging the renewable energy sources are the positive measures urgently required to be taken for the viability, continuity, sustainability and future survival of humans on the earth.

Pakistan is contributing less in terms of CO_2 addition into the atmosphere. But we are contributing our bit. We are not a separate entity we are part of the problem on this global village. It is needed to work towards a low carbon economy for our coming generation. Success in tackling the problems of climate change is dependent on our long-term commitment. It will need continuous action by Government to align policies and prevent contradictory objectives being pursued. This must be translated into the legislative and regulatory frameworks. It will involve greater knowledge and information and new attitudes and behaviour by ordinary people – as consumers and citizens – to overcome resistance to some of the new technologies.

In our national perspective, Pakistan needs to develop its own national goals and plans to reduce greenhouse gas emissions. Like many other countries, it should be a mix of incentives and regulations to reduce emissions. It is encouraging that Government has already taken initial steps in this regards. We hope that new Government will show more commitment towards this cause.

This symposium is an effort to create awareness regarding threats posed by global warming and climate change and provides a forum to address both the causes and effects of global warming.

Once again I thank all of you for being here and participating in the symposium.

Pakistan Paindabad

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INAUGURAL ADDRESS

By

ENGR. SYED RAGHIB ABBAS SHAH
MEMBER (WATER) WAPDA

World environmental day conceived in 1972 is the United Nations Principal day 5th June to sensitize people around the globe on pertinent environmental issues. This year the theme is “kick the habit, towards low carbon Economy”. Carbon dioxide is one of the major green house gasses responsible for global warming. Its increase in atmosphere is as a result of our habits, life styles and the choices we make due to our unsustainable consumption patterns and project implementations.

It is not only large industrial plant but also our day to day activities which contribute a lot to the net global carbon injection into the atmosphere. As a nation we can only kick the carbon habit and redirect our efforts towards a low carbon economy by identifying the sources of carbon injections into our atmosphere and proactively changing our habits to lower them.

Carbon dioxide contributes about 55 % to global warming from greenhouse gases produced by human activities. Industrial countries account for about 76 % of annual emissions, the main sources are fossil-fuel burning 67 % and deforestation and other forms of land clearing and burning activities 33 %. Carbon dioxide stays in the atmosphere for about 500 years.

Wapda is focusing on hydel power which is environmentally neat and clean. By grace of God we have hydro power potential of more than 40,000 MW. We have exploited only 6484 MW as yet. We are building Allai Khwar, Khan Khwar, Duber Khwar and Satpara hydel power project which would produce 339 MW of carbon free hydel power. Studies are going on for 20,000 MW of hydel power projects. Next year Insha-Allah we shall be starting 4500 MW Diamer Basha Hydel power project. After this a series of run off river hydro power projects would be built.

The industrialized countries which contributed maximum to the carbon content from their industries and thermal power houses are required to pay carbon credit to the countries which produce carbon free hydro power. We are claiming carbon credit for a number of our hydel projects. Indians have already obtained carbon credit for some of their hydro power projects.

The minister for environment while addressing the seminar in Islamabad on 5th June, inaugurated the solar geyser. This is a pioneer effort for conservation of energy and reducing carbon contents. The minister announced 2009 as “Year of Environment”.

Pakistan is blessed with abundant sunshine. We have to develop solar energy. Some villages in Baluchistan and Swat have been electrified as pilot projects. Alternative Energy Cell has already embarked upon wind energy. Along the Coast and from Badin to Hyderabad we have wind tunnel effect where a lot of wind turbines can be installed.

We the engineers have a challenge. We have to develop our Country, use our indigenous and natural resources and at the same time keep the carbon emission to the bare minimum. We have to design the machinery and devise mechanism which produces minimum carbon. Presentation of environment, sustainable growth and poverty eradication is our responsibility.

The challenge can only be addressed if we the pioneers of development make the project environment friendly and provide incentive for low carbon emissions. We all have to inculcate a habit of lifestyle and choices for development that aims towards low carbon economy.

I congratulate Pakistan Engineering Congress for arranging the seminar on such an important subject. I hope the recommendations of the seminar would provide us the way forward. I declare the seminar open.

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KEY NOTE ADDRESS

By

DR. ALLAH BAKHSH SUFI
CHIEF ENGINEER (WRPO) P&D (WATER), WAPDA

Honourable chief guest, Syed Raghib Abbas Shah Member (Water) WAPDA, dear fellows, engineers and scientists

The ever increasing amounts of greenhouse gases are responsible for unprecedented climate change. Unchecked burning of fossil fuels in the guise of development is creating carbon based ripples in the atmosphere. Burning of fossil fuel and cutting of forests is worsening the situation. Our various contributing scholars have enlightened us through their research oriented strives about the gloomy circumstances. It is high time to carve a better and judicious guidance way to embark on a low carbon economy.

The importance of fossil fuels on culprits adding CO_2 into the atmosphere, the advantages of renewable energy sources encouraging to kick start a habit of low CO_2 economy. All pros and cons of various environment friendly renewable energy sources are depicted, their limitations are highlighted and finally the use of hydel energy is advocated as best option. We need to exploit the existing potential of the 42000 MW hydel power upto its maximum for sustainable energy production and as an environmental friendly option.

The low carbon economy (LCE), as an economy which has minimal output of greenhouse gas (CO_2). Recently it has been established through scientific studies that there is an unreasonable accumulation of GHGs (CO_2) into the atmosphere. The aim of LCE to integrate all aspects of manufacturing, agriculture, transportation and power generation around technologies that produce energy and material with little GHG emissions, alongwith populations, buildings, machine and devices which used those energies in material efficiency and disposal or recycling of their wastes to minimal output of GHGs. Urbanization, industrialization and transportation activities are constantly deteriorating the ambient air quality of major cities in Pakistan, clean development mechanism (CDM), low carbon emissions and mitigations options are suggested to avoid catastrophic climate change.

Ladies and gentlemen, the concept of clean development mechanism is elaborated. It is a commitment of industrialized countries to invest in projects that reduce greenhouse gas emission in developing countries as an alternative to more expensive emission reductions in their own countries. The history and purpose of CDM is elaborated alongwith CDM project process in compassing outline of the project process, financial issues and concerns are also taken care off. The effect of greenhouse gas (CO_2), role of water vapours and their removal from atmosphere and global warming potential is also discussed.

The re-utilization of solid waste carbon is discussed to save economy. Here once again the effect of greenhouse gases induced by municipal solid waste produced by anthropogenic activities leading to climate change. To take stock of the solid waste

management in Lahore, the annual municipal solid waste was surveyed on percentage basis; it contained 87.31% organic matter, 3.89% stone, 1.46% wood, 1.58% polythene, 2.97% paper, 2.05% straw and 0.92% cloth. The proximate analysis of organic matter indicated average 2.0% protein, 9.1% ash, 76.6% moisture, 9.2% fat, and 3.1% fiber. Organic matter was composted and concentration of carbon and nitrogen was noted before and after composting.

The likely effect of global climate change has been discussed. According to the compilation, the greenhouse gases are major contributors towards global warming and consequent climate change. At one site, large scale expansion of power sector is required, on the other side there are environmental concerns, a careful planning is required not only to address the energy needs, but also be compatible with the theme of low carbon economy for sustainable development. In conclusion, the need to create awareness among masses about pollution and environment related degradation is highlighted.

The environmental pollution is world wide phenomenon affecting human health. The socio-economic activities of man are contributing toxic substances in the atmosphere. Fossil fuels burning is depicted as major contributing factor of greenhouse gases i.e. power generation sector is major culprit. While coal is worst among fossil fuels as far as carbon emissions are concerned. The stable isotopic and chemical techniques are applied for the characterization of coal in selective areas of Pakistan. The observed variations in the carbon isotope composition of coal obtained from various coal fields of Pakistan are attributed to the deposition environment. Significant consideration of toxic elements such as S, Cd, Cr, Mn, Ni, Pb. were found in these samples. It is finally concluded that use of coal for domestic / bricks kilns and in combustion chambers of thermal power plants and industrial and energy sector may cause a significant environmental pollution as well as health problems.

Ladies and gentlemen !

The present scenario of energy shortage, demands immediate steps on war footing need to generate and establish new energy production units, the option of fossil fuels is not desirable, other factors contributing towards greenhouse gases i.e. transport industry and deforestation are also required to be rationalized as far as GHGs emissions are concerned by adopting clean development mechanisms and by resorting to renewable energy sources for sustainability, viability, survival and continuity of human environment.

Thanks – Allah Hafiz