

**INTERNATIONAL WORKSHOP
ON CLEANER PRODUCTION & ENERGY CONSERVATION
KOCHI (INDIA), 24-26 JUNE 2008**

PARTICIPATING COUNTRIES: 17 COUNTRIES (INCLUDING 13 MEMBER COUNTRIES AND 1 INDUSTRY NETWORK MEMBER OF THE CENTRE

NUMBER OF PARTICIPANTS: MORE THAN 85 EXPERTS AND PROFESSIONALS, INCLUDING 20 FOREIGN DELEGATES FROM 16 COUNTRIES AND UNIDO

Cleaner production is the continuous application of an integrated environmental strategy to processes, products and services to increase efficiency and reduce risks to humans and the environment. It aims at minimizing the waste and emissions and maximizing the product output by analysing the flow of materials and energy inside a system. Improvements in technology help to reduce or suggest better choices in use of materials and energy, and to avoid solid waste, waste water effluents, and gaseous emissions, and also waste heat and noise. In the past, polluting companies concentrated on treating the waste generated by an industrial process in an attempt to reduce its impact on the environment, but often there was no attempt at source to reduce the overall level of waste. With cleaner production, industrial processes can often be improved so that not only the amount of waste, and consequently the pollution, is reduced, but money is also saved or generated for the company, which in other words becomes a win-win situation for the company. Cleaner production is most often applied to manufacturing processes, but it is also relevant to other sectors of the economy, including agriculture, mining and the provision of services. Whichever is the sector, the underlying principle is the same. Instead of relying on penalties that force companies to treat their waste, cleaner production offers rewards in the form of increased profits and an enhanced environmental image to those who can reduce their overall level of waste. Cleaner Production has been pursued in many countries for several years under various names such as pollution prevention, waste minimization, clean technology, environmental management, materials productivity, global competitiveness, natural resource conservation, green productivity etc. However, all these approaches represent different facets of Cleaner Production and collectively they address the triple objectives of sustainable development, namely, economy, environment and society.

Increasing energy demand exerts pressure on the energy producers to over exploitation of the limited natural sources for producing more energy. In developing countries, larger part of mechanical and electrical power is generated by burning of coal and petroleum products, which dramatically gives birth to the second major problem, i.e. pollution. In this way, it is much significant to sound Energy Conservation and Cleaner Production together as the balancing parts of a single combo-solution. Energy conservation is an important element of energy planning and policy as it leads to reduction in energy consumption and energy

demand per capita and offsets the growth in energy supply needed to keep up with population growth. This strategy reduces up to some extent the rise in energy costs and also the need for new power plants and energy imports. The reduced energy demand can provide more flexibility in choosing the most preferred methods of energy production.

Energy conservation facilitates the replacement of non-renewable resources with renewable energy. It is often the most economical solution to energy shortages, and is a more environmentally benign alternative to increased energy production. It represents a cost-effective approach to raising profitability, enhancing competitiveness and improving environmental performance ensuring a sustainable development. The possibilities range from relatively simple and low-cost process modifications to sophisticated and more costly investments in pollution prevention technologies.

Enabling developing countries to take full advantage of cleaner production options is particularly challenging. Many of these countries and their enterprises lack the human, institutional, technical and financial capacities needed to apply cleaner production methods. Development assistance and technology cooperation are therefore important policy tools in helping developing countries in their efforts to manage technological change for cleaner production. In order to address the issues relevant to what has been stated above, the Centre for Science and Technology of the Non-Aligned and other Developing Countries (NAM S&T Centre) organised an international workshop on Cleaner Production & Energy Conservation during 24-26 June 2008 at Riviera Suites in Cochin, India, jointly with the Society of Energy Engineers and Managers (SEEM) that was also supported by the Renewable Energy and Energy Efficiency Partnership (REEEP) and the French Agency for Environmental and Energy Management (ADEME).

Mr. L. Radhakrishnan, IAS, Secretary to the Government of Kerala in the Department of Power inaugurated the workshop after Welcome Address by Mr. C. Jayaraman, President, SEEM and Senior Manger, BPCL-Kochi Refinery; Introductory Remarks by Prof. Arun P. Kulshreshtha, Director, NAM S&T Centre; and Brief Remarks by Mr. V. M. Trehan, Chairman, Mekaster Engineering & Equipments (P) Ltd. and member of the S&T-Industry Network of the NAM S&T Centre. Mr. R. Harikumar, General Secretary, SEEM and Project Director, Agency for Non-conventional Energy & Rural Technology (ANERT) of Kerala presented the Vote of Thanks.

The Workshop was conducted in six technical sessions broadly categorised under 'Key note Addresses', 'Energy Efficiency Policy Intervention', 'Cleaner Production', 'Integrating CP/EE Tools Case Studies and CDM', 'Energy Efficiency in Buildings, Energy Needs and Access' and 'Renewable Energy'. These sessions were chaired / co-chaired respectively by Mr. C. Jayaraman, President, SEEM and Prof. H.J. Staniskis, Director, Institute of Environmental Engineering, Kaunas of Lithuania; Mr. R. Sudhir Kumar of Central Power Research Institute (CPRI), Bangalore and Mr. Binu Parthan, Deputy Director, REEEP, Vienna, Austria; Mr. C.R. Surendranathan, Dy. Chief Controller of Explosives, Government of India and Mr. G. Sivakumar, Director, Kerala State Productivity

Council; Prof. V.K. Damodaran, UNIDO International Energy Consultant and Vice-Chairman, Energy Management Centre, Kerala and Mr. R.K.R. Pillai, Chief Manager, BPCL Kochi Refineries; Mr. A.K. Asthana of Indo-German Energy Program, German Technical Corporation (GTZ) and Mr. A.M. Narayanan, Head, Energy Efficiency Division, Energy Management Centre, Kerala; and Prof. K.K. Sasi of Amritha Viswavidyapeetham & Co-ordinator, SEEM Tamilnadu Chapter and Dr. M.P. Sukumaran Nair, Managing Director, Travancore Cochin Chemicals Ltd.

The participants also had an opportunity to visit the National Exhibition on Energy Efficient and Renewable Energy Products & Technologies, also organised by SEEM jointly with the Centre for Innovation in Science & Social Action (CISSA) at the Cochin Town Hall, on its inaugural and valedictory sessions, which were respectively chaired by Mr. L. Radhakrishnan, IAS, Power Secretary of Kerala Government and Prof. Arun P. Kulshreshtha, Director, NAM S&T Centre.

The overall technical programme of the Workshop was coordinated by Mr. C. Jayaraman (President, SEEM and Senior Manger, BPCL-Kochi Refinery), Mr. R. Harikumar (General Secretary, SEEM and Project Director, ANERT), Mr. A.P. Jose (Treasurer, SEEM and Joint Director, Kerala State Productivity Council) and Mr. K.K. George (Chartered Engineer, Kerala Chapter), Mr.G..Krishnakumar (Energy Auditor and Treasurer SEEM Kerala Chapter), Mr.Mathew Samuel (Dy.General Manager, Hindustan Organic Chemicals, and General Secretary, SEEM Kerala Chapter), Mr.P.L.Manoj (Dy.Manager, BPCL-Kochi Refinery and SEEM member) among others. The workshop was attended by 85 experts and professionals, including 20 foreign delegates from 16 countries and UNIDO. The overseas participants were from Austria [Mr. Binu Parthan, Deputy Director - Programme Coordination, Renewable Energy and Energy Efficiency Partnership (REEEP), Vienna]; Egypt [Prof. Ahmed Galal Abdo, Professor, Faculty of Science, Cairo University and Advisor, Minister of Higher Education]; France [Dr. Brahmanand Mohanty, Regional Advisor, French Agency for Energy & Environment (ADEME), Paris]; Indonesia [Dr. Silvester Tursiloadi, Head, Process and Catalysis Technology Division, Research Centre for Chemistry, Indonesian Institute of Sciences, Jln. Cisitubandung]; Kenya [Ms. Mobagi Dinah, Senior Environmental Research Officer, National Environment Management Authority]; Lithuania [Prof. Dr. J. Staniskis, Director, Institute of Environmental Engineering, Kaunas]; Malaysia [Mr. Tajuddeen Abdul Majid, Content Specialist, Petrosains SDN BHD, Kula Lumpur]; Malawi [Mr. Alfred Vilili, Counsellor and Mr. S. Satheesh Kumar, Trade Secretary in the High Commission of Malawi in India]; Mauritius [Dr. Pradeep Mahesh Kumar Soonarane, Deputy Director, Ministry of Public Utilities]; Myanmar [Dr. Lat Lat Tun, Lecturer, Material Science and Material Engineering Research Department, Ministry of Science and Technology, Mandalay]; Nepal [Mr. Deb Kumar Shah, Technical Officer, Faculty of Technology, Nepal Academy of Science and Technology, Katmandu]; Nigeria [Mr. Garba Ladan, Deputy Director, Raw Materials Research and Development Council (RMRDC)]; South Africa [Dr. Minnesh Bipath, Senior Manager, End Use and Infrastructure Management, South African National Energy Research Institute (Pty) Ltd]; Sri Lanka [Mr. Shantha Siri, Scientific Officer, National Science Foundation (NSF), Colombo]; Tanzania [Mr. Hosea Anael Erasto Mbise,

Principal Engineer and Ag. Asst. Commissioner for Energy and Dr. Rwaichi J.A. Minja, Senior Lecturer, Chemical and Process Engineering Department, University of Dar es Salaam]; Uganda [Mr. Richard Tushemereirwe, APS/SC. & Adviser to the President in State House]; Zambia [Mr. John Lukonde Chongo, Senior S&T Officer, Ministry of Science, Technology and Vocational Training, Department of Science and Technology]; and UNIDO [Mr. Smail Alhilali, PTC/ Environmental Management Branch, Vienna], who made their presentation during the event.

The participants from India, who made scientific presentation during the workshop, were Mr. P.V. Unnikrishnan, Member, State Planning Board, Government of Kerala (on 'Total Energy Security Mission Towards Reforms, Mass Empowerment and Action for Cleaner Living'), Mr. K.M. Dharsan Unnithan, Director, Energy Management Centre, Thiruvananthapuram (on 'Demand-side management initiatives through people participation in Kerala), Mr. J. Nagesh Kumar, Sr. Deputy Director, National Productivity Council, Chennai (on 'Productivity Approach towards CP in Indian Industry'), Mr. Anil Kewalramani, General Manager, Reliance Industries Ltd., (on 'Case of Reliance Industries Limited, Vadodara), Mr.A.K.Asthana of Indo-German Energy Program, GTZ (on 'Case study on Energy Efficiency in Re-Rolling Mill Furnace'), Mr. P.P. Dhamangaonkar, General Manager, Excel Industries Limited, Roha (on 'Destination Global Cooling via Energy Conservation Excel Industries Limited, Roha Way'), Mr. B.J. Baruah, Dy. Manager-Technical, Visakh Refinery, Visakhapatnam (on 'Energy Conservation Measures at Visakh Refinery'), Mr. P.M. Kudva, Vice-President Marketing, ARMEC Group (on 'Fan Less and Fill Less Cooling Towers'), Mr. S. Mahadevan, Consultant, Energy & Energy Efficiency, Chennai (on 'Energy Efficient Motors with Die Cast Copper'), Mr. G. Harihara Iyer, Energy Auditor- BEE, Mining/Engineering Consultant, Hyderabad (on 'Save Energy or Perish'), Mr. G. Subramanyam, Divisional Head (Carbon Advisory), Siri Energy & Carbon Advisory Service (P) Ltd., Hyderabad (on 'A Successful Case Study of a Cold Storage'), Ms. Shraddha Mahore, Research Associate, The Energy And Research Institute (TERI), Delhi (on 'GRIHA Green Rating for Integrated Habitat Assessment'), Prof. Sharad Kale, Homi Bhabha National Institute, BARC, Mumbai (on 'Bio-Energy Options for India in 21st Century'), Mr. M.T. Sambandam, Chief Manager, NSIC-Technical Services Centre, Rajkot (on 'Energy and Emission Study in Ceramic Industry'), and Dr. R Sethumadhavan, Professor and Director, Institute of Energy Studies, Anna University, Chennai (On 'Biomass Gasifier Based Crematorium') and Dr. P. N. Joshi, Central Institute of Fisheries Technology, Cochin (on 'Renewable Energy for Hygienic Production of Dry Fish').

Among the foreign participants Mr. Smail Alhilali of UNIDO PTC/ Environmental Management Branch in Vienna made a keynote address on 'UNIDO/UNEP CP Programme Strategy 2008-2013'). Prof. Ahmed G. Abdo of Egypt made presentation on 'Energy Needs and Impact - The Challenge to Science and Technology'; Dr. B. Mohanty of ADEME, France on 'Energy Efficiency Policies and Strategies for the Developing Asia to cope with the Rising of Prices'; Dr. S. Tursiloadi of Indonesia on 'Bio-Energy for Sustainability of Energy in Indonesia'; Ms. M. Dinah of Kenya on 'Status of Cleaner Production and Energy

Conservation in Kenya'; Prof. H.J. Staniskis of Lithuania on 'System for Preventive Energy Saving and Cleaner Production'; Mr. A. Vilili of Malawi ; Dr. P.M.K. Soonarane of Mauritius on 'Energy Policy for Mauritius: Analysis, Prospects and Challenges'; Dr. Lat Lat Tun of Myanmar on 'Bio-gas Production from Distillery Slops'; Mr. D.K. Shah of Nepal on 'Solar Traffic Lighting System: Use of Multicolour LED Lamps'; Mr. G. Ladan of Nigeria on 'Sourcing of Local Raw Materials for sustainable Manufacturing of Solar Energy Powered Components for Small-Scale Industry in Nigeria'; Dr. M. Bipath of South Africa on 'Energy Efficiency Strategy of the Republic of South Africa'; Mr. Shantha Siri of Sri Lanka on 'Present Status, Initiatives, Achievements and Future Trends towards Energy Conservation for Sustainability'; Mr. H.A.E. Mbise of Tanzania on 'Government's Initiatives on Energy Conservation and Efficiency in Tanzania'; Dr. R.J.A. Minja of Tanzania on 'Energy Sources, Utilisation and Energy Access'; Mr. Richard Tushemereirwe of Uganda on 'Cleaner Production and Energy Conservation in Uganda and Across Africa'; and Mr. J.L. Chongo of Zambia on 'Cleaner Production and Energy Conservation for Sustainable Development'.

In the Concluding Session, before the Panel Discussion chaired by Mr. S. Alhilali, Prof. V.K. Damodaran, Prof. H.J. Staniskis, Prof. A.G. Abdo and Mr. H.A.E. Mbise and coordinated by Mr. C. Jayaraman, a summary of the deliberations of various workshop sessions was presented by Mr. P. L. Manoj, Deputy Manager (Process), BPCL- Kochi Refinery at Ambalamugal. This was followed by a discussion on the 'Kochi Declaration on Cleaner Production & Energy Conservation for Sustainability' that was presented by Prof. A.P. Kulshreshtha and later adopted by the participants. A copy of the Kochi Declaration is appended to this Report. The Workshop ended with the distribution of participation certificates to the participants.

The participants thanked the organizers of the Workshop and unanimously hoped that more similar events will be held in future with a focus on South-South cooperation.

KOCHI (Cochin) DECLARATION

On Cleaner Production & Energy Conservation for Sustainability

WE, THE DELEGATES to the 3-day international workshop on “Cleaner Production & Energy Conservation for Sustainability” comprising the Scientists, Academicians, Technocrats, Bureaucrats, Diplomats, Engineers, Consultants, Industrialists, Certified Energy Managers & Auditors from Egypt, India, Indonesia, Kenya, Lithuania, Malaysia, Malawi, Mauritius, Myanmar, Nepal, Nigeria, South Africa, Sri Lanka, Tanzania, Uganda, and Zambia, as well as UNIDO, REEEP and ADEME, during the deliberations of the workshop have strongly concluded that,

THE WHOLE WORLD is facing a serious environmental and energy crisis. Our unsustainable way of natural resources use at far greater rate than what the nature can replenish and the indiscriminate way we add pollutants to this Planet Earth needs to be addressed with top most priority.

WITH THIS OBJECTIVE, we unanimously resolve that:

- The present challenge faced on this “Warming Earth” is to make it greener and cleaner before it is passed on to the next generation, without reducing the present level of energy services and certainly expanding on it through a less energy intensive route.
- Technology plays a vital role in providing alternative solutions. Equal emphasis is required to address attitudinal issues of accepting innovative solutions. Hence, the need of the hour is out-of-the box solutions synergizing technology and attitudes to combat the new challenges posed as side effects to our developmental quest. This will entail collective and comprehensive action by experts, policy makers, governments and non-government agencies across the nations.
- In consultation with and under the guidance of the policy makers and community leaders, who as a team form the largest repository of wealth, to develop action plans with targets and time frame for promoting cleaner production and energy conservation for sustainability, facilitate outreach activities as a means of awareness creation and capacity building and show commitment to experiment and promote new and innovative solutions.
- Urge the corporate world to integrate with their growth strategies, the concept of cleaner production and practices and to use energy efficiency, water conservation and waste minimisation as focus areas to achieve green growth as a part of productivity improvement and for conservation of natural resources to protect our eco system for a better profit line and for attaining corporate social objectives.

- Appeal to the media print and electronic - to join us in giving clarion call to decision makers and public at large to wake up to the potent threat and to forearm by promoting green concepts and taking up inter alia, energy efficiency related activities as part of their social responsibility.
- Taking into account 'the Africa 10 year Framework on Sustainable Consumption and Production' and the objectives of the Fifth African Roundtable on Sustainable Consumption and Production with specific reference to 'explore existing sub-regional, regional and international collaboration programmes and mechanisms and explore ways of effectively utilizing and replicating them in promoting sustainable consumption and production in Africa', to provide support to a regional project titled 'Africa - NAM Initiative on Sustainable Production and Consumption' to translate these policy frameworks into specific activities or projects at African national levels through UNIDO assistance and facilitation by NAM S&T Centre. A draft action plan is annexed.
- With the looming oil crisis, developing economies are under threat of economic failures if energy efficiency and emission reduction in the transport sector are not addressed. The poor are the most vulnerable, and solutions to cater to their needs have to be provided.
- Establish a database for the researchers and companies working in the area of Renewable Energy to undertake capacity building programs to train and re-train personnel to work in community awareness on one hand and in industrial/ business sectors as well as educational institutions, in particular.
- To have a wider outreach and present case studies and best practices of the developing world, the quarterly magazine of SEEM - 'energy? manager' to have an international editorial board. The website of SEEM www.energyprofessional.in also to publish proven technology case studies from all over the globe.
- To accelerate efforts on Rural Electrification through off-grid renewable energy generation using solar, wind, biomass, small hydro, geothermal and other sustainable energy routes.
- The participants placed confidence and faith in the Society of Energy Engineers and Managers (SEEM) to take up and implement most of the action programs mentioned above.
- To foster the objectives of this declaration, the participants of this Kochi workshop have proposed to create an international knowledge network and a Federation of Cleaner Production and Energy Efficiency Professional Associations under the aegis of SEEM.

- The participants gratefully accepted the offer of Egypt to host a follow-up workshop sometime at the end of next year or soon thereafter jointly with NAM S&T Centre, SEEM and other agencies, subject to the formal concurrence by the Government of the Arab Republic of Egypt.

Done this Day, the 26th of June 2008 at Cochin, India