



Global Renewable Energy Forum Bulletin

A Summary Report of the Global Renewable Energy Forum "Scaling up Renewable Energy"

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SUMMARY OF THE GLOBAL RENEWABLE ENERGY FORUM: 7-9 OCTOBER 2009

Co-organized by the Ministry of Energy of Mexico and the United Nations Industrial Development Organization (UNIDO), the Global Renewable Energy Forum 2009 took place from 7 to 9 October 2009 in León, Mexico. The Forum, which took as its theme "Scaling up Renewable Energy," brought together over 2000 participants from over 73 countries, including 30 ministers and high-level representatives from governments, international organizations, academia, civil society and the private sector. Highlights included speeches from Mexican President Felipe Calderón and Rajendra K. Pachauri, Chairman of the Intergovernmental Panel on Climate Change.

The main objective of the 2009 Forum was to provide a platform for proactive dialogue to strengthen inter-regional cooperation and encourage innovative multi-stakeholder partnerships aimed at scaling-up renewable energy in Latin America and elsewhere. Furthermore, the event highlighted the leadership required to promote renewable energy and facilitate the development of supportive policy frameworks aimed at strengthening clean energy initiatives. Other major themes repeated throughout the event included the need for: stability and predictability in renewable energy policy to enhance prospects for private investment; improved capacities to utilize existing renewable technologies; energy poverty and energy justice issues to be addressed; and all countries, rich and poor, to take urgent action to adopt renewable technologies to ensure the transition to a post-carbon society.

The two-and-a-half day event included nine plenary sessions and three parallel sessions, all of which were organized as moderated discussion panels with keynote speakers. Plenary sessions were convened on the following themes: energy poverty, economic and financial crisis, and climate change; renewable energy and energy transition; renewable energy potential; the renewable energy and the access agenda; biofuels; investments in renewables; and innovative policy and institutional frameworks. The parallel sessions focused on new technologies, renewable energy for industrial applications, and energy efficiency. A series of business forums in the evenings and a renewable technology exhibition took place alongside the Forum, showcasing business activity in the renewables field.

BRIEF HISTORY OF RENEWABLE ENERGY MEETINGS UNDER UNIDO

During the fuel crisis of the 1970s, many countries began exploring alternative sources of energy. The international community's first major attempt to develop a strategy for the use of alternative fuels was the 1981 United Nations General Assembly Resolution A/RES/36/193 on the outcomes of the UN Conference on New and Renewable Sources of Energy.

Beginning in the 1990s, renewable energy increased in importance in light of the environmental implications of rising greenhouse gas emissions linked with economic growth. There was also an increasing realization of the contribution of energy to anthropogenic climate change. Renewable forms of energy such as solar, wind, hydro, geothermal and biomass are those that can be regenerated without compromising future generations. Moreover, renewable sources of energy generation offer a clean alternative to fossil fuels to meet the needs of the rapidly rising energy demands of the 21st Century.

Renewable energy is emerging as a fundamental requirement for addressing the challenges posed by climate change. It is also viewed as an essential foundation for meeting the needs of the rural poor, with an estimated 1.6 billion people still lacking access to electricity. Therefore, renewable energy has become not only an environmental issue, but also a social and economic component of implementing a sustainable energy future.

There is an emerging focus in the international renewables dialogue on the need to scale up sustainable and renewable energy both regionally and globally. To this end, there has

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been an emerging UN process on renewables since the UN Conference on Environment and Development in 1992 in Rio de Janeiro, Brazil. Since 1992, various UN organizations and agencies have been active on this issue, and numerous international conferences and forums have been held. Most recently, the International Renewable Energy Agency (IRENA) was created in January 2009. IRENA's objectives are to provide an international institutional framework to consolidate policy efforts and facilitate information sharing to catalyze the transition toward a renewables-based society.

The following selected international processes have contributed to shaping the progression of policy development and information sharing on renewable energy.

BONN RENEWABLES 2004: The first International Conference on Renewable Energy took place in June 2004, in Bonn, Germany. Delegates adopted three outcomes: policy recommendations; an international action programme; and a political declaration. The declaration called for the establishment of a global policy network, which led to the creation the Renewable Energy Policy Network for the 21st Century. IISD RS coverage of this meeting can be found at: <http://www.iisd.ca/sd/ren2004>

BIREC 2005: The Beijing International Renewable Energy Conference was held from 7-8 November 2005, in Beijing, China. Participants considered practical measures, success stories and effective legislative and policy measures to create institutional and technical infrastructure and to help market forces work more effectively. Officials adopted the Beijing Declaration, which recognizes the need for significant public and private financial resources and for investment in renewable energy and energy efficiency.

IBEROAMERICAN MINISTERIAL MEETING ON ENERGY SECURITY: One of the first regional attempts to discuss renewable energy in Latin America occurred at the Iberoamerican Ministerial Meeting on Energy Security in Latin America from 26-27 September 2006. The meeting provided a forum for discussions on energy security and regional cooperation to harness the potential of renewable energy technologies. It was at this meeting that the decision was taken to create the Global Renewable Energy Forum. IISD RS coverage of this meeting can be found at: <http://www.iisd.ca/YMB/SDIBE/26sep.htm>

WIREC 2008: The Washington International Renewable Energy Conference convened from 4-6 March 2008, in Washington D.C., US, and addressed four themes: market adoption and finance; agriculture, forestry and rural development; state and local authorities; and research and development. IISD RS coverage of the meeting can be found at: <http://www.iisd.ca/yimb/wirec2008/>

INTERNATIONAL CONFERENCE ON RENEWABLE ENERGY IN AFRICA: This meeting was held in Dakar, Senegal, from 16-18 April 2008, under the theme "making renewable energy markets work for Africa: policies, industries and finance for scaling up." The conference resulted in a Plan of Action on Scaling-Up Renewables in Africa and the Dakar Declaration on Scaling-Up Renewables in Africa. In the Declaration, participants agreed, *inter alia*, to: an African continental target for governments to scale up annual renewable energy investments to US\$10 billion between 2009-2014; adopt the Plan of Action on Scaling-Up Renewables in Africa and support its implementation with adequate resources; and recommend that the African Union, UNIDO and other relevant

development partners establish a ministerial-level policy advocacy group. IISD RS coverage of the meeting can be found at: <http://www.iisd.ca/yimb/sdrea/>

GLOBAL RENEWABLE ENERGY FORUM 2008: This Forum, held from 18-21 May 2008 in Foz do Iguaçu, Brazil, was jointly organized by UNIDO, the Brazilian Ministry of Mines and Energy, Eletrobras and Itaipu Binacional. The Forum endeavored to create a suitable environment to promote dialogue on strengthening inter-regional bonds and to set up joint actions between countries and regions aiming to reduce poverty and enhance energy security through the use of renewable energy. The Forum also sought to foster business and commercial relationships at the intra- and inter-regional level, and promote the development of renewable energy sources and related infrastructure in Latin America and in the Caribbean. IISD RS coverage of this meeting can be found at: <http://www.iisd.ca/yimb/greb2008/>

REPORT OF THE MEETING

The Global Renewable Energy Forum 2009 began on Wednesday, 7 October. Madgy Martínez-Soliman, UN Resident Coordinator, Mexico, opened the event with a message from UN Secretary-General Ban Ki-Moon, who hoped the Forum would help both in generating public support for the use of renewable energy in Latin America and the Caribbean and in reaching a global agreement on climate change at the United Nations Framework Convention on Climate Change (UNFCCC) COP-15 in Copenhagen in December.

Kandeh K. Yumkella, Director-General, United Nations Industrial

Development Organization (UNIDO), welcomed participants and thanked the hosts for organizing the Forum. He highlighted the need to improve energy access for the world's poor in order to reach the Millennium Development Goals (MDGs). He also urged that a global carbon price be established, and observed that greening industry will only work if it financially benefits companies, for example by removing barriers to implementing existing energy efficient technologies.

Georgina Kessel, Secretary of Energy, Mexico, emphasized that renewable energy is an alternative to fossil fuels and is economically feasible. She stressed the importance of cooperation between federal and state governments in creating direct and indirect jobs in the renewable energy sector, and expressed hope that the Forum would identify good practices for moving towards green economies.

Juan Manuel Oliva Ramírez, Governor of Guanajuato, Mexico, noted that the presence of Mexico's President at the Forum demonstrates the high priority Mexico accords to renewable energy. He expressed hope that the Forum would provide a sustainable vision for combining economic growth with environmental sustainability.

Mexican President Felipe de Jesús Calerón Hinojosa said humanity must pave the road to cleaner and less destructive energy. He lamented the skepticism and disbelief in climate change he encountered with the previous US administration despite clear evidence of climatic impacts in North America





Distinguished guests join Mexican President Felipe Calderón Hinojosa at the Inaugural Plenary Session of the Global Renewable Energy Forum in Leon, Guanajuato, Mexico, including: Georgina Kessel, Secretary of Energy, Mexico; Kandeh K. Yumkella, Director-General, UNIDO; Juan Manuel Oliva Ramírez, Governor, State of Guanajuato; Rajendra K. Pachauri, Chairman, IPCC and CEO, TERI, India; and Hélène Pelosse, Director-General, IRENA.

and elsewhere. Drawing attention to the consequences already experienced by developing countries, he proposed changing the paradigm that only developed countries should mitigate



Mexican President Felipe de Jesús Calerón Hinojosa

greenhouse gas emissions. Noting the decrease of oil revenues to Mexico's Treasury, he warned against dependence on fossil fuel revenues. He proposed a global green fund whose accessibility would be proportional to a country's emission reductions. He concluded that renewable energy could contribute to closing the gaps between rich and poor and between man and nature.

PLENARY SESSION I: ENERGY POVERTY, ECONOMIC AND FINANCIAL CRISIS, AND CLIMATE CHANGE

The first plenary session, which focused on energy poverty, economic and financial crisis, and climate change, was held in two parts. Each part included a different keynote speaker and panel that addressed these key topics.

PART I: Keynote speaker Rajendra K. Pachauri, Chairman, Intergovernmental Panel on Climate Change (IPCC) and Director-General, The Energy Research Institute, emphasized that the cost of action to avoid the worst impacts of climate change was modest, estimated at 3% of global gross domestic product, and that mitigation would be accompanied by other benefits to health, energy security, agricultural output and employment. He noted that innovation was needed to address

energy access in developing countries, where 1.6 billion people lack access to electricity. He concluded by proposing that



Rajendra K. Pachauri, Chairman, IPCC and CEO, TERI

Mexico and India forge an alliance to stimulate research and development, and public-private partnerships. He suggested naming such a partnership the "Development Alliance for Renewable Energy" (DARE).

Georgina Kessel, Secretary of Energy, Mexico, acknowledged the urgent need to restructure the energy sector in light of the challenges posed by climate change. She said that energy efficiency was critical to achieving an energy transition toward environmental sustainability, but also to meet the poor's energy needs. She noted that although over 97% of Mexicans have access to electricity, close to 3 million Mexicans still live without it. She also indicated that public-private partnerships have the potential to provide avenues to diversify Mexico's energy matrix.

Carlos Slim, Chairman and CEO of Grupo Carso, said the financial crisis offers opportunities to transform the agro-industrial development paradigm to a knowledge and service-based model. Noting the importance of financial resources for renewable energy investment, he said that current circumstances allowed the private sector to take the lead in enabling a shift in the



Carlos Slim, Chairman and CEO of Grupo Carso

energy paradigm by increasing financing for renewables. Slim stressed the importance of fostering cultural change to reduce energy consumption and increase energy efficiency. He noted the need to promote public transportation and telecommunication infrastructure and technologies as well as the importance of investing in research and development to advance clean technologies to reduce greenhouse gases, including nuclear energy.

Lorenzo Zambrano, Chairman and CEO of CEMEX, noted the importance of increasing energy efficiency and renewable energy for the future of the construction sector, and supported sectoral standards to improve the sustainability of the energy intensive cement industry and their inclusion in the Kyoto Protocol's Clean Development Mechanism (CDM). He said it was critical to provide incentives to use low-carbon inputs and reduce waste in the production process. He highlighted CEMEX's aim of achieving a 30% energy reduction per ton of cement produced by 2015, and said the provision of incentives for the use of renewables would be critical in accomplishing this goal.

The discussion began with moderator Kandeh K. Yumkella stressing the importance of involving the private sector to move beyond good intentions and enable an energy transformation. Other discussants addressed the need for: financing for renewable energy; sectoral sustainability standards; targeted research and development for public-private partnerships; and proactive government policies. Participants also discussed the prospects for nuclear energy and the importance of greater consumer awareness.

PART II: In the second part of the first plenary session, Juan Rafael Elvira Quesada, Secretary of Environment, Mexico, delivered the keynote speech. He emphasized that although historically industrialized countries were responsible for the lion's share of global carbon dioxide emissions, developing nations have caught up quickly and must also reduce their outputs. Noting that Mexico produces only 1.6% of global emissions, he acknowledged that it is still the 13th largest global emitter, and said the country has reacted by aiming aggressively for a 50% emissions reduction by 2050. Elvira Quesada added that to achieve this goal, along with a target of securing 26% of national energy production from renewables by 2012, the government must take significant steps to better incentivize the private sector. He suggested that investors currently dictate renewables investment in Mexico and that the government must show leadership by effectively steering more investment into this area.

Carlos Arturo Flórez Piedrahita, Executive Secretary, Latin American Energy Organization, spoke about the hydroelectric potential of Latin American nations. He also discussed the challenges facing those countries in terms of rural electrification and, in many cases, lack of transboundary electricity grid cooperation between countries.

Esteban Morrás Andrés, CEO of Acciona, said the scale of investment needed to meet the climate challenge effectively cannot come only through massive centralized investments. He urged instead the large-scale mobilization of small-scale investors as seen in Spain, where 120,000 individuals have been incentivized to invest in solar energy. He also stressed that renewables policies must be stable and predictable over time, and that tax systems must provide the correct incentives to move away from dirty fuels.

Marcin Korolec, Undersecretary of State, Ministry of Economy, Poland, noted that the largest potential for Poland's renewable energy lies with biomass, for which they have made financing available for 2000 plants by 2020. Noting that Poland has reduced its carbon emissions by more than five times its Kyoto Protocol obligations, Korolec said Poland has gained experience with the sale of its avoided emissions as Assigned Amount Units to other emitters. He indicated that this knowledge would be readily shared with interested UNIDO members. Finally, he expressed his support for the International Renewable Energy Agency (IRENA) becoming the premier global institution for the promotion of renewables.

Deepak Gupta, Secretary of New and Renewable Energy, India, argued that if his country, one of the poorest in the world, can realize 34% of its national energy production from renewable sources, then it should be possible for nearly every nation to do the same. He stressed that a major obstacle for developing nations to follow India's example is the current inaccessibility of CDM financing of many potential funding recipients who never apply due to the CDM's excessive requirements. He argued that this system requires urgent reevaluation.



Deepak Gupta, Secretary of New and Renewable Energy, India

PLENARY SESSION II: RENEWABLE ENERGY AND ENERGY TRANSITION

Nebojša Nakićenović, Deputy Director, International Institute for Applied Systems Analysis, presented the keynote speech for this session, focusing on the transformation requirements to enhance the role of renewable energy. He urged vigorous decarbonization, enhanced deployment and diffusion of new research, and development of renewables and upfront investments. He observed that government support for research and development in countries belonging to the Organisation for Economic Co-operation and Development (OECD) has declined since 1980. He also observed that global investment in new renewable technologies decreased by 40% from 2008 to 2009. Nakićenović explained that, while various climate scenarios diverge in their predictions of global temperature increases, the investments required to meet



Ged Davis, Global Energy Assessment

their respective targets do not significantly differ. He concluded by underlining that switching to renewable energy could simultaneously address climate change as well as energy equity and security issues.

In response to a question from moderator Ged Davis, Global Energy Assessment, about the need for a global climate agreement, Nakićenović highlighted the importance of carbon pricing and creating new niche markets for the deployment of renewable energy. He

also emphasized the importance of correcting the perverse incentives wherein investors are often rewarded for supporting dirty, and not clean, energy sources.

Richard Moorer, Associate Undersecretary for Energy, US Department of Energy, discussed his government's initiatives to promote renewable energy, namely its programmes to reduce technology costs and to formulate stable and predictable policy to enhance renewable energy industries, something which was reiterated numerous times by panelists and speakers throughout the Forum. He cited examples of economic tools utilized by the US to promote renewables, including direct loans, loan guarantees and tax credits. He then illustrated US strategies to enhance the transition toward renewables, such as incorporating climate change concerns in new bilateral agreements.

Francisco Barnés de Castro, Commissioner, Energy Regulatory Commission, Mexico, said that public agencies in Mexico do not have the capacity to provide sufficient subsidies for renewables to expand, adding that they have sought support from international organizations such as the World Bank. He underscored the importance of clear public policy to enhance integration of renewables into Mexico's energy grid. He also called for legal regulations to render investment in renewables more certain.

Enrique Villa Rivera, Director General, National Polytechnic Institute of Mexico, said Mexico has not been as successful as Brazil in generating scientific human capacity in higher educational institutions to work in the renewable energy sector. To catch up with Brazil, Rivera proposed the adoption of clear policies to incentivize the training of human resources in renewables technology.

Victor Abate, Vice President of Renewables for GE Energy, noted that the wind energy sector is a policy-driven industry and urged the US government to follow in the footsteps of the EU and China by setting bold targets for the inclusion of renewables in national energy production.

Altino Ventura, Secretary of Energy Planning and Development, Ministry of Mines and Energy, Brazil, said that nearly all of Brazil's electricity is generated from hydro and biomass and that these renewable sources are competitive with the costs of fossil fuels.

In the ensuing discussion, Nakićenović proposed focusing on energy services and standard setting to change energy consumption behavior. Barnés de Castro said Mexico must learn how to bring the benefits of biofuels to local farmers rather than business to avoid a food versus fuel scenario. Villa Rivera acknowledged that Mexico lacks a public policy for higher educational institutions to increase endogenous technological capacity for renewables. In response to a question on US tariffs on Brazilian ethanol, Moorer said that the US Department of Energy would not object to seeing more Brazilian ethanol in the US energy mix if it were economically and environmentally attractive.

PLENARY SESSION III: RENEWABLE ENERGY POTENTIAL - REALITY OR UTOPIA

Hélène Pelosse, Director-General, IRENA, delivered the keynote speech for this plenary session. She explained that IRENA was created in 2009 and has 179 member governments, adding that the organization plans to develop centers of expertise to share experiences and knowledge, and to foster training and capacity building to enable a transition to

renewable energy. Commenting on the feasibility of achieving 100% renewable energy use, she said that IRENA would work on renewables deployment and develop a global database on renewable energy potential for each country, with results expected by the end of 2010.

Eduardo Zenteno, President, Mexican Wind Association, said Mexico had advanced with wind energy potential faster than expected and referred to wind farms in Oaxaca as an example of Mexico's wind capacity potential. He stressed the need to modify Mexico's regulatory framework to enable the development of a long-term market and a clear vision for wind energy to attract investment.

Hans-Joachim Kohlsdorf, Vice-President, Executive Council of Global Enterprises, said there was a need to incentivize renewables production. He commented that concerns about waste generation could be addressed by transforming waste into energy, thereby creating a win-win outcome. He noted that this would only be possible if markets were created and supported by policy and regulatory frameworks.

Leandro Feliciano Alves, Head of the Energy Division at the Inter-American Development Bank, said many countries were implementing domestic economic stimulus packages to put renewable energy strategies in place. Commenting on the state of the electricity sector in Latin America, he suggested that the way forward lay in restructuring large, traditional facilities based primarily on fossil fuels, to include renewable energy and restructure power purchase agreements, as well as encouraging long-term financing for renewables.

Jorge Miguel Samek, Brazilian General Director, Itaipu Binacional, identified a dramatic improvement in global possibilities for renewables since 2008. Commenting on



Jorge Miguel Samek, Brazilian General Director, Itaipu Binacional

the urgency of taking appropriate measures to change the energy paradigm, he said Brazil's consistent and heavy investment for over thirty years has resulted in nearly 50% of total energy use coming from renewables today. He noted that, with the right policies, similar success can be accomplished elsewhere.

Wim Turkenburg, Scientific Director, Copernicus Institute for Sustainable Development and Innovation, Netherlands, cautioned that although renewables will play a major role in positively transforming the energy paradigm, care must be taken to ensure that they do not conflict with sustainable development. In this regard, he noted the impacts of large hydropower facilities on local communities and biodiversity, and the impacts of biomass production on biodiversity, land, and food security. These caveats notwithstanding, he said there is significant potential for sustainable biomass, wind and solar energy innovation, with the contribution of biomass depending on the conversion technologies and the evolution of the transport sector.

In the ensuing discussion, participants addressed the importance of developing a variety of renewable options for a balanced energy matrix, private sector implementation of sustainability criteria for biomass energy, and the need for a private sector lobby supporting the use of renewable energies.

OVERVIEW OF THE FIRST THREE SESSIONS:

Ged Davis, Council Co-President, Global Energy Assessment (GEA), presented a short summary of the major themes discussed in the first three plenary sessions. Referencing Rajendra Pachauri's observation that 70% of global greenhouse gases are energy-related, he underscored that sustainable energy is central not only to climate change but also to poverty alleviation, socioeconomic development, and food and energy security. He recalled that supportive, stable and durable policy and institutional frameworks are vital in securing long-term investment. He then outlined major gaps that must be closed in terms of capacity building, expertise and financing of renewables technology. He added that radical changes in energy infrastructure and grids are essential in the transition towards renewables.

PLENARY SESSION IV: RENEWABLE ENERGY AND THE ACCESS AGENDA

Keynote speaker Deepak Gupta, Secretary of New and Renewable Energy, India, said energy access is essential to poverty alleviation and sustainable development. He addressed how to improve availability of low-carbon technologies to the rural poor. He then outlined renewables-related projects to improve livelihoods in rural India involving biomass, solar, or hydro solutions to run irrigation pumps, the production of biodiesel from *Jatropha* on degraded lands, and the use of rice husks and micro-hydro to meet basic electricity needs. To advance the deployment of renewables, he called for capacity building and innovative funding solutions. He emphasized that there was a fundamental difference between luxury and subsistence greenhouse gas emissions, which urgently needed to be addressed by the global community.

Vijay Modi, Professor of Mechanical Engineering, Columbia University, illustrated improvements brought through irrigation services, and lessons being learned through the Millennium Villages project in Africa. He identified a unique opportunity to use renewable energy to reduce the existing high costs of providing energy and facilitating irrigation, and the multiple benefits this would bring. He urged greater consideration of energy use for irrigation in climate change discussions.

Philippe Benoit, Manager, Energy Sector, Department for Sustainable Development, Latin America Region, World Bank, outlined several challenges to increasing rural energy access in developing countries, including complicated geography, affordability, low energy consumption of remote populations, and limited access to finance. Noting the adaptability of renewables to meeting the challenges of energy access and supporting the climate change agenda, he said these aspects are in line with the World Bank's priorities for Latin America. He said these goals include energy security and access, management of oil price volatility and incorporating climate change into the energy equation.

Edigson Pérez Bedoya, Director-General, Institute for Planning and Promotion of Energy Solutions for the Off-grid Areas, Colombia, stressed the need for a broader energy basket that includes renewables to provide energy to rural areas. He explained that his institute develops centers of technological innovation in Colombia to enhance energy provision in off-grid areas in order to stimulate livelihoods and employment, including satellite monitoring for energy patterns.

Susan McDade, Resident Representative in Cuba, United Nations Development Programme, stated that not only is energy access the missing MDG, but that none of the MDGs could be achieved without improvements in energy access. She commented that although the global renewables debate is focused on electricity, there are currently no renewable energy options to provide heat for cooking. She criticized the current energy discourse for only considering renewables and ignoring efficient liquefied petroleum gas fuel for cooking that could replace highly pollutant traditional fuels.

The ensuing discussion was moderated by Alberto Bello, Chief Editor, *Expansión*, with participants focusing on linking energy access and renewables development, the need to increase information available to rural communities to define energy priorities, and the importance of technology to store solar energy.

PARALLEL SESSIONS

On Thursday morning and early afternoon, 8 October, three parallel sessions took place. These sessions focused on: the transition to a low-carbon economy – new technologies; renewable energy for industrial applications; and energy efficiency. The presentations and discussions in these parallel sessions are outlined below.

PARALLEL SESSION I: TRANSITION TO A LOW-CARBON ECONOMY – NEW TECHNOLOGIES: Paolo Frankl, Head of Renewable Energy at the International Energy Agency (IEA), presented the keynote speech. He drew attention to his organization's 2008 publication, *Energy Technology Perspectives*, which outlines the steps necessary to reduce carbon emissions by half by 2050, based on 2005 levels. He indicated that the need for large-scale integration of variable renewable energies into smart energy grids, which will match supplies to fluctuating demands across regions, is high on the IEA's priority list. He stressed that an integrated approach is required for widespread renewable energy adoption, and that a stable international carbon price is necessary but not sufficient for this to occur. He suggested that an integrated approach include an emphasis on improving efficiency, the promotion of research and development, identification of context specific barriers, and tailored deployment strategies.

Stanislav Miertus, Head of Pure and Applied Chemistry at UNIDO's International Centre for Science and High Technology, spoke about the need to continue pursuing new technologies for biofuels. He outlined UNIDO's role in aiding developing countries in this regard, especially in Africa where it has 25 partners in 20 nations. He suggested that humanity is entering a new era where bio-chemicals and chemicals-related industries will repeat the vast expansion of knowledge and markets that was seen in the 20th century with the development of petrochemicals, and that current biofuels are only the beginning of this burgeoning industry.

Nicolas Lymberopoulos, Director, Projects and Programmes, UNIDO International Centre for Hydrogen Energy, spoke about how hydrogen can support development in developing countries. He began by clarifying that hydrogen is not a source of energy *per se*, but rather an energy "carrier." He then elaborated on its potential for use for both stationary and mobile energy needs, noting that it is a portable and can both



Participants on the panel discussing New Technologies for Transitioning to a Low-Carbon Economy evaluated the potential of a variety of technologies and the funding for renewables in developing economies through the GEF and UNIDO. L-R: Fernando Marti Scharfhausen, National Energy Commission, Spain; Paolo Frankl, Head, Renewable Energy, IEA; Stanislav Miertus, UNIDO; Domenico Coiro, University of Naples; Nicolas Lymberopoulos, UNIDO; Chris Sladen, BP; and Dimitrios Zevgolis, GEF.

be transferred and stored. He then provided an overview of the funding opportunities offered by UNIDO for hydrogen-related pilot projects.

Domenico Coiro, Associate Professor, University of Naples, presented work being conducted in the field of underwater turbines, which he said can generate electricity using only a fraction of the materials needed for wind turbines of the same capacity. He emphasized that this technology could easily be scaled-down for use as decentralized energy production, but admitted that many barriers still exist for micro-hydro, chief among them being to simplify maintenance and adapt designs to specific local conditions.

Chris Sladen, Country Head, BP Mexico, elaborated on the importance of, and rationale for, the private sector to enter into renewable energies. He said that private investment will make or break the future of renewables. He also argued that the commercial case has never been stronger for private investment involvement in this field, noting, increasing demand for renewables caused by climate change, projected energy demand increases expected over the next 30 years, and issues relating to the and security of, and access to, energy supplies.

Dimitrios Zevgolis, Programme Manager, Climate Change and Chemicals, Global Environment Facility (GEF), described the GEF's efforts to promote renewables, including removing regulatory, financial and technical barriers. He said that the US\$2.5 billion which the GEF has invested to date in 150 renewable energy projects in developing countries has led to US\$15 billion of additional investments by partner organizations and governments, making it the largest public

sector financier of renewable energy technology globally. He explained that in future the GEF will be concentrating on technology transfer, which relies on functioning markets.

PARALLEL SESSION II: RENEWABLE ENERGY FOR INDUSTRIAL APPLICATIONS: N. H. Ravindranath, Professor, Indian Institute of Science, said the future for the industrial sector lies in renewables, but there are still barriers hindering their adoption, particularly by small and medium-sized enterprises (SMEs). He identified significant opportunities to develop conversion technologies for biomass and bioenergy, including improved stoves for household and industrial cooking, biogas production and cogeneration in the sugarcane industry. Among the potential drivers for renewables in industry in developing countries, he listed policy support and regulations, technological development, and CDM opportunities. Notwithstanding the importance of government support, he said that economic viability would drive the renewables sector, particularly for industrial applications.

Walter Danner, CEO, Rottaler Modell, Germany, provided examples of lessons learned in using renewables for industrial application in Africa and India, where the grid is often unstable. He noted that, once installed, biogas plants are cost effective, but that initial capital outlays are prohibitive and there is a lack of financing for these initial investments. He indicated that Germany is constructing several hundred biogas plants each year, which is driving down costs dramatically.

Mustapha Taoumi, Director, Development Centre for Renewable Energy, Morocco, said significant opportunities for renewables exist to contribute to the energy matrix of developing countries. Stressing the importance of including

renewables in industrial innovation, he called for financing, capacity building and North-South-South transfer of clean energy technologies.

Amit Kumar, Director, Energy Environment Technology Development Division, TERI, emphasized the importance of applying renewables in industrial processes, with solar thermal and biomass offering options for SMEs. In order to scale-up renewables, he proposed that existing technologies should be integrated in industrial systems through demonstration projects to ensure their economic viability. Noting that business often considers energy generation outside their core competence, he stressed the need to assess the role of biomass energy provision in the complete value chain of production.

Ramón Fiestas, General Secretary, Spanish Wind Energy Association, discussed the importance of political will to move forward, and called for public institutions to provide incentives for technological innovation in a targeted manner to make the initial investments more attractive.

Pointing out the growth of solar thermal energy in China, Xi Wenhua, Director-General of UNIDO's International Solar Energy Center for Technology Promotion and Transfer, China, said his Center has trained over 850 technicians from 106 countries on practical applications of solar, thermal and photovoltaic technologies. Stressing China's leadership in solar thermal applications, he noted their potential to increase industrial energy efficiency.

Liu Heng, Director-General of UNIDO's International Center on Small Hydro Power, China, focused on the potential for industrial applications of micro-hydropower in China. He explained that town and village enterprises, which play a key role in national industrial development, are benefiting from renewables applied at the local level in the agro-industrial sector.

Pradeep Monga, Director, Energy and Climate Change, UNIDO, moderated the ensuing discussions on the importance of facilitating technology transfer, the need to encourage South-South technological cooperation, and the importance of awareness raising to integrate renewables in existing industrial systems.

PARALLEL SESSION III: ENERGY EFFICIENCY:

Edwin Piñero, International Chair, International Organization for Standardization (ISO) Project Committee 242 – Energy Management, presented on the role of energy efficiency in energy management. Noting that energy efficiency is often overlooked as low-hanging fruit, he advocated that it be considered an equal partner to renewable energy in addressing climate change. He explained that management changes are as important as new technologies in achieving energy efficiency. Noting the existence of several national energy standards, he underscored the importance of creating global energy management standards to enable organizations to continually improve their energy efficiency. Piñero explained that energy management standards could develop similarly to the ISO's quality and environmental standards.

Hans-Holger Rogner, Section Head, International Atomic Energy Agency, cautioned that energy efficiency alone cannot be considered the solution to curbing the global energy demand.

Jennifer Bowman, Programme Director of Energy and Climate Change, Dow Chemicals, said energy efficiency has become critical to the operational success of many chemical companies from an environmental, competitive and financial perspective. She noted that Dow Chemicals had saved over

US\$8 billion since it began energy efficiency initiatives in 1994. Bowman said energy measurement and monitoring is vital in assessing the energy saving effectiveness of a project. She also added that such measurements are essential in prioritizing and assessing affordability of projects.

Emiliano Pedraza, Director-General, National Commission for Energy Efficiency, Mexico, described several of Mexico's energy saving programmes involving the public and private sectors. He explained that programmes aimed at consumers initially target low-income and marginalized groups. He predicted that the energy saved by such programmes by 2030 would equal Mexico's 2009 energy consumption. He assured a participant that federal measures, construction codes and standards would apply to all consumers, including foreign development projects in Mexico.

Dolf Gielen, Chief, Energy Efficiency and Policy, UNIDO, explained that energy efficiency is particularly challenging for industry due to the difficulty in designing efficiency-enhancing technologies appropriate for multiple industrial sectors. He underscored the importance of monitoring energy savings, and systems optimization in rendering industry more energy efficient. He also urged that energy efficiency policy be designed cooperatively by industry and government.

André Aranha Corrêa do Lago, Director, Department of Energy, Ministry of External Relations, Brazil, said the motivations for adopting energy efficiency differ between rich and poor countries, as well as between renewables-based and fossil fuel-based economies. Describing a recent awareness raising initiative on energy conservation initiated following Brazilian energy insecurity of the 1990s, he indicated that consumers did not return to their previous wasteful habits. He underscored the importance of tailoring energy efficiency programmes to individual countries and organizations.

In the ensuing discussion, participants also debated the merits of sustainable architecture, the role of housing standards in overall energy efficiency and the role of energy service companies. Participants also inquired about political and economic tools to enhance the market for the energy efficiency sector; as well as public regulations and standards to enhance behavioral and societal changes in energy consumption.

PLENARY SESSION V: FUTURE OF BIOFUELS: POTENTIAL AND CHALLENGES

William Holmberg, Chair of the Biomass Coordinating Council, was the keynote speaker for the plenary session on biofuels. He highlighted the enormous potential of biomass to be used by anyone for a variety of purposes, including bio-based chemicals, food, feed, fiber, fuels and fertilizers. He called for a simplified definition of biomass to include all forests, woodlots and lands. Stressing the need to promote the growth of biomass through land-use optimization and sustainable management practices, he urged an end to deforestation. Holmberg called for partnerships throughout the Americas to develop farmer owned and operated biofuel plants and cooperatives to support community development.

Recalling Brazil's thirty years of experience with ethanol, Suani Teixeira Coelho, Executive Secretary of the Brazilian Reference Center on Biomass, said many lessons have been learned, particularly concerning the importance of government support policies and infrastructure. She recalled that Brazil's initial motivation to produce ethanol stemmed from economic and energy security concerns, not



Moderator Ged Davis, GEA, prompted panelists in the Future of Biofuels: Potential and Challenges session to tackle the controversial elements surrounding biomass as an energy source. L-R: William Holmberg, Chair of the Biomass Coordinating Council; Sergio Ramírez Robles, Chief Corporate Affairs Officer, BioFields, Mexico; Melinda Kimble, Senior Vice President, United Nations Foundation; Ricardo Castello Branco, Chief Industrial Officer, Petrobras Biofuels; Ged Davis; Suani Teixeira Coelho, Executive Secretary of the Brazilian Reference Center on Biomass; Gustavo Best, Mexican Bioenergy Network on Biofuels and Rural Development.

environmental grounds. She said the Brazilian experience could be replicated in Latin America for ethanol and biodiesel with commercially-available technologies. She noted the need for capacity building to implement existing technologies and enact adequate legislative frameworks for bioenergy.

Sergio Ramírez Robles, Chief Corporate Affairs Officer, BioFields, Mexico, emphasized the advantages of producing bioenergy from algae. He said the energy balance for algae was favorable compared with first and second generation bioenergy feedstocks. He called for enhanced research and development with a supporting policy framework to accelerate progress towards making third generation technologies economically viable.

Melinda Kimble, Senior Vice President, United Nations Foundation, said the bioenergy market needed to overcome the first test of sustainability, which was whether bioenergy could compete in the marketplace with fossil fuels. In this respect, she said sugarcane ethanol was the most economically sustainable. The bioenergy debate should address how to integrate bioenergy in the total energy matrix. She noted that it was not sustainable to grow biomass for export unless it was sufficiently integrated in a country's overall energy strategy. She also stated that opportunities lay in second generation technologies.

Ricardo Castello Branco, Chief Industrial Officer, Petrobras Biofuels, explained that Petrobras used to be an oil company, but that it was increasing production and marketing biofuels despite the recently discovered Tupi oil field off the coast of Brazil. Noting that political will for climate change action would be the main driver for biofuels, he said their penetration in the energy market would depend on: the capacity to produce biofuels sustainably, effective removal of tariff and non-tariff barriers to their trade, and the development of second generation technologies. He

said the Brazilian ethanol experience shows the importance of investment in research and development, and integrated incentives such as those for the automotive sector.

Gustavo Best, Mexican Bioenergy Network on Biofuels and Rural Development, said there is strong potential for biofuels in Mexico, particularly in rural areas. He said Mexico's recent Renewable Energy Law would accelerate the implementation of biofuels and expand rural development options. Emphasizing the role of biofuels in the rural sector as an engine for development, he supported increasing integrated biomass systems in rural communities and research and development for second generation technologies. He said sustainability criteria should be developed in a transparent manner.

Moderator Ged Davis led panelists' discussions on next generation biofuels, which were estimated to be available in five years, but would not be economically viable for another 10-15 years. However, it was noted that even once second generation biofuels are developed, they can only be expected to partially satisfy the demands of a system based on individual transport using automobiles. Additional comments were made on the social impacts of sugarcane production in Brazil and the feasibility of third generation algal biofuels.

PLENARY SESSION VI: SCALING UP INVESTMENTS IN RENEWABLE ENERGY

Bruno Ferrari García de Alba, General Director, ProMexico, presented the keynote speech on scaling up investments in renewable energy. He discussed the benefits of investing in renewable energy in Mexico given its strategic trading position and large renewable energy capacity. He described the present and future capacity of wind, solar, hydro and biomass in Mexico. He also specified Mexico's strategies,

laws and regulations to promote renewable energy investment domestically, such as its law for renewable energy use and financing of renewable technology.

Enrique Nieto, Director, International Business, Nacional Financiera de Mexico, presented his institution's initiatives to promote investment in renewable energy projects; and described its instruments to improve feasibility of renewables projects such as liquidity schemes, direct investment and the incorporation of foreign finance. He explained that his organization finances projects ranging from small household initiatives to large industrial undertakings.

Venkata Ramana Putti, Senior Environmental Specialist, World Bank, described the Bank's contributions to global renewable energy needs, including the Clean Technology Fund, Strategic Climate Fund and Carbon Partnership Facility. He indicated that renewable energy is expected to contribute 20% more to the world's energy mix by 2050 than it does today. He listed encouraging signs of increasing investment, such as the EU and US commitments to renewable energy, the willingness of developing countries to embrace renewable energy, and the promotion of financial instruments targeted at renewables by the UN and multilateral banks.

Alexis Bonnel, Head, Infrastructure and Environment Division, French Development Agency, emphasized that renewable energy is both a technological and methodological issue. He explained that the present market does not give the incentives needed to properly manage energy given the exclusion of related environmental externalities. Noting that subsidies may initially be useful to correct some of the market's perverse effects, he stressed that in the long-term the costs of renewable technology must also come from taxes, consumers and other international funds because subsidies do not necessarily stimulate demand. He urged increased carbon taxation, but cautioned against their possible negative social ramifications.

Daniel Magallón, Managing Director, Basel Agency for Sustainable Energy, stressed the importance of involving local banks and entrepreneurs when investing in renewable energy and energy efficiency projects, and of stimulating the demand for renewable energy by investors. He also suggested that it was important for banks to understand the financial merits of investing in renewable energy projects. He proposed financial arrangements that could increase investment in renewables, including non-exploitation certificate arrangements between developing and developed countries.

Nicola Melchioni, General Manager – Mexico, Enel Latin America, presented on managing risks when investing in renewables. Noting that both renewable and fossil energy compete for profitability and risks, he said investment in renewables must outperform traditional sources of energy or face underinvestment. He described risk mitigation strategies, such as financial innovation and diversifying renewable energy investment portfolios. He cautioned that financial innovation cannot reduce systematic risks but instead distributes them across investors.

In the ensuing discussion moderated by Luis Gómez Echeverri, Associate Director of GEA, participants inquired about the adoption of subsidies and standards for renewable energy in Mexico; stimulating demand by banks to invest in renewables; and working with banks to increase the attractiveness of renewable energy and energy efficiency. One participant asked about financing the application of renewables in the health sector, and another raised the possibility of developing special markets to facilitate technology transfer to developing countries.

PLENARY SESSION VII: INNOVATIVE POLICY AND INSTITUTIONAL FRAMEWORK

Francisco Xavier Salazar Diez de Sollano, Chairman, Energy Regulatory Commission, Mexico, made the keynote speech in the session on innovative policy and the institutional framework. He said the Mexican experience shows that the commitment and creativity of policymakers and regulators is more of a driving force to promote renewables than a specific legal framework. He suggested that the ideal institutional framework should include: specific legal provisions, including goals and mandates to promote renewables; specific institutions with clear roles; and economic mechanisms to level the playing field, including funds, subsidies, tariffs, and taxes.

Štefan Bogdan Šalej, Director General, International Center for Promotion of Enterprises, Slovenia, focused his presentation on corporate social responsibility. He stressed the need for a change in attitude in the business sector to put sustainability into practice. He also recognized Brazil's offer to transfer sugarcane ethanol technologies to interested countries, and encouraged dialogue to establish partnerships in renewables development and encourage technology transfer.

Lakshman D. Guruswamy, Director, Center for Energy and Environmental Security, University of Colorado, focused on energy justice, arguing that the energy poor are marginalized from urban energy provision. He questioned how to address their plight while mitigating greenhouse gas emissions and suggested people-centered, appropriate technologies with low capital costs. He also urged developing countries to take the lead in producing energy efficient biochar to meet the energy needs of the poor.

Marianne Moscoso-Osterkorn, Director General, The Renewable Energy and Energy Efficiency Partnership (REEEP), noted the importance of governments in the energy sector as energy consumers, in guiding public procurement of renewables and in shaping their level of contribution. While recognizing that every country has unique energy matrices and institutional capacities, she warned that lengthy gaps between the adoption and implementation of regulations are not conducive to attracting investors.

Joseph Williams, Energy Programme Manager, Caribbean Community and Common Market (CARICOM), noted his region's high level of energy dependence and its vulnerability to climate change, which is in inverse proportion to its contribution to greenhouse gas emissions. To achieve energy security, he said CARICOM must diversify its energy mix and increase awareness of the need for energy efficiency and energy policy coordination. He noted the potential to implement geothermal energy across borders and cited solar water heating in Barbados as a best practice for renewables.

Rainer Hinrichs-Rahlwes, Board Member, German Renewable Energy Federation, said market distortions are the main reason why technologies have not achieved greater market penetration. He said the German policies underlying renewables growth are based on consensus over renewables' benefits and a solid legal framework, including guaranteed grid access, feed-in tariffs and tariff differentiation. He recommended building a stable investment framework to trigger growth, remove structural barriers for new entrants to sell electricity, and establish effective policies.

Mark Lambrides, Chief of Energy and Climate Change Mitigation, Organization of American States, stressed the need for partnerships and emphasized the importance of institutional frameworks for regional renewables cooperation, such as the

Energy and Climate Partnership of the Americas. He stated that the incorporation of renewables in national energy grids should be based upon a continuum of conditions, incorporating both national and local supplies and demands.

CLOSING PLENARY

Ged Davis, GEA, summarized the main themes of the Forum and presented recommendations that emerged from presentations and discussions. He emphasized the importance of energy for climate justice and of a potential green fund in carbon pricing. In complimenting Mexico for undertaking the challenge of halving its greenhouse emissions by 2050, he noted that renewables technologies are already available and that further and unprecedented mobilization for large-scale and urgent deployment is now required. He stressed the importance of flexible energy structures and the utilization of an array of renewable energy technologies.

Davis also stated that IRENA must quickly begin providing institutional support to jumpstart renewables. He emphasized the importance of accounting for the broad natural system in which biomass exists to realize its full potential sustainably, and clearly define criteria for the sustainability of biofuels. He then praised Brazil's perseverance with ethanol even during times of low oil prices. Davis concluded with proposed recommendations arising from the Forum, including to:

- establish a global access fund to target chronic problems of access to energy; develop
- clear sustainability guidelines and standards for biofuels;
- secure support for IRENA to quickly move forward;
- strengthen regional research capacities through networks; and
- establish UN Energy and industry partnerships.

Participants proposed additional recommendations, such as clarifying the boundary between IRENA and UN-Energy; penalizing fossil fuel usage through taxation; setting up an information bank of best practices in renewables; and integrating energy and environmental planning nationally and regionally. Davis then invited participants to send further ideas and suggestions to: p.monga@unido.org and aldo.flores@energia.gob.mx

Kandeh K. Yumkella, UNIDO, thanked the Mexican President for playing such a prominent role in promoting developing countries' voices in climate negotiations. Highlighting the need to take a holistic approach to energy, development and climate change, he said that 2010 should be dedicated to operationalizing the sustainable energy strategies envisaged at this Forum. He stated that the economic crisis has offered the world an opportunity to broaden dialogues on economic competitiveness, transformation, and innovation.



Juan Manuel Oliva Ramírez, Governor, State of Guanajuato, Mexico

Observing that climate change is already punishing the world's poorest billion people, he urged responsible action to address energy justice and ensure energy access for the poor.

Juan Manuel Oliva Ramírez, Governor, State of Guanajuato, Mexico, said the Forum had provided hope that renewables can serve as a basis for our sustainable future, and has created an opportunity for the creation of partnerships and investment in the

promotion of clean technologies. He concluded by calling for a fundamental change in humanity's relationship with nature to better preserve the environment for future generations, and closed the Forum at 1:39 pm.

UPCOMING MEETINGS

31ST SESSION OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: This meeting will take place from 26-29 October 2009 in Bali, Indonesia. Prior to the meeting, Working Groups I, II and III will approve their respective outlines for the Fifth Assessment Report. For more information, contact: the IPCC Secretariat; tel: +41-22-730-8208; fax: +41-22-730-8025; email: ipcc-sec@wmo.int; Internet: <http://www.ipcc.ch>

RESUMED AWG-LCA 7 AND AWG-KP 9: The resumed seventh session of the *Ad Hoc* Working Group on Long-term Cooperative Action under the United Nations Framework Convention on Climate Change (UNFCCC AWG-LCA 7) and the resumed ninth session of the *Ad Hoc* Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP 9) are scheduled to take place from 2-6 November 2009 in Barcelona, Spain. For more information, contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; Internet: <http://unfccc.int/>

CONFERENCE ON AVIATION AND ALTERNATIVE FUELS: This conference, organized by International Civil Aviation Organization (ICAO), will take place from 16-18 November 2009 in Rio de Janeiro, Brazil. It will showcase the state of the art in aviation alternative fuels and potential implementation. For more information, contact: ICAO Air Transport Bureau; tel: +1-514-954-8219, ext. 6321; e-mail: envcaaf@icao.int; Internet: <http://www.icao.int/CAAF2009/>

UNFCCC COP 15 AND KYOTO PROTOCOL COP/MOP 5: The fifteenth Conference of the Parties to the UNFCCC and fifth Meeting of the Parties to the Kyoto Protocol are scheduled to take place from 7-18 December 2009 in Copenhagen, Denmark. These meetings will coincide with the 31st meetings of the UNFCCC's subsidiary bodies. Under the "roadmap" agreed at the UN Climate Change Conference in Bali in December 2007, COP15 and COP/MOP 5 are expected to finalize an agreement on a framework for combating climate change post-2012 (when the Kyoto Protocol's first commitment period ends). For more information, contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; Internet: <http://unfccc.int/>

INTERNATIONAL CONFERENCE ON THE DEVELOPMENTS IN RENEWABLE ENERGY TECHNOLOGY

This conference will be held in Dhaka, Bangladesh, from 17-19 December 2009, and will cover all aspects of Renewable Energy, including its socioeconomic aspects. For more information, contact: Shahriar A. Chowdhury; email: icdret-tech@uiu.ac.bd; <http://www.uiubd.com/Content.php?page=ICDRET&Id=1100&pId=0&pageId=1100&Type=1>

FOURTH INTERNATIONAL RENEWABLE ENERGY CONFERENCE

This conference will be held in New Delhi and Uttar Pradesh, India, from 17-19 February 2010, and will discuss public policies and showcase programmes related to the renewable energy sector. For more information, contact: email: rajneeshk@eigroup.in; Internet: <http://direc2010.gov.in/>