



A Summary Report of the IHA World Congress 2009

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SUMMARY OF THE 2009 INTERNATIONAL HYDROPOWER ASSOCIATION WORLD CONGRESS ON ADVANCING SUSTAINABLE HYDROPOWER: 23-26 JUNE 2009

The 2009 International Hydropower Association (IHA) World Congress on Advancing Sustainable Hydropower convened at the Hilton Hotel in Reykjavik, Iceland, from 23-26 June 2009. The Congress included a networking tour, with visits to hydro and geothermal power stations. Participants also took part in other events throughout the week, including a trip to the Blue Lagoon thermal baths and a whale watching trip. Many participants also took part in a post Congress excursion to Iceland's most recent hydropower project, and an aluminum smelter.

This event is the second IHA World Congress to be held, two years after the inaugural event in Antalya, Turkey, and attracted nearly 300 participants. It provided a forum for dialogue among hydropower companies, investment and development banks, non-governmental organizations (NGOs) and other stakeholders involved in the development and operation of hydropower projects.

Participants attended sessions on a wide variety of topics, including: energy policy; water policy; linkages between hydropower and climate change; hydropower development; investment and financing; and hydropower markets.

This report consists of a brief history of IHA and multilateral energy initiatives, followed by a summary of the Congress proceedings.

A BRIEF HISTORY OF IHA AND MULTILATERAL ENERGY INITIATIVES

INTERNATIONAL HYDROPOWER ASSOCIATION:
IHA was formed under the auspices of the UN Educational, Scientific and Cultural Organization (UNESCO) in 1995 as a forum to promote and disseminate good practice and further knowledge of hydropower. It is governed by a Board, which comprises 18 elected members, up to six co-opted members, and one Executive Director.

IHA aims to advance the role of hydropower in meeting global water and energy needs by: championing continuous improvement and sustainable practices; building consensus through strong partnerships with other stakeholders; driving initiatives to increase the contribution of renewables, especially hydropower; and increasing awareness of the role that hydropower can play in sustainable development as an important source of renewable energy. Key initiatives

include: providing guidance on hydropower through the IHA Sustainability Guidelines and a Sustainable Assessment Protocol; rewarding excellence through the IHA Blue Planet Prize; sharing knowledge through the development of a website on good practice (<http://www.sustainablehydropower.org>); and working towards certification in the hydropower sector. The main IHA website is: <http://www.hydropower.org>

Sustainability Guidelines: Considering sustainable development to be a fundamental component of social responsibility, sound business practice and natural resource management, IHA developed its Sustainability Guidelines to provide a framework for good practice in hydropower. The IHA Sustainability Guidelines promote greater consideration of environmental, social, and economic sustainability in the assessment of new energy supply options, new hydro projects and the management and operation of existing hydropower facilities. They were formally adopted during the meeting of the IHA Council in November 2003.

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Sustainability Assessment Protocol: The IHA Sustainability Assessment Protocol was developed primarily to assist IHA members in assessing performance against criteria described in the IHA Sustainability Guidelines. The Protocol addresses new and existing hydropower projects and provides general guidance on consideration of sustainability issues. It can be used as part of preliminary due diligence reviews of water and energy planning, new hydropower projects and operating hydropower facilities, relying on objective evidence to support a “sustainability score” against 20 sustainability aspects of both process and performance. The Sustainability Assessment Protocol underwent extensive trialing, modification and testing for over two years before being approved by the IHA Board for adoption in July 2006.

First IHA World Congress: The IHA’s First World Congress on Advancing Sustainable Hydropower was held in Antalya, Turkey, from 29-31 May 2007, and included sessions on: technical hydropower innovation; social and environmental performance evaluation; the role of the public and private sectors; social responsibility; and certification of good practice in the hydropower sector.

Hydropower Sustainability Assessment Forum: The Hydropower Sustainability Assessment Forum (HSAF) was initiated in 2007 after a meeting between WWF, The Nature Conservancy (TNC) and IHA about endorsement of the IHA Sustainability Assessment Protocol by parties outside the sector. The Forum members are representatives of developed and developing country governments, the hydropower sector, social and environmental NGOs and the commercial and development banks.

Forum members are jointly reviewing and recommending enhancements to the IHA Sustainability Assessment Protocol and has produced a Draft Hydropower Sustainability Assessment Protocol (circulation: July 2009), and after a period of consultation and trialing, aims to produce a finalized Protocol by early 2010. A follow-on phase for the Forum is envisaged that will focus on ways forward for the Protocol, including the potential for a sector standard. A key components document for the Draft Hydropower Sustainability Assessment Protocol being developed by the HSAF was released for public review in January 2009.

MULTILATERAL INITIATIVES ON ENERGY: Energy emerged as an issue of environmental concern when Agenda 21 and the Rio Conventions were being implemented in the 1990s. In July 2000, leaders of the eight major industrialized democracies (G8) met in Okinawa, Japan, for the G8’s 26th Summit. The G8 established a Renewable Energy Task Force to identify actions to promote a change in the supply, distribution and use of renewable energy in developing countries. In 2001, the Task Force concluded that renewable energy resources can sharply reduce local, regional and global environmental impacts, as well as energy security risks.

The ninth Session of the UN Commission on Sustainable Development (CSD-9), held from 16-27 April 2001, at UN Headquarters in New York, addressed matters related to energy, transport and the atmosphere. The meeting was preceded by comprehensive preparations on energy issues, including meetings of the *Ad Hoc* Open-Ended Intersessional Group of Experts on Energy and Sustainable Development, and regional intersessional meetings. CSD-9 recognized, *inter alia*, that the Millennium Development Goals (MDGs) would not be met without increased access to modern energy services. Prior to the World Summit on Sustainable Development (WSSD),



Gullfoss, Iceland’s most famous waterfall, is a spectacular double cascade

held in Johannesburg, South Africa, from 26 August to 4 September 2002, UN Secretary-General Kofi Annan proposed energy as one of the key areas to be addressed at the summit. At its completion, the WSSD encouraged the development of new “Type II” initiatives, which are voluntary public-private partnerships aimed at advancing implementation on the ground. Several of these Type II initiatives were launched in the area of energy for sustainable development.

The International Conference for Renewable Energies (*renewables* 2004) took place from 1-4 June 2004, in Bonn, Germany. The conference consisted of nine plenary sessions, including a multi-stakeholder dialogue and a ministerial segment. The ministerial segment included three ministerial roundtables that considered: policies for renewable energy market development; financing options and strengthening capacities; and research and policy development, and institutions.

CSD-14, which met from 1-12 May 2006, at UN Headquarters in New York, was tasked with reviewing progress in the areas of energy for sustainable development, industrial development, air pollution, atmosphere and climate change. The meeting was dominated by the energy agenda, with discussions focusing on energy security, the impact of oil and gas prices, and the respective roles of renewable energy technologies, fossil fuels and nuclear power in the post-2012 climate change regime. CSD-14 adopted a Chair’s Summary that included reference to: access to energy for the poor and poverty alleviation in developing countries; participation of all stakeholders in long-term energy strategies in support of sustainable development; the impacts of increasing energy prices; the need for energy diversification; and incentives for providing clean energy services.

REPORT OF THE IHA CONGRESS 2009

The second IHA World Congress on Advancing Sustainable Hydropower was convened from 23-26 June 2009. Throughout the meeting, participants listened to presentations and participated in panel-led discussions. On Tuesday, 23 June, participants attended a networking tour of Iceland’s “Golden Circle,” including tours of local hydro and geothermal power stations. On Wednesday, 24 June, participants gathered for the opening session of the Congress, followed by panel-led sessions on: energy policy; water policy; and on linkages between hydropower and climate change. On Thursday, 25 June, delegates participated in panel-led discussions on hydropower development, investment and financing models, hydropower markets, and a seminar on hydropower and greenhouse gases. On Friday, 26 June, participants attended

panel-led discussions on sustainability standards and renewable energy sustainability initiatives, and attended a debate on the Hydropower Sustainability Assessment Forum. The meeting concluded with a summary of outcomes of the Congress, and the General Meeting of the International Hydropower Association. Participants later attended a closing banquet at the Pearl Restaurant, hosted by the President of Iceland and sponsored by Alstom, a transport and energy infrastructure company.

OPENING SESSION

Refaat Abdel-Malek, President of the IHA, chaired the opening session. Katrín Júlíusdóttir, Minister of Energy, Industry and Tourism, Iceland, welcomed delegates and provided an overview of energy production in Iceland. She explained that only 20% of Iceland's energy needs are met by imported fuels, and said Iceland was focusing on transitioning entirely to hydro and geothermal power. Júlíusdóttir described Iceland's framework programme for evaluating geothermal and hydropower use, noting the similarities to the proposed sustainability protocol being developed by IHA.



Katrín Júlíusdóttir, Minister of Energy, Industry and Tourism, Iceland

Showing pictures of geothermal and hydropower generating stations across Iceland, Bjarni Bjarnason, Landsvirkjun Power, outlined Iceland's transition from fossil fuels to renewable energy sources. He noted that 80% of the country's power comes from geothermal and hydropower, and explained Iceland's research into deep drilling technology for geothermal power. Bjarnason acknowledged concerns about industrial activities, but noted that energy-intensive activities such as aluminum production are more sustainable when powered by renewable energy.

Philippe Cochet, Hydro Equipment Association, described the role that hydropower can play within the broader energy mix, emphasizing that the global demand for energy will more than double by 2030. He said hydropower expansion will be most significant in developing countries, and that this can complement other, less predictable renewables such as solar and wind power. He noted that although hydropower reservoirs are associated with the release of methane, this varies by region and mainly occurs in tropical areas with shallow lakes.

Hilary Onek, Minister of Energy and Mineral Development, Uganda, discussed pathways to sustainability in hydropower development. Noting that Africa has adequate energy



L-R: Bjarni Bjarnason, Landsvirkjun Power; Philippe Cochet, Hydro Equipment Association; and Hilary Onek, Minister of Energy and Mineral Development, Uganda



Conference participants asking questions during the opening session

resources, he said these are currently underutilized. Regarding the potential use of hydropower in Africa, he said there are over 700 rivers in Africa of varying sizes, and that the Congo, Victoria, Nile and other rivers could be developed for hydropower. Providing examples of attempts to sustainably manage water resources, he highlighted legislative issues, and engineering, environmental and social concerns as common challenges.

Participants discussed the adoption of practices in the EU Water Directive by non-EU members such as Norway; hydropower project development in Uganda; and the economic viability and renewability of geothermal energy. In discussions about the length of time involved in hydropower project development, one participant noted that it would be useful to identify where bottlenecks occur, and another urged delegates to look at the integrated project management process in the IHA Sustainability Assessment Protocol.

ENERGY POLICY

Kadri Nassiep, South African National Energy Research Institute, facilitated the panel discussion on energy policy, highlighting the impact of the financial crisis on the renewable energy sector. He said smaller projects have been the most severely affected, but noted that hydro-technology is the most mature of conventional forms of renewable energy. He questioned why hydropower is not realizing its full potential and why pro-hydro policies are rare.

Christoph Frei, World Energy Council, underscored that the 15th Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC COP15) in Copenhagen in December is the most important energy conference of 2009, and discussed the increasing anticipated cost of carbon capture and storage (CCS) as well as the importance of energy conservation through increased efficiency. Frei stressed energy-water linkages and that the need for water security may outweigh energy security concerns. He urged delegates to consider the risks to energy production from potential water pattern changes.

Robin Martin Kåss, Deputy Minister of Petroleum and Energy, Norway, identified the global financial crisis as the biggest challenge to renewable energy development, calling it a "potential show-stopper." He suggested that recent energy price volatility has inhibited investors, particularly in developing countries, and said that investments in both renewable energy and distribution grid systems are necessary.



Kadri Nassiep, South African National Energy Research Institute



L-R: Christoph Frei, World Energy Council; Robin Martin Käss, Deputy Minister of Petroleum and Energy, Norway; Stefan Opitz, GTZ, Germany; Cédric Philibert, IEA; Stefan Schurig, World Future Council; and Christoph Winterbacher, Energy Globe

Calling for political leadership, he proposed that governments work towards creating predictable regulatory and taxation systems to facilitate project planning and financing.

Stefan Opitz, GTZ, Germany, brought attention to energy services, access to energy, and energy security. Opitz outlined strategies for responding to these challenges, including: risk reduction and diversification; promoting regional cooperation; creating enabling political, institutional, and legal frameworks; and strengthening capacity in developing countries. He stated that conventional hydropower will play an important role in meeting future energy needs, and emphasized the need to “tap the untapped potential” of energy efficiency.

Cédric Philibert, IEA, presented several future global energy scenarios, noting that small changes made now will have a significant impact by 2050. He described the “business-as-usual” scenario as unsustainable, with the largest emissions increases coming from the energy and transportation sectors. He said that emissions from the conversion of coal into liquid fuel will increase as conventional oil supplies are depleted, and said that global hydropower capacity has the potential to quadruple.

Stefan Schurig, World Future Council, called for a transition to a carbon-absorbing economy, with a focus on reducing energy demand and increasing bio-sequestration through reforestation, as opposed to technological solutions such as CCS. He emphasized that in order for renewable technology to be economically competitive, the true costs of burning fossil fuels must be internalized. He highlighted the benefits of introducing a feed-in tariff that guarantees a minimum price per unit of renewable energy delivered, noting that renewable energy now meets 15% of Germany’s total demand.

Christoph Winterbacher, Energy Globe, stressed that all of the proposed solutions will be required to switch to a renewable economy. He said the future challenge is to establish a balance between centralized and decentralized energy production. Winterbacher also highlighted the need for new market mechanisms to facilitate a shift to a renewable energy economy, and the need to ensure supply security.



A view of the room during the presentation by Cédric Philibert, IEA

In the ensuing discussion, delegates addressed: the importance of UNFCCC COP15 and the impending formation of the International Renewable Energy Agency for the renewable energy sector; the need to continue hydropower development at the national level; renewable solutions to supplying power to remote areas to alleviate poverty; the challenge of securing financing for hydropower activities due to high capital costs; the need for incentives for stronger investments; and the potential to upgrade existing hydropower plants.

WATER POLICY

The session on water policy, facilitated by Ger Bergkamp, World Water Council, addressed the challenges and potential policy solutions needed to guide the development and operations of hydropower generation.

Luis Berga, President of the International Commission on Large Dams, highlighted the interconnectedness of issues, including the lack of access to water, sanitation, electricity, and food for many people in developing countries, noting that these contribute to ongoing poverty.

Berga called for the adoption of integrated water resources management (IWRM) policies, energy efficiency activities, and increased water infrastructure and storage capacity, to develop a holistic strategy for addressing water and development.

Jian Hua Meng, WWF, described the causal chain linking the destruction of ecosystems with the services that they provide and with human livelihoods. He called for the conservation and restoration of ecosystem services, and emphasized the consideration of water quality, quantity and timing of flows. He said the location of hydro projects must be carefully considered, with adequate attention paid to demand-side management.

Henrik Larsen, DHI, noted that 40% of all water withdrawals in the US are for power generation, and encouraged reducing the water footprint of energy production. He said that while wind power has the lowest water footprint of all energy types, that of biofuels is exceptionally high, and hydropower lies between these two extremes. He said climate change and increased energy demand must be considered in future water scenarios, and encouraged cross-sectoral collaboration.



Ger Bergkamp, World Water Council



L-R: Alan Vaz Lopes, National Water Agency, Brazil; Haakon Thaulow, Norwegian Institute for Water Research; Jian Hua Meng, WWF; Peter Lee, International Commission on Irrigation and Drainage; Henrik Larsen, DHI; Luis Berga, President of the International Commission on Large Dams; and Reza Ardakanian, UN-Water Decade Programme on Capacity Development



Participants during the panel discussion on "Water Policy"

Haakon Thaulow, Norwegian Institute for Water Research, highlighted the need to balance hydropower demands and increased water storage with impacts on aquatic environments. He suggested solutions, including looking at hydropower in the context of river basins, as well as designated reservoirs for peak power production in Europe.

Peter Lee, International Commission on Irrigation and Drainage, stressed that food production is the biggest user of water. On potential ways to increase water storage, Lee stressed that agriculture can use non-potable water, and that food can be stored and traded more effectively than the water that is required to produce it. He called for integrated and smarter water, land, food and energy policies.

Alan Vaz Lopes, National Water Agency, Brazil, discussed the challenge of promoting sustainable and multiple uses of water resources, including the need to reconcile hydropower expansion with other water infrastructure projects, such as navigation and flood control, and to allocate water efficiently in order to meet energy demands, consumptive water uses and environmental flows.

Reza Ardakanian, UN-Water Decade Programme on Capacity Development, discussed the UN's interagency efforts to strengthen capacity development, including knowledge production, management, delivery, and evaluation. He stressed the importance of assessing capacity needs, activities and gaps, and developing knowledge-sharing tools. He also suggested that the integration of knowledge development must occur within universities, and called for interdisciplinary curriculum development.

In ensuing discussion, participants discussed the "water footprint" concept, and considered the amount of water used in food production and lost to evaporation from reservoirs. Caution was called for in allocation a single water footprint value to any one activity, as this did not reflect the reality of the real world. Participants also considered increasing the efficiency of current energy generation systems and the potential role of groundwater in meeting agricultural water needs. Panelists disagreed on taking supply- versus demand-side approaches to energy and water management, with one noting that end users must be involved in allocation and use decisions.

HYDROPOWER AND CLIMATE CHANGE

Michael Fink, IHA, facilitated the session on hydropower and climate change. Halldór Björnsson, Icelandic Meteorological Office, suggested that flexibility must be built into any coherent strategy for the energy sector for it to respond to uncertain conditions and to the unforeseen challenges from both environmental and social changes. He called for the adoption of a portfolio of policies, ranging from those that are "win-win" and not associated with significant costs, to policies that may require more significant trade-offs and difficult decisions.



L-R: Halldór Björnsson, Icelandic Meteorological Office; Sten Bergström, Swedish Meteorological and Hydrological Institute; David MacKenzie Crean, Hydro Tasmania; Mark Smith, IUCN; and Oluf Ulseth, Statkraft

Sten Bergström, Swedish Meteorological and Hydrological Institute, commented that the climate is changing but that society is changing more quickly, and said that flexibility must be a buzzword for planning. He suggested the use of multiple climate change scenarios, continuous dialogue with scientists, the incorporation of extra margins into planning and design, and the adoption of flexible technical solutions.

David MacKenzie Crean, Hydro Tasmania, identified reduced water flows and changes in the timing of inflows as significant challenges for the hydropower sector. He encouraged the monitoring of climate change effects and the modeling of potential impacts using long-term forecasting tools. Crean suggested that the proportion of renewables in the broader energy mix be increased, and said strong government policy, increased international cooperation, and innovative financing from government and the private sector were needed.

Mark Smith, International Union for the Conservation of Nature (IUCN), described IUCN's Water and Nature Initiative and the development of a global network on environmental flows and encouraged the participation of the hydropower industry. He stressed that energy and water security are interdependent, and that basins must be managed to ensure resilience to climate change.

Oluf Ulseth, Statkraft, highlighted incentives provided by the EU's 2020 targets for the renewable energy sector, and the opportunities for both hydropower and new energy technologies. Ulseth stressed that hydro can only provide part of the solution, and encouraged the electrification of transportation, the development of increased storage capacity, and the interconnection of grids.

In the subsequent discussion, participants addressed: region-specific effects of climate change on precipitation; multi-purpose dams; economic modelling of the value of natural infrastructure; and the relative merits of guidelines from the World Commission on Dams and the IHA Sustainability Assessment Protocol.



Oluf Ulseth, Statkraft



L-R: Jeremy Bird, Mekong River Commission; Albert Geber de Melo, Electrical Energy Research Center, Brazil; Israel Phiri, Ministry of Energy and Water Development, Zambia; Shi Guoqing, National Research Centre for Resettlement, China; Dipak Gyawali, Former Minister of Water Resources, Nepal; and Jean-François Astolfi, EDF



Delegates asking questions during the session on "Hydropower Development"

HYDROPOWER DEVELOPMENT

In this session, facilitated by Roger Gill, Hydro Focus PTY, participants were encouraged to consider the greatest challenges in developing hydropower.

Jeremy Bird, Mekong River Commission, discussed the relationship between hydropower development, fisheries, and livelihoods. He said hydropower projects create potential barriers for migratory aquatic species, but also noted the opportunities they provide for power generation, development and economic growth. He emphasized the importance of strategic planning and of opening up dialogue among stakeholders, including citizens, private companies, and governments.



Roger Gill, Hydro Focus PTY

Jorge Machado Damazio, Electrical Energy Research Center, Brazil, outlined Brazil's institutional arrangements for hydropower development, including basing energy sales on an auctioning system, meaning that 100% of captive load is allocated under long-term contracts.

Israel Phiri, Ministry of Energy and Water Development, Zambia, discussed the role of his office in facilitating private sector involvement in hydropower development, and described a Zambian policy that encourages independent power producers as well as public-private partnerships.

Shi Guoqing, National Research Centre for Resettlement, China, described China's resettlement strategy, stating that China's 86,000 dams have displaced nearly 20 million people since 1949. He said that involuntary resettlement is part of national policy and has affected both rural and urban citizens. He said that social impact assessment and the provision of safeguards are key components of IHA's Sustainability Assessment Protocol, and will be used in future resettlement strategies.

Dipak Gyawali, Former Minister of Water Resources, Nepal, expressed concern over recent allegations of embezzlement by German contractors from a GTZ-funded dam project in Nepal. He attributed current levels of corruption to a lack of robust institutional structures. He described infrastructure projects as a "runaway technology phenomenon" with an unreflexive hydrologic focus that ignored social and environmental concerns. He urged the hydropower sector to engage with multiple stakeholders, including social critics and civic movements.

Jean-François Astolfi, EDF, described his company's attempts to implement market-oriented operation of hydropower plants, as well as its concentration on the refurbishment and upgrading of existing power plants. He also explained EDF's work in Laos on the Nam Theun II hydroelectric project and said involvement of the local population was key to the project's success.

In the ensuing discussion, delegates addressed: refurbishment of hydropower plants for supplying power during peak demand periods; the importance of the International Finance Corporation Performance Standards and the Equator Principles, and the complementary use of the sector-specific IHA Sustainability Assessment Protocol; the lack of power engineering capacity in developing countries; the need for local support of hydropower projects; the challenge relating to free, prior and informed consent from local communities before proceeding with projects; and concerns about the "hijacking" of the political process for hydropower development by powerful interest groups.

INVESTMENT AND FINANCING

Jean-Michel Devernay, IHA, facilitated the panel on investment and financing models. Identifying financing as the primary limiting factor in hydropower development, he encouraged panelists to consider how private sector interest can be generated, given the current global financial crisis.

Providing an overview of trends in energy resource financing, Angus McCrone, New Energy Finance, presented charts of asset investments in clean energy, attributing the recent downward turn in investments to the recent credit crunch. He noted the resilience of hydropower compared with other renewable energy sectors like solar and wind power.

Colin Clark, Brookfield Power Corporation, said long-term, high-value hydro projects with steady cash flows are attractive to investors, but cautioned that there are inherent risks at all



Colin Clark (center), Brookfield Power Corporation, addresses the conference



L-R: Gil Maranhão Neto, GDF Suez Energy, Brazil, and Lin Chuxue, China Three Gorges Project Corporation



L-R: Edvard Gudnason, Landsvirkjun Power, and Clare Rhodes-James, Mott MacDonald

stages of their development and operation. He outlined risk management strategies, including investing in areas with mature markets and stable regulatory regimes, and allocating risks to the parties with the capacity to control them.

Marcelo Campos Battisti, Banco Itau, said that institutional change within the financial sector is unavoidable and urgent. Noting that this is based on a heightened aversion to risky investments, he said that this now includes legal and reputational risks associated with social and environmental issues. He noted that such risks can be mitigated by following the Equator Principles.

Donal O'Leary, Transparency International, said that the 2008 Global Corruption Report featured a chapter on the hydropower sector, and lamented that the sector's heavy reliance on contractors and consultants has led to high levels of corruption, which often undermines local support for projects and contributes to reputational risks. He noted that these risks can be offset through the use of anti-corruption "integrity pacts" between developers and bidding contractors, overseen by independent monitors.

Gil Maranhão Neto, GDF Suez Energy, Brazil, noted that the classic model of using developing banks for financing is becoming exhausted. He explained that there is limited participation of private banks in Brazil, due to inflationary inheritance. Maranhão said that Brazil needs to adapt its regulatory framework to decrease business risks, and to better allocate risks to ensure funders are attracted to projects.

Lin Chuxue, China Three Gorges Project Corporation, explained that the Three Gorges project was partially funded by an injection of capital from the Chinese government and a long-term policy loan from the China's State Development Bank. He said that between 2003 and 2008 the project had recovered one-third of its investment in the form of depreciation and profit.

During discussion, participants addressed: risk management; the merits of investing in a company as a whole, as opposed to individual projects; corruption as a reputational risk; new anti-corruption measures introduced by India's Supreme Court; the impact of political instability on hydropower development; the need to manage risks early in the project cycle and to allocate risk carefully; and the potential for corruption risk assessments.

solution as they allow for risk-sharing, with the public sector partner taking the development risks and the private sector partner taking the operation and construction risks.

Knut Vrålstad, SN Power, discussed the EU Emission Trading System (ETS) Linking Directive, which sets criteria on the sustainability and size of dams. He recommended avoiding layers of decision-making, saying that UNFCCC approval should be considered sufficient, and that Linking Directive restrictions on hydropower projects under the Clean Development Mechanism (CDM) should be removed in the post-2012 climate change agreement.

Edvard Gudnason, Landsvirkjun Power, said the main challenge facing the hydropower sector is the need to demonstrate that hydropower is sustainable. He outlined efforts in Iceland to assess the carbon footprint of hydropower production, and noted that Landsvirkjun has achieved international environmental certification for its hydropower production. He stressed that debates on sustainability, particularly for contentious projects, must include both hydro producers and consumers.

Clare Rhodes-James, Mott MacDonald, noted that hydropower is economically viable but that perceived risks in project development are stopping projects from moving forward. Presenting long-run costs of different energy sources, she suggested taking advantage of the current market opportunities for hydropower. She noted that lengthy deadlines in project development dissuade financing, and offered recommendations for developing the sector, including encouraging regulatory stability in the carbon market.

Reginald Hernaus, Ministry of Environment, the Netherlands, and the UN Designated National Authorities Forum, said the central challenge for the hydropower sector is to convince the international community, particularly negotiators of a post-Kyoto climate change regime, that hydropower is sustainable. He suggested IHA increase its outreach activities and promote the revised Hydropower Sustainability Assessment Protocol.

Marzena Chodor, European Commission, discussed the challenges for CDM and Joint Implementation hydropower projects to comply with the directives of the European



L-R: Marzena Chodor, European Commission; Reginald Hernaus, Ministry of Environment, the Netherlands and Designated National Authorities Forum; and Knut Vrålstad, SN Power

MARKETS

Øivind Johansen, Ministry of Petroleum and Energy, Norway, facilitated the session on hydropower markets. Raghuvver Sharma, World Bank, described challenges for hydropower markets, including weak economies, a lack of technical and managerial capacity, and policy changes. He stressed that public-private partnerships offer a potential

Emissions Trading Scheme (ETS). She noted that projects in the pipeline registered before 2012 would be included under existing carbon credit trading arrangements, but that new projects might not be eligible for credits under the ETS unless they are developed in countries listed in the UN register of Least Developed Countries (LDCs).

Paul Soffe, EcoSecurities, said that hydropower projects are being demonized in climate policy arenas and that many buyers will no longer buy hydro carbon credits. He urged the hydropower industry to lobby the US and individual EU governments to convince them of the sustainability of hydro projects.

Panelists and participants discussed: the role of governments and secure investment environments in attracting financing; the similarity in challenges faced by governments and private companies; the lack of CDM projects in LDCs; and the World Bank's strategies and requirements for funding and planning infrastructure projects. One panelist said that hydropower development will depend in part on the outcomes of regional and international climate change negotiations with respect to carbon markets.

HYDROPOWER AND GREENHOUSE GASES

On the issue of greenhouse gas (GHG) emissions from freshwater resources, Luiz Pinguelli Rosa, Federal University of Rio de Janeiro, provided an overview of reservoir emission types, including bubble, degassing and downstream emissions. In the ensuing panel discussions, panelists addressed: the process of methane release from reservoirs into the atmosphere through sediment and the water column; the importance of measuring the seasonal variation in emissions, and the benefits of continuous measurement; the Electric Power Sector Protocol and the Climate Change Registry; and the use of models as tools for the assessment of GHG emissions from reservoirs.

On the progress made so far in assessing net GHG emissions, Alain Tremblay, Hydro Québec, described the preliminary results of research on hydropower reservoirs in the boreal region. He explained that net emissions are measured by comparing the gross emissions from a natural ecosystem with the emissions from a reservoir at the same site. Noting the public perception that all reservoirs emit GHGs, he said the study showed a rapid return of methane and carbon dioxide emissions to natural levels.

Panelists presented research from Brazil, Norway, the US, and Laos, showing that: in many cases reservoirs act as carbon sinks; emissions from reservoirs are lower than from thermal power plants; methane emissions decrease with reservoir age; and carbon sedimentation sequesters more carbon than is emitted at the reservoir surface. They noted the importance of this research for hydropower development and policy.



Luiz Pinguelli Rosa, Federal University of Rio de Janeiro

Joel Goldenfum, IHA, provided an overview of the UNESCO/IHA GHG Research Project, noting its aim of gathering data on emissions from a diverse and representative sample of the world's reservoirs. He highlighted that this is an issue currently before the Intergovernmental Panel on Climate Change (IPCC), and that the CDM excludes certain hydro projects. He said the project includes a scientific forum of 140 experts and operates by consensus.

Panelists discussed the project, and recommended learning from GHG inventory methods employed by other industries, such as forestry, and gathering data from both old and new reservoirs. One panelist described a project in Laos, saying that measurement of soil carbon is labor intensive, and that the project examined carbon dioxide, methane and nitrous oxide emissions. Participants discussed the need for a marketing campaign to counter publications claiming that all reservoirs emit copious amounts of GHGs, and to maintaining a degree of freedom in the measurement methodologies put forward by the UNESCO/IHA GHG Research Project in order to allow for innovation and efficient data collection.

VIDEO MESSAGE FROM RAJENDRA PACHAURI

Rajendra Pachauri, IPCC, addressed IHA participants via a pre-recorded video. He highlighted the potential impacts of climate change on water flows and predicted intensified competition for water resources in the future and consequent challenges for the hydropower sector. He noted the need to invest in adaptation, and said more research is needed on region-specific impacts of climate change. He emphasized the importance of mitigation, calling for the setting of a price on carbon and for government involvement in creating incentives for new technology and investments in renewable energy.

DAM SAFETY AND THE WENCHUAN EARTHQUAKE

Chen Houqun, China Institute of Water Resources and



Chen Houqun, China Institute of Water Resources and Hydropower Research

Hydropower Research, described the effects of the 2008 Wenchuan Province earthquake on the region's 864 hydropower stations. He said that even though the intensity of the earthquake exceeded the specifications to which many of the dams were built to withstand, no major damage occurred. He said accusations that the earthquake was triggered by the weight of the nearby dam reservoir or the Three Gorges Dam were scientifically indefensible.

SUSTAINABILITY STANDARDS

Introducing the session as a chance for the hydropower industry to learn and benefit from experiences in other sectors, facilitator Stephanie Meyer, Stratos Inc., highlighted sustainability as a key theme of the IHA Congress. She noted the speed of the development and adoption of sustainability standards, noting that these were often driven by high-profile incidents, such as chemical spills and tailings dam breaches.

Marion Karmann, Forest Stewardship Council (FSC), introduced the background and standards development processes of the FSC, highlighting its goals of promoting



Marion Karmann, FSC

environmentally appropriate, socially beneficial, and economically viable forest management. Emphasizing that the FSC's main asset is its credibility, she outlined lessons the FSC could share with IHA, including the importance of: local, national, and international dialogue; transparent, inclusive standard-setting processes; balanced multi-stakeholder group engagement; realistic expectations;

and patience. In response to a question about the application of the principle of free, prior and informed consent in the forestry sector, Karmann said she was not certain it has been met in all cases, but that there are efforts to include local communities in forest management and the designation of high conservation value forests.

Chris McDonnell, Tembec, provided a forest sector perspective on sustainability standards. He discussed partnerships, stakeholder engagement activities, aboriginal relations, engagement with external wood fibre suppliers, and research and innovation. McDonnell highlighted the need to obtain a "social license" to operate, and said that in order to maintain this license companies must prove they are continually working towards sustainability. He said the benefits of maintaining a social license included broad market access for forest products, as well as strong customer support and loyalty.

Liz Wilks, Antalis International, described sustainability practices in the paper industry. She said the industry has a long history of raising environmental awareness, but has more work to do on communicating and formalizing this work. Regarding responsible procurement, she said her firm endeavored to deal with suppliers that demonstrate environmental and social responsibility. Wilks also said that industrial wood, pulp and paper production saves forests, and that paper is a fully renewable and sustainable resource.

Joerg Hartmann, WWF, emphasized the importance of credibility in sustainability standards across sectors, and said these standards must: be science-based; use measureable performance indicators; have clear boundaries for what they assess; be practical and financially viable to use; and consider the process as well as the outcome. He noted that standardization is not always the first choice for improving environmental and social performance, since it can be resource intensive and time consuming to negotiate agreed-upon standards, but emphasized that it is valuable for building a broad consensus among diverse stakeholders and is needed for third party verification processes.

Outlining DNV's work in providing certification assistance across sectors, Wenche Grønbekk, DNV, said that standards must be credible, affordable, value-adding, practical, and meaningful. Grønbekk described the outcomes of testing the IHA's Sustainability Assessment Protocol, and said the Protocol not only acts as a sustainability assessment tool, but also increases transparency by focusing on communication with stakeholder groups and on the documentation of environmental and social impact assessments.

Werner Schmied, Oesterreichische Kontrollbank AG (OeKB), explained that OeKB offers export financing and credit guarantees. He described the multiple sets of standards that export credit agencies must consider, including those from



L-R: Wenche Grønbekk, DNV, and Werner Schmied, OeKB

the World Bank, the International Finance Corporation, the Organisation for Economic Co-operation and Development (OECD), regional development banks, and the Equator Principles, along with sector-specific guidelines.

Panelists and participants discussed: the need for standards to establish a "level playing field"; the effectiveness of voluntary standards in managing reputational risks; the role of independent third party validation; the need to avoid a multiplicity of standards; certification of projects versus certification of governments; and certification as an agent of positive change as opposed to a tool to sanction status quo practices.

ENERGY SUSTAINABILITY INITIATIVES

Andrew Catchpole, IHA, facilitated the session on renewable energy sustainability initiatives. Panelists presented the challenges facing various renewable energy sectors and considered lessons that could be shared.



Andrew Catchpole, IHA

Nadine McCormick, IUCN, described IUCN's activities in assessing the ways in which energy options impact the environment and how ecosystems provide energy services. Commenting that, as with biofuels, there are many types of hydropower, McCormick said the challenge is to show that hydropower has the potential to be sustainable, and to distinguish between good and bad sources. She noted that policies on biofuels preceded scientific knowledge, but that lessons can be learned from past experiences in the agricultural and forestry sectors. She described the outreach and consultation efforts of the Roundtable on Sustainable Biofuels in its work to develop sustainability guidelines, and listed its consideration of cumulative and indirect impacts, implementation, government involvement, and strategic land-use planning in the process.

Gudni Jóhannesson, Icelandic National Energy Authority, outlined the role of the National Energy Authority in leading research and development of renewable energy sources, advising the government on energy issues, and licensing the exploration and exploitation of energy, hydrocarbons, and mineral resources. He remarked that "everybody wants a piece of Iceland these days," adding that demands from tourism and for undisturbed landscape can conflict with hydropower development.

Noting that it can take several years to learn about specific geothermal sites, Gudni Axelsson, Iceland GeoSurvey, suggested that stepwise development of geothermal resources be undertaken. He said that geothermal energy can be used

sustainably, but the question is how to do this, and noted that one strategy for this involves alternating cycles of use and recovery.

Monica Oliphant, International Solar Energy Society, said standardized methodologies to assess and optimize solar technology would be beneficial, and noted the importance of developing grid integration policies. She identified the need to promote a mix of sustainable energy sources, and highlighted the Renewable Energy Alliance as a forum for integrating the various renewable energy sectors.

Khempheng Pholsena, Minister of the Water Resources and Environment Administration, Laos, highlighted that the Government of Laos is using the experience of the Nam Theun II dam project as a model, and said that environmental and social safeguards ultimately lead to improved public expenditure management. She advocated taking an integrated approach, considering projects in the context of a basin-wide framework with due consideration given to other sectors such as fisheries and agriculture. She noted the need to empower local people and strengthen their sense of ownership over hydro projects.

David Gibb, Voith Hydro, cautioned that a rush to develop standards and legislation could prevent the development of technology in the renewable ocean energy sector. He said that technology needs to be appropriate for ecologically sensitive environments, and suggested that uncertainty concerning environmental impacts of new renewable energy technologies should not delay the development of small pilot projects.

Participants addressed measurements of the value of environmental services, water use for irrigation, and risk reduction through multiple markets for agricultural products and the implications of this for biofuel. Panelists also responded to questions on: the potential resistance to renewable energy sectors as they scale-up production; geothermal energy capacity; the role of legislation; the need for renewable energy sectors to work together; osmosis as a new source of renewable energy; and adding value to energy production.

HYDROPOWER SUSTAINABILITY ASSESSMENT FORUM

Helen Locher, IHA, facilitated the session and explained that the Hydropower Sustainability Assessment Forum (HSAF) is a collaboration of representatives from various sectors who aim to develop a broadly endorsed sustainability assessment tool to measure and guide performance in the hydropower sector. She explained that Forum members are jointly reviewing and recommending enhancements to the IHA Sustainability Assessment Protocol, released in 2006.

David Harrison, TNC, explained that his organization's aspirations for the HSAF included widespread improvement in the hydropower sector in the consideration of environmental flows and the use of integrated planning. Kirsten Nyman, GTZ, stressed the main challenge facing the HSAF was to achieve a balance between the dual needs of specificity and broad applicability. Israel Phiri, Ministry of Energy and Water Development, Zambia, said he looked forward to the Protocol creating a level playing field, and stressed that it needs to be relevant to Africa. Describing his aspirations for the Protocol, Andrew Scanlon, Hydro Tasmania, looked forward to a self-sustaining continual improvement process that manages assessment and certification.

Michael Simon, Oxfam, stressed the need for the involvement of indigenous people and dam-affected people. He also urged delegates to apply and implement the Protocol. Locher, on behalf of Daryl Fields, World Bank, outlined the major challenges facing the HSAF, including the need to address complexity and make the Protocol complete, understandable and acceptable.

Locher then asked the panelists to address three questions related to the HSAF and the Protocol. On the progress of the Forum, Nyman said work is continuing and that the participation of the Forum's many stakeholders has been reflected in a new draft of the Protocol, making it more comprehensive. Phiri and Scanlon agreed with Nyman, and added that the work completed requires testing. Scanlon noted the challenge of balancing specificity and objectivity with flexibility and subjectivity.

On priorities for finalizing the Protocol, Simon and Harrison commented that stakeholder consultations are needed for the draft Protocol, and that basin-specific field trials of the Protocol will be critical.

Regarding what successful implementation of the protocol would look like, and how it could be gauged, Harrison said this would depend on the uptake of the tool, particularly by non-IHA members and the NGO community, and Simon agreed that successful implementation would involve a broad range of stakeholders taking on the Protocol. Harrison said a good indicator of success would be if the Protocol becomes "relatively invisible but pervasive" in project planning. Scanlon noted that one test would be whether it is seen by industry as adding value, and whether, in practice, it raises the performance of the hydropower sector.

Discussions among panelists and participants addressed: the potential lessons that could be learned from the EU Water Framework Directive; river basin planning and the strategic environment; the advantages of a sector-specific, multi-stakeholder-informed, industry-supported standard; the compatibility of the Protocol with other assessment standards; if the Protocol can help projects become more timely as well as more sustainable; and whether the use of the tool would be expensive or time consuming. One industry participant commented that the 2006 version of the Protocol had been useful, and noted interest in the updated version.

Participants and panelists also considered how the Protocol takes into account specific basin contexts, including local and national laws and regulatory regimes. Scanlon noted that the HSAF worked to build flexibility for different circumstances into the Protocol and its performance measures, and Nyman said more input on addressing national contexts in the tool would be helpful. On whether there has been consideration of the transformation of the Protocol into a certification system



Panel of the session on "Hydropower Sustainability Assessment Forum"

or process, Scanlon suggested that a possible second phase for the HSAF would be to develop a fully functioning certification scheme.

CLOSING SESSION AND IHA GENERAL MEETING

Refaat Abdel-Malek, IHA, facilitated the closing session and the IHA General Meeting.

Summary reports: Lau Saili, IHA, summarized the water, energy and climate change sessions. Noting that water, energy and climate change challenges are converging, he explained that the hydropower sector lies at the nexus of these issues. On water and climate change, Saili pointed to the importance of hydropower in IWRM. On energy and water, he underscored the importance of hydropower to the security of both, and on the climate-energy nexus, he discussed the important role of the hydropower sector in carbon footprinting and carbon markets.

Jean-Michel Devernay, IHA, summarized the sessions on markets and investments and the seminar on greenhouse gases. On investments and finance, he said interactive discussions focused on risk management. Devernay explained that the markets session had focused on the importance of the outcome of the UNFCCC COP15 negotiations. Regarding the greenhouse gas seminar, he highlighted the interactive discussions focused on the need for further research for hydropower development and policy.

Roger Gill, IHA, reflected on the sustainability discussions, saying that many people thought they came to the Congress to discuss the business of hydropower, but discovered they were “here to discuss the sustainability of the world.” He said that times had changed, from when only “very brave” NGOs would attend meetings to the current multi-stakeholder process, and encouraged further engagement with a range of stakeholders. He lauded the Renewable Energy Alliance and the work of the Forum, and urged continued efforts in change management and capacity development. He concluded by saying that sustainability provides the key for the challenge of making a “quantum leap” in hydropower for the future.

IHA General Meeting: Abdel-Malek announced that the Three Gorges Corporation, the Hydro Equipment Association, and Statkraft had upgraded their IHA memberships to that of Platinum Sponsor.

Terry Moss, IHA, presented the Report of the Governance Committee, which included an overview of reviews of the governance framework, membership fee structure, finances, and monitoring of the performance of the IHA Board of Directors. He announced that no changes had been proposed for the constitution and bylaws, noting that periodic reviews would be continued, and that a new membership structure had been adopted based on the recommendations of an *Ad hoc* committee. Regarding future Congresses, Moss outlined changes being made to the decision process for choosing hosts and proposed venues, including plans for earlier announcements of future meeting locations. He described ongoing evaluations of the Board, including how it presents itself to stakeholders, and noted that the Board strives to be reflective of the organization in way that inspires pride in its members.

Moss presented the election procedure schedule and candidate profiles for the 2009 Board elections. He highlighted that 7 September 2009 is the deadline for submitting ballots, and said the Board would hold its first



L-R: Jean-Michel Devernay, Vice-President, IHA; Roger Gill, Vice-President, IHA; Terry Moss, Vice-President, IHA; and Michael Fink, Programme Director, IHA

meeting from 22-23 October 2009. He then presented the following candidates for election: Refaat Abdel-Malek, MWH Global, Inc.; Kenneth Adams, Manitoba Hydro; Bjarni Bjarnason, Landsvirkjun Power; Antonio Cardoso, Itaipu Binacional; Andrew Catchpole, Hydro Tasmania; Colin Clark, Brookfield Renewable Power; Philippe Cochet, Alstom Hydro Power; Jean-Michel Devernay, EDF; S.K. Garg, National Hydroelectric Power Corporation Ltd. (NHPC); Roger Gill, Hydro Focus PTY; Dominic Godde, E.ON Wasserkraft; Jon Ulrik Haaheim, Statkraft; Rasim Khaziakmetov, JSC RusHydro; Lin Chuxue, China Three Gorges Project Corporation; Gil Maranhão Neto, GDF Suez Energy; Terry Moss, ESKOM Holdings; Roland Münch, Voith Hydro; Israel Phiri, Ministry of Energy and Water Development, Zambia; Yogendra Prasad, NHPC; Nadia Sood, SN Power; and Myriam Truchon, Hydro Québec.

Abdel-Malek thanked outgoing board member Janak Lal Karmacharya, Clean Energy Development Bank, Nepal.

Michael Fink, IHA, explained voting procedures for the Board elections and presented the IHA Activity Report. Showing the pre-audit financial reports for the past fiscal year, and announcing a budget surplus, he thanked Kate Steel, IHA, for her work as membership coordinator, noting that membership funds had increased. He described IHA's involvement in water and energy policy, climate change, and sustainability initiatives, including its participation in the fifth World Water Forum and high-profile renewable energy conferences, as well as work with CDM methodologies planning, the European ETS, the IPCC, the UNESCO/GHG Project, and the International Renewable Energy Alliance. Fink also mentioned IHA's intention to continue with the IHA Blue Planet Prize. On markets and investment, he highlighted continuing efforts to work with the financial sector, provide up-to-date information for policy development, and increase communication with and outside of IHA's membership.

Closing remarks: Richard Taylor, IHA, thanked delegates, Landsvirkjun Power, the 40 partner organizations, the IHA Board, and the President of Iceland for contributing to the success of the Congress.

Refaat Abdel-Malek, IHA, underscored that IHA is an organization that confronts issues related to hydropower. He thanked Taylor for his dedication to IHA and to the staff of the IHA Central Office. He promised participants that IHA would continue to be proactive, and noted IHA's work would not be possible without the support of its members. He invited delegates to the closing dinner. In the evening, participants attended a banquet at the Perlan Restaurant, which is situated in a large glass dome on top of geothermal tanks, overlooking Reykjavik. Participants were addressed by Ólafur Ragnar Grímsson, the President of Iceland on the importance of hydropower and the need to invest wisely in all the renewable technologies.

UPCOMING MEETINGS

SECOND SESSION OF THE PREPARATORY COMMISSION OF THE INTERNATIONAL RENEWABLE ENERGY AGENCY (IRENA):

This meeting is scheduled to convene from 29-30 June 2009 in Sharm El Sheikh, Egypt. During its second session, the Preparatory Commission will determine the Agency's interim headquarters and its Interim Director-General. For more information, contact: e-mail: info@irenaegyptconf.net; internet: <http://www.irenaegyptconf.net/>

2009 WORLD WATER WEEK: This meeting will meet 16-22 August 2009 in Stockholm, Sweden, hosted by the Stockholm International Water Institute, and organized around the theme: "Responding to Global Change: Accessing Water for the Common Good." For more information, contact: tel: +46 (0)8 522 139 60; fax: +46 (0)8 522 139 61; internet: <http://www.worldwaterweek.org/>

WATER UTILITIES AND LAW: This meeting will convene from 3-4 September 2009 in Dundee, Scotland, organized by the UNESCO Centre for Water Law, Policy and Science at the University of Dundee. Participants will address the role of law in promoting appropriate policies, structural design and regulatory solutions in order to meet the Millennium Development Goals target of reducing the proportion of people without access to sustainable, safe drinking water by half. For more information contact: tel: +44 1382 384451; fax: +44 1382 388671; e-mail: water@dundee.ac.uk; internet: <http://www.dundee.ac.uk/water/news/waterutilities.php>

GLOBAL RENEWABLE ENERGY FORUM 2009:

This meeting will convene from 7-9 October 2009 in León, Mexico, co-organized by the Ministry of Energy of Mexico and the United Nations Industrial Development Organization (UNIDO). The Forum seeks to promote dialogue to strengthen interregional cooperation and encourage innovative multi-stakeholder partnerships aimed at scaling up investments in renewable energy. For more information contact: Pradeep Monga, UNIDO, tel: +43 1 26026 3018; e-mail: GREFMexico2009@unido.org; internet: <http://www.unido.org/index.php?id=7341>

ISES SOLAR WORLD CONGRESS 2009: This meeting is scheduled to take place from 11-14 October 2009 in Johannesburg, South Africa, under the theme of Renewable Energy Shaping Our Future. For more information, contact: tel: +27 12 807 7171; fax: +27 12 807 7191; e-mail: info@swc2009.co.za; internet: <http://www.swc2009.co.za/>

FIRST INTERNATIONAL SMALL HYDROPOWER CONFERENCE FOR NEW DEVELOPMENT, RENOVATION AND REVITALIZATION:

This meeting is scheduled to convene on 27 November 2009 in Salzburg, Germany. For more information, contact: tel: +43 66 282 2635; fax: +43 66 282 26 47; e-mail: info@reeco.at; internet: <http://www.reeco.at>

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, COP 15 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/>

COMMISSION ON SUSTAINABLE DEVELOPMENT

18TH SESSION (CSD-18): This meeting will be held 3-14 May 2010 at UN Headquarters, New York, US. This review-year session will evaluate progress and identify constraints to implementing the issues on the thematic cluster for the CSD 18-19 cycle: transport, chemicals, waste management, mining and the Ten-Year Framework of Programmes on Sustainable Consumption and Production Patterns. For more information, contact: UN Division for Sustainable Development; tel: +1-212-963-8102; fax: +1-212-963-4260; e-mail: dsd@un.org; internet: <http://www.un.org/esa/dsd/>

XXI WORLD ENERGY CONGRESS: This meeting is scheduled to convene 12-16 September 2010 in Montreal Canada, with the theme "Energy Transition for a Living Planet." Focused on energy accessibility, availability, acceptability and accountability, it is geared towards energy professionals from industry, governments, international organizations, universities, and industry associations. For more information, contact: tel: +1 514 397 1474; fax: +1 514 397 9114; internet: <http://www.wecmontreal2010.ca/>

FOURTH INTERNATIONAL RENEWABLE

ENERGY CONFERENCE (IREC): This meeting will take place 25-26 October 2010 in New Delhi and Uttar Pradesh, India, and is the fourth global ministerial level conference on renewable energy. It will consist of a ministerial meeting, business-to-business and business-to-government meetings, side events (symposiums, sectoral seminars and workshops) and a trade show/exhibition. For more information, contact: e-mail: ss.madan@nic.in; internet: <http://mnes.nic.in/pdf/irec-mnre.pdf>

GLOSSARY

CCS	Carbon Capture Storage
CDM	Cleaner Development Mechanism
GHG	Greenhouse Gas Emissions
ETS	Emission Trading Scheme
HSAF	Hydropower Sustainability Assessment Forum
IHA	International Hydropower Association
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water Resources Management
LDCs	Least Developed Countries
	http://www.un.org/special-rep/ohrlls/ldc/list.htm