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# IHA World Congress Bulletin

## A Daily Report of the IHA World Congress 2011

Published by the International Institute for Sustainable Development (IISD) in collaboration with the International Hydropower Association (IHA)

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### IHA WORLD CONGRESS HIGHLIGHTS: WEDNESDAY, 15 JUNE 2011

On Wednesday morning, participants gathered for the opening session of the International Hydropower Association (IHA) World Congress on Advancing Sustainable Hydropower. Throughout the day they heard presentations, panel-led discussions and attended parallel sessions. In the evening, participants shared a full moon dinner at Iguacu Falls.

#### OPENING SESSION: HYDROPOWER PERSPECTIVES

Refaat Abdel-Malek, IHA President, and Jorge Samek, CEO, Itaipu Binacional, welcomed participants to the IHA World Congress. Samek underscored the compatibility of environmental care, economic development and energy provision. Abdel-Malek invited panelists to discuss the themes of sustainable development of hydropower, financing challenges and communication.

Noting the growth of energy demands in Brazil, Flávio David Barra, Andrade Gutierrez, called for regional integration to take advantage of hydropower potential.

José da Costa Carvalho Neto, CEO, Electrobras, expressed concern that the hydropower sector has “lost the war of communication,” explaining that a “small percentage” of people against hydropower speak more loudly than the majority in support of hydropower.

Describing hydropower as a clean and renewable energy source, Antonio Miguel Marques, CEO, Camargo Correa S.A., encouraged discussion and debate to “create a conciliation of interests” where hydropower ventures could be implemented with lower environmental and community impacts.

Henrique Valladares, CEO, Odebrecht Energia, noted that the Hydropower Sustainability Assessment Protocol recognizes that development, sustainability and competitiveness are inseparable, rather than competing goals in energy generation.

Manoel Zaroni Torres, CEO, Tractebel Energia S.A., encouraged participants to reflect on the trade-offs between reducing reservoir size to minimize local impacts and the stored energy gained by increasing reservoir size, and to consider social networking tools for communication.

Stating that hydropower can be a “vector” for both environmental preservation and sustainable regional development, Mauricio Tolmasquim, CEO, Federal Energy Planning Company, Brazil, provided the example of the Belo Monte project that aims to provide social and environmental benefits to the surrounding communities.

Márcio Zimmermann, Deputy Minister of Mines and Energy, Brazil, noted that his country has opted to use hydropower as its main source of energy. He highlighted the implementation of rigorous environmental protection legislation for hydropower projects, and the social benefits of using local labor for construction.

#### PRESS CONFERENCE

Deputy Minister Zimmermann responded to queries by journalists on the future of the Brazilian energy matrix, and the balance between development goals and environmental and social costs of energy production. He highlighted Itaipu as a good example of implementation of sustainability criteria. He

further emphasized that the Belo Monte project in the Amazon will provide jobs and skills to thousands of people in a poverty-stricken region. He described work on energy efficiency policies, and highlighted Brazil’s electric energy procurement through auctions, noting wind-power energy producers are growing and flourishing even under competitive price conditions.

#### WORLD ENERGY COUNCIL PRESENTATION

Norberto Medeiros, President, World Energy Council, Brazil, outlined the 2010 Congress held in Canada, which concluded that sustainable energy growth is a necessity. He stressed the importance of international cooperation as traditional energy sources become scarcer and emphasized constructive dialogue across sectors.

#### INTEGRATING WATER AND ENERGY POLICIES

Moderator Aileen Anderson, Crossflow Consulting, introduced the interactive session chaired by Antonio Cardoso, Itaipu Binacional, who underscored the challenges involved in developing projects that share water and energy.

On competition between energy and water demands, Shahid Hasan, Associate Director, The Energy and Resources Institute (TERI), described trends in India, and called for the development of a framework of policies and regulations and greater civil society input to support integrated energy and water planning.

Mark Smith, Head, Water Programme, IUCN, noted many “natural infrastructure” services are related to water and stressed the role of a “portfolio” of natural and built infrastructure in climate-resilient sustainable development.

Addressing the challenges posed by uncertainty associated with climate change, Friedrich Hetzel, Senior Technical Advisor, German Ministry for Economic Cooperation (BMZ), underscored the need for long-term, flexible and “multi-parameter” planning for energy provision, and called for improved cross-sectoral policy coherence.

Lin Chuxue, Vice President, China Three Gorges Corporation, said that infrastructure with water storage capacity is important as dams can be multi-purpose, noting the Three Gorges Dam is used for flood control, improved irrigation and electricity generation and also contributes to climate change mitigation and adaptation.

Albert Geber de Melo, General Director of the Electric Energy Research Center (CEPEL), explained the stages in the Brazilian legal framework for planning and designing hydropower projects, including new requirements related to integrated environmental assessment for river basins.

Participants and panelists considered priority setting in cases of multi-purpose projects and the added value of the recently approved policy in Brazil for integrated impact assessments for whole basins, rather than for individual projects. An indigenous representative questioned the process for stakeholder consultation in the Xingu river basin. In closing, the panel highlighted the importance of engaging all actors in multi-stakeholder processes.

#### CLIMATE CHANGE: WHAT DOES HYDROPOWER OFFER?

In the afternoon, Reginald Hernaus, Ministry of the Environment, the Netherlands, chaired a panel on “Climate change: what does hydropower offer?” moderated by Lau Saili,

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IHA. Bjørn Lomborg, Director, Copenhagen Consensus Center, argued that climate change is real but said its effects are vastly exaggerated and one-sided, which leads to panic and poor decision-making. With examples including greening cities to reduce heat deaths, he said the most effective solutions might not be emissions reductions but rather adaptation strategies. He encouraged investment in green energy research and development, rather than cutting carbon emissions, as this would lead to a price-driven transition to clean energy sources.

Questions from the audience addressed: the role of economic incentives like carbon pricing for promoting research and development; the need to support the deployment of existing green energy technology; and how to best deal with climate change, whether through mitigation or adaptation.

Joan MacNaughton, Senior Vice President, Power and Environment, Alstom Power, highlighted the necessity of both mitigation and adaptation for natural disasters. She called for: hydropower generation capacity to double by 2050; a consistent regulatory framework; and appropriate incentives for research, development and deployment.

Carlos Tucci, Federal University of Rio Grande do Sul, Brazil, presented data showing that the volume of freshwater is decreasing over time as a result of climate change, and highlighted three key issues: forecasting and planning, having thermal complementary energy in stand-by mode, and improving management and environmental assessment at the national level.

Jacob Irving, President, Canadian Hydropower Association, highlighted Canada's clean energy matrix and potential for hydroelectricity, and called for fully exploring the potential for electric vehicle development.

In ensuing discussions, participants highlighted the recent release of an IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation, and its conclusions on the possibility to achieve an 8% renewable share in the global energy matrix. In closing, Irving called for dramatically increasing research and development in the renewables sector and MacNaughton emphasized that "the later we start the more difficult it is going to be and the more costly it will be."

## PARALLEL SESSIONS

**HYDROPOWER'S GHG FOOTPRINT: WHERE'S THE TRUTH?** A session on hydropower's GHG footprint was moderated by Joel Goldenfum, IHA, who said that for results to be useful they need to measure net emissions for a whole basin, with and without a reservoir. Jorge Damazio, CEPTEL, Brazil, noted Brazil is leading studies on the carbon balance of freshwater reservoirs, and Paul Jacobson, Electric Power Research Institute, US, highlighted the value of the UNESCO/IHA GHG Measurement Guidelines for Freshwater Reservoirs in allowing the interpretation and comparability of data and the development of predictive models.

Panelists discussed why reservoirs generate high levels of emissions during their first decade of operation, and emphasized oxygen levels - not the size of the reservoir - as the key driver for emissions. Participants thus debated the effects on emissions of removing forest and soil prior to impoundment. They also questioned the adequacy of Clean Development Mechanism (CDM) hydropower eligibility criteria, as well as multilateral funding criteria, focusing on the size of reservoirs.

Alain Tremblay, Hydro-Québec, Canada, said studies on GHG emissions in a whole basin did not find a substantive change over 100 years in the scenarios with and without a reservoir. Vincent Chanudet, EDF Hydro, France, noted GHG footprint calculations must consider net emissions pre- and post-impoundment. Marco Aurélio dos Santos, Federal University of Rio de Janeiro (UFRJ), Brazil, noted uncertainties and the need for further research on emission calculations. Participants emphasized the need to develop a robust predictive model to resolve this debate.

**HYDROPOWER DEVELOPMENT AND FRESHWATER CONSERVATION:** Moderator Breno Simonini, FMASE, said that despite advanced environmental

legislation in Brazil, a lack of predictability often counteracts the legislation's objectives. Jeff Opperman, The Nature Conservancy, stressed early coordination to attain hydropower and conservation objectives in river basins or regions.

Nelton Friedrich, Itaipu Binacional, highlighted efforts to conserve the local environment both during and post-construction of the Itaipu Dam, stressing the involvement of communities at the micro-basin level. Jian-hua Meng, World Wide Fund for Nature, called for going beyond a "project-by-project" approach for conservation and environment goals, highlighting the plethora of tools and knowledge available for planning and conservation.

Valter Cardeal de Souza, Electrobras, noted that Electrobras uses an approach that is socially just and environmentally sound for implementing hydropower projects, basing actions on robust science. Yuan Xianghua, HydroLancang, underscored the multi-stakeholder process, saying this can identify information gaps and allow the public and other stakeholders to gain a better understanding of the project, which leads to greater project certainty.

Terry Moss, ESKOM, on the Palmiet Water Transfer Project, said that extensive local consultations and subsequent actions were undertaken to address the environmental concerns of the local community, including invasive species and topsoil conservation.

## DOES HYDROPOWER CONSUME WATER?

Moderator Roy Adair, CEO, Hydro Tasmania, described the panel session on whether hydropower consumes water as "the nexus of hydropower production and water resource management." Christopher Eaglin, Pegasys, outlined research into the consumptive use of water in hydropower production, noting the paucity of data on the issue and stressing the need for a conceptual framework with common definitions and methodologies.

Heather Cooley, Pacific Institute, said that hydropower consumes water by increasing evaporation, but explained that there is variation across reservoirs and limited data, and that dam and reservoir design can mitigate and minimize losses. Presenting on the experiences of Manitoba Hydro with reservoir evaporation, Ken Adams, Manitoba Hydro, underscored the need to allocate losses across the multiple uses of reservoirs. Miroslav Marenc, UNESCO-IHE, discussed evaporation, reservoir seepage and water diversions, and challenged participants to ask the converse question of "whether hydropower conserves water." Describing governmental policies and management for water and energy in Brazil, Vicente Andreu, ANA, Brazil, stressed that it is important to consider the scale of river basins, and noted that impacts are often felt and measured locally.

## ELECTROBRAS BELO MONTE PRESENTATION

Valter Cardeal de Souza outlined the different aspects of the Belo Monte project, including amendments to lessen negative social and environmental impacts, and described a multi-stakeholder participatory process undertaken, highlighting compensation being provided to communities, including through relocation, improved infrastructure, health and sanitation, and food provision.

Sheyla Machado da Silva, Associação do Povo Indígena Juruna do Xingu do km 17, said that many indigenous groups have language barriers preventing participation. She bemoaned that four community meetings were not sufficient to address concerns, calling for development, not dams.

Patxon Metuktire, Instituto Raoni, Brazil, expressed dismay that there is little dialogue between communities and the government and companies. He invited everyone to "be attentive" because there might be conflict at the Belo Monte site and urged Electrobras to have further meetings with indigenous communities, to better explain the project and avoid possible conflict.

Cardeal de Souza noted that the main leaders and chiefs are in favor of the project and said Electrobras remains open to listening to communities.





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### IHA WORLD CONGRESS HIGHLIGHTS: THURSDAY, 16 JUNE 2011

Throughout the day, the International Hydropower Association (IHA) World Congress on Advancing Sustainable Hydropower held plenary sessions on assessing sustainability performance, diverging views on social issues and sharing water for development; as well as parallel sessions on using the Hydropower Sustainability Assessment Protocol, downstream flow regimes and hydropower in the 21st century. In the evening, participants were invited to a light and sound show at Itaipu Dam.

#### ASSESSING SUSTAINABILITY PERFORMANCE

Albert Geber de Melo, Electric Power Research Center (CEPEL), described the tools used for sustainability assessment in Brazil, including the 2007 Manual for Hydropower Inventory of River Basins, and highlighted the need to balance the cost effectiveness of energy production, social impacts, environmental impacts and multiple water uses. Israel Phiri, Ministry of Energy and Water Development, Zambia, described his country's experience in the development of the Kariba dam in the Zambezi river basin, noting the value of using the Protocol to make the project more attractive for international investors and enhance positive impacts on the adjacent populations and environment. Participants discussed the costs and benefits of assessing sustainability of African hydropower projects.

David Harrison, The Nature Conservancy (TNC), described the inception and development of the Protocol, noting the challenges posed by the "sheer complexity" of hydropower projects. He explained that the Protocol aims to provide an objective and systematic set of criteria for assessing multiple dimensions of sustainability.

Participants suggested holding a workshop on the Protocol in Asia and encouraged international financial institutions and governments to provide financing for applying the Protocol in Africa. The Asian Development Bank representative announced a project currently undertaken with the Mekong River Commission (MRC), World Wide Fund for Nature (WWF) and the US Agency for International Development (USAID) to formulate a basin-wide sustainability assessment tool.

Asked to provide the perspective of a regulator, Reginald Hernaus, Ministry of Infrastructure and Environment, the Netherlands, described existing processes within the European Union (EU) for assessing hydropower projects and challenged the IHA to demonstrate the value of its Protocol.

In the ensuing discussions, participants encouraged multiple sectors, including suppliers, contractors, operators and governments, to further develop and test the Protocol. In response to a statement from 22 civil society organizations against the Protocol, Harrison clarified that the Protocol is a measurement tool, not a new standard, and should be seen as strengthening, not displacing, the recommendations from the World Commission on Dams. Other participants noted that the Protocol provides common language for measuring performance.

Lauding the Protocol for being developed within the industry, Gil Maranhão Neto, GDF Suez Energy Brazil, observed that it allows stakeholder queries and expectations to be met. Terry

Moss, ESKOM, noted that the Protocol has been used to assess several pump storage and hydropower schemes, allowing a greater focus on their operation and management within their respective communities and environments. Richard Taylor acknowledged that the Protocol is not perfect, highlighting the current version is being released to gain practical experience from its implementation.

#### PRESS CONFERENCE

At a press conference held to launch the Sustainability Protocol, Refaat Abdel-Malek, IHA President, commended industry and non-governmental organizations (NGOs) for their engagement in its three-year review process. Harrison noted that NGO involvement in the process derives from their belief that only a systemic approach to dam design can save freshwater ecosystems, since past opposition to individual dams has not been effective. He hoped wide application of the Protocol would lead to a sustainability certification mechanism, while cautioning that it does not guarantee sustainability, but provides a process to measure it and a common language for stakeholders and affected parties. Cameron Ironside, IHA, presented a video showcasing an early trial of the Protocol in Kazakhstan's Shardara Dam. Phiri added that the Protocol gives governments ownership over the sustainability process, unlike in the past where different financial institutions imposed conditions. Andrew Scanlon, Hydro Tasmania, Australia, called on industry to embrace the Protocol. Transparency International welcomed the work of the IHA in promoting accountability, integrity and transparency within its membership.

#### DIVERGING VIEWS ON SOCIAL ISSUES

Jörg Hartmann, WWF, moderated a panel session on the "sensitive" topic of diverging views on social issues, which he explained represented multiple perspectives across sectors and global-, country- and project-levels. Hartmann stressed that the costs of social sustainability efforts should be seen as investments in reducing social conflicts.

Helen Locher, Hydro Tasmania, Australia, called attention to key challenging areas in the Protocol's development, including human rights, livelihoods and the differences between physical and economic displacement. Locher described how the assessment tools, scoring criteria and cross-cutting issues allow for consideration of a range of social concerns.

Shi Guoqing, International Network on Displacement and Resettlement, China, spoke on best practices for resettlement, using the example of the Danjiangkou Dam in China. He highlighted strategies including minimum compensation standards for housing, provision of improved community facilities, long-term compensation, and support for long-term sustainable livelihoods through, *inter alia*, skills and training programmes, generation of multi-income sources, micro-credit and post-resettlement support funds.

Outlining legislation and agreements on the rights of indigenous communities to natural resources and traditional lands, such as the International Labor Organization's (ILO) 1989 Convention Concerning Indigenous and Tribal People in Independent Countries, Roberta Leonhardt, Machado, Meyer,

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Sendacz e Opice Advogados, Brazil, discussed obligations to “free, prior and informed consent” (FPIC) from communities in developing hydropower projects in Brazil.

Michael Lawrenchuk, Lead Negotiator and former Chief, Fox Lake Cree Nation, Canada, recalled the plight of his community during the construction of three hydropower projects in the 1960s, saying it is important to learn from past experience and stressed the value of genuine dialogue and the need to take into account local and indigenous communities’ needs and vulnerabilities.

Olivier Salignat, EDF Hydro, France, outlined actions for addressing social issues with local communities, including: understanding the socio-economic issues; communicating effectively; adapting to evolving situations; and committing to compensation.

Participants discussed, among other things, social benefits of multi-purpose hydropower projects and case-by-case versus standardized approaches for identifying project-affected communities. On the Protocol’s expected impact on social issues, Locher recognized that as a scoring tool, it reduces complex social issues to numbers, but underscored its main value will be to act as a bridge between different world views and to facilitate dialogue among stakeholders.

### SHARING WATER FOR DEVELOPMENT

Session chair Jorge Samek, CEO, Itaipu Binacional, with moderator José Ayres de Campos, CEO, WorleyParsons Brazil and Argentina, pointed to Itaipu Dam as an example of sharing water across borders for development. Satit Phiromchai, Director of the Planning Division, MRC Secretariat, outlined the cooperation of the four countries of the lower Mekong basin through the 1995 Mekong Agreement and the MRC, highlighting: participatory processes and prior notification, consultation and agreement for dams; infrastructure development; irrigation expansion; food security; and mechanisms for benefit-sharing.

Daniel Mugerza recalled the more than 40-year process leading to the full operation of the Binational Yaciretá Dam between Argentina and Paraguay, reflecting on the changing political, strategic and sociological circumstances that influenced this process.

Jakob Granit, Stockholm International Water Institute, Sweden, reflected on the importance of international cooperation as a large number of river basins are shared among countries, highlighting the need for balancing benefits, needs and interests, and conflict prevention.

Salisu Abdulmumin, African Ministerial Council on Water (AMCOW), highlighted the successes and challenges Africa faces in developing its water resources in an equitable manner.

In the ensuing discussion, participants discussed how to ensure treaties are equitable, and how to proceed when there is no universally accepted treaty or body to ensure equitability.

### PARALLEL SESSIONS

#### USING THE HYDROPOWER SUSTAINABILITY

**ASSESSMENT PROTOCOL:** Ironside introduced the structure of the Hydropower Sustainability Assessment Protocol explaining that it follows the life cycle of a hydropower project, and measures the performance of different sustainability indicators in a range of 1-5. Jörg Hartmann, WWF, described: the institutional framework for the Protocol’s implementation including a Hydropower Assessment Council, chambers for interest groups and a Managing Entity; and the criteria applied to different categories of assessments, namely, official or unofficial, for private use or for publication. He noted the need to safeguard the Protocol and prevent its use for “green-washing”.

Participants noted the different nature of the proposed evaluation compared to traditional International Organization for Standardization (ISO)-type audits, and the need to build capacity in audit organizations. Donal O’Leary, Transparency International, highlighted the importance of high-quality evaluations and suggested some NGOs may be interested in being

trained as auditors. He added that unofficial assessments, for example by NGOs, may be most useful at the early stages of a project.

Ricardo Fontenele, Bureau Veritas, said client engagement is key to a good evaluation and highlighted evaluations usually lead to plans of action and improvements to operations’ sustainability. Participants also highlighted the usefulness of the Protocol for intra-firm management improvements and as a tool for dialogue.

**HYDROPOWER IN THE 21ST CENTURY: The Rise of Emerging Markets:** Moderator Emmanuel Branche, EDF Hydro, France, presented an overview of the global hydropower market, noting that recent growth in the sector has been driven by Asia and Latin America. He noted that future market leaders in hydropower will be China and India. Altino Ventura Filho, Ministry of Mines and Energy, Brazil, said that hydropower is set to grow 88% by 2030, thus taking advantage of two-thirds of potential hydropower resources in the long-term.

Y. N. Apparao, Athena Demwe Power, India, stressed that only 12% of hydropower potential has been exploited in India, and said that with the target of universal energy access by 2012, a number of strategies are being pursued, *inter alia*: low cost power generation methods; electricity distribution reforms; and improved communications strategies. Kuang Shangfu, China Institute of Water Resources and Hydropower Research, remarked that hydropower’s strategic significance for China is for: climate change adaptation; energy security; poverty reduction; and to support social and economic development.

In the ensuing discussion, one participant queried how to “marry” the commercial energy needs of India with the spiritual connection many citizens have to their rivers. On whether there are suitable markets to sell “green electricity” at a premium, Ventura Filho noted that as the majority of Brazil’s lowest-cost electricity is already renewable, this was not feasible. In conclusion, Rasim Kazhiakhmetov, Hydropower of Russia, observed that future growth in the industry will be aided by a change in perception to water as a global energy carrier.

**DOWNSTREAM FLOW REGIME:** Parallel session moderator James Dalton, International Union for the Conservation of Nature (IUCN), explained that dams and large-scale infrastructure smooth out river flows, and that some modifications can be made to replicate rivers’ natural flows to protect downstream ecosystems and communities that rely on more variable flows.

Gabriel Azevedo, Odebrecht Energia, outlined the shift in the hydropower sector from early concerns about “sanitary flows” focused on water quality, to recent recognition of “downstream flows” that consider a broad range of ecological and human considerations. He stressed that there is no “one-size-fits-all” solution, and encouraged a focus on variability and adaptive management.

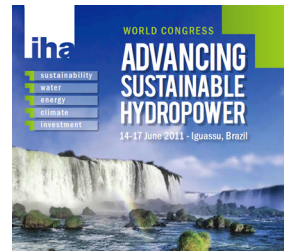
Domingo Rodriguez Fernandez, Itaipu Binacional, spoke on the impacts of flows on fish populations, especially for migratory species, and outlined the phases of planning and monitoring required for protecting the ecological integrity of rivers.

Antonio Fonseca dos Santos, Brookfield Energy, Brazil, pointed to the filling of reservoirs and the operation of power plants as distinct periods where flow regimes must be considered. Advocating for the identification of downstream needs on a case-specific basis, he described two examples of multi-stakeholder negotiations to address community concerns associated with hydropower projects in Brazil.

Scanlon outlined efforts to retrofit existing hydropower projects in Australia to address downstream flows, noting that there are often competing objectives and that the baseline of the natural river is not always appropriate, as ecological and social conditions may have changed over time.

Interventions from the audience addressed: baselines for minimum flows; concern for flow variability and maximums as well as minimum flows; the need for catchment-level analyses; groundwater recharge from floods; and how siting decisions can influence downstream flow issues.





### SUMMARY OF THE INTERNATIONAL HYDROPOWER ASSOCIATION WORLD CONGRESS ON ADVANCING SUSTAINABLE HYDROPOWER: 14-17 JUNE 2011

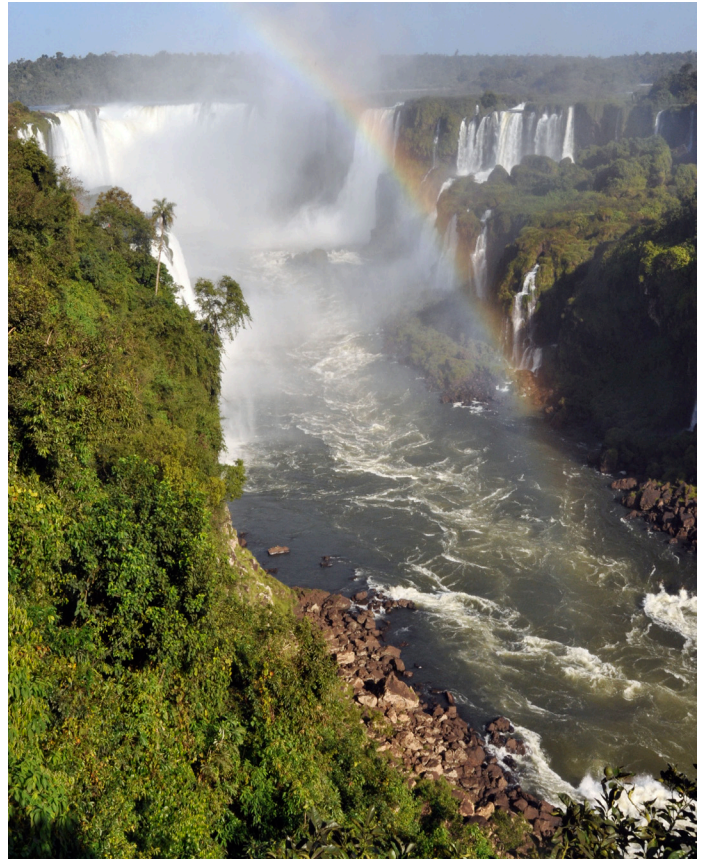
The International Hydropower Association (IHA) held its biennial World Congress on Advancing Sustainable Hydropower in Iguacu, Brazil. Five hundred participants attended the meeting from 71 countries. Representatives from the hydropower industry who are members of IHA, including utilities and operators, as well as representatives of social and environmental non-governmental organizations (NGOs), indigenous communities, multilateral finance institutions and research centers participated in the meeting.

Following previous Congresses held in Reykjavik, Iceland in 2009 and Antalya, Turkey in 2007, this event included the launch of the Hydropower Sustainability Assessment Protocol, the result of a joint effort by the industry and environmental and social NGOs to define criteria for the sustainable development and management of hydropower projects. The meeting presented a broad view of the sustainability challenges to hydropower development, reflected on the latest Intergovernmental Panel on Climate Change (IPCC) assessment on renewable energy, which notes sustainability does not have a direct relationship with dam size, and discussed the opportunities arising from the growing interest in green growth strategies within the international community, as well as from the growth of carbon market finance opportunities.

#### A BRIEF HISTORY OF IHA AND MULTILATERAL ENERGY INITIATIVES

The 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 practices and further knowledge of hydropower. It is governed by a biennial General Meeting of its members and by a Board, which meets at least three times a year and is comprised of up to 18 elected members, up to six co-opted members and one Executive Director.

The 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 renewable energy, especially hydropower; and raising awareness of the role that hydropower can play in sustainable development as a source of renewable energy. Key initiatives include: the Hydropower Sustainability Assessment Protocol and a specialized website to provide guidance and disseminate best practices ([hydrosustainability.org](http://hydrosustainability.org)); and the greenhouse gas (GHG) research project, a collaborative initiative with



Iguacu Falls

the International Hydrological Programme of UNESCO, to improve understanding of the impact of reservoirs on natural GHG emissions in a river basin. The latter seeks to obtain better comprehension of current methodologies and help to overcome knowledge gaps, including through the UNESCO/IHA GHG Measurement Guidelines for Freshwater Reservoirs. Specific workshops are also promoted by IHA to disseminate its guidelines and lessons learned. The main IHA website is: <http://www.hydropower.org>

**Sustainability Guidelines and Protocol:** Considering sustainable development to be a fundamental component of social responsibility, sound business practice and natural

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resource management, IHA developed Sustainability Guidelines, adopted during the meeting of the IHA Council in November 2003, to provide a framework for good practice in hydropower. This led to the development of an IHA Sustainability Assessment Protocol, approved by the IHA Board for adoption in July 2006, to assist IHA members in assessing performance against criteria described in the IHA Sustainability Guidelines. Both the Guidelines and IHA Protocol were superseded by the adoption of the Hydropower Sustainability Assessment Protocol in 2011.

**Hydropower Sustainability Assessment Protocol:** The Protocol is the result of intensive work from 2008 to 2010 by the Hydropower Sustainability Assessment Forum, a multi-stakeholder body with representatives from social and environmental NGOs (Oxfam, The Nature Conservancy, Transparency International, World Wide Fund for Nature); governments (China, Germany as observer, Iceland, Norway, Zambia); commercial and development banks (Equator Principles Financial Institutions Group, the World Bank as observer); and the hydropower sector, represented by IHA.

The Protocol assesses the four main stages of hydropower development: early stage, preparation, implementation and operation. Assessments rely on objective evidence to create a sustainability profile against some 20 topics, depending on the relevant stage and covering all aspects of sustainability.

**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 the certification of good practices in the hydropower sector. (IISD coverage: <http://www.iisd.ca/yimb/hydro/>)

**Second IHA World Congress:** The 2009 IHA World Congress on Advancing Sustainable Hydropower convened in Reykjavik, Iceland, from 23-26 June 2009, and discussed how hydropower is both vulnerable to and part of the solution to climate change. The first day of the Congress revolved around the theme "water, energy and climate change," while on the second day participants engaged in a seminar on hydropower and GHG emissions, as well as a discussion panel on hydropower markets. (IISD coverage: <http://www.iisd.ca/yimb/hydro/iha2009/>)

### MULTILATERAL INITIATIVES ON RENEWABLE 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.

**INTERNATIONAL CONFERENCE ON RENEWABLE ENERGIES:** This *Renewables 2004* Conference took place from 1-4 June 2004, in Bonn, Germany. It produced three outcome documents: a Political Declaration, Policy Recommendations, and an International Action Programme with 165 endorsed voluntary commitments, whose progress is monitored through the UN Commission on Sustainable

Development (CSD) process. Subsequent meetings were held in Beijing, China (2005), Washington, US (2007) and New Delhi, India (2010).

**CSD:** 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 would not be met without increased access to modern energy services.

The fourteenth and fifteenth sessions of the UN CSD (2006-2007) were tasked with reviewing progress in energy for sustainable development, industrial development, air pollution/atmosphere and climate change, together with inter-linked and cross-cutting issues. Countries did not arrive at an agreed outcome on these issues, with fundamental disagreements on the nature, scope and ambition of the sustainable development agenda – particularly the issues of energy and climate change – and the role of the CSD in this realm.

**WSSD:** The World Summit on Sustainable Development (WSSD), held in Johannesburg, South Africa, from 26 August to 4 September 2002, 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.

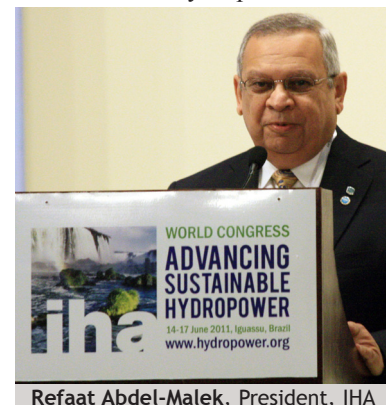
**IRENA:** Negotiations for the establishment of an international renewable energy agency were held during 2008-2009. A Founding Conference adopted the International Renewable Energy Agency (IRENA) statute on 26 January 2009, which entered into force on 8 July 2010. Five meetings of IRENA's Preparatory Commission were held during 2009-2011, leading to the first session of the IRENA Assembly held from 3-5 April 2011, in Abu Dhabi, United Arab Emirates. IRENA's purpose is to promote increased and widespread adoption and sustainable use of all forms of renewable energy. One hundred forty-eight countries and the European Union (EU) are signatories of IRENA, and 73 states and the EU have ratified its statute.

### REPORT OF THE MEETING

On Wednesday morning, 15 June, participants met for the opening session of the International Hydropower

Association's (IHA) 2011 World Congress. Refaat Abdel-Malek, President, IHA, and Jorge Samek, Director General, Itaipu Binacional, Brazil, welcomed participants to the Congress. Samek underscored the compatibility of environmental care, economic development and energy provision. Abdel-Malek invited panelists to discuss sustainable development of hydropower.

Chief Executive Officers (CEOs) of major hydropower companies and Brazil's Deputy Minister of Mines and Energy then addressed the meeting on the topic of hydropower



Refaat Abdel-Malek, President, IHA





L-R: Henrique Valladares, CEO, Odebrecht Energia; Antonio Miguel Marques, CEO, Camargo Correa; Jorge Samek, CEO, Itaipu Binacional; José da Costa Carvalho Neto, CEO, Electrobras; Márcio Zimmermann, Deputy Minister, Ministry of Mines and Energy, Brazil; Maurício Tolmasquim, CEO, Federal Energy Planning Company, Brazil; Flávio David Barra, Andrade Gutierrez; Manoel Zaroni Torres, CEO, Tractebel Energia; and Refaat Abdel-Malek, IHA President

perspectives for sustainability. Noting the growth of energy demands in Brazil, Flávio David Barra, Andrade Gutierrez, called for regional integration to take advantage of hydropower potential. José da Costa Carvalho Neto, CEO, Electrobras, expressed concern that the hydropower sector has “lost the war of communication,” explaining that a “small percentage” of people against hydropower speak more loudly than the majority in support of hydropower.

Describing hydropower as a clean and renewable energy source, Antonio Miguel Marques, CEO, Camargo Correa, encouraged discussion and debate to “create a conciliation of interests” where hydropower ventures could be implemented with lower environmental and community impacts. Henrique Valladares, CEO, Odebrecht Energia, noted that the Hydropower Sustainability Assessment Protocol recognizes that development, sustainability and competitiveness are inseparable, rather than competing goals in energy generation.

Manoel Zaroni Torres, CEO, Tractebel Energia, encouraged participants to reflect on the trade-offs between reducing reservoir size to minimize local impacts and the stored energy gained by increasing reservoir size, and also to consider social networking tools for communication. Stating that hydropower can be a “vector” for both environmental preservation and sustainable regional development, Maurício Tolmasquim, CEO, Federal Energy Planning Company, Brazil, provided the example of the Belo Monte project that aims to provide social and environmental benefits to the surrounding communities.

Márcio Zimmermann, Deputy Minister of Mines and Energy, Brazil, noted that his country has opted to use hydropower as its main source of energy. He highlighted the implementation of rigorous environmental protection legislation for hydropower projects, and the social benefits of using local labor for construction.

### **PRESS CONFERENCE ON BRAZILIAN HYDROPOWER POLICY**

Following opening plenary, a press conference on Brazilian hydropower policy was convened. Deputy Minister Zimmermann responded to queries by journalists on the future of the Brazilian energy matrix, and the balance between development goals and environmental and social costs of

energy production. He highlighted Itaipu as a good example of implementation of sustainability criteria. He further emphasized that the Belo Monte project in the Amazon will provide jobs and skills to thousands of people in a poverty-stricken region. He described work on energy efficiency policies, and highlighted Brazil’s electric energy procurement through auctions, noting wind-power energy producers are growing and flourishing even under competitive price conditions.

### **WORLD ENERGY COUNCIL PRESENTATION**



Norberto Medeiros, President, World Energy Council, Brazil

In a special intervention, Norberto Medeiros, President, World Energy Council, Brazil, outlined the 2010 Congress held in Canada, which concluded that sustainable energy growth is a necessity. He stressed the importance of international cooperation as traditional energy sources become scarcer and emphasized constructive dialogue across sectors.

### **INTEGRATING WATER AND ENERGY POLICIES**

On Wednesday morning, Moderator Aileen Anderson, Crossflow Consulting, introduced an “interactive” session on integrating water and energy policies, chaired by Antonio Cardoso, Itaipu Binacional. Cardoso underscored the challenges involved in developing projects that share water and energy.

On competition between energy and water demands, Shahid Hasan, The Energy and Resources Institute (TERI), described trends in India, and called for the development of a framework of policies and regulations and greater civil society input to support integrated energy and water planning.

Mark Smith, the International Union for Conservation of Nature (IUCN), noted many “natural infrastructure” services are related to water and stressed the role of a “portfolio” of natural and built infrastructure in climate-resilient sustainable development.





L-R: Albert Geber de Melo, CEPEL, Brazil; Lin Chuxue, China Three Gorges Corporation; Friedrich Hetzel, German Federal Ministry for Economic Cooperation and Development; Mark Smith, IUCN; Shahid Hasan, Associate Director, TERI; Antonio Cardoso, formerly of Itaipu Binacional; and Aileen Anderson, Crossflow Consulting

Addressing the challenges posed by uncertainty associated with climate change, Friedrich Hetzel, German Federal Ministry for Economic Cooperation and Development (BMZ), underscored the need for long-term, flexible and “multi-parameter” planning for energy provision, and called for improved cross-sectoral policy coherence.

Lin Chuxue, Vice President, China Three Gorges Corporation, said that infrastructure with water storage capacity is important as dams can be multi-purpose, noting the Three Gorges Dam is used for flood control, improved irrigation and electricity generation and also contributes to climate change mitigation and adaptation. Albert Geber de Melo, General Director, the Electric Energy Research Center (CEPEL), Brazil, explained the stages in the Brazilian legal framework for planning and designing hydropower projects, including new requirements related to integrated environmental assessment for river basins.

Participants and panelists considered priority setting in cases of multi-purpose projects and the added value of the recently approved policy in Brazil on integrated impact assessments for whole basins, rather than for individual projects. An indigenous representative questioned the process for stakeholder consultation in the Xingu river basin. In closing, the panel highlighted the importance of engaging all actors in multi-stakeholder processes.

### **CLIMATE CHANGE: WHAT DOES HYDROPOWER OFFER?**

The panel on “Climate change: what does hydropower offer?” was chaired by Reginald Hernaus, Ministry of the Environment, the Netherlands, and moderated by Lau Saili, IHA. Bjørn Lomborg, Director, Copenhagen Consensus Center, argued that climate change is real but said its effects are vastly exaggerated and one-sided, which leads to panic and poor decision-making. With examples including greening cities to reduce heat deaths, he said the most effective solutions might not be emissions reductions but rather adaptation strategies. He encouraged investment in green energy research and development, rather than cutting carbon emissions, as this would lead to a price-driven transition to clean energy sources.

Questions from the audience addressed: the role of economic incentives like carbon pricing for promoting research and development; the need to support the deployment of existing green energy technology; and how to address climate change, whether through mitigation or adaptation.

Joan MacNaughton, Alstom Power, US, highlighted the necessity of both mitigation and adaptation and called for: hydropower generation capacity to double by 2050; a consistent regulatory framework; and appropriate incentives for research, development and deployment.



L-R: Jacob Irving, President, Canadian Hydropower Association; Carlos Tucci, Federal University of Rio Grande do Sul; Joan MacNaughton, Alstom Power, US; Bjørn Lomborg, Director, Copenhagen Consensus Center; Reginald Hernaus, Ministry of the Environment, the Netherlands; and Lau Saili, IHA



Carlos Tucci, Federal University of Rio Grande do Sul, Brazil, presented data showing that the volume of freshwater reservoirs is decreasing over time, which means they are increasingly vulnerable to climate change, highlighting three key issues: forecasting and planning, having complementary thermal energy in stand-by mode, and improving management and environmental assessment at the national level. Jacob Irving, President, Canadian Hydropower Association, highlighted Canada's clean energy matrix and potential for hydroelectricity, and called for fully exploring the potential for electric vehicle development.

In ensuing discussions, participants highlighted the recent release of an Intergovernmental Panel on Climate Change (IPCC) Special Report on Renewable Energy Sources and Climate Change Mitigation, and its conclusions on the possibility to achieve an 8% renewable share in the global energy matrix. In closing, Irving called for dramatically increasing research and development in the renewables sector and MacNaughton emphasized that "the later we start the more difficult it is going to be and the more costly it will be."

### **HYDROPOWER'S GHG FOOTPRINT: WHERE'S THE TRUTH?**

The afternoon session on hydropower's greenhouse gas (GHG) footprint was moderated by Joel Goldenfum, IHA, who said that for results to be useful they need to measure net emissions for a whole basin, with and without a reservoir. Jorge Damazio, CEPEL, Brazil, noted Brazil is leading studies on the carbon balance of freshwater reservoirs, and Paul Jacobson, Electric Power Research Institute (EPRI), US, highlighted the value of the UN Educational, Scientific and Cultural Organization (UNESCO)/IHA GHG Measurement Guidelines for Freshwater Reservoirs in allowing the interpretation and comparability of data and the development of predictive models.



Joel Goldenfum, IHA

Panelists discussed why reservoirs generate high levels of emissions during their first decade of operation, and emphasized oxygen levels - not the size of the reservoir - as the key driver of emissions. Participants thus debated the effects on emissions of removing forest and soil prior to impoundment. They also questioned the adequacy of Clean Development Mechanism (CDM) hydropower eligibility criteria, as well as multilateral funding criteria, focusing on the size of reservoirs.

Alain Tremblay, Hydro-Québec, Canada, said studies on GHG emissions in a whole basin did not find a substantive change over 100 years in the scenarios with and without a reservoir. Vincent Chanudet, EDF Hydro, France, noted GHG footprint calculations must consider net emissions pre- and post-impoundment. Marco Aurélio dos Santos, Federal University of Rio de Janeiro (UFRJ), Brazil, noted uncertainties and the need for further research on emission calculations. Participants emphasized the need to develop a robust predictive model to resolve this debate.

### **HYDROPOWER DEVELOPMENT AND FRESHWATER CONSERVATION**

Moderator Breno Simonini, Fórum de Meio Ambiente do Setor Elétrico (FMASE), introducing the session on "Hydropower Development and Freshwater Conservation," said that despite advanced environmental legislation in Brazil, a lack of predictability often counteracts the legislation's objectives. Jeff Opperman, The Nature Conservancy (TNC), stressed early coordination is key to attain hydropower and conservation objectives in river basins or regions.

Nelton Friedrich, Itaipu Binacional, highlighted efforts to conserve the local environment both during and post-construction of the Itaipu Dam, stressing the involvement of communities at the micro-basin level. Jian-hua Meng, World Wide Fund for Nature (WWF), called for going beyond a "project-by-project" approach for conservation and environment goals, highlighting the plethora of tools and knowledge available for planning and conservation.

Valter Cardeal de Souza, Electrobras, noted that Electrobras uses an approach that is socially just and environmentally sound for implementing hydropower projects, basing actions on robust science. Yuan Xianghua, HydroLancang, underscored the multi-stakeholder process, saying this can identify information gaps and allow the public and other stakeholders to gain a better understanding of the project, which leads to greater project certainty.



Valter Cardeal de Souza, Electrobras

Terry Moss, Eskom, on the Palmiet Water Transfer Project, said that extensive local consultations and subsequent actions were undertaken to address the environmental concerns of the local community, including invasive species and topsoil conservation.

### **DOES HYDROPOWER CONSUME WATER?**

Moderator Roy Adair, CEO, Hydro Tasmania, Australia, described the panel session on whether hydropower consumes water as "the nexus of hydropower production and water resource management." Christopher Eaglin, Pegasys, outlined a current research project on the consumptive use of water



Christopher Eaglin, Pegasys



in hydropower production, noting the paucity of data on the issue and stressing the need for a conceptual framework with common definitions and methodologies.

Heather Cooley, Pacific Institute, said that hydropower consumes water by increasing evaporation, but explained that there is variation across reservoirs and limited data, and that dam and reservoir design can mitigate and minimize losses. Presenting on the experiences of Manitoba Hydro with reservoir evaporation, Ken Adams, Manitoba Hydro, underscored the need to allocate losses across the multiple uses of reservoirs rather than attributing them all to hydropower production. Miroslav Marenc, UNESCO- Institute for Water Education (IHE), discussed evaporation, reservoir seepage and water diversions, and challenged participants to ask the converse question of “whether hydropower conserves water.” Describing governmental policies and management for water and energy in Brazil, Vicente Andreu, President, National Water Agency (ANA), Brazil, stressed that it is important to consider the scale of river basins, and noted that impacts are often felt and measured locally.

### **ELECTROBRAS BELO MONTE PRESENTATION**

Electrobras held a special presentation on the recently approved Belo Monte hydropower project in the Amazon region. Valter Cardeal de Souza outlined the different aspects of the Belo Monte project, including amendments to lessen negative social and environmental impacts, and described a multi-stakeholder participatory process undertaken, highlighting compensation being provided to communities, including through relocation, improved infrastructure, health and sanitation, and food provision.



Sheyla Machado da Silva, Associação do Povo Indígena Juruna do Xingu do km 17

Sheyla Machado da Silva, Associação do Povo Indígena Juruna do Xingu do km 17, said that many indigenous groups have language barriers preventing participation. She lamented that four community meetings were not sufficient to address concerns, and called for “development, not dams”.



Patxon Metuktire, Instituto Raoni, Brazil

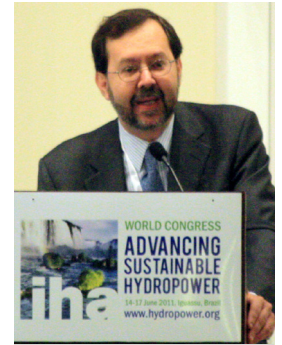
Patxon Metuktire, Instituto Raoni, Brazil, expressed concern that there is little dialogue between communities and the government and companies. He invited everyone to “be attentive” because there might be conflict at the Belo Monte site and urged Electrobras to have further meetings with indigenous communities, to better explain the project and avoid possible conflict.

Cardeal de Souza noted that the main leaders and chiefs are in favor of the project and said Electrobras remains open to listening to communities.

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### **ASSESSING SUSTAINABILITY PERFORMANCE**

On Thursday morning, Roger Gill, Hydro Focus, US, moderated the session on sustainability assessments, with panelists discussing examples and challenges in performing sustainability assessments and the Hydropower Sustainability Assessment Protocol. Chairing the session, Albert Geber de Melo, Electric Power Research Center (CEPEL), described the tools used for sustainability assessment in Brazil, including the 2007 Manual for Hydropower Inventory of River Basins, and highlighted the need to balance the cost effectiveness of energy production, social impacts, environmental impacts and multiple water uses. Israel Phiri, Ministry of Energy and Water Development, Zambia, described his country’s experience in the development of the Kariba dam in the Zambezi river basin, noting the added value provided in using the Protocol to make the project more attractive for international investors and enhance positive impacts on the adjacent populations and environment. Participants discussed the costs and benefits of assessing sustainability of African hydropower projects.



Albert Geber de Melo, CEPEL



Israel Phiri, Ministry of Energy and Water Development, Zambia

David Harrison, TNC, described the Protocol’s inception and development, noting the challenges posed by the “sheer complexity” of hydropower projects. He explained that the



David Harrison, TNC

Protocol aims to provide an objective and systematic set of criteria for assessing multiple dimensions of sustainability.

Participants suggested holding a workshop on the Protocol in Asia and encouraged international financial institutions (IFIs) and governments to provide financing for applying the Protocol in Africa. The Asian Development Bank (ADB) representative announced a project currently undertaken with the Mekong River Commission (MRC), WWF and the US Agency for International Development (USAID) to formulate a basin-wide sustainability assessment tool.

Asked to provide the perspective of a regulator, Reginald Hernaus, Ministry of Infrastructure and Environment, the Netherlands, described existing processes within the European Union (EU) for assessing hydropower projects and challenged the IHA to demonstrate the value of its Protocol.

In the ensuing discussions, participants encouraged multiple sectors, including suppliers, contractors, operators and



Reginald Hernaus, Ministry of Infrastructure and Environment, the Netherlands



governments, to further develop and test the Protocol. In response to a statement from 22 civil society organizations against the Protocol, Harrison clarified that the Protocol is a measurement tool, not a new standard, and should be seen as strengthening, not displacing, the recommendations from the World Commission on Dams. Other participants noted that the Protocol provides common language for measuring performance.

Lauding the Protocol for being developed within the industry, Gil Maranhão Neto, GDF Suez Energy, Brazil, observed that it allows stakeholder queries and expectations to be met. Terry Moss, Eskom, noted that the Protocol has been used to assess several pump storage and hydropower schemes, allowing a greater focus on their operation and management within their respective communities and environments. Richard Taylor, Executive Director, IHA, acknowledged that the Protocol is not perfect, highlighting the current version is being released to gain practical experience from its implementation.

### **PRESS CONFERENCE ON THE HYDROPOWER SUSTAINABILITY ASSESSMENT PROTOCOL**

At Thursday's press conference, held to launch the Hydropower Sustainability Assessment Protocol, Refaat Abdel-Malek, President, IHA, commended industry and NGOs for their engagement in its three-year review process. David Harrison, TNC, noted that NGO involvement in the process derives from their belief that only a systemic approach to dam design can save freshwater ecosystems, since past opposition to individual dams has not been effective. He hoped wide application of the Protocol would lead to a sustainability certification mechanism, and, while cautioning that it does not guarantee sustainability, said it provides a measurement process and a common language for stakeholders and affected parties. Cameron Ironside, IHA, presented a video showcasing an early trial of the Protocol in Kazakhstan's Shardara Dam. Phiri added that the Protocol gives governments ownership over the sustainability process, unlike in the past where different financial institutions imposed conditions. Andrew Scanlon, Hydro Tasmania, called on industry to embrace the Protocol. Transparency International welcomed the work of the IHA in promoting accountability, integrity and transparency within its membership.

### **DIVERGING VIEWS ON SOCIAL ISSUES**

Jörg Hartmann, WWF, moderated a panel session on the "sensitive" topic of diverging views on social issues, which he explained represented multiple perspectives across sectors and global-, country- and project-levels. Hartmann stressed that the costs of social sustainability efforts should be seen as investments in reducing social conflicts.

Helen Locher, Hydro Tasmania, called attention to key challenging areas in the Protocol's development, including human rights, livelihoods and the differences between physical and economic displacement. Locher described how the assessment tools, scoring criteria and cross-cutting issues allow for consideration of a range of social concerns.

Shi Guoqing, International Network on Displacement and Resettlement, China, spoke on best practices for resettlement, using the example of the Danjiangkou Dam in China. He highlighted strategies including minimum compensation standards for housing, provision of improved community facilities and long-term compensation. To support the development of long-term sustainable livelihoods, he encouraged, *inter alia*, skills and training programmes, generation of multi-income sources, micro-credit and post-resettlement support funds.

Outlining legislation and agreements on the rights of indigenous communities to natural resources and their traditional lands in Brazil, Roberta Leonhardt, Machado, Meyer, Sendacz e Opice Advogados, Brazil, discussed obligations to "free, prior and informed consent" from communities in developing hydropower projects.

Michael Lawrenchuk, Lead Negotiator and former Chief, Fox Lake Cree Nation, Canada, recalled the plight of his community during the construction of three hydropower projects in the 1960s, saying it is important to learn from past experience. He stressed the value of genuine dialogue and the importance of taking into account local and indigenous communities' needs and vulnerabilities.

Olivier Salignat, EDF Hydro, outlined actions for addressing social issues with local communities, including: understanding their socio-economic issues; communicating effectively; adapting to evolving situations; and committing to compensation.



L-R: Michael Lawrenchuk, Lead Negotiator and former Chief, Fox Lake Cree Nation, Canada; Shi Guoqing, International Network on Displacement and Resettlement, China; Olivier Salignat, EDF Hydro; Roberta Leonhardt, Machado, Meyer, Sendacz e Opice Advogados, Brazil; and Helen Locher, Hydro Tasmania





Panelists in the session on sharing water for development

Participants discussed, among other things, social benefits of multi-purpose hydropower projects and case-by-case versus standardized approaches for identifying project-affected communities. On the Protocol's expected impact on social issues, Locher recognized that as a scoring tool it reduces complex social issues to numbers, but underscored its main value will be to act as a bridge between different world views and to facilitate dialogue among stakeholders.

### **SHARING WATER FOR DEVELOPMENT**

In the afternoon, session chair Jorge Samek, CEO, Itaipu Binacional, with moderator José Ayres de Campos, CEO, WorleyParsons Brazil and Argentina, pointed to Itaipu Dam as an example of sharing water across borders for development. Satit Phiomchai, MRC Secretariat, outlined the cooperation of four countries (Viet Nam, Lao PDR, Cambodia and Thailand) of the lower Mekong basin through the 1995 Mekong Agreement and the MRC, highlighting: participatory processes and prior notification, consultation and agreement for dams; infrastructure development; irrigation expansion; food security; and mechanisms for benefit-sharing.

Daniel Muguerza, Entidad Binacional Yaciretá, recalled the more than 40-year process leading to the full operation of the binational Yaciretá Dam between Argentina and Paraguay, reflecting on the changing political, strategic and sociological circumstances that influenced this process.

Jakob Granit, Stockholm International Water Institute, Sweden, reflected on the importance of international cooperation as a large number of river basins are shared among countries, highlighting the value of balancing benefits, needs and interests, for conflict prevention.

Salisu Abdulmumin, African Ministerial Council on Water (AMCOW), highlighted the successes and challenges Africa faces in equitable development of its water resources.

In the ensuing discussion, participants discussed how to ensure treaties are equitable, and how to proceed when there is no universally accepted treaty or body to ensure equitability.

### **USING THE HYDROPOWER SUSTAINABILITY ASSESSMENT PROTOCOL**

Cameron Ironside, IHA, introduced the structure of the Hydropower Sustainability Assessment Protocol, explaining that it follows the life cycle of a hydropower project and measures the performance of different sustainability indicators on a scale of 1-5. Jörg Hartmann, WWF, described the institutional framework for the Protocol's implementation including a Hydropower Assessment Council, chambers for interest groups and a Managing Entity. He also outlined the

criteria applied to different categories of assessments, namely, "official" or "unofficial" depending on whether the operating entity participates in the process or not, and "for private use" or "for publication." Hartmann noted the need to safeguard the Protocol and prevent its use for "green-washing."

Participants noted the different nature of the proposed evaluation compared to traditional International Organization for Standardization (ISO)-type audits, and the need to build capacity of evaluators and audit organizations. Donal O'Leary, Transparency International, highlighted the importance of ensuring high-quality evaluations and suggested some NGOs may be interested in being trained as auditors. He added that unofficial assessments, for example by NGOs, may be most useful at the early stages of a project.

Ricardo Fontenele, Bureau Veritas, said client engagement is key to a good evaluation and commented that evaluations usually lead to plans of action and improvements to operations' sustainability. Participants also highlighted the usefulness of the Protocol for intra-firm management improvements and as a tool for dialogue.



Ricardo Fontenele, Bureau Veritas

### **HYDROPOWER IN THE 21ST CENTURY: THE RISE OF EMERGING MARKETS**

Moderator Emmanuel Branche, EDF Hydro, presented an overview of the global hydropower market, noting that recent growth in the sector has been driven by Asia and Latin America. He noted that future market leaders in hydropower will be China and India. Altino Ventura Filho, Ministry of Mines and Energy, Brazil, said that hydropower is set to grow 88% by 2030, thus taking advantage of two-thirds of potential hydropower resources in the long-term.



Y. N. Apparao, Athena Demwe Power, India

Y. N. Apparao, Athena Demwe Power, India, stressed that only 12% of hydropower potential has been exploited in India, and said that a number of strategies are being pursued to reach the target of universal energy access by 2012, such as low cost power generation methods,



electricity distribution reforms and improved communications strategies. Kuang Shangfu, China Institute of Water Resources and Hydropower Research, remarked that hydropower's strategic significance for China is for: climate change adaptation; energy security; poverty reduction; and social and economic development.

In the ensuing discussion, one participant queried how to "marry" the commercial energy needs of India with the spiritual connection many citizens have to their rivers. On whether there are suitable markets to sell "green electricity" at a premium, Ventura Filho noted such an action would not be feasible in Brazil as the majority of the country's lowest-cost electricity is already renewable. In conclusion, Rasim Kazhiakhmetov, RusHydro, Russian Federation, observed that a change in perception to water as a global energy carrier will aid future growth in the industry.

### DOWNSTREAM FLOW REGIME

Moderating a parallel session on the effects of dams on downstream flow regimes, James Dalton, IUCN, explained that dams and large-scale infrastructure smooth out river flows, and that some modifications can be made to replicate rivers' natural flows to protect downstream ecosystems and communities that rely on more variable flows.

Gabriel Azevedo, Odebrecht Energia, Brazil, outlined the progressive shift in the hydropower sector from early concerns about "sanitary flows" focused on water quality, to recent recognition of "downstream flows" that consider a broad range of ecological and human considerations. He stressed that there is no "one-size-fits-all" solution, and encouraged a focus on variability and adaptive management.

Domingo Rodriguez Fernandez, Itaipu Binacional, spoke on the impacts of flows on fish populations, especially for migratory species, and outlined the phases of planning and monitoring required for protecting the ecological integrity of rivers.

Antonio Fonseca dos Santos, Brookfield Energy, Brazil, pointed to the filling of reservoirs and the operation of power plants as two distinct periods where flow regimes must be considered. Advocating for the identification of downstream needs on a case-specific basis, he described two examples of multi-stakeholder negotiations to address community concerns associated with hydropower projects in Brazil.

Andrew Scanlon, Hydro Tasmania, outlined efforts to retrofit existing hydropower projects in Australia to address downstream flows, noting that



Kuang Shangfu, China Institute of Water Resources and Hydropower Research



Gabriel Azevedo, Odebrecht Energia, Brazil



Antonio Fonseca dos Santos, Brookfield Energy, Brazil

there are often competing objectives and that the relying on the baseline of the natural river is not always appropriate, as ecological and social conditions may have changed over time.

Interventions from the audience addressed: baselines for minimum flows; concern for flow variability and maximums as well as minimum flows; the need for catchment-level analyses; groundwater recharge from floods; and how siting and design decisions can influence downstream flow issues.

### OUR RENEWABLE FUTURE: COMBINING TECHNOLOGIES

In the morning, moderator David Renné, President, International Solar Energy Society, presented his organization's vision for a rapid transition to a renewable energy world, and stressed that no single technology can provide the solution, encouraging renewables sectors to work together to reach this goal.

Highlighting the participation of developed and developing countries in the International Renewable Energy Agency (IRENA), session chair Gauri Singh, IRENA, described the agency's membership and work, outlining its focus on the three areas of: knowledge management and technical cooperation; policy advice and

capacity building services; and innovation and technology.

In a discussion on IRENA, participants considered, *inter alia*: communication about the benefits of renewable energy to the general public, since public opinion drives government decision-making; the relationship between, and differing roles of, IRENA and the International Energy Agency; a focus on project sustainability rather than distinctions between large and small hydropower projects; IRENA's analysis of the recent IPCC report on renewable energy, especially in the African context; and market mechanisms for making renewable energies more economically sustainable, for instance through carbon credit trading. Panelists emphasized the need for international cooperation, government engagement and champions of renewable energy at high levels of government.

Hironao Matsubara, Institute for Sustainable Energy Policies (ISEP), Japan, described the small current, but large potential,

contribution of renewables to energy production in Japan. He highlighted the achievements in some prefectures and towns that meet their energy demands entirely through renewable sources, and noted the increased interest in realizing renewable energy potential following the events at the Fukushima nuclear power plant. Laércio Couto, World Bioenergy Association, Brazil, said discussions should be on complementary - rather than alternative - sources of energy. He gave the example of Brazilian complementary use



David Renné, President, International Solar Energy Society



Session Chair Gauri Singh, IRENA



Hironao Matsubara, ISEP, Japan





Laércio Couto, World Bioenergy Association, Brazil

of eucalyptus for the production of biomass in the season when sugarcane is unavailable.

David Crean, Hydro Tasmania, presented on a renewable energy integration project on King Island, Australia, that combines renewable energy sources, smart grid and fuel substitution technologies, as well as innovative tariff approaches, with the aim to increase the current 15% renewable power source contribution to a 90% penetration in the future.

Tron Engebretsen, Statkraft, described Norway, Finland, Sweden and Denmark's regional Nordic Power System, highlighting the potential to enhance renewable energy sources, and identifying challenges ahead including, for example, social acceptance of large wind farms or reservoirs, and technical improvements needed to compensate for fluctuating wind supply.

Maretta Sander, International Geothermal Association, presented on combining geothermal energy with other technologies such



Maretta Sander, International Geothermal Association

as solar power or biomass, and noted resulting advantages in increased fuel efficiency and economic viability.

In the ensuing discussion, one participant lauded the renewable energy sector for using a systemic perspective, but cautioned against using hydropower as the "battery" of the system, since this could have detrimental ecological effects on rivers upstream. Other participants highlighted the potential for scaling-up solar and geothermal installations.

## REGIONAL COOPERATION FOR HYDROPOWER DEVELOPMENT

In a session on regional cooperation moderated by Torstein Sjøtveit, CEO, Sarawak Energy, Chair Miguel Zydan Sória, Itaipu Binacional, summarized the Global Workshop on Regional Cooperation for Hydropower Development, held at the start of the IHA World Congress, by the IHA, World Bank and ADB. He highlighted the following four main points of their discussions: assessing distant markets; regional power trading; hydropower on transboundary rivers; and structuring for public and private involvement.

Emmanuel Boulet, Inter-American Development Bank (IADB), discussed the status of regional development of power markets in Latin America, with a focus on the need for regional basin-level cooperation to optimize power generation and manage complex sustainability issues. He explained that although there are many bilateral initiatives in South America, there is little broader integration of power markets, contrasting this to power market integration efforts underway in Central America.

Takafumi Kadono, ADB, outlined regional cooperation initiatives within Asia, highlighting that ADB has a strategic advantage in bringing all stakeholders within the region together. Grania Rubomboras, Nile Basin Initiative, said that



Tron Engebretsen, Statkraft



Takafumi Kadono, ADB



Jasper Oduor, EAPP

the Initiative, which was formed in 1999, advances cooperation between its 10 member states and highlighted its two-track approach to "build trust and capacity" and to establish a cooperative framework.

Jasper Oduor, Eastern Africa Power Pool (EAPP), noted that the mandate of the EAPP is to facilitate the development of the electricity market of the region and optimize energy resource usage, and lamented the delays in the development of adequate physical infrastructure.

In an extensive discussion of economic and pricing issues in regionally-integrated markets, participants raised questions on setting tariff levels, affordability of power and subsidy options for poor consumers when power is traded internationally.

Participants also discussed: the length of time needed to develop regionally-integrated power markets; infrastructure harmonization for bilateral and regional power trade; political, as well as technical, barriers to regional cooperation; and enabling environments for attracting private sector investment and developing public-private partnerships in hydropower. On capacity building, Boulet noted efforts by IADB to gather and share examples of best practices, and Kadono described ADB's work on assisting countries with policy and regulatory framework development so they can capitalize on their resources. In conclusion, Rubomboras pointed to the potential for sustainable resource development through continued cooperation, and Oduor highlighted the role of hydropower in stabilizing the power system and lowering its costs.

## MARKETS AND INCENTIVES

Jean-Michel Devernay, Deputy Managing Director, EDF Hydro, chaired and moderated the session, noting that the question of financing underpins most discussions of hydropower, and described the IHA's working group on markets and investment. Outlining predictions in the recent IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation of a growth of hydropower, roughly doubling capacity by 2050, he said that the financing for this expansion is likely to be met since hydropower is, in many cases, the most cost-effective way of providing electricity.

On the theme of carbon markets, Philipp Hauser, GDF Suez, commented that carbon markets can support the development of a portfolio of green energy. Hauser observed that while Organisation for Economic Co-operation and Development (OECD) countries have mature energy matrices, and so must rotate assets to reduce emissions, non-OECD countries need immediate economic incentives to pursue clean energy for economic growth and development.



Philipp Hauser, GDF Suez



In response to questions, Hauser called the CDM “ineffective” but a “first step” towards carbon markets, noting that the integration of the CDM with Nationally Appropriate Mitigation Actions (NAMAs) moves the international community in the right direction.

Participants discussed the contribution of storage-based hydropower in compensating for variability in a renewable energy portfolio, noting that run-of-river projects have had a better reputation but do not provide additional water storage benefits. They also discussed benefit sharing associated with carbon trade for hydropower projects.

Karin Seelos, Statkraft, recognized that the market does not provide the right price to encourage alternative energy sources, but underscored in spite of higher costs, producers should consider that such sources provide ancillary services to stabilize the grid, for example to provide power during peak load and thus allow optimum thermal operation. Chair Devernay pondered the complexity of valuing these ancillary services and participants reflected on how policy and jurisdictional fragmentation lead to poor knowledge of the synergies and efficiencies that may be achieved by diversifying power sources.



Karin Seelos, Statkraft

Colin Clark, Brookfield Renewable Power, noted that sponsors and investors of hydropower projects have a number of concerns but that the main concern is in risk and its management. Marcelo Campos Battisti, Itaipu BBA, noted that hydropower is the leader in the renewable sector with the lowest average cost, and said investors must undertake risk assessments of, *inter alia*, the regulatory environment, the predictability of cash flows and the business case. To encourage investment in hydropower, Campos Battisti called for increased government flexibility and improved environmental and social risk management.

Some participants suggested early planning for hydropower projects helps not only ensure that costs do not exceed project estimates, but also mitigates risk. Another participant suggested certain models for hydropower projects increase their risk, citing an example where project developers are committed to reparations and costs for the affected environment and communities but where they are only granted preliminary permits and licenses. Some noted that early use of panels of experts may decrease environmental risk and ensure that environmental safeguards are established.



IHA President Refaat Abdel-Malek thanked the members of the Hydropower Sustainability Assessment Forum

## CLOSING SESSION: THE FUTURE OF SUSTAINABLE HYDROPOWER

Closing the meeting, Refaat Abdel-Malek, President, IHA, reminded participants of the main achievements the past week and Lau Saili, IHA, showed a slide presentation and video with the meeting highlights. Abdel-Malek referred to the adoption of the Hydropower Sustainability Assessment Protocol, saying it took some great minds to achieve a result that balances the needs of the industry with the necessary social and environmental safeguards. He introduced the members of the Hydropower Sustainability Assessment Forum present at the meeting, who were received with a standing ovation from the audience, and he said the Forum had officially concluded its work. He then announced that Jörg Hartmann, WWF, will be the new Chair of the Governance Committee.

David Harrison, TNC, described the newly adopted Hydropower Sustainability Council Charter to guide the Protocol's implementation, and announced the constitution of a Governance Committee whose members will be elected by different Charters representing interest groups, as well as the appointment of IHA as Secretariat and Managing Entity for the Council. He said the adoption of these documents represents the official launch of the Protocol's application phase.

Representing the meeting sponsors, Margaret Groff, Itaipu Binacional, emphasized that objectives of hydroelectric projects will only be achieved when social, environmental and economic concerns are all taken into account to ensure sustainability and respond to the challenges of green growth. She also underscored it is possible to both provide sustainable hydropower and make a profit, and highlighted the need to consider multiple uses of water when designing new hydropower projects.

Terry Moss, IHA, led the audience in applause for IHA President Abdel-Malek as a leader and champion across multiple fora for the IHA and for the development of the Protocol. Moss then outlined the new process developed by the Board to decide systematically upon locations for future IHA Congresses, and announced Malaysia as the next host for the meeting in 2013.

Datuk Amar Haji Awang Tengah Ali Hasan, Minister of Public Utilities of the Sarawak State, Malaysia, welcomed participants to the city of Kuching in 2013, and invited them to a closing banquet for the current Congress. Describing Sarawak's socio-economic characteristics and hydropower resources, he outlined work on the Sarawak Corridor of Renewable Energy (SCORE) to attract energy-intensive industry to the region by developing its hydropower resources, and showed a video about the state and conference venue.

IHA President Abdel-Malek and Executive Director Taylor closed the Congress at 5:15pm and participants were entertained by a short and lively musical presentation.





IHA President Refaat Abdel-Malek thanked the corporate sponsors of the Congress

### **IHA GENERAL MEETING**

On Friday afternoon, Abdel-Malek opened the IHA General Meeting. Cameron Ironside, IHA, presented the activity report for 2010-2011, noting the continued increase in membership and revenues. Ironside outlined the activities of the working groups noting that future efforts of the Markets and Investment Group will include studies on the risk assessment and financing of hydropower, and economic analyses including the determination of the economic value of multi-purpose hydropower projects.

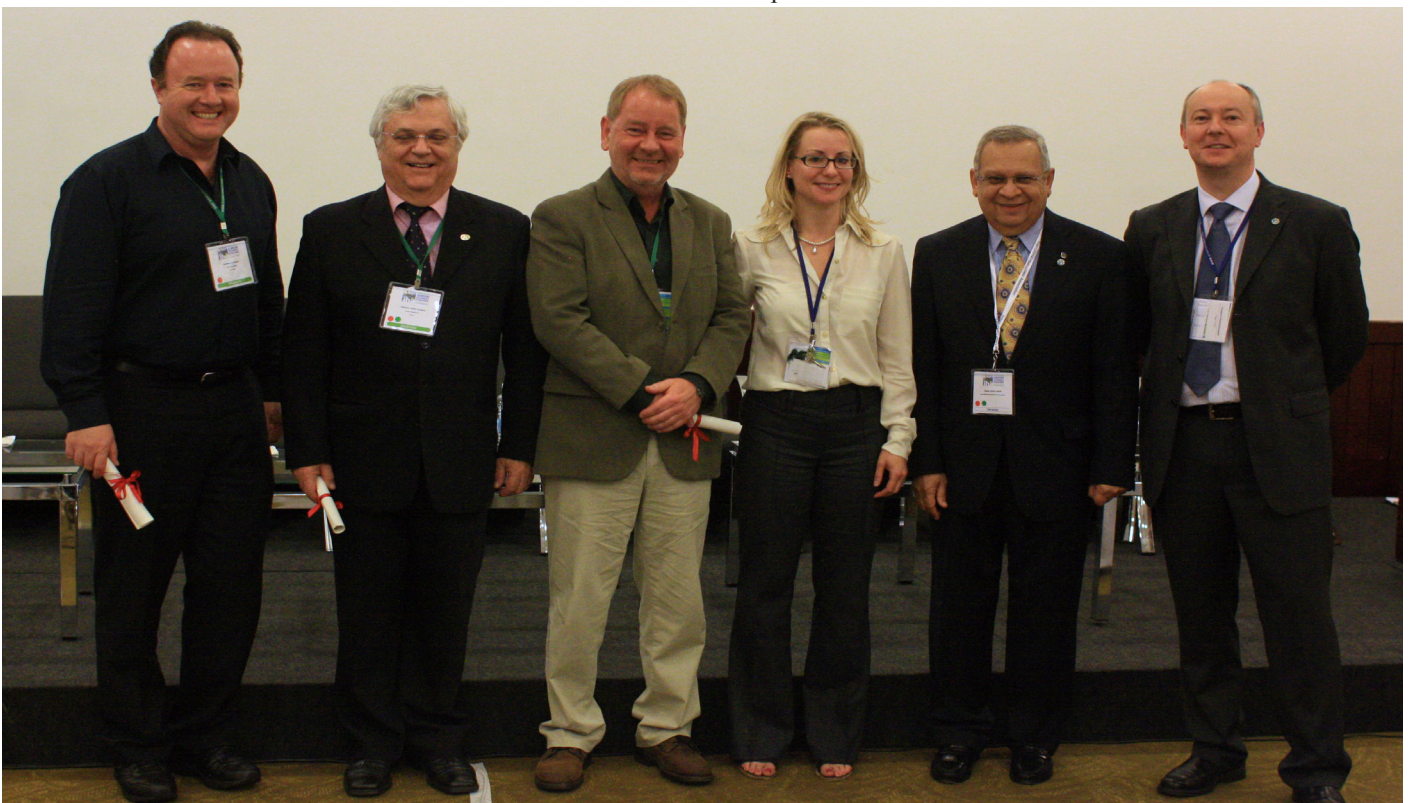
On the work of the Energy Group, he highlighted its continued contribution at various fora such as the meeting of the Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC) as well as their continued membership in the International Renewable Energy Alliance (REN). Ironside said that the Climate Group's GHG project had produced the UNESCO/IHA GHG Measurement Guidelines for Freshwater Reservoirs, and that future work on this project includes organization of workshops. He underscored IHA's adoption of the Hydropower Sustainability Assessment Protocol and noted their continued work in cooperating with sustainability partners in this area.

Terry Moss, IHA, presented the Report of the Governance Committee, highlighting that changes in constitution and bylaws had been approved, which ensure that the laws of the Association are current and remain well-suited for its

future aims. He noted the clarification and introduction of membership benefits and responsibilities for different membership tiers, as well as a mandate for the central office to further the creation of regional and national offices.

Moss presented the election procedure schedule and candidate profiles for the 2011 Board elections. He highlighted that 5 September 2011 is the deadline for submitting ballots. He then presented candidates for election or reelection, including: Refaat Abdel-Malek, MWH Global; Israel Phiri, Ministry of Energy and Water Development, Zambia; Terry Moss, Eskom Holdings; Colin Clark, Brookfield Renewable Power; Gil Maranhão Neto, GDF Suez Energy; Mário Lúcio Ozelame, Itaipu Binacional; A.B.L. Srivistava, NHPC; Lin Chuxue, China Three Gorges Project Corporation; Roger Gill, Hydro Focus; Roy Adair, Hydro Tasmania; Torsten Dale Sjøtveit, Sarawak Energy; Rasim Khaziakmetov, RusHydro; Christine van Oldeneel, Hydro Equipment Association; Dominic Godde, E.ON Wasserkraft; Jean-Michel Devernay, EDF Hydro; Karin Seelos, Statkraft; ÓGB Sveinsson, Landsvirkjun; Roland Münch, Voith Hydro; and Wolfgang Semper, Andritz Hydro.

Abdel-Malek thanked outgoing board members and, in turn, Richard Taylor, IHA, thanked Refaat Abdel-Malek for his tireless leadership of the organization. The meeting closed at 6:04 pm.



Honorees with IHA leadership during the biennial meeting



## UPCOMING MEETINGS

**Sixth Asia Clean Energy Forum 2011:** This forum, organized by the Asian Development Bank (ADB), the US Agency for International Development (USAID), and World Resources Institute (WRI), seeks to promote best practices in clean energy policy and regulation, financing and investment, innovative business models, and energy access. **dates:** 20-24 June 2011 **venue:** ADB Headquarters **location:** Manila, Philippines **contact:** Aiming Zhou, ADB **email:** [azhou@adb.org](mailto:azhou@adb.org) **www:** <http://www.iisd.ca/yimb/energy/acef/2011/>

**2011 CIF Pilot Country Meetings:** The Pilot Country Meetings aim to provide a common space for representatives from pilot countries to share their experiences with Climate Investment Funds (CIF) activities. Meetings will include the Scaling Up Renewable Energy Program (SREP), Clean Technology Fund (CTF), Forest Investment Program (FIP), Pilot Program for Climate Resilience (PPCR), and CIF pilot countries. **dates:** 20-26 June 2011 **venue:** Cape Town International Conference Center **location:** Cape Town, South Africa **contact:** CIF Administrative Unit **www:** [http://www.climateinvestmentfunds.org/cif/pf\\_2011\\_pilot\\_country\\_meetings](http://www.climateinvestmentfunds.org/cif/pf_2011_pilot_country_meetings)

**Vienna Energy Conference 2011:** The Conference, organized by the UN Industrial Development Organization (UNIDO), will facilitate an international dialogue on providing universal energy access and on the multiple co-benefits of increasing energy efficiency, under the banner “Energy for All: Time for Action.” **dates:** 21-23 June 2011 **location:** Vienna, Austria **contact:** Vanessa Masegg, UNIDO **phone:** +43-1-26026 3773 **email:** [v.masegg@unido.org](mailto:v.masegg@unido.org) **www:** <http://www.unido.org/index.php?id=1001185>

**CIF Partnership Forum 2011:** The CIF Partnership Forum 2011 provides an opportunity for all stakeholders to contribute to deepening global understanding of climate change and development in the CIF context. In addition, stakeholders unable to attend the meeting in Cape Town are invited to participate in an online live-streaming event of the sessions titled “Greening Clean Energy Sources: Managing the Social and Biodiversity Trade-Offs for Wind Energy,” which will take place on 24 June 2011 in the morning. **dates:** 24-25 June 2011 **location:** Cape Town, South Africa **contact:** Lina Karaoglanova **phone:** +1-202-458-1801 **email:** [lkaraoglanova@worldbank.org](mailto:lkaraoglanova@worldbank.org) **www:** [http://www.climateinvestmentfunds.org/cif/partnership\\_forum\\_2011\\_home](http://www.climateinvestmentfunds.org/cif/partnership_forum_2011_home)

**High-Level Africa Consultative Forum on Renewable Energy:** The International Renewable Energy Agency (IRENA) is convening a meeting to discuss specific implementation challenges facing Africa with respect to renewable energy technologies, as well as practical approaches to generate the critical policy and technical information, advice and capacity that is required to support the extensive deployment of renewable energy in Africa. **dates:** 8-9 July 2011 **location:** Abu Dhabi, United Arab Emirates (UAE) **contact:** Mahenau Agha **phone:** +971-241-79-062 **email:** [magha@irena.org](mailto:magha@irena.org) **www:** <http://www.irena.org/menu/index.aspx?mnu=Subcat&PriMenuID=30&CatID=79&SubcatID=105>

**Inter-American Dialogue on Financing Low-Carbon Electricity:** This Dialogue aims to encourage debate and share perspectives and experiences in investment policies and regulatory frameworks for electricity generation projects with low-carbon emissions. **dates:** 22-24 August 2011 **venue:** ECLAC Headquarters **location:** Santiago, Chile **contact:** Federico Bernardelli **phone:** +56-2-210-2182 **email:** [federico.bernardelli@cepal.org](mailto:federico.bernardelli@cepal.org) **www:** <http://www.e8.org/en/index.jsp?numPage=118&numFiche=258>

**Third Meeting of the Group of Experts on Global Energy Efficiency:** The Group of Experts will continue work on the Global Strategy for Energy Efficiency Market Formation.

**dates:** 17-18 October 2011 **location:** Geneva, Switzerland **contact:** Viktor Badaker, Project Manager GEE21 **email:** [viktor.badaker@unece.org](mailto:viktor.badaker@unece.org) **www:** [http://www.unece.org/energy/welcome/Calendar\\_Meeting.html](http://www.unece.org/energy/welcome/Calendar_Meeting.html)

**Caribbean Renewable Energy Forum 2011:** This annual event, co-sponsored by the Inter-American Development Bank, CARICOM, and the Organization of American States, will look at policy and regulatory issues and the forces driving finance and investment in renewable energy sources in the Caribbean context, and the scope for a regional approach. **dates:** 12-14 October 2011 **location:** Bridgetown, Barbados **contact:** Matthew Perks **phone:** +1-845-440-7800 **email:** [mperks@caribbeanenergyforum.com](mailto:mperks@caribbeanenergyforum.com) **www:** <http://www.caribbeanenergyforum.com>

**International Year for Sustainable Energy for All:** In December 2010, the UN General Assembly adopted a resolution proclaiming 2012 as the “International Year for Sustainable Energy for All” (Resolution 65/151), aimed at creating “an enabling environment for the promotion and use of new and renewable energy technologies, including measures to improve access to such technologies.” **date:** year-round **location:** worldwide **www:** [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/65/436](http://www.un.org/ga/search/view_doc.asp?symbol=A/65/436)

**Fifth World Future Energy Summit 2012:** The fifth edition of the World Future Energy Summit will promote innovation and investment opportunities surrounding alternative energy, clean technology and environment. **dates:** 16-19 January 2012 **location:** Abu Dhabi, UAE **contact:** WFES Director Ara Fernezian **phone:** +971-2-4446113 **fax:** +971-2-4443768 **email:** [ara.fernezian@reedexpo.ae](mailto:ara.fernezian@reedexpo.ae) **www:** <http://www.worldfutureenergysummit.com>

**Second Session of the IRENA Assembly:** The second IRENA Assembly is scheduled to take place in January 2012. **dates:** 14-15 January 2012 **location:** Abu Dhabi, UAE **contact:** Adnan Amin, Executive Director **phone:** +971-2-4179001 **email:** [secretariat@irena.org](mailto:secretariat@irena.org) **www:** <http://www.irena.org>



Iguaçu Falls