

INTERNATIONAL
HYDROPOWER
ASSOCIATION



2013

IHA HYDROPOWER REPORT

This report covers the period from April 2012 to March 2013.

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2013

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IHA

The International Hydropower Association (IHA) is a non-profit organisation, working with a network of members and partners to advance sustainable hydropower.

IHA's mission is to build and share knowledge on the role of hydropower in renewable energy systems, responsible freshwater management and climate change solutions. IHA champions continuous improvement in the hydropower sector through dialogue with all stakeholders.

Membership is open to individuals and organisations that support IHA's mission. IHA networks include: public and private companies, governments, NGOs, financial institutions, communities and academia.

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Introduction

Welcome to the 2013 IHA Hydropower Report. This document builds on previous activity reports; it has an expanded section on the hydropower sector globally and regionally, and reviews the activities of IHA over the last year.

IHA has worked with members and partners in many initiatives throughout the year, and this Report attempts to summarise these activities. Within the association, members have become increasingly active in the various committees and working groups. The Board and Central, National and Regional Offices have also worked together closely. Externally, IHA's many partners have engaged with enthusiasm, and progress has been made in building understanding and sharing knowledge. Perhaps the best example of the strength of collaboration is the number of partners that have agreed to help build and enrich the 2013 IHA World Congress programme. We very much look forward to this landmark event in May, and thank all the organisations involved.

Our work on sustainability has grown, and the increasing number of organisations committed to utilise the Hydropower Sustainability Assessment Protocol demonstrate the value of this multistakeholder initiative. The Sustainability Partners in particular, with whom a major part of our sustainability work is done, are to be thanked. In addition, we would like to congratulate the first accredited assessors, and we look forward to the progression of official Protocol assessments.

Throughout the world, an increasing number of developers and investors are entering the hydro sector, or extending their activities beyond their own country. Some 30GW of new hydropower has been commissioned in 2012, including about 2GW of pumped storage. IHA has been able to track this information through the IHA Hydropower Database. The database is becoming a comprehensive reference source, and this will help monitor hydropower investment, deployment and related markets. The work on setting up the database has been a major task of the IHA Hydropower Development section, and the contribution of its Statistics and Knowledge Management working group is very much appreciated. It will continue to be a focus of our efforts going forward. Response to media requests and requirements relating to collaboration with various international organisations has already improved in consequence.

IHA needs to work hard to engage with the growing hydropower community. There has been a considerable thirst for information on good practice, and the expectations on IHA continue to grow.

IHA is a network. Our strength is in the depth and breadth of the relationships with members and partners. The contribution of everyone involved drives us in our vision to advance sustainable hydropower. We look forward to the year ahead with great appreciation of past achievements, and enthusiasm for the work we have before us.

Global Overview

2012 has seen significant investment in hydropower in all regions of the world. IHA estimates that 27-30GW of hydropower and 2-3GW of pumped storage was commissioned throughout the year.

Trend 1: Hydropower contributes to regional collaboration and interconnection

Increasing demand for the security of supply of both water and energy continues to drive development

on a regional basis. Hydropower operators are seeing increased intersectoral and transboundary collaboration to manage water and develop power systems beyond national boundaries.

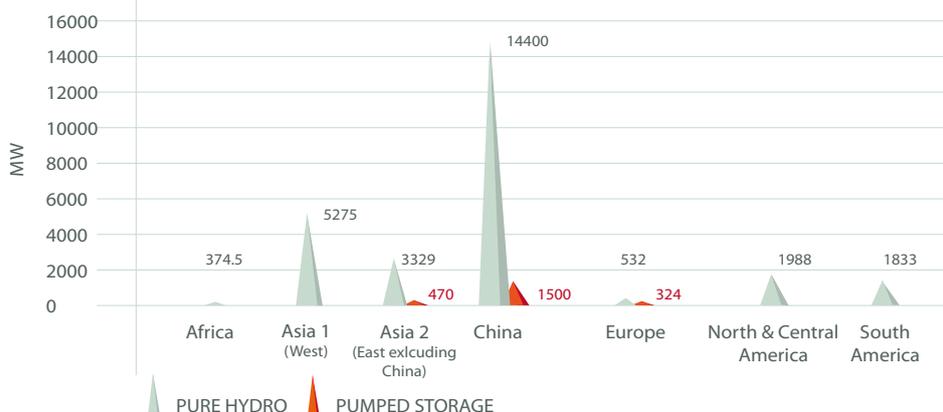
This collaborative success on the water management level is amplified by a global trend for electricity interconnection between countries. Most continents are working to build transmission lines between countries and to pool power. Examples include Central America's

Electrical Interconnection System (SIEPAC), Africa's power pools, as well as efforts to further extend the European system. Transmission over longer distances are also increasingly possible with stretches of the world's longest transmission line, the Madeira River 600kv Transmission Line in Brazil, expected to be completed in 2013.

Trend 2: New players in hydropower investment

Investment in hydropower projects is becoming increasing global with investors exploring new regions. Examples of this development are South Korea's investment in Nepal, Pakistan and the Philippines, and China and India driving investments in Africa.

IHA ESTIMATES OF ADDED HYDROPOWER CAPACITY IN 2012



This development has often been accompanied by renewable energy support policies; for example, as with the United States and Japan. In addition, emerging regional carbon trading schemes, for example in Australia, China, or Colombia, are also encouraging investment in low-carbon energy sources.

2012 has also been a year of hydrological extremes, seeing both record productions at major projects, such as Itaipu Binacional, Brazil, and Three Gorges, China, as well as significant droughts. Often, these extremes have occurred in the same countries at different times or different provinces.

Country	Capacity End 2012 (MW)	Pipeline Capacity (MW)
Global	516.7	~3000.0
South Korea (Tidal)	254.0	2,200.0
France (Tidal)	240.0	0
Canada (Tidal)	20.0	0
United Kingdom (Ocean)	1.2	498.0
Russian Fed (Tidal)	1.7	12.0
USA (Ocean)	0.2	2.5
Spain (Ocean)	0.3	0
China (Tidal)	3.2	50.0
India (Tidal)	0	250.0

Installed and planned tidal and ocean capacity worldwide (IHA estimates)

This trend brings new foreign direct investment into regions that have had few options to develop infrastructure previously. Private investment often enables smaller projects to be built in a shorter timeframe. An example in 2012 was the inauguration of the Chinese-financed 120MW Djibloho project in Equatorial Guinea. This project was built in four years and now satisfies 90% of the country's electricity demand. In contrast, projects with a multitude of international lenders and institutions often experience delays.

To encourage further foreign investment, planned projects need to have a reliable local customer to reduce risks on electricity sales. Robust power purchase agreements, as well as establishment of regional power pools are helping overcome this challenge.

This new private investment can, however, present challenges for regional strategic development. It will become increasingly important for planning agencies and regulators to build capacity and to implement environmental and social policies that support infrastructure development.

Trend 3: New developments in hydropower technology

The upsurge in hydropower development has also spurred research and seen improvement of technologies. Further to regular refinement of the design of turbines, materials and reservoirs, recent additional developments in 2012 were the increased research in and implementation of tidal hydropower, adaptation to an increasingly renewable energy mix, pumped storage and fish-friendly infrastructure.

Tidal and ocean hydropower, where available, are emerging as significant technologies. IHA estimates that 516MW of tidal and ocean hydropower is currently installed worldwide. Potential projects in the pipeline amount to at least 3GW, with more proposed in the longer term. Viability of this source and specialist equipment are still under investigation and companies are working with research institutes to improve the technology. Notable projects in 2012 included the French refurbishment of the 240MW La Rance project after 45 years of successful operation and South Korea's official completion of the world's biggest tidal project, the 254MW Sihwa Lake station.

Significant investment is also continuing into pumped storage technology, particularly variable speed pumps, with the continuing expectation that this technology will be required to back up short-term variability from renewables such as wind and solar.

The necessity for fish passage often causes environmental concerns around hydropower projects and may even result in considerable costs in civil works and equipment. To combine the need for healthy ecosystems with the necessity for water and electricity supply, researchers are exploring solutions. The US Electric Power Research Institute (EPRI), for example, is currently undertaking research both in the area of development of fish-friendly hydropower turbines that cause minimal injury to passing fish and in the collection of more general information on fish behaviour at passages and ladders and the effectiveness of such measures.

Countries in North and Central America by hydropower capacity
(Source: IHA Hydropower Database)

Country	Capacity (GW)	Increase 2012 (GW)
United States	99.9*	0.2
Canada	77*	0.7
Mexico	12	0.8
Costa Rica	1.6	0
Panama	1.4	0.3
Others	5.1	0.1
Total	197	2

* includes pumped storage

North and Central America

North and Central America still have significant undeveloped hydropower potential, as well as a need to upgrade and modernise existing ageing facilities. To facilitate hydropower development, investment in additional transmission infrastructure is also required.

Canada is currently the world's third largest hydropower generator with more than 75GW of installed capacity, and there is scope to more than double its existing capacity.

Addressing regulatory hurdles would help to enable hydropower development. The Canadian Government's Budget Implementation Act (Bill C-38), enacted in June 2012, is intended to streamline the review process for all types of projects. While the Act is also intended to strengthen environmental protection, environmental groups in Canada hold different opinions. Some measures found in Bill C-38 are already in place, although other implementation policies and regulations are yet to be developed. For example, policies and regulations associated with changes to the Fisheries Act still need to be made. Until all measures have been fully implemented, it will be difficult to discern if the Bill has improved approval processes for hydropower developers.

Three major new projects went online in 2012: the 200MW Wuskwatim HPP, the 225MW Shipshaw upgrade, and the 768MW Eastmain-1-A HPP. Projects being prepared or under construction include the 824MW Muskrat Falls project, the 640MW Romaine-2, the 695MW Keeyask, the 550MW Mica-5&6 extension, and the 270MW Romaine-1. Completion for these projects is expected between 2013 and 2017. A notable current

diversion project is the construction of the Niagara Tunnel in Ontario, which will divert flow from the Niagara River underneath the city of Niagara Falls to the existing 1,997MW Sir Adam Beck station.

Canadian hydropower operators are also increasing installed capacity through the upgarding of existing stations. The Lower Mattagami station in Ontario, for example, will add 440MW of capacity to the region without building a new dam.

Elsewhere in Central and North America, hydropower development is also taking place. Examples are the 750MW La Yesca project in Mexico and the 305.5MW Reventazón project in Costa Rica. Costa Rica has also undertaken pre-feasibility studies on five projects, including the 200MW Savegre and the 127MW Ayil sites. The Dominican Republic has recently invited expressions of interest to rehabilitate ageing facilities, including the 113MW Tavera and the 98MW Jigüey stations. Panama also plans to increase its installed hydropower capacity by 720MW through 30 new hydropower plants. Challenges to hydropower development in Panama include insufficient transmission systems and divided public opinion on the acceptability of specific projects.

*Eastmain-1-A hydroelectric powerhouse, officially inaugurated on 28 June 2012.
Photo: Hydro-Quebec*



Central American Interconnection

Regional integration and affordable, reliable electricity are essential for Central American development. The Central American Electrical Interconnection System (SIEPAC) is an on-going interconnection project of six countries: Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.

The interconnection system is the infrastructure component of the treaty on a Central American Electricity Market, which was signed by all six countries in 1996. Following this treaty, a regional electricity market (MER) was created and national laws are being harmonised to facilitate electricity trading in the region.

Upon completion, SIEPAC will run from Panama to Guatemala in a single 230 KV dual direction transmission line with 15 substations. The direction of the electricity flow will be determined by needs and pricing within the MER.

Through the connection of national electricity grids, SIEPAC is expected to alleviate power shortages, to reduce operating costs, and to enable market access for larger projects. In a second stage, it is also intended to connect the MER with larger neighbouring markets such as Colombia and Mexico. Finally, creating a larger electricity market is also hoped to encourage investment in the abundant renewable resources, which could help to reduce the reliance on fossil fuel imports (fuel oil and diesel) for generation.





New turbines were installed at Holtwood hydropower station last year, bringing its capacity from 107MW to 232MW

Photo: PPL

United States

US policy-makers face the need to grow the overall share of renewable energy and manage an ageing generation and transmission infrastructure. While a clean energy or renewable electricity standard is yet to be established on a national level, many states have instituted a renewable portfolio standard (RPS) that requires retail electricity suppliers to provide a minimum percentage of electricity from renewable sources, and establish a variety of tax incentives and subsidies. As of March 2012, 29 States and the District of Columbia and Puerto Rico have an RPS. Each state sets its own targets and designates which technologies will be eligible. While hydropower is recognized as a fully renewable resource, its inclusion as an eligible technology varies from state to state. Where RPSs include hydropower, there are often conditions on size, location or date that limit its eligibility. However, there has been a trend in recent years towards more inclusive treatment of hydropower.

In January 2013, the Hydropower Regulatory Efficiency Act was unanimously passed as a policy to promote the growth of mini and run-of-river hydropower through streamlining the permitting process for such types of hydropower. Also in January 2013, the American Taxpayer Relief Act included a one-year extension of the Production Tax Credit (PTC) for renewable energy development.

A major challenge for the two largest hydropower operators, the US Army Corps of Engineers and the US Bureau of Reclamation, is the ageing of existing facilities, which is causing production declines. In 2012, the median age of facilities was 47 years and 51 years respectively. As state-run organisations, both operating agencies are obliged to supply electricity at a guaranteed low price. This can provide challenges for investment in upgrades, although financing options are under review. In 2012, rehabilitation or upgrade work was performed at the 518MW Garrison, 199MW Folsom Dam, 428MW Hungry Horse, 402MW Dworshak, 1,077MW Bonneville, 2,078MW Hoover Dam, 980MW McNary, 2,457MW Chief Joseph, and 810MW Lower Granite stations. Upgrades can be an opportunity for further environmental mitigation; as part of its current upgrade, Holtwood hydropower project, for example, is enhancing anadromous fish passage.

Environmental concerns related to fish passage has led to the removal of some dams in the US. This often involves deciding on trade-offs between ecosystem restoration and the current socio-economic benefits of the projects. One example under consideration is the proposed removal of four locks on the lower Snake River in Washington. At present, these facilities have 3GW of capacity and average annual generation of 7,800GWh. They also support navigation of the river by commercial barges.

Country	Capacity (GW)	Increase 2012 (GW)
Brazil	84.2	1.8
Venezuela	15.7	0
Colombia	11.6	0.1
Paraguay	8.8	0
Argentina	7.7*	0
Others	16	0
Total	144	1.9

Countries in South America by hydropower capacity (Source: IHA Hydropower Database)

* includes pumped storage

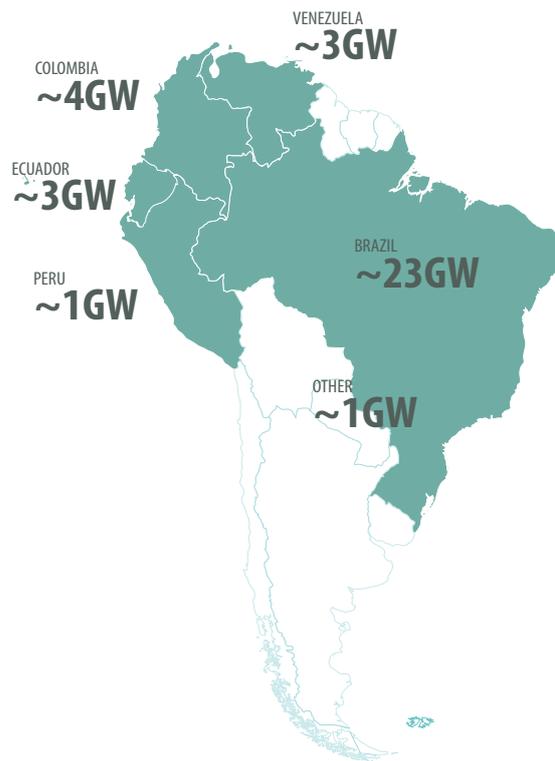
South America

South America offers a diverse picture on renewable energy development, with some countries leading, and others still reliant mostly on fossil fuels. Several countries are undergoing assessments of potential and policy reforms. Paraguay, for example, undertook an assessment of national hydropower potential throughout 2012 to identify project locations. Argentina has completed its 2030 Plan including an Energy Policy Main Axis focussing on hydropower and nuclear with the goal to reduce gas in the electricity market from 52% to 30%. Similarly Chile published its National Energy Strategy 2012-2030 which intends to increase the market share of hydropower from the current 34% to 48%. It also plans to gradually develop other renewables, including off-grid projects, which are not included in the 48% plan.

In terms of new hydropower development, Argentina is conducting the bidding for two projects on the Santa Cruz River with a combined capacity of 1,740MW. In Chile, planned development includes the 531MW Alto Maipo HPP and the 2,750MW HidroAysen. Venezuela is planning to rehabilitate six units at the 10,300MW Simon Bolivar project and is building the 2,330 MW (10 x 233MW) Manuel Piar HPP, which is expected to be completed in 2014. Bolivia has seen a pre-feasibility study for the 600MW Rositas HPP. Peru, which currently generated 65% of its electricity from hydropower, is proceeding with the construction of the 406MW Chaglla HPP, scheduled

to start operation in 2016, and has signed contracts for development of the 510MW Cerro del Aguila and the 98MW Santa Teresa HPPs.

Hydropower planned and under construction in South America



Brazil

Over the next 10 years, electricity consumption in Brazil is expected to grow at an average rate of 4.5% per year from 443 TWh in 2011 to 736 TWh in 2021. Industry is expected to account for around 50% of the country's electricity consumption in 2021. To meet this additional demand and to ensure national energy security, the Brazilian Government has been promoting the construction of new hydropower. Hydropower currently generates 80% of Brazil's electricity but there remains significant untapped potential.

In 2012, the major project commissioned was the 1,087MW Estreito HPP on the Tocantins River. In terms of on-going development, three large projects are under construction in the Amazon region: Belo Monte (11,233MW), Santo Antonio (3,150MW) and Jirau (3,750MW). Santo Antonio started partial operation in 2012. Jirau started commercial operation on 1 March 2013; Belo Monte will follow in 2014. Other projects under construction include: Teles Pires (1,820MW), Garibaldi (192MW), Simplício (334MW), Ferreira Gomes (252MW) and Colíder (300MW). Auctions that will take place between 2013 and 2015 and were prepared in 2012 included: São Manoel (746 MW) and Sinop (400 MW) on the Teles Pires River and five projects in the Tapajós Basin.

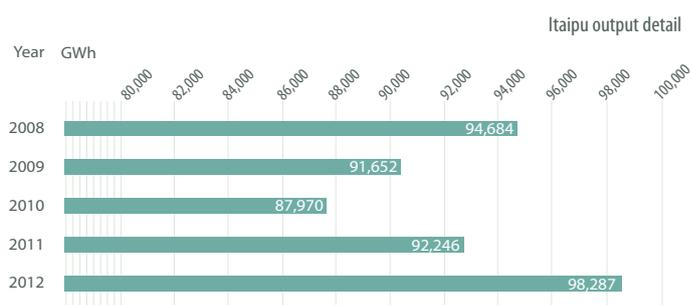
In September 2012, Brazil announced new conditions for the renewal of several hydropower generation and transmission concessions. The intention is to reduce electricity prices for consumers and to thus increase industrial competitiveness of the country. This concerns 22,000MW of hydropower generation and 85,000 km of

The 3,750MW Jirau Hydropower Project Photo: GDF SUEZ Energy Brasil



transmission lines, including Paulo Afonso (4,280 MW), Ilha Solteira (4,251 MW) and Jupia (1,551 MW). While this policy has presented a drop in income for electricity generators, the Brazilian government has offered compensation to companies whose assets were not yet fully depreciated.

In 2012, climate events impacted on the Brazilian hydropower sector both positively and negatively. Producers faced shortages in some regions due to drought, causing awareness for the need for further energy storage projects. Itaipu, on the other hand, recorded its highest ever production year. This was due to an exceptionally wet December in the south of Brasil, as well as optimisation efforts in the river basin.



*Dilma Rousseff, President of Brazil, joined Gérard Mestrallet, Chairman and CEO of GDF SUEZ, and other dignitaries (left) to inaugurate the 1,087MW Estreito hydropower plant (right).
Photo: Tractebel Energia*



Colombia

With a development potential of 113GW hydropower, Colombia is second only to Brazil in South America. Similarly high are the potential prospects for other renewables: including 21GW of wind and extensive solar and geothermal potential.

Total installed electricity capacity is currently around 14GW with 9GW represented by hydropower. While hydropower accounted for 80% of all electricity produced in the 1990s, this decreased to 68% by 2010 with higher shares of electricity produced from fossil fuels. There are presently three large hydropower projects over 1,000MW (San Carlos, Guavio, and Chivor) and another 12 projects of over 200MW (including: Guatapé, Betania and Guadalupe). The two main projects which are currently under construction in Colombia are the 2,400MW Ituango and the 820MW Sogamoso projects. Once operational in 2018, the Ituango station will be the biggest in Colombia, setting the scene for the country's future plans.

Colombia's energy policy is defined by the National Energy Plan 2006-2025, and the Integral Energy Strategy (2003-2020). Within the planned and contracted generation expansion of 4GW through 2021, 3GW will be made up of hydropower. Recent studies indicate that wind power is available when Colombia's energy needs are highest; that is, during the dry seasons and in the early evenings. Policy-makers are therefore investigating the joint operation of wind and hydropower plants in some basins and the creation of smart grids with storage hydropower backing up wind power and other renewables.

Regional interconnection is also a stated priority. Since 2003, Colombia has been supplying surplus electricity to neighbouring Ecuador. Other potential markets include Venezuela and the Central-American Electricity market.

Country	Capacity (GW)	Increase 2012 (GW)
Norway	30.3*	
France	25.4*	
Italy	19.5*	
Spain	16.1*	
Sweden	16*	0.2
Others	119.7*	0.3
Total	227	0.5

Countries in Europe by hydropower capacity (Source: IHA Hydropower Database)

* includes pumped storage

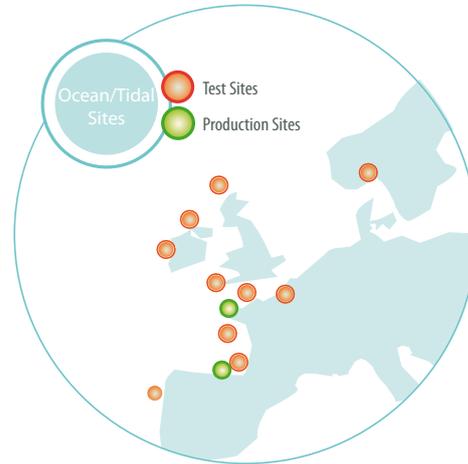
Europe

The EU Renewable Energy Directive sets the ambitious target of 20% of energy from renewable sources by 2020. This target has led to extensive investment in all types of renewables in Europe. Hydropower currently accounts for around 60% of all renewable electricity generation in Europe. Although hydropower is well developed in the region, there remains potential for new development and upgrades. New technologies such as marine and tidal projects and advances in pumped storage turbines are also occurring in the region.

In the United Kingdom and Ireland, work is taking place to develop wave and tidal hydropower. Ireland is developing 100MW project off the north coast of Antrim, Northern Ireland. The UK Crown Estate announced in 2012 that it will invest up to US\$32 million in wave projects. This money will serve to establish two demonstration projects with around 3MW capacity each. Construction is also ongoing at the 400MW Inner Sound tidal project in the UK Pentland Firth region, which is scheduled to be commissioned in 2014. The UK is looking again at development of the tidal project in the Severn Estuary, which could generate up to 5% of the UK's electricity.

Greenland is aiming to replace its diesel power plants with hydropower projects running on glacial meltwater. The latest project is the 22.5MW station for the town of Ilussat. The unstaffed project will be built 200m below the ground and operated remotely. This project is the third of its kind in Greenland after the 9MW Qorlortorsuaq project in 2007 and the 15MW Sisimut project in 2010. As a result of these and other hydropower projects, almost 70% of Greenland's electricity is now generated by hydropower.

Research and Development of new technologies for offshore hydropower is also taking place across the region.



Tidal turbine being readied for deployment at the Paimpol-Bréhat tidal demonstration farm, France
Photo: OpenHydro



Among other notable new developments in Europe are the 162MW Messorocha and the 154MW Ilarionas projects in Greece as well as the 150MW Innertkirchen project in Switzerland. Albania is planning the rehabilitation and modernisation of up to 14 dams and will also start construction on the 280MW Devoll project in 2013. In 2012, Albania commissioned the 48MW Ashta stations, consisting of Ashta I and II. This marks the first time that hydromatrix technology has been deployed on a larger scale at a hydropower project. Instead of one large turbine, this technology employs several small ones. As a result, it is possible to utilise even low heads and increase efficiency of energy recovery at such sites.

Pumped Storage

Encouraged by European policy, the share of renewable electricity sources is growing. Other renewables are more variable and need balancing in times of excess or insufficient production. At the present time, the only scalable storage technology is hydropower, including conventional storage and pumped storage projects (PSP). Currently around 50GW of PSPs are in operation throughout Europe, and the region is seeing increased investment in new development. In April 2012, for example, Austria, Germany and Switzerland signed a declaration for the joint development of PSP.

Construction of new PSPs is underway across the continent. In 2012, the German state of Thuringia alone identified 13 PSP sites with a total potential of 5.1GW. In Switzerland, six projects with a total capacity of 4GW are planned or under construction; for example, the 900MW Nant de Drance. Austria is developing the 430MW Reißbeck and planning the 300MW Pfaffenboden PSP. Poland is refurbishing the 156MW Zydowo PSP. Portugal is developing 746MW Venda Nova III, 259MW Foz Tua and 207MW Salamonde II. The biggest PSP construction project in Europe is a 1,944MW project in Ukraine.

Several countries seek to utilise a new equipment design known as variable speed turbine technology. This will enable greater provision of grid support services in terms of quality and supply. In 2012, France started the upgrade of the 485MW Le Cheylas PSP with variable speed turbines. It is estimated that the project will generate an additional 70MWh after the upgrade. Similar installations could take place at several existing PSP in Europe, offering the opportunity to increase the back-up for greater feed-in from variable renewables and to manage the voltage and frequency regulation in the electricity grid.



*Aerial photo showing the Waldeck Pumped Storage Plant, Germany
Photo: Rolf Sturm/E.ON*

Country	Capacity (GW)	Increase 2012 (GW)
Egypt	3	
Democratic Republic of the Congo	2	
South Africa	2*	
Mozambique	2	
Ethiopia	2	
Others	15*	0.4
Total	27	0.4

*Countries in Africa
by hydropower capacity
(Source: IHA Hydropower Database)*

* includes pumped storage

Africa

For much of Africa, the integration of communities into national grids is seen as a stepping stone for development and the provision of electricity and water services to business and industry remain an investment priority for economic progress. Most of Africa has significant unexploited renewables potential. Remote areas still often rely on off-grid power generation with diesel generators or by burning biomass, and most national electricity grids depend on imported fossil fuels. While conditions vary, common challenges are capacity building, transparency and grid integration.

Development of hydropower along with other renewables is now an explicit priority for many African countries. Zambia completed civil works on the 2x 360MW machines at Kariba North Bank and work has started on the 120MW Itezhi-Tezhi hydropower station. 2012 also marked the completion of Uganda's 250MW Bujagali station, the largest private sector investment in the country's history. With the completion of Bujagali, Uganda's electricity production exceeds its demand for the first time, and industrial operations will no longer be faced with the daily outages that have compromised the country's progress. Although demand for electricity will continue to rise above current capacity, Bujagali represents a major landmark for the country.

Also in 2012, South Africa signed agreements with independent power producers as part of its newly established Renewable Energy Power Producers Procurement Programme (REIPP). The first agreements are expected to add 1,415MW of capacity to the grid through 28 renewable energy projects by 2014. Developers

of hydropower projects are eligible to bid under the programme.

Ethiopia continues with major hydropower development, including the Grand Renaissance Dam and Gilgel Gibe III. Additional projects include: Chemoga-Yeda I & II, Helele & Werabesa and Genale Dawa III. The 1,870MW Gilgel Gibe III is closest to completion and started filling in late 2012. It is expected to be operational in mid-2013 when it will be the largest operational hydropower plant in Africa. Construction has also started at the 6,000MW Grand Renaissance Dam. As well as supplying electricity for domestic use, the project's output will also be exported to neighbouring countries. In addition, the Grand Renaissance Project will store the seasonal flows of the Blue Nile River with the aim of improving water supply and reducing flood impacts downstream of the dam.

In October 2012, Equatorial Guinea inaugurated the 120MW Djibloho HPP on the Wele River. Djibloho will increase the country's electricity supply to 220MW and will meet approximately 90% of the demand on the mainland area.

The Democratic Republic of Congo (DRC) has the largest unexploited hydropower potential in Africa with only 2.4GW of its estimated 100GW developed. Development of the planned 4,300MW Inga 3 HPP was reaffirmed in late 2012 although construction is yet to begin. In August 2012, DRC signed a draft treaty with South Africa for the development of the 40,000MW Grand Inga HPP. The agreement foresees construction of extensive transmission lines to neighbouring countries.

Cameroon

With at least 23GW of unexploited hydropower, Cameroon has Africa's second largest potential after DRC. Only 3% of this potential has been harnessed at present with around 800MW of installed capacity. The main three operating projects are Edea (264 MW), Songloulou (398 MW) and Lagdo (72 MW).

For decades, poverty eradication has been given priority over investments in the energy sector, but in recent years policy-makers have reconsidered the role of reliable electricity services in bringing socio-economic development. To meet growing domestic electricity needs, there are now three additional hydropower projects under construction: Lom Pangar, Memve'ele and Mekin.

The 56MW Lom Pangar project is planned upstream of Edea and Songloulou. By serving as a regulating dam to

reduce seasonal variability, it will increase year-round production at the downstream projects and respond to water service needs in the region. The project will also reserve 30MW for rural electrification. It is scheduled to be fully operational in 2016.

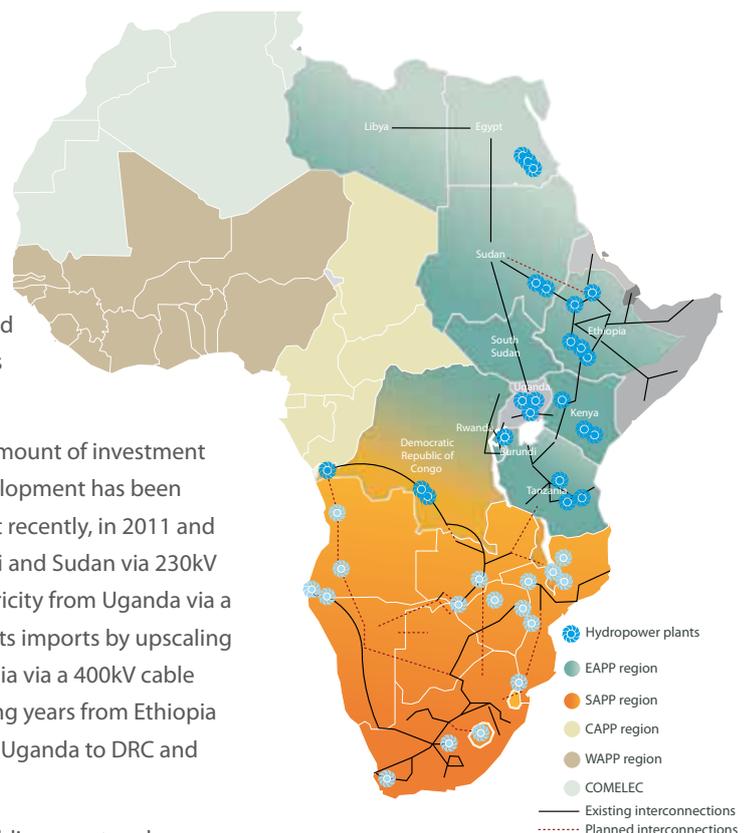
Cameroon has also recently conducted studies of its solar and wind energy potential finding that northern regions have high solar potential, while wind is abundant in the west. In 2012, the country partnered with China to electrify 1,000 villages through solar power plants. The country is currently preparing a renewable energy policy to attract partners to develop the existing potential. Renewable technology development may have implications for how hydropower is operated in the future.

Eastern African Power Pool

The Eastern African Power Pool (EAPP) is a regional body based in Addis Ababa, Ethiopia. Its mission is to pool and optimise the use of electricity in eastern Africa and to spread the availability of affordable and reliable electricity. While being rich in renewable energy potential, eastern Africa is currently marked by power supply shortages, low access to electricity, large populations, and vast territories. Since its establishment in 2005, the EAPP coordinates cross-border trade and grid interconnection in the region. The EAPP currently counts nine countries and thirteen utilities as members.

Over the past decade the region has seen a significant amount of investment in generation facilities and transmission lines. Such development has been sought by the countries but facilitated by the EAPP. Most recently, in 2011 and 2012, Ethiopia became an electricity exporter to Djibouti and Sudan via 230kV interconnection cables. Kenya has been importing electricity from Uganda via a 132kV cable since the 1950s, and now plans to increase its imports by upscaling the existing cable to 220kV and by connecting to Tanzania via a 400kV cable in 2014. Further connections are planned over the coming years from Ethiopia to Kenya and Eritrea, from Tanzania to Uganda and from Uganda to DRC and Rwanda.

EAPP also works in technical assistance and capacity building, master plan design, and feasibility, environmental and grid studies. This work is often in coordination with international donors and investors. The region is also planning transmission lines from Tanzania and Zambia to connect the EAPP to Southern African Power Pool.



Country	Capacity (GW)	Increase 2012 (GW)
Russian Federation	47.6*	2.9
India	43.2*	0.6
Turkey	19.6	0.7
Iran, Islamic Republic of	9.5*	0.8
Pakistan	6.6	0.1
Others	28.5	0.2
Total	155	5.3

Countries in West and Central Asia by hydropower capacity
(Source: IHA Hydropower Database)

* includes pumped storage

West and Central Asia (Asia 1)

Energy development in West and Central Asia has been recognised as an important condition for socio-economic development, with a strong need for regional cooperation. Significant hydropower potential remains in the region, much of it requiring management of water resources across country borders.

In central Asia, Kyrgyzstan is seeking investment in the 1,900MW Kambarata 1 project while Tajikistan plans the 3,600MW Rogun project, amongst several others.

These projects are upstream of Uzbekistan and Turkmenistan, and therefore have cross-border water requirements, such as releasing water when it is most needed for agriculture in downstream countries while generating sufficient electricity for demand in the winter months in the upstream countries.

2012 saw the registration of Bhutan's first hydropower construction company, Bhutan Energy and Infrastructure Limited (BEIL). BEIL aims to develop the country's natural resources and to accelerate on-going projects for domestic supply. The country is also planning to develop up to 3,500MW of new hydropower projects for the export of electricity to India.

In Pakistan, relief of the country's energy shortages has become a priority. In 2012 projects moved forward in terms of engineering designs and feasibility and environmental studies included Dasu (4,320MW) and



Water Resources in Central Asia (Source: Stratfor)

Kurram Tangi (83MW). The country is also exploring options around a 106MW project on the Golden Gol River.

In 2012, Nepal issued the Project Development Agreement, which will serve as a template to streamline the approval process for hydropower projects over 500MW. It was immediately applied to four projects: Arun III (900MW), Tamakoshi III (650MW), Upper Karnali (900MW), and Upper Marsyangdi (600MW). Studies also investigated resuming development of the 750MW West Seti HPP.

Hydropower development is on-going in Sri Lanka. The country inaugurated the 150MW Upper Kotwale and the 134MW Uma Oya projects in 2012, and is looking at widespread mini-hydropower development with up to 200 projects planned. Such projects will serve as community schemes to facilitate rural development.

Russia

Russia currently generates around 16% of its electricity from hydropower. There are at least 15 projects over 1,000MW in operation or under construction, and over 100 hydropower plants with lower capacity. Many of the older hydropower projects are now undergoing large-scale modernisation and safety improvements. This includes the 10,000MW Volga-Kama cascade and the 2,341MW Zhigulevskaya project. Three years after the accident at Russia's largest station, the 6,400MW Sayano-Shushenskaya, six out of ten turbines have returned to full operation. The power station is expected to be entirely restored in 2014.

Among newly built hydropower, the largest on-going construction project is the 2,000MW Boguchanskaya. As of January 2013, four of the six 333MW turbines were in operation with the full project to be completed in 2014. The project also includes construction of a cellulose plant and an aluminium smelter. Other hydropower projects to be completed in 2013-14 include the 840MW Zagorskaya 2 PSP, the 100MW Gotsatinskaya in Caucasus and the 570MW Ust-Srednekanskaya in Siberia.

Development of small-scale hydropower is happening mostly in the northern Caucasus, where the conditions



Cheboksarskaya Hydropower Plant, Russia (Photo: IHA)

are most favourable and where small projects have the potential to increase the reliability of power supply. The RusHydro Investment Programme is financing many of these projects, including Barsuchkovky (4.8MW), Sengileevsky (10MW), Stavropol (1.9MW) and Egorlykская (3.5MW), all under development 2012-2016.

Russia is also developing its far east region, which is scarcely populated but rich in mineral resources. In 2012, the government allocated US\$1.7B to the development of four hydropower stations in Siberia. Overall, Russia plans an additional 10GW of new, mostly hydroelectric capacity in its Far East. In 2013, construction of Lower Bureya project started. The goal will be to attract energy intensive industries, and also to export electricity to China.

India

In 2012, India was faced with its greatest energy security challenge. In July, a major power outage affected 600,000 people, roughly half of the country's population. The event was attributed to a grid failure resulting from electricity demand exceeding available supply. Developing the hydropower potential and increasing the grid connections between northern India and neighbouring countries can help address this supply problem.

India currently has an installed hydropower capacity of 39GW. In its 12th Five-Year Plan (2012-2017), India foresees an additional 25-30GW of development. While this goal has recently been adjusted to 10GW, India is currently starting construction at a number of projects: Baglihar (450MW), Lakhwad (300MW) Rattle (850MW), Shongtong-Karcham (450MW), Tawang 1 (600MW), Tawang 2 (800MW), as well as a 1,000MW PSP planned in the Purulia District. The country has also completed pre-feasibility studies for a 9,750MW project on the Brahmaputra River, and is collaborating with neighbouring Bhutan to develop the 600MW Kholongchu

and 570MW Wangchu projects. Both projects will be situated in Bhutan but will export power to India.

Indian state governments are also investigating regional options. Pune in the west has formed a committee to identify small hydropower production sites and to fast-track their development. Jammu & Kashmir in the north intends to add up to 8,000MW of capacity in the next decade. Similarly Assam in the north-east is planning the development of up to 149 smaller hydropower projects.

In addition to developing new power projects, the country is also expanding its transmission system both internally and with its neighbours. The intent is to provide grid stability to the region and to tap into neighbouring hydropower and natural gas resources.

India has also been a significant generator of certified emission reduction units (CERs) under the UN's Clean Development Mechanism. In 2012, the 1,000MW Karcham Wangtoo project was registered under the CDM and the 192MW Alain Duhangan station started producing CERs for the first time.

Country	Capacity (GW)	Increase 2012 (GW)
China	248.9*	15.5
Japan	46*	0.5
Vietnam	13	2.3
Australia	8.5*	
New Zealand	5.5	
Others	33.1*	0.8
Total	355	19.1

Countries in East Asia and Oceania by hydropower capacity (Source: IHA Hydropower Database)

* includes pumped storage

East Asia and Oceania (Asia 2)

Throughout eastern Asia, two factors are impacting energy policy: Asia's heavy reliance on coal and a reluctance of Asian countries to increase their nuclear capacity following the Fukushima incident in March 2011. Many countries are therefore prioritising the development of renewable energies. In June 2012, Japan introduced a feed-in-tariff that includes hydropower projects. It guarantees a payment of 0.32 - 0.45 USD/kWh for 20 years for new hydropower projects up to 30MW.

Moreover, with increasing installation of renewable energy, Asian countries are also focussing on providing back up and grid stability for variable renewables such as wind and solar. Pumped storage projects (PSP) are increasingly being built. For example, China is currently planning a 3,600MW PSP in Hebei Province, which would be the world's largest. Similarly Indonesia is building the 1,040MW Upper Cisokan PSP.

Countries sharing the Mekong River Basin – Cambodia, China, Lao PDR, Myanmar, Thailand, and Vietnam – are active in hydropower development. The region has seen major investment in hydropower throughout the last

seven years and will continue to do so until at least 2020 (see table). Challenges include strategic interconnection between countries and transboundary water resources management. These are currently being addressed through regional workshops and within institutions such as the Mekong River Commission.

Also in South-East Asia, Indonesia has moved forward the 500MW Batang Toru, the 450MW Kamara, and the 450MW Kerinci projects. The Philippines is exploring the possibility of up to 40 small and mini hydropower sites in rural areas of which some started construction in 2012. Fiji commissioned the 40MW Nadarivatu project.

Hydropower development in Asia increasingly focussed on dam safety since seismic activity in the region has left some projects vulnerable or damaged. In 2012 this unfortunately included the 120MW Stung Atay project in Cambodia and the 190MW Song Tranh 2 project in Vietnam.

Also in Vietnam, construction of Lai Chau 1200MW has recently started, as well as other projects with 80-320MW capacities. Plans to construct several major PSPs in the north and south of the country are under consideration.

Country	2005 Installed HP capacity (MW)	2012 Installed HP capacity (MW)	Capacity increase forecast	Hydropower completed in 2012 (selection)	HPP under construction (selection)
Vietnam	4,150	~12,000	17,000MW by 2020	Son La (2,400MW)	Lai Chau (1,200MW) A Luoi (172MW)
Lao PDR	680	~3,000	> 10,000MW under construction or proposed	Nam Ngum 5 (120MW) Theun Hinboun (280MW of 500MW) Xekaman 3 (250MW)	Xayaburi (1,285MW)
Cambodia	13	~200	700MW under construction 2,100MW planned or under construction	Kirirom III (18MW)	Lower Sesan 2 (400MW)
Myanmar	480	~2,600	> 40,000MW under construction or planned	Kyee ON Kyee Wa (74MW)	Chipwi (2000MW)



Bakun Hydropower Project (Spillway)



Murum Construction Site (Power House)

Malaysia

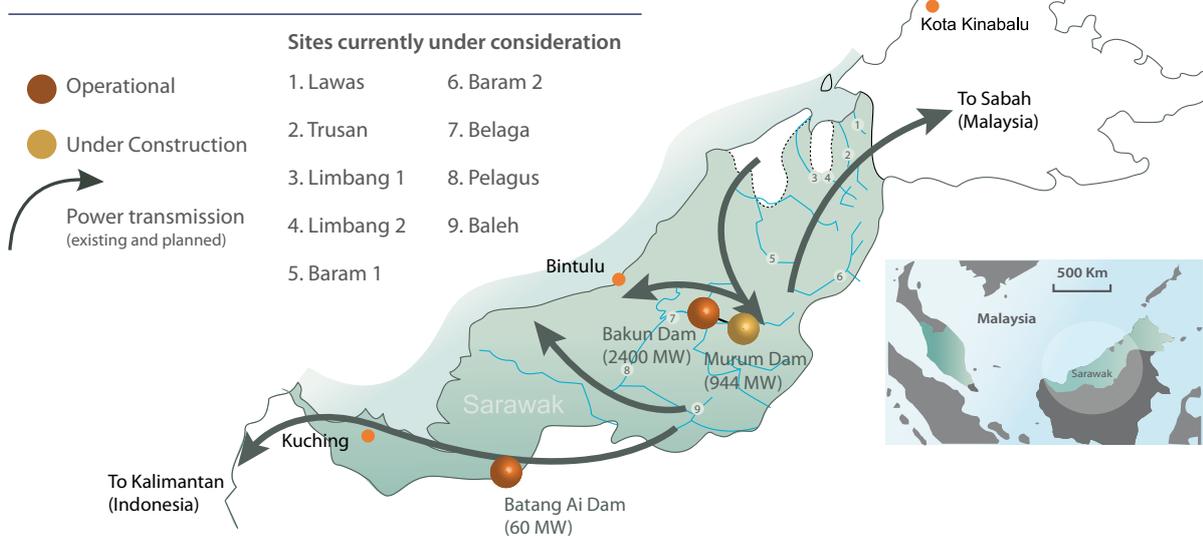
The Government of the State of Sarawak is proceeding with hydropower development to implement the Sarawak Corridor of Renewable Energy (SCORE) initiative. SCORE, one of five regional development corridors being developed in Malaysia, aims to provide reliable, clean, electricity to the population and to facilitate economic development. SCORE also aims to attract energy-intensive industries to the region.

Currently, Sarawak's electricity system is largely based on gas and coal. The goal is to shift this balance towards more renewables with up to 80% of the island's growing electricity consumption to be provided by hydropower in 2020. The 944MW Murum project is currently under construction, with impoundment due to begin in 2013.

51 hydropower sites, totalling up to 20GW, were identified by the Sarawak Government in a 1979 survey. Nine hydropower sites are currently identified by Sarawak Energy Bhd. as "highly prospective" for hydropower development (see map below).

In 2012, construction continued at the 944MW Murum project, while the 2,400MW Bakun project was being commissioned.

Elsewhere in Malaysia, Tenaga Nasional Berhad (TNB) continued construction of the 212MW Hulu Terengganu and the 372MW Ulu Jelai projects, which are expected to be ready by 2015 and 2016 respectively. Ulu Jelai was registered under the UN's Clean Development Mechanism (CDM) in October 2012.



China	2012	2011
Installed capacity (GW)	+15.5	+12.5
Generation (TWh)	864.1	662
Investment (Billion USD)	20	15

China

China is working to expand its electricity generation capacity to sustain its rapid growth. In an effort to minimise greenhouse gas emissions from fossil fuel-based power plants, China's 12th Five-Year Plan (2011-2015), foresees an additional 284GW of new capacity, including 41GW of pumped storage.

During this five year period, construction is scheduled to begin on more than 60 hydropower projects. If this estimate is realised, China will be exploiting 71% of its available realistic hydroelectric potential: 100% of that from eastern and central China and approximately 54% of the available hydroelectric power in west China. These ambitions are already being transformed in increases in hydropower installed capacity, generation and investment as the table (above) shows for the years 2011 and 2012

In July 2012, China completed the installation of the world's largest hydropower generating turbine. The Xiangjiaba station is located on a tributary of the Yangtze and will run on eight turbines with 800MW each when the 6,400MW project is completed in 2014.

Also in July 2012, the 22,500MW Three Gorges complex entered full operation when the last of the 32 turbines were installed, completing almost two decades of work. In 2012, Three Gorges is estimated to have generated 14% of China's total hydropower generation. Other major construction is currently on-going at the 13,860MW Xiluodu, the 6,400MW Xiangjiaba, and the 5,850MW Nuozhadu projects.

China is also leading in the area of investment in

renewable energy. In 2011, the country was responsible for one-fifth of the total global investment in renewable energy, spending US\$52 billion. China's goal is to have 20% of its total energy demand sourced from renewable energy by 2020. As a result of this policy, China increased its installed on-grid wind capacity to 68GW and its solar capacity to 6.2GW in 2012 and now produces more electricity from wind than from nuclear power. The aim for 2020 is 200GW of installed wind, 50GW of solar and 30GW of biomass.

China Three Gorges units installed and hydropower generated



Sustainability

Over the last year the Hydropower Sustainability Assessment Protocol has been applied across the world, on all stages of project development, with key hydropower organizations continuing to support its rollout through a Sustainability Partner model. In addition, governance and management structures have been designed around the Protocol. Within these structures, training materials have been developed for a range of scenarios, including capacity building training for civil society and industry, materials to help companies prepare for assessments and incorporate the Protocol into business systems, and training for accredited assessors.

The Protocol website (www.hydosustainability.org) continues to grow. As well as providing information about the Protocol, the site also gives information on sustainability topics and details of assessments. In the coming months it will also include official assessment

reports from assessments authorised for publication by the Protocol Terms and Conditions, providing further knowledge and learning.

An accreditation system for Protocol assessors is now in place, and the first assessors have now completed accreditation. These assessors provide the expert resource for companies wanting to use the Protocol, through training, consultation and assessments, and are the only individuals recognised by the Protocol Governance Council as qualified to undertake this work.

Support from non-industry partners, both within the governance structures and outside, continues to grow and there is increasing recognition from actors in governments, civil society and the finance sector that the Protocol can play an important role in guiding decision making and engagement with hydropower projects.



Hydropower Sustainability Assessment Protocol assessment of Landsvirkjun's Hvammur Hydropower Project, Iceland

The Hydropower Sustainability Assessment Protocol

The Hydropower Sustainability Assessment Protocol is a framework for assessing the sustainability of hydropower projects, and promoting the continuous improvement of hydropower sustainability performance. It is a globally applicable methodology that can be applied to a project anywhere in the world, regardless of the type or size, or of other uses associated.

The Protocol consists of four tools that correspond to the stage of development of the project: early stage, preparation, implementation and operation. Each tool comprises up to 23 sustainability topics of most relevance to that stage, covering all aspects of sustainability –

environmental, social, technical,

financial and institutional. A Protocol assessment report for projects at the preparation, implementation and operation stages will include scores from one to five for each topic. Scoring is an essential feature of the Protocol, providing a way to easily communicate the project's strengths, weaknesses and opportunities. This can show where the operator or developer should most effectively target their efforts, and it may support the availability of finance by meeting lenders' requirements.



Hydropower Sustainability Assessment Protocol

Sustainability Partners

Sustainability Partners are leading hydropower companies who partner with IHA to foster understanding of the Protocol and its value. These partners receive training on the Protocol, and their projects are assessed under the Partnership in a manner that enables them to incorporate the Protocol not only at project level, but also within their business systems. Fifteen entities have become IHA Sustainability Partners to participate in the implementation of the Protocol, and this number is expected to grow further this year. Sustainability partners are leading the industry in their support for the use of the Protocol.



Protocol implementation

The implementation of the Protocol is supported by three programmes: Sustainability Partnerships, the EU-funded Hydro4LIFE and a Norad funded project.

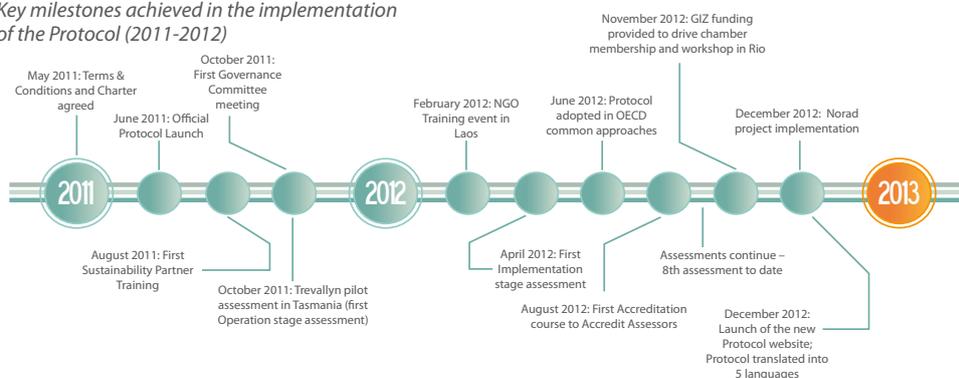
The objectives of the Norad funding are to consolidate the knowledge base on hydropower sustainability performance and to raise awareness and build capacity about the Protocol.

Furthermore, at the time of writing, eight Protocol assessments have been undertaken in Australasia, Europe, North and South America and Asia, with more than 10 assessments planned for completion in 2013, and growing numbers under discussion.

Feedback has been received from a number of Sustainability Partners regarding their experiences with the Protocol. Companies are finding that the application of the Protocol provides benefits at project and corporate level, as explained by E.ON Energie:

'Following the successful assessment at the Walchensee Power Plant, E.ON Energie concluded that the study's results can be translated into real benefits because they provide insights for: external stakeholder communication; operational excellence and continuous improvement initiatives; higher employee productivity and excellence in project management; and corporate decision-making regarding prioritisation of investments.'

Key milestones achieved in the implementation of the Protocol (2011-2012)



Furthermore, incorporation of the Protocol into business systems helps to ensure a consistent consideration of sustainability issues across different departments as explained by Steven Bartholomeusz (Sarawak Energy Berhad):

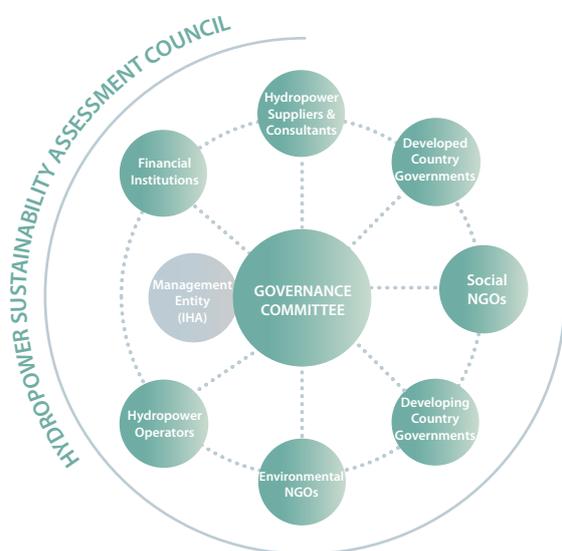
'We have used the Protocol as a guidance tool to support how we embed sustainability in our business. Considering this, in 2012 we mapped the Protocol against the Sarawak Energy Project Model. Today, our Project Design and Project Execution teams use this new roadmap to guide their projects with the support of the Corporate Social Responsibility division to ensure that sustainability issues are seriously considered when designing and building hydroelectric projects in Sarawak.'

Protocol Governance and Management

Quality control and global governance arrangements for the Protocol have been established through Terms and Conditions for use of the Protocol and a Charter governing the formation of, and decision-making through, the Hydropower Sustainability Assessment

Council. The current Council structure expands on the global, multi-stakeholder approach that was used to develop the Protocol.

The Council consists of a series of Chambers, each representing a different segment of stakeholders. Once the Chambers are established in the coming months, they will elect chairs and alternate chairs who will come together to form a decision-making Governance



Committee. All decision-making in the Chambers and by the Governance Committee will be sought by consensus. As the Chambers are being populated, a Transitional Governance Committee has guided the governance of the Protocol through this initial period, made up largely of previous Forum members. The figure above shows the structure of the Council.

A management entity is also provided for within the Council structure, and is the organisation responsible for implementation of the Protocol. The management entity is responsible for general training and the system for accrediting assessors, translation of Protocol content, maintaining the consistency of Protocol application and results, and the development of tools such as a standard report format and assessment database, and reports to the Governance Committee on its work in these areas. The management entity currently resides in the Central Office of IHA.

Quality Systems

As the Protocol is rolled out, the Governance Committee has emphasised the importance of ensuring that it is applied in a consistent manner, to an appropriate standard, and that it will deliver results that are uniform, irrespective of where it is used. The keystone of this approach is the accreditation of assessors qualified to use the Protocol. The accreditation requirements include completion of a substantial programme of training authorised by the Protocol Council and adoption of a code of conduct, with assessors regulated by a license. Assessors will also need to demonstrate previous experience relevant to the hydropower sector and have participated in at least two Protocol assessments under an already accredited assessor prior to being granted a license.

The accredited assessor training course provides a detailed understanding of the Protocol methodology as well as assessment best practice, following the ISO19011



IHA Vice President Dr. Roland Münch talking at a Hydropower Sustainability Assessment Protocol training event

guidelines for quality and environmental management systems (EMS) auditing. Aspiring assessors will also need to be accredited to an auditing course with a high element of the principles of ISO19011 in a relevant field, such as EMS or social auditing. The first Protocol accredited assessors training course took place in London in August 2012, providing accreditation to a group of five assessors. Dr Bernt Rydgren (ÅF Consult), one of the first accredited assessors explained:

'The Protocol adds significant value to sustainability management in the hydropower sector. It is a sector-specific tool developed in a multi-stakeholder environment, enabling a more effective, targeted assessment of an individual project. One aspect I believe will be especially important for its uptake is the lack of a "pass and fail". The most significant Protocol-implementation experience for me so far is the depth and detail a Protocol assessment can achieve in a comparatively limited amount of time, even of large, complex hydropower projects.'

Further courses will be held during 2013.

Only accredited assessors are mandated by the Governance Committee and Council to work with companies on Protocol assessments, including provision of consulting services and assessments. Given the knowledge base being developed through and by this group, which includes a number within the IHA Central Office, it is vital that companies wishing to engage meaningfully with the Protocol do so using accredited individuals.

Moving forward

Ongoing engagement with financial institutions, development banks, governments and regulators will enable greater awareness of the additional benefits of the Protocol use, and IHA and the Governance Committee will work to partner with these key stakeholders during this year. Implementation of the Protocol will continue through Sustainability Partnerships, Hydro4LIFE and the Norad project; further assessors will be accredited to expand this body of experts and ensure the uniform application of the Protocol.

A number of regional workshops to introduce the Protocol will be run for hydropower developers, operators, governments and civil society. The IHA World Congress on Advancing Sustainable Hydropower will take place in Sarawak, Malaysia, from 21-24 May 2013 with a number of topics focussed on sustainability issues, including the Protocol. Prior to this event, the election of Chamber Council representatives will take place at the annual meeting of the Governance Council. The results will be presented at the IHA World Congress.



Hydropower Sustainability Assessment Protocol events in Iceland (left) and Romania (right)

Hydro4LIFE

Hydro4LIFE is an EC funded project which has delivered Protocol training workshops and assessments to hydropower companies and other stakeholders within in the EU, including E.ON Energie, EDF, Scottish and Southern Energy, Andritz, Alstom and Voith. The workshops have also been attended by representatives from export credit agencies (for example, OeKB, Coface and Euler Hermes), investment banks (such as Société Générale and Credit Agricole), consultants and regulators. An example of the outcomes of work in this regard is affirmation of the Protocol by the OECD in its Common Approaches in June 2012. The project has also allowed IHA to present the Protocol at a number of key fora, such as the 17th International Seminar on Hydropower in Vienna in November 2012.



NORAD project

In December 2012, IHA received funding from the Norwegian Agency for Development Cooperation (Norad) under a project to promote and use the Protocol in developing economy countries. The project runs from December 2012 until December 2016 and will demonstrate the value of including sustainability criteria into project decision making at an early stage. It will also build capacity amongst developing country regulators, regional bodies, and civil society in the identified countries.



Hydropower Development

The current Hydropower Development work programme was set by the IHA Board at the end of 2011. During the year, Programme Director Tracy Lane joined the team to lead the programme and develop work plans for the identified activities. Following a review and assessment of the priority tasks for the programme, five working groups were established to guide the planning and delivery of the Hydropower Development Work Programme. These working groups are: Climate Change, Regional & Renewable Systems, Risk & Finance, Statistics & Knowledge Management, and Water-Energy Nexus.

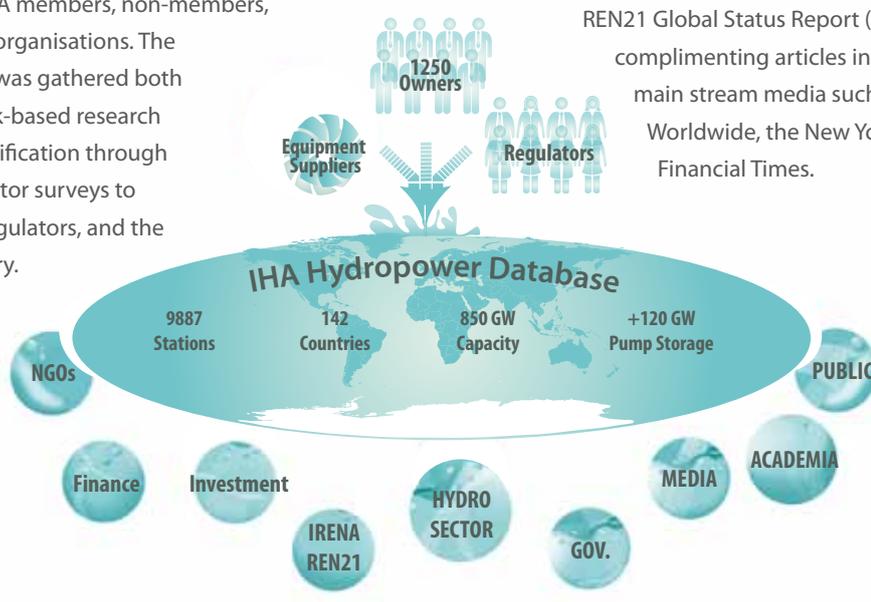
Statistics & Knowledge Management

During 2012, IHA significantly progressed with the development of the IHA Hydropower Database. As of March 2013, IHA has recorded over 1,100 entities who either own or operate almost 10,000 hydropower stations with 967GW (including 120GW of pumped storage) capacity, in 144 countries. This was achieved through work with IHA members, non-members, and partner organisations. The information was gathered both through desk-based research as well as verification through owner/operator surveys to members, regulators, and the wider industry.

Progress on the IHA Hydropower Database was made possible with collaboration between the IHA Central Office team in the UK, a team from Entura in Australia, and contractor support, both in Europe and Asia. A robust database has been developed by IHA to house the data, with access provided to those working directly on data collection and analysis. As described previously in this report, IHA estimates that in 2012 the world's installed hydropower capacity grew to 985GW, with an additional 130GW of pumped storage capacity. The estimated hydropower production for 2012 is 3,400TWh.

For 2013, IHA will continue to collect and refine the data on capacity and generation at the station level. IHA will be strengthening relationships with owner/operators and regulators to develop a richer data set.

IHA uses this data internally and supplies IHA members with up-to-date sector analysis. External uses have included input in sector-reports such as the annual REN21 Global Status Report (GSR), as well as complimenting articles in both specialist and main stream media such as Hydro Review Worldwide, the New York Times and the Financial Times.



Risk & Finance

Clean Development Mechanism

IHA continues to monitor and to report on Clean Development Mechanism (CDM) updates. As of 5 March 2013, of the 8,013 renewables projects active in the CDM pipeline, 2,899 (36%) are hydropower with a potential combined installed capacity of 138GW.

If all the projects currently active in the database were approved they would represent almost 50% (392,569,745) of total credits delivered for renewable energy projects per year (826,802,000).

New host countries in 2012 were Albania, Cambodia, Georgia, Kenya, Lao PDR, Macedonia, and Nicaragua.

In April 2012, the 1,000MW Karcham Wangtoo project in India was registered with the CDM and is the largest project to have reached this stage so far. The biggest project at validation stage is the 3,750MW Jirau project in Brazil. There remain however significant regional gaps with the Asia-Pacific region counting the majority of CDM projects and Africa merely 10%. To assist under-represented regions participate in the CDM, the UNFCCC established two regional collaboration centres in Africa (Togo and Uganda) during 2012-2013.

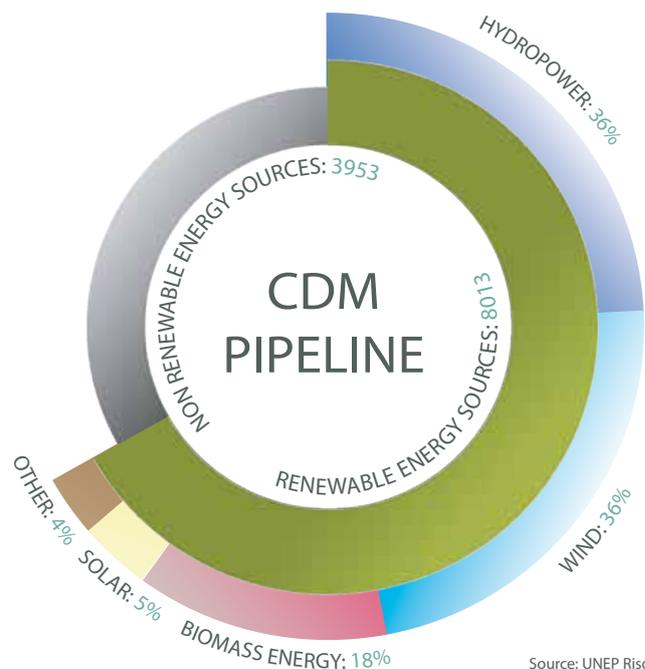
EU Emission Trading System

In late 2012, the EU undertook a public consultation on the European Emission Trading System (ETS), which represents the world's largest buyer of CDM credits.

Stakeholders and experts in the field of the European carbon market were invited to comment on proposed structural reforms. IHA submitted a brief response to the consultation in February 2013.

Green Climate Fund

In October 2012, Songdo, Incheon City, South Korea was selected to host the Green Climate Fund (GCF). GCF is now actively recruiting to staff its operations and IHA will seek to make contact with the GCF administration to provide a point of contact on matters related to hydropower.



Source: UNEP Risoe,
5 March 2013



The 1,000MW Karcham Wangtoo project, India, currently the largest hydropower project registered with the CDM.
(Photo: JP Power Ventures)

CDM taskforce contributions to Policy Dialogue

At the UN Climate Change Conference in 2011, a CDM Policy Dialogue was launched to take stock of lessons learned implementing the CDM and to recommend how to structure the mechanism in the future. IHA members formed a task force, to prepare a submission from the hydropower sector. Key recommendations from this submission are:

1. Renewable energies are fundamental for clean and sustainable growth of developing countries.
2. The benefit and cost of renewable energies should be judged at a system level.
3. The CDM modalities and procedures have to be streamlined and the distinction between small and large CDM projects should be eliminated.
4. The CDM must evolve towards a global offset mechanism indirectly, and subsequently directly, linking existing and emerging carbon markets.
5. Additionality assessment must be simplified based on sound economic rationale and the recognition of NAMA policies.
6. The debate on the sustainability of hydropower must be addressed based on sound, science-based criteria. This should inform any discussion on additionality and eligibility of projects.
7. Burden for proof of environmental integrity and meeting of sound sustainable practice must deliver confidence without choking initiatives with excessive requirements.

The private sector is ready to take its responsibility to finance and develop an environmentally sound and efficient RE matrix if CDM regulation is reformed to eliminate risks and adequate mechanisms for financing and risk management are established.

The Final Report of the CDM Policy Dialogue was published in September 2012 and can be downloaded from www.cdmpolicydialogue.org.



IHA workshop on EU Water Policy and Hydropower Workshop, London, September 2012

Water-Energy Nexus

The Water Framework Directive (WFD) requires all member states of the European Union (EU) to prepare river basin management plans and to achieve 'good ecological status' (GES) or 'good ecological potential' (GEP) for their waters by 2015. Implementation of the WFD is dependent on the member states and varies in each country. These differences have been shown to influence hydropower operations across the EU. To achieve clarity on WFD impacts on hydropower operations and to inform policy makers, IHA surveyed European operators in 2012. In September 2012, IHA also organised a workshop on Hydropower and European Water Policy. The following key observations were communicated to the EU Commission's Directorate General for Environment:

1. Stronger interaction with the hydropower sector will be important in meeting Europe's water and energy policy objectives.
2. All three pillars of sustainability are incorporated in the WFD and social and economic aspects should receive the same attention as those of the environment during the Directive's implementation.
3. Both designation and classification of water bodies should be carried out on a case-by-case basis, and, if proposed, ecological enhancement measures should be subjected to cost-benefit analyses prior to becoming a recommended action.

More broadly, the impact of energy generation on water resources continues to be an important topic. At the 6th World Water Forum in March 2012, EDF accepted the leadership of an initiative to create an Evaluation Framework for Energy Impacts on Water. Outcomes of this initiative are expected at the 7th World Water Forum in 2015. Throughout 2012, EDF ensured co-chairing of the initiative by the World Water Council (WWC) and the World Energy Council (WEC), and recruited experts and organisations to contribute to the work. IHA is part of the initiative's steering committee, participates in the working group on renewable energies and attended its first workshop in Paris in January 2013.

Climate Change

Greenhouse Gas Project

During 2012, the UNESCO/IHA GHG Status of Freshwater Reservoirs Project published an initial Risk Assessment Tool (beta version) for the scientific and industrial community to review and test. The tool is intended to assist project developers to predict a site's potential for GHG emissions using simple site-specific parameters, thereby avoiding the need for long-term measurement programmes at sites where there are no issues. This Risk Assessment Tool marks an important milestone of the project and will, over the coming two years, be further refined to incorporate the concept of net emissions and allocation of impacts among reservoir uses. IHA invites suggestions and comments on the tool, which can be accessed on the IHA website.

2012 also saw the publication of a set of Frequently Asked Questions on GHG fluxes associated with reservoirs on the IHA website: www.hydropower.org/iha/development/ghg

IHA would like to thank the following project sponsors who have confirmed sponsorship arrangements for an additional two-year period through 2015: Statkraft, SN Power, and the Hydro Equipment Association. IHA also thanks the expert contributors to the Project, along with the peer review group and others who have provided support and contributions to the project's work.

Special thanks are due to Dr Joel Goldenfum who worked as the Project Manager for the Greenhouse Gas Project up until September 2012 as part of his four year secondment to IHA from the Federal University of Rio Grande do Sul, Brazil.

COP18

IHA Central Office attended the 18th climate negotiations of the United Nations Framework Convention for Climate Change (UNFCCC). IHA activities during the conference included staffing an IHA stand and participating in a REN Alliance press conference and side event entitled "Towards 100% Renewables: Case studies and examples from regions and municipalities". The IHA presentation highlighted the example of hydropower and geothermal integration in Iceland. It was agreed that the REN Alliance will organise a similar side event at COP19 in Warsaw, Poland. IHA also attended a number of climate-related side events, and followed the outcomes from the perspective of hydropower.

Tracy Lane, IHA Programme Director, presenting as part of the REN Alliance side event at COP18





Kristin Schumann, IHA Policy Analyst, staffing the IHA stand at COP18



Roy Adair, IHA Board Member, speaks at the World Future Energy Summit

Regional & Renewables Systems

Energy systems around the world are increasingly interconnected, including regional power pools and trans-boundary cooperation around energy and water resources. An efficient integration of renewables also requires greater cooperation among technologies and across borders.

In this context, hydropower actors are increasingly influenced by regional policies and directives. IHA is uniquely placed to build knowledge on initiatives around the world, and to engage with partners and stakeholders to understand and promote good practice in the area of regional cooperation. This includes improving knowledge on renewable energy systems.

IHA's newly established Regional Systems Working Group is the reference entity that guides the work of IHA in this area. The working group is also steering IHA's ongoing collaboration with the Renewable Energy Alliance, which promotes all forms of renewable energy and examines the complementarities between them, as well as collaboration with the International Renewable Energy Agency (IRENA). The outputs and knowledge gained through this work will be incorporated into IHA's work programme.

In 2012, the work was progressed through regional events organized in Kuching (Malaysia) and Rio de Janeiro (Brazil), which both included an important component on regional cooperation. IHA also participated in the Abu Dhabi Sustainability Week and the Abu Dhabi International Renewable Energy Conference by facilitating a session reviewing the evolution of hydropower in modern energy systems, as well as participating in a

session on the role of hydropower as an energy storage technology, emphasizing hydropower's growing contribution to renewable energy systems through the storage of water.

More specifically on renewable energy systems, IHA continues to actively engage with other renewable energy organisations. REN Alliance members, for example, have committed to attend each other's events over the next years. In 2012 this included the World Wind Energy Conference. In 2013, IHA will attend the World Wind Energy Association Congress in June 2013 and the International Solar Energy Society Congress in November 2013. Similarly, there will be a session on "Renewable Systems" at the IHA Congress 2013. IHA will also, as part of the REN Alliance, attend the COP19 Climate Conference (Warsaw, Poland) in November 2013, which will take forward the theme of "Toward 100% Renewables" from the REN Alliance's successful presence at COP18 in Doha in December 2012.

IHA has also strengthened its relationships with REN21 by formally joining the REN21 Steering Committee in January 2013 and continues to work towards formalising collaboration with IRENA



Map showing IHA's activity and reach over the past 12 months

Communications

Sharing knowledge with members and hydropower stakeholders is a key activity of IHA. Communication is carried out in the form of regular on-line and print reporting, face-to-face meetings, participation in events (organised by IHA or by its partners), and direct interactions with media.

Over the year, IHA has developed its communications team with the addition of a Design and Communications Officer.

Outreach initiatives

A special emphasis has been put on outreach at the national and regional levels. IHA organised meetings with members in South and Central America and China, and translated a number of publications into Chinese, Spanish and Portuguese.

Meetings with hydropower stakeholders, including regulators, developers and operators, were held in Mexico, the Philippines and Indonesia. IHA officers also engaged in many individual meetings with national energy champions (see map), and organised regional forums to discuss local development challenges and solutions.

Media engagement

Work carried out last year developing the Association's public relations activities and building plans and processes for responding to media enquiries came to fruition this year, resulting in interest from a number of media outlets from within the renewable energy sector and beyond.

Daily tracking of news and media allows the communications team to brief IHA Central Office and the Association's members with latest developments and highlight media coverage.

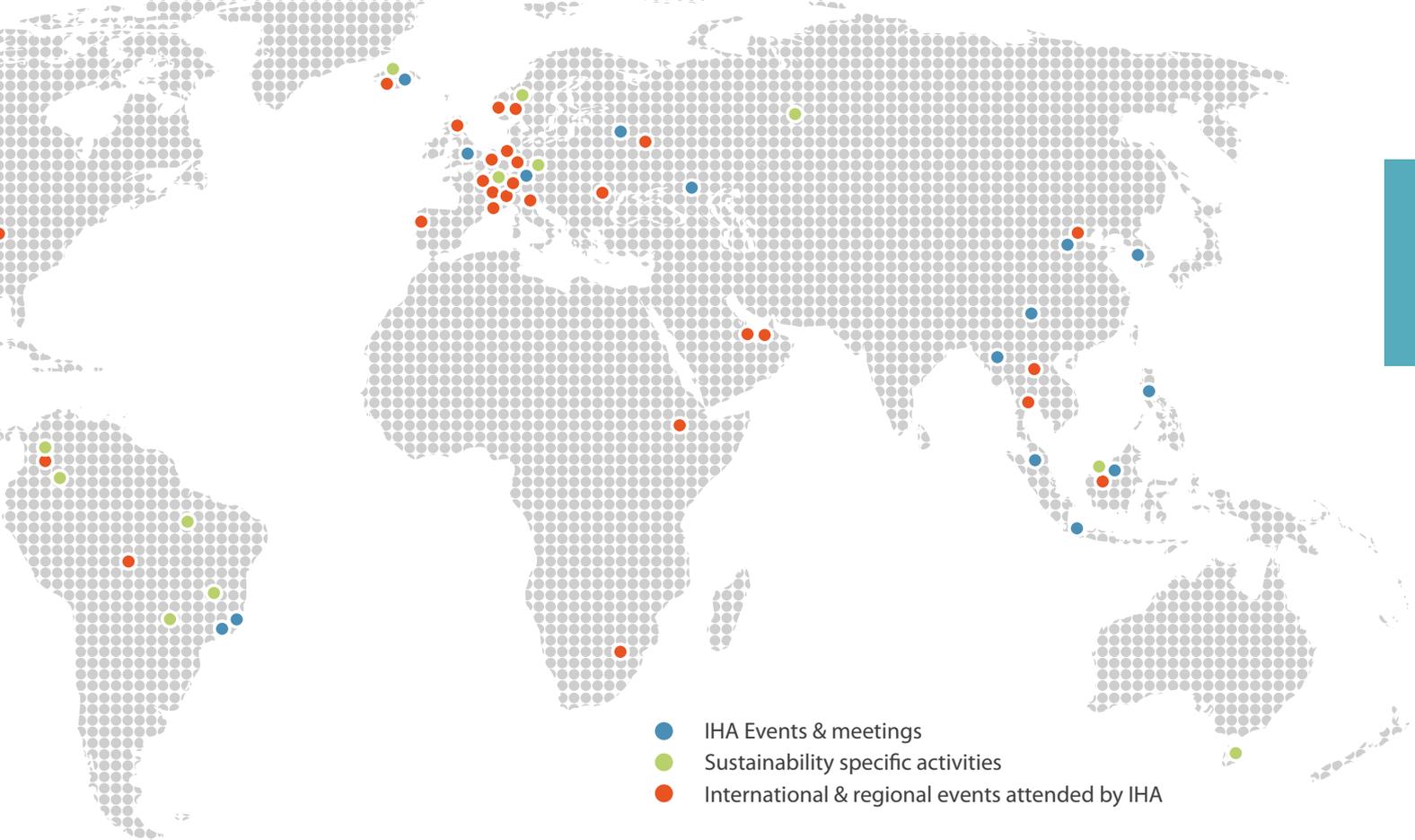
IHA spoke with, and received coverage in, a number of publications and outlets, including but not limited to, the Financial Times, Bloomberg, Talk Radio Europe, Hydro Review Worldwide (HRW) and special publications such as World Future Energy Summit magazine, and RioPlus Business.

Staying in touch with IHA

Members are invited to stay in touch with the work of IHA through Transmission, a weekly update on Central Office activities that includes news of interest from the sector.

Members can also get involved through the Communications network, comprising communications specialists from across IHA's membership. The network contributes to shaping the Association's messages and materials.

On the web, hydropower.org remains a key way to explain the Association's mission. The website has grown over the past year to include sections highlighting the different



strands of work, as well as a central space to download IHA publications.

IHA is also present on various social media sites. Photographs of events that IHA organises or attends, along with pictures of IHA projects and other hydropower-related imagery, are uploaded to Flickr. Pictures are placed under a Creative Commons license, giving journalists and others access to a collection of approved free-to-use images.

Other social media tools used by the Association include Twitter, which is used to alert followers to recent updates and developments; YouTube is used to share interviews and other videos and SlideShare allows access to presentations given at IHA events.

IHA's sustainability team has also provided a substantial contribution to the review of the Hydro4LIFE website on the Hydropower Sustainability Assessment Protocol, to make it easier to find information about the Protocol, its history, governance and funding. The website includes a comprehensive information section on sustainability.



Regular publications:

- IHA Connect newsletter
- IHA Transmission e-mail newsletter
- IHA Currents Congress magazine
- IHA Hydropower Report

Links:

- www.hydropower.org
- www.hydrosustainability.org
- www.ihacongress.org

- Photos: www.flickr.com/photos/hydropower
- Videos: www.youtube.com/user/ihaveideos
- Presentations: www.slideshare.net/hydropower
- Twitter: [@iha_org](https://twitter.com/iha_org)

Regional Forums

Continuing its efforts started in 2011 in Africa, IHA organised two regional forums in the last year to discuss hydropower development with decision-makers and stakeholders from Asia-Pacific and Latin America.

The first meeting took place in Kuching, Sarawak in May 2012 and was organised with the support of Sarawak Energy Bhd. The second event was organised in partnership with the Inter-American Development Bank, the German International Cooperation (GIZ) GmbH and Odebrecht Energia. This event took place in Rio de Janeiro, Brazil, in November 2012.

Asia-Pacific Business Leaders

The Regional Hydropower Business Forum (10 May) attracted 120 participants from Australia, Cambodia, China, Indonesia, Malaysia, the Philippines and Singapore.

The forum included discussions on the latest developments in Sarawak, in particular the Sarawak Corridor of Renewable Energy, as well as hydropower's role in driving regional integration. Other experiences of hydropower development in the region were used for comparison,



with some critical issues being brought to the fore, for example the need for appropriate regulatory framework and for capacity building in key aspects of hydropower development that are under particular scrutiny.

A special emphasis was put on sustainability initiatives, with contributions from civil society. Participants described existing social and environmental programmes, and IHA presented its Sustainability Partnership programme.

Attendees, Regional Hydropower Business Forum Asia, May 2012





Regional Hydropower Business Forum Latin America, November 2012

Decision-Makers in Latin-America and the Caribbean

The Regional Leadership Forum: Hydropower and Sustainable Development (12-13 November) brought together developers, operators, financial institutions, government and civil society representatives from Latin America and the Caribbean. Countries represented included: Brazil, Colombia, Costa Rica, Dominican Republic, Guyana, Honduras, Paraguay and Peru.

The forum served to highlight experiences and explore innovative solutions for sustainable hydropower development in Latin America and the Caribbean.

The key issues discussed in the Forum were:

- Transmission and cross-border interconnections,
- Multiple use of water and acceptance of hydropower projects,
- Financing, including for environmental and social investment
- Environmental issues at the system planning and project levels
- Communications with and support from local communities
- The use of sustainability benchmarking tools to identify strengths and correct witnesses of hydropower projects.

Speakers included representatives from the UN Economic Commission for Latin America and the Caribbean, Latin America Energy Organization (OLADE), World Water Council, Latin-American Development Bank (CAF), and

the Center for Research on Traditional Populations Cuniã (CPPT) from Brazil.

Participants acknowledged the emerging regional consensus on sustainable hydropower and agreed to continue dialogue and capacity building.

Regional matters in the IHA Congress

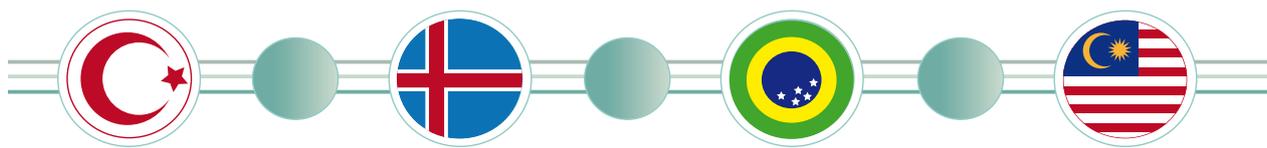
Participants from multilateral and private financial institutions, planning agencies, government, civil society and business organisations from various regions of the world will be invited to continue the conversation on regional development during the upcoming IHA Congress.

The Workshop on Hydropower and Regional Development will link together the knowledge built during the regional events.

It will identify key elements of success in three types of initiatives:

1. establishing power-intensive activities where the energy resource is available
2. interconnecting electricity grids for greater security and efficiency, and
3. planning water and energy strategically in a river-basin

This event will take place on 20 May 2013, immediately before the IHA World Congress in Kuching, Malaysia.



2007: Antalya, Turkey

2009: Reykjavik, Iceland

2011: Iguassu, Brazil

2013: Kuching, Malaysia

IHA World Congress

Since 2007, the biennial IHA World Congress on Advancing Sustainable Hydropower provides an international forum to present and discuss real-world solutions to energy, water and climate challenges. It offers an opportunity to inform policy-makers, shape action and set future strategy.

IHA organises its Congress with the help of a number of sponsors and partners, and in close collaboration with host governments: Turkey in 2007, Iceland in 2009, Brazil in 2011 and Sarawak, Malaysia in 2013. The Congress also benefits from the support of a host company, Sarawak Energy Bhd. in 2013.

One of distinctive characters of the IHA World Congress is its diversity: the event brings together a broad range of participants and perspectives, making it the world's most important gathering of hydropower decision-makers and stakeholders. In 2011, participants from more than 75 countries participated in the Congress in Iguassu, Brazil, representing governments, industry, research institutes, civil society, financial institutions and other international organisations.

The IHA World Congress is also interactive and informative: discussion sessions are organised in plenary or in smaller groups, and designed to provide a platform for lively discussions and exchanges of experience between participants.

What is modern hydropower?

Over the course of three days, the Congress covers all aspects of modern hydropower development, from policy to practice, with first-hand accounts from decision-makers and on-the-ground experts.

In 2013, participants will address the evolving role of hydropower in energy, water and climate policies; how better planning at the national and regional level can ensure that energy provision does not compete with water management; how hydropower can be incentivised to help with adaptation to climate change; and so on.

As hydropower experiences unprecedented growth in many parts of the world, the Congress will also look at discrepancies between countries and regions, compare opportunities, and identify risks and barriers to investment.

Themes covered during the Congress echo the work programme of IHA; the Congress gives a chance to review the progress made by the Association, and bring in new external perspectives on the topics.

Regional development

Although international by nature, Congress discussions are enriched by the experience of the country or region in which they take place. In 2013, the Congress will be held for the first time in Asia, where the urgent need for energy brings about specific impetus for planning and development.

Following up on previous events, and using the experience of Sarawak as backdrop, the 2013 World Congress will put special emphasis on regional development, and the role that hydropower is playing in this process, including the provision of energy for clusters of power-intensive activities to uplift a region. A workshop on regional development will take place ahead of the Congress and provide elements of discussion for a focus session later in the week.

Incorporating sustainability into business practices

As the flagship event of the Association, the Congress is the international reference for exchanges on hydropower sustainability.

Tackling challenging questions, such as the articulation of economic development and social and environmental standards in developing countries, the Congress will also look at practical experiences with project-affected communities.

The Congress will give an opportunity to update participants on the progress of the sustainability Protocol. The first Sustainability Protocol Governance Council will be held in Kuching, and a special gathering of Sustainability Partners is planned. Participants will be invited to discuss emerging roles for the Protocol.

Directions for hydropower

The Congress is a unique occasion for the Association to present and gather feedback on its activities. It is also a means for the hydropower sector to receive guidance from external parties.

Since the first edition, the Congress is coupled with a general meeting of the Members, and a meeting of the IHA Consultative Council.

The Consultative Council brings together 70 heads of organisations and high-level executives involved in hydropower development, including finance, government and civil society representatives. Proceedings from the meeting serve to guide the work of the association in the next two years and are discussed throughout the Congress.



Announcing the IHA Congress at International Energy Week (IEW) 2012, Kuching

The IHA Board meets three times a year in different locations around the world.



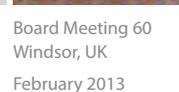
Board Meeting 58
Volgograd, Russia
June 2012



Board Meeting 59
Beijing, China
October 2012



Board Meeting 60
Windsor, UK
February 2013



IHA Board



Dr. Refaat Abdel-Malek
IHA President

International Hydropower
Association



Mr. Richard M. Taylor, F.E.I.
Executive Director

International Hydropower
Association



Mr. Ken R.F. Adams
IHA Vice President

Senior Vice President, Power Supply
Manitoba Hydro



Mr. Roger Gill, BE, MAICD
IHA Vice President

Managing Director and Principal
Consultant
Hydro Focus Pty, Ltd.



Mr. Gil Maranhão Neto
IHA Vice President

Director of Business Development
GDF Suez Energy Brasil/ Tractebel
Energia S.A.



Dr. Terry Moss
IHA Vice President

General Manager
ESKOM Holdings Pty, Ltd.



Dr. Roland Münch
IHA Vice President

President and CEO
Voith Hydro Holding GmbH & Co. KG



Mr. Roy Adair
CEO
Hydro Tasmania



Prof. Dr. H. Dogan Altinbilek
Retired from the Board, February 2013



Jean-François Astolfi
Senior Executive Vice President
EDF



Mr. Colin Clark
Managing Partner & Chief Technical Officer,
Brookfield Asset Management Inc.



Prof. Dr. Dominik Godde
Director Hydro Fleet Germany,
Global Unit Generation
E.ON Kraftwerke GmbH



Mr. Rasim Khaziakhmetov
Director of Technology Policy
RusHydro



Mr. Chuxue Lin
Vice President
China Three Gorges Corporation



Mr. Mário Lúcio Ozelame
Assistant to the Executive Technical Director
Itaipu Binacional



Mr. Israel Phiri
Manager, OPPPI
Ministry of Lands, Energy & Water Development



Ms. Marie-Anne Sauvé
Senior Advisor – Strategic Planning
Hydro-Québec



Ms. Karin Seelos
Vice President
Statkraft Energi AS



Mr. Wolfgang Semper
Senior Vice President
Andritz Hydro



Mr. Torstein Dale Sjøtveit
CEO
Sarawak Energy Berhad



Mr. A. B. L. Srivastava
Retired from the Board, June 2012



Ms. Elsbeth Sande Tronstad
Executive Vice President
SN Power

IHA Central Office

The IHA Central Office includes the office of the Executive Director and five divisions: Operations & Membership, Finance, Communications, Hydropower Development, and Sustainability. The Central Office staff work closely with the IHA Board, Committees, Working Groups and Networks. The Central Office is also in close collaboration with the National (China) and Regional (South America) Offices. Reporting to the Executive Director, the activities of the Central Office are carried out by the following officers:

Operations & Membership

Ms Kate Steel

Operations Director, ks@hydropower.org

Ms Lucy Hazell

Support Officer, lh@hydropower.org

Finance

Mr Stelios Vassileou

Finance Director, sv@hydropower.org

Ms Lorna Charles

Assistant Accountant, lc@hydropower.org

Communications

Mr Gregory Tracz

Communications Manager, gt@hydropower.org

Ms Sharon Bruton

Design & Communications Officer, sb@hydropower.org

Mr Mat Simpson

Communications Officer, ms@hydropower.org

Hydropower Development

Ms Tracy Lane

Programme Director, tl@hydropower.org

Ms Kristin Schumann

Policy Analyst, krs@hydropower.org

Mr Simon Smith

Market Analyst, ss@hydropower.org

Vacant position, Climate Specialist, tbc.

Sustainability

Mr Cameron Ironside

Programme Director, ci@hydropower.org

Mr Douglas Smith

Senior Sustainability Specialist, ds@hydropower.org

Ms Aida Khalil

Sustainability Specialist, ak@hydropower.org

Mr Simon Howard

Sustainability Specialist, sh@hydropower.org

Ms Michelle Tompson

Sustainability Coordinator, mt@hydropower.org

Regional and National Offices

IHA currently has a National Office operating in China and a Regional Office covering South America, based in Brazil. Following a successful trial period of two years, the agreements for both offices were renewed in August 2012.

Each office has a dedicated full-time member of staff to act as membership liaison with relevant organisations. In addition, they participate in relevant working groups, and assist with membership recruitment, the compilation of hydropower information, translation of IHA material, and setting up of key meetings.

IHA thanks the China Institute of Water Resources and Hydropower Research and Itaipu Binacional for their cooperation in resourcing the work of the IHA China National Office and the IHA South America Office respectively.

IHA South America Office



The IHA South America office assisted with the organisation a regional members' meeting in Rio. In addition, Mr. Krauskopf Neto has acted as membership officer for IHA's many South American members, and assisted with the translation of the Sustainability Protocol.

Mr. Ricardo Krauskopf Neto
IHA South America Regional Office

IHA China Office



IHA China office has helped to facilitate meetings with potential partners and sponsors based in China. The China office assisted with translation of materials for IHA and the IHA World Congress. The office also helped make arrangements for the IHA Board to meet in Beijing for IHA Board Meeting 59.

Mr. Huang Zhenli, Director
Ms. Liping Jiang, Liaison Officer

Membership Report

IHA exists for the benefit of its members, and it is IHA's aim to have membership representative of the global hydropower sector. To that effect, the Association has worked through its Central Office, its China National Office, its South America Regional Office, and its international Board to reach out to organisations throughout the world.

The IHA Board has decided to increase its activities to recruit new members and to recognise the contribution of its existing members. A Membership Working Group has been established to work with the Operations & Membership department in Central Office to increase membership diversity.

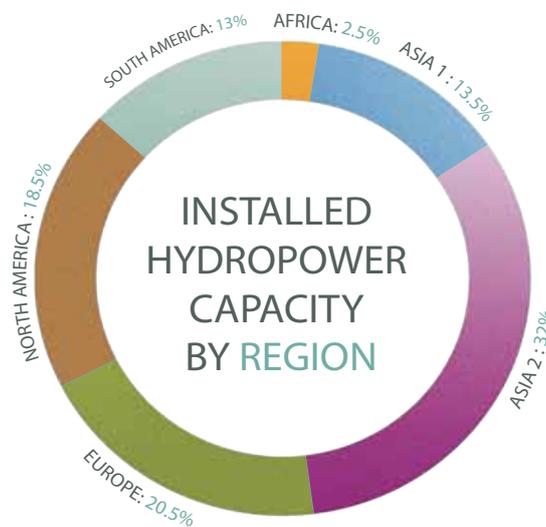
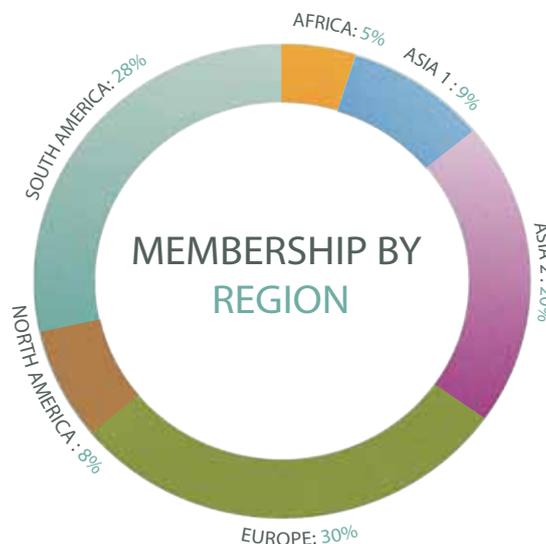
The IHA World Congress is an important opportunity to showcase the benefits of membership to non-member organisations, and so a broad range of organisations will be invited to the IHA 2013 World Congress in Kuching, Malaysia.

New organisations joined IHA and we are pleased to welcome: China Power Investment Corporation, Dongfang Electric Machinery Co.Ltd, Light Energia SA, Schluchseewerk Aktiengesellschaft, Verkis Consulting Engineers, and ACHC.

Last year key members of the Central Office team visited organisations in China and also attended a meeting of South American members. Both visits included the participation of IHA's President and Executive Director. Other visits to important regions for hydropower have taken place, and the IHA community continues to grow in depth and breadth.

IHA Central Office focusses on serving the needs of the Associations members, and engages with them to contribute to the work programme. Members of all levels are invited to participate in IHA activities.

If you think that your organisation could be a potential member, we invite you to contact Central Office for more information. Visit www.hydropower.org/join, or email membership@hydropower.org.



Platinum Sponsors



China Institute of Water Resources and Hydropower Research	China (PRC)	www.iwhr.com
China Power Investment Corporation (CPI)	China (PRC)	eng.cpicorp.com.cn
China Three Gorges Corporation - CTG	China (PRC)	www.ctgpc.com
EDF - CIH	France	www.edf.fr
Hydro Equipment Association - HEA	-	www.thehea.org
Itaipu Binacional	Brazil	www.itaipu.gov.br
JSC RusHydro	Russia	www.rushydro.ru
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EDP - Gestão da Produção de Energia SA	Portugal	www.edp.pt
ELETROBRAS	Brazil	www.eletrobras.com
Eletrosul Centrais Elétricas S.A.	Brazil	www.eletrosul.gov.br
Entidad Binacional Yacyreta	Argentina	www.eby.org.ar
Eskom Holdings SOC Ltd	South Africa	www.eskom.co.za
EuroSibEnergia Plc.	Russia	www.eurosib.ru
FURNAS	Brazil	www.furnas.com.br
GDF Suez Tractebel Energia SA	Brazil	www.tractebelenergia.com.br
Huaneng Lancang River Hydropower Co. Ltd	China (PRC)	www.hnlcj.cn
Hydro Tasmania	Australia	www.hydro.com.au
Hydro-Québec	Canada	www.hydroquebec.com
Isagen S.A	Colombia	www.isagen.com.co
Landsvirkjun	Iceland	www.landsvirkjun.com
Manitoba Hydro	Canada	www.hydro.mb.ca
NHPC Ltd.	India	www.nhpc.nic.in
Rio Tinto Alcan	Canada	www.energie.alcan.com
SN Power	Norway	www.snpower.com

Corporate One Members

AES Eurasia Enerji Yatırımları LTD. ŞTİ	Turkey	www.ictasenerji.com.tr
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Dongfang Electric Machinery Co Ltd	China (PRC)	www.dongfang.com.cn
E-CO Vannkraft AS	Norway	www.e-co.no
Empresas Públicas de Medellín E.S.P.	Colombia	www.epm.com.co
Endesa	Chile	www.endesa.cl
GDF Suez (France)	France	www.gdfsuez.com
Hatch	Canada	www.hatch.ca
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Hidroeléctrica de Cahora Bassa	Mozambique	www.hcb.co.mz
Hubei Qingjiang Hydropower Development Co. Ltd	China (PRC)	qol.qdc.com.cn
Kemijoki Oy	Finland	www.kemijoki.fi
Light Energia S.A.	Brazil	www.light.com.br
MWH Global Inc.	USA	www.mwhglobal.com
Pacific Hydro	Chile	www.pacifichydro.com
RWE Innogy GmbH	Germany	www.rwe.com
S.C. Hidroelectrica S.A.	Romania	www.hidroelectrica.ro
Sarawak Energy Berhad	Malaysia	www.sarawakenergy.com
Schluchseewerk Aktiengesellschaft	Germany	
SNC Lavalin	Canada	www.snclavalin.com
Snowy Hydro Limited	Australia	www.snowyhydro.com.au
TIWAG - Tiroler Wasserkraft AG	Austria	www.tiwag.at
Verkís Consulting Engineers	Iceland	www.verkis.com
Volta River Authority	Ghana	www.vra.com
ZESCO Limited	Zambia	www.zesco.co.zm

Corporate Two Members

All - Ukrainian Association Ukrhydroenergo	Ukraine	www.ukrhydroenergo.org
AXYS Technologies Inc.	Canada	www.axystechnologies.com
Bhote Koshi Power Company Pvt Ltd	Nepal	www.bhotekoshi.com.np
Carpi Tech S.A.	Switzerland	www.carpitech.com
Cennergi Pty Ltd	South Africa	www.cennergi.com
CKD Blansko Engineering a.s.	Czech Republic	www.cbeng.cz
Dolsar Engineering Limited	Turkey	www.dolsar.com.tr
DSD Noell GmbH	Germany	www.dsd-noell.com
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Instituto Acende Brasil	Brazil	www.acendebrasil.com.br
KONCAR-KET	Croatia	www.koncar-ket.hr
Lahmeyer International GmbH	Germany	www.lahmeyer.de
Lunsemfwa Hydro Power Company Ltd	Zambia	
Mighty River Power	New Zealand	www.mightyriver.co.nz
NuPlanet (Pty) Ltd	South Africa	www.nuplanet.co.za
PennWell Corporation	USA	www.pennwell.com
Pöyry Energy Ltd (formerly Elektrowatt)	Switzerland	www.poyry.ch
Regional Power Inc.	Canada	www.regionalpower.com
Savske Elektrarne Ljubljana d.o.o	Slovenia	www.sel.si
Stellba Hydro GmbH & Co KG	Germany	www.stellba.de
Stucky Limited	Switzerland	www.stucky.ch
Towarzystwo Elektrowni Wodnych - TEW	Poland	www.tew.pl
TRACTEBEL ENGINEERING S.A. / COYNE ET BELLIER	France	www.coyne-et-bellier.fr
Ukrhydroproject Co Limited	Ukraine	www.uhp.kharkov.ua
Upstream Ayeyawady Confluence Basin Hydropower Co. Ltd. (ACHC)	Myanmar	www.uachc.com

Governance

Governance Committee

The IHA Governance Committee meets approximately three times per year to ensure that the Association is operating in accordance with its Constitution and Bye-laws.

Membership of the Governance Committee consists of Dr Terry Moss (Chair), Mr Ken Adams, Dr Roland Münch, Mr Gil Maranhão Neto and Mr Roger Gill.

In addition, the Committee regularly reviews and recommends modifications to the Board Guidance Document, which clarifies the roles and responsibilities

of officers and organs of the Association, the rights and responsibilities of membership, terms of reference for committees, working groups, and national and regional offices. The Board Guidance Document also outlines procedures relating to the conduct of the Board and other Association meetings and Board/management interfaces.

The President, Executive Director and senior management team may attend Committee meetings by invitation as observers.

Legal Status of the Association

Work on the legal status of the organisation has progressed during the period covered by this report. While further legal review is required in order that any transition adequately caters for the forthcoming Board Elections process (see below), it is currently envisaged that a structure providing

more protection to members than the organisation's current unincorporated association status be proposed during the course of the 2013/14 membership year.

Board Elections

As the current Board, and IHA President, will stand down in October 2013, the process for Board Elections has commenced with a Call for Nominations such that a new Board may be appointed. Appointments will take effect in October 2013 and will last for two years.

A new IHA President, and Vice Presidents, will be appointed (also in October 2013) from within the membership of the new Board.

IHA Accounts

Finance Committee

The newly formed IHA Finance Committee will meet on at least a quarterly basis each year in order to recommend to the Board financial policies, targets, and budgets that support the mission, values, and strategic goals of IHA. The Committee will review IHA's financial performance against its goals and will provide input to the Board on major financial commitments and transactions. The Committee will also monitor external audits of the organisation and report its findings to the Board.

The Finance Committee's members are Mr Roy Adair (Chair), Dr Terry Moss and Mr Colin Clark.

Results for the Eighteen Months to 30 September 2012

The most recent independently audited IHA financial statements covered the eighteen month period ending 30 September 2012, resulting from a one-time accounting reference date adjustment such that material Congress cash flows may be accounted for within single accounting periods (as opposed to being split between two accounting periods). Going forwards, audited financial statements will be prepared with reference to 30 September year end dates.

During the eighteen month period IHA recognised membership revenue of £1,254,158, of which £631,608 related to membership year 2012/13 and £622,550 related to membership year 2011/12. Revenue was also derived from Congress 2011 (£688,749) and initial Congress 2013 sponsorship income (£140,756 after accounting adjustments). Other sources of funding included £171,283 of greenhouse gas-associated research funding, £269,941 of Hydro4LIFE and European-sourced Hydropower Sustainability Assessment Protocol ("Protocol") funding and £235,070 of RoW Protocol funding (all figures are stated after accounting adjustments).

IHA's Central Office functions (membership and Congress 2011/2013) achieved an overall surplus of £347,388 for the eighteen months to 30 September 2012. Taking major projects (greenhouse gas and sustainability-associated efforts) into account, overall IHA surplus for the eighteen month period stood at £318,509.

IHA Audited Accounts (£000) **Audited Results**
18 Months to
30 Sept 12

Revenue	
Membership	1,254
Congress 2011	689
Congress 2013	141
Other events and communications	9
Greenhouse Gas Research	171
Climate Change & Water Policy	70
Non-EU Sustainability	191
Hydro4LIFE	270
Total	2,795

Expenses	
Membership	39
Operations	652
Congress 2011	425
Congress 2013	141
Other events & communications	112
Greenhouse Gas Research	171
Climate Change & Water Policy	257
Non-EU Sustainability	409
Hydro4LIFE	270
Total	2,476

Surplus/(Deficit)	319
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