

# IN-SHP

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*International Network  
On Small Hydro Power*



## NEWSLETTER

### Message from the Director General



Prof. Liu Heng  
Director General, IN-SHP

I'm proud to present the sixth edition of our IN-SHP newsletter. We are an international organisation that strives to promote the use of small hydro power (SHP) as a clean energy solution to meet the growing demand for energy in the world. The network supports over 380 organisations in more than 75 countries in their small hydro power related activities. This newsletter highlights some of IN-SHP's recent and forthcoming activities.

The headquarters of IN-SHP, the International Centre on Small Hydro Power (ICSHP), is one of UNIDO's International Technology Centres. In July one of our staff members from the Project Development Division returned from his 3-month stay to Zambia, while our Multilateral Division has been busy developing a Programme of Activities for small scale hydropower in China for the Clean Development Mechanism. So again this newsletter is introducing you to other small hydropower programmes worldwide, all of which are currently under validation.

ICSHP is coordinating a report on the worldwide development status of small hydropower. This month the Editorial Board has been established constituting of 14 members from reputable hydropower, renewable energy or water organizations. Thus the Editorial Board has members that represent Asia, Europe, Africa, Latin America, North America and the Pacific Islands as well as UNIDO, UNESCAP and UNESCO-IHE. The report aims to inform SHP practitioners, policy- and decision-makers, investors, as well as those interested in clean, renewable and local energy and sustainable development. Please find more information on how you might be able to contribute to the report below.

We are tremendously grateful for your continued support and welcome any news, comments or suggestions.

## Special Events

### Update on **Zambian Mini-Hydropower Project**

After an initial site survey in Shiwang'andu, Chinsali District, Zambia in 2006, the construction has been started on the 1MW hydropower project in this April. Since Zambia's dry season is between April and December, construction including a 5m flow-over dam is planned to be finished by November of this year. It will then provide electricity within a 50km radius to the surrounding community of 50, 000 people, as well as schools, clinics and farms.



While the project is mostly funded by ZESCO, the Zambian electric company that has a market share of 99%, UNEP and GEF have provided a grant of half a million US dollars. "This is the first project that ZESCO is constructing after 30 years. Shwang'andu is a very historical place for Zambia, thus ZESCO chose this location for rural electrification", said Mr Wei Jianghui, chief of ICSHPs Project Development Division who returned on 9<sup>th</sup> of July from a three months

stay in Zambia. Zambia's rural electrification rate is 3% and its employment rate is 40%. Currently, 25 Chinese contractors, as well as up to 70 local laborers are working on the construction site every day.

In order to ensure least environmental impact, a coffer dam has been built to divert the water during dam construction. This ensures that the downstream waterfall, an important tourist attraction in the area, continues to flow as usual and a 1.5m fish gate will be fit into the dam for migrating animals, such as fish, crabs and shrimp. Once the project is commissioned, ICSHP will train up to 20 ZESCO employees to continue to run the mini hydropower plant and locals will be hired for plant maintenance. China has given Zambia



a 20 million US dollar grant for mini hydropower projects, so more hydropower projects will be built in Zambia

to support rural electrification and discontinue the use of diesel for electricity generation.

## **World SHP News**

### **1. Three small hydropower stations to be constructed in Azerbaijan**

### **2. Nepal says no to exporting hydroelectric power**

### **Three small hydropower stations to be constructed in Azerbaijan (July 25, 2011)**

News Azaz (July 25, 2011)

Three hydroelectric power stations are to be built in Azerbaijan this year, Azenco specialist Javid Shalbusov has said. The stations will be situated in Goychay, Gusar and Ismayilli regions. The next hydropower is to come on stream in Fuzuli. Shahbusov also said "A total of 200 mini hydroelectric power stations are planned across the country. These stations will be constructed in areas with hydro energy potential."

### **Small hydropower plants promote economic growth; Armenian Prime Minister**

ARKA (July 14, 2011)

The increasing number of small hydropower plants in Armenia is promoting economic growth, Prime Minister Tigran Sarkisian said at Cabinet session today after the Cabinet decided to change the category of some land areas in central Kotayk province from agricultural to industrial. Deputy Minister of territorial administration, Vache Terteryan, said small hydropower plants will be built on these land areas.

Today there are 108 small hydropower stations across Armenia with an average capacity of 130 MW, which generate 450 million kWh of energy per year. This represents about 10% of the total consumption and 8% of the total production in the country.

Other 65 small hydropower plants are under construction. By the end of 2011 the number of operating small hydropower plants in Armenia will rise to 165 with total capacity of 265 MW and annual power generation of 923 million kWh.

### **Kinlochleven small hydropower scheme approved in Scotland**

PennWell (July 7, 2011)

A new small hydroelectric project has been given the go-ahead by the Scottish Government, the government reported. The 5-MW small hydro development at Loch Eilde Mor, near Kinlochleven, is expected to generate enough renewable energy to power around 2,400 homes and create around 12 jobs during construction.

The government also approved a refurbishment of the existing Innerhadden hydroelectric scheme near Kinloch Rannoch in Perth and Kinross, which will see the installation of two new weirs with self cleaning screens. Its expected capacity is 1.4 MW.

The government's target is to meet the equivalent of 100 percent of electricity demand from renewable by 2020. In 2009, 27 percent of electricity demand came from renewable. There is around 7,000 MW of renewable capacity installed, under construction or consented around Scotland, which will take Scotland beyond the interim target of 31 percent of Scotland's electricity demand from renewable by 2011.



### **Small Hydropower Bill Advances**

Pennwell (August 3, 2011)

The Natural Resources Committee of the U.S. House of Representatives recently passed the Small-Scale Hydropower Enhancement Act, which was introduced by Congressman Adrian Smith, R-Neb. The act would exempt hydropower projects generating less than 1.5 MW from Federal Energy Regulatory Commission permitting rules.

"I appreciate the Natural Resources Committee recognizing the importance of smaller scale hydropower opportunities to an all-of-the-above approach to energy policy," Smith said. "Most think hydropower is a resource requiring a massive dam, but advancements in smaller projects offer tremendous opportunity to expand this resource as a viable option, particularly for rural consumers."

Having crossed its first hurdle, the bill now awaits consideration by the House Energy and Commerce Committee and the Transportation and Infrastructure Committee. Linda Church Ciocci, executive director of the National Hydropower Association, stated: "NHA is pleased that the Natural Resources committee has reported H.R. 795, the Small-Scale Hydropower Enhancement Act. I am thrilled that both parties recognize hydropower's undeniable benefits and passed the bill unanimously. We greatly appreciate the work of Congressman Adrian Smith, chief sponsor of the bill. He has shown tremendous leadership introducing and shepherding this legislation through the committee process."

### **National Hydropower Association applauds passage of Energy and Water budget by House committee**

PennWell (June 17, 2011)

The National Hydropower Association commends the House Appropriations Committee's recommendation of US\$50 million for the Energy Department's Water Power Program, NHA announced. Linda Church Ciocci, executive director of the NHA, said these funds are a vital investment in continued progress for hydropower research and development. Church Ciocci said NHA also is pleased to see that the funding has been equally divided between conventional and marine and hydrokinetic technologies.

Church Ciocci stated: "The hydropower industry is poised for tremendous growth, both in terms of generation and the economic benefits it provides. Over 1.4 million cumulative jobs could be created in the industry as it seeks to add over 60,000 MW of new capacity in the future. Continued funding of the Water Power Program helps to lower costs, improve operations and remove market-entry barriers to help make these goals a reality."

### **Nepal says no to exporting hydroelectric power**

PennWell (June 29, 2011)

Nepal has decided not to approve any hydropower projects that will export the bulk of the electricity they generate, media reports indicate. The announcement was made by Dharmendra Bastola, head of the Seti-Mahakail Bureau, the region where the Upper Karnali hydropower project is located, reports indicate.

Bastola said the central committee of his party decided that the license given to the project developer GMR to conduct a survey should be scrapped and a fresh contract negotiated. A consortium led by GMR received the license in 2008 to develop the Upper Karnali, with Nepal Electricity Authority receiving 27 percent free equity and Nepal 12 percent free power. The rest of the generated power was to be sold to India.

### **RusHydro Plans 15 Small Hydropower Projects in Northern Ossetia**

PennWell (June 17, 2011)

Russian hydropower producer RusHydro plans to construct as many as 15 small hydropower projects in the republic of Northern Ossetia, wire services reported. The small hydro plants are to be built at the Fiagdon and Uruh rivers, as well as the Ardon river confluent rivers - the Sadonka, the Arkhondon, the Tsmikomdon and others, reports indicate. Timeframes for the project have yet to be disclosed.

In other news, RusHydro plans to complete upgrading the main equipment at its Rybinsk and Uglich hydro plants by 2020. As part of the upgrade, RusHydro has already reconstructed a second power unit at the Uglich hydro plant, after which the unit's capacity increased to 65 MW from the previous 10 MW. The upgrade was carried out by Austria's Voith Hydro and cost an estimated 34 million euros.

### **Statement of NHA Executive Director Linda Church Ciocchi on H.R. 795, the Small-Scale Hydropower Enhancement Act of 2011**

NHA (May 13, 2011)

The following is a statement from Linda Church Ciocchi, Executive Director of the National Hydropower Association: “NHA is proud to announce its support for Representative Adrian Smith’s Small-Scale Hydropower Enhancement Act of 2011. Reducing the cost and delays for new hydropower generation is key to meeting America’s clean energy goals. This legislation strikes a balance between these aims and ensuring that public participation is maintained and federal and state environmental standards are met.

“This bipartisan bill removes from Federal Energy Regulatory Commission jurisdiction certain small conduit hydropower projects. It also directs the Interior Department to further study potential of small hydropower at federal facilities.” The expansion of the Energy Policy Act of 2005 hydropower study to include projects with less than 1 MW of capacity is important, as NHA believes there is tremendous untapped hydropower potential throughout the federal system, particularly from these types of small projects.” “With this legislation, we move one step closer to realizing the full potential of hydropower in the United States.”

### **Federal Judge Rejects U.S. Salmon Plan**

Renewable Energy World Network Editors (August 8, 2011)

A federal judge in Oregon has found that the Obama administration's attempt to make federal hydroelectric power projects in the Northwest safer for protected salmon violates the Endangered Species Act, wire services reported.

Judge James Redden of Federal District Court in Portland ruled that the plan, known as a biological opinion, is too vague and uncertain on specific steps that will be taken in future years to improve salmon habitat, the Associated Press reported. Redden said he did not think the government could meet the standards of the Endangered Species Act by habitat improvements alone, and that it was time to consider new options, including removing some of the dams. The judge left the plan in place through 2013, when federal agencies must come up with more specific projects to help salmon.

## Clean Development Mechanism

1. More new small-scale renewable energy Programme of Activities including hydropower under validation
2. CDM in Least Developed Countries and Sub-Saharan Africa

### New small-scale renewable energy PoAs including hydropower under validation

A [Programme of Activities \(PoA\) for Sustainable Renewable Energy Power Generation in Papua New Guinea](#) (PNG) is currently in its validation period. The PoA envisages to assist development of all small - scale renewable energy power plants (including wind / photovoltaic / hydro / geothermal / tidal / wave / renewable biomass) across Papua New Guinea (PNG). Currently, less than 2% (220 MW) of the technical hydropower potential in PNG (around 15,000 MW) is used. The first CPA under this proposed PoA is Divune small hydro project (3MW) and the preliminary estimate of annual emission reductions is around 20,000 tCO<sub>2</sub>e. The commenting period for the PoA was from 12.07.-10.08.2011.

Another PoA currently under validation is [Tunki Small Scale Hydropower Program of Activities](#) in Peru. The first CPA is in the province of Huaura. It is a new small scale run of the power plant with an installed capacity of 1.68 MW connected to the national Peruvian electricity grid (SEIN). The project will use a horizontal Francis turbine for a net height of 28 m and 6,7m<sup>3</sup>/s water flow. The power plant will produce 12,170 MWh per year using water flow from an irrigation channel (Quipico Channel). The turbinated water will be discharged to the Quipico channel and used for irrigation purposes. The CPA is expected to reduce 6,897 tCO<sub>2</sub> annually, leading to a 42,281 tCO<sub>2</sub> over the first crediting period (7 years).

PoAs are beginning to be developed, which include more than one host country. While the last newsletter introduced a small scale hydropower PoA in Honduras (Masca Small Hydropower PoA), another [Guacamaya Small Scale Hydropower Programme of Activities](#) is under validation, which covers several host counties, including Honduras, as well as Guatemala and Costa Rica.

### The CDM in Least Developed Countries and Sub-Saharan Africa

The African Carbon Forum with more than 1,000 registered participants was held in Marrakech, Morocco from 4-6 July. Key issues were barrier removal through programmatic CDM, simplification and standardization of baselines as well as attracting investment for CDM in Africa. Forum participants further pointed out the importance of credits from Non-LDC countries in Africa post-2012, which cover more than 90% of CERs issued so far and projected until 2012 from the continent. From 2013 onwards, the respective credits will only be eligible under the EU ETS after ratification of bilateral agreements – a procedure that is expected to delay the implementation of future projects and thus could deter CDM investments in Non-LDC African countries. For more information and presentations of the forum, visit <http://africacarbonforum.com>.

A project from Zambia (a LDC) [Rural Electrification by Mujila Falls Lower Zambia Mini-hydropower station](#) entered the pipeline in July. The 1.4 MW Mini-hydropower stations with a project start in 2013, is a greenfield

## Publications

1. [Rehabilitation of Hydropower – An Introduction to economic and technical issues](#)
2. [Assessment of supply-demand balance for Kyoto offsets](#)
3. [Linking Renewable Energy Promotion Policies with International Carbon Trade](#)

run of river type project and is estimated to generate approximately 11GWh of electricity per annum.

A new paper, [Rehabilitation of Hydropower - An introduction to economic and technical issues](#) has been published by the World Bank (June 2011). The paper assesses the hydropower rehabilitation market in continental Africa, Central America and Mexico. Hydroelectric station rehabilitation covers a broad set of activities, including repairing/replacing components, upgrading generating capability and availability, realigning services to meet market opportunities and new market requirements and modifying the management of water resources to enhance ecosystems. In the current study, rehabilitation is focused on the major electrical and mechanical equipment associated with power generation, namely the turbine and generator. Rehabilitation can start with the replacement of equipment on a “like for like” basis where there is minimum effort to enhance the overall output of the station. The primary objective of this is to provide “life extension” to the existing facilities and restore their initial performances. In contrast it can often be justified to include an “upgrade” of the equipment (efficiency, output) which yields greater output but at increased costs which is justified by the additional revenue over the service life of the equipment. This study examines both of these investment scenarios. Non-structural optimization, such as improved operation rules based on improved hydrology, timing of releases in cascades etc has not been considered.

**What will be happened post-Kyoto?** A new working paper on the [Assessment of supply-demand balance for Kyoto offsets](#) (by Delbosc et al., 2011) estimates the supply and potential demand as regards Kyoto carbon credits (CER and ERU) up to 2020. Two distinct periods have been pinpointed: 2008-2012, the first commitment period of the Kyoto Protocol, and 2013-2020, the phase when the climate-energy package will be implemented in Europe, and the period for compliance with international commitments agreed in Cancún. The paper estimates that the credit market will be in deficit by 2013 and should be in surplus by 2020, unless there is an increased European commitment, or new sources of demand appear throughout the world. Demand for Kyoto credits is estimated at between 2.2 and 4.4 billion for the 2008- 2020 period. The large spread reflects 1) uncertainty about the size of European demand (EU ETS and Member States), which could rise from 1.3 to 2.2 billion credits if Europe’s 2020 emissions reduction target were increased from 20% to 30%; and 2) uncertainties regarding the use of Kyoto credits by other actors.

The scoping study [“Linking RE Promotion Policies with International Carbon Trade”](#) for IEA RETD is a report that explores the barriers that currently prevent a more effective promotion of renewable energy (RE) through the carbon market and a positive interaction between the market and domestic RE promotion policies. While the main focus is on CDM/JI, the report also looks beyond CDM/JI to find possible solutions among the new instruments being proposed for the new climate regime and the carbon market after 2012. In one of its recommendations the report suggests an increased emphasis on Programmes of Activities to help reduce transaction costs and broaden the scope of CDM/JI activities, However, specifically in the case of the CDM, this needs to be accompanied by a resolution of the regulatory barriers preventing the take-off of Programmes of Activities: the strong liability for validators in case of mistakes in the selection of individual programme

components, and the definition of acceptable criteria for determining additionality of these components.

### Hydropower Africa 2011 Programme



Boasting a full three day conference, featuring over 40 international speakers and over 450 visitors from across the globe! 19-23 September 2011, Johannesburg, South Africa.

Hydropower Africa 2011 will look at prospects for hydropower development in Africa, encourage investment in hydropower projects in Africa and identify and overcome challenges for hydropower development in rural and urban areas. Themes include:

- Planned projects and tender prospects for hydropower development in Africa
- Innovative funding solutions for projects – big and small.
- Refurbishment and modernization updates of major hydropower facilities as well as operation and maintenance best practices from across the continent
- Infrastructure development and African-appropriate engineering solutions to provide power to villages, rural areas and urban communities
- Achieving operational objectives while addressing environment and social challenge

For more information please visit: <http://www.hydropowerafrica.com/en/index.php>



## World Small Hydropower Development Report 2011



# World Small Hydropower Development Report 2011



The International Centre on Small Hydro Power (IC-SHP), under the auspices of UNIDO, is coordinating a report on the worldwide development status of small hydro power (SHP). The aim of the report, as a contribution to global renewable energy, is to give a global overview of the status of SHP and thereby inform SHP practitioners, policy- and decision-makers, investors, as well as those interested in clean, renewable and local energy and sustainable development.

The report will include

- an overview for each region (i.e. Africa, Asia and the Pacific, Europe, North America, Latin America)
- the country status of over 140 countries on SHP development (including updates on innovative technology, SHP policy environment and financing)
- a technology section featuring case studies
- a policy section featuring case studies
- a finance section featuring case studies

The Editorial Board welcome experts and professionals from UN system, NGO, Governmental and Intergovernmental Organization, Enterprises, Communities etc to involve in the report preparation, in kind of articles and case studies. Case studies on countries, areas, projects describing specific policies, technologies, approaches or environmental or social impact should be no more than 1000 words. Authors are invited to submit their interest in writing with a brief description via email to the ICSHP team on the report. ([report@icshp.org](mailto:report@icshp.org))

### Other Events

#### [Hydropower Africa](#)

Sandton Convention Centre, Johannesburg, South Africa  
19 – 23 September, 2011

#### [HydroVision Brazil](#)

Windsor Barra Hotel, Rio de Janeiro, Brazil  
20-22 September, 2011

#### [Renewable Energy World Asia](#)

KLCC, Kuala Lumpur, Malaysia  
27 – 29 September, 2011

#### [Hydro 2011: Practical Solutions for a Sustainable Future](#)

Prague, Czech Republic  
17 - 19 October, 2011

#### [Low Carbon Earth Summit](#)

Dalian, China  
19 – 26 October, 2011

#### [Hydro Energy Andean and Central American 2011 Congress and Exhibition](#)

Bogota, Colombia  
10 – 11 October, 2011

#### [World Renewable Energy Congress](#)

Bali, Indonesia  
17 – 19 October, 2011

#### [Africa Green Energy & Environment Summit](#)

Lagos, Nigeria  
17 – 20 October, 2011

#### [RENEXPO Poland](#)

Warsaw, Poland  
26 – 28 October, 2011

#### [SYMCOM](#)

Lodz, Poland  
26 – 28 October, 2011

#### [Hydro 2011](#)

Esplanade Hotel in Perth – Fremantle, Western Australia,  
7–10 November, 2011

#### [3rd International Small Hydropower Conference: New Construction, Renovation and Revitalization](#)

Salzburg, RENEXPO Austria  
25 November, 2011

#### [Small Hydro Latin America](#)

Panama City, Panama  
5 – 6 December, 2011

#### [Fourth International Conference on Water Resources and Renewable Energy Development in Asia](#)

Shangri-La Hotel, Chiang Mai, Thailand  
26 - 27 March, 2012

#### [Hydro Costa Rica 2012](#)

San Jose, Costa Rica  
16–18 April, 2012

#### [Hidroenergia 2012](#)

Wrocław, Poland  
23-26 May, 2012

#### [UN Conference on Sustainable Development](#)

Rio de Janeiro, Brazil  
4 – 6 June, 2012

### CONTACT IN-SHP e-NEWSLETTER

e-NEWSLETTER is a free online publication keeping hundreds of people and organizations informed of the many factors that affect SHP development and their impact on creating a brighter and greener world.

For more information, please visit our website: [www.inshp.org](http://www.inshp.org)

We value your comments and suggestions. Please send these to the Editor at [report@icshp.org](mailto:report@icshp.org)

