

# INSHP Newsletter



## Hydroenergia 2014



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The Hydroenergia Trade and Congress this year was held in Istanbul, Turkey, from 21 to 23 June. More than 250 people and 45 exhibitors attended Hydroenergia, which is organized by the European Small Hydropower Association (ESHA). The president of ESHA, Marko Gospodjinački, introduced the hydropower situation in Turkey during the opening session.

Senior Programme Officer of ICSHP, Lara Esser, spoke in her keynote on the need for further resource assessments based on her findings of the *World Small Hydropower Development Report 2013*. "There are many countries that have outdated and incomplete re-

source assessments, as well as countries that need to improve their hydrological data collection. This is particularly important in the face of climate change and to manage water resources properly", she said. Massimo Bergadano, representing the Alliance for Rural Electrification (ARE), spoke about the important role of small hydropower in off-grid and rural electrification: "ARE has started a half-year campaign with the focus specifically on small hydropower."

ESHA has been organizing Hydroenergia every other year since 1989 and represents the interests of the small hydropower sector by promoting the benefits and opportunities of hydropower. ESHA



campaigns for improved market conditions for the hydropower sector, removal of barriers to hydropower development and an increase in hydro electricity production in the EU and wider Europe. In a roundtable discussion 'How to boost Government support for hydropower', information on common difficulties such as dealing with the European Water Framework Directive (WFD) were exchanged. Kearon Bennett, Operating Agent and Secretary of IEA Annex II for Small Hydro, reminded the audience that it is key to have strong enforced contracts for the long-term. Lara Esser spoke on the many social, economic and environmental benefits of small hydropower in the context of rural electrification and poverty reduction in developing countries, as well as climate mitigation, watershed management and positive public health aspects.

Managing Director of ICSHP, Prof Liu Deyou, spoke in the session 'Hydropower exploitation in emerging economies'. He shared China's more than 100 year practice of small hydropower. Interest from the audience was raised in particular on the implementation of the 'Hydropower replacing wood' rural electrification programme.

The Congress also included workshops on the RESTOR Hydro project, co-funded by Intelligent Energy Europe and the ongoing work by IEA's Annex II for small hydropower. A subtask of Annex II led by Japan is currently to collect case studies to exemplify sustainable small-scale hydropower in local communities.

During the closing ceremony, the Scientific Committee of Hidroenergia 2014 announced the winners of the Hidroenergia Innovation Award. It should decorate a person who has elaborated and developed scientific findings in the wider field of hydropower. The results to be awarded should have significant positive impact on the further hydropower development. The first place went to a representative of Ehlach & Ehlach GmbH from Frankfurt and Ravensburg, Germany. Firstrunner up was Mobile Hydro and second-runner up was Smart Hydro.



A final roundtable on the key findings and messages of the congress were moderated by Alison Bartle, Publisher and Editor of The International Journal on Hydropower & Dams. She concluded that small hydropower community should also exchange experience with other renewable energy representatives to overcome various barriers for further development of small hydropower.





Ambassador Cheng Jingye and all ICSHP staffs



Professor Liu Heng  
Director General of ICSHP

Welcome to the third issue, 2014 of the INSHP newsletter!

In China, two ICSHP working groups, commissioned by the Ministry of Water Resources, went to four provinces to apply in a first trial the methodology of the Green Small Hydro Assessment Standard. This standard was developed by ICSHP and was tried on two provinces of abundant rainfall and rivers as well as in two provinces where groundwater is overexploited. Local water administrators and small hydropower plant owners were cooperative and actively provided information on discharge flow, water quality, landscape, migration, water utilization, economy, safety and operational management practices. We look forward to sharing more information on the results of this trial methodology and foresee that the Green Small Hydro Assessment Standard may be applied more widely within China in the future, to ensure small hydropower, as a clean and renewable energy technology benefits both society and the environment.

In Pohnpei State of the Federated States of Micronesia, Nanpil Hydro Power Station was connected to the grid in June. Plant refurbishment only took four months and we are glad the station is able to produce electricity again, since the plant had been out of operation after heavy flooding in 2003 and more technical issues in 2008.

In May, an ICSHP delegation visited Hydroenergia 2014, organized by ESHA in Istanbul, Turkey. The presentations and roundtable discussions made us realize that small hydropower is used worldwide under a wide variety of circumstances. In the European Union in particular due to the different interpretation of the Water Framework Directive in each country, new small hydropower may already face considerable challenges in the planning stage. The benefits of small hydropower development are more obvious in the context of developing countries, where other barriers, such as technical and capacity, need to be overcome.

We encourage readers of the *World Small Hydropower Development Report 2013* to send relevant short updates to the report secretariat ([report@icshp.org](mailto:report@icshp.org)). Please note that our coordinator, Lara Esser is returning to Germany, and WANG Xianlai, Jenny, will continue to coordinate the report. Furthermore I am very pleased to announce two new editorial board members for the World Small Hydropower Development Report, Prof Arun Kumar from India and Mr Wim Klunne based in South Africa.

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## The Refurbishment Project in Micronesia was completed



*The powerhouse*

On June 16<sup>th</sup> 2014, the refurbishment of Micronesia's Nanpil Station was completed and connected to the grid. As the general contractor, ICSHP attended the whole construction. This project is one of the renewable energy development projects in Pohnpei state undertaken by the Secretariat of the Pacific Community (SPC).

The Nanpil Hydro Power Station locates at approximately 3 miles south of Pohnpei's capital, Kolonia. It was installed in 1986 and started operation in 1987. The system consists of two horizontal Francis turbine configurations with rating of 1.335 MW and 0.725 MW. The hydro operation was disrupted in 2003 due to heavy flooding that damaged the switchgear compartment and

other control equipment. Some damaged electrical equipment were refurbished in 2008 but the system was soon faced with other technical problems such as excessive vibration and system controls when it resumed operation. Since then, the hydro plants have not been in operation.

In 2013, SPC has secured funds under the North REP for the Nanpil Hydro Power Station refurbishment as part of the Northern Pacific countries RE development projects. The aim was to change present energy consumption pattern of Micronesia that just depended on the diesel. ICSHP won the bidding in

August, 2013 and started the construction in this March. The refurbishment included the renewal of equipments and renovation of the forebay and powerhouse. In June, the project was finished and the station connected to the grid.



*The equipment*

## Green Small Hydro, Never a Dream

Commissioned by the Ministry of Water Resources, International Center on Small Hydro Power sent two working groups to Jiangxi, Hunan, Shanxi and Hebei Provinces to review 35 pilot small hydropower stations on site for Green Small Hydro Assessment.

The working groups checked the conditions of plants' dams, reservoirs, powerhouses, and retaining, division and release structures as well as units and switch yard; according to the Green Small Hydro Assessment Standard (Trial), the working groups looked up, verified and collected all necessary documents and data for Green Small Hydro Assessment, including discharging flow, water quality, landscape, migration, common interests, water comprehensive utilization, economy, security management and operation management; two groups also listened to the suggestions on Green Small Hydro construction and gave advice for local water administration on some problems.

Hunan and Jiangxi Provinces have abundant rainfall and rivers, but in Shanxi and Hebei Provinces, the most precious ground water is over exploited which cause serious infiltration. Although the water conditions are quite different in these four provinces, the local water administrations and plant owners still actively participate in the construction of Green Small Hydro. They introduced that their stations were environmental friendly with standardized management, being benefit to the social harmony. It seems that they waited for years.



*The discharge orifice of Panxi Station in Jiangxi Province*

Here I should say yes: it is time to correct that small hydropower never damage the ecological environment. Small Hydropower is a clear and renewable energy that can protect the environment.



*Tailwater of Suoxi Station in Hunan Province*

In order to ensure the production and living water as well as ecological water on the downstream, some stations installed the minimum discharge device, and some others discharged the ecological flow by the bottom holes, overflow weirs, spillway tunnels and flushing sluices. For instance, in order to ensure the ecological water on the downstream and avoid hydrostatic sedimentation and water quality deterioration in the reservoir, Shuan Lvquan Station in Jincheng, Shanxi Province ignored the generation but intended to install the discharge pipe; Zhua Shuqiao and Yao Linkou stations in Hunan and Hebei Provinces added a small ecological unit respectively in order to protect the ecological water on the downstream; Panxi Station of Jiangxi Province, Suoxi Station of Hunan Province and Dong Jiaohe Station of Shanxi Province all used existed discharge orifices to bleed off the base flow.

In terms of water quality protection, ecological landscape, management and so on, the 35 pilot small hydropower stations took relevant measures respectively in order to meet the green small hydro standard and finally protect the ecological

environment.



*The dam on Duhe River in Shanxi Province*



*Water reducing reach of Dong Jiaohe River in Shanxi Province*



*The discharging flow of Dong Wushi Station in Hebei Province*



*The switch yard of Panxi Station in Jiangxi Province*



*The powerhouse of Gushi Station in Shanxi Province*



*High-pressure GIS of Yao Linkou Substation in Hebei Province*

### Armenian deputy of The Prospering Armenia party stated that liberalization of the market of small hydropower at once is an impossible task.

On June, 16th at press conference, the deputy and the vice-president of the parliamentary commission on economy Mikael Melkumjan declared that small hydropower market cannot be liberalized at once. He also noted that relevant legislative amendments already are considered by the parliament, nevertheless, liberalization should be implemented gradually. The deputy explains that he is concerned about businesses' investments of which did not pay back yet, and in case of the full liberalization a electricity distributive company may want to buy electric power from those businesses at unfavorable price or not buy it at all.

Previously in May on a parliamentary meeting, Armenian government discussed project of amendments to the Law *On power*. According to existing legislation small hydropower plants can distribute and sell produced electricity at a fixed during 15 years after which a two-year long transition period is stipulated. By that time, Commission on regulation of public services of Armenia should discuss conditions of partial liberalization of renewable energy market. (Source: ArmeniaNews - NEWS.am, 2014/6/16)

### Austria: Environmental association demands protection zones

The environmental association (UWD) of Austria demands a stop of financial support for eco-friendly electricity of small hydropower and an improved coordination of the implementation plan. Ecologically sensitive areas should be designated as no-go areas and round-tables should be established according to Natura 2000 goals. It furthermore criticizes the uncoordinated planning by the communes.

According to the UWD, too many hydropower projects are already in planning, many in sensitive and very sensitive water areas. In Upper and Lower Austria, stricter regulations are already in preparation. In the Steiermark, a regulation to designate power plant no-go zones in a water atlas will take effect by end of 2014.

This June, Austria has to submit its first report to the European Union (EU) according to the Natura 2000 schedule of the Habitats Directive. By September the first tranche of protected areas have to be nominated, and by end of 2015 the second report will be due. According to the president of the UWD, Gerhard Heiligbrunner, it is not yet clear whether in the end 220, or 170, 150 or only 140 protected areas will be listed. Up to 2012, Austria's 'Natura 2000' network included 220 areas with a total area of 12,324 km<sup>2</sup>, 14.7 percent of the national area, the EU average lies at 17.5 percent.

One of the reasons given why communes are so active in planning hydropower projects are its financial support – 2 million Euro annually via eco-electricity tariffs and 16 million Euro as investment support. Such subsidies should be discontinued according to Heiligbrunner, or changed to support solar power. Nationwide, according to UWD, there are about 300 power plants with an annual generation capacity of 13.75 TWh in construction, recently running or in planning. It is assumed, not all power plants will be realized. In Salzburg alone, 22 hydropower plants are in planning.

According to the water resource usage plan (NGP) of 2009, only 14 percent of the rivers are in very good condition and 21 percent in good ecological condition, the rest is significantly impacted due to damming, river or riverside construction and river regulation, water extraction etc. More than 1,200 km of Austrian rivers have dams according to the Ministry of Environment. Before developing greenfield sites, areas of the river that are already developed for energy production should be expanded, demands the UWD. This should be considered by the communes, who are now replacing traditional electricity business in small-scale power plant planning.

While the UWD demands a round-table for better coordination, to discuss while keeping a list of concrete projects in mind, Ernst Brandstetter of Austria Energy, says that EU law forbids the electricity businesses to meet and talk about potential projects in sensitive areas in a coordinated planned discussion. He acknowledged that the electricity business has already limited its plans. (Source: Salzburger Nachrichten, APA, 2014/5/27)

### In Black Sea province hydropower plant project without environmental report canceled

A hydroelectric plant project in the Black Sea province of Giresun has been canceled on June 24, after a local court rejected a previous administrative decision by the Governor's Office, which stated that an environment impact assessment report (ÇED) was not necessary to proceed with the construction. The Vanazit hydropower project, planned to be constructed in Giresun's Keşap district near the Black Sea coastline, had drawn a huge reaction from environmental activists, who pointed to the danger of allowing such a construction without requesting a ÇED report.

The Brotherhood of Streams Platform, who filed an objection on behalf of the locals in Keşap, stressed the importance of the Ordu administrative court's ruling. Similar hydropower projects are planned on streams all across the Black Sea region, particularly in the eastern provinces despite a sound popular opposition. Many projects are also decided for being carried on despite insufficient ÇED reports and experts pointing out their shortcomings. (Source: Daily News, 2014/6/25)

### EBRD SUPPORTING SUSTAINABLE ENERGY IN SLOVAK REPUBLIC

The EBRD is deepening its support for sustainable energy investments in the Slovak Republic with a €20m loan to Slovenska Sporitelna, a.s. (SLSP), one of the country's leading banks. The funds will be on-lent to private companies for renewable energy projects and energy efficiency in industry and buildings. These funds will be sourced from the proceeds of a carbon credit transaction between the Slovak Republic and Spain and provide incentives for energy efficiency investments. Donor funding of €2 million for technical assistance has been provided by Spain.

Despite significant improvements in energy and greenhouse gas (GHG) intensity over the last decade, the potential to improve energy efficiency and further decarbonise the Slovak economy remains high. SlovSEFF III will seek to reduce greenhouse gas emissions and rewards the best performing projects in this respect by linking incentive payment with the GHG emission reduction potential of projects.

SlovSEFF, launched in 2007, is a credit line aimed at promoting sustainable energy investments in Slovakia's private sector through local banks. To date, SlovSEFF has supported around 700 sustainable energy investments worth over €190 million, which combined annual savings equivalent to the household electricity consumption of a city the size of Bratislava. The two previous SlovSEFF phases are expected to reduce the amount of CO<sub>2</sub> by 115,000 tonnes per year.

Since the beginning of its operations in the Slovak Republic the EBRD has invested over €2 billion in more than 125 projects in the country, mobilising over €4.5 billion of financing from other sources. (Source: EBRD, news, 2014/6/13)

#### [Estonian National Development Plan of the Energy Sector Until 2030 planned to be submitted to the Government for approval at the end of 2014](#)

The Estonian National Development Plan of the Energy Sector Until 2030 is aimed at ensuring an energy supply that is available to consumers at a reasonable price and effort and with an acceptable environmental condition, while observing the terms and conditions established in the long-term energy and climate policy of the European Union. The most beneficial economic competitiveness aspects must be observed for the purposes of the implementation of National Development Plan of the Energy Sector Until 2030. The new plan also drafts the benchmarks for renewable energy and energy efficiency operational programmes and the vision for the renovation of buildings.

(Source: Ministry of Economic Affairs and communications of Republic of Estonia, Development Plans)

#### [European Commission releases €750 million for infrastructure projects](#)

The first call for proposals under the Connecting Europe Facility (CEF) to help finance key trans-European energy infrastructure projects is open. A total of €750 million will be made available for first priority projects mainly in the gas and electricity sectors. These projects will address security of supply issues and help bring an end to the energy isolation of some Member States. They will also contribute to the completion of the EU-wide internal energy market and to the integration of renewables to the energy grid. The EU funding will accelerate investment in missing cross-border links by leveraging the necessary private and public funding.

In order to apply for a grant, a project has to be included in the list of 'projects of common interest'. The first list was adopted by the European Commission in October 2013. It consists of some 250 key energy infrastructure projects which, when completed, would each ensure significant benefits for at least two Member States; enhance security of supply, contribute to market integration and further competition as well as reduce CO<sub>2</sub> emissions. (Source: European Commission - IP/14/547, Energy section, 2014/5/12)

#### [Jamaican government will receive technical assistance to promote and develop small hydropower plants](#)

The Jamaican Government signed a US\$45 million contract for technical assistance towards the promotion and development of cost effective, small hydropower projects. Argentinean company, BA Energy Solutions, in association with United States-

based, Hydro Science Consulting, has been awarded the 12-month contract. The programme will be implemented by the Petroleum Corporation of Jamaica (PCJ), with funding from the World Bank, under the Government's Energy Security Efficiency and Enhancement Project.

The technical assistance will involve feasibility studies, assistance and guidance to key agencies in the administration of hydropower development, including the support to develop and implement departmental policies and procedures for the effective management of hydropower projects from design to operation.

Portfolio Minister, Hon. Phillip Paulwell informed that Jamaica has several sites where small hydropower capacity could be developed and harnessed for use. He explained that about 15 MW of the total 23 MW of small hydro potential in the island is considered firm, while the rest is variable, due to seasonal changes in the stream flow. A recent assessment conducted by the United Nations Economic Commission for Latin America and the Caribbean to determine the hydropower potential at 11 sites across Jamaica found that most sites demonstrated a potential capacity of some 2.5 MW or more. This amounts to a total potential of 33.4 MW. Mr. Paulwell said the country's small hydro-power resources can play an important role in providing low cost current to the electricity grid, as well as expanding energy access to remote locations. (Source: Athaliah Reynolds-Baker, Jamaica Information Service, 2014/5/28)

#### [Kazakhstan residents will get 50% of compensation of renewable energy equipment cost](#)

At the briefing in the Central Communications Service the minister of Environment and Water Resources Nurlan Kapparov made a statement that the state will pay half the cost of the power equipment to Kazakhstan residents who install renewable energy plants.

"Ordinary consumers, who want to install renewable energy equipment with the capacity up to 5 kW in their households in remote areas, will get 50% subsidies from the national budget," Kapparov said.

He also said that in late May, the Government of Kazakhstan approved the tariffs for electricity generated by renewable energy sources. With accordance to approved tariffs, electricity from small hydro power plants will cost 16.71 tenge per 1 kW/h, from wind farms -22.68 tenge per 1 kW/h. The rate for solar power is 34.61 tenge per 1 kW/h, for for biogas equipment - 32.23 tenge per 1 kW/h. According to Kapparov, such measure has been taken to support domestic manufacturers.

(Source: Prime Minister of Kazakhstan Karim Massimov official website, News, Energy section, 2014/6/13)

#### [RusHydro plants to develop small hydro in the Russian Far East](#)

JSC RusHydro announced that during the official visit of the President of the Russian Federation, Vladimir Putin, to Shanghai, RusHydro has signed a number of agreements on cooperation with leading Chinese energy companies. Agreement on strategic cooperation between RusHydro and PowerChina focuses on development of small hydropower generation in Russia. In particular, PowerChina could get a number of EPC contracts to develop a number of small hydropower projects. The companies are forming a working group in order to formulate more detailed cooperation plan,

including selection of specific projects. (Source: RusHydro press release, 2014/5/20)

#### [RusHydro partnership with PowerChina for small hydro-power development](#)

Energy conglomerates JSC RusHydro and PowerChina have signed a number of agreements calling for cooperation in developing small hydropower projects in Russia's Far East. The agreement was signed during an official visit by President of the Russian Federation Vladimir Putin during a recent visit to Shanghai. It stipulate that PowerChina could receive a number of engineering, procurement and construction contracts for the proposed hydroelectric plants. The agreement also calls for JSC RusHydro and PowerChina to form a working group that will develop a more detailed plan, including the selection of potential projects. Earlier this month, with accordance to the HydroWorld.com, RusHydro had signed an agreement with tidal energy developer Atlantis Operations Ltd. to develop joint projects in Australia. (Source: HydroWorld, Michael Harris, 2014/5/22)

#### [RusHydro's small hydropower projects selected at RES competitive auction](#)

Three small hydropower plants projects in the North Caucasus region, developed by RusHydro, have been successfully selected for implementation through a tender for construction of renewable energy sources (RES) capacity. The selected projects will be covered by 15-year capacity supply agreements with basic annual return of up to 14 percent (the current level of yield is linked to the yield of the federal loan bonds). A shortage of generation capacity and natural conditions favorable for small hydropower plants make the North Caucasus a high priority region for such projects.

In 2017, RusHydro will commission 10 MW Sengileevskaya, 5.04 MW Barsuchkovskaya and 5.6 MW Ust-Dzhegutinskaya small hydropower plants. The new plants are located in Stavropol region and Karachay-Cherkessia Republic. Sengileevskaya will be built near existing 15 MW Sengileevskaya. Implementation of the project will not only add generation capacity but also will have positive environmental effect by reducing silting of Sengileevskaya water reservoir – main source of water supply for the city of Stavropol. Barsuchkovskaya will be built on the tailrace of regulating water reservoir of hydropower plant-4 of Kuban' Cascade, and will be using excess water after switching of Nevinnomyskaya CHP to closed-cycle water supply. Ust-Dzhegutinskaya will be built on Ust-Dzhegutinskiy Hydro-technical Complex. The Complex serves as intake to the Large Stavropol canal and the small hydropower plant will be using sterile spills into the tailrace.

In line with the tender requirements capital expenditures per 1 kW of installed capacity will be RUB 146,000, ensuring projects' profitability. (Source: RusHydro press release, 2014/6/16)

#### [RusHydro has passed a renewable energy investment projects selection for three projects on small power / RusHydro will construct three small hydropower plants in North Caucasus after its projects were selected for implementation through a renewable energy sources auction](#)

Three small hydropower projects to be constructed by an open

society RusHydro on the North Caucasus, have passed investment projects selection conducted by JSC "ATC". As earlier informed by observation post "Market Advice", the selected projects will sign agreement, according to which investors will receive a compensation of their expenses during 15 years with an annual basic profitability up to 14 % (current profitability depends on profitability of long-term bonds of the federal loan).

With accordance to the application, in 2017 RusHydro will start exploitation of Sengileevskaia small hydropower plant with capacity of 10 MW, Barsychkoskaia small hydropower plant with capacity of 5.04MW and Ust-Dzhegytynskaia small hydropower plant with capacity of 5,6 MW. New stations' platforms are located in Stavropol Territory and Karachaevo-Circassia.

Sengileevskaia small hydropower plant will be constructed near to the operating Sengileevskaia hydropower plant with capacity of 15 MW, which is a part of the Cascade of the Kuban hydropower plants. Realization of this project will allow not only to increase electricity generation from renewable energy source, but also will have significant ecological impacts as it will slow down amud accumulation process of Sengileevskwater basins – the basic source of water supply of Stavropol.

#### [Saas-Balen contemplates 4.6 MW small hydropower project](#)

An investigation on the possible construction of a 4.6 MW hydropower plant above the Fellbach waterfall have begun in a Swiss village Saas-Balen by German developer Kraftwerke Mattmark AG (KWM). Utility company Axpo has been contracted to conduct studies for the project. It is projected that the project will cost around US\$19 million and take up to two years to construct.

According to Axpo, Saas-Balen must first renew water rights concessions, though the town's application that is likely to be submitted by the end of 2015. If the town decides to proceed with the project, the application will then go before the Canton of Valais for review. (Source: Michael Harris, HydroWorld, 2014/6/2)

#### [South Africa's most recent bidding window for renewable energy from independent power producers sees larger allocation for larger small hydropower projects](#)

In early June, the South African government has issued a Request for Qualifications and Proposal for its 4th bidding window of the Renewable Energy Independent Power Producers Programme (REIPPP). The REIPPP is the bidding process initiated by the government to procure electricity from renewable energy sources. Under windows 1 to 3 of REIPPP small hydropower was defined as having an installed capacity of between 1 and 10 MW. Only in window 2 two hydropower projects were awarded the preferred bidder status.

The 4th bidding window REIPPP includes a new capacity limit for small hydropower. For this window projects up to 40 MW qualify. Another change was the maximum price the government is willing to pay for hydro based electricity. The new price cap for small hydro is now R 1060 / MWh [increased from R 850 / MWh] (US\$ 99 and US\$ 79 respectively). (Source: Wim Klunne, hydro4Africa.net, 2014/6/1)

### [Swiss Energy Richemont Bakery Craft School optimized electricity use from hydropower](#)

Richemont uses the Xamax systems from Alpiq for energy optimization saving grid costs and thanks to flexible procurement on the free market and that considerably reduces its electricity costs. What is more, the company has been obtaining electricity from 100 percent hydropower from Alpiq since 1 January 2014.

The liberalisation of the Swiss electricity market results in profound changes and opportunities for consumers. Market price of electricity has been almost halved within the past two years. The free market offers favourable conditions for the next three to five years. Industrial end consumers can save several tens of thousands of Swiss francs per year depending on their consumption. The Richemont Centre of Excellence in Lucerne, better known as the "Bakery Craft School", has also taken the step onto the free electricity market.

"The deciding factors for our purchase of electricity from Alpiq were the potential savings compared to the local basic supply tariff and the possibility of using fixed prices to already now secure our electricity purchase for the coming years. This provides us with budget security," says Reto Fries, Director of the Richemont Centre of Excellence. He also adds that in order to contribute towards the environmental protection, Richemont Centre made a conscious decision in favour of electricity from 100 percent hydropower.

The demand charges of the local distribution grid operators have steadily increased with the liberalisation of the electricity market. Without affecting the customers' operational processes, the Xamax energy-optimising systems cushion these additional costs.

In future it will be possible to pool the switchable loads of the Richemont Centre of Excellence with those of other industrial companies and to market them as balancing energy. With their virtual balancing power station "poweralliance", Alpiq and Xamax will start offering this solution in the course of 2014. The Richemont Centre of Excellence has already confirmed its readiness to participate in this project. (Source : ALPIQ, 2014/5/20)

### [Ukrainian small hydropower plants in Zakarpattia: a way to energy independence or an ecological danger?](#)

In November 2011 Zakarpattia city council made a decision about building 330 hydropower plants, this initiative was largely criticized by local public activists. And even though the case was reviewed by the court and so-called among people "Project-330" was cancelled, local ecology activists continue to criticize small hydropower, forgetting that it appeared 70 years ago in the region. The author brings new facts for consideration of possible benefits and resulting dangers of SHP.

Documents found in archives confirm construction of two small hydropower plants Onokievskia and Uzhgorodskia on the river Uzh in 1943. Whereas medium capacity hydropower plant Tereblia-Ricku was built after the World War II. As it is reported, all three stations played off already and now provides electricity almost for free.

According to the statistic data presented in the article, the princi-

ple electricity volume in Zakarpattia produced by the hydropower plants is 98,8%; at the national market their part presents 5,2%. Zakarpattia does not use fully its potential despite the fact that it has the biggest energy potential in Ukraine ( 6.45 billion kW/h a year), where there are more than 9 thousand rivers. In the article, Lydmula Arhipova, a PhD of technical studies, department of tourism of the Ivano-Frankivsk National Technical University of Oil and Gas, was sharing her opinion as an expert on the situation. The expert notes that small hydropower development in the country starts from 2008. She also adds that hydropower plant differentiation in capacity and their type is important for ecological impact. Ms Arhipova concludes that derivation type of the plant are safer for ecology and considers to be a 'green' source of energy. Moreover, Lydmula Arhipova said that ecological impact of small hydropower is usually local. An article highlights an importance of finding mutual compromise between investors and locals. The expert also expressed her opinion when she said that capacity of small hydropower plants in the region should be limited up to 5MW. According to a scientist, ecologically safe potential of Carpathian rivers presents 15% from their total hydropower capacity. (Source: Pavlo Biletskij, Golos Karpat, 2014/6/17)

### [Ukrainian cities unite to send out energy efficiency SOS](#)

A bloc of 35 Ukrainian cities has sent an urgent plea for European help in scaling up the efficiency of their buildings, district heating and transport networks in a bid to curb Russian energy dependence.

The letter was sent by the Association of Energy Efficient Cities of Ukraine (EECU), which unites local authorities from the country's east and west, encompassing two million people. It has sparked fresh calls for EU action on efficiency in an energy security report next month that will weigh measures to curb Europe's reliance on Russian gas, some 40% which arrives via Ukraine.

The former Soviet republic's need to wean itself off gas and nuclear power dependency is described as "critical" by Volodymyr Harazd, the EECU's president, in the missive. He cites "hostile and often aggressive actions by the Russian Federation against Ukraine" and "the limited ability of the central government in Ukraine to address these" as pressing reasons for tackling energy waste.

At least five of the EECU's cities are located in Ukraine's Russian-speaking east, where national sympathies tend towards the other side of the border. But Tatyana Nikolaevna, the first deputy mayor of Artemivsk, a town on the Russian frontier, gave Harazd's letter unqualified support.

"One of our main goals is to save budget funds by using safe energy resources," Nikolaevna added. "The main goal of this project is [also] to save energy resources."

The EECU's letter was sent to Energy Cities, a grouping of some 1,000 environmentally-friendly local authorities in the EU. Gérard Magnin, the group's director said that it illustrated how energy savings could "mobilise and provide a unifying bond" in societies.

Ukraine is the fourth most energy-intense country in the world - nearly twice as inefficient as Russia - and one US state department official told EurActiv that "the US sees significant opportunities for improved energy efficiency in Ukraine". (Source: Euroactive, 2014/5/8)

**United Kingdom: Construction of 0.9 MW Kames Hydro project started**

The construction of 0.9 MW Kames Hydro project, located on the east shore of Loch Awe in Scotland has started. It is the first of a number of hydro projects to be developed by Gilkes Energy on the National Forest Estate managed by Forestry Commission Scotland. The project is a classic high-head design incorporating a single intake, high-pressure pipeline and a Gilkes Twin-Jet Pelton turbine in a purpose built powerhouse. Planning permission and the SEPA CAR license were received in late 2013. After a detailed tendering and procurement exercise the project has now formally achieved 'Financial Close' and the civil construction team started to mobilize in June. The scheme is planned to be operational by March 2015. (Source: Gilkes Energy, 2014/6)

**United Kingdom: Durham city center receives 100 kW hydropower project**

Developers of a mixed-use project in Durham City, England, have installed a 100 kW Archimedes screw turbine that will provide about 75 percent of the energy needed by the complex. The 13-meter long, 20 ton turbine unit was manufactured by Spaans Babcock Ltd. and was also designed to help improve fish passage along the River Weir. The inclusion of the turbine helped the complex earn an "A"-Rated Energy Performance Certificate and BREEAM Excellent status.

The unit is expected to begin generating power in the fall. (Source: Michael Harris, Hydroworld, 2014/6/11)

**United Kingdom: Small hydropower returns to Scotland's Dawyck Garden**

A new 11 kW micro hydropower project has helped make Scotland's Dawyck Botanic Garden the first carbon-neutral botanical garden in the United Kingdom. The plant, launched by Scottish Minister for Energy, Enterprise and Tourism Fergus Ewing, benefitted from a US\$50,520 grant from EDF Energy's Green Fund. "The Dawyck Garden is a fantastic example of how different renewable technologies (i.e. hydro and an existing biomass boiler) can work in tandem to produce a low-carbon energy mix and help Scotland reach its ambitious national targets for reducing greenhouse gas emissions by 80 percent by 2050," Ewing said.

The project was designed and constructed by small hydropower developer BabyHydro on the site of a previous hydro-power plant that had long ceased operation. The plant uses waters from a River Tweed tributary, Scrape Burn, which runs through the garden. (Source: Michael Harris, Hydroworld, 2014/5/20)

**United States: 49 micro-hydro power sites assessed in North Carolina**

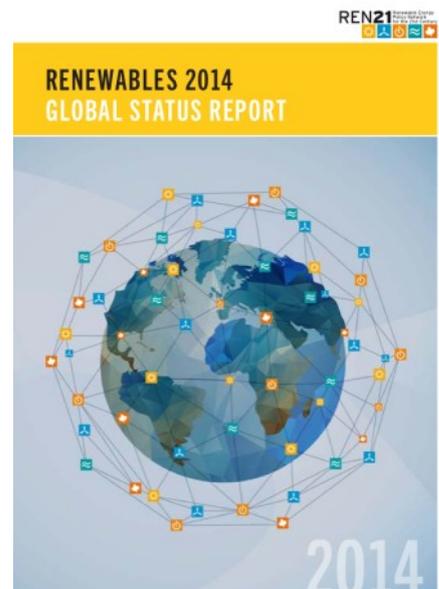
The rolling hills of North Carolina's Piedmont region are home to over 3,000 low-head dams with a theoretical potential for

micro-hydro power generation. RETScreen software was used during the feasibility study to analyze the potential. The software was both robust enough to conduct a thorough analysis but generalized enough that the findings could be broadly applicable to other sites in the United States. RETScreen hydropower models were created for each of the 49 test dam sites. These models first calculated the energy potential of the site and then applied a financial analysis, as well as sensitivity and risk analyses. Additional RETScreen analyses assessed the impact of various income tax scenarios and carbon reduction credits on the viability of micro-hydro power for low-head dams, thus generating valuable inputs for future clean energy policy initiatives. (Source: Natural Resources Canada, 2014/5/28)

**Publication**

First released in 2005, REN21's Renewables Global Status Report (GSR) provides a comprehensive and timely overview of renewable energy market, industry, investment and policy developments worldwide. It enables policymakers, industry, investors and civil society to make informed decisions. The report covers recent developments, current status, and key trends; by design, it does not provide analysis or forecast.

The newly released Renewables 2014 GSR is now available. Read about the expansion of supporting policies in developing economies, additions to electricity generating capacity, progress made in renewables heating and cooling, shifts in investments, leaders in renewable energy deployment and the evolution of the renewable energy field in the last decade. The Renewables 2014 GSR relies on up-to-date renewable energy data, provided by an international network of more than 500 contributors, researchers, and authors. Available from: <http://www.ren21.net/REN21Activities/GlobalStatusReport.aspx>.



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## SMALL HYDROPOWER WORLD

WORLD  
small hydropower capacity (in GW)

43% installed  
75.00  
173.00 potential

### NEWS

- World Small Hydropower Development Report (WSHPDR) 2013 online!
- Executive Summary soon available in further languages

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## World Small Hydropower Development Report 2013 Overview-Asia

### Central Asia

All five countries (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan) in Central Asia use small hydropower. Central Asia has an estimated small hydropower potential of about 4,880 MW (for plants up to 10 MW), of which 183.5 MW has been developed so far. The countries with the highest potential are Kazakhstan (2,707 MW) and Uzbekistan (1,760 MW).

Legislations on renewable energy exist in Kazakhstan, Kyrgyzstan and Tajikistan, while Turkmenistan's Renewable Energy Development Strategy includes plans to develop renewable energy frameworks. Only Kyrgyzstan has a special FIT for small hydropower. However, accompanying by-laws and regulations are yet to be developed or

adopted. The region has a large reservoir of small hydropower sites, but its potential is hampered by in-country disadvantages. Both Turkmenistan and Uzbekistan do not have a related policy in place to promote renewable energy. Even where such legislations exist, the uncertainty in the legal and regulatory framework for private sector participation is high (e.g. Kyrgyzstan and Tajikistan).

The local technical capacity for construction, maintenance and equipment or spare parts required for small hydropower projects need to be improved in Kyrgyzstan or built up in the case of Tajikistan. There is a need in Tajikistan to attract financing and managing resources from donors or state-funded support for decentralized renewable development. In Kyrgyzstan, private investors face unfavourable economic conditions, also low stream flow

reduces operation hours during winter time, when power and heat are greatest in demand and the central grids are unable to compensate. Additionally, most communities are grid-connected, thus during summer the demand for additional off-grid power is low.

### Eastern Asia

Five out of seven countries/regions in Eastern Asia use small hydropower. Eastern Asia has the largest estimated small hydropower potential worldwide. The potential is estimated at 75,312 MW (for plants up to 10 MW), of which 40,485 MW has been developed. The country with the highest potential is China (63,492 MW) followed by Japan (7,062 MW). China is the only country in the region with a small hydropower definition of up to 50 MW. China's small hydropower potential (for plants up to 50 MW) is 128,000 MW, of

which 65,680 MW has been developed.

The importance of renewable energy is widely acknowledged throughout the region. The Republic of Korea has legislation on alternative energy with the aim of reaching a renewable energy supply share of 6.1 per cent by 2030. China plans to achieve a 30-per cent non-fossil capacity in its national installed capacity by 2030. The local governments in China are encouraged to develop small hydropower; value-added tax (VAT) for small hydropower is subsidized. In Japan, a FIT system was established in 2012 under an Act that promotes renewable energy usage. Some laws in Japan simplify the process for renewable energy producers to sell electricity to the electric utility. The policy orientation of Democratic People's Republic of Korea inclines towards non-fossil fuel options, solving the issues of ageing infrastructure and of the transmission and distribution networks. Its policy is favourable to the development of small hydropower. However, small hydropower information about this country is scarce. Mongolia has a renewable energy programme that aims to achieve a renewable energy share of 25 per cent in its electricity system by 2020.

The main barrier to small hydropower development is of a financial nature, such as the access to funding and generation equipment in the Democratic People's Republic of Korea. In the Republic of Korea, topographical conditions are not suitable for small hydropower, thus the economic feasibility of small hydropower projects is limited. In Japan the potential is being reassessed to include less conventional sites from existing infrastructure facilities, such as dams, weirs, irrigation channels, water supply and sewerage systems, in order to avoid environmental impacts.

#### **Southern Asia**

Eight out of the nine countries in Southern Asia use small hydropower. The region has the second largest small hydropower potential estimated at 18,077 MW (for plants up to 10 MW), of which 3,563 MW has been developed. Afghanistan has a known potential of (1,200 MW). The small hydropower potential in India for plants up to 10 MW is not known, and it is 15,000 MW for plants up to 25 MW. Some countries define small hydropower as below 10 MW, however Bangladesh has an upper limit of 15 MW. Bhutan and India apply a threshold of 25 MW and Pakistan of 50 MW.

Most countries have renewable energy policy (e.g. Bangladesh, Bhutan, Pakistan) and a renewable energy target, or a hydropower policy (e.g. Bhutan, India, Nepal). Afghanistan has a Rural Renewable Energy Strategy Action Plan up to 2014. Renewable energy is seen as an opportunity to boost rural electrification (e.g. India, Afghanistan) and an option to be less dependent on imported fossil fuels (e.g. Pakistan). In India, subsidies for the development of small hydropower through the private sector are in place, but it varies from state to state and may include power wheeling, power banking, buy-back of power and/or facilities for third party sales. Some states also provide concessions such as leasing of land, exemption from electricity duty and entry tax on power generation equipment. The Iranian Government purchases electricity produced by private sector renewable energy plants at a tariff three times higher than those paid by the consumers. In Nepal, there are

several incentives available, such as VAT exemption, custom duty reductions for imported small hydropower related machinery or equipment and income tax exemptions for the first 10 years from the date of plant commissioning, thereafter 50 per cent for the next five years.

A range of barriers exist in Southern Asia, such as the remote location of potential sites and the need for road access and long-distance transmission lines (e.g. Bangladesh, Pakistan). Related to this is the uncertainty of grid extension, as it may not be economically feasible in rural areas where power demand is low (e.g. Nepal, Bhutan). Financial barriers include economic feasibility due to terrain and topographical conditions (e.g. Bhutan) and the lack of understanding by the local banks on financing needs of project developers (e.g. Bangladesh). In short, the lack of/low interest from the private sector to develop small hydropower plants is because there is no proper tariff structure and/or electricity market system (e.g. Pakistan, Bhutan) in place. Administrative complexity and long waiting times delay small hydropower development in Bangladesh, India and Nepal. The seasonality of rain, with low output during the dry season poses a barrier for Bangladesh and Bhutan, and in countries like Bhutan it is a big concern due to the country-specific conservative environmental laws. Other specific barriers reported for each country were with regards to human resources capacity, technical knowledge and institutional capacity.

#### **South-Eastern Asia**

Nine out of eleven countries in South-Eastern Asia use small hydropower. The region has an estimated small hydropower potential of about 6,682.5 MW (for plants up to 10 MW), of which 1,252 MW has been developed. The country with the highest known potential is Viet Nam (2,205 MW), followed by the Philippines (1,876 MW) and Indonesia (1,267 MW). The upper limit of small hydropower varies. In Malaysia and Indonesia it is 10 MW, in Lao People's Democratic Republic (PDR) and Thailand it is 15 MW and in Viet Nam 30 MW. In the Philippines and Cambodia the upper limit of mini-hydropower is 10 MW, while no definition is available for Myanmar and Timor-Leste.

Most South-Eastern Asian countries have a national renewable energy action plan that sets renewable energy target in the national power generation mix. Lao PDR has a draft Renewable Energy Development Strategy that promotes small hydropower of up to 15 MW. Thailand also has a small hydropower target of 0.04 per cent of the total generation mix by 2015. Viet Nam has an avoided cost tariff specifically for small hydropower, and the Philippines has mini-hydropower projects auctions as well as a FIT. In Indonesia, the electricity is bought by the State at an agreed fixed price. In general the FIT system is not well developed in the region. Renewable energy policy limitations have been reported in Timor-Leste, Malaysia, Indonesia and the Philippines. For example there was a delay in the implementation of the Renewable Energy Act of the Philippines.

The lack of field expertise and technical skills is the largest barrier impeding the development of small hydropower and this has been reported in many countries. The second important barrier is of a financial nature, ranging from the lack of financial sources in Cambodia; to financial institutions that are unfamiliar with assessing risks for small hydropower projects in Malaysia and Thailand. High costs for the development of small hydropower are reported in

Cambodia, Malaysia and Timor-Leste. More subsidies are available in Thailand for importing electricity to rural areas than for building small hydropower plants. In Lao PDR, only large hydropower projects attract foreign investors. Environmental or climatic barriers are reported as well, such as vulnerability to drought in Malaysia and Timor-Leste, and a reduction of maximum water flow from rivers that can be used for electricity generation in the Philippines have been reported.

### **Western Asia**

Eight out of eighteen countries in Western Asia use small hydropower. Western Asia has an estimated small hydropower potential of about 7,754 MW (for plants up to 10 MW), of which 489 MW has been developed. The country with the highest known potential is Turkey (more than 6,500 MW). Not all countries in the region are suitable for small hydropower development due to climatic conditions, some even suffer from water stress.

Most countries consider renewable energy as an important resource. Armenia and Turkey have renewable energy laws, while other countries such as Azerbaijan, Georgia and Armenia have national renewable energy programmes. Armenia has a strategic hydropower development programme that includes small hydropower and international finance mechanisms to support its development. Azerbaijan does not have any customized laws for renewable energies, but producers of small hydropower plants with a capacity from 50 kW to 10 MW do receive subsidy that guarantees the unlimited purchase of their electricity based on a combination of applicable laws. In Georgia, the programme regulates and supports the construction of new renewable energy projects with a capacity up to 100 MW. It offers long-term purchasing agreements and favourable FITs and license-free electricity generation for power plants up to 10 MW.

Some countries such as Iraq, Jordan and Lebanon, do not have any policy for renewable energy, as renewable energy in general is not prevalent. Lebanon needs to evaluate the various demands on its water resources. Turkey's renewable energy law does not differentiate between small- and large-hydropower, thus the private sector's interest has moved towards large hydropower systems due to potentially higher profits. Many regulatory, legal and technical barriers need to be overcome in Armenia to fully develop the small hydropower potential, including its low FIT.



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**July**

10-11.07.2014	<a href="#">THETIS International Convention Renewable Energy</a>	Papeete Presidence Broche French Polynesia
22-25.07.2014	<a href="#">Hydro Vision International</a>	Nashville, TN, USA
27.07.2014- 01.08.2014	<a href="#">Grand Renewable Energy 2014 Intewrnational Conference and Exhibition</a>	Tokyo, Japan

**August**

25-27.08.2014	<a href="#">Renewable Energy 2014, 5th Handelsblatt Annual Conference</a>	Berlin , Germany
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**September**

17-18.09.2014	<a href="#">The Renewable Energy Finance Forum - Europe</a>	London, United Kingdom
10-12.09.2014	<a href="#">Renewable Energy World Asia, co-located with POWER-GEN Asia 2014</a>	Malaysia

**October**

08.10.2014	<a href="#">West Africa Forum for Clean Energy Financing (WAFCEF), ECOWAS Renewable Energy Investment Week</a>	La Palm Royal Beach Hotel in Accra, Ghana
12-14.10.2014	<a href="#">The WaterWorld Middle East 2014</a>	Abu Dhabi, UAE
13-15.10.2014	<a href="#">Building on Recent Development Progress, International Conference and Exhibition</a>	Lake Como, Italy
21-23.10.2014	<a href="#">The Preeminent Conference and Exhibition for All Things Hydropower In Brazil, HydroVision Brazil</a>	Sao Paulo, Brazil
23-24.10.2014	<a href="#">Local Renewables 2014</a>	Freiburg im Breisgau, Germany

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