



International Centre
for Hydropower

Annual Report 2013

Gaining through training

www.ich.no



Norad

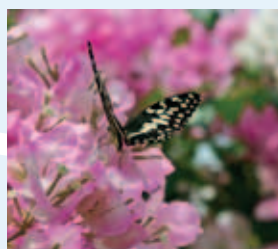


Member status

At the beginning of 2013, the centre had 57 members from 17 countries. The following 16 organisations joined ICH as members during the year:

- Asociación de Usuarios de la Unidad de Riego San Jeronimo-AURSA, Guatemala
- Mulanje Renewable Energy Agency (MuREA), Malawi
- Southern African Research and Documentation Centre (SARDC), Zimbabwe
- Asociación Salvadoreña de Energías Renovables (ASER), El Salvador
- CELAPEH, Colombia
- CESEL S.A., Peru
- Constuloría y Arquitectura Ambiental (CAA), Guatemala
- Aryabhata, India
- Arusha Technical College (ATC), Tanzania
- Electricity Control Board (ECB), Namibia
- Mercados Eléctricos de Mesoamérica S.A. (MELESCA), Guatemala
- Fedeagro, Guatemala
- Agro Engineering Works PVT. LTD., Nepal
- Kenya Electricity Generating Company Limited (KENGEN), Kenya
- Norwegian Renewable Energy Partners (INTPOW), Norway
- Norwegian-African Business Association (NABA), Norway

Of these organisations, the last two have established mutual membership with ICH. Thus, at the end of 2013, the Centre had 73 members from 21 countries, representing an increase of 28% over the last year, and 55% over the last 2 years. A list of the current members is presented on page 17.



The work of the Board

The Board held four meetings during 2013. A total of 34 issues were dealt with. Amongst the most important were the strategy discussions, budgeting and financial monitoring.

The present Board members were elected at the Annual Meeting in May 2013 for the period May 2013 to May 2015. The Board consists of the following members:

Kjell Repp, NVE (chair)
alternate: Kjell Erik Stensby, NVE
Torbjørn Nielsen, NTNU (deputy chair)
alternate: Leif Lia, NTNU
Jan Daleng, Statkraft
alternate: Nils Skjeldal, BKK
Hege Iversen, Norconsult
alternate: Ove Rusten, NORPLAN
Reidar Hindrum, NEA
alternate: Bjarne Børresen, Energi Norge

The election committee consists of:

Odd K. Ystgaard, Norconsult AS (chair)
Øivind Johansen, OED
Kjell Erik Stensby, NVE

The committee is elected for the period May 2011 to May 2015.

The Academic Committee was established in 2010, and helps to ensure the quality of existing and new courses, participate in the evaluation of ICH's activities and propose new ones, and has this year given valuable input in connection with on-going processes like strategic planning. The committee is called upon by ICH's Managing Director and consists of the following representatives from ICH's members:

Meg Bishwakarma, Hydro Lab, Nepal
John Moe, Norconsult AS
Anders Iversen, NEA
Ole Gunnar Dahlhaug, NTNU



*Back row, The Board, from left: Kjell Repp (chair), Kjell Erik Stensby, Reidar Hindrum, Jan Daleng, Torbjørn Nielsen, Hege Iversen, Nils Kristian Skjeldal, Ove Rusten
Front row, ICH staff: Laura Bull, Carole Rosenlund, Pål Johansen*

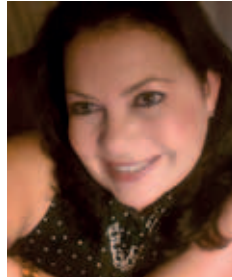
The Secretariat



Tom Solberg, MD
Managing Director



Pål Johansen, PM
Project Manager O&M



Laura Bull, HS
Head of Studies



Carole Rosenlund, PM
Project Manager



Anne Camilla Vaalund,
Head of Administration

Tom Solberg has served as Managing Director since 17th January 2011. Laura Bull and Carole Rosenlund hold full time positions as Head of Studies and as Project Manager respectively. Pål Johansen joined ICH as Project Manager O&M from 9th September and Anne Camilla Vaalund joined in a 50 % position as Head of Administration from 1st October. The total capacity of the secretariat thus totalled 3.4 FTEs (Full Time Equivalents) for 2013, and will from 2014 be 4.5. Capacity was additionally supplemented by the outsourcing of accounting services to Evry Økonomitjenester AS and through an operating and service agreement for IT services with Evry Regional ITO. Reception and postal services are included in the rental agreement.

Current activities

Profiling

The Centre's web-site is continuously developed and made as dynamic as the capacity and resources allow.

The quarterly ICH Magazine that was introduced in 2011 has continued to grow, and is now regularly receiving contributions from the member organizations, course participants and other parties in the ICH network. Other relevant information is also posted regularly on the web-site. Through agreements with other organizations many new links are established to the relevant web-sites. Registration forms for the

Centre's activities are filled in directly on the web-site, and only on-line applications are now accepted.

The 2014 course programme is distributed on the ICH web-site and Facebook page.

The course programme and information brochures about new activities such as the turbine courses, Latin-America courses and general ICH information were also distributed at all the events where ICH was represented in 2013.

The International Water Power & Dam Construction May 2013 edition featured an article by Carole Rosenlund (ICH Project Manager) on "Battling against power threats" which dealt with the topics from the popular ICH course on Revenue Protection Management and Vandalism.

ICH continues to liaise with Norwegian embassies, National Authorities, Development Banks and other stakeholders in the regions where different training events are being organised. In several cases this kind of promotional activity has resulted in new requests for training as well as new sources of financing those activities.

The Centre is a member of International Association for Small Hydro, India, International Network on Small Hydro Power (IN-SHP), China, International Hydropower Association (IHA), United Kingdom, European Small

Hydro Association (ESHA), Belgium and Norsk Hydrologiråd and Forum for Teknologi og Utviklingsarbeid (FTU) under Tekna.

ICH is represented in the IN-SHP's Coordinating Committee, IHA's permanent committee for research and education, Norsk Hydrologiråd and in NNCOLD's support committee. NNCOLD will be hosting the World Congress of ICOLD in Stavanger in 2015, and ICH has made an agreement with the arrangement committee of NNCOLD to be responsible for the technical symposium that will take place in connection with this event.

Activities under the Norad agreement

Courses

The present framework agreement with Norad covers the period 2011–2015. It was extended with an additional agreement covering the years 2013 to 2015 to expand the scope and activity level for ICH. Together, these agreements gave ICH the basis for implementing 21 courses and seminars or workshops in 2013. The activities implemented outside of the Norad agreement are commented below in a separate section of this report.

Brief reports from these courses are presented in the following section:

HYDROPOWER DEVELOPMENT AND MANAGEMENT (17510002) took place in Trondheim, Norway, from 19th August to 5th September 2013. This course is the most popular in the ICH portfolio and was organised for the 14th time. The academic content and case studies are updated and renewed every few years, as was also the case this year. 22 participants from 15 countries took part, including 6 women. The 3-week course is a mix of academic study, group exercises and case studies, and a 4 day excursion to Hydropower related sites culminated in Oslo for the final days of visits to institutions and the presentation of the group work.

HYDROPOWER FINANCE AND PROJECT ECONOMY (17510009) took place in Trondheim, Norway, from 8th to 12th April 2013. This course was represented by 8 countries from 4 continents and had a total of 14 participants including 2 ladies, both from Myanmar. The programme included both academic lectures and group exercises.

TURBINE MAINTENANCE (17510017) is a two part course with an online part and a workshop. ICH now has 2 modules available: the original Francis Turbine module and from 2012 the Turbine Governor module and due to very strong demand it was decided to run both modules in 2013. The Turbine Governor module had the workshop in Trondheim, Norway, from 25th to 31st August





2013 and the Francis Turbine workshop was held at Akosombo in Ghana from 17th to 23rd November 2013.

The Turbine Governor workshop was expanded and upgraded based on participants' feedback, and had a total of 14 participants including 3 women, and the Francis Turbine workshop was attended by a total of 17, but unfortunately the only female who completed the online part was prevented from attending the workshop due to illness. A total of 9 countries were represented in the 2 workshops.

DAM SAFETY INSPECTION (17510028) took place in Trondheim, Norway, from 6th to 11th May 2013 and had 14 participants, including 2 women. The week's lectures focused primarily on the various dam schemes, dam safety awareness and how to identify deficiencies that may affect safety, emergency action planning, monitoring and instrumentation of dams. The course concluded with a 2 ½ day excursion where various dam sites in the Trøndelag region were visited. Different

dams were inspected included single and double curved arch dams, rock fill dams, gravity dams, and buttress dams.

SEDIMENT WORKSHOP NEPAL (17510013) took place in Kathmandu and Pokhara, Nepal, from 22nd to 29th September 2013. This regional workshop was organised together with Hydro Lab of Nepal and had 18 participants from 6 countries, including 4 women. The workshop consisted of academic sessions focusing on sedimentation issues related to Headworks design, and fieldtrips to relevant hydropower installations where the sedimentation problems could be seen and discussed on site.

LAC REGIONAL COURSE HONDURAS (17510025) was held in Tegucigalpa from 3rd to 9th June 2013 and focused on Risk Management in Hydropower Development in Latin America. A total of 23 from 7 countries in the region, of which 4 were female, took part in the seminar. During the popular fieldtrip both Hydropower installations and Rural Communities were visited.



ELRI LAC SAN SALVADOR (17510037) took place in El Salvador from 27th to 30th November 2013, and had a record turnout of 80 participants, 10 of which were women, with more than 25 % of the total costs covered by participants' fees. The seminar focused on designing the market, with emphasis on transparency. 12 countries were represented, most of which were from the close region, some were also from South America and Europe (Norway).

REGIONAL POWER TRADE AFRICA (17510038) was held in Walvis Bay, Namibia, from 21st to 26th October 2013. 26 participants from 6 African countries took part, including 10 women. The event was organised together with the Regional Electricity Regulators Association (RERA), and the Electricity Control Board (ECB) of Namibia. The focus was on Power Purchase Agreements - overcoming regulatory challenges in providing frameworks for stakeholders. The programme

introduced participants to the key PPA features and experiences within the power sector in emerging and developed power markets. The programme attracted a lot of interest with 23 paying participants.

SOCIAL IMPACT ASSESSMENT (17510041) took place in Trondheim, Norway, from 7th to 11th October 2013. There were 7 females among the total of 17 participants, with a very wide geographical distribution represented by 12 countries. The seminar contained academic lectures as well as role play exercises, with one of the highlights being the exercise entitled: "Alignment of CSR and SIA and the emerging role of Indigenous Peoples, Minorities and Politically Marginalised Populations".

KGRTC – REVENUE PROTECTION MANAGEMENT AND VANDALISM (17510042). This workshop took place from 15th to 24th July 2013 and was



a follow-up to the pilot conducted in 2012 and which was immediately requested to be held again. Hosted in partnership with KGRTC, Zambia, the aim of this workshop was to facilitate resources and opportunities to help utilities on the continent facing major challenges associated with the continued theft of electricity, and vandalism of utility infrastructure which relentlessly hinders the uninterrupted supply of electricity vital for achieving development goals and economic growth.

Based on the feedback given the year before, it was deemed necessary to extend the workshop by 4 days to give enough time for the practical exercises. 24 participants attended the workshop, with 4 women included.

IPPAN – NEGOTIATION TECHNIQUES PART 2 (17510043) was held in Bangkok from 28th January to 1st February 2013. This workshop formed the second and final part of the programme that was held the year before in Pokhara with a workshop on Concession Agreements.

In addition to the main course that is part of ICH's regular cooperation with IPPAN an emphatic request had been forwarded to IPPAN from the Banking sector in Nepal, calling for a training event focusing on Hydropower Financing and Risk Management from the bankers' perspective. A mini seminar was therefore organised for 18th April that had a large turnout of 40 participants including 5 females, all from the banking sector as well as the legal, investment and insurance sectors.

CONFLICT MANAGEMENT BOLIVIA (17510050) was held in Santa Cruz from 11th to 14th June 2013. 15 participants from a wide range of stakeholders took part in the workshop, including 3 women. The focus of the workshop was the Prevention and Administration of Social and Environmental Conflicts and the participants included Indigenous Leaders as well as engineers, lawyers and Development Professionals.

COURSES IN MYANMAR (17510052). A total of 4 training events took place in Myanmar during the course of 2013. All events were held at the Ministry of Electric Power (MOEP) in Nay



Pyi Taw, the Political Capital of Myanmar. The following events were held in 2013:

- **Hydropower Development – Joint Public Private Development of Hydropower**, was held from 11th to 14th February 2013, and had 212 participants including 50 women. In addition, approximately 60 observers were present during most of the 4 days, and these included Ministers, retired officials and Director Generals of various Ministry Departments. With a strong team of experts from Norway this seminar aimed at giving an introduction to Hydropower Development, as viewed from a Joint Public Private perspective. It focused on the various aspects of Hydropower Development and the components that are necessary for the successful development of a country's hydropower resources. This seminar was for the main part, sponsored by the Norwegian Ministry of Foreign Affairs through the embassy in Yangon.

- **Mini seminar: Export of Hydropower** took place on April 18th 2013 and had 23 participants of which 4 were women. The focus in this mini seminar was to give an insight into international

agreements, pricing formulas and legal issues that are relevant for this kind of export.

- **Economic and Financial Analysis** was held from 4th to 6th June 2013 and had 14 participants of which a majority of 10 were women. This seminar was urgently requested by the Ministry of Electric Power and was built around the relevant module in the ICH course on Hydropower Financing and Project Economy, but was adapted to the specific situation in Myanmar.

- **Negotiation Techniques part 1** took place from 16th to 19th September 2013 with 23 participants with a majority of 16 women. This first part of a 2 part programme prepared the participants for a Negotiation situation by giving the necessary insight into the relevant agreements, Risk Management, Economy and Costing as well as the Legal Issues.

LAOS DAM SAFETY INSPECTION (17510054) was the South East Asia course for the year and was held from 3rd to 10th November 2013. With a total participation of 23, including 4 women



the course focused on the updated topics of Dam Safety Inspection and Monitoring. Experts were sourced from the Norwegian Hydropower Industry and dam expertise from NVE, as well as from the World Bank and IFC. A 2 day technical tour took the participants to visit the NG1 and NG2 sites, where the academic topics covered in the lectures could be shown and discussed in practice.

MICRO AND SMALL HYDRO GUATEMALA (17510056) took place in San Jeronimo with 17 participants including 2 women. The event was focused as a "Development Option for Rural and Indigenous People Communities" and gave insight into the Planning and Implementation of Micro and Small Hydropower. The participants were taken on a fieldtrip to visit several projects in the San Jeronimo area, where a positive development had been achieved through a constructive approach and communication between the developers and the indigenous people.

HYDROPOWER AND THE ENVIRONMENT UGANDA (17510057) was held at Entebbe from 23rd to

28th September 2013 through a cooperation with Makerere University, Uganda. A total of 24 participants followed the course, including 6 women. The programme focused on the region's environmental concerns that have been known to cripple the development of hydropower projects, and that are critical in providing much needed electricity to the country.

INDONESIA O & M (17510058) is supported by Norad, OED and the Norwegian embassy in Jakarta, and is a cooperation between ICH and the Indonesian State Utility for Electricity, PLN. The main part of this project is scheduled for 2014, but 2013 saw the major part of the preparation work, including meetings with PLN to agree on the practical details of the cooperation. ICH will provide the experts and the academic programme, and PLN will make available their infrastructure at the PLN corporate University at Makassar, Sulawesi, Faculty for Renewable Energy. This includes all teaching facilities as well as accommodation and board for the participants. Three different seminars are planned for March 2014.



Online Competence Market (17510007)

The user friendliness of the website continues to improve. Applications are now submitted electronically through the website, and have enhanced ICH's electronic network worldwide.

The online platform elearning.ich.no is actively used to manage the online turbine monitoring and turbine governor courses.

Participants Feedback

All ICH courses undergo continuous improvements based on feedback from lecturers, participants and observations. Starting from 2014 new courses will be offered in Operation, Maintenance and Rehabilitation of Hydropower Plants.

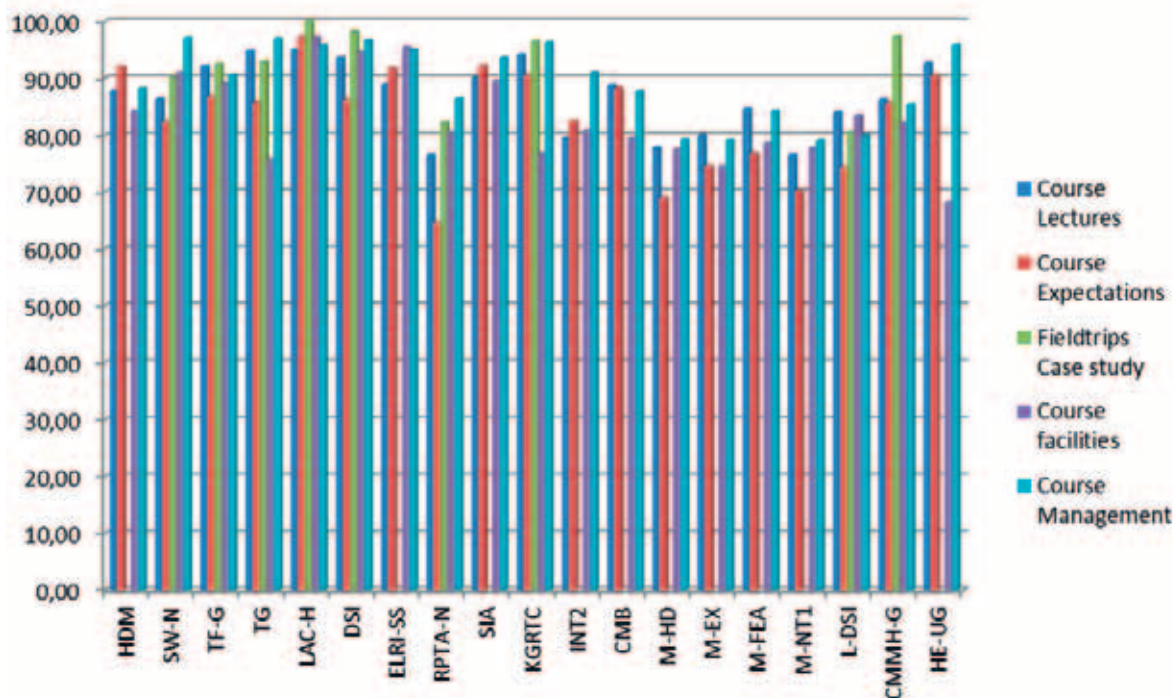
The activity level continued to increase in 2013, in line with the current plans of offering more activities while expanding the geographical base. The most important effort in a new market for 2013 has been Myanmar with 4 events during the year. The first seminar took place in Nay Pyi

Taw in February and had a massive turnout of 212 regular participants, as well as 60 observers including ministers, retired officials and Director Generals of various Ministry Departments.

The feedback from course participants on the quality and relevance of the courses is generally very good, as the graph below indicates.

Other externally financed activities

ARMENIAN DELEGATION STUDY TOUR (17510048) was conducted from 27th to 31st May 2013, with company visits and lectures organised in Oslo and Bergen. The focus was on issues relevant for the development of small hydropower plants and the exchange of experiences with Norwegian counterparts. Company visits to NVE, INTPOW, Kraftsenteret in Bergen, EnergiTeknikk and technical visits to various power plants in the region were organised. The delegation was small with 5 members, including 2 women. The program is sponsored by the Norwegian Ministry of Foreign Affairs through a 3 year program with Norsk Energi, and further study tours will be conducted in 2014.



Summary of Evaluations for ICH courses in 2013

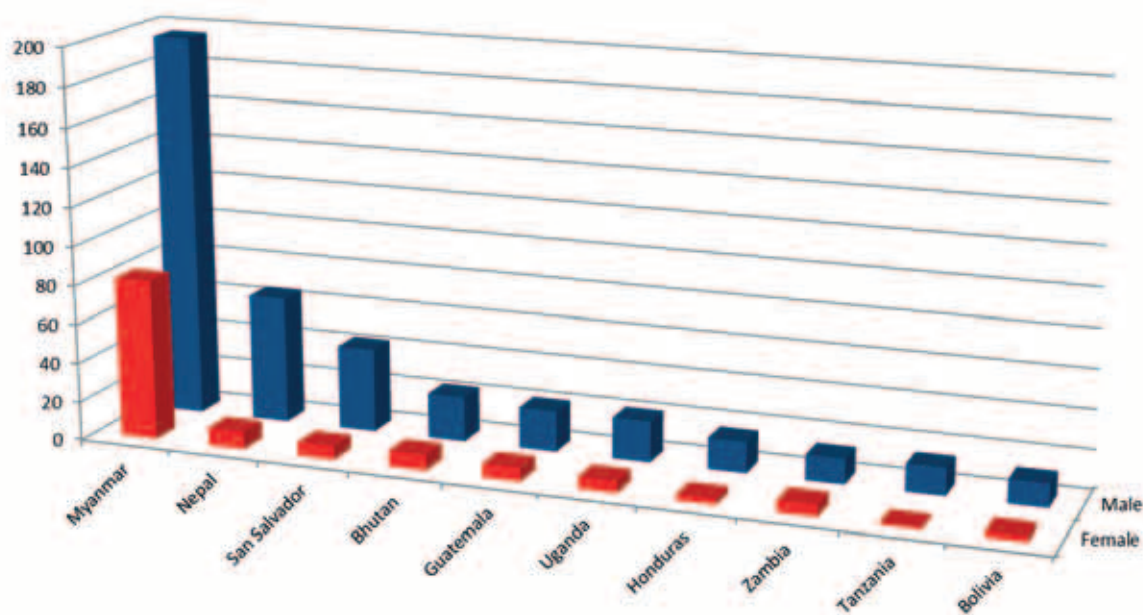
Geographical distribution

Country	Female	Male	Total
Myanmar	82	196	278
Nepal	9	65	74
San Salvador	7	43	50
Bhutan	8	23	31
Guatemala	7	21	28
Uganda	6	21	27
Honduras	3	16	19
Zambia	6	13	19
Tanzania	1	14	15
Bolivia	3	12	15
Ghana		13	13
Costa Rica	1	12	13
Laos	2	9	11
Malawi	1	9	10
Kenya	2	7	9
Namibia	5	4	9
Sri Lanka	1	5	6
Nicaragua	2	4	6
Pakistan		5	5
Armenia	2	3	5
Norway	2	3	5

Colombia		4	4
Mozambique	1	2	3
Panama	1	2	3
Brazil		2	2
India		2	2
Liberia		2	2
Peru		2	2
Turkey		2	2
Vietnam	1	1	2
Zimbabwe	1	1	2
Nigeria	2		2
Chile		1	1
Denmark		1	1
Ethiopia		1	1
Indonesia		1	1
Iran		1	1
Malaysia		1	1
Mexico		1	1
South Africa		1	1
Rwanda	1		1
Total	157	526	683

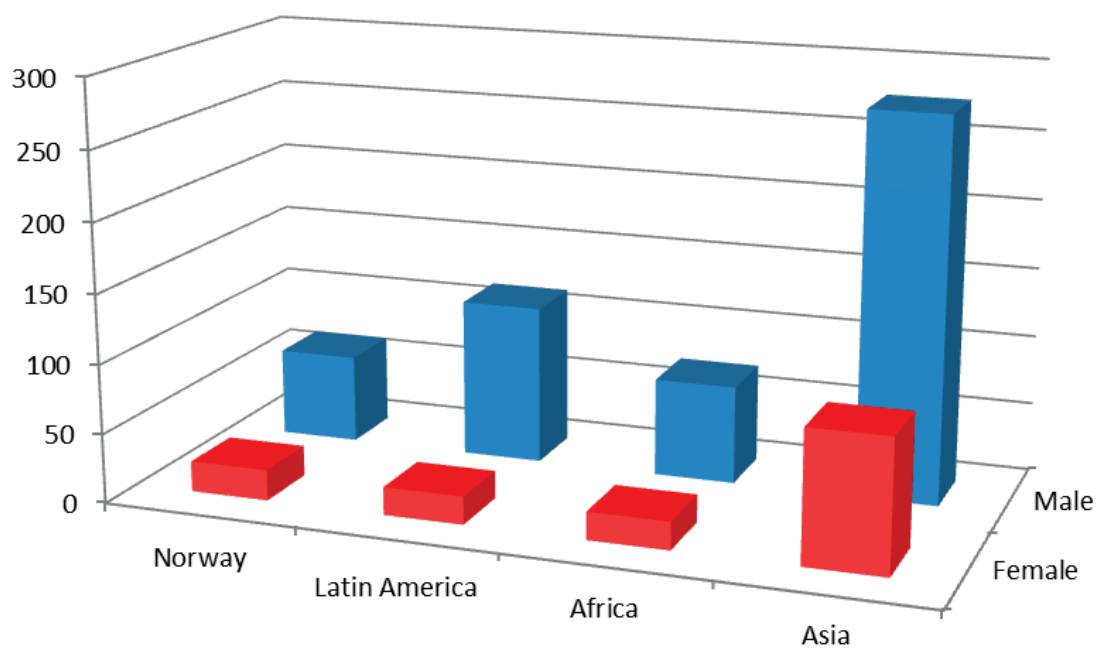
Distribution by country for all ICH courses in 2013.





Graphical representation of the 10 countries with the highest number of participants, for all ICH activities.

	Norway	Latin America	Africa	Asia
Male	64	115	71	276
Female	22	20	20	95



Regional distribution of participants according to course location.

The Regional distribution of courses and gender is shown in the above tables and graphs. The first table shows the participation by country for all of ICH's activities, and the next graph depicts the 10 countries that had the most participants overall, out of a total of 41 countries represented in 2013.

The following table and graph shows the distribution of participants to the regions where ICH is active. Asia is the most active region, and this is due to a generally high activity level in that region, but the initial event in Myanmar that hosted 212 participants is also a major contributor to the overall high level.

The overall distribution of the regions and participants for the different ICH events is shown in more detail on page 18.

Gender issues

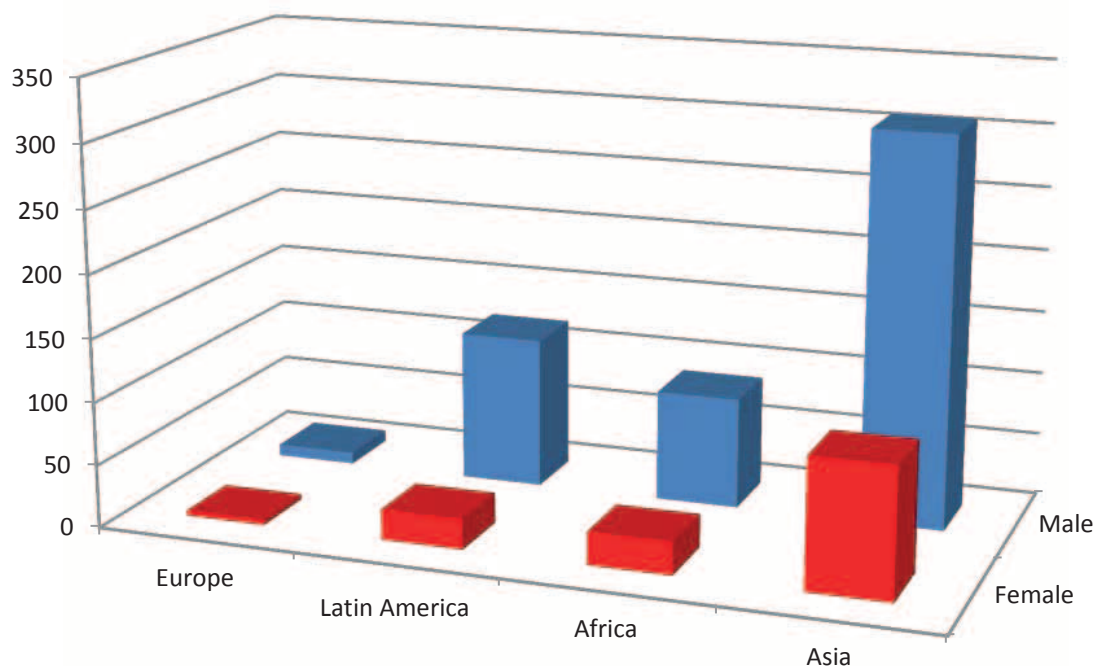
ICH Board of Directors

The Board of Directors for ICH has five members. Each member also has an alternate member. The gender distribution of the Board is 4 male Directors and 1 female. The female component in the Board is thus 20 %, which is down from last year's 40%.

ICH Secretariat

The ICH secretariat has, throughout 2013, had 1 male and 2 female staff members in full time positions, and one more male staff was employed in September in a 100 % position, and one female staff was employed in October in a 50 % position. The female component in the secretariat for 2013 is thus 63%.

	Norway	Latin America	Africa	Asia
Male	9	120	88	309
Female	4	24	26	103



Distribution of participants originating from the Regions for all ICH courses for 2013.

ICH Participants

The ICH Course and other Event Participants for 2013 increased by 93 % to a total of 683 persons, of which 526 were male and 157 were female. The female component was thus increased from

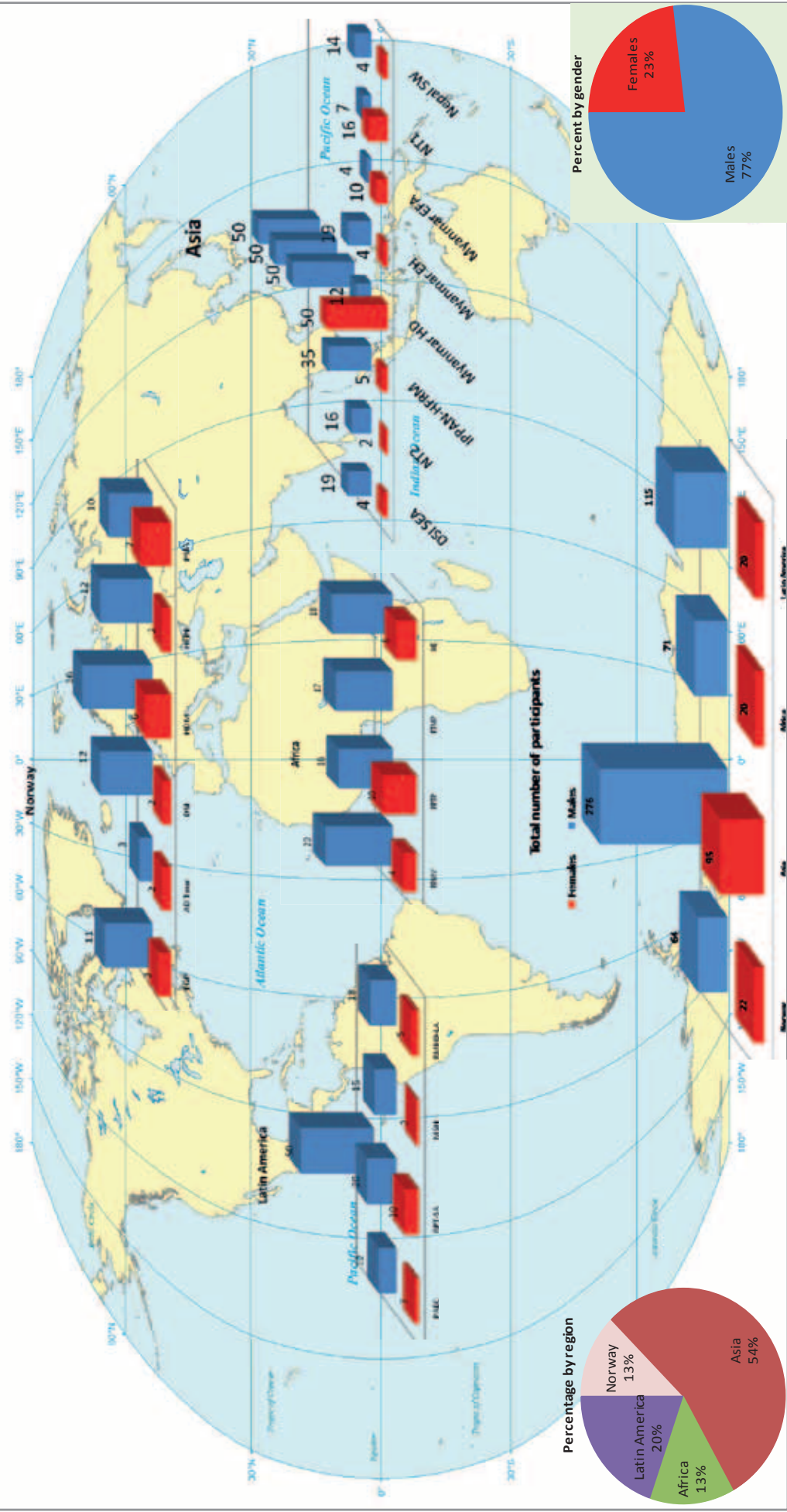
21% in 2012 to 23% in 2013. ICH continues to encourage females to apply for the courses and events, and it is believed that through sustained efforts the female component will continue to grow.



MEMBERSHIP STATUS as of 31st December 2013

ACOPE, Costa Rica	Hangzhou International Center on Small Hydro Power, China
Agder Energi AS, Norway	Himal Power Ltd., Nepal
AGER, Guatemala	HMV Ingenieros, Colombia
AGRO Engineering Works PVT. LTD., Nepal	Hydroambiental Consulting S. A., Costa Rica
Agua Imara, Norway	Hydro Lab Pvt. Ltd., Nepal
AHPPER - Asociación Hondureña de Productores de Energía Renovable, Honduras	Independent Power Producers' Association, Nepal
Alternate Hydro Energy Centre, Indian Institute of Technology, Roorkee, India	Instituto Costarricense de Electricidad (ICE), Costa Rica
Arusha Technical College (ATC), Tanzania	International Association for Small Hydro, India
ASER, El Salvador	International Hydropower Association (IHA), United Kingdom
Aryabhata, India	INTPOW, Norway
Asociación Aguapaz, Guatemala	Inversiones Pasabién S.A. Hidroeléctrica Pasabien, Guatemala
AURSA, Guatemala	ISAGEN S.A., Colombia
Bergenshalvøens Kommunale Kraftselskap AS, Norway	Kafue Gorge Regional Training Centre, Zambia
Butwal Power Company Ltd., Nepal	KENGEN, Kenya
CELAPEH, Colombia	Mercados Eléctricos de Mesoamérica S.A. (MELESCA), Guatemala
Carbon Brokers, S.A., Guatemala	Makerere University, Uganda
Central Engineering Consultancy Bureau, Sri Lanka	MuREA, Malawi
Centro Internacional de Física (CIF), Colombia	Norwegian-African Business Association (NABA), Norway
CESEL S.A., Peru	Norwegian Environment Agency (NEA), Norway
Colegio de Ingenieros Mecánicos, Electricistas y Químicos de Honduras, Honduras	NACEUN, Nepal
Consultora Socioambiental del Neotrópico S.A., Costa Rica	Norconsult AS, Norway
Constutoría y Arquitectura Ambiental (CAA), Guatemala	NORPLAN A.S, Norway
Department of Civil Engineering, University of Dar es Salaam, Tanzania	Norwegian Water Resources and Energy Directorate (NVE), Norway
Department of Hydraulic and Environmental Engineering, NTNU, Norway	Newplan Ltd., Uganda
Druk Green Power Corporation Limited, Bhutan	O-Tek Int. S.A., Colombia
EDL-Generation public company, Laos	PAH Guatemala, S.A., Guatemala
ELCOSA, Honduras	Payandab Tavan Consulting Engineers, Iran
Electricidad de Cortés, Honduras	Sanima Hydropower Ltd., Nepal
Electricity Control Board (ECB), Namibia	SARDC, Zimbabwe
Empresa Nacional de Energía Eléctrica (ENEE), Honduras	SN Power, Norway
Energi Norge, Norway	SN Power Holding Singapore Pte. Ltd., Nepal
Energy Regulatory Commission, Kenya	Statkraft Energy AS, Norway
Environmental Resources Group, Nepal	Sweco, Norway
Estrategias de Inversión S. A., Guatemala	Tanzania Electric Supply Company (TANESCO), Tanzania
European Small Hydro Association (ESHA), Belgium	Trønderenergi Kraft AS, Norway
FEDEAGRO, Guatemala	The Norwegian Ministry for Petroleum and Energy, Norway
	Volta River Authority, Ghana

Global Categorization of ICH courses for 2013



Portfolio of courses spanning virtually the whole range of issues within:

Planning, design, construction and operation phases in the hydropower sector.

Members:



Promoting Capacity Building for the Power Sector

Non-profit organisation,
Competence raising in the Hydropower industry



International Centre
for Hydropower

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