International Centre for Hydropower

ICH 2022 Annual Report









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Chairman's Note

Kjell Repp
Chairman of the ICH Board of Directors

ICH is gradually returning to 'normal'. After some very challenging years with the pandemic ruling almost every part of our daily lives and activities, the start of this new normal seems to be gathering momentum. We are proud that despite the constraints, we have been able to continue to deliver most of our courses. At the beginning we were restricted to online courses, but gradually we are working towards more and more courses that can be delivered onsite.

That said, we can probably say that we may never go fully back to that 'normal'. Reflecting on our course portfolio from 5 to 10 years ago, even as many of us have expressed some fatigue with all our interactions being online, there are several reasons for not returning fully to the 'old days'. Our evaluations have found that a combination of online and onsite in many cases improves the quality of the courses, and as such, enhances learning.

Another reason for a new approach, is the vastly increased costs of travel over the last couple of years. Air fares and higher accommodation costs have made the need to be more efficient with on-site courses.

We can still see many problems and many challenges to overcome before we are fully back to 'normal'. We are also optimistic that with the continued assistance and support from our members and partners, that we will continue to succeed in fulfilling the goal of ICH. Our commitment is unwavering. We will continue to support the hydropower industry by gathering, developing, and marketing knowhow on environmental, technological, economic, and administrative aspects of hydropower. We look forward to continuing this journey to a new normal together with you.

> The sharing of knowledge through collaboration is a core value of ICH.

Reconnection

Line Amlund Hagen
Managing Director, ICH

In 2022, after what felt like a very long time, we passed a milestone when we were finally able to return to meeting face to face and normal operations. For this we are delighted! We have truly missed the valuable experiences created in meeting and learning together during the opportunities created by our regional courses.

That said, the pandemic has taught us some important lessons. These include how to make robust contingency plans, how to find the best mix between online and onsite courses and how best to utilise the resources and opportunities we have.

These learnings have resulted in some changes which will be evident in the course program and delivery for 2023. We hope that we have managed to get the best of both worlds with the careful planning of the course structure and delivery modes, we can continue to deliver relevant and engaging courses.

Over the years, ICH has had the privilege to work with numerous organisations around the world. Many have decided to apply for membership in ICH and have enjoyed the benefits that this brings. Our list now includes more than 100 organisations. Towards the end of 2022 we decided to refresh our relationship with our members. We asked for confirmation of a contact person, that the organisation would sign our "code of conduct" and that the membership fee account is settled.

We have also endeavoured to give even more benefits to membership and in that way making it even more valuable to the organisation. It is great to see that the interest in ICH membership is higher than ever and that new applications continue to arrive every month.

Please remember, we love to hear from you, whether it be ideas, feedback, or any other issue you would like to discuss.

We look forward to seeing you at one of our events soon!

> Energy connects us, ICH keeps us together

The **Board**

DIRECTORS

Kjell Repp
Chairman

Christine Birkeland
Deputy Chairman – Norwegian Energy and Water Resources Administration (NVE)

Stephen Sparkes
Statkraft

Bjarne Børresen
Multiconsult AS

Leif Lia
NTNU

DEPUTY DIRECTORS

Ole Gunnar Dahlhaug
NTNU/HydroCen

Hans Arild Bredesen
Bredesen Consulting

Eivind Heløe
Energi Norge

Gunn Vik
NORWEP

Halvor Haugsvold
Norconsult

Four board meetings were held in 2022. As with the courses, we were again able to meet in person for the board meetings. However, as the members of the board are in different parts of the country, we opted for a hybrid model with online participation thus saving time, money and emissions on travel.

The success with the hybrid (online / onsite) Annual Meetings in 2020 and 2021 was continued in 2022.

2022 was the first full year of working under the new Norad contract. The board worked to streamline the different levels of reporting and revising the workflow of the board in addition to the required revision of budgets, work plans and accounts.

Over the years, ICH has had a steady flow of membership applications. Following the pandemic, the flow has increased substantially. The board decided to start work on revising and validating the list of members, establishing clear criteria for approval of memberships. This work is still ongoing as the secretariat has not yet been able to reach all ICH's existing members but will be completed by the end of the year.

The 2020–2023 Election Committee comprises:

Øivind Johansen, OED (Ministry of Petroleum and Energy), (Chair)
Odd K. Ystgaard, Norconsult AS
Vegard Willumsen, Multiconsult

Elections for the Board of Directors were held at the Annual Meeting on 5th April 2022.

The **Secretariat**

Tom Solberg
Project Director

Carole Rosenlund
Head of Africa

Line Amlund Hagen
Managing Director

Laura Bull
Head of Studies and Latin America

Monde Lisulo Hamududu
Project Manager

The ICH team were delighted to again be able to meet our students in the regions, so home offices were exchanged for flights, hotels, and course venues. The team also set aside time to meet with partners and experts in the regions.

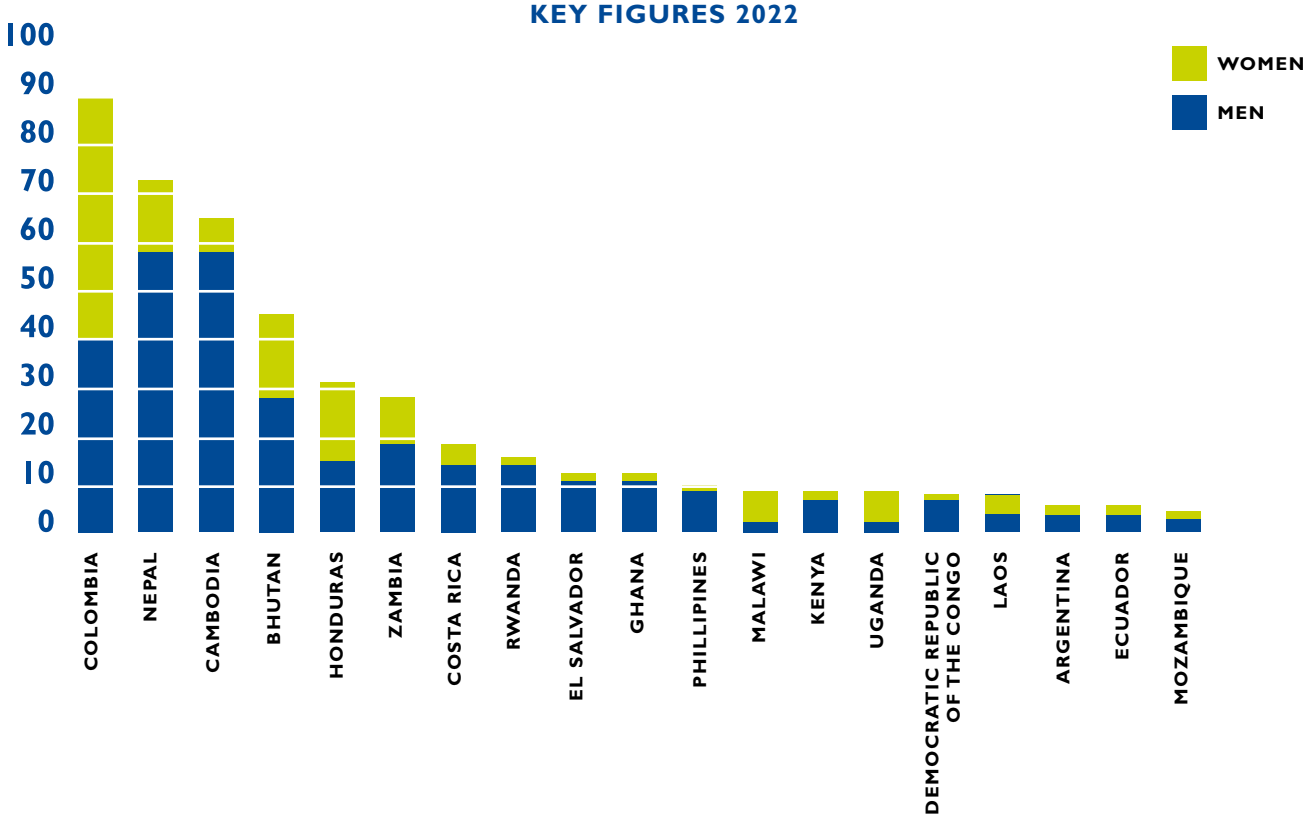
Throughout 2022 ICH engaged outsourced professionals for accounting, auditing, and ICT.

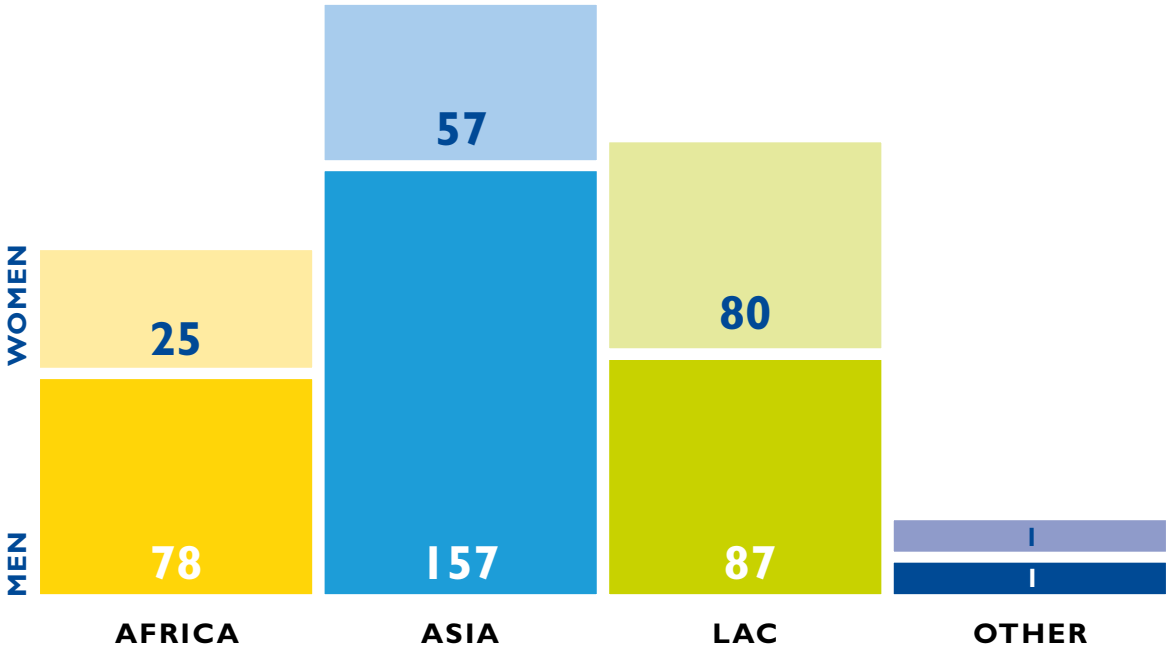
ICH **Mission**

- To develop and implement training and capacity-building activities in renewable energy with an emphasis on hydropower.
- To collaborate with key Norwegian partners for effective implementation of the government's commitment to clean energy development; and to strengthen networks between the public and private sectors to mutually benefit members and the implementation of ICH activities.
- To contribute to institution building and improved management through the dissemination of knowledge on hydropower and other renewable energy sources.
- To provide services to Norwegian and foreign partners of high international quality in courses and conferences that are in line with current guidelines for Norwegian development assistance activities.

ICH **Impact**

KEY FIGURES 2022





486 participants

25 courses

34% women

31 countries











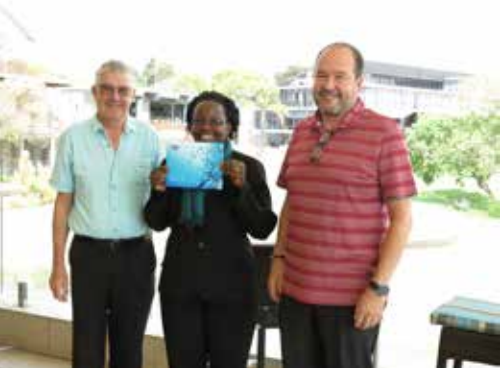
















LUMBINI


Sustainability Champions

Laura C. Bull
Head of Studies, ICH
Head Latin America
and the Caribbean, ICH

The year 2022 presented significant challenges and with it, emerging opportunities for everyone worldwide. Uncertainty was still present during the final stages of the pandemic as the full consequences came to light. Despite the difficulties, ICH continued to evolve with innovative digital transformation towards virtual, hybrid and onsite courses. We have been busy developing new technology platforms, creating an exciting new learning experience for our course participants. These will fully launch in 2023 and we hope to be able to inspire them on their journey as champions for sustainable development models, ready for use in their unique contexts.

ICH's focus on action recognizes hydropower's role as an essential part of the future energy matrix and is ready to build the human capital needed for a successful energy transition. To do this, we are passionate about inspiring the next generation of professionals in the sector. We aim to strengthen capacity in the full range of skills needed, in order that we can meet the industry challenges of the present and the future.

Most of our online courses held in 2022 were complemented by technical tours and onsite training for participants. Learning through experience, based on evidence, constructive conversations, and experiences shared with experts, professionals and most importantly along with local communities. It was wonderful to be reunited and bring stakeholder participation back to the core of our training.

Our mission and combined purpose continue to be shaped by the Sustainable Development Goals and moving towards 2023 they are the basis of our academic activities. We will continue to place the needs of communities in vulnerable situations as the focus and recognize the value of human, natural and social capital with the same attention as financial and physical capital.

Mentoring and developing leadership provided our participants with great possibilities for interaction. This allows us to do the work of mentoring for conscious leadership, connected with the environment and with the different voices that add and create value and are essential in the sustainability dimensions that apply to the hydropower sector.

ICH in 2022, a year of capacity building for Sustainability Champions!

Thank you to our committed Members worldwide, our professionals, and our experts for making it possible!

ICH value creation through education.
Laura C. Bull

ICH courses in 2022:
Promoting sustainable hydropower development throughout the world.

		Venue	Dates in 2022
	Africa		
1	HSSE for Sustainable Hydropower in Africa	Online	9-13. May
2	Financial Modelling, PPA Structuring and Negotiations: Module II	South Africa	13-17. June
3	Revenue Protection, Infrastructure Security and Metering	Uganda	18-22. July
4	UEGCL – Francis Turbine, Condition Monitoring & Maintenance Planning	E-learning	28. Aug.–31. Dec
5	Regional Power Trade Program	South Africa	12-16. September
6	Reservoir Sediment Management for Sustainable Hydropower – PART 2	Zambia	26-30. September
7	The Process of Social Impact Assessment in Renewable Energy Projects	S.Africa	7-11. November
	Asia		
8	Financial Modelling Module II	Nepal	12-16. September
9	Resettlement Module II, ASIA Region	Thailand	17-21. October
10	Revenue Protection and Smart Metering	Cambodia	24-28. October
11	TTL: Experience sharing on challenges of sediment erosion in hydropower turbines	Nepal	1. November
12	Planning & Design of Hydropower Headworks in Sediment Loaded Rivers	Nepal	3-8. November
13	Hydropower Project Development	Bhutan	28. Nov. – 1. Dec.
14	Dam Safety	Cambodia	5-8. December
	Latin America		
15	Financial Risk Management II	Online	9-11. February
16	Energy Markets IV	Colombia	1-3. June
17	Environmental and Social Monitoring in Energy Projects III	Costa Rica	22-24. June
18	Integrated Water Management Program	Costa Rica	26-30. September
19	Electricity Transmission and Distribution for The Future	Online	14-18. November
20	Financial Risk Management III	Colombia	23-25. November
21	Gender and Management, The Capacity to Transform	Colombia	29. Nov.-2. Dec.
	International courses		
22	Social and Environmental Monitoring in HPP Module II	Online	23-25 March
23	Resettlement: Module I	Online	4-6 April
24	Risk Management in hydropower development: Module II	Online	18-20 May
25	Rehabilitation and Modernization, Foundational training	Online	8 -10 June

INTERNATIONAL

Maximising the potential of the virtual methodology as a build-up to onsite training worked well across the portfolio in 2022. ICH was able to complete a series of modules that began in 2020 with online modules to provide a consistent entry point to more advanced modules. This was able to be combined with technical tours and regional courses to set the learning in a regional context.

Within the course cluster Operations and Maintenance & Project Management, the course **Risk Management in Hydropower Development II** was delivered in May online. Building on the previous risk management syllabus, a further exploration of the complexity of contingency and climate change along with the evolving political economy of risk. Participants were taken through critical environmental, social, health and safety processes and activities undertaken at critical project phases. These highlighted strategic approaches to facilitate or accelerate access to international finance opportunities.

This followed by a foundational course on **Rehabilitation and Modernization of Hydropower Assets**. This is an increasingly important issue to extend the life and efficiency of assets. The course addressed the need to look at sustainable asset management over the long term, using risk management and a life-cycle analysis approach to optimize the rehabilitation programs.

Both the **Environmental Monitoring Module II** and **Resettlement I** were held online but led to onsite regional trainings. Environmental Monitoring included a review of case studies that demonstrated successful implementation and lessons learned. Also included were the criteria to update and review planning and compliance documents related to their work environments and the tools to measure, analyse, and assess the level of compliance and generate corrective plans where indicated.

The foundation course in resettlement course provided a framework for assessment of the risks of resettlement and how to plan effective programs unique to each situation and context. This included cross-cutting issues such as gender, Indigenous Peoples, and the pressures of climate change, which are considered crucial issues requiring specific measures for successful implementation.

International courses			
Social and Environmental Monitoring in HPP Module II Online • 23-25 March	Resettlement: Module 1 Online • 4-6 April	Risk Management in hydropower development: Module II Online • 18-20 May	Rehabilitation and Modernization, Foundational training Online • 8 -10 June

AFRICA

Africa's diverse resources position her to play a leading role in the deployment of clean energy solutions. To empower the region's renewable energy practitioners with the advanced skills needed to promote sustainable development of renewables, ICH delivered seven training courses in 2022, five of which were onsite.

Health, Safety, Security & Environment, and its importance for sustainable hydropower development kicked-off the years activities and was delivered online in May. Good HSE culture ensures the safety of people and the environment, but also makes plants and equipment more reliable, reduces breakdowns and ensures the cost benefits of better productivity and efficiency.

The second module of **Financial Modelling, PPA Structuring and Negotiations;** featured an intensive approach building on the foundations from Module I. Developing a well formulated financial model is vital for project evaluation and works to reduce barriers to investment in the region. PPA structuring, and negotiation, investment analysis and operational scenario evaluation were also featured.

Revenue Protection, Infrastructure Security and Metering course built on the fundamentals covered in Module I of the online course. These extended into the deployment of processes for management of losses, the application of specific international standards and best practice on metering installations, and the revenue protection and metering linkages for enhanced Information flow and impact on structures.

Under the UEGCL HOME programme, ICH as the training coordinator delivered the online part of the –**2-part Condition Monitoring & Maintenance Planning of the Francis Turbine.** Maintenance of infrastructure is vital to drive efficiency, reduce down-time and maximise revenue. The web-based part of this course was a preparatory tool to increase and harmonise the skills of the participants prior to the scheduled 2023 in person session.

The continued focus on exploiting renewable energies to meet Africa's growing electricity demand requires an evaluation of and evolution of existing power systems. **The Regional Power Trade Programme** held in South Africa examined how renewable energies be efficiently integrated into the grid in a cost-effective way whilst maintaining grid stability and ensuring reliable supply of electricity. This is a key requirement for the development of cohesive systems that will be needed to meet future demands.

The build-up of sediments in reservoirs significantly reduce storage capacity thereby affecting energy production and the reliable supply of water. Sediment management is therefore important and relevant for the sustainable use of water resources and addresses the problems of food, water, and energy in-security. The importance of active sediment management, sustain reservoir storage capacity, prevent degradation and other problematic impacts was emphasised in the second module of **Reservoir Sediment Management for Sustainable Hydropower in Africa (II)** a practical hands-on training that included comprehensive strategies for sediment sampling, measurements, and modelling approaches for the estimation of sediment in water bodies.

Drawing from both African and international examples **The Process of Social Impact Assessment in Renewable Energy Projects** was held in South Africa in November. The course built on the principles and processes included in Module I and offering a practical perspective of the essential international ESIA standards for hydropower and renewable energy projects.

Africa			
HSSE for Sustainable Hydropower in Africa Online • 9-13. Ma	Financial Modelling, PPA Structuring and Negotiations: Module II South Africa • 13-17. June	Revenue Protection, Infrastructure Security and Metering Uganda • 18-22. July	UEGCL – Francis Turbine, Condition Monitoring & Maintenance Planning E-learning • 28. Aug.–31. Dec
Regional Power Trade Program South Africa • 12-16. September	Reservoir Sediment Management for Sustainable Hydropower – PART 2 Zambia • 26-30. September	The Process of Social Impact Assessment in Renewable Energy Projects S. Africa • 7-11. November	

ASIA

After more than two years of not being able to meet physically due to the pandemic situation and restrictions to travelling, it was finally possible to arrange onsite programs in the Asian region.

The project management cluster saw continued work on **Financial Modelling,** this time at an advanced level for a select group of participants from Bhutan, Nepal, and Cambodia. The training was held in Nepal in September and had a total of 15 participants.

A brand-new course on **Resettlement**, complemented previously run courses on Prevention and the Administration of Conflict. Module I was held online followed by Module II, in Bangkok in October for regional participants. This training was developed for practitioners with highly interactive tasks to illustrate the process of resettlement and how to develop tools, stakeholder engagement and managing and mitigating risks.

A first in Asia was the **Revenue Protection and Smart Metering** held in Cambodia for a group of participants from the Cambodian distribution utilities. This training was based on the series of courses pioneered in Africa and included resource persons from South Africa, Zambia and Uganda.

An onsite session organised together with the **Turbine Testing Lab** of the Kathmandu University was delivered in Nepal on the 1st of November. This one-day event discussed the the Sedimentation Issues of Hydropower Plants from different perspectives and had participants from the university departments as well as from the hydropower industry in Nepal.

The **Sediment Workshop** focused on Headworks Design and catered for a group of 22 participants from Nepal, Bhutan, and Sri Lanka. A total of 11 resource persons shared their knowledge and experience, and the program included a fruitful site visit to the Marsyangdi Hydropower Plant.

The onsite portion of the 2-part course on **Project Development** was delivered in Bhutan. The training focused on the management issues in project development and included pre-investment activities, design, procurement, risk assessment, cost and time estimates, financing, and financial modelling.

The important subject of **Dam Safety** for Cambodia had been postponed as a physical course from the previous year but was finally conducted in Phnom Penh in December. An online introduction had been delivered in 2021 and most of the 20 participants had taken the online part first. The training culminated with a field visit to a hydropower plant near Phnom Penh.

Asia			
Financial Modelling Module II Nepal • 12-16. September	Resettlement Module II, ASIA Region Thailand • 17-21. October	Revenue Protection and Smart Metering Cambodia • 24-28. October	TTL: Experience sharing on challenges of sediment erosion in hydropower turbines Nepal • 1. November
Planning & Design of Hydropower Headworks in Sediment Loaded Rivers Nepal • 3-8. November	Hydropower Project Development Bhutan • 28. Nov. – 1. Dec.	Dam Safety Cambodia • 5-8. December	

LATIN AMERICA

The highlights of this year link to the continued work for strengthening capacity to drive the region's energy transition. The world is in constant flux where environmental and social risks threaten to destabilize economic growth as we have hitherto known.

Failure to act on climate action, loss of biodiversity, involuntary migration and infectious diseases are some risks governments, society, and companies commonly identify as impediments to long-term inclusive economic growth.

The courses and field visits are designed to illustrate the virtuous circle of sustainability. They provide an opportunity to understand, share and discuss current developments and trends in sustainable investment and finance and the technological challenges to keep growing transmission capacity in the region. This began with an online course; the second module of **Financial Risk Management** was complemented by an onsite **Module III** in Columbia in November.

Onsite training resumed in Colombia in June with **Energy Markets Module IV.** This covered the opportunities, challenges and enabling conditions for organizations to benefit from growth opportunities for sustainable investment including thematic bonds, building on the foundation of previous courses in the series.

The need for continued development of **Environmental and Social Monitoring in Energy Projects III** was strengthened with an onsite course in Costa Rica in June. This included a technical site visit and covered monitoring requirements for the full range of potential hydropower impacts.

During the **Integrated Water Resources Management** training series, the participants were led through a process to identify a series of topics for creating social and economic value with ecosystem services, recognizing natural capital, and further developing the concept of strategic alliances to achieve successful implementation of projects.

Electricity Transmission and Distribution for The Future and the energy transition the hydropower role as an essential part of the regional energy matrix, energy transmission for the future. Without effective distribution the transition to renewable energy will be constrained.

Gender in Management, The Capacity to Transform closed the year with an onsite course in Colombia. This leadership development course highlighted gender issues in the renewable energy sector. The provision of tools for incorporating gender guidelines in business policies and strategic plans based on a due diligence analysis in their chain and the identification of sustainable management axes. Participants learned about strategies and actions to achieve transformational leadership when developing and implementing tactical and operational action plans with a gender focus.

Latin america			
Social and Environmental Monitoring in HPP Module II Online • 23-25 March	Resettlement: Module I Online • 4-6 April	Risk Management in hydropower development: Module II Online • 18-20 May	Rehabilitation and Modernization, Foundational training Online • 8 -10 June
Electricity Transmission and Distribution for The Future Online • 14-18. November	Financial Risk Management III Colombia • 23-25. November	Gender and Management, The Capacity to Transform Colombia • 29. Nov.-2. Dec.	

ICH Members

Norwegian members

Bærekraftig Investering AS

Norconsult AS

Rainpower

Dynavec AS

NVE (Norwegian Water Resources and Energy Directorate)

Scatec

Energi Norge

NTNU - Department of Civil and Environmental Engineering

Statkraft AS

Multiconsult AS

OED (Norwegian Ministry of Petroleum and Energy)

SWECO Norge AS

Noord Pool Consulting

Tinfos

Trønder Energi Kraft AS

Mutual members

CELAPEH (Centro Latinamericano para la Pequena Empresa, Colombia)

IC-SHP (International Center on Small Hydro Power)

NORWEP (Norwegian Energy Partners)

HydroCen

IHA (International Hydropower Organization)

NABA (Norwegian-African Business Association)

International members

Acolgen

AURSA

CIMEQH - Colegio de Ingenieros

ENEE- Empresa Nacional de Energia Eléctrica

Agro Engineering Works Pvt. Ltd.

AVCV Management Consultancy

Di Avante

Energy Development Council (EDC)

ACOPE

Himal Power Ltd.

EDL Generation public company

Energy Regulatory Commission - ERC

Alternate Hydro Energi Centre

Butwal Power Company LTD - BP

Druk Green Power Corporation

Environmental Resources Group Pvt. Ltd, NEPAL

AHPPER - Asociación Hondureña

CDL (Consejo Departamental de Lima del Colegio de Ingenioeros del Peru)

EAST AFRICAN POWER LTD

Escom, Malawi

Arusha Technical College ATC

Central Engineering Concultancy Bureau - CECB

Electricidad de Cortés - ELCOSA

FEDEAGRO S.A.

Aryabhatta Group of Institutes

Celsia S.A.E.S.P

Electricite du Cambodge EDC

Frontier Energy

Asociación Hondureña de Energía Renovable (AHER)

Cemedar

Electricity Control Board - ECB

Hydro Lab Pvt. Ltd

Asociasion Salvadoreña de Energias Renovables - ASER

Empesas Públicas de Medellín EPM

HMV Ingenieros Ltda

Institute of energy studies and reseach (IESR) - (KPLC)

Kafue Gorge Regional Training Centre - KGRTC

NACEUN

Hobuka

Institute of Water Resources Planning

Kaizen Africa Ltd

Newplan Ltd

Hydroambiental Consulting S.A

Instituto Costarricense de Electricidad -ICE

Makerere University

Sanima Hydropower Ltd

Independent Power Producers Associations Nepal IPPAN

INTEGRAL S.A.

Kenya Electricity Generation Company Ltd - KENGEN

Payandab Tavan Consulting Engineers

Hydroelectricity Investment and Development Company Limited (HIDCL)

Iran Water and Power Resources Development Company - IWPCO

Ludhiana Holdings

PBP Power Business Partner

Ingetec

ISAGEN S.A. ESP

LUNSEMFWA HYDRO POWER COMPANY LIMITED (LHPC)

SAPP (Southern African Power Pool)

Institut de Technologie ITC

Jammu and Kashmir energy development agency (JAKEDA)

Mercados Electricos de Meso-america S.A. - MELESCA

SARDC

Mulanje Renewable Energy Agency - MuREA

Savimaxx Ltd.

SEDIC S.A.

TETYS International PJS

Zambezi River Authority

TANESCO Limited, Head Office

UEGCL

ZESCO

SIGET

UETCL

Sustainable Strategies

University of Dar es Salaam, Department of Civil Engineering

Sustainablility Framework

University of Medellin

Tanahun Hydropower Limited

Volta River Authority

Gaining Through Training

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