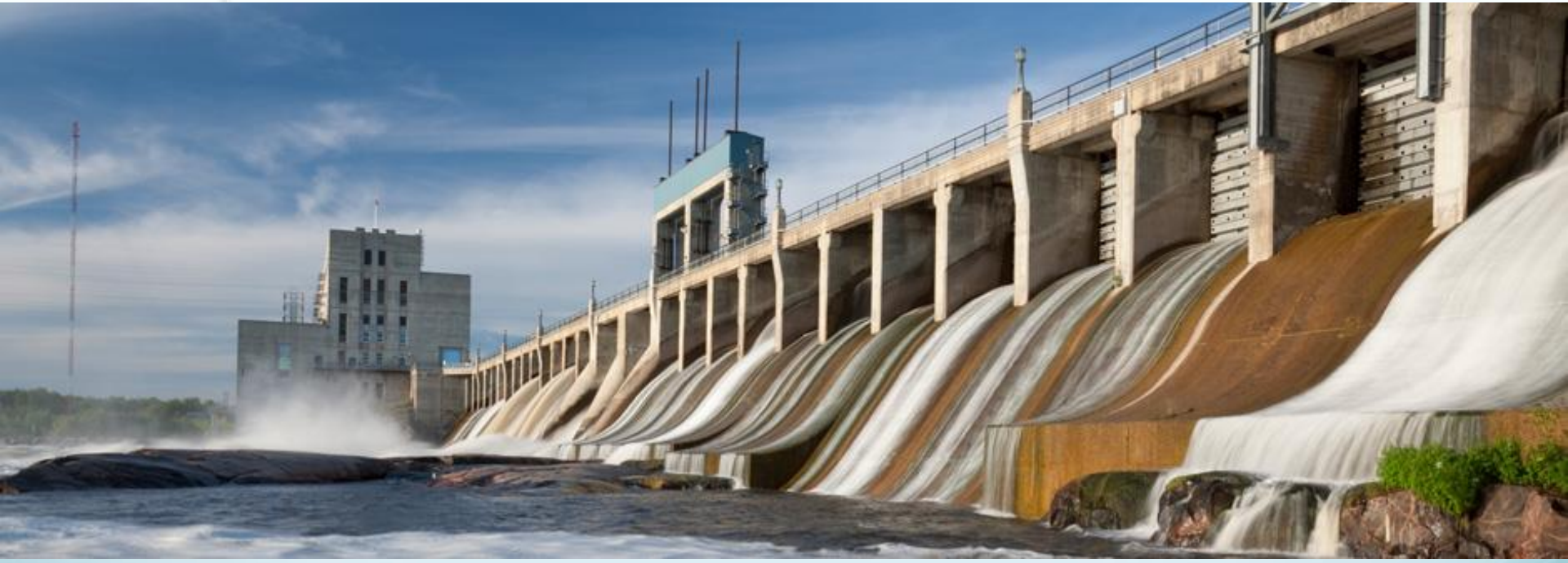
Introduction to IEA Hydro Activity



Niels Nielsen, Secretary, IEA Hydro

February 2019, Tokyo, Japan

THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON HYDROPOWER

IEA Hydropower

Introduction to IEA Hydro Activity

- Strategic Objectives
- ExCo Members
- Work Program
- Dissemination of Research
- Collaboration with other Organizations
- Summary

THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON HYDROPOWER

IEA Hydropower

Strategic Objectives

To encourage countries to co-operate in innovative research, development and demonstration of hydropower as a renewable and sustainable energy source, by:

- *Encouraging **public acceptance** of Hydropower as a feasible, socially desirable and renewable form of energy.*
- *Increasing the current wealth of **knowledge** on a wide array of issues currently associated with hydropower.*
- *Exploring areas of common interest among international organizations interested in the **continued use of hydropower** as a socially desirable energy resource.*
- *Bringing a balanced view of **hydropower** to the worldwide debate on its **feasibility** as an **environmentally desirable** energy technology.*
- *Encouraging an interdisciplinary approach to the **research needed to support** the technology.*

THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON HYDROPOWER

IEA Hydropower

Status of Hydropower Market and Technology Trends

- There is a solid future for hydropower as a key player in a low-carbon society as it represents a domestic, mature, affordable and sustainable source of energy.
- Hydropower provides a renewable base load and important load-balancing system capabilities for the increased penetration of intermittent wind energy and solar power.
- Flexible multipurpose hydropower provides a wide range of non-energy services, including flood protection, irrigation flows, water supply, recreation and navigation.
- With the electricity sector changing continuously, a program of hydropower research is essential to ensure its place in the energy supply mix as a sustainable resource
- Technology advancements in hydropower equipment are required to meet today's system requirements and provide modest improvements in performance
- Deployment of new hydropower will continue strongly in non-OECD countries. Slowly increasing development is expected in some African countries

THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON HYDROPOWER

IEA Hydropower

ExCo Membership

- **Australia** – *Hydro Tasmania*
- **Brazil** – *Ministry of Mines and Energy, CEPEL*
- **China** – *China Yangtze Power Co/International Centre for Small Hydropower*
- **European Union** – *European Commission*
- **Finland** – *Finnish Funding Agency for Technology & Innovation (TEKES)/Kemijoki Oy*
- **Japan** – *New Energy Foundation (NEF), Agency for Natural Resources & Energy (MITI)*
- **Norway** – *Norwegian Water Resources & Energy Directorate (NVE)*
- **USA** – *US Department of Energy, Oak Ridge National Laboratory (ORNL)*

THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON HYDROPOWER

IEA Hydropower

Technology Cooperation Program on Hydropower

Annexes (Working groups)

- **Annex XVI** Hidden Hydropower
- **Annex IX** Valuing Hydropower Energy and Water Services
- **Annex XII** GHG Emissions from Freshwater Reservoirs
- **Annex XIII** Hydropower and Fish
- **Annex XIV** Management Models for Hydropower Cascade Reservoirs
- **Annex XV** Maintenance Works and Decision-Making for Hydroplant Renewals

THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON HYDROPOWER

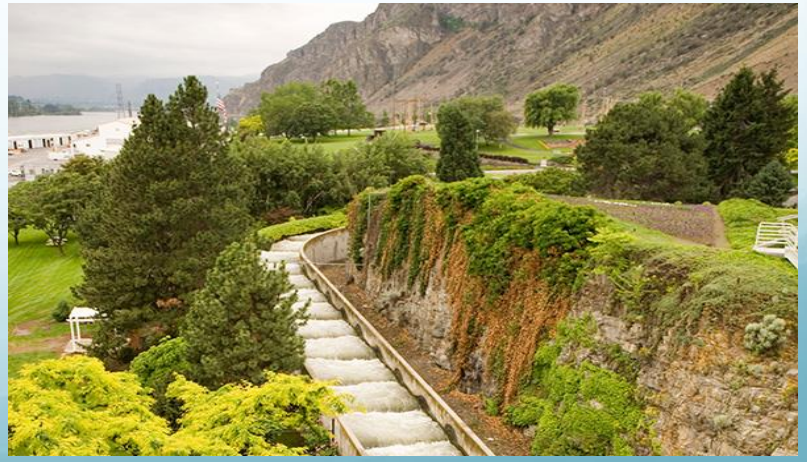
IEA Hydropower

Annex XII: Managing the Carbon Balance of Freshwater Reservoirs

Brazil - lead

- *Three Guidelines prepared on "Quantitative Analysis of Net GHG Reservoir Emissions*
- *A position paper on "Status of the GHG debate"*
- *Support for IPCC Working Group*
- ***Forward program - Adaptation and Resiliency to Climatic Change***

Annex XIII: Hydropower and Fish



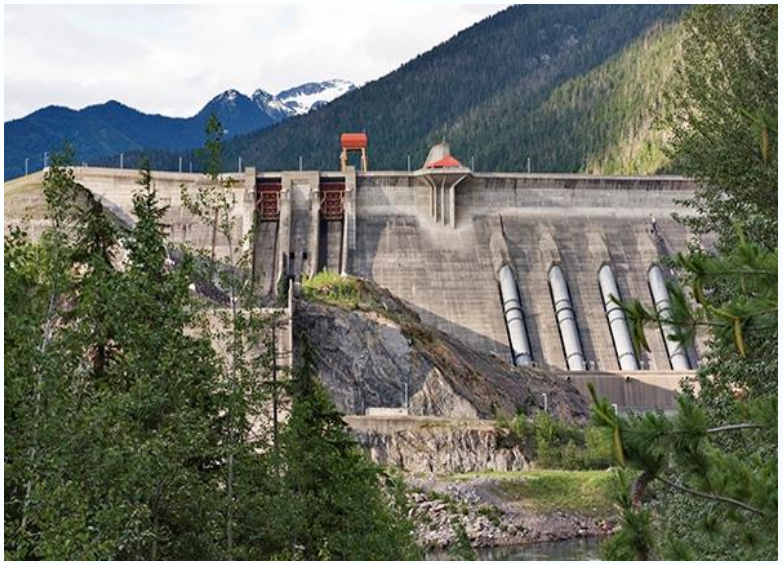
Norway - lead

- *Developing a Roadmap/guideline for Sustainable Fish Populations and Management in Rivers with Hydropower Production*

THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON HYDROPOWER

IEA Hydropower

Annex XIV: Management Models for Hydropower Cascade Reservoirs



China - lead

- *Examining key issues to be addressed in the design of new hydropower cascade reservoir schemes and the operation and management of existing plants*

Annex XV: Decision-Making for Hydroplant Renewals

Japan - lead

- *Decision-making process from diagnosis of soundness to renewal and upgrading of existing hydro facilities*

THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON HYDROPOWER

IEA Hydropower

Annex XVI: Hidden Hydro

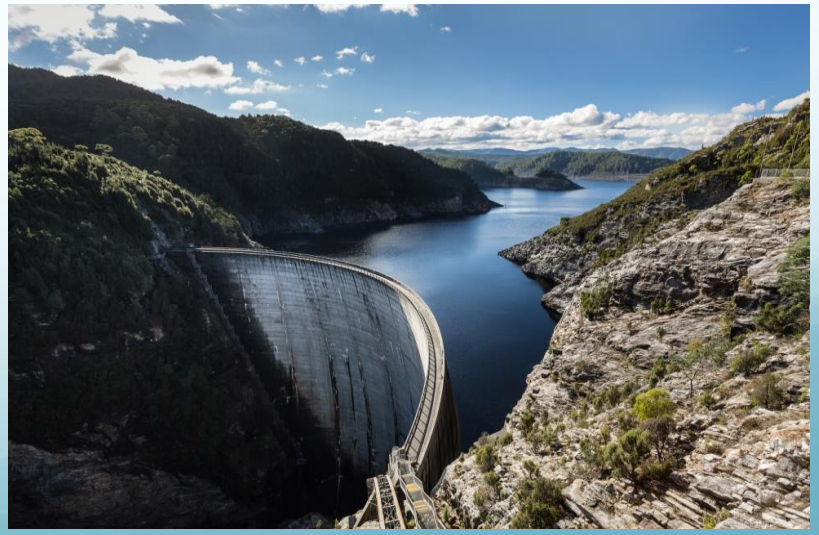
IEA Hydro Secretary - lead

- *Harnessing untapped potential from existing infrastructure*
- *Understanding and identifying the potential, e.g. adding power to non-power dams and conduits.*
- *Identifying innovative technology development through an R&D agenda*

Annex IX: Valuing Hydropower Services

Norway- lead

- *Phase I completed with a Summary Report (2017)*
- *Phase II starting with a KO Workshop in 2018.*
- *Theme is «Utilization of Hydropower Flexibility Capability in Evolving Energy Systems"*



THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON HYDROPOWER

IEA Hydropower

DISSEMINATION

ACHIEVED

- **HydroVision 2018** – USA Organizing Annex meetings.
- **HYDRO 2018** – Poland. Chairing sessions and presenting work of IEA Hydro Annexes
- **ASIA 2018** – Vietnam. Chairing sessions and presenting work of Annex XV
- **Regular Website updates**
- **Launching Summary Report and Appendices for Annex IX.**
- **Launching Guidelines Volume 3 Report for Annex XII.**

PLANNED

- **AFRICA 2019** – Namibia. Presentation on work of the TCP
- **IHA Congress 2019** – Paris. Presentations on the work of Annex IX
- **HYDRO 2019 – Portugal .** Chairing sessions and presenting work of IEA Hydro Annexes
- **Regular Website updates**
- **Roadmap on work of Annex XIII Hydropower and Fish.**
- **Preliminary Report on work of Annex IX Phase 2-Valuing Hydropower Services**

THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON HYDROPOWER

IEA Hydropower

COLLABORATION WITH OTHER ORGANIZATIONS

ACHIEVED

IEA/TCP

- Chairman & Secretary attended **REWP # 74** meeting and associated workshops
- Attended **GIVAR** Meetings in Japan
- Reviewed **IEA** publications, including **REMR 2018 Report**

Other Organizations

- **Aqua Media:** Publishers of *Hydropower and Dams* and organizer of HYDRO 2018 and ASIA 2018
- **International Hydropower Association (IHA):** MoU for collaboration on Annex XII

PLANNED

IEA/TCP

- Attending **REWP** meetings/workshops.
- Review **IEA** publications as requested
- Collaborate on hydropower integration research (Annex IX)
- Raise awareness of Hydropower TCP
- **Other Organizations**
- **Aqua Media:** HYDRO 2019, AFRICA 2019
- **IHA:** Congress 2019
- **ICOLD and UNIDO** - Exploratory

THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON HYDROPOWER

IEA Hydropower

Summary

The Hydropower TCP countries will continue to address emerging issues and future roles of hydropower in mature energy markets:

- The transformation of energy markets that include hydropower, covering changing demand patterns - industry composition, emerging industries and increase in grid-connections
- Increased generation from renewable sources, e.g. wind & solar, and investigate ability of hydropower to balance power systems and provide storage
- Approaches for economic decision-making for ageing hydroplants
- Policy and regulatory frameworks to remove barriers and provide incentives for investment in Hidden Hydro