

Auditoriums in use: EL 5 (plenary), EL 6 & EL 3

TUESDAY 13 JUNE

09:00 Registration

10:00 Opening plenary

EL 5 Moderators: Dana McCoskey (US Dep of Energy) & Anders Iversen (NEA, NO)

Welcome address, setting the scene: Striking the right balance between hydropower and ecology (15 min)
Anders Iversen (NEA, NO)

Key challenges and opportunities addressed in Sweden (15 min)
Jakob Granit (SWAM, SE)

The role of hydropower in the green transition (15 min)
Martin C. Brittain & Kjetil Lund (NVE, NO)

The role of hydropower in Clean Energy Transition: A World Bank Perspective on Environmental and Social Standards (ESS) (15 min)
Pravin Karki (World Bank)

KEYNOTE: Hydropower and EU policy on water management, biodiversity, and climate adaptation
Wouter van de Bund (EU JRC) (30 min)

11:30 Coffee Break

11:50 Opening plenary (cont.)

EL 5 Going forward, the only acceptable hydropower is sustainable hydropower – a bold statement, but can it be followed up with action? (15 min)
Pablo Valverde (IHA)

EU Hydropower balances targets for climate and environment (15 min)
Anne Bolle (Eurelectric/Statkraft)

Green for real? Have you asked the eel? (15 min)
Åsa Renman et al. (The Norwegian Biodiversity Network, Sabima, NO)

PANEL DISCUSSION : Dilemmas and solutions to ensure a climate and nature friendly hydropower production. (30 min)

Moderators: Tor Simon Pedersen (Dep of Climate and Environment, NO) & Dana McCoskey (US Dep of Energy)

13:00 Lunch

EL 5 14:00 Plenary 2: Lessons learned, regionalwise best practises and sustainable management of water

Moderator: Jakob Granit (SWAM, SE) & Wouter van de Bund (EU JRC)

KEYNOTE: An Overview of Environmentally Sustainable Hydropower in the United States Viewed Through the Lens of EU Taxonomy for Sustainable Activities (30 min)
Brenda Pracheil, Pacific Northwest National Laboratory (PNNL)

- Approaches for Sustainable Hydropower use in Austria. (25 min)
Gisela Ofenböck (Federal Ministry) & Franz Greimel (BOKU)

- Overview of mitigation measures implemented in France to reduce ecological impacts of hydropower
Veronique Gouraud (EDF, FR) (25 min)

- National plan for revision of hydropower in Sweden (20 min)
Anders Skarstedt (SWAM, SE)

An overview of emerging management practise to reduce ecological impacts from hydropower in Norway
Oda Bjærke (NVE) (20 min)

16:00 Coffee break

16:20 Plenary 2 (cont.)

EL 5 Balancing increased capacity and flexibility with environmental values in a proposed redevelopment of an existing hydropower scheme (20 min)

Marie Egerup (*Hydro Tasmania, AU*)

KEYNOTE: Mitigation measures revisited – environmental effects, costs and endurance (30 min)

Ulrich Pulg et al. (*NORCE*)

PANEL DISCUSSION 2: How should the hydropower sector contribute best to solve both the energy-, nature- and climate crisis? (30 min)

Moderators: Tor Simon Pedersen
(*Dep of Climate and Environment, NO*)
& **Jakob Granit** (*SWAM, SE*)

Poster speed presentations (20 min)

Moderator: Tor Haakon Bakken
(*NTNU, NO*)

- 18:00** Poster session with ice breaker
- 18:30** End of scientific program, day 1
- 19:30** Conference dinner at Royal Garden Hotel

WEDNESDAY 14 JUNE

09:00 Plenary 3

EL 5

Moderators: Brenda Pracheil (PNNL), Martin Schletterer (TIWAG/BOKU)

KEYNOTE: Effects of planned hydro-power dams and barriers on river connectivity in the Balkan region
M. Carolli et al. (SINTEF, NO) (30 min)

Climate change in the context of Environmental flows and changed hydrology in three basin areas in Sweden (20 min)

Åsa Widén et al. (SLU - Swedish University of Agricultural Sciences)

Methods, indicators and solutions for sustainable hydropower (20 min)
Atle Harby et al. (HydroCen/SINTEF, NO)

Mapping the natural values and ecological rehabilitation potential of Sweden's bypassed river reaches (20 min)

Birgitta Malm Renöfält et al. (Umeå University)

10:30 Coffee break

11:00 Parallell sessions 1–3

SESSION 1: Hydropeaking and sustainable flexibility from hydropower

EL 6

Moderators: Vebjørn K. Opsanger (University of Bergen) & Isabel Boavida (University of Lisbon)

New approaches for a sustainable hydropeaking management: The HEM-Peak model and the role of channel evolution, river morphology and sediment dynamics
Christoph Hauer (BOKU, AT) (15 min)

Mitigating hydropeaking impacts and enhancing fish habitat by hydro-morphological adaptations of the river bathymetry (15 min)

Sissel Hauge Mykletun (Eviny, NO)

The benefits of artificial refuges as hideouts to pulsed flows for Iberian cyprinids (15 min)

Maria João Costa et al. (PT)

The influence of repeated hydro-peaking events on early life stages of European grayling (*Thymallus thymallus*) and common nase (*Chondrostoma nasus*) (15 min)

Stefan Auer et al. (BOKU, AT)

SESSION 2: Connectivity, barrier and solutions

EL 5

Moderator: Ana Silva (NINA) & Abe Schneider (Natel energy)

An overview over upstream fish passages past barriers in Norway (15 min)
Sebastian Franz Stranzl et al. (NORCE LFI, NO)

Impact of weirs and hydropower regulation on brown trout, invertebrates and people in an inland river; expanding the concept of environmental design. (15 min)

Line E. Sundt-Hansen et al. (NINA/HydroCen, NO)

Behaviour of post-spawned Atlantic salmon (*Salmo salar*) migrating past a hydropower dam.
Olivia Simmons (NINA, NO) (15 min)

A framework to identify cost-effective mitigation measures using Influence Diagrams (15 min)
Ana Adeva-Bustos et al. (SINTEF, NO)

SESSION 3: International hydropower, sustainability and LCA

EL 3

Moderator: Shaua F. Chen (NTNU) & Johan Kling (SWAM)

Mass fish mortality events: a (novel?) threat to hydropower in tropical systems (15 min)
Luiz G. M. Silva et al. (ETH Zurich, CH)

Uncertainty and complexity in ecological and social mitigation of hydropower in developing countries
Leah Bêche (EDF, FR) (15 min)

Analysis of flow variation in the Kelani River due to the impact of the Laxapana Hydropower System in Sri Lanka (15 min)

Sajana P. Hemakumara (NTNU, NO)

R. Kaushalya (Dept of irrigation, Sri Lanka)

CoolHydro – mitigating extreme temperature events in hydropower catchments (15 min)

Lennart Schönfelder et al.
(NTNU, NO)

12:00 Coffee break

12:15 Parallell sessions 1–3 (Cont.)

SESSION 1 continued:

EL 6 Hydropeaking effects on two cyprinid fish species, barbel and nase, under experimental conditions emphasizing larval stranding (15 min)

Simon Führer et al. (BOKU, AT)

Sustaining hydropower production and salmonid populations: Ecological models for assessing hydropeaking and habitat restoration scenarios (15 min)

Mahboobeh Hajjesmaeili et al.
(Karlstad University, SE)

Unravelling the complex relationship between artificial flow fluctuations and cyprinid fish: a comprehensive analysis (15 min)

Daniel Hayes et al.
(Hypeak Network/BOKU, AT)

SESSION 2 continued:

EL 5 Bidirectional use of a natural fishpass (15 min) (Online)

Walter Reckendorfer et al.
(Verbund, AT)

Passage Efficiency of Downstream Moving Fish at a Bypass Gate with Bottom and Top Opening (15 min)

Luiz G. M. Silva et al. (ETH Zurich, CH)

Bubble curtain and novel ‘dancing rods’ behavioural guidance solutions for out-migrating European eels and Atlantic salmon smolts. (15 min)

Velizara Stoilova et al. (Karlstad U., SE)

SESSION 3 continued:

EL 3 Hidden effects of water impoundment on surrounding vegetation and water consumption (15 min)

Fernando Jaramillo (Stockholm University, SE)

Biodiversity footprint of hydropower: introducing aquatic pressures into the Product Biodiversity Footprint (PBF) (15 min)

Agnes Barrilier et al. (EDF, FR)

Q & A (15 min)

13:00 Lunch

14:00 Parallell sessions 4–6

SESSION 4: Hydropeaking flexibility and impacts downstream HP outlets

EL 6

Moderators: Ingrid Haug (NVE) & Jo H. Halleraker (NEA)

The ecological effects of sub-daily flow variability on riverine fishes – a systematic review (15 min)

Bryan Bozeman et al.
(Oak Ridge National Lab, US)

Effects of spatio-temporal variability of hydropeaking on juvenile fish

Kevin Merl et al. (BOKU, AT) (15 min)

The effects of supersaturation on benthic invertebrates in two Norwegian rivers (15 min)

Vebjørn Kveberg Opsanger et al.
(NORCE LFI, NO)

The effects of gas supersaturation on fish and benthic invertebrates (15min)

Gaute Velle et al. (NORCE LFI, NO)

Gas supersaturation at Norwegian hydroplants – risk modelling and monitoring (15 min)

Ulrich Pulg et al. (NORCE LFI, NO)

Hydropower and hydromorphological impacts in freshwater pearl mussel (*Margaritifera margaritifera*) rivers: ecological bottlenecks and potential mitigation measures (15min)

Marie-Pierre Gosselin et al. (NINA.NO)

SESSION 5: Connectivity, barriers and integrated solutions

EL 5

Moderators: Christof Hauer (BOKU) & Marie Egerup (Hydro Tasmania)

Fish passage facilities in a new hydropower plant at Hvammur in River Thjorsa, Iceland (15 min)

Sigurdur Gudjonsson
(Landsvirkjun, IS)

Turbine Design for Fish Inclusion
Sterling Watson & Abe Schneider
(Natal Energy, US) (15 min)

A new method for passing substrate over weirs (15 min)

Tom Jacobsen (Sedicon, NO)

Evaluation of vertical connectivity in regulated river reaches using a multi-parametric measuring approach

Markus Noack & Alcides Aybar Galdos
(University of Karlsruhe, DE) (15 min)

The benefits and challenges of using environmental nucleotides for fish passage species detection and enumeration (15 min)

Kristine N. Moody et al.
(Oak Ridge Nat. Lab, US)

Modelling fish recruitment potential of lithophilic fish in restored rivers by means of functional habitat and population dynamics modelling. (15 min)

David Farò & Christian Wolter
(Leibniz Institute - IGB, DE)

17:30 Q & A (15 min)

SESSION 6: Reservoirs, their role in the future energy system and the effects of environmental constraints

EL 3

Physical environmental impacts on a hydropower reservoir under different operational modes (15 min)

Ana Adeva-Bustos et al. (SINTEF, NO)

Optimal Integration of Hybrid Pumped Storage Hydropower to increase renewables penetration and reduce CO₂ emissions (15 min)

Alban Kuriqi et al.
(University of Lisbon, PT)

Application of remote sensing for monitoring fish spawning sites of a large hydropower plant reservoir in a lowland region (15 min)

Linas Jurevicius (Dept of Water Eng., LI)

Green Lidar in Lakes (15 min)
Raffa Ahmed et al. (NTNU, NO)

CoolHydro – mitigating extreme temperature events in hydropower catchments (15 min)

Lennart Schönfelder et al. (NTNU, NO)

An assessment of the impact of environmental constraints on utilization of Norwegian hydropower flexibility for integration of wind and solar power (15 min)

Viviane Aubin et al. (NTNU, NO)

Determining the hydrological implications of regulation on Swedish lakes with space observations (15 min)

Fernando Jaramillo et al.
(Stockholm University, SE)

15:45 Coffee break

16:15 Plenary 4: Good governance and long-term changes of the water resources systems

EL 5

Moderators: **Emanuele Quaranta** (JRC) & **Ana Adeva Bustos** (SINTEF)

Multidecadal trends in brown trout (*Salmo trutta*) populations in regulated and unregulated river (15 min)

Laurence Tissot et al. (EDF, FR)

Long term changes in riverscapes in rivers regulated for hydropower (15 min)

Knut Alfredsen et al. (NTNU, NO)

Governance responses to tightening environmental requirements for hydropower – Finland, Germany and Sweden (15 min)

Antti Iho (LUKE, FI)

Increasing biodiversity in heavily modified rivers without affecting production or balancing capacity of hydropower - strategy and examples of case studies (15 min)

Erik Sparrevik (Vattenfall Hydro, SE)

17:15 Q & A (15 min)

17:30 Poster session 2

18:00 End of scientific program, day 2

18:30 Concert in Nidaros Cathedral

19:00 Reception at Two Towers

THURSDAY 15 JUNE

09:00 **Plenary 5: Evidence based solutions for sustainable management of hydropower impacts**

EL 5

Moderators: Åsa Widén (SLU, SE) & Tor Haakon Bakken (NTNU, NO)

KEYNOTE: IEA Roadmap for best practise solutions for hydropower and fish (30 min)

Ana Bustos (SINTEF, NO)
Marcell Szabó-Mészáros (SINTEF/IEA Hydro)

Restoration of flood-maintained ecosystems (20 min)
Birgitta Malm Renöfält & Roland Jansson (Umeå University, SE)

Using turbulent eddies to guide fish: The Fishpath Project (20 min)
Ana T. Silva et al. (NINA/HydroCen, NO)

A critical review of best practice mitigation towards low ecological impacts from large hydropower in Europe and the US (20 min)
Jo Halvard Halleraker et al. (NTNU, NO)

10:30 **Coffee break**

10:50 **Plenary 5 continued**

EL 5

Moderators: Gisela Ofenböck (Federal Ministry, AT) & Vegard Pettersen (Renewable Norway)

KEYNOTE: Opportunities and challenges for sustainable hydropower in the European Union and in Europe (30 min)

Emanuele Quaranta (EU Com, JRC)

Flexible hydropower ensures the security of electricity supply - Growing challenges due to accelerated climate targets and energy crisis (20 min)

Martin Schletterer et al. (TIWAG/ Vorarlberger Illwerke AG, AT)

Sustainable sediment management for hydropower: Results of the CD-Laboratory "Sediment research and management" (20 min)
Christoph Hauer (BOKU, AT)

Research priorities in hydropeaking
Daniel Hayes et al. (20 min)
(Hypeak network/BOKU, AT)

Overview of U.S. Department of Energy's Water Power Technologies Office R&D to Advance Sustainable Hydropower (20 min)
Dana N. McCoskey (U.S. Dept. of Energy)

Concluding remarks, possibly a surprise? and wrap up (20 min)
Anders Iversen (NEA, NO)
Jakob Granit (SWAM, SE)

13:00 **Grab and go Lunch**

Boxed lunch at Cafe Elektro.

13:15 **Bus departure for Tour 3: Overnight excursion to Surna & Driva National Salmon Rivers**

Participants in tour 3 can grab a boxed lunch at Cafe Elektro before boarding the bus.

14:00 **Departure for Tours 1 & 2:**

Tour #1a: Excursion to hydroelectric labs at NTNU (Ends 16:15 approx.)

Tour #1b: Nidelva & Leirfossen (Ends at Austman micro brewery at 20:00 approx. for those who join for beer tasting dinner at own expenses)

*Safe travels
home!*



SUSHP 2023

Sustainability in Hydropower 2023

FLOORPLAN

First floor (ground floor)

Rooms in use: EL3, EL5 and EL 6.

