WISE
WATERLOO INSTITUTE
FOR SUSTAINABLE ENERGY

LECTURE SERIES

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BUILDINGS | CARBON CAPTURE AND STORAGE | FUEL CELLS | NUCLEAR | POLICY | PLANNING
RENEWABLES | SMART GRID | STORAGE | SUSTAINABLE MOBILITY | SUSTAINABILITY ANALYSES

PRESENTED BY THE WATERLOO INSTITUTE FOR SUSTAINABLE ENERGY

Friday, July 12th, 2013
2 - 3 pm
CPH 4333

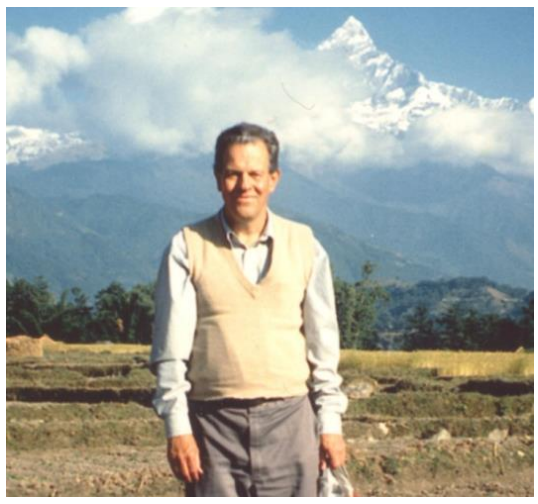
THE ROLE OF HYDRO IN MODERN SUSTAINABLE POWER GRIDS

Phil Helwig, M.Sc., P. Eng., Hydropower Consultant, Helwig Hydrotechnique Limited

In his presentation, Phil will examine five topics related to the role of hydro in modern sustainable power grids.

1. **Features of hydro developments**, including the importance of hydrology and site topography, the types of hydro development concepts, and run-of-river vs storage developments.
2. **Comparison with other renewables**, including variability and availability, predictability and diversity of energy production, and energy storage.
3. **Contribution to Grid**, including rapid dispatch, frequency stabilization, dispersion of generation sources and the potential to provide “virtual” storage.
4. **Challenges to hydro**, specifically the size of plant footprint, the impact on flow regime, the environmental effects (both negative and positive), the socio-economic effects, and the regulatory regime.
5. Finally, Phil will examine the question “**is hydro sustainable?”**

Biography



Phil Helwig, near Pokhara, Nepal

Phil Helwig has had a varied engineering career in both education (8 years) and in design and technical management (40 years). Most of his formative experience was with a small company in Newfoundland which valued versatility, as a result Phil was able to develop expertize that goes well beyond the skills set normally associated with his formal area of competence, as a hydrotechnical specialist. His main areas of expertize are in the fields of hydropower, dam safety assessment and water resources, where he has been involved in investigations, economic planning and project optimization studies and detailed design. He has been responsible for several innovations in Canadian practice: notably, the design of Cat Arm Hydel unlined pressure tunnel (head = 386 m) and “bathtub overflow spillway” and design of Hinds Lake Power Canal based on natural armouring (the first application of this technology in hydro design world wide) and the design of Paradise River double curvature arch dam only the third arch dam ever built in Canada. He also has experience in working with first nations as an advisor to the Tlicho on the Snare Cascades G.S. in NWT. More recently from his experience in South Asia he has developed expertize in design of hydraulic structures to handle water borne sediment. His latest interest is in the field of eco-hydraulics. Technology transfer is an integral part of all Phil Helwig’s assignments. Since 2004 he has worked on four continents in three languages. Phil received his M.Sc. (Hydraulics) from Queen's University in 1966 and his B.A.Sc. (Honours), Civil Engineering from the University of Toronto in 1961.

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