

I N N O V A T I O N T H R O U G H C O L L A B O R A T I O N



Centre for Energy Advancement
through Technological Innovation

What is CEATI International?

The Answer:

A user-driven technology solutions exchange and development program for utilities

- The CEATI program model was built to combine **inter-utility benchmarking/information exchange** with the development of practical projects yielding results that have immediate impact for our participants
- Projects are initiated on issues raised by participating organizations. They are typically short term, **fewer than 18 months, resulting in practical deliverables**

What is CEATI International?

The Answer:

Facilitates one of the largest hydro utility programs in the world

- R+D needs discussed and prioritized annually through CEATI program cycle (per Interest Group)
 - Input from over 60 utilities and other industry organizations from around the globe

- Ownership of project results resides with sponsors
 - They decide whether these are made public/private



Dam Safety

Over 60

Participating Utilities



Water Management



Hydraulic Plant Life



**Strategic Options for
Sustainable Power Generation**

Participation: 2008



Alcan
Altalink LP
ATCO Electric
BC Hydro
British Columbia Transmission Corporation
Brookfield Power
Churchill Falls (Labrador) Corporation
Columbia Power
Enbridge Gas Distribution Inc.
ENMAX Power Corporation
EPCOR
FortisAlberta Inc.
FortisBC Inc.
Great Lakes Power Limited
Hydro One Networks Inc.
Hydro Ottawa
Hydro-Québec
Hydro-Québec TransÉnergie
Manitoba Hydro
Natural Resources Canada
New Brunswick Power
Newfoundland & Labrador Hydro
Newfoundland Power Inc.
Nova Scotia Power Inc.
Ontario Center of Excellence
Ontario Power Authority
Ontario Power Generation
PAPRICAN
Saskatoon Light & Power
SaskPower
Toronto Hydro-Electric System Limited
TransAlta Energy
TransCanada Pipelines
Veridian Connections



Allegheny Energy
AmerenUE
American Electric Power
American Transmission Co.
Arizona Public Service Co.
Bonneville Power Administration
California Department of Water Resources
Central Hudson Gas & Electric
Chelan County Power
Consolidated Edison Company of New York, Inc.
Consumers Energy
Douglas County PUD
Duke Energy
Entergy Services Inc.
Eugene Water and Electric Board
Exelon Energy Delivery
FirstEnergy Corporation
Florida Power & Light Company
Grant County Public Utility District
Hetch Hetchy Water and Power
Indianapolis Power & Light
ISO New England
Keyspan
LABELEC
National Grid
National Rural Electric Cooperative Association
New York Power Authority
New York State Electric & Gas
Northeast Utilities
Portland General Electric
Public Service Electric and Gas Company
Puget Sound Energy
Sacramento Municipal Utility District
Salt River Project
Seattle City Light
Seattle Public Utilities
Southern California Edison
South Carolina Electric and Gas Company
Southern Company
Tacoma Power
Tennessee Valley Authority
US Bureau of Reclamation
US Army Corps of Engineers
Wisconsin Public Service Corporation



ESB Ireland



Elforsk AB
Vattenfall AB



Fortum



Scottish and Southern Energy



Deltares
NUON



Electricité de France
RTE France



E.ON Wasserkraft GmbH



Israel Electric Co. Ltd.



Hubei Electric
Power Corporation



Korea Electric Power



Tohoku Electric Power Co., Inc.
Tokyo Electric Power Company



Energy Australia
Energex
Hydro Tasmania
Snowy Hydro Limited



Meridian Energy Limited
Mighty River Power
Transpower New Zealand Limited

For more information regarding our Interest Groups, Events and Publications, visit www.ceatech.ca

Grant County
PUBLIC UTILITY DISTRICT

CHELAN COUNTY
PUBLIC UTILITY DISTRICT

Douglas County

TACOMA POWER
TACOMA PUBLIC UTILITIES



PSE PUGET SOUND ENERGY

EWEB

PGE



SMUD
SACRAMENTO MUNICIPAL
UTILITY DISTRICT



APS

SNP

Participation: 2008

CEATI

Central Hudson
Gas & Electric Corporation

NYSEG

ISO new england

New York Power
Authority

nationalgrid

conEdison

KEYSPAN

Allegheny Energy

Northeast
Utilities

PSEG

Public Service

Consumers Energy

AEP
AMERICAN
ELECTRIC
POWER

FirstEnergy

Exelon

IPL
An AES Company

Ameren

TVA

Duke
Energy

SCE&G

SOUTHERN
COMPANY

Entergy

FPL

National Organizations

National Rural Electric
Cooperative Association

US Army Corps
of Engineers

US DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CEATI Hydro Participation – North America

FERC Licensees

- Allegheny Energy Supply
- Ameren UE
- American Electric Power
- Brookfield Power Corporation
- Chelan County Public Utility District
- City of Seattle
- Douglas County PUD
- Duke Energy
- Eugene Water and Electric Board
- Grant County Public Utility District
- Hetch Hetchy Water & Power
- KeySpan
- New York Power Authority
- Portland General Electric
- Puget Sound Energy
- Sacramento Municipal Utility District
- Seattle City Light
- Southern California Edison
- Southern Company
- Tacoma Power
- TransAlta Energy Corporation
- TransCanada Pipelines

US Government

- Bonneville Power Administration
- California Department of Water Resources
- Tennessee Valley Authority (TVA)
- U.S. Army Corps of Engineers
- U.S. Bureau of Reclamation

Canada

- ALCAN Inc.
- BC Hydro Generation
- Churchill Falls (Labrador) Corporation
- Columbia Power Corporation
- EPCOR
- FortisBC Inc.
- Hydro-Quebec
- Manitoba Hydro
- Natural Resources Canada
- New Brunswick Power Generation Corporation
- Newfoundland and Labrador Hydro
- Nova Scotia Power
- Ontario Power Generation
- SaskPower

CEATI Hydro Participation – Worldwide

Europe

- Deltares
- E.ON Wasserkraft GmbH
- Electricite de France (EDF)
- ELFORSK
- ESB (Electricity Supply Board)
- Fortum Generation AB
- Scottish and Southern Energy
- Vattenfall AB

Australia/New Zealand

- Hydro Tasmania
- Mighty River Power
- Meridian Energy
- Snowy Hydro Limited

Africa

- ESKOM



Hydraulic Plant Life Interest Group (HPLIG) (Asset/Plant/Operations/Mechanical/Electrical Engineering Managers)

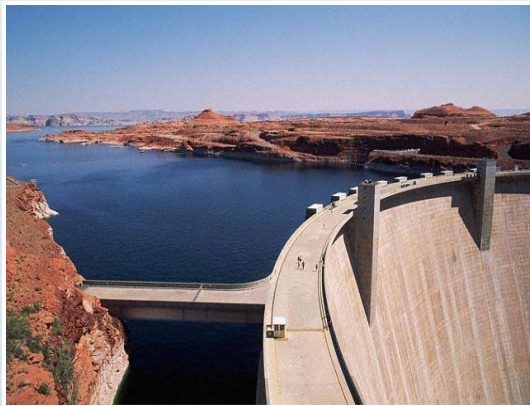
- » The HPLIG is a collaborative, technology-focused program designed to assist hydroelectric utilities in their efforts to:
1. Lower capital and operations costs,
 2. Extend equipment life,
 3. Improve efficiency,
 4. Increase reliability and reduce outage times for equipment repair and maintenance.
 5. Improve safety and environmental performance,
 6. Improve risk based asset management decision making, and
 7. Improve performance evaluation and benchmarking techniques.



Dam Safety Interest Group (DSIG)

(Dam Safety Managers/Civil Engineering Managers)

- » The Dam Safety Interest Group is composed of Dam Owners who jointly sponsor research & development projects designed to help assess and improve the safety of dams.
- » Today, the DSIG is represented internationally by participants from Canada, the United States, Australia, Sweden, the Netherlands, France, the United Kingdom and Germany.



DSIG Project: Dam Monitoring and Data Analysis Management – Best Practices

Project Objectives:

- » Documenting existing best practices for dam surveillance and inspection, instrumentation maintenance, needs, data collection, and program development, data analysis and management.

- » **This project will be undertaken in phases and will address a number of tasks including:**
 - Types of instrumentation, their uses, and pertinent information on each.
 - Understanding how dams can fail, potential failure mechanisms in the various types of dams, and how these should be monitored and instrumented.
 - Proper instrumentation maintenance and the development of specific purposes of each instrument.
 - Develop a model surveillance and monitoring program to include organization, responsibilities, staffing needs, type of staff, and training.

DSIG Workshop 2009: Case Studies – Learning from International Dam Incidents and Failures

Organized in Collaboration with the FERC

DSIG Workshop Program:

- » The objectives of this International Case Histories Workshop are to initiate opportunities for continual learning, coordinating and collaborating knowledge and the lack of knowledge, identifying and scoping out the need for additional research and development, and coordinating international efforts concerning the safety of dams around the world.
- » This workshop is intended to be the initiating step in global communication and coordination of dam safety topics.

Dam safety professionals, owners, consultants, and regulators, are invited to **Los Angeles, CA on March 24-25, 2008 to share their knowledge of past dam safety incidents and failures.**



Water Management Interest Group (WMIG)

(Water Managers/Hydrologists/Inflow Forecasters)

» The scope of the Water Management Interest Group is to focus on the development of methods & tools required to optimize hydraulic processes while maintaining safe and environmentally–friendly operations.

» **Focus**

- Watershed Management/Water Use Planning
- Meteorology/Hydrology
- Data Acquisition
- Operational Modeling and Optimization
- Hydroelectric Operation and Environmental Concerns
- Risk Management
- Improved Safety of Waterways



WMIG 2008 Workshop: Climate Change Impacts on Hydroelectric Water Resource Management

» Climate Change – Impacts on Hydroelectric Water Resource Management

- Bridging the Gap between Scientists and Practitioners: Short, Medium and Long Term Forecasting
- October 8-9, 2008 – Montreal, QC

Presentations will focus on:

- 1) Technical Challenges for Adaptation to Climate Change
- 2) Adaptation on Short/Medium/Long Term Planning



Strategic Options for Sustainable Power Generation (SOIG)

(Strategic Planning Managers/Directors, Managers of Renewable Energy Programs, Distributed Generation Managers)

Scope

The scope of the SOIG is to develop, evaluate and demonstrate sustainable power generation technologies that will result in an increase in power supply capacity and a reduction in greenhouse gas emissions.

Focus

- **Renewable Energy**
 - Small Hydro,
 - Marine Energy
 - Others: Wind, Solar, BioEnergy, Geothermal
- **Distributed Energy Resources**
 - Energy Storage, PHEV & EV, Sustainable Communities, Fuel Cells, CHP
- **Emissions/GHG Reduction Technologies**

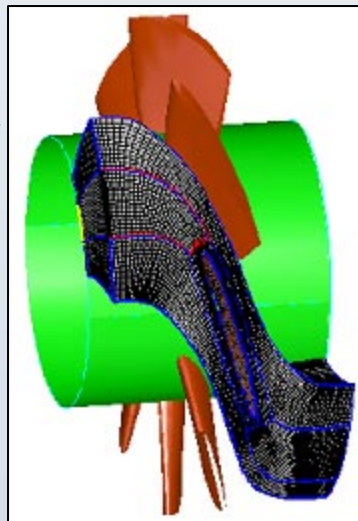


SOIG Project: Very Low Head Turbine Pilot Project

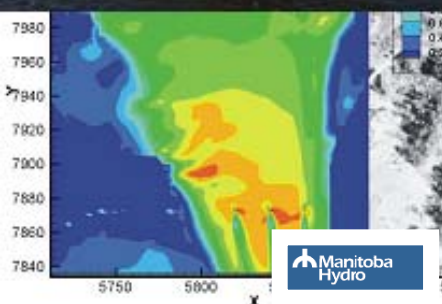
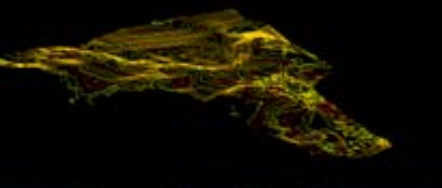
- » The VLH offers the following key features:
 - advanced low-speed generator
 - variable speed operations;
 - draft tube shortened or eliminated
 - fish-friendly because of the low velocity and low pressure flow through the runner.

- » As a result, the new turbine offers improved economics, environment friendliness and adaptability to Canadian conditions (winter and ice).

- » These claims will be assessed through this project.



SOIG Project: Development and Monitoring of a 60kW Kinetic Underwater Flow Turbine



- » This 1-year River Kinetic Turbine Demonstration will address:
 - Operational concerns such as in cold weather climate impacts
 - Safety concerns such as deployment, retrieval, and maintenance

- » Specific topics include: cost effectiveness, capacity factor, efficiency, reliability, analysis of anchoring system, ice flow/debris mitigation, deployment/retrieval procedure, fish mortality, and suitability of PEBBs for interconnection, etc.



Dr. Eric Bibeau
Mechanical & Industrial Engineering Dept
Manitoba Hydro/NSERC Chair in Alternative Energy

SOIG Project: River Energy Project (CORE) Phase One - In-River Test Plan



- » In-River Test of Turbine Mounting & Deployment / Retrieval Systems
 - Using “Simulated” Turbines

- » Short-term Deployment / Retrieval of Two Operational GEN 5 Turbines
 - Grid Connected (Cornwall Electric)

- » In-River Extended Demonstration Run of Two Operational KHPS Systems



Upcoming Interest Group Meetings

» **Hydraulic Plant Life**

- December 5, 2008 – Atlanta, GA (Dissolved Oxygen Working Group)
- February 12-13, 2009 – Los Angeles, USA
- September 17-18, 2009 – Montreal, Canada

» **Dam Safety**

- March 24-25, 2009 – Los Angeles, USA (Incidents Case Studies Workshop)
- March 26-27, 2009 – Los Angeles, USA
- October 5-7, 2009 – Whistler, BC

Upcoming Interest Group Meetings

» **Strategic Options for Sustainable Power Generation**

- April 22, 2009 - Vancouver, BC (Small Hydro Workshop)
- April 23-24, 2009 – Vancouver, BC
- October 1-2, 2009 – Chattanooga, TN

» **Water Management**

- April 30-May 1, 2009 – Gatineau, Canada
- November 18, 2009 – Atlanta, USA
- November 19-20, 2009 – Atlanta, USA (Optimization Modeling Workshop)

For More Information

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