

NAME	93. PIMICIKAMAK REVENUE STREAMS	
NEED	Pimicikamak needs to establish revenue streams associated with the Hydro Project that will lead to a sustainable relationship with the parties.	
GOAL	A preliminary review and analysis of potential revenue streams in relation to the Lake Winnipeg Regulation.	
DELIVERABLES	A draft report highlighting <ul style="list-style-type: none"> • Initial research findings, • Output of initial model runs related to the allocation of rentals, • Findings of assessment of information related to the quantification of benefits and costs of the LWR, and • Recommendations for moving forward. 	
STRATEGY / SCHEDULE / MILESTONES	Four months	<ul style="list-style-type: none"> • Initial research • Information request • Additional document review • Rental allocation model • Presenting summary of findings to Manitoba Hydro and Manitoba
CONSTRAINTS	NA	
ASSUMPTIONS / RISKS	Assuming there will be no missing gaps of information in the initial information request phase, or if there are, that the information will be provided in a timely manner.	
ROLES	Management by Pimicikamak in consultation with Manitoba and Manitoba Hydro.	
BUDGET 16/17	\$73,450 \$1,878 \$75,328 \$6,026 \$81,354	Consultation Disbursements Subtotal Admin Fee (8%) TOTAL

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**SHARING IN THE FINANCIAL BENEFITS OF HYDROELECTRIC
DEVELOPMENT IN NORTHERN MANITOBA**

**Technical support for negotiation of a Financial Benefits Agreement with
Manitoba Hydro and the Government of Manitoba**

July 2016



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APPENDIX A: BUDGET

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1 INTRODUCTION

This proposal details Camerado Energy Consulting Inc. (CECI) personnel, our proposed approach, workplan and budget for assisting Pimicikamak and OKT Law with analysis and negotiation in relation to a proposed financial benefits agreement respecting the hydroelectric facilities developed pursuant to the Northern Flood Agreement (the “Hydro Project”).¹ As requested, we have included for an initial negotiation session with Manitoba Hydro and the Government of Manitoba, following an initial research period extending over a period of two-three months commencing upon execution of an agreement for services. A detailed budget is attached as Appendix A.

The potential for Pimicikamak to share more fully in the financial benefits of the Hydro Project follows from a recently signed Process Agreement between Pimicikamak, Manitoba Hydro and the Manitoba Government, which reads as follows:

- 7.1 Recognizing that input and consultation with the public and interested third parties will be fundamental to these policy level issues and that Manitoba and Hydro may engage in separate and/or concurrent discussions with other parties on these matters, the following issues are to be considered by the Main Table and possibly at Working Group(s) and where agreed to by the Parties negotiated by the Main Table:
 - 7.1.1 Revenue sharing with, and the allocation of water power rentals, to Pimicikamak, and/or equity ownership by Pimicikamak, all in respect of the Hydro Project and/or certain of its elements, including consideration of: other aboriginal peoples and communities affected by the Hydro Project; relevant legislation and regulatory requirements; and examples of revenue sharing and equity ownership involving aboriginal peoples and communities in Manitoba and Canada;

We understand this Process Agreement to provide for the negotiation of one or more mechanisms whereby Pimicikamak would share in the financial benefits of the Hydro Project. Specifically the Agreement mentions three potential mechanisms:

- Allocation of water power rentals
- Revenue sharing

¹ Lake Winnipeg Regulation and the Churchill River Diversion Projects as described in the Summary Report of the Lake Winnipeg, Churchill and Nelson Rivers Study Board (April 1975).

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- Equity ownership

Water power rentals refer to land use and water use rentals paid to the Province of Manitoba in relation to the component facilities of the Hydro Project. This proposal addresses research, analysis and modelling of the water power rentals potentially payable to Pimicikamak in relation to the Hydro Project.

Revenue sharing can take many forms. For reasons described in greater detail in section 3, the complex and integrated nature of the Hydro Project and its operations dictates a staged approach to the research and analysis, with future work to be determined based on initial findings. Our proposal is limited to a preliminary review and analysis of potential revenue sharing in relation to the Lake Winnipeg Regulation. However, our analysis could be expanded to include other aspects of the Hydro Project, including Churchill River Diversion, pursuant to an additional workplan and budget.

Regarding equity participation, Pimicikamak does not wish to explore this option at this time. As such, we have not included for research, analysis or modelling of partnership or ownership models, or for receiving a portion of government dividends, were dividends to be taken by the Province in the future.

2 CORPORATE PROFILE

2.1 *Camerado Energy Consulting Inc.*

Richard M. (Rick) Hendriks is the Director of Camerado Energy Consulting. Mr. Hendriks has over fifteen years of technical, environmental, regulatory and policy knowledge and experience of the electricity sector in Canada. He will be the project manager for this project, and will have responsibility for its quality and execution. As the primary researcher, he will lead the compilation and review of relevant documents, preparation of information requests, model development, and summarization of findings.

From 1999-2002, Mr. Hendriks was the environmental and engineering analyst for Innu Nation in relation to hydroelectric development proposals in Labrador. There he participated in ongoing community and Crown consultation, environmental assessment, negotiation of an environmental protection chapter of an impacts and benefits agreement in relation to the proposed Lower Churchill Project, and technical and research support for negotiation of a compensation agreement for the Churchill Falls Project.

In 2003, Mr. Hendriks joined Chignecto Consulting Group as an Associate where he provided resource negotiation and environmental assessment support services to Aboriginal groups across Canada. His work included negotiation of impacts and benefits agreements, regulatory interventions, and assessment of social, environmental and economic impacts and benefits related to hydroelectric and mining developments.

For the past seven years, Mr. Hendriks has been the Director of Camerado Energy Consulting. During this time, on behalf of his Aboriginal clients, he has conducted and managed the environmental, technical and economic review of several of Canada's largest proposed hydroelectric projects, including the Lower Churchill Hydroelectric Generation Project, the Slave River Hydro Development, and the Site C Clean Energy Project. He has also assessed the potential for compensation to Aboriginal communities for historic and ongoing effects of hydroelectric and transmission development in Ontario and the Northwest Territories.

In 2010, Mr. Hendriks testified before the Alberta Utilities Commission during its Inquiry on Hydroelectric Power Generation that was reviewing the policy, planning and regulatory context for additional hydroelectric development in that Province. The following year, Mr. Hendriks presented on the economic costs and benefits of reservoir clearing before the Joint Review Panel for the Lower Churchill Project, who accepted his recommendations. More recently, Mr. Hendriks testified on several occasions before the Joint Review Panel for the Site C Project, who adopted several of his recommendations, including with respect to the significant

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environmental effects of the proposed project on fish, fish habitat, and Aboriginal fisheries. In May 2014, the Manitoba Public Utilities Board qualified Mr. Hendriks as an expert in the socioeconomic implications and environmental consequences for Aboriginal communities of large-scale hydroelectric developments, including the policy and planning aspects of these developments.

Mr. Hendriks' curriculum vitae is provided in Appendix B.

2.2 Helios Centre

Cofounder of the Helios Centre, Philip Raphals has extensive experience in many aspects of sustainable energy policy, including least-cost energy planning, utility regulation (including transmission ratemaking) and green power certification. He is the author of numerous studies and reports and frequently appears as an expert witness in the regulatory arena. For this project, Mr. Raphals will assist with the preparation of requests for technical information, analysis of information related to the operational benefits and costs of the Hydro Project, as well as review of model design and outputs.

From 1992 to 1994, Mr. Raphals was Assistant Scientific Coordinator for the Support Office of the Environmental Assessment of the Great Whale hydro project, where he coauthored a study on the role of integrated resource planning in assessing project justification.

In 1997, he advised the Standing Committee on the Economy and Labour of the Quebec National Assembly in its oversight hearings concerning Hydro-Quebec. In 2001, he authored a major study on the implications of electricity market restructuring for hydropower developments, entitled *Restructured Rivers: Hydropower in the Era of Competitive Energy Markets*. In 2005, he advised the Federal Review Commission studying the Eastmain 1A/Rupert Diversion hydro project with respect to project justification. Later, he drafted a submission to this same panel on behalf of the affected Cree communities of Nemaska, Waskaganish and Chisasibi.

Mr. Raphals has appeared as an expert witness on behalf of Grand Riverkeeper Labrador Inc. in the hearings of the Joint Review Panel (JRP) on the Lower Churchill Generation Project, and in those before the Newfoundland and Labrador Public Utilities Board concerning the Muskrat Falls project and concerning reliability of the Island electrical system (ongoing). He has also appeared there as an expert witness on behalf of the Innu Nation in the ongoing General Rate Application of Newfoundland and Labrador Hydro.

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In 2013, he presented expert testimony to the Nova Scotia Utility and Review Board in the proceedings concerning the Maritime Link, on behalf of the Canadian Wind Energy Association and, for the compliance phase, the Low Power Rates Alliance.

In British Columbia, Mr. Raphals testified on behalf of the Treaty 8 Tribal Association before the Joint Review Panel examining the proposal to build the Site C Hydroelectric Project.

Mr. Raphals chairs the Renewable Market Advisory Panel of the Low Impact Hydropower Institute (LIHI) in the United States. He also played a major role in developing the low impact renewable electricity guideline for the Canadian Ecologo programme.

Mr. Raphals is a frequent expert witness before the Quebec Energy Board (the Régie de l'énergie du Québec), with respect to transmission tariffs (FERC), the integration of wind power, security of supply with respect to hydropower, energy efficiency and avoided costs, and sustainable development criteria.

Mr. Raphals' curriculum vitae is provided in Appendix B.

3 APPROACH

Based on our preliminary discussions with OKT Law, we understand that, while the investigation of financial benefits must consider existing laws and policies in the Province of Manitoba, it should also explore opportunities for revenue sharing that may require adjustments to existing legal or policy instruments. In addition, the models or approaches proposed as a result of the research and analysis pursuant to this proposal should ideally have potential application to other Aboriginal Groups affected by the Hydro Project.

These constraints, opportunities and limitations are explored further below in terms of two of the three forms of financial benefits contemplated in the Process Agreement.

3.1 Allocation of Water Power Rentals

In the Province of Manitoba, s.48 of the *Water Power Regulation* under *The Water Power Act* (C.C.S.M. c. W60) requires the payment to the Crown of land use and water use rentals by licensees, including Manitoba Hydro. Rental rates are established in the legislation, as amended from time to time, and are applied individually to each water power facility based on monthly energy generation (in horsepower-years) in the case of water rentals, and on directly affected land area in the case of land rentals.

Financial benefits to Pimicikamak from land and water rentals could involve either a portion of the rentals paid to the Province or new land and water rentals paid directly to Pimicikamak. In order to proceed with negotiations, we understand that it will be important to model the potential allocation to Pimicikamak of land use and water use rentals in a manner that is transparent, consistent and adaptable to other Aboriginal groups affected by the Hydro Project.

The scope of our proposed initial work in relation to the allocation of rentals includes to:

- a. Conduct research into land use and water use rentals paid by Manitoba Hydro, as well as similar rentals and allocations to Aboriginal groups in other jurisdictions;
- b. Investigate the payment of land rentals in relation to transmission infrastructure in the context of similar payments in other jurisdictions;
- c. Develop a spreadsheet model quantifying the existing land and water rentals payable by Manitoba Hydro from the generation and transmission components of the Hydro Project;
- d. Use the model to develop various scenarios for sharing of land and water rentals with Pimicikamak, based on similar rentals and agreements in other jurisdictions; and
- e. Summarize and report these initial findings.

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3.2 Revenue Sharing

While the modelling of land use and water use rentals provides a useful starting point for negotiations, the allocations of land rentals based on directly affected land area, and water use rentals based on energy generation, do not adequately reflect the full value of the generation, transmission, diversion, storage and related facilities that compose the Hydro Project. For example, the Jenpeg Generating Station generates only about 500 GWh/year of energy and occupies only about 110 acres of Crown Land. However, Jenpeg is a key element of the Lake Winnipeg Regulation system (LWR), which provides numerous additional benefits to the Hydro Project, and to the Manitoba Hydro electricity system as a whole that are not reflected in the Jenpeg land use and water use rentals. These benefits include but are not limited to:

- **Additional downstream generating capacity.** The LWR regulates the downstream flows into the Nelson River, allowing for the installation of higher capacity generating facilities downstream, avoiding natural gas or other peaking facilities.
- **Additional downstream firm energy.** By tending to equalize seasonal flows downstream as well as by retaining water in Lake Winnipeg, LWR avoids downstream spillage, increasing the amount of energy generated each year for export sales.
- **Operational flexibility.** The operational control created by the LWR permits the generating facilities on the Nelson River to be operated in response to seasonal load requirements by making more effective use of the water in Lake Winnipeg, increasing export sales and increasing the value of those export sales.
- **Low-emission export sales.** By increasing both downstream capacity and firm energy, the LWR delays the need for alternative generating facilities and increases export sales of low emission energy.

While the allocation of land use and water use rentals to Pimicikamak is an important component of a financial benefits agreement, revenue sharing that reflects the full value of the resources is also essential to an equitable arrangement.

Several approaches exist in Canada for sharing revenues from large-scale hydroelectric developments with Aboriginal groups. In addition to equity participation, which is not considered here, these approaches include: shares of gross revenues from electricity sales, shares of after-debt net cash flows, lump sum and milestone payments, and reductions in the price of electricity, among other arrangements. Other financial benefits in lieu of direct cash payments are also common, including direct investment in community infrastructure, and land transfers, but these are considered to be outside the scope of “revenue sharing” contemplated in the Process Agreement, and are not considered further in this proposal.

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For the purposes of this proposal, we consider “revenue sharing” to refer to forms of financial benefit potentially payable to Pimicikamak resulting from the financial benefits obtained by Manitoba Hydro as a result of the historic and ongoing operation of the Hydro Project. Financial benefits from the Hydro Project also accrue to the government of Manitoba (in addition to water power rentals) in the form of income taxes, for example, as well as to the ratepayers of Manitoba in the form of lower electricity rates. These benefits are not considered in this proposal, though these benefits may be relevant to the ultimate revenue sharing arrangement negotiated between Pimicikamak, Manitoba Hydro and Manitoba.

In terms of the financial benefits obtained from its hydroelectric resources, Manitoba Hydro maintains several models for quantifying the hydrologic and financial performance of its interconnected electricity system. Though there have been several public reviews of these models over the past decade, the models themselves do not appear to have been made public at any time. The availability of system operations and financial information is a key consideration in determining the potential for equitable revenue sharing, regardless of the approach ultimately negotiated between Pimicikamak, Manitoba Hydro and Manitoba.

The following models were in use by Manitoba Hydro at the time of the 2010-2012 General Rate Application, and are presumed to have been upgraded or modified since the filing of that GRA in November 2009:

- MOST: the Market Optimized Short-Term model is a decision support system for scheduling generation and reservoir operations across the Manitoba Hydro system;
- HERMES: the Hydro Electric Reservoir Management Evaluation System model quantifies future short-term hydroelectric system operations (i.e. up to two years), based on hydrologic conditions over the past century;
- SPLASH: the Simulation Program for Long Term Analysis of Systems Hydraulics quantifies future long-term hydroelectric system operations (i.e. greater than two years), based on hydrologic conditions over the past century;
- PRISM: the Power Risk System Model, tailored for use in the Manitoba Hydro system, is used to simulate the financial impact of variations in flow and generation input parameters using a Monte Carlo technique.

The above models are used to inform Manitoba Hydro’s Integrated Financial Forecast, and to quantify opportunities (e.g. short-term purchases or sales) and risks (e.g. droughts). Though the primary purpose of these models is not to assess the financial benefits arising from particular facilities, such as the Hydro Project or its components, they appear to be capable of providing estimates of financial benefits that are facility-specific, at least in relation to some key facilities.

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During the recent Lake Winnipeg Regulation (LWR) hearings before the CEC, Manitoba Hydro appears to have used the above models (or descendants of these models) to analyse the implications of adjustments to the LWR operating licence. In particular, though it was not seeking a change to the existing licence (only a renewal), Hydro modelled the financial implications of three alternatives for the LWR operations:

- Maintain the existing 711-715 foot operation range, and maximize Jenpeg spillway and power house flows when Lake Winnipeg levels exceed 715 feet.
- Reduce operating range to 711-714 feet, maximizing Jenpeg spillway and power house flows when Lake Winnipeg levels exceed 714 feet.
- Raise the operating range to 711-716 feet, maximizing spillway and power house flows when Lake Winnipeg levels exceed 716 feet.²

Experts for the Manitoba PUB had requested Manitoba Hydro to “provide IFF14 [Integrated Financial Forecast 2014] twenty-year outlooks for each of the above three operating scenarios.” Despite Manitoba Hydro’s initial reluctance to provide the requested information, the PUB determined that: “The questions are relevant and will assist the Board in understanding the range for financial implications from changes to Manitoba Hydro’s Lake Winnipeg Regulation licence.”

Manitoba Hydro provided a response that excluded the costs of mitigation associated with adverse effects to stakeholders, and that was based on a previous analysis using NFAT Plan 14 (i.e. the preferred development plan of Keeyask in-service in 2019, Conawapa in 2025, and a new 750 MW interconnection to the United States). While an updated analysis that takes into account the suspension of the Conawapa project would provide more up-to-date information, the response provides initial insight into the value of the LWR and the substantial role it plays in the operations of Manitoba Hydro:

- One foot decrease in the LWR Operating Range:
 - Advances need for energy resources to around 2024/25 – in-service cost of \$100 million
 - Net extraprovincial revenues – \$480 million lower compared to the base scenario
 - Borrowing requirements and finance expense – increased by \$330 million if the rate increases used in the base scenario are maintained at 3.95% per year

² Manitoba Hydro 2014/15 & 2015/16 General Rate Application PUB/MH-I-80a

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- Retained earnings – \$830 million lower compared to the base scenario by 2031/32
- Rates – would need to grow by 4.08% per year to 2031/32 to achieve the 75:25 debt/equity ratio by 2031/32
- One foot increase in the LWR Operating Range:
 - Eliminates the need for energy resources within the 20-year forecast period
 - Net extraprovincial revenues – \$420 million higher, compared to the base scenario
 - Borrowing requirements and finance expense – decreased by \$180 million if the rate increases used in the base scenario are maintained at 3.95% per year
 - Retained earnings – \$590 million higher compared to the base scenario by 2031/32
 - Rates – would need to grow by just 3.85% per year to 2031/32 to achieve the 75:25 debt/equity ratio by 2031/32

Considering the availability of information and the proximity of the Lake Winnipeg Regulation facilities to the Pimicikamak, we propose the LWR as the focus of our initial research and analysis respecting the financial benefits that could form the basis of a revenue sharing agreement between Pimicikamak, Manitoba Hydro and Manitoba. However, our analysis could be expanded to include other aspects of the Hydro Project, including Churchill River Diversion, pursuant to an additional workplan and budget.

The scope of this preliminary work is to:

- a. Review recent utility board and other regulatory filings to identify the kinds of financial, economic, and operational benefits provided by and costs related to the LWR;
- b. Summarize and assess available information pertaining to the quantification of those benefits and costs; and
- c. Propose next steps to further quantify those benefits and costs in support of negotiations.

4 WORKPLAN AND BUDGET

4.1 Summary

The table at the end of this section summarizes the tasks for this assignment. We propose to simultaneously undertake the work tasks in relation to the allocation of water power rentals and revenue sharing. The anticipated duration of the assignment is approximately 4 months, although this depends substantially on the timeliness of responses to information requests and scheduling of meetings.

4.2 Initial Research

The initial research phase will include the following:

- a. Research into land use and water use rentals paid by Manitoba Hydro, as well as similar payments and allocations to Aboriginal groups in other jurisdictions;
- b. Investigation of the payment of land rentals in relation to transmission infrastructure in the context of similar payments in other jurisdictions; and
- c. Review of recent utility board and regulatory filings to identify the kinds of financial, economic, and operational benefits provided by the LWR.

4.3 Information Request

The purpose of this information request to Manitoba Hydro and/or the Government of Manitoba is to fill any gaps in the information necessary to the preparation of a preliminary land and water use rental allocation model, and to understanding the scope of benefits and costs related to the LWR. Following this initial information request, it is envisioned that the parties will develop an approach to information sharing as part of the negotiation process, making future formal information requests unnecessary.

4.4 Additional Document Review

Documents obtained in response to the information request and any relevant documentation located since the time of the initial document review will be reviewed in order to prepare the land and water use rental allocation model, and to complete the summary of benefits and costs related to the LWR.

4.5 Rental Allocation Model

Based on the review of documentation, a spreadsheet land and water use rental allocation model will be prepared. The purpose of this model is to illustrate the allocation of rentals under different scenarios. The time to prepare the draft model is inclusive of a teleconference with

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Pimicikamak and OKT to query the model under different scenarios in order to prepare for future discussions with Manitoba Hydro and Manitoba.

4.6 *Summary of Findings*

Following the development of the land and water use rental allocation model and the review of additional information related to revenue sharing, a draft report will be prepared including:

- a. Initial research findings;
- b. Output of initial model runs related to the allocation of rentals;
- c. Findings related to the assessment of information related to the quantification of benefits and costs of the LWR; and
- d. Next steps in support of future negotiations.

4.7 *Initial Meeting with Manitoba Hydro and Manitoba*

The purpose of this initial meeting with Manitoba Hydro is to discuss concepts for negotiation of a revenue sharing agreement, initial findings of the land and water use rental allocation model, and the benefits and costs of the LWR. The need for additional drafting and meetings will be determined based on discussions between the parties, with budgets and workplans prepared going forward, as appropriate.

4.8 *Project Management and Administration*

An equivalent of 8 hours per month has been allocated for project management during the course of this work. This includes regular reporting to Pimicikamak and OKT, ongoing correspondence, administration, and travel planning.

APPENDIX A: BUDGET

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Budget - Pimicikamak Financial Benefits of Hydroelectric Development										July 2016	
Task No.	1	2	3	4	5	6	7				
Task Description	Initial Research	Information Request	Additional Document Review	Rental Allocation Model	Summary of Findings	Initial Meeting with Manitoba Hydro and Government of Manitoba	Project Management and Administration				
PERSONNEL								Hours	Rate	Cost	
Rick Hendriks	100	12	40	24	60	32	32	300	\$ 150.00	\$ 45,000.00	
Phil Raphals	24	8	16	12	16	4	0	80	\$ 250.00	\$ 20,000.00	
Task Hours	124	20	56	36		36	32	380			
									Sub-total	\$ 65,000.00	
									GST/HST	\$ 8,450.00	
									Total Fees	\$ 73,450.00	
DISBURSEMENTS								Units	Rate	Cost	
Flight (per direction)						2		2	\$ 400.00	\$ 800.00	
Airport parking (per day)						3		3	\$ 30.00	\$ 90.00	
Mileage (per km)						130		130	\$ 0.55	\$ 71.50	
Accommodations (per night)						2		2	\$ 180.00	\$ 360.00	
Meals & incidentals (per day)						3		3	\$ 100.00	\$ 300.00	
Airport Transit						2		2	\$ 20.00	\$ 40.00	
									Sub-total	\$ 1,661.50	
									GST/HST	\$ 216.00	
									Total Disbursements	\$ 1,877.50	
									TOTAL	\$ 75,327.50	

APPENDIX B: CURRICULUM VITAE

SUMMARY

Richard M. (Rick) Hendriks is the Director of Camerado Energy Consulting. Mr. Hendriks has over fifteen years of technical, environmental, regulatory and policy knowledge and experience of the electricity sector in Canada. He provides management consulting, energy planning, policy analysis, research, and negotiation services to clients across Canada. He works with organizational leadership to envision, implement and achieve strategic, economic and environmental objectives.

Trained in engineering, science and social science, Mr. Hendriks brings an analytical, structured and comprehensive approach to understanding, analyzing and explaining the opportunities and risks of energy plans, projects and proposals. An experienced negotiator, educator and researcher, he supports clients seeking to build partnerships with industry, to understand the implications of development, to resolve historic disputes, and to intervene in regulatory processes to change the course of development.

Mr. Hendriks offers services in the following areas:

Regulatory intervention. Energy system planning, environmental assessment, project permitting, government inquiries, energy policy reviews, environmental and climate policy, community energy planning, written and oral testimony

Project evaluation. Issues scoping studies, terms of reference design and review, baseline study design and review, need and alternatives analysis, socio-economic impacts and benefits analysis, strategic planning, economic valuation, technical review management

Negotiation. Process and funding agreements, exploration and feasibility study memoranda of understanding, environmental assessment participation agreements, impacts and benefits agreements, financial benefits agreements, environmental and socioeconomic monitoring agreements, negotiation management, agreement consultation

PROFESSIONAL EXPERIENCE

Camerado Energy Consulting Inc. (2009-2016)

- Founder and director of a management consulting firm providing services to Aboriginal communities, community energy cooperatives, non-governmental organizations, municipalities, and community-based developers

Chignecto Consulting Group Inc. (2003-2009)

- Associate with a management consulting firm providing resource negotiation, environmental assessment and related support services to Aboriginal communities across Canada

McMaster University, Engineering and Society Program (2003-2005)

- Co-instructor of an undergraduate course aimed at developing skills to assess, prevent and manage environmental, social and economic impacts associated with engineering design with applications to energy, mining, and materials

Innu Nation (1999-2002)

- Environmental and engineering analyst for a First Nation organization in relation to hydroelectric generation and transmission development

Halsall Associates Consulting Engineers (1997-1999)

- Engineering staff providing services to the residential and commercial building sector including: site investigations, specifications, tendering, construction review, and project management

SELECTED PROJECTS

Doig River First Nation, Amisk Hydroelectric Development (2015-2016)

- Provide strategic direction concerning intervention in the environmental assessment, and related Natural Resources Conservation Board and Alberta Utilities Commission review processes
- Represent the potentially-affected First Nation community in consultation and accommodation discussions with the proponent and government agencies

Wabun Tribal Council, Côté Gold Project (2013-2016)

- Manage review of baseline socio-economic and environmental studies and review of the environmental impact statement
- Represent the potentially-affected First Nation communities in consultation and accommodation discussions with government agencies
- Participate in negotiation of the environmental protection chapter of an impacts and benefits agreement between the affected First Nations and the proponent

Treaty 8 First Nation, Taltson River Hydroelectric Project (2015)

- Conducted an assessment of alternative schemes for development of the hydroelectric potential of the Taltson River, Northwest Territories
- Researched and reported on the historical and contemporary environmental effects, economic benefits, electricity policy, land use policy, and transmission line infrastructure development to inform negotiation of compensation

Treaty 8 Tribal Association, BC Hydro Site C Clean Energy Project (2010-2015)

- Provided strategic direction concerning First Nation intervention in the environmental assessment, and related integrated resources planning and policy review processes
- Represented the potentially-affected First Nation communities in consultation and accommodation discussions with the Crown proponent and government agencies
- Responsible author for written submissions to the Joint Review Panel environmental assessment and related regulatory processes
- Responsible author for written submissions to BC Hydro – Integrated Resource Planning process, regarding aboriginal consultation, energy planning, and implications of the proposed Site C Project

Innu Nation, Nalcor Energy Lower Churchill Hydro Electric Generation Project (1999-2013)

- Responsible author for written submissions to the Joint Review Panel environmental assessment of the Lower Churchill Hydroelectric Generation Project, and environmental assessment of the Labrador-Island Transmission Link
- Participated in ongoing community and Crown consultation requiring public presentations, regulatory submissions, workshops and plain-language summaries
- Participated in negotiations of the environmental protection chapter of an impacts and benefits agreement between the affected First Nations and the proponent
- Provided technical and research support for negotiation of a compensation agreement concerning past and ongoing infringements

Mikisew Cree First Nation, Hydroelectric Project Compensation (2013)

- Participated as an invited practitioner in the discoveries process respecting the nature and extent of biophysical and socio-economic effects related to historic hydroelectric development on the Peace River to inform negotiation of compensation

Robinson Huron Treaty First Nations, Transmission Line Compensation (2010-2013)

- Researched and reported on the historical and contemporary environmental effects, electricity policy, land use policy, and transmission line development to inform negotiation of compensation

Treaty 8 Alberta Nations, AUC Inquiry – Hydroelectric Power Generation (2010-2011)

- Researched regulatory processes for hydroelectric generation and transmission across Canada to identify best practices for environmental assessment and First Nation consultation
- Prepared and provided written and oral testimony to the Alberta Utilities Commission on behalf of Athabasca Chipewyan, Mikisew Cree and Smith's Landing First Nations

Smith's Landing First Nation, Atco-TransCanada Slave River Hydro Development (2007-2010)

- Successfully negotiated a feasibility partnership agreement with Atco Power and TransCanada for the joint conduct of a multi-year baseline and feasibility study program
- Systematically reviewed the relevant literature pertaining to the ecological, social and economic effects of previous hydroelectric development on the Peace River

Ch-ihl-kway-uhk First Nations/Badger Power Generation (2004-2005)

- Reviewed and reported on the preliminary feasibility of proposed small-scale hydroelectric projects in the Chilliwack River Valley, British Columbia
- Developed hydrotechnical and energy models to assess project economic viability under various hydrologic, energy and climate scenarios

Attawapiskat First Nation, Victor Diamond Project (2003-2008)

- Managed environmental, socio-economic and technical review of an environmental assessment of a proposed open pit diamond mine and associated transportation and transmission infrastructure
- Successfully negotiated the environmental protection chapter and related provisions of an impacts and benefits agreement between the First Nation and De Beers Canada
- Represented the First Nation on a joint committee with the proponent tasked with implementing the environmental provisions of the impacts and benefits agreement, including in relation to project permitting, compliance monitoring and effects monitoring
- Facilitated discussion sessions with the First Nation Elders Advisory Committee concerning the potential effects of the proposed project on traditional land use
- Lead the development of a comprehensive long-term socio-economic monitoring program, including issues scoping, data compilation, report writing and implementation planning
- Successfully negotiated a follow-up program agreement with the proponent and Canada designed to verify the accuracy of the environmental assessment with respect to environmental and socio-economic effects and to assess the effectiveness of mitigation measures

EDUCATION

- Bachelor of Engineering & Society (Civil), McMaster University, Hamilton, Ontario (1996)
- Bachelor of Science (Honours Psychology), McMaster University, Hamilton, Ontario (2009)
- Continuing Education (Economics), McMaster University, Hamilton, Ontario (ongoing)

LANGUAGES

- English (written and spoken fluently)
- French (written and spoken working knowledge)
- Spanish (conversational)

PUBLICATIONS

▪ TESTIMONY

Amended General Rate Application, Newfoundland and Labrador Hydro (2015)

- Helios Centre – Electricity Generation and Distribution Services: Remote Communities in Ontario

NFAT Review, Manitoba Hydro Keeyask and Conawapa Projects (2013-2014)

- Manitoba Métis Federation – Evaluating Macroenvironmental Impact
- Manitoba Métis Federation – Evaluating the Macroenvironmental and Socio-economic Implications of Additional Wind Resources in Manitoba

Joint Review Panel Hearings, Site C Clean Energy Project (2013-2014)

- Treaty 8 Tribal Association – General and Specific Comments on the EIS
- Treaty 8 Tribal Association – General and Specific Comments on the EIS Addendum
- Alternative Hydroelectric Sites on the Peace River: Opportunity for Consultation and Reconciliation
- Avoidance and Mitigation Measures – Current Use of Lands and Resources for Traditional Purposes
- Sustainable Economic Development for Treaty 8 First Nations
- Treaty 8 Tribal Association – Joint Review Panel Hearings Summary Report

Legislative Assembly of Alberta, Standing Committee on Resource Stewardship – Review of the Potential for Expanded Hydroelectric Energy Production in Northern Alberta (2013)

- Improving the Regulatory Process for Hydroelectric Development
- Considerations for Electricity Resource Planning in Alberta

Joint Review Panel Hearings, Lower Churchill Hydroelectric Generation Project (2011)

- Innu Nation – Comments on the Lower Churchill Hydroelectric Generation Project EIS
- Socio-economic Benefits and (Reservoir Clearing) Contracting Opportunities for Innu Nation
- Biophysical and Socio-economic Monitoring, Mitigation, and Follow-up

Alberta Utilities Commission – Inquiry on Hydroelectric Power Generation (2010)

- The Policy and Planning Context for Hydroelectric Development in Alberta
- The Regulatory Process for Hydroelectric Development in Alberta

▪ ACADEMIC

Sustainable Dialogues Canada (2015)

- P. Raphals and R. Hendriks, Towards a Sustainable Low-Carbon Electric System: Challenges and Opportunities, in Potvin, C., et al. (eds.), Acting on Climate Change: Extending the Dialogue Among Canadians, UNESCO-McGill Chair for Dialogues on Sustainability, 2015 (in press).

▪ POLICY

Canadian Environmental Assessment Agency – Operational Policy Statement Review (2014)

- Operational Policy Statement: Addressing “Purpose of” and “Alternative Means” under the Canadian Environmental Assessment Act, 2012. December 2013.

British Columbia Ministry of Energy – Review of the BCUC (2014)

- Application of the *Clean Energy Act*; Regulatory models for Crown electricity utilities

British Columbia Ministry of Energy – Industrial Electricity Policy Review (2013)

- Transmission Service Rates; Aboriginal Policy; Environmental Policy (co-authored)

▪ CONFERENCES

- **The Evolving Role of Aboriginal Communities in Renewable Energy Development**, Invited Presentation to Hatch Renewable Power Symposium, February 2014.
- **The End of the Dam Age?** Invited presentation to the Treaty 8 Alberta Regional Session on Water Governance, Energy Development & Indigenous Rights, October 2012
- **Treaty 8 First Nations and the Proposed Site C Project**, Invited presentation to the Treaty 8 Alberta Regional Session on Water, Land and Treaty Rights, November 2011
- **Community Well-Being Workshop**, Invited Practitioner, Nuclear Waste Management Organization, January 2008 and November 2014
- **Environmental Assessment and Local Communities: Lessons in Responsibility**, Invited Presentation to Parks Canada, EA Practitioners Conference, Montreal, Quebec, November 2006
- **Helping Communities Cope with Change**, Invited Presentation to the Ontario Association for Impact Assessment Annual Conference, Ottawa, Ontario, October 2006

AFFILIATIONS

- Ontario Sustainable Energy Association
- Ontario Association for Impact Assessment

ACTIVITIES

- Bruce Trail Conservancy
- Hollyhock Educational Institute
- Hamilton Association for Renewable Energy



“Energy research for a sustainable future”

Philip Raphals

Executive Director
Helios Centre
326 Saint-Joseph Blvd. East, Suite 100
Montreal, Quebec, Canada H2T 1J2
Tel. +1 514 849-7091
Fax +1 206 984-9421
philip@centrehelios.org
skype: raphals

PROFESSIONAL EXPERIENCE

1996- **HELIOS Centre, Executive Director (since 2004)**

An independent, non-profit research organization dedicated to the analysis of energy regulatory or investment options and the design of strategies and policies for the sustainable use and development of energy resources. Responsible for management and development of the Helios Centre, direction of its publication Enjeux-ÉNERGIE (2004-2007), and consulting activities.

Selected projects:

- **Régie de l'énergie:** Expert testimony on behalf of the Regroupement national des conseils régionaux de l'environnement du Québec (RNCREQ), l'Union de consommateurs, the Fédération des commissions scolaires du Québec, and other groups (including the Groupe de la charge locale), in hearings concerning:
 - Hydro-Québec's transmission tariff (R-3401-98, R-3493-04, R-3605-06; R-3549 phase 2, R-3640-07 and R-3669-08 phase 1; R-3669-08 phase 2 (harmonization with Order 890); R-3738-10);
 - the framework agreement between HQ-Production and HQ-Distribution (R-3622-06),

- the need for a balancing contract for wind energy (R-3550-04 and R-3648-07),
- Hydro-Québec's security of supply (concerning its resource plans R-3470-01 and R-3550-04, its interruptible tariffs in R-3518, and its Suroît project in R-3526-04),
- Hydro-Québec's energy efficiency plan and avoided costs (R-3473, R-3519 and R-3708-09),
- sustainable development criteria (R-3525-04), and
- acquisition of power from small hydro developers (R-3410).
- **Technocentre éolien** – Étude sur l'énergie éolienne et les exportations d'électricité (2014)
- **Treaty 8 Tribal Association:**
 - Affidavits in support of judicial review and injunction applications (2014 - 2015)
 - Expert testimony in the Environmental Assessment of the Site C Hydroelectric Project (2013 - 2014)
- **Innu Nation (Labrador):** Expert testimony in general rate hearing of Newfoundland Labrador Hydro (2013 -)
- **Low Power Rates Alliance:** Expert testimony before the Nova Scotia Utility and Review Board concerning the compliance filing of NSPI (2013)
- **CanWEA (Canadian Wind Energy Association):**
 - Expert testimony before the Nova Scotia Utility and Review Board concerning the proposed Maritime Link and related agreements.
 - Study on rate impacts of wind energy in Quebec (*L'impact de l'énergie éolienne sur les tarifs d'Hydro-Québec Distribution*) (2013)
- **Canmet ÉNERGIE:** Review of regulatory policies relevant to Smart Grid development in Canada's provinces and territories (2012)
- **Grand Riverkeeper Labrador :** Expert testimony in NL PUB hearing on supply issues (2014 -); Expert testimony on the justification for the proposed Lower Churchill Project (2011); Testimony before the Public Utilities Board of Newfoundland and Labrador regarding the Muskrat Falls Reference (2012); Affidavit In support of Federal Court File No. T-2060-11 (judicial review of Joint Panel Report (2012)); Comments on the justification of the proposed Labrador-Island Transmission Link (2012)
- **Natural Resources Defence Council :** Power supply issues concerning the Champlain Hudson Power Express (2010)

- **SPG Hydro inc.** : Market study on in-stream hydropower (*Étude de marché sur la filière de l'hydrolienne fluviale*) (2008)
- **Service d'actions entrepreneuriales Manicouagan** : Étude sur les coûts de revient de la nouvelle filière de l'hydraulienne fluviale. (2008)
- **Communauté innue d'Ekuanitshit** : Conseils sur les enjeux énergétiques et économiques du Complexe La Romaine (2008)
- **Groupe Pacific**: Electric supply options for a new residential community on Montreal Island. (2008)
- **Hydro-Québec / ACDI / Électricité d'Haïti**: Études sur le potentiel et la mise en œuvre des énergies renouvelables en Haïti
 - Survol des technologies d'énergie renouvelable et technologies d'appoint (2007)
 - Options pour l'intégration des énergies renouvelables dans le réseau de Jacmel (2007)
- **Centre local de développement Manicouagan**: Étude sur les coûts de l'Entente entre le gouvernement du Québec et Alcan (2007)
- **Association québécoise des consommateurs industriels d'électricité**: Étude sur l'évolution des prix disponibles sur les marchés d'exportation d'Hydro-Québec Production (2007)
- **Latin American Energy Organization (OLADE)**: Competition in Energy Markets: An Analysis of the Relevance of North American Experiences to the Latin American and Caribbean Region. Project leader and principal consultant (with Peter Bradford). Project includes an in-depth review of the impact on restructuring on electricity and natural gas consumers in the U.S. and Canada, with an emphasis on regulatory policy concerning transmission, guidance and oversight of case studies of electricity restructuring experience in Brazil, Chile, Peru and Trinidad and Tobago, and the development of policy guidelines to regulate energy markets in the public interest in Latin America and the Caribbean. (2003 - 07)
- **Law Offices of Scott Hempling (Washington, D.C. law firm specializing in energy regulatory matters)**: Senior policy advisor. (2005-06)
- **Hydro-Québec, Direction Réseaux Autonomes**: Renewable energy potential in off-grid communities (2005-06)
- **National Grid USA: Economic Development and Environmental Impacts of Narragansett Electric's Energy Efficiency Programs**: Analysis of avoided cost component (for the Goodman Group) (2006)
- **Cree Nations of Nemaska, Waskaganish and Chisasibi**: Comments on the Justification of the Eastmain -1A/Rupert Diversion Project (2006)

- **Cree Nation of Nemaska:** Advice concerning wind energy development and community energy planning (2005-06)
- **Canadian Wind Energy Association:** Submission to the Ontario Power Authority's Supply Mix Consultation (with Hélimax Énergie inc.) (2005)
- **National Roundtable on the Economy and the Environment:** Background paper on the role of hydropower in a carbon-constrained energy future for Canada (2005)
- **Federal Review Commission, Eastmain 1A/Rupert Hydroelectric Project:** Report on the conformity of the Eastmain 1A/Rupert Environmental Impact Study, with respect to project justification (2005)
- **Institut d'énergie et de l'environnement de la Francophonie (IEPF):** Editorial supervision and co-author, *Mettre en Place Une Autorité Nationale Désignée pour le MDP: Pourquoi et Comment?*, presentation at COP-11 in Montreal; Profiles of the Clean Development Mechanism potential of the developing countries in the Francophonie (with Helios staff). Presentation at COP-10 in Buenos Aires. (2004)
- **Mushkegowuk Council (Ontario):** Critical review of power supply options (including transmission upgrades) for De Beers' Victor diamond mine (CEAA environmental assessment process). (2004)
- **Pemex – Refinación:** Co-facilitator with Jay Ogilvy and Napier Collyns of Global Business Network of a strategic planning scenario workshop for the company's management. (2004)
- **Nuclear Waste Management Organization:** Expert participant in interdisciplinary scenarios team for long-term management of high-level reactor waste in Canada. (2003)
- **Energy Foundation:** Proposed eligibility criteria for hydropower in the New York State Renewables Portfolio Standard. (2003)
- **Low Impact Hydropower Institute:** Principal consultant for pilot project to develop an international green standard for small-scale hydropower, funded by North American Fund for Environmental Cooperation. (2002-03)
- **Commission for Environmental Cooperation:** Expert reviewer for *Environmental Challenges and Opportunities of the Evolving Continental Electricity Market*. (2002)
- **Pimicimak Cree Nation:** Research on hydropower mitigation costs and operations reviews. (2002)
- **Hydro-Québec-Recouvrement/ARC/CACQ/FACEF :** Review of low-income customer assistance programs in U.S. (2001)

- **International Rivers Network:** Commissioned book-length study:
Restructured Rivers: Hydropower in the Era of Competitive Markets. (2001)
- **Low Impact Stakeholders Alliance (Ontario):** Options paper on environmental rating of electricity; consultations on certification of hydroelectric facilities for green power market. (2000-01)
- **Innu Nation (Labrador):** Overview of Quebec and U.S. energy policy issues. (2000)
- **Grand Council of the Crees (of Quebec) :** Orientations for a Cree Energy Policy (2009)

Drafting project justification section of *Draft Directives for the Preparation of the Impact Statement for the Eastmain-1A and Rupert Diversion Project* (for COMEV, the tripartite Evaluating Committee under the JBNQA). (2003)

Expert testimony before U.S. Court of Appeal (D.C. Circuit) on role of exports in Hydro-Québec planning; technical analysis for FERC consultation on Regional Transmission Organizations and for the World Commission on Dams. (1999)

Assistance in preparation of technical affidavits submitted to the Federal Energy Regulatory Commission concerning the application by Hydro-Québec U.S. Inc. for energy marketer status. (1997)
- **HéliMax Inc. :** Report on the Implications of the Kyoto Protocol for Renewable Energy Projects in Developing Countries (1999)
- **World Bank:** Critical review of French translation of *Environmental Assessment Sourcebook*, chapter on economic analysis of projects and policies. (1999)
- **Option consommateurs :** Study on traditional and incentive ratemaking approaches in electricity regulation (1998)

Study on electricity market restructuring options and rate impacts. (1997)
- **Standing Committee on the Economy and Labour, National Assembly of Quebec:**

Analysis of Hydro-Québec's Strategic Plan 2000-2004. (2000)

Analysis of Hydro-Québec's Strategic Plan in relation to the Committee's June 1997 recommendations; drafting of questions. (1998)

Expert assistance in oversight hearings concerning Hydro-Québec, especially with respect to market restructuring and energy efficiency, including drafting introductory texts, seminars with committee members, drafting report. (1997)

- **Rivers Canada** : Preliminary study on the implications of the restructuring of electricity markets in North America for the preservation of Canada's rivers. (1997)
- **Quebec Forestries Industries Association**: Workshop on electricity market restructuring and competition, and their impacts on Quebec electricity rates, energy efficiency and biomass generation. (1997)
- **Averyt and Associates (for Green Mountain Power)** : Report on Native issues in the context of Quebec energy policy. (1996)
- **Ad hoc working group of American and Canadian environmental groups** : Design of legislative mechanisms to reduce the environmental impacts of electricity restructuring. (1996)

1995- **Independent energy analyst**

Environnement Jeunesse (1996-97)

Representative at the *Commission of inquiry into Hydro-Québec's purchase policy for private producers*.

Université de Montréal (1995)

Coordination of a lecture series on *Energy and Resources at the Dawn of the 21st Century*. Lectures by David Freeman (then CEO of New York Power Authority), Allen Kupcis (CEO of Ontario Hydro) and Victoria Yegorova (Donetsk Research Institute, Ukraine).

Government of Québec: Natural Resources Department (1995)

Study on approach used for the regulation of energy in British Columbia and on the interest of this model for Quebec, published for the Quebec Public Debate on Energy.

Government of Canada: Environment Department (1995)

Quebec chapter of a study on the treatment of externalities (social costing methodologies) in Canada, under subcontract from Passmore Associates.

Grand Council of the Crees (of Québec) (1995-)

Expert assistance on costs and benefits of different generating technologies, alternative solutions, and methodologies for taking externalities into account in competitive energy markets.

1992-95 **Deputy Scientific Coordinator**
Great Whale Public Review Support Office

- Member of the support staff for the committees and commissions responsible for the assessment of the Great Whale project.
- Responsible for analyses concerning project justification.
- Drafting of preparatory documents and preliminary versions of reports; selection and oversight of consultants.
- Co-author, with James Litchfield and Roy Hemmingway, of a study on integrated resource planning and its application to the project.
- Editor of study on mitigation measures at the La Grande hydroelectric complex.
- Assisted in editing and publishing of 9 other studies on issues related to the project (mercury, dam safety, traditional ecological knowledge, etc.)
- Involved in designing, planning and carrying out all aspects of the public review process.

1987-92 **Freelance science journalist**

- Articles on energy, science and medicine in *Science*, *The New Scientist*, *The Medical Post* and other specialized publications.

ÉDUCATION

1976 M. Music (performance), Boston University

1974 B.A., *cum laude*, in philosophy, Yale University. Minor in biological sciences.

LANGUAGES

- **English, French and Spanish** (written and spoken fluently)
- **German and Italian** (limited comprehension)

CONFERENCE PRESENTATIONS

Rencontre expert sur les surplus d'électricité. Commission sur les enjeux énergétiques du Québec. Montréal, le 21 octobre 2013.

Greenhouse gas emissions and hydropower. 13th Annual Waterkeeper Alliance Conference, Northwestern University, Evanston, Illinois, June 24, 2011.

Invited testimony, Senate Standing Committee on Energy, the Environment and Natural Resources. February 2011.

La filière hydrolienne : Une introduction. AQPER Colloque — Québec: Carrefour des énergies renouvelables octobre 2009.

L'avenir énergétique au Québec et ailleurs : structures institutionnelles et les nouvelles technologies d'énergie verte. Réseau des ingénieurs du Québec, Congrès annuel des ingénieurs, 25 novembre 2008.

Tarification sur la base des coûts, ou des coûts d'opportunité ? Réplique au Groupe de travail sur la tarification des services publics (Groupe Montmarquette), Forum québécois sur l'électricité, 14 mai 2008.

La filière de l'hydraulienne fluviale : un premier regard sur les coûts, Ocean Renewable Energy Group, Spring Symposium, Canada's Ocean Energy Future: New Partnerships and Wider Opportunities, Québec, 21 avril 2008 (à venir).

Les coûts de l'Entente Alcan: un deuxième regard, Conférence sur le développement durable dans l'industrie de l'aluminium (Céddi-AL), Baie-Comeau, Québec, September 20, 2007.

The Restructuring of North American Energy Markets, Seminario regional de OLADE sobre el futuro de los mercados energéticos en Latinoamérica y el Caribe, Buenos Aires, March 8, 2007.

Des monopoles aux marchés concurrentiels : Implications environnementales de la restructuration des marchés, 3e conférence internationale sur la mise à niveau environnementale : Entreprise et économie d'eau et d'énergie, CITET, Tunis, le 8 décembre 2006.

Technologies émergentes de production d'électricité, AQPER Colloque sur l'énergie éolienne ... et autres énergies vertes 30 octobre 2006.

politiques européennes sur les énergies renouvelables, l', 9 juin 2006.

L'application conjointe : un outil méconnu mais prometteur, Les énergies traditionnelles, les énergies nouvelles, les énergies de demain », November 4, 2005.

La sécurité énergétique et les sources alternatives de production d'énergie : oui mais à quel prix ? », (Montreal, April 18, 2005).

« Le MDP dans la Francophonie: Fiches d'information sur le potentiel et les opportunités dans les pays de la Francophonie », présentation aux représentants de la Francophonie en marge de 10^e Conférence des parties de la Convention sur le climat (Buenos Aires, December 2004).

"Toward an International Green Standard for Small-Scale Hydropower, ," World Renewable Energy Conference, Denver, Colorado (September 2, 2004).

“The Role of Hydropower in Green Power Markets,” Ontario Green Power Trade Show, (Toronto, Oct. 2002)

“Creating Value by Working with NGOs,” HydroVision (Portland, Oregon, August 2002)

“Quebec Energy Policy,” Environmental Law McGill Forum on James Bay and Sustainable Development (Montreal, March 2002)

“Approaches to Green Power Certification,” Ontario Green Power Trade Show, (Toronto, Nov. 2001)

Guest Lecturer, Hydropower and Sustainable Energy Policy, Yale School of Forestry and Environmental Sciences, FES 850b (Energy Policy and Environmental Protection, 2001-02)

North American Commission for Environmental Cooperation, Symposium on Understanding the Linkages between Trade and the Environment (discussant). (Washington, D.C., October 2000)

Harvard Electricity Policy Group, Special Session: Retail and Wholesale Transmission Markets: Can They Be Unified? Defining the Issues and the Ramifications (Invited participant) (Washington, D.C., March 19, 1999)

Ontario Low Impact Stakeholders’ Alliance, Public Workshop, *Environmental Ranking of Hydropower Facilities in Canada*. (Toronto, May 2000)

Canadian Association of Members of Public Utility Tribunals, annual meeting. Lecture on the implications of electricity deregulation for the environment. (1997, *Whistler, B.C.*)

National Forum on Markets, Regulation and the Future for Canadian Energy Utilities. Talk on IRP in a competitive market. (1995, *Whistler, B.C.*)

Quebec Public Debate on Energy : presentations on the application of integrated resource planning in the Quebec context and on resource portfolio analysis. (1995, *Montreal*)

COMMITTEES, BOARDS AND AWARDS

2015 Finalist, R.J. Templin Award (CanWEA)

2010- Choeur de chambre Tactus, Board of Directors (Chair)

1999- Low Impact Hydropower Institute, Renewable Markets Advisory Panel (Chair 2003-)

1997- Helios Centre, Board of Directors (Vice President)

- 2009-10 Ecologo Advisory Committee, Renewable Low-Impact Electricity
- 2008 Expert Review Panel, National Centres for Excellence, Centres of Excellence for Commercialization and Research (CECR).
- 2007-08 Comité d'Experts francophones, Stratégies nationales de développement durable des pays africaines, Délégation au développement durable de la France.
- 2005 Conseil de la science et de la technologie du Québec, Groupe de travail sur les défis en énergie.
- 2004-05 Quebec Climate Change Action Centre, Advisory Committee
- 2003-04 National Roundtable for Energy and the Environment, Ecological Fiscal Reform and Energy Program, Advisory Committee on Energy Efficiency
- 1995-98 Working Group on Methodology, Focalisation, Evaluation and Scope of Environmental Impact Assessment (NATO *Committee on Challenges to Modern Society*)
- 1995-97 Environnement Jeunesse, Board of Directors

PUBLICATIONS

■ ACADEMIC AND TECHNICAL PRESS

- P. Raphals and R. Hendriks, Towards a Sustainable Low-Carbon Electric System: Challenges and Opportunities, in Potvin, C., et al. (eds.), *Acting on Climate Change: Extending the Dialogue Among Canadians*, UNESCO-McGill Chair for Dialogues on Sustainability, 2015 (in press).
- P. Raphals and R. Hendriks, Vers un système électrique sobre en carbone et durable : défis et opportunités, in Potvin, C., et al. (eds.), *Agir sur les changements climatiques : vers un dialogue élargi à la société civile canadienne*, UNESCO-McGill Chair for Dialogues on Sustainability, 2015 (in press).
- P. Dunskey and P. Raphals, Challenges for Effective Competition in Large Hydro-Dominated Markets — The Case of Québec, in Zaccour, Georges (ed.), *Deregulation of Electric Utilities*, (Boston : Kluwer Academic Publishers), 1998
- P. Dunskey and P. Raphals, « Pour une fiabilité énergétique accrue — Quelques leçons à tirer de la récente tempête de verglas », in *L'Énergie au Québec : Quels sont nos choix?* (Montréal : ÉcoSociété, 1998), pp. 85-98.

- P. Raphals and P. Dunsky, *Ouverture des marchés de l'électricité au Québec — Modèles, impératifs d'une réelle concurrence et implications pour les prix globaux, Option consommateurs*, October 1997
- M.A. Bouchard and P. Raphals, *Mécanismes et méthodologies d'évaluation d'impacts dans le cadre de la restructuration du marché de l'électricité*, Association québécoise pour l'évaluation des impacts, June 1997

■ TESTIMONY

- Commentaires sur le dossier tarifaire 2016-17 d'Hydro-Québec Distribution, Régie de l'énergie du Québec, témoignage pour le RNCREQ, Régie de l'énergie du Québec, R-3933-2015, 10 novembre 2015.
- Costs and benefits of delaying the construction and commissioning of the Site C Hydroelectric Project, submitted to the Supreme Court of British Columbia in support of a judicial review petition and injunction application of the Prophet River and West Moberly First Nations, July 7, 2015.
- Comments on the Amended 2013 General Rate Application of Newfoundland Labrador Hydro, submitted to the Public Utilities Board of Newfoundland and Labrador on behalf of the Innu Nation, June 23, 2015.
- Bénéfices potentiels des compteurs « intelligents » pour répondre aux besoins en puissance, Régie de l'énergie du Québec, R-3864-2013, Plan d'approvisionnement d'Hydro-Québec Distribution, pour le RNCREQ, 21 mai 2014.
- Comments on the 2013 General Rate Application of Newfoundland Labrador Hydro, submitted to the Public Utilities Board of Newfoundland and Labrador on behalf of the Innu Nation, April 28, 2014
- Response to BC Hydro Rebuttal Evidence, submitted to the Joint Review Panel for the Site C Hydroelectric Project on behalf of the Treaty 8 Tribal Association, January 18, 2014
- Need for, Purpose of and Alternatives to the Site C Hydroelectric Project, submitted to the Joint Review Panel for the Site C Hydroelectric Project on behalf of the Treaty 8 Tribal Association, November 25, 2013.
- Conformity of the Maritime Link Compliance Filing with the NSUARB Condition Concerning Market-Priced Energy, submitted to the Nova Scotia Utility And Review Board on behalf of the Low Power Rates Alliance, November 7, 2013.
- Comments on the Proposed Maritime Link Project, submitted to the Nova Scotia Utility and Review Board on behalf of the Canadian Wind Energy Association (CanWEA), April 17, 2013.

- Comments on the Justification for the Lower Churchill Transmission Project (Labrador-Island Transmission Link), submitted to the Canadian Environmental Assessment Agency — Comprehensive Study on the Lower Churchill Transmission Project and to the Government of Newfoundland and Labrador, Department of Environment and Conservation, on behalf of Grand Riverkeeper Labrador Inc., June 12, 2012.
- Demande d'approbation du Projet de Lecture à Distance, Phase I d'Hydro-Québec Distribution, Régie de l'énergie du Québec, R-3770-2011, *Mémoire* du RNCREQ (with Christian Martel), December 6, 2012.
- Testimony before the Public Utilities Board of Newfoundland Labrador on the Muskrat Falls Reference, February 23, 2012.
- Affidavit before the Federal Court of Canada concerning the judicial review of the Joint Panel Report on the Lower Churchill Generation Project (Court File No. T-2060-11), February 1, 2012.
- Comments on the Justification for the Lower Churchill Generation Project, submitted to the Joint Review Panel for the Lower Churchill Generation Project, on behalf of Grand Riverkeeper Labrador Inc., February 28, 2011.
- La politique d'ajouts : L'application du concept de neutralité tarifaire à la Charge Locale (Témoignage expert pour UC, ACEFO, FCEI, UMQ et ACEFQ), Régie de l'énergie du Québec, R-3738-2010, 15 novembre 2010.
- La modification des Tarifs et conditions de TransÉnergie en fonction de l'Ordonnance 890, Régie de l'énergie du Québec, R-3669-08 phase 2 (témoignage expert pour le RNCREQ et UC), 15 juin 2009 ; v. rév. 23 sept. 2010.
- La proposition du Transporteur concernant les Services de compensation des écarts de livraison et de réception, Régie de l'énergie du Québec, R-3669-08 phase 2 (témoignage expert pour le RNCREQ et UC), 19 juin 2009 ; v. rév. 23 sept. 2010.
- Les coûts évités d'Hydro-Québec Distribution, Régie de l'énergie du Québec, R-3708-09 (témoignage expert pour le RNCREQ), 3 novembre 2009.
- La tarification des Services de compensation des écarts de livraison et de réception, Régie de l'énergie du Québec, Régie de l'énergie du Québec, R-3669-08 (témoignage expert pour le RNCREQ), 4 novembre 2008.
- The Fixed Charge in Hydro-Québec Distribution's Domestic Rates, Régie de l'énergie du Québec, R-3677-08 (pour le RNCREQ), 28 octobre 2008.
- L'énergie éolienne, l'équilibrage et la demande à la pointe, dans le contexte du contrat patrimonial, Régie de l'énergie du Québec, R-3648-07 (témoignage expert pour le ROÉÉ et le RNCREQ), 28 mars 2008.
- Reforming the rate structure to better reflect marginal costs : Comments on Hydro-Québec Distribution's 2008 Rate Proposal (Testimony of Jim Lazar, in

- collaboration with Philip Raphals), Régie de l'énergie du Québec, R-3644-07, October 30, 2007.
- P. Raphals, Allocation of transmission costs in Hydro-Québec Distribution's 2008 rate filing, Régie de l'énergie du Québec, R-3644-07, October 30, 2007.
- Commentaires sur la demande tarifaire 2008 d'Hydro-Québec TransÉnergie, Régie de l'énergie du Québec, témoignage expert pour le RNCREQ, Régie de l'énergie du Québec, R-3640-07, 15 octobre 2007 (en anglais).
- Commentaires sur l'entente cadre 2006 entre Hydro-Québec Distribution et Hydro-Québec Production, Régie de l'énergie du Québec, R-3622-06, April 18, 2007.
- TransÉnergie's *Tarifs et conditions*: comments concerning rates, discounts, interconnection costs and generation imbalance service, Régie de l'énergie du Québec, R-3549 phase 2, Expert testimony, October 18, 2005.
- Implications pour Hydro-Québec Distribution de l'ajout des parcs éoliens en Gaspésie, Régie de l'énergie du Québec, R-3550-04, témoignage expert, May 25, 2005.
- Témoignage expert sur la demande tarifaire 2005 de TransÉnergie, Régie de l'énergie du Québec, R-3549-04, 22 décembre 2004.
- La contribution du projet Suroît à la sécurité des approvisionnements en électricité d'Hydro-Québec Production, Régie de l'énergie du Québec, R-3526-04, 22 avril 2004.
- Proposition pour un critère non monétaire relié au développement durable, Régie de l'énergie du Québec, du Québec, Régie de l'énergie du Québec, R-3525-04, 12 août 2004.
- Les coûts évités d'Hydro-Québec Distribution, Régie de l'énergie du Québec, R-3519-03, témoignage expert, 15 mars 2004.
- Le tarif BT et l'Entente concernant son alimentation, Régie de l'énergie du Québec, R-3492-02, phase 2, pour la Fédération des commissions scolaires du Québec, 22 octobre 2003.
- Concernant la demande d'approbation des dispositions tarifaires applicables à une option d'électricité interruptible, Régie de l'énergie du Québec, R-3518-03, 21 novembre 2003.
- On Hydro-Québec's Energy Efficiency Plan 2003-2006, Régie de l'énergie du Québec, R-3473-01, February 5, 2003 (expert testimony, with Tim Woolf).
- Rapport d'expert concernant les tarifs de court terme de TransÉnergie, Régie de l'énergie du Québec, R-3493-02, 13 septembre 2002.

- La sécurité des approvisionnements patrimoniaux dans le cadre du Plan d'approvisionnement, Régie de l'énergie du Québec, R-3470-01, phase 2, témoignage expert, April 23, 2002.
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Professional cellist

Choral singing (amateur)