

MH/AMC I - 1

Reference:

Section 1.1, page 2

Question:

- a) Please provide a copy of your retainer letter. Please also provide any instructions you received with respect to your retainer.
- b) Please advise which areas raised in your evidence were identified by you and which were identified by the Assembly of Manitoba Chiefs.

Response:

- a) There is no retainer letter between Mr. Raphals and AMC. AMC requested the assistance of the Helios Centre to review the evidence in this proceeding and to provide an expert opinion regarding energy poverty on First Nation Reserves in Manitoba, and the impact that this rate application will have on energy poverty on Reserve.
- b) Mr. Raphals identified the issues that would be raised in his evidence. Mr. Raphals was already familiar with the issues raised by AMC in the 2017 GRA and was aware that those same issues needed to be addressed in the present application.

MH/AMC I - 2

Reference:

Section 2, pages 3-14

Question:

- a) Please identify the name and qualifications of each person who worked on the findings contained in the report, including identifying previous projects or proceedings in which the individual participated in related to the topic and his/her role in the project or proceeding.
- b) Please provide a list of public reports or evidence provided or prepared by each of these individuals relevant to the findings raised in the report.

Response:

- a) Mr. Raphals worked on the report and its findings. His curriculum vitae is attached as Appendix A.
- b) Please see Mr. Raphals' curriculum vitae, which lists his publications, reports, articles and instances in which he has provided testimony. We would be pleased to request any relevant documents from Mr. Raphals.

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Reference:

Section 3, page 15

Preamble:

As per Appendix 10 (Updated), revenue for the Residential on Reserve class and Diesel Residential class are \$47 million and \$0.7 million respectively or approximately 3% of total Domestic Revenue of \$1,699 million at approved rates.

Question:

Please provide the calculation which supports the statement on page 15 that the FNOR rate class accounts for just 0.08% of total domestic revenue.

Response:

The following response was provided by Mr. Raphals:

The figure of 0.08% was drawn from Manitoba Hydro's response to AMC's IRs. See AMC/MH I-3b:

b) The \$1,400,000 in revenue from the Residential On-Reserve class equates to 0.08% of total domestic revenue.¹

However, I would note that the \$1,400,000 in revenue referred to in the response represents the anticipated additional revenues from the Residential On-Reserve class that MH would expect to receive if the 3.5% rate increase were approved.

For clarity, the last sentence of my report should be amended to read:

This result is not surprising, given that the proposed rate increase for the FNOR rate class accounts for just 0.08% of total domestic revenue.²

¹ Note 32 of my report incorrectly referenced this response as AMC/MH I-2b.

² AMC/MH I-3b.

APPENDIX A



“Energy research for a sustainable future”

Philip Raphals

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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:

- s **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:
 - s 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);
 - s the framework agreement between HQ-Production and HQ-Distribution (R-3622-06),

- s the need for a balancing contract for wind energy (R-3550-04 and R-3648-07),
- s 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),
- s Hydro-Québec's energy efficiency plan and avoided costs (R-3473, R-3519 and R-3708-09),
- s sustainable development criteria (R-3525-04), and
- s acquisition of power from small hydro developers (R-3410).
- s **Commission of Inquiry Respecting the Muskrat Falls Project:**
 - s Testimony with respect to project justification and water management
- s **Newfoundland and Labrador Public Utilities Board:**
 - s Expert testimony on behalf of Labrador Interconnected Group, NL Hydro, 2017 General Rate Application and related matters (2017-)
 - s Expert testimony on behalf of Innu Nation, NL Hydro, Amended General Rate Application 2013 (2014-2015)
 - s Expert testimony on behalf of Grand Riverkeeper, Muskrat Falls Inquiry (2012)
- s **Manitoba Public Utilities Board:**
 - s Expert testimony on behalf of Assembly of Manitoba Chiefs, Manitoba Hydro General Rate Application 2017/18 and 2018/19, before the Manitoba Public Utilities Board (2017 -)
- s **British Columbia Utilities Commission:**
 - s Expert testimony on behalf of the BC Sustainable Energy Association and Sierra Club BC, Fortis BC Rate Design Proposal, before the BC Utilities Commission (2018)
 - s Submissions on behalf of the University of British Columbia Program on Water Governance, Site C Inquiry (2017)
- s **University of British Columbia — Program on Water Governance:**
 - s Reassessing the Need for the Site C Hydroelectric Project (2017)
- * **Small hydro producers:**
 - s Expert litigation support in confidential arbitration proceedings with respect to avoided costs (2016 – 2017)

- * **NEB Modernization Expert Panel:**
 - * Critical review of the NEB's role in electricity regulation and energy information on behalf of the Front commun pour la transition énergétique (2017)
- * **Peace Valley Landholders' Association:** Expert affidavit in injunction proceeding (2016)
- * **Treaty 8 Tribal Association:**
 - * Expert 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)
- * **Grand Riverkeeper Labrador :** 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)
- * **Technocentre éolien – Étude sur l'énergie éolienne et les exportations d'électricité (2014)**
- * **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)
- * **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
 - β Survol des technologies d'énergie renouvelable et technologies d'appoint (2007)
 - β 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 Collins 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

- s Member of the support staff for the committees and commissions responsible for the assessment of the Great Whale project.
- s Responsible for analyses concerning project justification.
- s Drafting of preparatory documents and preliminary versions of reports; selection and oversight of consultants.

- s Co-author, with James Litchfield and Roy Hemmingway, of a study on integrated resource planning and its application to the project.
- s Editor of study on mitigation measures at the La Grande hydroelectric complex.
- s Assisted in editing and publishing of 9 other studies on issues related to the project (mercury, dam safety, traditional ecological knowledge, etc.)
- s Involved in designing, planning and carrying out all aspects of the public review process.

1987-92 **Freelance science journalist**

- s 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

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

CONFERENCE PRESENTATIONS

Integrated Resource Planning and the Site C Project: Implications for Newfoundland and Labrador, Muskrat Falls Public Symposium, Labrador Institute, Happy Valley – Goose Bay, Labrador, Thursday, February 22, 2018.

Present Value Analysis of the Site C Hydroelectric Project. Presentation to British Columbia Utilities Commission, Site C Inquiry, Technical Session, October 14, 2017.

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 future 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 énergie 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 and Secretary)

- 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

- Hendriks, R., Raphals, P., Bakker, K. and Christie, G. (2017) First Nations and Hydropower: The Case of British Columbia's Site C Dam Project, Items (SSRC) (items.ssrc.org).
- Christie, G., Hendriks, R., Raphals, P. and K. Bakker (2017) Site C: It's not too late to hit pause. *Policy Options*, April 19, 2017.
- Hendriks, R., Raphals, P. and K. Bakker (2017) Reassessing the Need for Site C. Program on Water Governance, University of British Columbia: Vancouver.
- 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. Dunsky 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. Dunsky 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

- Raphals, P. (1^{er} novembre 2018). Analyse du Programme proposé sur l'Usage cryptographique appliqué aux chaînes de blocs, on behalf of RNCREQ, dossier R-4045-2018 de la Régie de l'énergie.
- Cormier, P. et Raphals, P. (22 août 2018). Programme GDP Affaires, on behalf of RNCREQ, dossier R-4041-2018 de la Régie de l'énergie.
- Raphals, P. (July 2018). Moratoria Applied to Cryptocurrency Loads in Low-Cost Jurisdictions, on behalf of the Labrador Interconnected Group, regarding an application by NLH for temporary service in Labrador West, before the Newfoundland and Labrador Public Utilities Board.
- Raphals, P. (July 2018). Evidence on the Fortis BC Rate Design Proposal, on behalf of the BC Sustainable Energy Association and Sierra Club BC, before the British Columbia Utilities Commission.
- Cormier, P. and Raphals, P. (22 août 2018). Programme GDP Affaires : Rapport d'analyse externe, on behalf of the RNCREQ, dossier R-4041-2018 de la Régie de l'énergie.
- Raphals, P. (December 2017). Commentaires sur le dossier tarifaire 2017-2018 d'Hydro-Québec Distribution : Stratégie tarifaire et Mesurage net, on behalf of the RNCREQ, dossier R-4011-2017 de la Régie de l'énergie.
- Raphals, P. (December 2017). Comments on the 2017 General Rate Application of Newfoundland Labrador Hydro, on behalf of the Labrador Interconnected Group.
- Raphals, P. (October 2017). Implications of Manitoba Hydro's General Rate Application, on behalf of the Assembly of Manitoba Chiefs.
- Raphals, P. and Hendriks, R. (October 2017). An Updated Present Value Cost Analysis of the Site C Project, submitted to the BCUC Site C Inquiry on behalf of the

University of British Columbia Program on Water Governance.

Raphals, P. and Hendriks, R. (August 2017). Submission to the British Columbia Utilities Commission regarding the Site C Hydroelectric Project, on behalf of the University of British Columbia Program on Water Governance.

Les achats de court terme d'Hydro-Québec Distribution, rapport d'analyse externe préparé pour le RNCREQ dans le cadre du dossier R-3986-2016 de la Régie de l'énergie du Québec, sur le Plan d'approvisionnement 2017-2026 d'HQ Distribution, 4 avril 2017.

Avis de la Régie de l'énergie sur les mesures susceptibles d'améliorer les pratiques tarifaires dans le domaine de l'électricité et du gaz naturel, Rapport d'analyse externe pour le RNCREQ, dossier R-3972-2016 de la Régie de l'énergie, 18 janvier 2017.

Costs and benefits to ratepayers of delaying the construction and commissioning of the Site C Hydroelectric Project, expert testimony submitted to the Supreme Court of British Columbia in reply to an injunction proceeding, February 11, 2016.

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, expert testimony 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, expert testimony 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, expert testimony 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, expert testimony 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, expert testimony 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, expert testimony 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.
- Expert 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.
- Testimony Concerning Hydro-Québec's Revised Application For The Modification Of Rates For The Transmission Of Electric Power, Quebec Energy Board Régie de l'énergie du Québec, R-3401-98, February 7, 2001 (expert testimony with Peter A. Bradford and Ellis O. Disher).
- Critical Review of the Reliability Assessment Prepared for the Régie de l'énergie du Québec, Régie de l'énergie du Québec, R-3416-98, June 7, 2000 (with Robert McCullough).
- General Regulatory Principles Concerning the Choice of Test Year and the Identification and Treatment of Non-Regulated Activities, Régie de l'énergie du Québec, R-3405-98, April 9, 1999 (expert testimony with Peter A. Bradford).
- L'attribution d'une quote-part à la filière de la petite production hydroélectrique : Principes, méthodes et considérations, Régie de l'énergie du Québec, R-3410-98, March 26, 1999 (with Philippe Dunsky).
- Affidavit concerning the role of exports in Hydro-Québec's planning, U.S. Court of Appeals for the District of Columbia Circuit, Docket 98-1280, January 22, 1999.
- La sécurité des approvisionnements en énergie au Québec, Régie de l'énergie du Québec, R-3416-98, October 26, 1998.
- Analyse de la Proposition d'Hydro-Québec concernant les modalités d'établissement et d'implantation des tarifs de fourniture, Régie de l'énergie du Québec, témoignage expert, R-3398-98, May 5, 1998.

■ REPORTS AND STUDIES

- P. Raphals and R. Hendriks. 2017. The NEB's Role in Electricity Regulation and Energy Information: A Critical Review, submitted to the NEB Modernization Expert Panel on behalf of the Front commun pour la transition énergétique, March 31, 2017.
- P. Raphals, en association avec La Capra Associates. 2014. L'énergie éolienne et les exportations d'électricité du Québec (pour le Technocentre éolien).
- P. Raphals. 2012. *L'impact de l'énergie éolienne sur les tarifs d'Hydro-Québec Distribution*, pour Canadian Wind Energy Association (CanWEA), 2012.
- P. Raphals et al. 2008. La filière de l'hydrolienne fluviale : Étude de marché en Amérique du nord (pour SPG Hydro inc.), septembre 2008.

- P. Raphals. 2008. La filière de l'hydraulique fluviale : un premier regard sur les coûts, (pour le Service d'actions entrepreneuriales Manicouagan), 7 avril 2008.
- P. Raphals, M. Tampier, N. Muszynski, R. Michaud, S. Favre et J. Vianou. 2007. Potentiel des énergies renouvelables en Haïti: Survol des technologies d'énergie renouvelable et technologies d'appoint (pour Hydro-Québec), 31 décembre 2007.
- P. Raphals, N. Muszynski, R. Michaud, J. Vianou et S. Favre. 2007. Potentiel des énergies renouvelables en Haïti: Options pour l'intégration des énergies renouvelables dans le réseau de Jacmel (pour Hydro-Québec), 31 décembre 2007.
- P. Raphals. 2007. Les coûts de l'Entente Alcan: un deuxième regard, prepared for the CLD Manicouagan, September 21, 2007, 34 pp.
- P. Raphals. 2007. Commentaires sur les prix disponibles sur les marchés d'exportation d'Hydro-Québec Production, prepared for the Association québécoise des consommateurs industriels d'électricité.
- P. Raphals. 2006. Comments on the Justification of the Eastmain-1-A / Rupert Diversion Project, prepared for the Cree Nations of Nemaska, Waskaganish and Chisasibi, 49 pp.
- P. Raphals, S. Krohn and M. Tampier. 2006. Technologies permettant de réduire l'utilisation du diesel dans les territoires des réseaux autonomes d'Hydro-Québec, Prepared for Hydro-Québec, Direction Régionale – Réseaux Autonomes et Planification du réseau. (Montréal: Centre Hélios), 158 pp.
- P. Raphals. 2005. Projet Eastmain-1-A / dérivation Rupert : Rapport sur la conformité de l'étude d'impact (volet justification). Prepared for the Federal Review Panel, 40 pp.
- P. Raphals. 2005. The Role of Hydropower in a Carbon-Constrained Energy Future for Canada : Briefing paper for the National Roundtable on the Environment and the Economy, 39 pp.
- P. Raphals and P. Bradford. 2005. The Evolution of Competitive Energy Markets in North America, for OLADE (Latin American Energy Organization), 115 pp.
- P. Raphals. 2004. L'hydroélectricité et les marchés d'énergie verte. *Cahiers de l'énergie*, vol. 1, no. 4. (Centre Hélios), 14 pp.
- P. Raphals. 2004. Seeding Green Power: Community Pilot Project To Develop an International Green Standard For Small-Scale Hydropower (Final Report), for Low Impact Hydropower Institute, 47 pp.
- P. Raphals. 2002. Comments Concerning Discussion Draft ECP-79, Guideline On Renewable Low-Impact Electricity (Environment Canada Environmental Choice Program (Ecologo), 14 pp.

- P. Raphals. 2001. *Restructured Rivers : Hydropower in the Era of Competitive Markets* (Berkeley: International Rivers Network), 115 pp.
- P. Raphals. 2001. *Balisage — Services aux ménages à faible revenu* (Montréal : Centre Hélios), for Hydro-Québec-Recouvrement/ARC/CACQ/FACEF, 29 pp.
- P. Raphals. 2000. *Options for Environmental Rating of Electricity* (Montréal: Centre Hélios), for Ontario Low Impact Stakeholders' Alliance, 14 pp.
- P. Raphals. 2000. *Overview of Energy Policy Issues Relevant to the Proposed Churchill River Complex*, (Montréal : Centre Hélios), 103 pp.
- P. Dunsky and P. Raphals. 2000. *Analyse critique du Plan stratégique 2000-2004 de la société Hydro-Québec* (Montréal : Centre Hélios), 63 pp.
- P. Raphals. 1999. *Implications of the Kyoto Protocol for Renewable Energy Projects In Developing Countries : Initial Considerations* (Montréal: Centre Hélios), 21 pp. (for Hélimax Énergie inc.).
- P. Dunsky and P. Raphals. 1998. *La réglementation des tarifs d'électricité — Discussion des approches traditionnelle et incitatives et de leurs effets sur l'efficacité énergétique* (Montréal : Centre Hélios), 42 pp.
- P. Raphals and P. Dunsky. 1998. *Les chiffres derrière le Plan — Analyse des éléments quantitatifs du Plan stratégique 1998-2002 d'Hydro-Québec* (Montréal : Centre Hélios), 47 pp.
- P. Dunsky and P. Raphals. 1998. *Plan stratégique 1998-2002 d'Hydro-Québec — Comparaison avec les principales recommandations de la Commission de l'économie et du travail*, for the Standing Committee on the Economy and Labour (Montréal : Centre Hélios, January 1998), 21 pp.
- P. Raphals and P. Dunsky. 1997. *Commentaires sur le projet de Règlement sur la procédure de la Régie de l'énergie* (Montréal : Centre Hélios, December 1997), 22 pp.
- P. Raphals. 1997. *Competitive Electric Power Markets : Implications for New Hydroelectric Development in Canada*, for Rivers Canada, November 18, 1997. 18 pp.
- P. Raphals and P. Dunsky. 1997. *Ouverture des marché de l'électricité au Québec – Options, impératifs d'une réelle concurrence et conséquences pour les prix*. (Montréal : Options Consommateurs). October 1997, 86 pp.
- P. Dunsky and P. Raphals. 1997. *Challenges for Effective Competition in Large-Hydro Dominated Markets : The Case of Québec*. Presented to International Workshop on Deregulation of Electric Utilities, Sept. 10, 1997. 16 pp.
- P. Dunsky and P. Raphals. 1997. « Concilier l'inconciliable », *Le Devoir (page des Idées)*, July 7, 1997, A-8.

- P. Dunsky and P. Raphals. 1997. *L'efficacité énergétique*, pour la Commission de l'économie et du travail de l'Assemblée nationale du Québec, (Montréal : Centre Hélios, March 1997), 28 pp.
- P. Raphals. 1997. *La restructuration des marchés de l'électricité*, pour la Commission de l'économie et du travail de l'Assemblée nationale du Québec, (Montréal : Centre Hélios, March 1997), 41 pp.
- P. Raphals. 1996. *Mémoire d'Environnement Jeunesse présenté à la Commission d'enquête sur la politique d'achat par Hydro-Québec d'électricité auprès de producteurs privés* (January 30, 1996), 90 pp. plus appendices.
- P. Raphals and P. Dunsky. 1996. *La réglementation de l'énergie au Québec : Commentaires sur le projet de loi sur la Régie de l'énergie* (Montréal : Centre Hélios, 1996), 52 pp.
- P. Raphals and P. Dunsky. 1996. *Propositions du Centre Hélios concernant l'avant-projet de loi sur la Régie de l'énergie* (Montréal : Centre Hélios, 1996), 13 pp.
- P. Dunsky and P. Raphals. 1996. *Quelques réflexions au sujet des dispositions de la future Régie de l'énergie du Québec* (Montréal : Centre Hélios, 1996), 21 pp.
- P. Dunsky and P. Raphals. 1996. *Avis au Ministre d'État des Ressources naturelles concernant la proposition tarifaire 1996 d'Hydro-Québec* (Montréal : Centre Hélios, 1996), 15 pp.
- P. Raphals. 1995. "Effectiveness of Environmental Assessment in Canada: Acceptability and Optimality Paradigms," in NATO/CCMS Pilot Study on Methodology, Focalisation, Evaluation and Scope of Environmental Impact Assessment, Report on Eighth Workshop, Kusadasi (Turquie), April 26-30, 1995, pp. 1-9.
- P. Raphals. 1995. *Energy in Québec : planning and regulation*. Brief submitted to the Quebec Public Debate on Energy, 67 pp. (also published in French)
- P. Raphals. 1995. *Energy in British Colombia: Integrated resource planning and regulation*, Report prepared for the Quebec Natural Resources Department, 98 pp. (also published in French)
- P. Raphals. 1995. "Evaluation of the Public Participation Process in Environmental Impact Assessment (Canada)," in NATO/CCMS Pilot Study on Methodology, Focalisation, Evaluation and Scope of Environmental Impact Assessment, troisième rapport, July 1995, pp. 21-31.
- P. Raphals. 1995. *Economic aspects of hydroelectricity in Quebec: Costs and risks*. Prepared for the Grand Council of the Crees (of Québec). 34pp. (also published in French)

J. Litchfield, L. Hemmingway, and P. Raphals. 1994. *Integrated resources planning and the Great Whale Public Review*. Background paper no. 7, Great Whale Public Review Support Office, 115 pp. (also published in French)

■ ARTICLES

- P. Raphals. 2005. "Le boom de l'éolien au Québec," *L'Annuaire du Québec 2006*, pp. 230-235.
- P. Raphals. 2000. "Comprehensive Review on Dams Urges Consultation," *Energy Analects*, November 27, 2000.
- P. Raphals. 2000. "Power Industry Changes Spur Debate at Conference," *Energy Analects*, June 26, 2000.
- P. Raphals. 2000. "Energy Policy Shift Providing Advantages To Hydro-Quebec," *Energy Analects*, May 29, 2000.
- P. Raphals. 2000. "Power from the people" (analysis of Quebec Bill 116), *The Montreal Gazette*, May 24, 2000.
- P. Dunsky and P. Raphals. 1998. « L'après-tempête de verglas — Pour minimiser les risques à l'avenir », *Le Devoir*, page des Idées, January 1998.
- P. Dunsky and P. Raphals. 1998. « L'après-tempête de verglas — Les énergies 'dispersées' ne demandent qu'à servir », *Le Devoir*, page des Idées, January 1998.
- P. Dunsky and P. Raphals. 1998. « L'après-tempête de verglas — L'efficacité énergétique a bien meilleur coût », *Le Devoir*, page des Idées, January 1998.
- P. Dunsky and P. Raphals. 1997. « Énergie au Québec — Concilier l'inconciliable », *Le Devoir*, page des idées, July 7, 1997.
- P. Raphals. 1996. Review of *L'électricité est-elle à risque?* by André Beauchamp, *L'ENJEU*, 1996, vol. 16, no. 4, p. 8.
- P. Raphals. 1994. "Integrated resource planning," in *Perspectives*, vol. 6, no. 3, janvier-février 1994, pp. 30-39. (also published in French)
- P. Raphals. 1992. "The Hidden Cost of Canada's Cheap Power," *New Scientist*, vol. 133, no. 1808, February 15, 1992, pp. 50-54.

OTHER ACTIVITIES

Professional cellist

Voces Boreales (a cappella choir)