



Philip Raphals

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PROFESSIONAL EXPERIENCE

1996- HELIOS Centre (Director since 2003)

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.

- ***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)
- ***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 (team including Peter Bradford and Scott Hempling). Project includes an in-depth review of the impact on restructuring on electricity and natural gas consumers in the U.S. and Canada, guidance and oversight of case studies of electricity restructuring experience in Argentina, Chile, Peru and the Dominican Republic, and the development of policy guidelines to regulate energy markets in the public interest in Latin America and the Caribbean. (2003 -)
- ***Fédération des commissions scolaires du Québec:*** Testimony concerning Hydro-Québec's BT tariff. (2003)
- ***Nuclear Waste Management Organization:*** Expert participant in interdisciplinary scenarios team for long-term management of high-level reactor waste in Canada. (2003)
- ***Regroupement national des Conseils régionaux de l'environnement du Québec (Quebec Association of Regional***

Environmental Councils): Expert testimony before the Quebec Energy Board (Régie de l'énergie) in hearings concerning Hydro-Québec's energy efficiency plan (R-3473, jointly with Tim Woolf), resource plan (R-3470, with respect to security of supply), interruptible tariffs (R-3518) and its transmission tariff (R-3401, jointly with Peter Bradford and Ellis O. Disher), supply tariff (R-3398, jointly with Peter Bradford) as well as concerning acquisition of power from small hydro developers (R-3410, jointly with Philippe Dunsky). (1998 -)

- **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) :** Drafting for 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.
- 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.

EDUCATION

- 1976 M. M., Boston University
- 1974 B.A., *cum laude*, in philosophy, Yale University. Minor in biological sciences.

LANGUAGES

- **English, French and Spanish** (written and spoken fluently)
Familiarity with **German**

CONFERENCES

- “Toward an international green standard for small-scale hydropower,” Green Power in Canada workshop series (Pollution Probe, Summerhill Group), (Montreal, North American Commission for Environmental Cooperation, Nov. 4, 2003).
- “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)

- σ North American Commission for Environmental Cooperation, Symposium on Understanding the Linkages between Trade and the Environment (discussant). (Washington, D.C., October 2000)
- σ Ontario Low Impact Stakeholders' Alliance, Public Workshop, *Environmental Ranking of Hydropower Facilities in Canada*. (Toronto, May 2000)
- σ Canadian Association of Members of Public Utility Tribunals, annual meeting. Lecture on the implications of electricity deregulation for the environment. (1997, *Whistler, B.C.*)
- σ National Forum on Markets, Regulation and the Future for Canadian Energy Utilities. Talk on IRP in a competitive market. (1995, *Whistler, B.C.*)
- σ 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 AND BOARDS

- 1999- Renewable Advisory Panel, Low Impact Hydropower Institute (Chair as of 2003)
- 1997- Board of Directors (Vice President, Secretary as of 2003), Helios Centre
- 1995-98 Working Group on Methodology, Focalisation, Evaluation and Scope of Environmental Impact Assessment (NATO *Committee on Challenges to Modern Society*)
- 1995-97 Board of Directors, Environnement Jeunesse

PUBLICATIONS

■ ACADEMIC AND TECHNICAL 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

■ EXPERT TESTIMONY

- Les coûts évités d'Hydro-Québec Distribution, R-3519-03, 15 mars 2004.
- Le tarif BT et l'Entente concernant son alimentation, 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, R-3518-03, 21 novembre 2003.
- On Hydro-Québec's Energy Efficiency Plan 2003-2006, R-3473-01, February 5, 2003 (with Tim Woolf).
- Rapport d'expert concernant les tarifs de court terme de TransÉnergie, R-3493-02, 13 septembre 2002.
- La sécurité des approvisionnements patrimoniaux dans le cadre du Plan d'approvisionnement, R-3470-01, phase 2, April 23, 2002.
- Testimony Concerning Hydro-Québec's Revised Application For The Modification Of Rates For The Transmission Of Electric Power, Quebec Energy Board R-3401-98, February 7, 2001 (with Peter A. Bradford and Ellis O. Disher).
- Critical Review of the Reliability Assessment Prepared for the Régie de l'énergie, Quebec Energy Board, 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, Quebec Energy Board R-3405-98, April 9, 1999 (with Peter A. Bradford).
- L'attribution d'une quote-part à la filière de la petite production hydroélectrique : Principes, méthodes et considérations, Quebec Energy Board 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, Quebec Energy Board 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, Quebec Energy Board, R-3398-98, May 5, 1998.

■ REPORTS AND STUDIES

- 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. 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.