

PHILIP RAPHALS – CURRICULUM VITAE

PROFESSIONAL EXPERIENCE

2018-Present: Founder and Chief Innovation Officer, NovoPower International Inc., dedicated to developing thermoelectric solutions for industrial waste heat.

1996-Present: Co-founder and Executive Director (since 2004) of [Helios Centre](http://centrehelios.org), an independent, non-profit research organization dedicated to the analysis of energy policies and the design of strategies and regulatory policies for the sustainable use and development of energy resources.

EDUCATION

1976 M. Mus. (performance), Boston University

1974 B.A., cum laude with Honors (philosophy), Yale University. Minor in biological sciences.

REGULATORY TESTIMONY

Expert and analyst testimony before the Régie de l'énergie du Québec concerning Hydro-Québec's supply plan, avoided costs, transmission tariff, framework agreement, wind energy contracts, cryptocurrency, security of supply, energy efficiency, and sustainable development.

Expert testimony with respect to project justification and water management for the Commission of Inquiry Respecting the Muskrat Falls Project.

Expert testimony on behalf of Labrador Interconnected Group and Innu Nation in various proceedings before the Newfoundland and Labrador Public Utilities Board.

Expert testimony on behalf of Assembly of Manitoba Chiefs in Manitoba Hydro General Rate Application before the Manitoba Public Utilities Board.

Expert testimony on behalf of BC Sustainable Energy Association and Sierra Club BC in Fortis BC Rate Design Proposal before the BC Utilities Commission.

Expert testimony on behalf of University of British Columbia Program on Water Governance in Site C Inquiry.

PATENTS

System and method for converting waste heat from assemblages of computing equipment into electricity, WO2023073660A1 (PCT) (filed Oct. 31, 2022)

Electric power generating apparatus and method of operating same, WO20204098137A1 (PCT), filed on Nov. 2, 2023.

Pressurized-gas compressor and system comprising same, US9470110B2, granted October 18, 2016

COMMITTEES, BOARDS AND AWARDS

- 2023 Climate Solutions Breakthrough Research Award, with Concordia University
- 2022- Treasurer, Montreal Choral Institute
- 2015 Finalist, R.J. Templin Award (CanWEA)
- 1999- Low Impact Hydropower Institute, Renewable Markets Advisory Panel (Chair)
- 2008 Expert Review Panel, National Centres for Excellence, Centres of Excellence for Commercialization and Research (CECR).
- 2008 Comité d'Experts francophones, Stratégies nationales de développement durable des pays africaines, Délégation au développement durable de la France.

SELECTED PUBLICATIONS

- Orrego Caicedo, C.J., Rodrigues, L, and Raphals, P. (2023), Control system for a free-piston linear engine based on quadratic neural networks (*in press*)
- C. S. Cyusa *et al.*, "Modeling and Design of a Tubular Linear Generator for Direct-Drive Free-Piston Engine," *IECON 2021 – 47th Annual Conference of the IEEE Industrial Electronics Society*, Toronto, ON, Canada, 2021, pp. 1-6, doi: 10.1109/IECON48115.2021.9589072.
- 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.
- Stroganov, V. and Raphals, P., Pressurized-gas compressor and system comprising same, US Patent 9,470,110 B2 (granted Oct. 18, 2016).
- 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.
- 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, 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 and P. Bradford. 2005. The Evolution of Competitive Energy Markets in North America, for OLADE (Latin American Energy Organization), 115 pp.

- P. Raphals. 2004. Seeding Green Power: Community Pilot Project To Develop an International Green Standard For Small-Scale Hydropower (Final Report), for Impact Hydropower Institute, 47 pp.
- P. Raphals. 2001. Restructured Rivers : Hydropower in the Era of Competitive Markets (Berkeley: International Rivers Network), 115 pp.
- 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

MUSICAL ACTIVITIES

Professional cellist
Voces Boreales (a cappella chamber choir)
Chœur de l'Orchestre symphonique de Montréal