



CHRISTOPHER OLLSON, PH.D., QP_{RA}

Owner and
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Dr. Ollson is Owner and Senior Environmental Health Scientist at Ollson Environmental Health Management (OEHM). He has 20 years of international consulting experience in environmental health sciences and toxicology. Dr. Ollson has worked across the United States and is well versed in Federal and State environmental legislation. His Canadian experience spans from coast-to-coast-to-coast, having worked in all Provinces and Territories. Throughout his career, Chris has led some of North America's most high profile and controversial multi-disciplinary environmental health assessments.

Dr. Ollson is considered an expert in environmental health issues related to the energy sector. He has led risk assessments and provided risk communication support for wind turbine, solar, hydroelectric, energy-from-waste / waste-to-energy facilities, wind turbine projects, natural gas fired stations, oil sands environmental assessments, refineries, pipelines, and coal power plants. Dr. Ollson has conducted extensive research in potential health and environmental issues surrounding wind turbine facilities and has published numerous peer-reviewed articles and government white papers on the topic.

Chris has spent countless hours in community and stakeholder consultation on behalf of clients. Through proper risk communication they became part of the decision-making process on issues surrounding atmospheric, soil and water contaminant issues. Specific to the wind and solar sector Dr. Ollson has spent 1000s of hours in public consultation, stakeholder engagement, meetings with public health staff and local councils.

Dr. Ollson has testified at more than a dozen environmental review tribunals, commissions, hearings and court proceedings with respect to potential health concerns in living in proximity to wind turbines. With six peer-reviewed scientific journal articles, numerous invited conference presentations and invited university lectures he is considered one of the foremost experts in North America on renewable energy health issues. In recognition of these accomplishments he was the co-recipient of the 2015 Canadian Wind Energy Association R.J. Templin Award. The R.J. Templin Award recognizes an individual or organization that has undertaken scientific, technical, engineering or policy research and development work that has produced results that have served to significantly advance the wind energy industry in Canada.

In addition to his consulting practice, Dr. Ollson maintains an active research program through his Adjunct Assistant Professor appointment at the University of Toronto Scarborough. He teaches graduate level courses in Environmental Risk Assessment and has co-supervised a number of graduate students and Post-Doctoral Fellows. Dr. Ollson's primary research interests are in potential health issues related to the renewable energy sector, waste-to-energy sector and the emerging field of Health Impact Assessment of major projects.

EDUCATION

2003	Ph.D., Environmental Science (Specialization in Risk Assessment), Royal Military College of Canada
2000	M.Sc., Environmental Science, Royal Military College of Canada
1995	B.Sc., (Honours), Biology, Queen's University.
QP_{RA}	Qualified Person for Risk Assessment as defined by the Environmental Protection Act of Ontario (Brownfields Legislation)

AREAS OF SCIENTIFIC EXPERTISE

- Health Impact Assessment
- Environmental Health
- Air Quality Assessment
- Human Health Risk Assessment
- Major Infrastructure Health Assessment
- Energy Sector

EMPLOYMENT HISTORY

2015 – Present	Ollson Environmental Health Management Senior Environmental Health Scientist
2011-2015	Intrinsic Environmental Sciences Inc. Mississauga, Ontario Vice President, Strategic Development Senior Environmental Health Scientist
2002 – 2011	Stantec Consulting Ltd (formerly Jacques Whitford Limited) Practice Leader, Environmental Health Sciences
1997 - 2002	Royal Military College of Canada, Environmental Sciences Group (ESG) Senior Environmental Scientist / Risk Assessor
1990 – 2002	Naval Reserves, Department of National Defence Maritime Surface (MARS) Officer, Lt(N) Ret'd

PROFESSIONAL AFFILIATIONS

- Full Member of the International Association for Impact Assessment (IAIA)
- Full Member of the Society of Practitioners of Health Impact Assessment (SOPHIA)

ACADEMIC EXPERIENCE

- 2013 – PRESENT** **University of Toronto Scarborough, Department of Physical and Environmental Sciences**
Adjunct Professor
- 2011 – PRESENT** **University of Toronto, School of the Environment**
Graduate Course Lecturer
- 2013 - 2016** **University of Toronto Scarborough, Member Campus Governing Council, Vice-Chair of the Academic Affairs Committee**
- 2009-2011** **University of Toronto, Scarborough**
Adjunct Lecturer, Physical & Environmental Sciences,
- 2004 - PRESENT** **Royal Military College of Canada**
Adjunct Assistant Professor

AWARDS

Co-recipient of the 2015 Canadian Wind Energy Association R.J. Templin Award. *First awarded in 1985, the R.J. Templin Award recognizes an individual or organization that has undertaken scientific, technical, engineering or policy research and development work that has produced results that have served to significantly advance the wind energy industry in Canada.*

Wind Turbine Peer Reviewed Scientific Publications

Primary Research

Berger, R.G., Ashtiani, P., **Ollson, C.A.**, Whitfield Aslund, M. McCallum, L.C., Leventhall, G. and Knopper, L.D. 2015 Health-based audible noise guidelines account for infrasound and low-frequency noise produced by wind turbines. *Front. Public Health* 3:31. Citations: 8

McCallum, L., Whitfield Aslund, M., Knopper, L.D., Ferguson, G.M. and **Ollson, C.A.** 2014. An investigation of wind energy and health: quantifying electromagnetic fields around wind turbines in Canada. *Environmental Health* 2014, 13:9. Citations: 7

Whitfield Aslund, M.L., **Ollson, C.A.**, Knopper, L.D. 2013. Projected contributions of future wind farm development to community noise and annoyance levels in Ontario, Canada. *Energy Policy* 62, 44-50. Citations: 4

Systematic Literature Reviews

Knopper, L.D., **Ollson, C.A.**, McCallum, L.C., Aslund, M.L., Berger, R.G, Souweine, K., and McDaniel, M. 2014. Wind turbines and Human Health. *Front. Public Health*, 19 June 2014. Citations: 22

Knopper, L.D. and **Ollson, C.A.** 2011. Health Effects and Wind Turbines: A Review of the Literature. *Environmental Health*. 10:78. Open Access. Highly Accessed. Citations: 86

Published Critique

Ollson, C.A., Knopper L.D. McCallum, L.C., Aslund-Whitfield, M.L. 2013. Are the findings of 'Effects of industrial wind turbine noise on sleep and health' supported? *Noise & Health* 15:63, 148-150. Citations: 5

Hearings, Tribunals and Court Proceedings on Wind Turbines and Associated Transmission Lines

In the following proceedings I testified and formally qualified as an expert in wind turbines and human health

Rivard & Bourque v. Éoliennes de l'Érable S.E.C. Superior Court of Québec. Case No. 415-06-000002-128. (March 2019)

Diana's Great Idea, LLC, et. al. v. Crazy Mounty Wind, LLC et. al. Cause No. Dv 18-161 Montana Sixth Judicial District Court Park County (February 2019)

Ontario Environmental Review Tribunals – Appeal of Company Renewable Energy Approvals

Erickson v. MOE 2011	Suncor
Monture v. MOE [GREP] 2012;	Samsung
Moseley v. MOE 2014;	Capstone
Lambton County v. MOE 2015	Suncor
EOCA v MOE 2015	ProWind

Queen's Bench of Saskatchewan in McKinnon v. Martin (2010 – also referred to as the Red Lily case)

Alberta Utilities Commission (AUC) Proceeding No. 22563, Halkirk 2 Wind Project (November 2017)

Alberta Utilities Commission (AUC) Proceeding No. 3329, Grizzly Bear Creek Wind Project (March 2016)

Alberta Utilities Commission (AUC) Proceeding No. 1955, Bull Creek Wind Project (October 2013)

North Dakota Public Services Commission 2015

Brady Wind Energy Center	NextEra
Brady II Wind Energy Center	NextEra
Oliver III Wind Energy Center	NextEra

Clinton County Planning and Zoning Commission, MO, County Ordinance Changes (2016)

Chowan County and Perquimins County Board of Commissioners hearings for the Timbermill Wind Project (2016)

Court Proceedings Unrelated to Wind Turbine Projects

John Chart vs. Town of Parma. W.D.N.Y Civil Action No. 6:10-CV-06179, Deposed 2013.

Lockridge and Plain v. Ministry of the Environment and Suncor Energy Products Ltd., 528/10, Ontario Superior Court of Justice, Deposed 2012

Appearances before Government Bodies

North Dakota State Senate and Representative Natural Resources Committee. Study on Wind Energy Conversion Facilities. December 2017.

Indiana State Senate Energy Committee Meeting on Wind Turbine Siting. October 2017.

North Dakota State Senate Energy and Natural Resources Committee. Senate Bill 2313. Exclusion Areas for Wind Energy Conversion Facilities. February 2017.

Vermont Public Services Board. Proposed Rule on Sound from Wind Generation Facilities. December 2016.

Example Appearances before US County Planning & Zoning Commissions and County Boards

Redfield Town Board, New York, Mad River Wind Farm, 2017
Parshville Town Board, New York, North Ridge Wind Farm, 2017
Grant and Dickinson County Planning and Zoning Commissions, Iowa, Upland Prairie Wind Farm, 2017
Codington and Grant County Planning Commissions, Dakota Range Wind, South Dakota, 2017
Deuel County Zoning Board, South Dakota, Crown Ridge Wind Project, 2017
Rush County Board of Zoning Appeals, Indiana, West Forks Wind Project, 2016
Hettinger County Planning and Zoning Commission and County Commission, North Dakota, Brady II Wind Energy Center, 2016
Kingman County Planning and Zoning Commission, Kansas, Kingman Wind Energy Center, 2016
Pratt County Planning and Zoning Commission, Kansas, Ninnescah Wind Energy Center, 2016
Stark County Planning and Zoning Commission and County Commission, North Dakota, Dickinson Wind Energy Center, 2015, 2016
Stark County Planning and Zoning Commission and County Commission, North Dakota, Brady Wind Energy Center, 2015, 2016
Colfax Township Board, Dekalb County, Missouri, Osborn Wind Energy Center, 2016
Washington Township Planning Board, Dekalb County, Missouri, Osborn Wind Energy Center, 2016
Niagara County Board of Health, New York, Lightstation Wind Energy Center, 2015
El Paso Planning Commission and County Commission, Colorado, Golden West Energy Center, 2015
Stony Creek Town Commission, New York, Proposed InvEnergy project, working for the Town Commission, 2011

Wind Project Developers- Worked as Project Health Consultant of Record (Alphabetical)

- APEX, Algonquin Power, Avangrid, BluEarth, Boralex, Capital Power, Capstone, EDF, EDPR, InvEnergy, Longyung Power, NextERA, Niagara Region Wind Corporation, Northland Power, Pattern Energy, Prowind, RES, Samsung, South Canoe Wind, Sprott, Suncor, Veresen, Vermont Public Services Department, WPD

Wind Turbine Conference Proceedings

Whitfield Aslund, M.L., Berger, R.G.; Ashtiani, P.; **Ollson, C.A.**; McCallum L.C.; Leventhall, G.; Knopper, L.D. 2015. Health-based audible noise guidelines account for infrasound and low frequency noise produced by wind turbines. *Proceedings of the 6th International Conference on Wind Turbine Noise, April 2015, Glasgow, Scotland.*

Whitfield Aslund, M.L., Ollson, C.A., Knopper, L.D. 2013. 'Projected contributions of future wind farm development to community noise and annoyance levels in Ontario, Canada', submitted for publication in *Proceedings of the 5th International Conference on Wind Turbine Noise, Denver Colorado 28-30 August 2013*

Knopper, L.D., Whitfield Aslund, M.L., McCallum, L.C., Ollson, C.A. 2013. 'Wind turbine noise: What has the Science Told Us?', submitted for publication in *Proceedings of the 5th International Conference on Wind Turbine Noise, Denver Colorado 28-30 August 2013*

Conference Presentations on Wind Turbines and Health

Ollson, C.A., 2015. Effective Communication Strategies for Addressing Health Concerns. CanWEA annual conference.

Ollson, C.A. 2014. Responding to Health Concerns. CanWEA annual conference.

Ollson, C.A. 2014 Wind Turbines – Do They Cause Health Impacts? CPANs Air & Waste Management Association. Edmonton, Alberta

Ollson, C.A., McCallum, L.C., Whitfield Aslund, M.L., Knopper, L.D. 2014. Social Licence to Operate – Lessons From Canadian Wind Industry. International Association of Impact Assessment (IAIA) International Conference 2014. Chile.

Whitfield Aslund, M.L., **Ollson, C.A.**, Knopper, L.D. 2013. 'Projected contributions of future wind farm development to community noise and annoyance levels in Ontario, Canada', Wind Turbine Noise 2013, Denver, August 2013.

Ollson, C.A. ; Knopper, L.D., Whitfield Aslund, M.L., McCallum, L.C., 2013. 'Wind turbine noise: What has the Science Told Us?', Wind Turbine Noise 2013, Denver, August 2013.

Ollson, C.A., 2013 Health Effects and Renewable Energy: An Overview of the Issues. Association of Power Producers of Ontario Toronto, 2013

Ollson, C.A. and Knopper, L.D. Health Effects and Wind Turbines: A Review of the Issues. CANWEA Communications Summit , Vancouver, October, 2011

Additional Peer-Reviewed Scientific Publications

McCallum, LC, **Ollson, CA**, Stefanovic, IL. 2017. An adaptable Health Impact Assessment (HIA) framework for assessing health within Environmental Assessment (EA): Canadian Context, International Application. Impact Assessment and Project Appraisal. In Press.

McCallum, LC, **Ollson, CA**, Stefanovic, IL. 2016. Prioritizing Health: A Systematic Approach to Scoping Determinants in Health Impact Assessment. *Frontiers in Public Health*. Aug 22;4:170

McCallum, LC, **Ollson, CA**, Stefanovic, IL. 2016. Development of a Health Impact Assessment Screening Tool: A Value Versus Investment Approach. *Journal of Environmental Assessment Policy and Management* Vol. 18, No. 2

McAuley, C., Dersch, A., Kates, L. N., Sowan, D. R. and **Ollson, C. A.** 2016. Improving Risk Assessment Calculations for Traditional Foods Through Collaborative Research with First Nations Communities. *Risk Analysis*. Dec; 36(12):2195-2207

McAuley, C., Dersch, A., Kates, L. N., Sowan, D. R., Koppe, R and **Ollson, C. A.** 2016. Assessment of Exposure to Chlorinated Organics through the Ingestion of Moose Meat for a Canadian First Nation Community. *Frontiers in Environmental Science*. November 2016: Vol 4: Article 78

McCallum LC, Souweine K, McDaniel M, Koppe B, McFarland C, Butler K, **Ollson CA**. Health Impact Assessment of an oil drilling project in California. *Int J Occup Med Environ Health*. 2016;29(2):229-53.

McCallum, L.C., **Ollson, C.A.** and Stefanovic I.L. 2015. Advancing the practice of health impact assessment in Canada: obstacles and opportunities. *Environmental Impact Assessment Review*. Volume 55, November 2015, Pages 98–109

Ollson, C.A., Knopper, L.D., Whitfield Aslund, M., Jayasinghe, R. 2014. Site specific risk assessment of an energy-from-waste thermal treatment facility in Durham Region, Ontario, Canada. Part A: Human health risk assessment. *Science of the Total Environment* 466-467: 345-356.

Ollson, C.A., Knopper, L.D., Whitfield Aslund, M., Dan, T. 2014. Site specific risk assessment of an energy-from-waste/ thermal treatment facility in Durham Region, Ontario, Canada. Part B: Ecological risk assessment. *Science of the Total Environment* 466-467: 242-252.

Johnson KE, Knopper LD, Schneider DC, **Ollson CA**, Reimer KJ. 2009. Effects of local point source polychlorinated biphenyl (PCB) contamination on bone mineral density in deer mice (*Peromyscus*

- maniculatus). *Sci Total Environ.* 2009 Sep 1; 407(18):5050-5. Epub 2009 Jul 5
- Ollson, C.A.**, Koch, I., Smith, P.; Knopper, L.D., Hough, C., Reimer, K, J. 2009. Addressing arsenic bioaccessibility in ecological risk assessment: A novel approach to avoid overestimating risk. *Environmental Toxicology and Chemistry* 28(3): 668-675.
- Knopper, L.D., Smith, G.K., **Ollson, C.A.**, Stephenson, M. 2009. Use of Body Mass Scaling of Dose in Ecological Risk Assessments In *Ecotoxicological Research Developments*. Nova Publishers, pp. 23-29.
- Gregor, D., Stow, J., Kennedy, D., Reimer, K., **Ollson, C.** 2003. Local Sources of Contaminants in the Canadian Arctic. *Canadian Arctic Contaminants Assessment Report /I(CACAR /I) Physical Environment* 157-183
- Reimer, K.J., **Ollson, C.A.**, Koch, I. 2002. An Approach for Characterizing Arsenic Sources and Risks at Contaminated Sites: The Consequences of 60 Years of Gold Mining in Yellowknife, NWT, Canada. 2003. *Metals in the Environment*. American Chemical Society.
- Koch, I., Hough, C., Mousseau, S., Mir, K., Rutter, A., **Ollson, C.**, Lee, E., Andrewes, P., Granhchino, S., Cullen, B., Reimer, K. 2002. *Canadian Journal of Analytical Sciences And Spectroscopy* 47(4):109-118.
- Koch, I., **Ollson, C.A.**, Potten, J., and Reimer, K.J. 2002. Arsenic in Vegetables: An Evaluation of Risk from the Consumption of Produce from Residential and Mine Gardens in Yellowknife, Northwest Territories, Canada. I. in *Annual Reviews in Food and Nutrition: Toxic and Pathological Aspects*, Taylor & Francis, London.
- Koch, I., Wang, L., **Ollson, C.A.**, Cullen, W.R., Reimer, K. J. 2000. The Predominance of Inorganic Arsenic Species in Plants from Yellowknife, Northwest Territories, Canada. *Environmental Science and Technology* 34:22 26.
- Ollson, C. A.** 2003. *Arsenic Risk Assessments: The Importance of Bioavailability*. PhD Thesis, Royal Military College of Canada.
- Ollson, C. A.** 1999. *Arsenic Contamination of the Terrestrial and Freshwater Environment Impacted by Gold Mining Operations, Yellowknife, NWT*. M,Sc, Thesis, Royal Military College of Canada.