Lisa (Elisabeth) DeMarco
Senior Partner
Bay Adelaide Centre
333 Bay Street, Suite 625
Toronto, ON M5H 2R2
TEL +1.647.991.1190
FAX +1.888.734.9459
lisa@demarcoallan.com

June 26, 2019

Kirsten Walli
Board Secretary
Ontario Energy Board
P.O. Box 2319, 27th Floor
2300 Yonge Street
Toronto, ON M4P 1E4

Dear Ms. Walli:

Re: Toronto Hydro-Electric System Limited
Application for order or orders approving or fixing just and reasonable distribution rates and other charges, effective January 1, 2020 to December 31, 2024
Board File No. EB-2018-0165

We are counsel to the Distributed Resource Coalition (**DRC**) in the above-referenced proceeding (the **Proceeding**). DRC filed the expert evidence of Dr. Josipa Petrunic on March 20, 2019 and her curriculum vitae on February 12, 2019. Please find attached as Appendix A Dr. Petrunic's updated curriculum vitae.

DRC intends to have Dr. Petrunic qualified as an expert in electric mobility and electric mobility related energy and transportation modelling in Canada. We have qualified our time estimates for direct examination of Dr. Petrunic to allow for her expert qualification, and are in the position to decrease those time estimates if the applicant and the few parties intending to examine Dr. Petrunic accept her related qualification. We therefore ask that parties advise us if they intend to challenge Dr. Petrunic's qualification on or before June 28, 2019 so that we can prepare and proceed accordingly.

Sincerely,

Lisa (Elisabeth) DeMarco

c. Charles Keizer and Arlen Sternberg, Torys LLP
Andrew Sasso and Daliana Coban, Toronto Hydro
Distributed Resource Coalition

APPENDIX A

DR. JOSIPA G. PETRUNIĆ

TELSEC BUSINESS CENTRES
1 YONGE STREET #1801
TORONTO, ON M5E 1W7
EMAIL: JOSIPA.PETRUNIC@CUTRIC-CRITUC.ORG
PHONE: 647-981-4020

CURRENT SUMMARY

As the Executive Director & CEO of the Canadian Urban Transit Research & Innovation Consortium (CUTRIC), I lead the formulation of several national transportation technology trials related to zero-emissions and low carbon "smart" mobility, specifically related to transit and public fleet applications. Key projects include the Pan-Canadian Electric Bus Demonstration & Integration Trial (Phases I-III), the Pan-Canadian Hydrogen Fuel Cell Demonstration & Integration Trial (Phase I), and the Canadian National Smart Vehicle Demonstration & Integration Trial (Phase I). Over the past four years, I have grown CUTRIC's innovation consortium to include more than 100 private and public sector companies and organizations across Canada with an operational revenue base that has increased from $50,000 in 2015 to $1,200,000 as of 2018.

EMPLOYMENT HISTORY

Chief Executive Officer & Executive Director	**February 2015 – Present**

Canadian Urban Transit Research & Innovation Consortium (CUTRIC) / Consortium de recherche et d'innovation en transport urbain au Canada (CRITUC)

- Create, develop and launch industry-led globally relevant standardization and commercialization trials that advance innovative low carbon smart mobility technologies in Canada's transit and transportation systems based on structured consultation engagement with industry stakeholders.

Major initiatives include:

- **Pan-Canadian Electric Bus Demonstration & Integration Trial (Phase I-III)** planning commenced in 2015 with 24 months of technical consultation sessions (focus group methodology) resulting in several White Papers and consultation summary reports to transit agencies and manufacturers outlining the need for e-bus interoperability, standards development and demonstration of **high-powered charging systems for on route "plug and play" mechanisms** in a Phase I deployment with Brampton Transit, York Region Transit and TransLink totaling 18 e-buses (76-200 kWh with Nova Bus and New Flyer models) and 7 overhead chargers (450 kW ABB and Siemens models).
    - Phase II of the project (currently underway) is being developed **through structured technical consultation sessions** with additional transit agencies, including Durham Region Transit, Burlington Transit, Edmonton Transit and Toronto Transit Commissions (TTC), to focus on the delivery of higher powered charging systems (600kW) combined with larger battery capacities onboard (up to 600 kWh with Nova Bus, New Flyer and Proterra models) and energy storage integration (varying capacities based on modelling predictions).
    - Phase III of the project (development commencing Q1 2020) will focus on **automated bus technologies** reducing carbon energy inefficiencies in accelerating and decelerating the electric buses and optimizing and automating connection with the overhead chargers.
- **Pan-Canadian Hydrogen Fuel Cell Electric Bus Demonstration & Integration Trial (Phase I)** planning commenced in 2016 with 36 months of ongoing technical consultation sessions (focus group methodology) resulting a substantive report including literature review that documents global hydrogen bus deployments and the need for standardization and technical implementation of **localized hydrogen fuel (H2) production, compression, distribution, storage and fueling facilities** for fleets of a minimum of 10 fuel cell e-buses per transit agency; this Project is being led by Mississauga Transit with New Flyer fuel cell e-bus models integrating both Ballard Power Systems and Hydrogenics fuel cell stacks.
- **National Smart Vehicle Demonstration & Integration Trial (Phase I)** planning commenced in 2016 with 36 months of ongoing technical consultation sessions (focus group methodology) resulting in

substantive report including literature review that documents global smart vehicle (automated and connected electric low-speed shuttles) deployments of **first mile/last mile transit system applications** with Navya, Easymile and 2GetThere shuttles, and the need for vehicle-to-vehicle and charging systems standardization across the three.

- Ontario Public Transit Agencies (OPTA)-led **"Carbon Pricing Policies: Benefits and Challenges for the Transit Sector in Ontario" initiative** commenced in the fall of 2016 and continued into 2018 with the publication of an eponymously titled report to OPTA's provincial membership base, and also submitted to the Ontario Ministry of Transportation. The initiative included six consultation sessions with transit agencies across Ontario – including regional meetings in northern Ontario – assessing the value of carbon pricing for transit agencies and the potential benefits of carbon pricing for transit technology integration, and developing a report card for all Ontario transit agencies that scored transit on a scale of "A" to "F" for carbon intensity based on passenger-kilometers and revenue-kilometers.
- **Ontario Power Providers Working Group (PPWG) initiative**, sponsored by the Ministry of Energy (Ontario), commenced planning in September 2015 extending through 24 months of more than 12 consultation sessions and report review sessions (focus group methodologies and interview-based methodologies) with power providers, including local distribution companies (LDCs), the Independent Electricity System Operator (IESO), and Ontario Power Generation (OPG) to **assess the readiness levels of the Ontario electrical grid system in preparation for electric bus and electric vehicle integration**. That effort resulted in a final report endorsed by all participants entitled, *Ontario Power Provider's EV Working Group: Long-Term Energy Plan 2017 Feedback & Final Report*.
- Ministry of Economic Development & Growth (MEDG)'s **Light-weight, Electrified, Automated and Cybersecure Transportation Innovation in Ontario** initiative commenced in early 2016 with six consultation sessions held provincially, funded by the Ministry of Economic Development and Growth (MEDG) in Ontario, to assess the value and supply chain of light-weight, electrified, automated and cybersecure technologies for application to bus and automotive vehicles of the future. The initiative resulted in an eponymously entitled report submitted to MEDG in 2017.
- Industry Canada's **Automotive and Transportation Innovation Across Canada & Regional Transportation Needs and Capacities as Targeted Research, Development and Demonstration (RD&D) Projects** initiative commenced in 2105 with consultation sessions across Ontario, Quebec and British Columbia capturing several hundred stakeholder participants to generate an eponymously entitled report to Industry Canada in 2016, documenting all of the country's electric and alternative vehicle capacities throughout the value and supply chains in automotive, heavy-duty bus and rail, and charging infrastructure.

[Full reports available upon request]

Lead Consultant: Driver & rider preferences Related to Electric Mobility in Ontario	**May 2016 – May 2017**

Electric Vehicle (EV) Consulting Canada, funded by Toronto Atmospheric Fund

- Lead consultant designing a national and local Toronto survey of Electric Vehicle owners, riders, and drivers to assess driver preferences vis-à-vis EVs in urban settings, resulting in a major report to the Toronto Atmospheric Fund (TAF).
- The initiative resulted in a report entitled, "Driving EV Uptake in the Greater Toronto Hamilton Area submitted to both Plug'n Drive and TAF for publication as a consumer-friendly white paper. http://www.plugndrive.ca/wp-content/uploads/2017/07/EV-Survey-Report.pdf

Globalization Economics: Qualitative & Quantitative Methodologies Lecturer	**September 2014 – Present**

Masters of Global Health, McMaster University

- Design, research, and deliver course content and curriculum in the *Introduction to Globalization Economics (710)* core course at the graduate level, utilizing interdisciplinary research methodologies, including focus group and case study methodologies specific to urban and population health-economics studies.

Interdisciplinary Research Methods Expert: Qualitative & Quantitative Methodologies Lecturer	**February 2012 – Present**

Masters of Integrated Studies (MA-IS) Program, Athabasca University

- Design, research, and deliver course content and curriculum in *Interdisciplinary Research Methods (602)* at the graduate level, including focus group, interview and observational analyses as well as statistical and quantitative methods.

Executive Director	**September 2013 – February 2015**

Social Costs and Benefits of Electric Mobility in Canada, **McMaster Institute for Transportation and Logistics (MITL), McMaster University, funded by Social Scences & Humanities Research Council**

- Design, develop and launch a national series of consultation sessions with transit, automotive, taxi and other private fleets to assess electric mobility deployment and technology development possibilities in Canada.
- Produce a summary White Paper report internal to consultation participants exploring automotive versus transit requirements for electric mobility applications utilizing battery electric technologies and tools.
- Lead a research team at McMaster University in theorizing and deploying the design and collection of consumer, dealership, and transit fleet survey data related to electric mobility in Canada.

Senior Research Fellow: *Electric Vehicle Technology Roadmap for Canada* & **Project Manager, Canadian Institute for Commercialization of Electric Transportation Technologies**	**May 2013 – Present**

McMaster Automotive Resource Centre (MARC), McMaster University

- Design, develop and launch the development of a research framework assessing an *Electric Vehicle Technology Roadmap for Canada*, which was later incorporated (in part) into Electric Mobility Canada's advice and guidance to Environment & Climate Change Canada regarding future zero-emissions vehicles (ZEVs).
- Provide a full analysis of electric vehicle (heavy-duty and light-duty, transit and automotive) electric vehicle technologies in Canada to identify small to medium sized enterprises (SMEs) and manufacturers in Canada that could benefit from job growth in EV innovation, including New Flyer Industries, Nova Bus and Bombardier supply chains in Canada.
- Assess regional investments in sustainable transportation focusing on the comparative benefits of electrified transportation incentives (including rebates, subsidies, HOV lanes) for hybrid, plug in hybrid, and battery electric vehicles, fleets, and buses across Canada.
- Deliver graduate-level lectures and supervise student research.

Post-Doctoral Research Fellow, Transportation Technologies Research (historical and contemporary)	**September 2011 – April 2013**

Institute for the History and Philosophy of Science and Technology (IHPST), University of Toronto

- Engage in research, publishing and international scholarly networking activities to develop an international reputation in the area of cultures in mathematics; lead a network of global scholars in the history, philosophy, and sociology of mathematics, mathematical physics, and engineering.
- Deliver graduate-level lectures and supervise graduate student research

Head of Policy Research & Constituency Manager, Urban Issues & Transportation	October 2011 – May 2012

Alberta Legislative Assembly & Constituency Office, Edmonton-Gold Bar

- Manage community outreach related to urban mobility, transportation and liveability in Edmonton-Gold Bar with MLA Hugh MacDonald.
- Engage in policy research and guidance document development related to energy and infrastructure policies vis-à-vis Alberta's energy and transportation sectors.
- Engage the province's electricity system suppliers/utilities, the Alberta Electrical System Operator (AESO) and energy infrastructure designers/builders to assess energy expansion efforts (specifically, transmission line and distribution expansion) to assess future-proofing needs associated with a shift to low-carbon energy and fuels.

Post-Doctoral Research Fellow, Science & Technologies in Urban Industrialization	September 2009 – September 2010

Department of Science and Technology Studies, University College London (UK)

- Design, develop and publish research studies associated with industrial Britain's urban industrialization and transportation requirements from the inter-disciplinary perspectives of sociology of science, history, physics and mathematics.
- Lead the development and expansion of the sub-discipline of Sociology of Scientific Knowledge (SSK) across Great Britain building the University of Edinburgh's Strong Programme of Sociology of Scientific Knowledge (SSK).
- Deliver graduate-level lectures and supervise graduate student research.

Senior Manager & Director of Operations	September 2008 – October 2011

Prepskills Inc. 250 Merton Street, Suite 404, Toronto, ON

- Design and produce innovative technology and curriculum products focusing on science, technology, algebra, calculus, and logic for students entering the private schooling system in Canada and the USA.
- Manage and grow office staff and train instructors.
- Financially plan for new product design and commercial launch, as well as intellectual property design.
- Generate monthly sales targets, employing productivity metrics to measure quarterly outputs; design and implement marketing campaigns via telephone advertising, traditional and social media, and school visits to support those client seminars; organize and lead client seminars (with 100+ clients per seminar).

Intern Journalist	May 1998 – September 2002

The Calgary Herald (1999); The Edmonton Journal (2000); The Globe and Mail (2001); The Toronto Star (2002)

GOVERNANCE (BOARD & COMMITTEE) LEADERSHIP

Current and recent directorship and Advisory Committee roles:

1. Car of the Future: Government of Canada, Automated & Connected Vehicles Multi-Stakeholder Advisory Committee, September 2018-Present.
2. Board Director, International Women in Transportation Seminar Foundation (WTSF), 2018 – Present.
3. Advisor, International Association of Public Transport (UITP) JIVE Group on Hydrogen Fuel Cell Innovation, 2017 - Present.
4. Members, Society of Automotive Engineers (SAE) International Standards Committee, J3105 Charging Standardization Committee, 2017 – Present.

5. Board Director, InnovÉE Quebec (Innovation en Énergie Électrique), 2017 – 2018.
6. Advisor, Sidewalk Labs/Waterfront Toronto Initiative, 2018-2019.
7. Advisor, City of Vancouver, Electric Vehicle Strategy Advisory Committee, 2018.
8. Advisor, Ontario Ministry of Environment & Climate Change (MOECC) Climate Action Group led by Environment and Climate Change Minister Glen Murray, 2015-2017.
9. Advisor, Advisory Committee for Plug'n Drive, 2015 – 2016.
10. Board Director, Electric Mobility Canada (EMC), 2014 – 2015.

REFEREED PUBLICATIONS

Petrunic, J.G and Roschlau, M. (2019) Chapter 13: North America, in *A Research Agenda in Transport Policy*. Eds. John Stanley & David Hensher. Camberley, Surrey, UK.: Edward Elgar Publishing (EEP).

Petrunic, J.G. (2016) Mathematical kinds? A case study in nineteenth century symbolical algebra, in *Natural Kinds and Classification in Practice (History of Philosophy of Biology)*. Ed. Katherine Kendig. New York, NY: Routledge, pp. 186-196.

Petrunic, J.G. (2015). Democratic deficit: a case study analysis of e-voting and its implications for the Alberta Liberal Party leadership race (2011). In the Digital Nexus: *Identity, Agency and Political Engagement.* Ed. Raphael Foshay. Athabasca, AB: Athabasca University Press, pp. 2490-279.

Emadi, A., Petrunic, J.G. (2014) Chapter One: Automotive Industry and Electrification, in *Advanced Electric Drive Vehicles*. Ed. Ali Emadi. New York, NY: Taylor & Francis, pp. 1-13.

Petrunic, J.G. (2014) Advanced Automotive System, Electrification, and Policy Concerns. *Policy Papers: Automotive Policy Research Centre (APRC).* Eds. C. Yates and B. Sweeney. pp. 1-35. Available at www.socialsciences.mcmaster.ca/APRC/research [Last accessed 5 November 2014]

Petrunic, J.G. (2014) Chapter Five: Evolutionary naturalism in mathematical innovation: William Kingdon Clifford's use of Spencerian evolutionism, in *John Tyndall and Victorian Science*. Eds. Bernard Lightman, Josh Howe and Michael Reidy. London, UK: Pickering and Chatto Publishers, pp. 89-112.

Petrunic, J.G. (2013) James G. Frazer, in *Theory in Social and Cultural Anthropology: An Encyclopedia.* Vol 1. Eds. Jon McGee and Richard Warms. Thousand Oaks, CA: SAGE Publications, pp. 283-288.

Petrunic, J.G. (2011) Algebra and Algebra Education, in *Encyclopedia of Mathematics and Society*. Vol 1. Eds. Sarah J. Greenwald and Jill E. Thomley. Pasadena, CA: Salem Press, pp. 31-35.

Petrunic, J.G. (2009) Continuity and controversy: the problematic concept of continuity in William Kingdon's Clifford's account of differential calculus, 1860-1879. *Philosophia Scientiae*, 13(2), pp. 1-45.

Petrunic, J.G. (2007) "Evolutionary Mathematics: the discourse of evolution in W.K. Clifford (1860-1879)." In Amanda Caleb, ed., (*Re)creating Science in Nineteenth-Century Britain*. Cambridge Scholars Press, Cambridge: 230-250.

NON-REFEREED PUBLICATIONS

Petrunic, J.G., Jami, A., Duffy, G., Franca, A. (2018) *Oxford County Feasibility Study: EVSE Data Mapping & Analysis in Support of Oxford County's Electric Vehicle Accessibility Plan (EVAP).* Oxford County, Ontario, pp. 1-77.

Petrunic, J.G., Jami A., Duffy, G., Franca, A. (2018) *Carbon Pricing Policies: Benefits and Challenges for the Transit Sector in Ontario.* Ontario Public Transit Association (OPTA), Ontario, pp. 1-155.

Petrunic, J.G. (2016) *Ontario Power Provider's EV Working Group: LTEP 2017 Feedback & Final Report*. Canadian Urban Transit Research & Innovation Consortium (CUTRIC), Ontario, pp. 1-65.

Petrunic, J.G. (2016) *Light-weight, Electrified, Automated and Cybersecure Transportation Innovation in Ontario.* Ministry of Economic Development and Growth (MEDG), Ontario, pp. 1-71.

Petrunic, J.G. (2015) *Automotive and Transportation Innovation Across Canada & Regional Transportation Needs and Capacities as Targeted Research, Development and Demonstration (RD&D) Projects*. Industry Canada, Ottawa, pp. 1-138.

Petrunic, J.G. (2014) Policy Dialogue: Automotive Manufacturing for the Twenty-First Century. *Auto Mayors Policy Dialogue Series.* Ford Motor Company, Oakville, ON: Automotive Policy Research Centre (APRC), pp.1-5.

Petrunic, J.G. (2010) Colonial Mathematics: The Spread of Metropole Knowledge in the Nineteenth Century. Vol 23. *Proceedings of the Twenty-Fifth Annual Meeting of the Canadian Society for the History and Philosophy of Mathematics,* Montreal 2010. Ed. Antonella Cupillari. Pennsylvania: CSHPM, pp. 120-129.

Petrunic, J.G. (2009) *Quaternion engagements and terrains of knowledge (1858-1880): A comparative social history of Peter Guthrie Tait and William Kingdon Clifford's uses of quaternions*. PhD Thesis. Edinburgh, UK: University of Edinburgh, pp. 1 – 418.

Petrunic, J.G. (2009) J. W. Gibbs and the development of Vector Analysis in the late-19th century. Vol 22. Ed. *Proceedings of the Twenty-Fifth Annual Meeting of the Canadian Society for the History and Philosophy of Mathematics,* Montreal 2010. Ed. Antonella Cupillari. Pennsylvania: CSHPM, pp. 121-130.

FORTHCOMING

Petrunic, J.G. (2019, In Progress). The political appetite for electrified transport in Canada: a comparative case study of Ontario, Quebec and British Columbia's electrified transportation policies. *Canadian Public Policy*. 30 pages (7,500 words).

Petrunic, Ana Marija and Petrunic, J.G. (2019, In Progress) Enough to buy a new house: a case study analysis of remittance patterns and relationships among Croatian-Canadians (1970-1995). *Journal of Ethnography.* 32 pages (8,000 words).

Petrunic, J.G. (2019, In Progress) Cambridge mathematics in the north? The local nature of mathematical knowledge—a case study of Philip Kelland and Peter Guthrie Tait in Edinburgh 1858-1865. *Notes and Records of the Royal Society.* 20 pages (5,000 words).

RECENT AWARDS

1. Bloomberg Canada's Top 40 Under 40 Award, June 2018
2. Croatian Women of Influence Award, March 2018
3. Canada's Clean 50 Award for Advocates & ENGOs, Canada's Clean 50, September 2017
4. Professional of the Year, Croatian Canadian Chamber of Commerce, May 2016

EDUCATION

PhD Science and Technology Studies (Sociology of Scientific Knowledge), University of Edinburgh, 2009
Major awards: Commonwealth Scholarship, Archives Henri Poincare fellowship

MSc Science and Technology Studies (Sociology of Scientific Knowledge), University of Edinburgh, 2004
Major awards: Commonwealth Scholarship, Sir James Lougheed Award of Distinction

MSc Political Theory, London School of Economics and Political Science, 2003
Major awards: Sir James Lougheed Graduate Award of Distinction, Ontario Graduate Scholarship

BJ Political Science and Journalism, Carleton University, 2002
Major awards: Chancellor's scholarship award (full tuition), Dean's List 1997-2002, Senate Medal for Outstanding Academic Achievement**,** Hume Wrong Scholarship in Political Science (2002), John Bird Memorial Scholarship for Political Science (2002), Canadian Association of Journalism National Student Award (2002), Ottawa Citizen Scholarship in Journalism (2002), Pollara Research Prize for Advanced Quantitative Analysis (2001)

LANGUAGES

English (fluent), Croatian (advanced), French (advanced), Italian (intermediate), German (beginner)