

# Sean Smillie, P.Eng., Ph.D.

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## **ENERGY AND ENVIRONMENTAL ECONOMICS, INC.**

Vancouver, BC

*Managing Consultant*

Dr. Sean Smillie focuses on developing efficient and technically sound energy policy at the intersection of the natural gas and electric systems. He supports E3's future of gas projects by assessing the opportunities and challenges associated with low carbon gases and building electrification as well as their impacts on the natural gas system. Dr. Smillie applies this expertise for model development within E3's suite of building electrification tools. He also draws on his professional background and academic research in assessing gas and electric interdependencies on the bulk system and their reliability implications.

Select E3 projects include:

**BC Ministry of Energy, Mines, and Low Carbon Innovation (EMLI), Pathways and Integrated Utilities Modelling (2023-2024).** Served as E3's Technical Lead, completing load forecasting for gas and electric utilities under scenarios compliant with British Columbia's climate goals compliant scenarios. Integrated load forecasts into broader analysis, working with the government and alongside BC utilities, examining how the province's decarbonization targets might impact both gas and electric utilities through 2050.

**Confidential Midwest Utility, Scope 3 Emissions Planning (2023).** Developed a spreadsheet-based tool to estimate the electric loads caused by heat pump adoption. E3 applied these findings to advise an integrated gas/electric utility on avenues for decreasing scope 3 emissions.

**Due Diligence for Gas Pipeline Transaction (2024).** Provided transaction and diligence support for a pipeline transaction for a US pipeline serving states with aggressive climate goals.

**National Resources Defense Council, Non-Pipes Alternatives (NPA) and Targeted Electrification Analysis (2024).** Calculated the potential for cost savings from NPA projects. Identified how the cost savings from avoiding pipeline expenditures might cover electrification costs in California.

## **CARNEGIE MELLON ELECTRICITY INDUSTRY CENTER**

Pittsburgh, PA

*PhD Researcher*

2019 – 2023

- Evaluated the cost-effectiveness of hybrid fossil fuel and heat pump residential heating systems to decarbonize building heat using an energy systems model. Assessed the implications to both the electric and natural gas systems
- Identified the 10% of US natural gas transmission compressor stations dependent on the electric grid. Demonstrated how this interdependency produces single-cause failures greater than any considered in electric reliability planning. Published in *The Electricity Journal*
- Analyzed the change in greenhouse gas estimates of liquefied natural gas export projects due to indirect economic effects, finding an 80% difference from prior methods. Published in *Environmental Science & Technology*

- Presented results to senior regulators and industry stakeholders at the National Association of Regulatory Utility Commissioners (NARUC) Annual Conference, the North American Electric Reliability Corporation (NERC) Gas-Electric Working Group, and the Carnegie Mellon Electricity Industry Center Annual Meeting

**UNIVERSITY OF BRITISH COLUMBIA**

Vancouver, BC

*MSc Researcher*

2017 – 2019

- Quantified the technical and economic potential for low-carbon electricity generation from Canadian natural gas compressor station waste heat
- Offered follow-up contract work by three waste heat development companies

**UNIVERSITY OF BRITISH COLUMBIA**

Vancouver, BC

*Sustainability Scholar*

Summer 2018

- Worked with BC Hydro to evaluate the reliability impacts and electricity savings of high heat pump penetration on a small electric grid, leading to revised energy efficiency program strategies

**TRANSCANADA PIPELINES**

Calgary, AB

*Mechanical Engineer*

January 2015 – January 2017

- Responsible for mechanical design of facility projects, including engineering and construction contractor oversight and preparing engineering documents for regulatory review.
- Implemented new research findings on high gas velocities while collaborating with stakeholders from five departments, resulting in \$15 million of avoided facility costs.

*Project Engineer*

September 2012 – January 2015

- Led pipeline construction projects with budgets up to \$80 million from preliminary stages to successful completion, including managing contractors, leading 15+ person weekly team meetings, and submitting project applications for regulatory review.
- Reformed construction scheduling and contractor manpower tracking systems for regulated Canadian pipeline projects (\$200-\$500 million annually), vastly improving internal data-driven evaluations of multimillion-dollar contract claims.

**Education**

Carnegie Mellon University

Pittsburgh, PA

*Ph.D., Engineering and Public Policy*

August 2023

*Fulbright Scholarship*

2019 – 2022

University of British Columbia

Vancouver, BC

*M.Sc., Resources, Environment and Sustainability*

June 2019

University of Alberta

Edmonton, AB

*B.Sc., Mechanical Engineering*

April 2012

## Certifications

Professional Engineer (P.Eng.), Engineers and Geoscientists of British Columbia, #59750

## Publications

Smillie, S., Muller, N., Griffin, W. M., & Apt, J. (2022). Greenhouse Gas Estimates of LNG Exports Must Include Global Market Effects. *Environmental Science & Technology*, 56(2), 1194–1201.

<https://doi.org/10.1021/acs.est.1c04753>

Smillie, S., Morgan, M. G., & Apt, J. (2023). How vulnerable are US natural gas pipelines to electric outages? *The Electricity Journal*, 36(2), 107251. <https://doi.org/10.1016/j.tej.2023.107251>