



CUTRIC · CRITUC

Academic Institution Initiatives (2024 - 2025) Engagement and Membership Value

SUMMARY REPORT

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List of acronyms

CUTRIC	Canadian Urban Transit Research and Innovation Consortium
IP	Intellectual property
R&D	Research and development
RDD&I	Research, development, demonstration and integration



1. Introduction

This report has been prepared to document the *National Academic Strategy* of the Canadian Urban Transit Research & Innovation Consortium (CUTRIC). It provides a comprehensive overview of the *Strategy*, detailing its key components, the presentation to members, feedback received and the subsequent refinements and execution plans.

The exercise of crafting and presenting this *Strategy* aims to deliver significant value to CUTRIC's academic members, ensuring their needs and insights are incorporated. The *Strategy* is designed to align with the needs of the urban transit industry. This dual alignment helps ensure that CUTRIC's activities are on the right track while balancing academic interests with industry demands, as the *Strategy* is refined and executed. By engaging in this iterative process of feedback and refinement, CUTRIC strives to enhance the effectiveness of the *National Academic Strategy* and ensure its successful implementation.

1.1. CUTRIC's vision and mission

CUTRIC is Canada's non-profit leader supporting the design, development and commercialization of advanced technologies in transit through industry-led collaborative research, development, demonstration and integration (RDD&I) projects. With a consortium of over 140 organizations in transportation innovation, including industry and software companies, consultancy and construction, utilities, transit agencies and operators, government, academia and non-profit sectors, CUTRIC fosters a vibrant ecosystem for technological advancements in urban transit.

CUTRIC's vision is to establish Canada as a global leader in low-carbon smart mobility technology innovation across both light-duty and heavy-duty platforms. This encompasses advanced transit, transportation and integrated mobility applications. The organization remains steadfast in its mission to support the commercialization of these technologies through collaborative RDD&I projects, ensuring that innovative designs contribute to Canada's low-carbon smart mobility ecosystem. Over the past nine years, CUTRIC has maintained a consistent focus on zero-emissions technologies, autonomous vehicle technologies and big data reinforcing Canada's leadership in these critical areas.

To achieve its vision, CUTRIC operates within five specific pillars of innovation: zero- and low-emissions propulsion technologies, smart vehicles and smart infrastructure, big data for mobility analytics, cybersecurity in advanced mobility applications and zero-emission and cybersecure rail. By concentrating efforts within these pillars, CUTRIC ensures a focused and impactful approach, identifying and supporting academic research teams dedicated to transit applications. This targeted *Strategy* not only addresses current industry needs but also prepares the academic community to contribute effectively to future technological advancements in public transit and mobility.



1.2. CUTRIC's *National Academic Strategy*

The *National Academic Strategy* presented in this report represents CUTRIC's response to feedback from our academic members on enhancing membership value. The *Strategy* is focused on convening and actively engaging industry partners, transit agencies and every academic research team in Canada performing work within CUTRIC's pillars of innovation.

CUTRIC's commitment to a national perspective ensures that collaborations and partnerships are not confined to provincial boundaries but instead drive new research and innovation nationwide.

Although the *Strategy* outlines activities for 2024 and 2025, the benefits are expected to extend until 2028.

The following sections outline the key elements comprising the *National Academic Strategy*.

1.2.1. Academic sessions

A series of academic sessions have been scheduled throughout the year. The first set of sessions include consultations with Canada's national academic community on what activities are needed to foster collaboration within the transit industry. These consultations are expected to identify the specific projects between industry and academic collaborators that could be developed further or showcased immediately.

The next set of sessions will focus on showcasing the work of academic members to other CUTRIC members and partners, such as manufacturers, transit agencies, utility companies and representatives from the federal and provincial governments.

These academic sessions are intended to demonstrate to Canada's three federal research agencies – namely, the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Social Sciences and Humanities Research Council of Canada (SSHRC), commonly referred to as the Tri-Council – that there is a cohort of transit-related research, development and innovation active in Canada that needs to be further invested in.

This regular collaboration will enable us to present and group the community's work within specific themes of research. Consequently, these themes will inform and empower CUTRIC to collectively advocate for research funding.

1.2.2. Electric bus maintenance training programs

Transit agencies in Canada are seeking an organized and coordinated effort to facilitate workforce development and provide support for training and internships for electric bus maintenance and operations. This element in the *Strategy* seeks to advance the existing training programs offered by academic members and support the development of new training programs to address the current needs of transit agencies in various stages of their transit electrification journey.



1.2.3. Return to transit initiatives and funding

In 2022, CUTRIC consulted members and stakeholders to formulate a series of recommendations to the federal government on how to best build a low-carbon, innovative, resilient transit system for Canadians. This set of recommendations was published as CUTRIC's [Five Point Plan](#).

In light of the latest advancements in urban transit technologies, the diverse experiences of CUTRIC's members and insights gained from past projects and initiatives, CUTRIC has reopened discussions on these topics to create an updated set of recommendations to government in a soon-to-be-released, *CUTRIC's Six Point Plan*. One of the main points in the new *Plan* is to advocate for the creation of large research funding envelopes to encourage and support post-pandemic transit innovation. CUTRIC will convene academic members to ensure alignment across universities and colleges, particularly when communicating with all levels of government. The creation of consistent key messages will serve as a guide to CUTRIC as we investigate new sources of funding for transit projects.

1.2.4. Online directory of academic researchers and key projects

CUTRIC will create an online directory of academic and research capabilities in Canada to foster greater collaboration between academic institutions and industry. This resource will provide CUTRIC's members, specifically transit agencies, manufacturers and industry suppliers with insights into the specialized work conducted by each academic institution along with details about researchers for outreach or potential hiring. The directory will be curated by CUTRIC to ensure that the information presented aligns with transit electrification and urban transit innovations needs. This directory aims to streamline the process for CUTRIC's members, simplifying the identification of academic institutions and/or researchers aiming to address specific industry requirements.

1.2.5. Transit Innovation Day

The aforementioned activities will culminate in a Transit Innovation Day in the last quarter of 2025 showcasing next-generation products and solutions for transit. A formalized pitch competition will also be organized to facilitate academic team presentations and engagement opportunities with industry partners.



2. Methodology

The methodology for developing the *National Academic Strategy* involved gathering feedback from academic members while leveraging CUTRIC's expertise and resource capabilities to formulate a list of key initiatives to engage members and provide value.

The *Strategy* was also reviewed and edited by an academic board member and approved by CUTRIC's Board of Directors.

On May 22, 2024, the *Strategy* was presented to CUTRIC's broader academic community. Feedback from academic members was obtained and will be used to further refine the *Strategy* prior to execution.

Initial consultation sessions will be inclusive of all academic institution representatives. The subsequent consultations sessions will focus on specific objectives and elements of the overall *Strategy*, and will be exclusive to CUTRIC member participants. Outcomes of each session will be summarized in a report that documents participating organizations. The full set of session reports will be shared with participants.

3. Consultation Sessions

3.1. Initial Session

3.1.1. Session overview and objectives

This session served as the launch event of the CUTRIC *National Academic Strategy*. An overview of the scope of the *Strategy* was presented and participants engaged in a brief discussion on each scope element.

The objective of this session was to determine both interest level and relevance of the *Strategy* to each academic institution. Feedback gathered from this session will be used to refine the *Strategy* and prioritize related activities based on expected benefits and value to universities and colleges.

3.1.2. Session date and participants

Session Title: 2024-2028 *National Academic Strategy* Kick-off

Date & Time: May 22, 2024, 3:00 - 4:00 p.m. EDT

Meeting Platform: Zoom (virtual)

Participating Organizations: Brock University, Centennial College, Carleton University, McMaster University, Mohawk College, Red River College Polytechnic, University of Alberta, University of British Columbia-Okanagan, University of Calgary, University of Windsor, York University



3.1.3. Session outcomes

3.1.3.1. **Question 1: What about CUTRIC's National Academic Strategy is appealing to your organization?**

- **Program listings and training replication**

Institution-specific electrification and hydrogen training programs should be shared in a national directory. The Directory could serve as an efficient mechanism for matching industry members' needs with researchers in the zero emissions, autonomous and data-driven public transit space.

Colleges and universities with training programs focused on zero emissions public transit vehicles, operations or management training should share curriculum knowledge and templates to help the efficient replication of programming across the country.

Supporting institutions: *Centennial College, Mohawk College, RRC Polytech*

- **Collaboration and partnership opportunities**

Universities and colleges may need CUTRIC's leadership in fostering collaboration and partnerships with the transit industry. These collaborations normally involve industry project investments at a university or college and result in mutually beneficial outcomes.

Information about existing short- or long-term partnerships in this industry should be shared with other institutions so that colleges and universities lacking partnerships with the transit industry could potentially identify symbiotic collaboration opportunities.

Supporting institutions: *Brock University, McMaster University, Simon Fraser University, University of Alberta, University of Calgary, University of Windsor, York University*

- **Funding needs**

CUTRIC could or should advocate for funding in a "Return to Transit" or allied transit-focused type of national programming.

Other funding sources for universities and colleges have been exhausted and no transit-specific fund exists.

A fund similar to the coordinated Zero Emission Transit Fund (ZETF) but for transit-related research in general could be an ideal model to follow.

Most academics will not have the time to perform the related activities that CUTRIC can deliver on for advocacy.



Supporting institutions: *Centennial College, RRC Polytech, Simon Fraser University, University of Calgary, York University*

- **Focus on sustainability and technology**

CUTRIC's specific pillars of innovation, namely zero- and low-emissions propulsion technologies, smart vehicles and smart infrastructure could form the basis for targeted and efficient federal or provincial funding programs that align with current industry needs in transit.

Supporting institutions: *Mohawk College, Simon Fraser University, University of Calgary*

3.1.3.2. Question 2: Do you have a research team or project team ready to go in the next 3 to 6 months?

- **Active research projects and readiness of research teams**

Several national ongoing research projects already exist focused on cybersecurity, hydrogen, battery technologies, driver safety, passenger experience and big data, but they are not connected with one another. Some of these projects include ongoing collaborations with industry partners such as New Flyer and the Toronto Transit Commission (TTC).

Several institutions noted that they have teams ready to start projects within three to six months. Some teams already have students or researchers actively working on related projects.

Supporting institutions: *McMaster University, University of Calgary, University of Windsor, York University*

- **Potential readiness of research teams**

Previous projects that have closed produced highly qualified personnel (HQP), many of whom are still at participating institutions. These qualified personnel could be re-recruited easily for new projects with little ramp up time depending on specific topics and deliverables.

Supporting institutions: *Brock University, Simon Fraser University, University of Alberta*

3.1.3.3. Question 3: What other value can CUTRIC bring to you in addition to what was presented?

- **Showcasing academic projects funded by CUTRIC members**

CUTRIC can provide much needed increased visibility of existing academic projects.



CUTRIC can leverage its reach to also promote the work academic institutions have successfully completed for similar organizations in the transit space.

- **Educational and training opportunities**

There is a need to establish dedicated scholarships, internships, standardized public transportation courses and undergraduate exposure to transit projects was noted. Additional funding may be required for these initiatives.

CUTRIC could assist in helping to identify the gaps where research may be needed, creating additional opportunities in non-technical training such as in planning, deployment and operations to assist operational advancements in transit technologies.

- **Networking and industry engagement**

There is academic interest in national pitch sessions, networking events for students and researchers and a national directory for like-minded engagement connections.

A Transit Innovation Day should serve to showcase existing work of academic institutions and also to inform universities and colleges of industry needs.

- **Innovation and project support**

CUTRIC should support the development of specific projects in first-kilometre/last-kilometre solutions, ride-sharing integration and facilitating ongoing engagement opportunities to explore new ideas was also noted.

3.1.3.4. Summary

CUTRIC's academic institution members and allied colleges and universities recognize their pivotal role in advancing sustainable energy and transportation technologies. They are committed to exploring all available avenues to promote and advance their work.

A comprehensive online directory is a key element noted in the *Strategy* that academic institutions are ready to support immediately. Nationally, there are several active projects that are ready to begin if funding were available, while others could be mobilized quickly with standing armies of research teams that exist across Canada as opportunities arise.

Advocacy federally and provincially is critical to achieve these goals and CUTRIC's leadership role here is seen as a core membership value for academic institutions. CUTRIC is encouraged to actively pursue funding opportunities encompassing academic institutions across Canada, rather than focus on specific provinces.

