



Resiliency & Transit: Measuring the Impact of New Projects



Fig. 1 : Initial rendering of a typical REM LRT station. Photo credit: CDPQ-INFRA.

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Abstract (As submitted): Montreal has seen anemic investment in transit expansion as it struggles to modernize the aging subway, updating the bus service as well as rebuilding a crumbling highway network. The provincial government has chosen a new mechanism to build the much needed transit improvements. The CDPQ-INFRA (a major public fund) is expected to break ground on a new automated LRT network, called REM, in the greater Montreal area this summer. The 67 km 27 station LRT network will link downtown with the South Shore, the Airport, the West Island and the North Shore. In fact, the network is replacing a Bus Rapid Transit network, the airport bus shuttle, an electric commuter rail line as well as multiple bus lines operating on highways and in city streets. The four elements that are being replaced have been problematic for many years now. Insufficient capacity, aging infrastructure, congestion and growing demand have created a highly problematic situation. Growth has halted on these transit services, and some are seeing diminishing ridership, such as the Deux-Montagne Commuter Rail service, while the rest of the network continues to see growth. When combined with the traffic congestion, weather, major road construction as well as the reliability issues plaguing the metro network and bus systems, Montrealers have voiced their opinion that more and better transit is needed. However, there has been much public debate, such as during BAPE (Bureau d'audiences publiques sur l'environnement) hearings, concerning if the REM project is the one that should be completed.

The object of the research project is to measure the potential impact of the REM on the resiliency of the transit system. We have measured resilience via two factors: Firstly, our model compares the reliability of similar automated LRT networks with the existing network in order to measure the impact on the transit services availability and reliability. Secondly, we measured the added benefit of being able to offer alternative routes when the existing Metro is experiencing issues, as well as added capacity to the existing transit network.

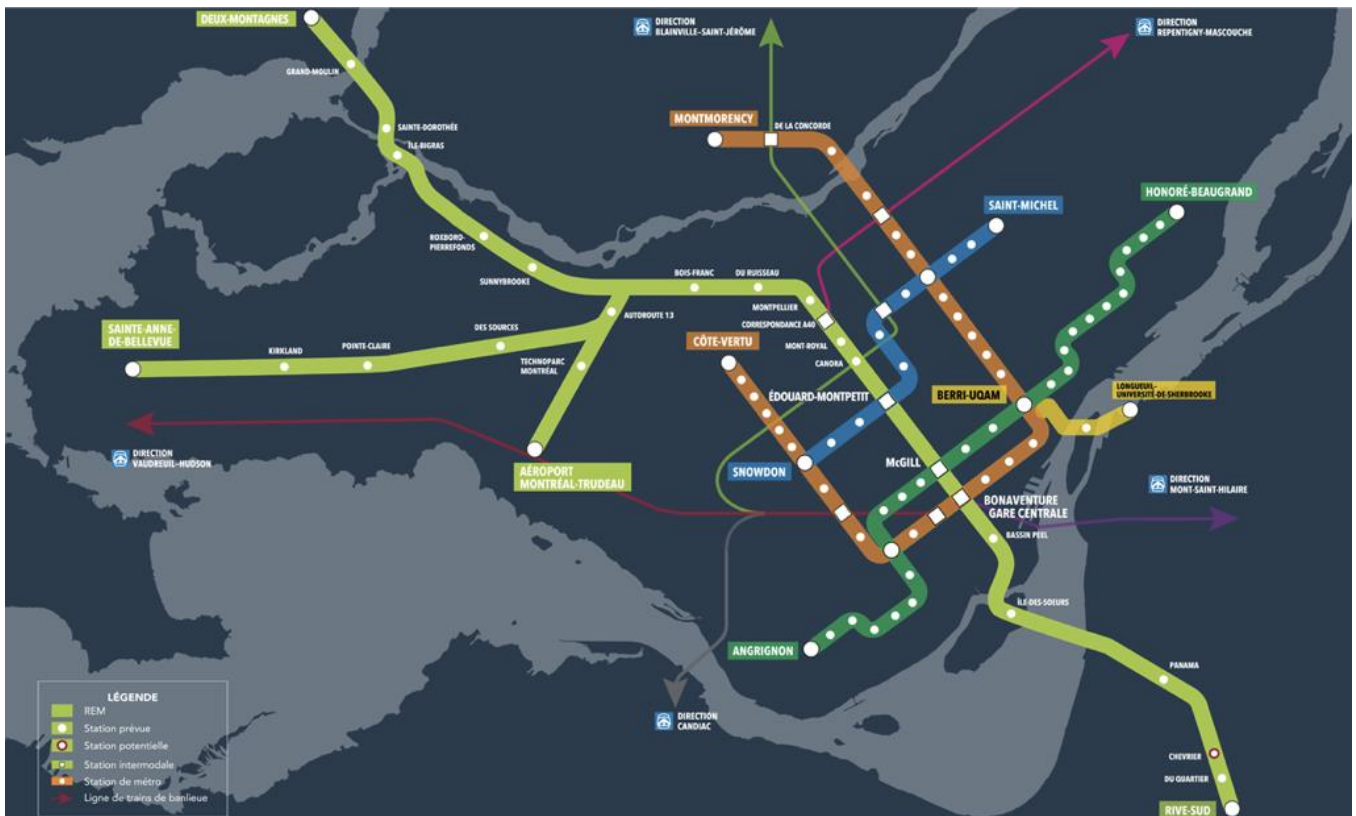


Fig. 2: Proposed REM project overlaid by subway and commuter rail service. Photo credit: CDPQ-INFRA.



Research Problem	Tools that evaluate the impacts of transit projects have become more and more elaborate over the decades. In particular, modelling techniques have become highly complex. Transit projects in Quebec, and in many other jurisdictions must successfully complete an environmental impact assessment. Citizens are asked to participate in this process. However, citizens must rely on the conclusions that are made by the specialists. It therefore becomes more and more complex for citizens to participate in the public consultation process as they are unable to evaluate themselves the projects. Furthermore, citizens may attempt to circumvent the difficulties of using existing modelling techniques by improvising. This may bring them towards flawed conclusions and may cause unnecessary confrontations between proponents and opponents of the project.
Objectives	The objective of this project was to explore new methods in order to measure the impact of transit projects. We focused on two facets of transit projects: travel times as well as their impact on the resilience of a transit network.

Methodology : Instead of relying on complex transit modelling, we opted to evaluate travel times between suburb to suburb destinations (Dix-30, Aéroport de Montréal, Université de Montréal, Gare de Deux-Montagnes and the intersection of Langelier and Jarry in the City of Montréal). Suburb-to-suburb travel is historically in Montreal where transit’s modal share is the lowest.

The estimated travel times were estimated using Google Maps estimated travel times. The values used were the averages over 12 days over two weeks when no significant meteorological events occurred. Travel times for transit were estimated using the Agence Métropolitaine de transport’s website (<http://www.amt.qc.ca/>). Estimated travel times on the future REM network were estimated with the help of the estimated travel times used by the project planner (CDPQ-INFRA).

We also compared levels of reliability based on operational data provided to us for the transit service that will be replaced by the REM network. We compared them with the required level of reliability stated within the contracting documents of the REM network.

Results	<ul style="list-style-type: none">• There are methodological sound ways that would permit the general population to evaluate transit projects.• The impact on travel times within specific corridors is significant. While current travel times by mass transit are comparable to driving a car during rush hour, with the REM, travel times are comparable to driving by car Sunday morning. Gains are significant in suburb to suburb travel. For example, travel times by Mass transit would be cut by approximately 50% if travelling from Deux-Montagnes or Brossard towards YUL Airport.• The average commuter who currently travels within the catchment basin of the project would see an average of 2 delays of five minutes or more per year on the REM instead of : 13 events if by Subway, 12 events if by Commuter Rail and 17 events if by BRT. Furthermore, riders of the Subway who do not live in the catchment basin of the REM, but are commuting using the Orange line would also see their number of events diminish since when the Subway has an event, some users could transfer to the REM instead.
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Implications Our exercise has demonstrated that it is possible to use publicly available data and using simple tools to estimate the impact of transit projects on travel time and reliability of service.

Our next step is to secure funding to continue the research and produce a handbook for citizens to better understand and critique transit projects. We are currently preparing a funding application at two foundations in order to complete this task.

References :

Barrieau, P. (2018). La prise en charge et modernisation des trains de banlieue montréalais par l'État. Thèse de doctorat.

Data provided from transit operators and CDPQ-INFRA.

Data provided by Google Maps.