Building Public Transit Infrastructure: The REM Experience in Montréal

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At a time when public finances are under strain, maintaining infrastructure, addressing its wear and tear and undertaking new projects can be challenging for governments. High public indebtedness, ever-increasing demand for services and fluctuating government revenues depending on economic cycles are phenomena whose importance and impacts are accentuated by an aging population and a succession of major events (COVID 19 pandemic, armed conflicts).

This was certainly the case in Québec. As early as 2014-2015, rating agencies were sending out signals that, without a turnaround, Québec's credit rating could be downgraded, which would result in higher borrowing costs.

The provincial government, elected in 2014, quickly found itself confronted with this reality as it had to shore up public finances, reduce public debt and eventually the tax burden, while fulfilling as many of its commitments as possible at the same time. Among these was the construction of a light rail system linking the South Shore, downtown and the West Island of Montréal as well as the Montréal-Trudeau International Airport. The lack of a rapid transit link between the airport and downtown had long been criticized. There was also a need to improve service to the South Shore and the West Island of Montréal. The government was determined to build a state-of-the-art all-electric project. This led to the Réseau Express Métropolitain (REM) project.

As the REM celebrates its first 100 days of operation, this report discusses the approach taken for the development of this project in terms of governance, financing and technical innovations. We conclude by identifying the successes and lessons that can be learned from the last 100 days.

About the REM

The Réseau Express Métropolitain is a fully automated light electric metro currently being rolled out in Montréal. Five stations were inaugurated for passengers on July 31, 2023, between Montréal's South Shore and the Central Station downtown. This is the largest mass transit project in Montréal since the metro was introduced over 50 years ago.

Once fully completed, the REM will be one of the world's largest automated electric subways, with 67 kilometers and 26 stations stretching north and west across the island of Montréal. The construction of the system will continue until the end of 2024. The Montréal-Trudeau International Airport station will open to the public in 2027.

Source: Réseau express métropolitain.

The REM operates 20 hours a day. Once the entire network is up and running, REM trains will run at similar intervals to the subway (every 2.5 minutes during peak periods and every 15 minutes otherwise). This will considerably shorten travel times. For example, it will take just 20 minutes to get from downtown to the airport, a considerable improvement from the current situation.

The Approach Taken by the Government

In the wake of the 2008 financial crisis, the participation of private sector capital in the construction of public infrastructure was debated around the world. Many believed the large sums under the management of sovereign wealth funds (such as employee pension funds and other government funds) could be mobilized for infrastructure projects, thereby reducing the burden on public debt. However, certain conditions had to be met before such an approach could be implemented:

- Maintain the independence of sovereign wealth funds.
- Generate a guaranteed rate of return aligned with depositors' quantitative objectives and time horizon.
- Minority government shareholding without effective control.

A subsidiary of the Caisse de dépôt et placement (CDPQ) was created under the name of CDPQ Infra. It was entirely dedicated to the financing and execution of infrastructure projects as well as to operation management and maintenance. This partnership was announced in January 2015 to leverage the specific expertise CDPQ had acquired through previous investments in Keolis, Bombardier, Vancouver's Canada Line, Heathrow Express and Eurostar. This is an innovative feature of the REM project: traditionally, when pension funds participated in infrastructure financing, it was on a passive basis with no active management role or majority ownership of the project.

CDPQ Infra assumes several risks inherent to the REM project, notably ridership levels. It recruited an international team with a high level of expertise, which allows for technology transfer - another major benefit of the project. In June 2016, CDPQ Infra launched two international calls for tenders for the REM. The first, entitled "Engineering, Procurement and Construction for the Infrastructures of the Réseau électrique métropolitain de Montréal," was won by NouvLR, a partnership of Canadian companies. The second for the "Provision of the Rolling Stock, Systems and Operation and Maintenance Services of the Réseau électrique métropolitain de Montréal" was won by the PMM consortium led by a French firm.

For its part, in addition to defining the project's needs, the provincial government passed legislation to clear up administrative hurdles common to major projects such as land acquisition. During the initial development of the project, a single government contact for the CDPQ was designated to facilitate interactions with the various ministries and agencies. These factors greatly contributed to the rapid execution of the REM project.

COLLABORATION WITH MUNICIPALITIES

The planning of the REM's route and stations was done in close collaboration with municipalities and the Québec ministry of transportation. Connection "nodes" with the Montréal subway were established at three locations as well as along the entire network with buses. This upstream collaboration also ensures that REM riders can transfer with commuter trains.

The governance of the REM is supported by an executive committee. It is complemented by an operational committee that includes key stakeholders such as municipalities and the various public transit agencies to ensure a high level of responsiveness.

How the Project Was Financed

The project's financing is made up of equity and debt from partners related to the state, which led many to describe this model as a "public-public partnership." From a fiscal standpoint, the parameters selected ensure this infrastructure investment remains outside the scope of public debt.

CDPQ is the majority shareholder with a stake of $4.58 billion, representing 78 per cent of the equity. The Québec government invested $1.28 billion in equity. The Government of Canada is also participating in the financing package in the form of a $1.28 billion debt issued by the Canada Infrastructure Bank.

The CDPQ's expected return on investment is eight per cent, above which the Québec government also receives its share of the return up to a maximum of 3.7 per cent. If necessary, these two shareholders receive additional sums in proportion to their shares.

The REM operator "captures" its share of revenues through the Autorité Régionale de Transport Métropolitain (ARTM). As a public body, the ARTM is responsible for coordinating, planning and financing public transit in the Greater Montréal area. In addition to the REM, the ARTM issues tickets for bus and metro services in the same catchment areas.

Hydro-Québec and ARTM also participate in the financing of the project. Hydro-Québec's contribution of $295 million covers the fixed equipment required for the electrification of the REM.

The ARTM pays CDPQ Infra a ridership-related royalty of $0.75 per passenger per kilometer (indexed and capped according to ridership) as well as royalties related to real estate development adjacent to the REM's route. In this regard, ridership risk is mitigated by real estate revenues.

The ARTM's contribution to CDPQ Infra via real estate development royalties is estimated at $600 million over the next 50 years. Real estate developers building projects along the REM axes must pay royalties to the ARTM, which then directs them to CDPQ Infra.

Real estate royalties are currently $112 per square metre of floor (indexed over time), but the first $750,000 of work is excluded from the calculations. They are collected at permit issuance and apply within a radius of 500 to 1,000 meters from stations, depending on which station is involved. The purpose of these fees is twofold: to introduce a new source of revenue beyond the sale of transit fares while capturing part of the added value to the benefit of communities.

How Project Costs Evolved

When work on the REM began in 2018, project costs were estimated at $6.3 billion. They are now evaluated at $7.95 billion. In terms of cost control, this is a strong performance. For example, a McKinsey study of 532 projects showed an average cost overrun of 79 per cent, which is higher than 26 per cent for the REM. As Dan Gardner and Professor Bent Flyvbjerg explain in their book ***How Big Things Get Done***, many infrastructure projects suffer from an "optimism bias" in budget and delivery estimates. In their enthusiasm and eagerness to see projects move forward, developers sometimes use lower or outdated forecasts, which in turn can facilitate government approvals. In this regard, the REM has shown a highly competitive cost control despite the project's late completion.

While the original schedule was extended, the project still stands out for its rapid execution. The inauguration for the first users took place just over five years after the work began, a period during which the world went through a major pandemic.

Unsuspected issues related to the Mount Royal Tunnel (old explosives were discovered in this structure which dates back to 1918) largely explain why the schedule had to be extended. It should be noted that cost control is closely linked to speed of execution, since it limits the impact of inflation. At present, 85 per cent of the project is completed and therefore sheltered from future inflation.

Having parts of the REM route on aerial structures contributes to cost control, as is the case in other major cities that have similar systems. Opinions are divided on the merits (the aesthetics in particular) of such structures compared with traditional installations at ground level. There is however no doubt that leveraging aerial structure is faster and less costly than the alternative. It also takes up far less space from a traffic standpoint.

In the case of the REM, the choice of an aerial design was facilitated by the proximity of express lanes with usable rights-of-way. In total, 45 per cent of the route is at ground level, 42 per cent is aerial and 13 per cent is underground.

Source: Alain Roberge, Archives La Presse

Successes and Lessons Learned from the First 100 Days

Ridership has been good so far averaging 30,000 passengers per day with peaks of 38,000. CDPQ Infra considers that current ridership numbers do not benefit yet from the full integration of the network and its interconnections. It also bears noting that public transit systems in Canada are still recovering from the significant drop in ridership stemming from the pandemic and the move to remote work.

The REM's reliability has been high with close to 99 per cent of operating time achieved on the entire network since it went into operation. However, this high level of reliability must be closely monitored given there were three instances of computer problems with service disruptions in the days leading up to the publication of this report.

Some specific issues have been criticized by users and residents. These require a high level of attention from the operator as they could pose important future risks as additional REM segments get rolled out:

- Signage and ticketing, which is the responsibility of the ARTM.
- Switch failures during the first hours of operation. However, these have not recurred since.

- A high noise level in a section near houses along the track between Nuns' Island and the downtown Central Station. At the time of writing, a decision was taken to close a section of the REM at 10:00 p.m. for approximately six weeks, starting on October 15. Operations to grind the rails and install noise dampers are underway to remedy the situation. To avoid similar problems in the future, CDPQ Infra has identified the most at-risk operating zones to plan preventive interventions.
- The most striking criticism pertains to accessibility for people with reduced mobility, despite the fact accessibility was a priority for the planners. The REM's early operations were marked by elevator problems. This situation thankfully improved starting in early October following the work of technical teams. However, we must note a difference here between the installations of the Central Station and the other stations. The former is a unique location due to its age and pre-existing systems.

Finally, even though "dry runs" were carried out in all weather conditions prior to commissioning, the REM's performance will need to be closely monitored during the winter period when ridership levels will be high.

IMPACT ON URBAN DEVELOPMENT

Transit-oriented urban development is one of the desired effects of this type of infrastructure. It helps achieve a number of objectives, such as sustainable mobility, better density planning and enabling a social mix.

The effect of the REM on urban development is already measurable. The vicinity of the Du Quartier station is a good example. This phenomenon was visible as early as 2017 and has accelerated since the REM. In fact, the observed pace of residential and commercial development is already much higher than originally anticipated.

Conclusion

Given the fiscal pressures facing governments, the large number of projects to be carried out and their importance in the fight against climate change, the REM model will undoubtedly generate a great deal of interest. Beyond limiting the financial burden on the government, involving CDPQ Infra in several aspects of the project enabled the CDPQ to develop a new expertise as the manager and operator of the REM. For such an approach to become a reality, governments must accept a relative loss of control, which presupposes a high degree of trust between the various stakeholders and high-quality management.

The nature of the problems identified since the REM's inauguration serves as a reminder of the importance of the "user experience" in the deployment of public transport infrastructure. These issues will need to remain at the heart of CDPQ Infra's concerns during the next phases of deployment. Communication with users during service interruptions needs to be considerably improved, as demonstrated by the October 30, 2023, outage during which they were left not knowing what was going on. This can lead to feelings of insecurity and frustration among users.

Ultimately, a project like the REM is much more than the construction of infrastructure. It is also an economic and urban development project and a new public service offering that benefits users.

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