

# Memoire on Réseau électrique métropolitain

---

Brief presented to the BAPE

By Thomas Schwalb, B.Eng, Pierrefonds, QC  
22-Sep-16

## 1. Introduction

The transportation situation in the Montreal region is chaotic, inefficient, frustrating and polluting. While there is an extensive public transportation system, it is not seen as adequate, resulting in large numbers of private automobiles sharing the roads with busses and trucks. The cost of time lost in traffic, and the health costs caused by pollution are enormous. The World Health Organization (WHO) estimates air pollution to cause 3.7 million premature deaths worldwide per year in 2012, due to exposure to small particulate matter of 10 microns or less in diameter (PM<sub>10</sub>), which cause cardiovascular and respiratory disease, and cancers. There is no safe threshold, and even the lowest levels of PM have health impacts. Other pollutants, such as ozone, nitrogen and sulfur dioxides (constituents of smog) are major factors in asthma morbidity, and bronchial symptoms.<sup>1</sup> The WHO also considers that transport is responsible for 30 to 50% of the pollution, and that diesel engines are a major contributor.<sup>2</sup> Then there are the green house gas emissions and climate change impacts.

Therefore it is very encouraging to see major investments in the public transportation network. However the current REM project as proposed will not significantly improve the situation, and in some respects, may even worsen it. As will be shown, the ridership will not be greatly increased (no abandonment of private autos in favour of public transport) while the scale of the investment (\$5.5 billion+) will drain any funds for the foreseeable future to implement meaningful expansion and improvement. Other negative factors include encroachment of existing or proposed greenspace, and the disruption to existing public transport during the construction phase.

## 2. Problems with the Proposed Plan

The goal of the proposed plan is to provide fast, economical public transit which will greatly increase the ridership and reduce the numbers of private automobiles on the roads. However the proposed plan has numerous problems which will negate these claims. One problem is that the plan will parasitize the AMT ridership, stripping it of its major route, and displacing some ridership from the Vaudreuil/Hudson and Candiac lines. As well, the Mascouche line would terminate at the REM transfer station, probably reducing its ridership as well.

### 2.1 Travel Time

Due to the insufficient interconnection of the various modes of transport with the REM, the average trip duration will not be as optimistic as shown in the CDPQ Infra estimates. In particular, these estimates seem to imply that passengers live within less than 5 minute's walk of a station, and their destination is similarly close to a station, and that transfer points take next to no time. While the majority of passengers arriving presently at Gare Centrale walk to work, this cannot be extrapolated to the targeted increased ridership because they use other transportation today, mainly due to their destination not being nearby, or the AMT line being too far to access. Radio Canada has measured the transfer time at Gare Centrale to the Metro as at least 10 minutes. If one adds just 10 more minutes to the walk at each end and a 10 minute Metro ride, we arrive at a 40 minute figure. Yet the CDPQ chart show as low as 15

minutes from the South Shore, and 35 minutes from the West Island. This means that the travel times on the REM are zero or negative, obviously erroneous. Therefore the chart's comparison with current travel times by public transport or automobile is not valid. Furthermore, if there is no time advantage to the REM, this is not a factor in leaving the car at home.

## 2.2 Trip Logistics

The factors in the decision to take public transport are ease of use, cost, comfort, schedules, and duration of travel. The REM parking lots, if modeled on the current AMT ones, would be inadequate and finding parking space could be difficult, stressful, and expensive (permit parking). Larger lots will lead to traffic congestion, and longer walks. If a bus is to be used for access, then the comfort, schedule, and duration factors are invoked. Required transfers to complete the journey impact all the above factors, and with the minimal integration of the proposed system with other networks, are actually a disadvantage in ease of use, comfort, schedule, duration, and perhaps cost. Autos would have the advantage in comfort, and schedule, although not in cost and perhaps duration depending on traffic and other circumstances. Finally, the lack of high density near the REM stations will favour auto use since most people would have to use a bus or auto to access the REM. Users of the current AMT line will not see any advantage except for off-peak schedules (but will face fare hikes). The airport will see a modest improvement perhaps, and the greatest potential improvement would be for the new areas of the West Island which are very poorly served by public transport presently. Any advantage for the South Shore is dubious as the area's officials have stated. The rest of the Montreal region will be unaffected and will see little improvement for the \$5.5 billion. This analysis shows that the ridership on the REM will be limited, and not achieve the levels hoped for.

The Table below summarizes these elements and their advantages or disadvantages. Please note that the trips consider door to door factors, not just the REM component. (For example, for schedule, a bus to access the REM has a schedule, as does a metro (7 minutes or more off peak) or terminating bus line. )

Table 2.2 Comparison of factors affecting ridership

|             | REM | Private Auto |
|-------------|-----|--------------|
| Schedule    | ↓   | ↑            |
| Comfort     | ↓   | ↑            |
| Duration    | —   | —            |
| Cost        | ↑   | ↓            |
| Ease of Use | ↓   | ↑            |

Legend: ↑ Advantage                      ↓ Disadvantage                      — Not determined

Note that the trip cost assumes a ticket fare reasonably in line with the current one. Very high fares in the premium service category (over \$5 in the city center, \$10 outside) will seriously impact ridership and change from advantage to disadvantage for REM.

Duration is not determined because it is so case dependent. While most people arriving presently at Gare Centrale can walk from there to work, this cannot be extrapolated to the potential increased ridership, as those people currently use other modes of transport perhaps because their destination is elsewhere.

### 2.3 Costs of Implementation

Per trip costs are not possible to compare among technologies, as the fare structure is not as yet known. However the public capital cost of \$5.5 billion is very significant but is not a factor that an individual would make in choosing how to commute to work in the morning. Nevertheless it is a factor in choosing what type of transit system to build. The proposed system is among the most costly to implement. For a simple surface LRT, the 67 km length of the REM can be built for just over \$2 billion. That is less than half of the estimated \$ 5.5 B, before the newly proposed additional station interconnects. Operating costs are also higher for the REM. The large capital cost of this project is such that it will drain funds for perhaps a decade from any new expansion. Therefore it is imperative that these funds be spent wisely, and to maximize the displacement of the automobile in favour of public transit. The proposed REM does not fit these criteria.

### 2.4 Financials

These can be divided into two categories: capital and operating expenses. Capital will be provided by Caisse de Depot, and various Federal and Provincial, possibly municipal governments. The idea of the investment is to improve public transport, thereby growing the economy, decreasing pollution and, for the Caisse, to make a profit. Public transport as a rule does not provide any profit. The Canadian average for recovery of transit operating costs from fares is only 60%. That is recovery, not profit. Operating expenses for the REM can be expected to be higher than traditional LRT's, and therefore will not be profitable, especially as the ridership forecasts will not be achieved. The only mechanism for increasing the revenue would be through real estate development and taxes, because alternatively a high ticket price would decrease ridership. Transit Oriented Development (TOD) would be logical, however there are obstacles and pitfalls here. Around the existing Deux Montagnes line stations, there is not much developable land. So redevelopment and expropriation will have to be considered. For new proposed stations, many are in or adjacent to green spaces. These cannot and must not be seen as available land waiting to be exploited and developed. Finally, special tax zones around stations would eat into the municipalities' tax base leaving them with just the additional costs of developments (sewers, schools, traffic etc.).

### 2.5 Access to REM Stations

In the proposed plan, access to the REM stations is either on foot, by bus, or auto. Foot traffic is only feasible for the minority of people living within a 10 minute walk from the station. Busses will be needed for those not wishing to use a car. This would necessitate numerous bus lines converging at the station. South Shore officials have already flagged this as a congestion problem. The busses would also have to run on a frequent schedule in order to fully exploit the REM frequency. In off peak times this is even

more important because a rapid REM ride coupled with a long wait for a bus would negate a lot of the advantages. Busses also are polluting, especially if diesel engine driven. Finally for autos, incentive parking would be offered. This would require massive parking lots that would eat into space for TOD development, and possibly threaten adjoining green spaces. These green spaces have been implemented to mitigate pollution effects and heat islands, and to provide for recreation and biodiversity. Montreal has the least amount of greenspace of any major North American city. There can be no question to encroach on them. However even proximity to development can have negative effects, such as pollution run off from pavement, noise, air pollution, snow dumping, and litter. Parking lots also lead to congestion problems, and still rely on automobiles, although at a reduced rate, for commuting.

### 2.6 Disruption of Service during Construction

The Deux Montagnes Train line will have to be completely rebuilt, and two new stations have just been proposed in the Mt. Royal tunnel. The current AMT service runs on overhead high voltage electric power, and uses fairly complex signaling. While assurances and plans have been made to provide service during the construction period, it is difficult to believe that this can occur, especially in the tunnel. The clearances in the tunnel are tight, the roadbed, signaling, control, and power must be redone, and while working on one track at a time is feasible, it is almost unavoidable not to affect the second one. And what happens after the first track work is completed-will it be fully compatible with the current equipment without problems while the second track is redone? It really stretches the imagination. Furthermore, construction of stations in the tunnel, with the associated tunneling to the surface will prove challenging to keeping the line in service. The plan seems to be to run the trains during rush hour and busses off-peak. There is a credibility problem here and I expect that service on the AMT line will be severely disrupted due to unforeseen events and accidents. This line has the largest suburban train ridership in the province, and interruption of service or even unreliability will cause large numbers of people to abandon it, furthering the tremendous traffic chaos in the Montreal region at a time of major construction everywhere. Pollution levels and economic impacts will be significant.

## 3. Alternatives

The alternatives to the REM proposal can be divided into four areas; Central Core, Extensions, Access Networks, and Network Interconnection.

### 3.1 Central Core

The Central Core is comprised of the existing 30 Km AMT Deux Montagnes line shared by the common part of the Mascouche line. It seems very inefficient and costly to throw away the \$290 Million 1992 upgrade as well as half of the new Mascouche line cost (the dual electric/diesel locomotives). Instead, the core should be kept with increased rolling stock, double tracking and signaling upgrades to provide more frequent service. Some road underpasses may be required to accommodate the much higher

service frequency. Instead of scrapping successful infrastructure, we would be building and expanding on existing investments.

### 3.2 Extensions

The extensions to the Central Core comprise the South Shore, Trudeau Airport, and Sainte Anne de Bellevue legs for a total of 37 Km. Instead of the proposed Skytrain concept, these trajectories should be implemented using traditional surface Light Rail Transit technology, which is much cheaper to build and operate. This technology is implemented worldwide, especially in major European cities. While perhaps not as fast as the proposed REM technology, its advantages are numerous. They are very efficient, comfortable, reliable, and cost effective. Primarily due to the capital cost savings, it would liberate about half of the \$5.5 billion to extend to other areas of the Montreal region, and greatly improve the access network to the Metro and the Core Network (AMT Deux Montagnes)

Transfer stations between the Extensions and the Core Network can be made to maximize ease of use, and time efficiency, limiting the total trip duration impact. Any longer time due to transferring can actually be negated by more efficient access networks. Transfer stations would be located at Gare Centrale for the South Shore line, and Autoroute 13 for the airport and Sainte Anne lines.

An even simpler alternative configuration would be to just extend the Deux Montagnes line technology. If the complete rebuild of the 30 km line in 1992 for \$290 million was possible, then it should not cost much more than \$1 billion for the 37km extensions, once the right of way is established.

### 3.3 Access Networks

To access the Alternative REM (AREM), passengers would use autos and busses. Both of these pose problems and are polluting. The autos cause traffic congestion in the extended area, and require massive parking lots, as has been experienced with the AMT lots. They are stressful, and solve only part of the public transport puzzle. Busses also have a congestion problem, but add schedules and lack of comfort to the equation. A good alternative would be trams or similar surface LRT's. This way parking lots could be distributed along the tram route, making them much more of a human scale, and avoiding the congestion and discomfort factors. Furthermore, with the capital cost savings of the AREM, many of these tram lines could be deployed, even serving the Metro. One could envision a tram on Henri Bourassa or Jean Talon to the Metro, or one on Pierrefonds Boulevard, or Boulevard St.Jean to the AREM. These would certainly attract the higher ridership that is targeted, and would spread the advantages to a larger section of the Island, in particular to higher density areas. This would be a real improvement in public transit.

### 3.4 Network Interconnection

Initially, the REM proposal had a single tenuous transfer point with the Metro, that at Gare Centrale, to the Bonaventure Metro. This involves a 10 minute complex walk. After much comment, CDPQ Infra

decided to add two more stations in the Mt. Royal tunnel. This will be very expensive, increasing the \$5.5 Billion figure, and be probably delayed until after the in service date. There is a high probability that the construction will cause service disruptions. This is all in order to interconnect a showcase, single focus line. It would be better to forget the expensive new stations. Alternatively, one could implement a large scale distributed transit network, with two poles, the AREM, and the Metro, interconnected with extensive tram lines throughout the city. Increased ridership and displacement of the auto of such a network would be more significant as higher density areas and more remote areas would both enjoy better access.

#### 4. Conclusions

The proposed REM plan will not meet its objective of fast, efficient, and even profitable public transit, increasing ridership to reduce auto use and pollution. It threatens to become a white elephant, its ridership targets unmet, while wasting valuable investment funds for public transit, and like the Olympic Stadium, requiring constant injections of money that can't be shut down. Furthermore, while not displacing the automobile in any meaningful way, it will cause congestion and other problems, threatening greenspace. The overwhelming majority of commuters will not see any improvement for the \$5.5 billion price tag. It will probably have a difficult birth, with service disruptions of existing public transit. It has a single flagship architecture which is poorly integrated with the rest of the transit network. All in all, the design is flawed. We need to use every dollar wisely, to improve the Montreal transit situation to maximum benefit.

The alternative plan is to use the current AMT technology for the entire 67km line, or a surface LRT for the 30 km extension, combined with numerous tram lines to feed the Metro and AREM from all over the city. This would be a real improvement for many more commuters, and represent a true investment in public transit as opposed to the glitzy but wasteful and ineffective original plan.

#### References

1. [www.who.int/mediacentre/factsheets/fs313/en/](http://www.who.int/mediacentre/factsheets/fs313/en/)
2. [www.who.int/sustainable-development/transport/health-risks/air-pollution/en/](http://www.who.int/sustainable-development/transport/health-risks/air-pollution/en/)

End of Document