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## Executive Summary

The Greater Toronto and Hamilton Area (GTHA) faces a major transportation crisis. Commuting times are among the highest in North America. The cost of congestion is estimated at \$6-billion annually, and projected to increase to \$15-billion annually unless major investment in transportation infrastructure is made. As gridlock worsens, significant action is needed on a regional scale. This Regional Rapid Rail report puts forward a cost-effective option and vision for a substantial increase in service to transit users across the GTHA.

### 1. Background and Precursors

In 2006, Metrolinx was established by the Ontario Government to develop and implement a regional transportation plan for the Greater Toronto and Hamilton Area (GTHA). This was released in 2008 and was entitled “*The Big Move*.” At the time, it was estimated to cost \$50-billion over 25 years. Also released in 2008 was a modeling backgrounder that provides projected 2031 demands for various projects in *The Big Move*, including demands for the GO corridors. That model included fare integration defined as follows:

*Transit fares for the model were kept at the same current level, in real terms, with fare integration between local transit operators assumed, such that double fares for short cross-boundary trips would be eliminated.*

The figures from the modeling backgrounder were used to determine 2031 service levels for this Regional Rapid Rail report.

GO Transit (GO), a division of Metrolinx since 2009, operates seven commuter rail corridors – all currently diesel powered – totaling

450km and serving 62 stations. The corridors connect Toronto Union Station with Hamilton, Milton, Kitchener, Barrie, Richmond Hill, Stouffville (Lincolntonville), and Oshawa, and all are envisioned to play major roles in achieving the goals in *The Big Move*, particularly those identified for “Express Rail” service.

The map at the end of this section depicts the current network.

In January, 2011, Metrolinx released the 2010 electrification study on the electrification of the GO rail network. The study identified the fixed infrastructure requirements such as bridges, track, grade separations, etcetera, needed to improve service to meet 2021 demand levels in the “Reference Case,” but an estimate of the cost for that infrastructure was not published. It also identified fixed infrastructure needs for electrification, such as overhead catenary, substations, and autotransformers, for which their estimated costs were published. Trainsets were assumed to be locomotives pulling



10 bi-level coaches. This separation of fixed infrastructure types resulted in electrification-specific costs being isolated, thereby avoiding any overstating of the “cost of electrification.”

The Metrolinx Board ultimately approved an option to electrify the Lakeshore East, Lakeshore West and Kitchener corridors over a 22-year period. The Ontario Government initiated an environmental assessment for electrifying only the Air Rail Link and access from Union Station to Willowbrook Yards, although the 2010 electrification study warned such action would be inadvisable due to the low benefit relative to its cost. Preliminary engineering is currently underway, but no funding is committed for implementation at time of writing.

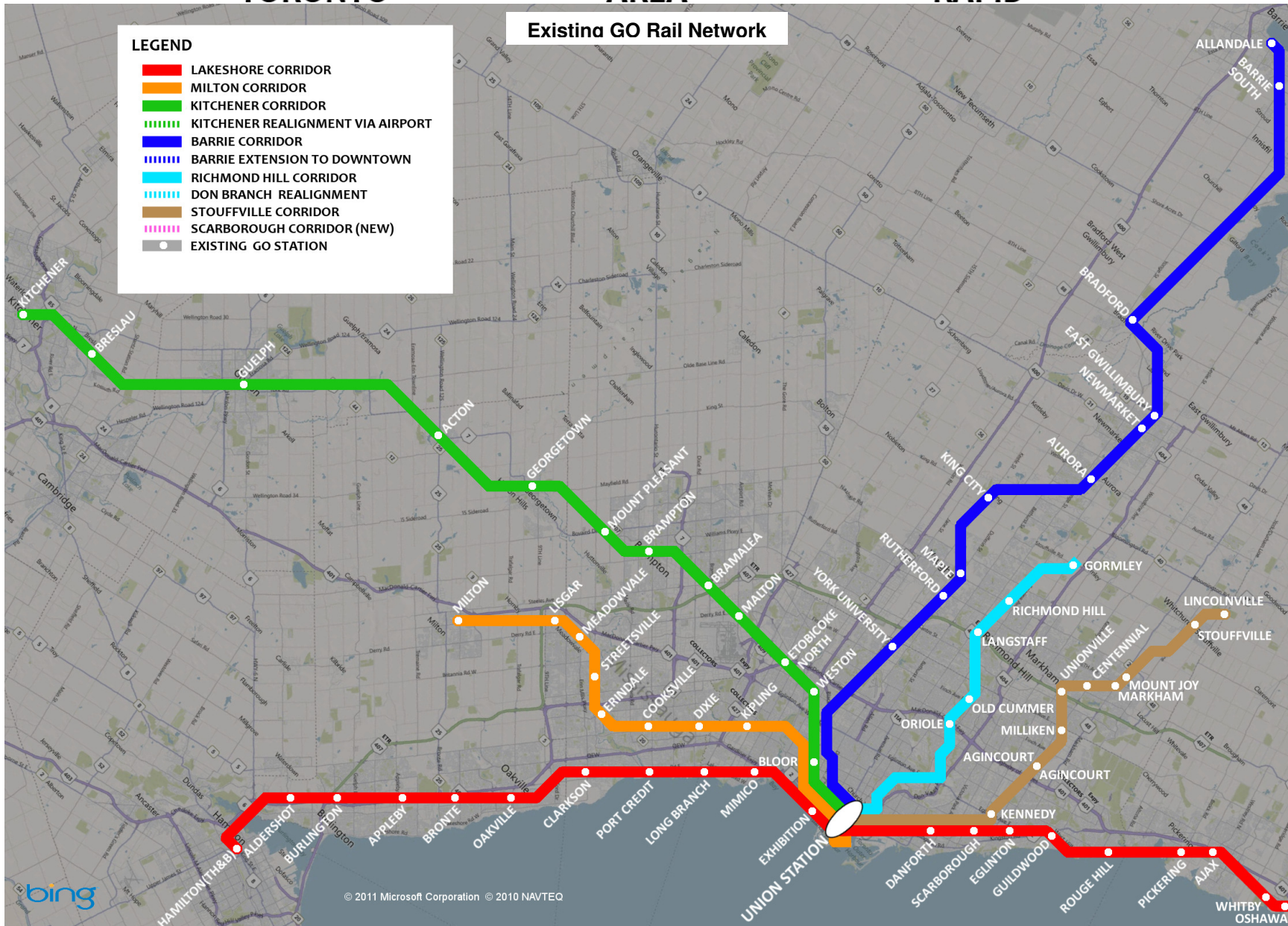
In May, 2011, Transport Action Ontario, the Clean Train Coalition, and the Canadian Auto Workers released a report titled “No Little Plan: Electrifying GO Transit,” by Greg Gormick, noted transportation policy advisor and writer. It discussed the benefits of electrification across the world and for GO, especially using Electric Multiple-Units (EMU). It recommended an accelerated pace and expanded scope of electrification, as well as implementation of an urban rail concept similar to those of various “Stadtschnellbahn” [S-Bahn] systems in cities such as Berlin (Germany), Zurich (Switzerland), Copenhagen (Denmark), and Vienna (Austria).

This Regional Rapid Rail report is both an investigative analysis and a visioning piece on the potential future of GO Transit as influenced by technology choices that must be made soon, as well as a follow-up to “No Little Plan.” The report presents a corridor-by-corridor detailed analysis of the infrastructure needs, costs and challenges of providing an electrified rail network with service levels comparable to a “surface subway” utilizing the existing mainline railway network in the GTHA, suitably enhanced. The objective is to make this information available and digestible for anyone that is affected by or interested in the challenges that face the GO rail network. This Regional Rapid Rail report envisions a plan that is achievable in about 15 years, covering two phases, plus a comparatively modest third phase beyond the 15-year horizon.

This report focuses on the existing GO corridors, with the exception of the Scarborough corridor (proposed herein), which largely replaces and extends the service offered by the existing SRT line while also accommodating an alternative arrangement to the Locust Hill service proposed in *The Big Move*.

Finally, it is recognized that other new corridors could be developed in the future and added to the GO rail network. As one example, *The Big Move* envisions a new corridor to Bolton. However, it is unlikely that such new corridors, if implemented, would be converted to electric operation in the short-term.

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## 2. The Regional Rapid Rail Vision for the GTHA

This Regional Rapid Rail report envisions an efficient, longer-distance, two-way, all-day frequent transit service covering most population centres within the GTHA. It is comparable to S-Bahn systems in Berlin, Germany and Vienna, Austria. This would involve:

1. Electrification with EMUs to provide improved operational flexibility and greater cost-efficiency
2. Expanded connections with local transit along electrified lines to increase the number and distribution of convenient interchanges and origin-destination pairs, by adding 56 stations to the existing network, as well as six more new stations along a new line through Scarborough
3. Improved service frequency to substantially reduce the impact of just missing a train, as summarized in the table below (in minutes):

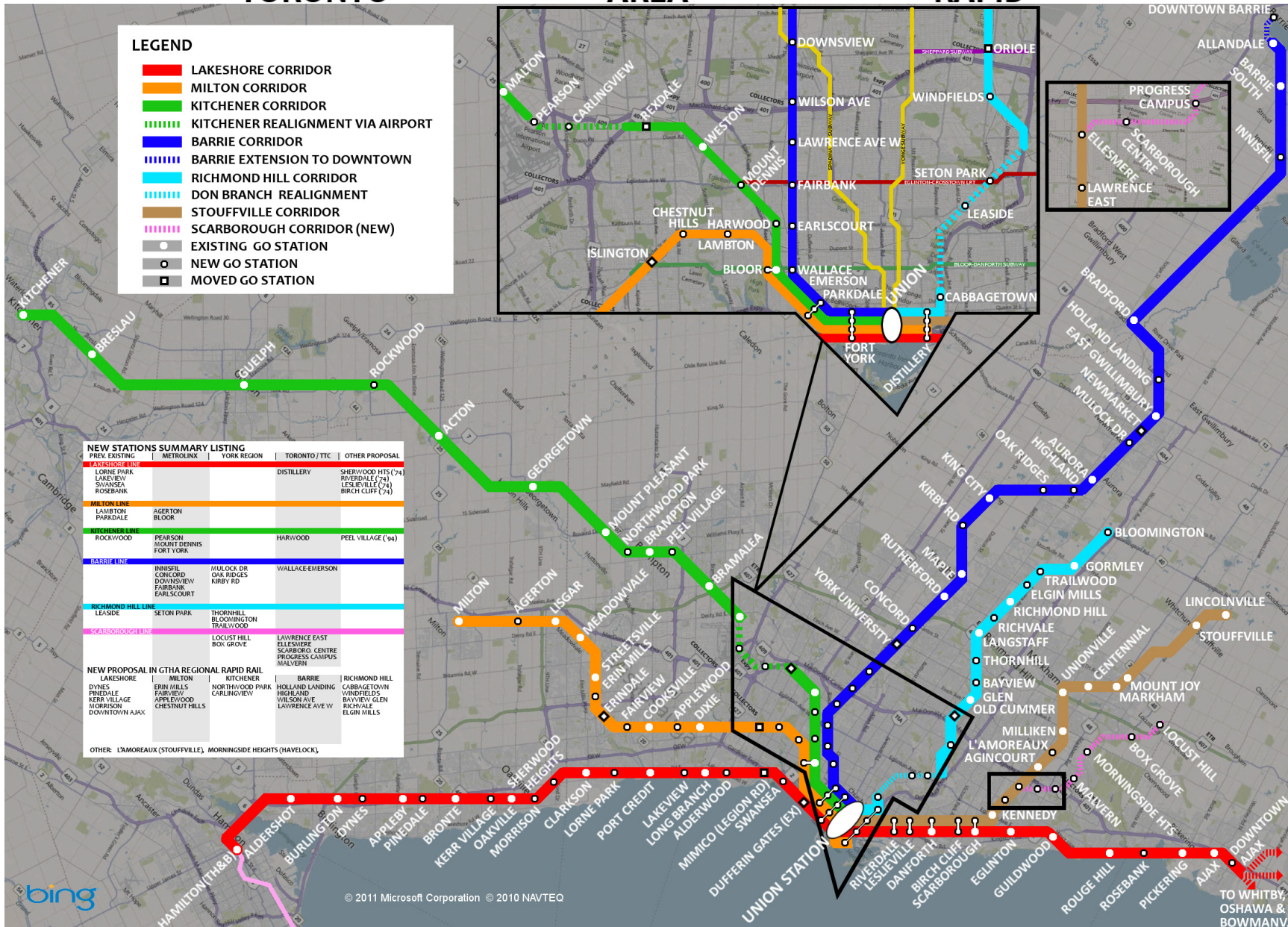
### 2021-2031 Service Outlook

Service Level by Period	Peak Hour Frequencies in minutes (Average)			Off-Peak Frequencies in minutes (Scheduled)		
	Current	2021	2031	Current	2021	2031
<b>Corridor</b>						
<b>Lakeshore West</b>	10	6	4	30 to 60	30	15
<b>Lakeshore East</b>	8.5	6.5	5	30 to 60	30	15
<b>Kitchener (via Pearson)</b>	25	8.5	4	Bus only	60	15
<b>Milton</b>	15	10	3.5	Bus only	60	15
<b>Richmond Hill</b>	30	20	5	Bus only	60	15
<b>Barrie</b>	30	15	10	Bus only	60	15
<b>Stouffville</b>	31	15	10	Bus only	60	15
<b>Scarborough (NEW)</b>	Not built	n/a	6	Not built	n/a	±7.5

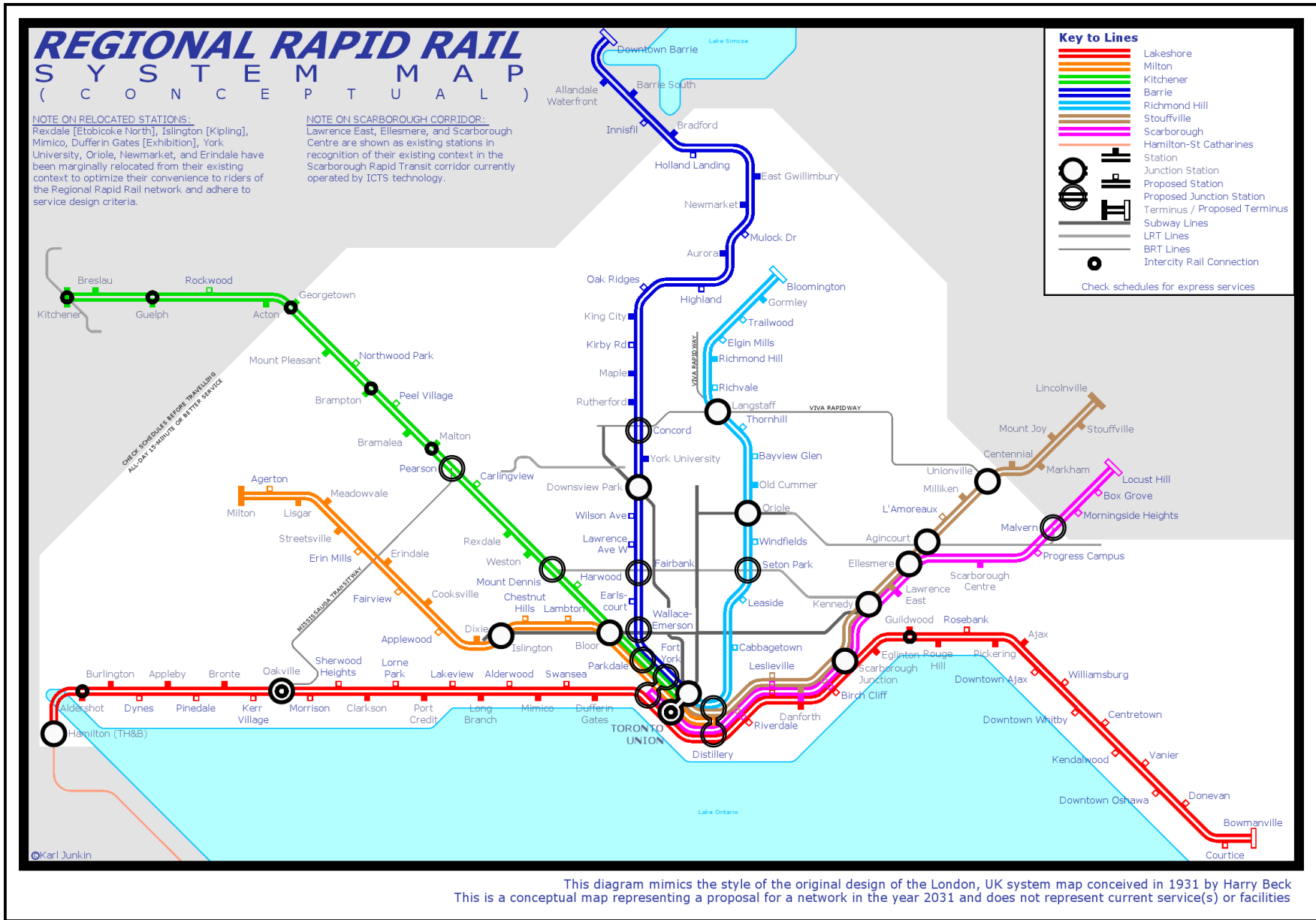
The two maps on the following pages depict the proposed network, including all new stations.

Most lines would have an express service available. Lakeshore would be four tracks over a substantial length of the route and other corridors would have 3-track stretches or occasional overtake tracks to accommodate express service. Only Milton would not have any overtake tracks in the vision outlined in this Regional Rapid Rail report, due to the complexities associated with right-of-way constraints combined with CP's requirement of 2-track freight service availability at all times. Overtake tracks on the Milton corridor are not impossible, but right-of-way constraints are complicated and would involve property acquisition, a subject that this report will not delve into.

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### 3. Use of an EMU Fleet

The 2010 electrification study dealt only briefly with EMUs. Nevertheless, its results indicated that EMUs would be 2.5 times more costly to operate than electric locomotive-hauled trains over a 25-year period. This Regional Rapid Rail report identified concerns with some of the assumptions used in the 2010 electrification study that contributed to that conclusion. Three important assumptions outlined in the 2010 electrification study that caused concern were: (a) trains being all-EMU rather than half EMU's and half unpowered coaches; (b) having the same service model applied to all technologies; and (c) all trains required to be the same length at all times. The methodology applied in this Regional Rapid Rail report did not include those three assumptions, and resulted in the finding that EMUs would be the cheapest option for the medium-term and beyond. Results for the short-term/2021 outlook were mixed and inconsistent among corridors, but EMUs became progressively more efficient on all corridors as service levels increased over time.

EMUs have the potential to revolutionize GO's operations. They are faster due to more powerful acceleration and deceleration ability, opening up the ability to use a smaller fleet for the same service level. This would provide numerous benefits, including reduced maintenance and smaller storage yards for the same service level.

EMUs can also be easily split into shorter trains, providing energy savings and opening up operational flexibility. The more powerful

regenerative braking of EMUs offers potential reduction in electrical power demand draw. This is a result of the opportunity for greater sharing of energy within the network between EMU-operated trains, even between trains on different lines, for which opportunities would be plentiful within Toronto especially. As some vehicles brake while others accelerate, the electrical power is both generated and used within the network, reducing stress on the electrical grid.



*EMU trains criss-cross The Netherlands, with most routes 40-130km long, and a 160km/h (100mph) top speed. A 12-car "VIRM" bi-level EMU train is shown above. Photo credit: Maurits Vink, 2007  
Link: [en.wikipedia.org/wiki/File:VIRM6.jpg](http://en.wikipedia.org/wiki/File:VIRM6.jpg)*

EMUs can also serve more stations without adding to passenger total travel time, which is a key attribute of the Regional Rapid Rail vision.

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A simulated service model using the Milton corridor was prepared to evaluate the impact of additional stations, and the finding was that the number of stations could almost double without a penalty to the trip time from terminus to terminus using EMUs compared with diesel locomotives. Adding stations to lines with electrification is not a new concept; it is taking place right now in the San Francisco and San Jose area. Given the existing built form around most new stations proposed in this Regional Rapid Rail report, it is assumed new stations would have little (if any) parking, unless local transit was absent or minimal.

The “Reference Case” from the 2010 electrification study assumed a near-doubling of the size of the diesel fleet between 2010 and 2020 before any work on electrification begins. While current diesel equipment can continue to service non-electrified corridors (existing or new), for the Government of Ontario to consider investing \$1.5-billion on a much larger diesel fleet instead of using

electrification as a means to accommodate system growth could have unforeseen, expensive consequences. This concern is based on future operating expense calculations found in the appendices of this Regional Rapid Rail report. Also of concern is the risk (with a larger diesel fleet) relating to the cost-prohibitive option of converting locomotive-hauled coaches to EMU-operation, which even applies to the non-powered coaches in an EMU trainset.

EMUs are not new to the region, as the TTC subway system is run with EMUs, and the new LRT lines will also be EMUs. Decades ago, EMU-operation appeared on TTC streetcar lines as well. EMUs have been serving a wide variety of railways worldwide for over a century, and remain common today. The analyses in this report demonstrate without a doubt that the selection of EMUs as the preferred electric vehicle technology for the future of the GO rail network would clearly be the soundest policy going forward, if not the only practical option going forward, given the projected demands.



**4. Whitby: An EMU Maintenance Facility**

GO needs a new maintenance yard if it is to grow. Its sole existing yard, Willowbrook, located in Mimico, is at capacity. Electrification with EMUs as envisioned in this Regional Rapid Rail report would enable Willowbrook to continue undisturbed as the diesel maintenance facility, with storage-only functions for electric trains, and a new maintenance facility for EMUs would be built east of the Whitby GO station.

However, because the plan assumed in the 2010 electrification study does not envisage electrification commencing until 2020, after billions will have been spent on nearly doubling the size of the diesel fleet, that plan would be more expensive to deliver and less efficient to operate than the proposal described herein. Under the assumptions outlined in the 2010 electrification study Reference Case, the Whitby yard would be designed for diesel operations, with provision for electrification only for electric locomotives (i.e. it would not be EMU-compatible), and the Willowbrook yard would be electrified first. Commencing GO rail electrification immediately, as envisioned in this Regional Rapid Rail report, would allow all growth to be taken on by electric vehicles that could be serviced initially only at a new Whitby EMU maintenance facility. When Willowbrook's diesel capacity needs ultimately decline, some EMU functionality could then be provided there.

**5. Union Station: Underground Component Needed**

Union Station has long been known to require expanded capacity for meeting projected 2021 demands, and there is now work underway to provide solutions to those short-term pressures. These include a new west concourse to improve crowd movement on and off platforms, and an improved signal system with modernized trackwork to increase train speeds between Cherry St and Strachan Ave. No project currently underway will add any tracks to the station.

The capacity problems at Union Station projected for 2031 exist whether the GO operations remain dieselized or are electrified. Electrification of the busiest lines, however, would create new possibilities that would not be achievable with diesel operation. Specifically, electrification would offer the opportunity to construct up to six or possibly seven tracks on an underground level beneath Union, as there would be no diesel exhaust fumes to deal with. While this is the only feasible way to add new through-tracks to Union Station, it is admittedly a costly project. Further details are provided in Chapter 12, and are summarized in section 7.8 of this Executive Summary.



## 6. Network Cost Summary (\$ Billion)

Network costs, including both fixed infrastructure and fleet capital costs and operating costs were estimated from the 2010 electrification study and from other comparable reports, reflecting professional judgment. Fleet costs are based on the assumption that diesel equipment made surplus on lines electrified in the first phase can be either reused to the end of its useful life on other diesel-operated lines in the network or resold to others. The costing methodology is described more fully in Chapter 4 and the numbers can be found in appendices A through T. These appendices are part of a large Excel spreadsheet (with some cells unlocked) that can be made available to interested readers.

### Capital Costs Between Now and 2021 (2021) and Between 2021 and 2031 (2031)

<b>Corridor</b>	<b>2021(\$B)</b>	<b>2031(\$B)</b>
Lakeshore (West & East)	\$4.56	\$1.30
Stouffville	\$0.73	\$0.00
Scarborough	\$1.72	\$0.56
Kitchener	\$2.67	\$1.43
Milton	\$0.87	\$1.14
Richmond Hill	\$0.49	\$1.31
Barrie	\$1.20	\$1.15
USRC	\$1.00	\$4.68
<b>NETWORK TOTAL</b>	<b>\$13.24</b>	<b>\$11.57</b>

Per the above table, total capital costs, in 2010-dollars, for an EMU-based GO rail system as envisioned in this Regional Rapid Rail report for meeting 2031 service levels are estimated to be \$24.81-billion. It is of interest to compare the 2031 EMU capital costs to the 2031 diesel locomotive case. This can readily be done for the existing corridors (Lakeshore, Kitchener, Stouffville, Milton, Richmond Hill, Barrie) from information in this Regional Rapid Rail report. Total capital costs for the EMU option are \$17-billion versus \$12.6-billion for the diesel locomotive option, a difference of \$4.4-billion. Excluded from this breakdown are implications for the Union Station Rail Corridor (USRC). Indications from other studies suggest that USRC track capacity expansion will be critical, but expansion of track capacity with operations based entirely on diesel locomotives renders underground operations infeasible. Therefore, track expansion in the USRC is only considered possible with electric operations. With no diesel option for new tracks in the USRC, there cannot be any comparison of costs between diesel and electric USRC options.



The difference of \$4.4-billion would pay for itself in a few years from the substantial operating cost savings the investment would yield, which are summarized below:

**Annual Incremental Operating Cost Comparison by Technology by Corridor in 2031**

Corridor	Diesel Ann. Op. Cost (\$M)	EMU Ann. Op. Cost (\$M)	Annual Difference
Lakeshore	\$383.64	\$147.64	\$236.00
Stouffville	n/a	n/a	n/a
Scarborough	n/a	n/a	n/a
Kitchener	\$146.88	\$82.75	\$64.13
Milton	\$150.88	\$84.10	\$66.78
Richmond Hill	\$101.66	\$61.24	\$40.42
Barrie (Off-Peak Fuel \$ Only)	\$67.91	\$8.47	\$59.44
<b>TOTAL</b>	<b>\$850.97</b>	<b>\$384.19</b>	<b>\$466.78</b>

Estimated operating cost savings in 2031 would exceed \$465-million/year, ensuring the additional initial investment in EMU technology would be quickly recouped by system efficiencies, and would yield substantial ongoing savings after the investment has paid itself off.



## 7. Corridor-by-Corridor analysis

The next sections provide summaries of the opportunities, challenges and costs for each corridor.

### 7.1. Lakeshore Corridor

- Electrification between Aldershot and Hamilton requires a commitment to one of the two routes through Hamilton. The ideal long-term solution from both transit planning and sustainable development perspectives for providing Hamilton with all-day GO rail service would be the continuation of operation along the CP line to connect to the current Hamilton TH&B station. The TH&B station is located in Hamilton's downtown core along Hunter St E, immediately east of James St S. It is accessed by trains to/from Toronto through the single-tracked Hunter St tunnel. An expanded Hunter St tunnel would be necessary to accommodate reliable, frequent GO rail service in co-existence with CP freight rail operations. Admittedly, this would be a costly undertaking. Consideration could be given to a comprehensive benefits:cost analysis that includes the long-term 2031 outlook – or beyond – for both freight rail activity and GO rail activity, as well as local and intercity bus activity, to determine the implications of the CN and CP routes. Publications on this subject to date do not look beyond the year 2021.
- A future rail connection from the TH&B station to St Catharines would be possible with the addition of a short turning track to connect the CP line to the CN line west of the Ottawa St N and Beach Rd intersection. DMUs could provide service between St Catharines and Hamilton, with transfers to the electrified GO line to/from Toronto made via a shared platform at the Hamilton TH&B station, with special design features providing accessible boarding for both vehicle types.
- Regarding the route from Ajax to Oshawa, in the context of an extension to Bowmanville in which the CP line is preferred from and through Oshawa, further Metrolinx evaluation would be justified in the context of a substantial GO rail service improvement through Whitby by connecting from the existing line to the CP corridor near Lakeridge Rd.
- This Regional Rapid Rail report proposes ten new stations for the Lakeshore West section of the corridor, plus the relocation of the Mimico station, and six new stations for the Lakeshore East section of the corridor west of Whitby. Nine more stations along the realignment and extension from Whitby to Bowmanville are also proposed.
- To accommodate local freight movements, this Regional Rapid Rail report proposes a section of fifth track accompanied by additional main line switches through each of the Willowbrook and Oakville yards.
- A rail-to-rail grade separation over the Hamilton junction for exclusive GO use warrants consideration as a means for providing frequent GO rail service between the Aldershot station and Hamilton. This would permanently avoid frequent conflicts with CN freight trains operating



to/from the Grimsby subdivision and/or the CN Hamilton yard. This is expected to be required even for half-hourly all-day service to Hamilton, whether Hamilton is served by the CN or CP line – as per above, the CP line is preferred.

- Eighteen new road-rail grade separations, 24 road bridge widenings, and 13 river bridge widenings would be necessary to accommodate future service levels, irrespective of vehicle technology.
- The Lakeshore corridor would yield the highest savings from EMU operations of any single corridor. Electric locomotives were found to have higher operating costs in 2021 than EMUs, and an electric locomotive-based fleet would incur higher capital cost than an EMU-based fleet.
- Fleet costs are substantial, regardless of whether diesel locomotives or EMU's are used, and are estimated to cost about \$1.8-billion by 2031.
- Fleet maintenance costs were found to be higher using EMUs than locomotive options, but were more than offset by significant energy savings, debt servicing savings and reduced labour costs.
- Costs not captured in the calculations prepared for this report include regular track wear, differences in yard and layover facility sizes/capacities, etc., but it is clear that such costs would be reduced by adopting the lighter, smaller EMU fleet.
- In the long term, EMUs will be invaluable to the Lakeshore corridor as well as to other corridors thereafter by cost-effectively and safely meeting the high demand projections of 2031 and beyond. The estimates indicate that a conversion from diesel locomotives to electric locomotives first would be a more expensive two-step transition. An electrification process that uses an EMU fleet from the outset would save money by eliminating repetitive fleet replacement long before the end of the replaced fleet's useful service life.



**7.2. Stouffville Corridor**

- Electrification from the Scarborough junction [the Scarborough GO station] to the Unionville GO station would facilitate off-peak and counter-peak EMU service south of the Unionville GO station, providing operating savings from reduced energy costs.
- Peak diesel rail service to/from Union Station and bus services between Unionville and Lincolnville/Uxbridge were assumed to continue. Co-existence of EMU and diesel locomotive-hauled trains on the same track would be very minimal
- Consider providing off-peak service to the Unionville GO station with 4-car EMU trains split from Scarborough and/or Lakeshore East trains at Lawrence East and Birch Cliff stations, respectively, as detailed in Chapter 7 and summarized in section 7.3 in this executive summary.
- Seven arterial road grade separations and two river bridge widenings would be necessary to accommodate future service levels.
- A single-track fly-under at the Scarborough junction warrants consideration to accommodate northbound Stouffville corridor (and Scarborough corridor) trains. This would permanently avoid likely frequent conflicts with westbound Lakeshore East operations.
- This Regional Rapid Rail report proposes three new stations at Finch Ave E, Ellesmere Rd, and Lawrence Ave E. The latter two are also related to the Scarborough corridor summarized in the following section.





**7.3. Scarborough Corridor**

- Conversion of the current SRT line (currently planned for conversion to LRT) from Ellesmere to Scarborough Centre to GO EMU service warrants consideration. This would avoid having two transit corridors with different technologies immediately next to one another for the 4km between the Kennedy and Ellesmere stations.
- The estimated \$500-million savings of the GO EMU option versus the LRT option could allow extension of service to Malvern with EMUs in the short-term.
- The option of operating one-seat service between Union Station and Scarborough Centre could be made available with the Scarborough corridor GO EMU service. Such an operation would lead to some alleviation of stress on the Yonge subway, as well as on transfer traffic at the Bloor-Yonge station, significantly improving the quality of transit options between downtown Toronto and various locations throughout Scarborough. This could be especially significant given the unlikelihood of new subway capacity into downtown Toronto being operational within the next 12 to 15 years.
- The ability to join together and break apart trains at the next station southwest of the Scarborough GO station – presumably the new Birch Cliff station proposed in the Lakeshore chapter of this Regional Rapid Rail report – also could alleviate stress on Union Station.
- An extension from Malvern to the north to connect with the Havelock subdivision south of Passmore Ave could serve parts of northeast Scarborough and southeast Markham. This would require approximately 3.2 km of new track, including 1.2 km underground. This would facilitate GO service to Locust Hill without operating along CP’s main line. Locust Hill GO service was envisioned in *The Big Move* utilizing CP’s Belleville subdivision. However, due to CP’s abandonment of its Ottawa Valley line, all CP freight traffic now runs through Toronto, complicating access for GO operations along the Belleville subdivision.
- The connection from the Havelock subdivision to Malvern and Scarborough Centre could also substantially reduce conflicting traffic movements at Union Station resulting from the proposed Peterborough passenger rail service, if the Peterborough (Shining Waters Railway) service were to serve Union Station.
- In total, five new stations beyond Scarborough Centre are proposed in this Regional Rapid Rail report – Progress Campus, Malvern, Morningside Heights, Box Grove and Locust Hill (all variations of proposals by others).
- Capacity differences between the LRT and GO EMU options would be of particular concern if major redevelopment initiatives do materialize at some point in the future, especially if within 500m, or possibly 800m, walking distance of an access to the Scarborough Centre station.

**7.4. Kitchener Corridor**

- The Air-Rail Link [Union-Pearson Express] will serve Pearson Airport by rail in the short-term, but to provide an optimum long-term solution for rail service between the airport and downtown Toronto, a service through the airport that utilizes the same GO EMUs that would be used for the Kitchener GO corridor would be the most efficient. This would render unnecessary the fourth Weston subdivision track, as well as an additional underground Union Station track and platform to facilitate the proposed Air-Rail Link there, among other avoidable costs. A comparison of these costs is presented in the table to the right, and indicates that both options are virtually equal at \$1.2-billion.
- Relocation of the Etobicoke North station to Islington Ave in Rexdale would provide improved access and connectivity with bus services.
- While the Air-Rail Link is in operation, construction of an airport rail access that is compatible with GO rail from the 401 crossing with the Weston subdivision could take place. This new rail access could potentially include a station at the Carlingview Dr and Dixon Rd intersection. During peak periods, an interim service model that could be considered at this point in the transition would involve splitting an EMU GO train from Toronto into an airport-bound train and a Brampton/Kitchener train at the Rexdale station. Trains would combine in the opposite direction. During off-peak periods, when demand would be lower and trains shorter, branch operations could also be considered.
- Upon completion of the new GO rail airport access, the Air-Rail Link spur now under construction could be re-purposed for LRT service into the airport as part of an extension of the Etobicoke-Finch West LRT from the Humber College North Campus, while the new GO rail access is extended north of the airport to reconnect with the existing line, providing Kitchener GO rail operations through-routed via the airport.

Infrastructure	2-Car DMU Plan (\$M)	16-Car EMU Plan (\$M)	Comment
+1 Underground Track/Platform at Union Station	\$250	n/a	Full-length track required; DMUs on surface track
+1 Rail-to-rail grade separation along Weston subdivision	\$125	n/a	Required for DMUs to get north of GO Kitchener ops in 2031
Bloor GO station 6-track layout (platforms for all tracks)	\$150	n/a	Serves Milton & Kitchener/ARL; only 5 tracks with airport through-routed ops
Parkdale GO station 8-track layout (platforms serving all tracks)	\$250	n/a	Opportunity cost - serves Barrie, Milton, Kitchener/ARL; 7 tracks if thru-routed
Weston subdivision 4th track (20km)	\$400	n/a	Not required with through-route
Electrification Incremental \$	\$15	\$0	Difference in single-track-kilometres
Additional DMUs for St Catharines	\$55	\$0	Hamilton to St Catharines fleet
Savings on Finch W. LRT Extension	\$0	(\$100)	2+km of re-purposed infrastructure
New EMU link from east of Pearson	n/a	\$1,000	First component for through-routed design
New EMU link from north of Pearson	n/a	\$350	Second component for through-routed design
<b>OPTION TOTALS</b>	<b>\$1,245</b>	<b>\$1,250</b>	

*Note: Except 4th track, all costs in above chart are rough guesstimates*



- The Georgetown South Project (expansion to a 3-track corridor and elimination of all level crossings through Toronto) essentially makes the corridor east of Highway 427 ready for expanded Kitchener GO rail service if consolidation with rail service to the airport could be realized.
- In addition to the Pearson Airport through-routed service alternative, this Regional Rapid Rail report suggests six additional stations – three in Toronto, two in Brampton, and one in Rockwood.
- The station proposed at St Clair Ave W (Harwood) in Toronto is admittedly a challenge, due to the legacy of the existing narrow grade separation at this crossing. There is an opportunity, albeit expensive, to lower the GO and CP lines and have St Clair Ave W pass over the tracks. This would allow for a wider street and improved connections with local streetcar and bus services.
- Estimated infrastructure west of Highway 427 included triple tracking, eight river bridge expansions and 18 new road-rail grade separations.
- Electrification from Union to Kitchener would achieve an estimated annual operating savings of \$5- to \$10-million by 2021, and an estimated \$55- to \$65-million by 2031. EMUs achieve higher savings in the 2031 estimate and savings are anticipated further over the electric locomotive option's savings compared with the diesel option as prices escalate over time in combination with further service level increases.
- A fourth track was included in the Halwest Junction area (immediately east of Bramalea GO station) estimate to accommodate freight traffic.



**7.5. Milton Corridor**

- The implied benefit:cost ratio for electrification of the Milton corridor is 0.94:1 based on the 2010 electrification study, a very strong score.
- This service operates on one of the most heavily used CP freight corridors. Therefore, accommodating heavy volumes of both freight and passenger services would be a key factor in corridor design. CP requires two-track freight service at all times on this corridor. Therefore, a 4-track corridor would be necessary to run frequent all-day GO service with high peak period demands, regardless of the technology selected for GO trains.
- A 4-track corridor would involve expansion of ten river crossings and six existing road bridges.
- Consider alternative solutions for two at-grade road-rail crossings where conventional grade separation would appear to be unreasonable. These two crossings are at Ontario St W and Loreland Ave.
- Consider relocation of the Kipling GO station to Islington for improved convenience and efficiency of connections between the GO system and local transit, and better integration with the urban fabric of Etobicoke Centre, an Urban Growth Centre.
- One new station proposed as part of the Reference Case (at Trafalgar Rd [Agerton]) and five more are proposed in this Regional Rapid Rail report – two in Toronto and three in Mississauga.
- Corridor property constraints combined with the demands imposed by freight and passenger services would complicate the implementation of overtake tracks, although such provisions are not impossible.



**7.6. Richmond Hill Corridor**

- This corridor presents significant potential for intercepting passenger demand that currently favours the Yonge subway. There is political pressure to extend the Yonge subway north to Richmond Hill in order to serve the growing demand north of Finch, but this would risk exacerbating capacity problems downstream. At \$4.2-billion for a 6.8km line (7.4km with satellite yard), it is an extremely expensive project.
- As cited in the recent Downtown Rapid Transit Expansion Study (DRTES) released in October, 2012, the Yonge subway faces significant capacity challenges in the future, even without an extension northward. The DRTES assumed “enhanced GO services”, but the service frequency for the Richmond Hill corridor was not modeled at a frequency better than every 20 minutes. EMUs on the Richmond Hill GO line would have the potential to provide significant Yonge corridor relief, at reasonable cost. To provide alleviation on the Yonge subway, capacity above projected demand would be necessary to absorb the diverted demand. Consider a 2031 EMU service frequency of 4.25 minutes along the Richmond Hill corridor and extending all peak hour trains and platforms from 12 to 16 cars in length. This would represent an increase from a frequency of every 5 minutes with 12-car trains for a 2031 EMU base service calculated from the 2008 modeling backgrounder published with *The Big Move*. The extra capacity could be provided at an extra cost of around \$300-million. This capacity in the system would provide the time needed for implementation of new subway capacity between Flemingdon Park and Toronto’s downtown, but it must be noted that both the Richmond Hill GO corridor and the new subway will ultimately be heavily used.
- Consider switching from the current ex-CN Bala subdivision routing to the ex-CP Don Branch routing between Lawrence Ave E and Gerrard St E for improved speed south of Lawrence Ave E. Access to the Don Branch would be provided via new, dedicated GO tracks along the CP main line using lands mostly occupied by former freight yards. Utilizing the Don Branch would shorten the route by approximately 1km. If the tracks were rehabilitated and upgraded, the Don Branch speeds between Gerrard St E and Lawrence Ave E should be at least 50% higher than what is possible on the existing Bala subdivision between those same streets.
- Utilizing the Don Branch could also allow service to be provided to Leaside, at a station located close to the high density Thorncliffe Park community, and make a possible connection with the Eglinton-Crosstown LRT near Leslie St and Eglinton Ave E, dramatically changing the ridership projection for the Leslie station along the Eglinton-Crosstown.
- Twelve new or altered stations are envisioned in this Regional Rapid Rail report, including one at Thornhill that, although more expensive than a typical GO rail station, would meet an important need and may not be possible to add at a future date due to potential complications relating to the Doncaster diamond grade separation project. No connection from the Richmond Hill corridor to the Bloor subway is proposed in this report, due to such a connection’s great complexity and probable high cost.



**7.7. Barrie Corridor**

- Significant untapped potential for growth in this corridor is known to exist, with numerous additional stations already proposed by Metrolinx (EarlsCourt, Fairbank, Downsview, Concord, and Innisfil), York Region (Kirby, Oak Ridges, and Mulock), and the City of Toronto (Wallace-Emerson). With the exception of Innisfil, all existing proposals are located on the Toronto-Bradford section of the corridor.
- This Regional Rapid Rail report generally agrees with the 2010 electrification study's conclusion that corridors should be electrified in their entirety before starting electric service in a corridor. However, the Barrie corridor could be a potential exception, with the limitation that only off-peak service be provided by electric vehicles. A surplus of fleet would be available at off-peak times since most other lines would be electric by the time the Barrie corridor is electrified, and therefore no additional electric fleet investment would be required.
- Estimated off-peak energy savings support consideration of electrification of the Barrie corridor between Parkdale and Bradford. The section between Parkdale and Union would presumably have already been electrified by this time. Peak period diesel service to/from Barrie is assumed in this Regional Rapid Rail report to continue until end-of-life of diesel equipment, unless economic or operating considerations force early retirement of diesel equipment on the Barrie corridor.
- The fuel savings estimated in this Regional Rapid Rail report for off-peak EMU service to Bradford are significant due to the 67km one-way length of trip from Toronto and quantity of fuel involved for each trip. Not estimated, but also worth consideration is that fuel consumption would rise with the substantial number of additional stations along the corridor.
- The new infrastructure to be constructed involves double-tracking Union-Bradford, new grade separations, all but one of which are in York Region, and twinning some river bridges, particularly the Holland River bridge near Bradford.
- At the Davenport diamond, where the Barrie corridor crosses the CP North Toronto subdivision, a rail-rail grade separation solution is necessary, and is one of the most expensive line items in the capital cost estimate for this corridor. This Regional Rapid Rail report suggests integrating a new GO station between Bloor St W and Wallace Ave, as has been proposed in past City of Toronto planning documents to provide an interchange with the Lansdowne station on the Bloor-Danforth subway. This would be a component of the Davenport diamond grade separation project.
- Consider approximately 5km of overtake tracks for running express services at locations to be determined.
- Consider potential road configuration adjustments in King City as an alternative solution to peak period traffic volumes around the King City GO station due to significant complications associated with a grade separation at Station Rd.
- Consider elevating the existing Aurora GO station in its current location to achieve a grade separation with Wellington St E in Aurora.



- Consider relocation of the existing Newmarket GO station to the opposite side of Davis Dr in order to enhance safety at the station by not locating the station along a curve with a large building obstructing sight lines and sound paths.
- Four additional stations beyond existing proposals are proposed in this Regional Rapid Rail report – two in Toronto and two in York Region.
- Consider relocation of the York University GO station to abut Steeles Ave W to connect with bus services.
- Consider a short reinstatement of tracks to a downtown station in Barrie, to connect with the Downtown Barrie Bus Terminal.
- There may be freight traffic management concerns between Finch Ave W and Steeles Ave W requiring scheduling agreements in coordination with CN and CN customers.



**7.8. Union Station Rail Corridor (USRC)**

- The USRC is a special part of the network where every train ultimately operates. This creates significant challenges as a consequence. Modeling a design in this corridor capable of meeting 2031 service levels that match *The Big Move* projected demands was the most complex part of this Regional Rapid Rail report.
- Work currently underway on track layout and platforms is expected to provide the capacity required for projected demands at Union Station until 2021.
- Metrolinx recently published two studies on the USRC: *The Union Station and Union Station Rail Corridor Capacity Study* and the *Union Station Demands and Opportunities Study*. Results of these studies indicated that four new underground tracks would be needed at Union Station by 2031 in order to accommodate approximately 90 trains through the station during the AM peak hour. An alternative proposal presented in the aforementioned studies that involved a satellite terminus between Spadina and Bathurst serving the Georgetown and Barrie corridors would appear to encounter operating complications in the medium- to long-term.
- In addition to extra tracks, future improvements to platforms and pedestrian management will still be needed to meet 2031 demands; i.e. meeting the need to safely empty a train of 1,500-2,000 passengers in less than 2 minutes.
- The analysis in this Regional Rapid Rail report agrees with the aforementioned reports that a total of 18-19 tracks will be needed at Union Station by 2031. That suggests that 3-4 new underground tracks at Union Station would be essential if unreliable peak period service on GO rail corridors is to be avoided. VIA Rail Canada may also be affected in the absence of new underground tracks. A conceptual track assignment model that would maximize corridor capacity for 2031 demands was developed in this Regional Rapid Rail report. This included providing track and platforms for VIA Rail Canada in addition to GO Transit. The analysis indicated that the Lakeshore corridor was best to move underground, and included the provision for future additional underground tracks at Union Station to be added when necessary.
- To avoid conflicting train movements between busy GO operations and VIA Rail Canada's "The Canadian" train through the Union Station Rail Corridor, consider having "The Canadian" use the Stouffville corridor with a connection to the existing transcontinental alignment near Beaverton. This would involve the restoration of about 50km of abandoned rail corridors between Beaverton and Uxbridge, comprising sections of three different railway subdivisions. This approach would be less costly than very complex alternatives confined to the rail network that is currently operational.





- Consider shoulder stations at the east and west ends of the USRC to increase route choice for riders and reduce the number of alighting passengers in the morning peak period at Union Station. Trains scheduled to terminate in the downtown core would pass through Union and terminate at a shoulder station beyond Union, with possible exceptions for a small number of trains to/from the Willowbrook yard. To the west, a station could be located at Fort York (Bathurst St and Front St W). The current Exhibition station may require relocation to Dufferin Gates as a result of its close proximity to the Fort York station. To the east, a new station could be located at the Distillery District (between Parliament St and Cherry St). Lakeshore train service at both shoulders would be at an underground level due to a lack of space to ascend sooner in the western section of the USRC and to frequent, closely spaced road-under-rail crossings in the eastern section of the USRC. At Fort York, westbound Kitchener trains and some eastbound trains would be a few meters below grade – but still open-air – to allow a platform to be installed beneath adjacent tracks.
- Interchange opportunities with a new east-west subway across the downtown core would enhance the GO rail network’s versatility and conveniently serve a greater number of origin-destination pairs. An interchange would be especially opportune at Fort York, where a comparable proposal appeared in the *Union Station 2031 Demands and Opportunities Study*, except that no terminating operations eastbound at Fort York are envisioned in this Regional Rapid Rail report and all lines would serve the Fort York station. Similar opportunities for a connection east of Union Station would also be worth considering, but the alignment of a new east-west subway has far more potential alternatives east of Yonge St than west of Yonge St.
- In order to divert large numbers of GO rail passengers away from Union Station by means of shoulder stations, it would be very beneficial for employment concentrations to expand on an east-west axis within the precincts adjacent to or otherwise within walking distance of the USRC. Currently, employment concentrations have been oriented along the north-south axis that follows the Yonge and University subway lines.
- At the Bloor GO station, only Kitchener trains currently provide service while Milton trains pass the station without stopping. Metrolinx has expressed a desire for both trains to serve the Bloor GO station, but the limited available space precludes six tracks through the station. Were the airport to be served by regular GO trains instead of a separate service with a different fleet, five tracks at the Bloor GO station would be sufficient for both Kitchener and Milton corridors to serve the station.
- Consider additional stations at Parkdale, Riverdale and Cabbagetown if it can be confirmed that TTC services connecting with these stations could handle the projected AM peak surge loads. Both the Parkdale and Cabbagetown stations could be positioned to serve northern areas of the downtown core by means of enhanced streetcar infrastructure, if they would not be overwhelmed by the demand. The Riverdale station might serve a connection with a new east-west subway line, depending on its alignment.



**7.9. Network and Implementation Issues**

- The service frequencies that would be needed to meet the demands projected in *The Big Move* would require a Positive Train Control signaling system in order to facilitate the closer spacing of trains. This would be applicable for all GO trains, as well as VIA Rail Canada trains serving the Greater Toronto and Hamilton Area.
- As trains enter stations, train bells must be sounded to meet the requirement of the Canadian Rail Operating Rules. To protect smart growth development opportunities around stations and avoid complaints from neighbours about the frequent noise of the bells when service becomes much more frequent, most GO stations should be upgraded to include an arched ceiling with a suitable acoustic lining and speakers pointing into this arch. Rural stations such as Gormley and stations near freight yards such as Aldershot would not need such upgrading.
- Consider two additional layover yards, one each west and east of Union Station, to accommodate the large number of trains that will require a layover location between the morning and afternoon peak periods by 2031. In the west, the most favourable location may be CP’s Obico intermodal terminal (southwest of Kipling GO station), which has recently ceased operating. In the east, the most favourable location would likely be somewhere on the Havelock subdivision – where land may be found – on the conceptual Scarborough corridor.
- To support an all-day GO rail service model, expansion of local transit services would play an essential role given the inherent constraints associated with park-and-ride facilities for a rail network that is radial with respect to the downtown core. All issues associated with coordinating the various transit services would be determined in negotiations with local transit agencies.
- It is recognized that new stations would not be opened simultaneously on any given corridor. Some new stations would be implemented sooner to meet latent demand as service frequencies improve to provide more capacity, while other new stations would be part of broader planning opportunities relating to sustainable development and smart growth. This would also represent a good opportunity to build public and political acceptance of regional rapid rail.
- Based on a 2008 study of the Lakeshore corridor, the timeline to electrify each corridor is expected to be 7-8 years, including environmental assessment, design, construction, and commissioning. It would be feasible, and conceivably more efficient, to stagger multiple corridors’ workflows. This would facilitate dramatically more expedient electrification of the network as a whole. The most efficient means of electrifying an existing rail corridor is to use what is known as a multi-function “factory train,” which is like a rail-mounted assembly line that typically operates during overnight periods, electrifying approximately 1.6 single-track-kilometres per night.
- The timeline envisioned in this Regional Rapid Rail report for electrified revenue service to be phased in is roughly as illustrated in the table on the following page. While this sequence has been used for estimating purposes, policymakers could change the prioritization sequence.

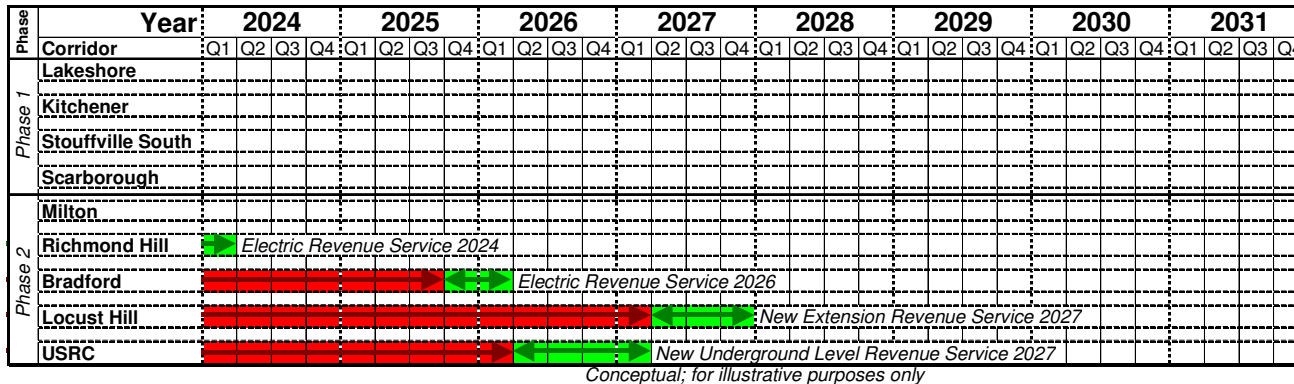
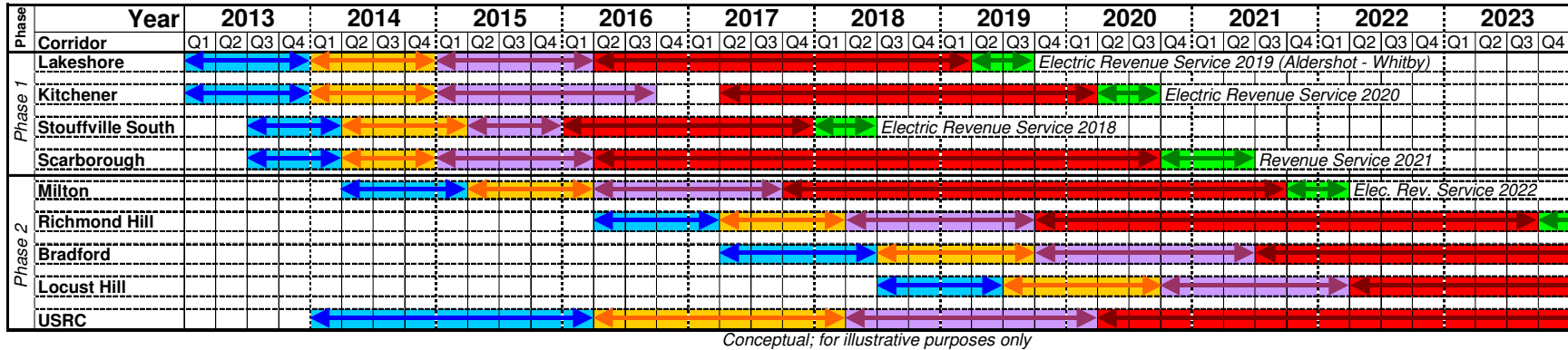


Conceptual Roll Out of GO Electrification

Phase 1			
Corridor	Segment	Elec. Ops. Start	Notes
<b>Stouffville South</b>	Kennedy to Ellesmere	2017	Necessary EA approvals already in place from SRT
	Ellesmere to Unionville	2019	Also includes Scarborough Junction to Kennedy
<b>Lakeshore</b>	Hamilton to Bowmanville	2019	Hamilton (TH&B) may require more construction time
<b>Kitchener</b>	Kitchener to Toronto	2020	Excludes through-routed Pearson service
<b>Scarborough</b>	Ellesmere to Malvern	2021	No factory train – new rapid transit construction
Phase 2			
Corridor	Segment	Elec. Ops. Start	Notes
<b>Milton</b>	Milton to Toronto	2022	Runs to Distillery District east of Union Station
<b>Richmond Hill</b>	Toronto to Richmond Hill	2024	Can alleviate Yonge Subway with additional fleet
<b>Barrie</b>	Bradford to Toronto	2026	Consider reinstatement of line into downtown Barrie
<b>Underground USRC</b>	Parkdale to Riverdale	2027	Surveying, design work, etc. should start as soon as possible
<b>Kitchener</b>	Rexdale to Pearson	2028	Corridor through-routed via Pearson Airport
Phase 3			
Corridor	Segment	Elec. Ops. Start	Notes
<b>Scarborough</b>	Malvern to Locust Hill	2029	New construction connects with Havelock subdivision
<b>Stouffville North</b>	Unionville to Lincolnville	2036	Approximate end of life of current locomotives
<b>Barrie</b>	Barrie to Bradford	2036	Approximate end of life of current locomotives

**GREATER HAMILTON REGIONAL TORONTO AREA RAPID RAIL**

A hypothetical implementation plan may look comparable to the following project schedule:



- LEGEND**
- Preliminary Design (10%)
  - Environmental Assessment (30%)
  - Detailed Design and Procurement (100%)
  - Execution/Construction
  - Commissioning



## 8. Conclusions

The *Big Move* projections for the future of the GO rail lines are ambitious, with some lines being called upon to carry more than 20,000 passengers per hour per direction (i.e. a train every 3½ to 5 minutes). The key conclusion of this Regional Rapid Rail report is that these projections prepared for *The Big Move* can be met if the capital required for the prerequisite infrastructure enhancements can be made available - electrified rail lines using EMUs, numerous new stations for better local transit integration, Positive Train Control, and all-day service every 15 minutes (or better). Indeed, on the basis of passenger capacity per dollar of capital expenditure, a GO EMU approach would be substantially more cost-effective than other rapid transit technologies, such as subway, LRT, or BRT.

Corridor	2021(\$B)	2031(\$B)
Lakeshore (West & East)	\$4.56	\$1.30
Stouffville	\$0.73	\$0.00
Scarborough	\$1.72	\$0.56
Kitchener	\$2.67	\$1.43
Milton	\$0.87	\$1.14
Richmond Hill	\$0.49	\$1.31
Barrie	\$1.20	\$1.15
USRC	\$1.00	\$4.68
<b>NETWORK TOTAL</b>	<b>\$13.24</b>	<b>\$11.57</b>

The cost analysis shows that, by 2031, annual network operating costs for EMUs are estimated to be \$467-million less than diesel locomotive-hauled consists, which should spur a greater urgency to electrify as quickly as possible. Furthermore, of the \$17-billion

capital cost for the 7 existing rail corridors (not including the USRC), the cost analysis also shows that about 74% of the total would comprise costs associated with accommodating the required service levels, as well as new stations that have been included in existing plans. Including the purchase of the EMU fleet, the electrification costs (\$2.7B) represents only 18% of the \$17-billion total and could be readily recouped by the aforementioned operating cost savings. The remaining 8% includes the cost of Positive Train Control, and new stations that were not part of existing plans at time of writing.

The vision outlined in this Regional Rapid Rail report, which corresponds with much of what *The Big Move* envisions for the GO rail system as a whole, cannot be achieved without the Union Station Rail Corridor being expanded by means of a new underground track level. Running DMUs every 15 minutes in both directions would consume disproportionate Union Station Rail Corridor resources at its most constrained point. A transition strategy that re-purposes the DMU infrastructure as LRT infrastructure could be worth considering in an effort to avoid difficult operating complications developing in the Union Station Rail Corridor at some point between 2021 and 2031.

It is proposed in this Regional Rapid Rail report that the DMUs already purchased for the Air-Rail Link be reassigned to operate between the Hamilton TH&B station and St Catharines (or elsewhere

in the Niagara region), as the ridership projections and patterns published in the EA for expansion into the Niagara region would not support full-length GO trains.

In large part, this Regional Rapid Rail report reflects the conclusions of the report “No Little Plan” written by Greg Gormick in 2011. It is also remarkably consistent with a little-seen “Super GO” report from 1974 prepared for the Ontario Government’s then-Ministry of Transportation and Communications that analyzed electrification of the Lakeshore corridor.

The most influential factor relating to operating costs resulting from electrification was energy cost. Notable was the very wide increase in the gap between fuel options between the 2021 and 2031 horizons.

It is essential to highlight the sensitivity to the price of diesel fuel, as the price of oil is known to be volatile and therefore difficult to predict. The price of a barrel of oil went up

**Energy Cost Sensitivity Analysis for 2021 & 2031**

Average Annual Price Increase		Annual Network Operating Savings (\$M)	
Diesel	Electric	2021	2031
6%	6%	\$43.00	\$305.58
6%	7.5%	\$37.24	\$268.57
6%	9%	\$30.61	\$219.64
6%	10.5%	\$23.00	\$155.21
6%	12%	\$14.29	\$70.69
<b>7.5%</b>	<b>6%</b>	<b>\$62.66</b>	<b>\$466.78</b>
7.5%	7.5%	\$56.89	\$429.76
7.5%	9%	\$50.26	\$380.83
7.5%	10.5%	\$42.66	\$316.40
7.5%	12%	\$33.94	\$231.88
9%	6%	\$85.57	\$682.84
9%	7.5%	\$79.80	\$645.82
9%	9%	\$73.17	\$596.89
9%	10.5%	\$65.57	\$532.46
9%	12%	\$56.86	\$447.94
10.5%	6%	\$112.23	\$971.26
10.5%	7.5%	\$106.46	\$934.25
10.5%	9%	\$99.83	\$885.32
10.5%	10.5%	\$92.23	\$820.89
10.5%	12%	\$83.51	\$736.37
12%	6%	\$143.17	\$1,354.80
12%	7.5%	\$137.41	\$1,317.78
12%	9%	\$130.78	\$1,268.85
12%	10.5%	\$123.18	\$1,204.42
12%	12%	\$114.46	\$1,119.90

*Debt interest rate and average labour cost increase changes had negligibly small impacts.*

by 550% between early 2002 and early 2012, and gasoline prices in Toronto have doubled over the last 10 years, which is equivalent to a 7.5% annual average increase. This is indicative of the enormous risk inherent in choosing to maintain dependence upon diesel motive power. Such a decision could lead to particularly serious consequences if there is a sharp increase in the costs of oil production as new sources become increasingly difficult to extract in a safe and environmentally responsible manner. Potential instability of certain major oil producing regions is another factor to consider seriously.

The sensitivity analysis relating to energy costs set out in the table on this page supports the assertion that the methodology applied in this Regional Rapid Rail report is reasonably conservative, in that it is based upon recent and established trends. This has very serious ramifications for future provincial budgets in the form of subsidies, or for sharp increases in transit fares on the GO rail system. Electrification would offer a safeguard against such volatility.



Regarding capital cost estimates between now and 2021, there is a great deal of common ground between this Regional Rapid Rail report and the requirements associated with the “Next Wave” of *The Big Move* that was being promoted at time of writing. One element of the comparison that would be necessary to consider is the issue of subway network capacity constraints. The Scarborough GO corridor is particularly relevant to this, as proposals such as the SRT (LRT) that would feed more riders onto the Bloor-Danforth subway would push demand above what it can carry while the Scarborough GO rail corridor proposed in this report would alleviate the Bloor-Danforth subway. As was discussed in Chapter 7, capacity expansion on the Bloor-Danforth subway would be complicated. A value of \$1-billion was assigned as a representation of this cost, although this may be understated, and includes a new yard and its connecting tracks, new fleet, and new pocket tracks to enable trippers similar to what is done on the Yonge subway during the morning peak period. Therefore, most of the costs between now and 2021 would not be “new money.”

While there is a lack of information publicly available for constructing a comparison over the 2021-2031 period, the costs of proposals in this Regional Rapid Rail report between now and 2021 can be reconciled with the “Next Wave” and the SRT. While the capital cost estimate from not 2021 is \$13.2-billion, existing plans and network requirements are worth \$11.5-billion, a \$1.7-billion difference, as detailed in the following table:

**Reconciliation up to Year 2021**

GTHA Regional Rapid Rail		The Big Move [Next Wave]			
Item	Cost (\$B)	Cost (\$B)	Item	Funding Status	Funding Description
Diesel Case (7 Corridors)	\$6.0	\$4.9	All-Day 2-Way Service (5 Corridors)	Requested	Funding requested
Lakeshore Electrification	\$0.9	\$1.7	Lakeshore Electrification	Requested	
Kitchener Electrification	\$0.6	\$0.9	Kitchener Electrification	Requested	
<b>Subtotal</b>	<b>\$7.5</b>	<b>\$7.5</b>		Requested	Total funding requested
Scarborough Corridor	\$1.7	\$1.8	SRT	Committed	Total funding in hand
<b>Subtotal</b>	<b>\$1.7</b>	<b>\$1.8</b>			
USRC Expansion	\$1.0	\$0.0	N/A (1)	None	Need identified in USRC study, but no estimate
Stouffville Electrification	\$0.1	\$0.0	N/A	None	No corresponding project or plan
Additional Stations, PTC, Misc	\$1.7	\$0.0	N/A	None	
Pearson Thru-Route	\$1.2	\$1.2	Air-Rail Link Accommodation (2)	Unidentified Need	Weston S/D 4th trk, fly-over, USRC req.ts, etc. for shuttle
N/A	\$0.0	\$1.0	Subway Capacity Expansion (3)	Unidentified Need	Various essential projects with no funding identified
<b>Subtotal</b>	<b>\$4.0</b>	<b>\$2.2</b>		Unfunded	No funding
<b>Total</b>	<b>\$13.2</b>	<b>\$11.5</b>	Total Funding Needs		

Notes:

1. USRC expansion with four underground tracks was recommended in the US & USRC Track Capacity Study
2. Air-Rail Link accommodation is estimated to be expensive to allow co-existence between expanded GO service and ARL service
3. More subway capacity required in the absence of the Scarborough Corridor and existing GO rail corridor capacity-boosting improvements.



This Regional Rapid Rail report draws attention to 17 items that would have significant impacts in relation to a more sustainable GO rail system being achieved within a reasonable period of time. Although all are important, the following, which have network-wide impacts, are especially critical:

- Replacement of the diesel fleet expansion plans and with a fleet plan based on EMUs.
- Revision of the parameters of the contract being prepared for the Whitby maintenance facility.
- Initiation of planning and design work for a new underground level through the USRC at the earliest opportunity.
- Development of a strategy to transition the Air-Rail Link service as it is currently envisaged into an operating model in which Kitchener GO rail EMU service would through-route via Pearson Airport. The current Air-Rail Link model would consume USRC resources that are disproportionate to its potential ridership and could be a significant contributor to operational complications over the long-term.

Queen's Park frequently reiterates its existing commitments to GTHA transit totaling \$16-billion as the largest in Ontario history. However, in the context of three decades' worth of required catch-up (not to mention inflation), \$16-billion does not go as far as one might wish,

particularly when underground infrastructure projects are involved. To ensure the GTHA stays competitive, additional investment by Queen's Park will be required. This would most likely be achieved by means of new revenue mechanisms. The GO rail system is the most valuable regional transportation resource the GTHA has, but it can be much better. The system clearly has enormous potential, especially with EMUs (the most cost-effective option), if Queen's Park decides to invest in that system. There has to be dedicated, visionary leadership at Queen's Park, similar to that demonstrated by Premier John Robarts in the 1960s that resulted in the debut of GO Transit service between Pickering and Oakville, and also resulted in the guaranteed loan for then-Metropolitan Toronto to assist with the construction of the Bloor-Danforth subway, which was instrumental in bringing forward the opening date of the Keele to Woodbine section from 1969 to early 1966.

It is physically feasible to make this transformation in GO service happen if the leadership at Queen's Park is seriously committed to keeping the GTHA the envy of most other regions across North America – as Premier Robarts demonstrated a generation ago. Will Queen's Park lead, and help secure the requisite funding and legislative support? The region's future depends on it.