KPMG

QUÉBEC/ONTARIO HIGH SPEED RAIL PROJECT

TRENDS IN INTERCITY PASSENGER TRANSPORTATION

AND GOVERNMENT SUPPORT

Final Report

Prepared for

Steering Committee
Québec-Ontario High Speed Rail Project

Submitted by

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NOTE TO THE READER

This document is KPMG's final report for the Québec-Ontario High Speed Rail Project component study entitled "Trends in Intercity Passenger Transportation and Government Support".

The report is a synthesis of the several stages of the study which have covered trends in intercity passenger transportation and government support for public modes, as well as the potential impacts on those modes of High Speed Rail, if it were to be introduced in the Québec-Windsor Corridor.

The report presents the principal findings and conclusions of the "Trends" study, drawing on the contents of the several interim reports that have been prepared. Those reports present the results of the research and analyses undertaken to develop the study's "Reference Scenario", to estimate current and projected subsidies provided to the transportation modes in the Corridor, and to analyze the potential impacts of high speed train service on the other modes as well as the potential availability of subsidy support for High Speed Rail.

Additional explanatory details are provided in those reports and in their appendices.

The "Trends" study drew on numerous sources including the broad-based literature on the future of intercity travel, recent studies (such as the Royal Commission on National Passenger Transportation), and other expert opinion gathered through consultations and a workshop. KPMG wishes to thank all those who contributed to the study.

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Executive Summary

The overall objective of the Québec-Ontario High Speed Rail Project is to recommend "whether or not the Governments of Canada, Ontario and Québec should decide to initiate and/or support the development of high speed passenger rail services in the Québec/Windsor corridor." The answer to this question has required, among other things, an analysis of the potential impacts that High Speed Rail would likely have on other public modes and on the availability of government support in the form of transportation subsidies. The execution of that analysis was the objective of the component study entitled "Trends in Intercity Passenger Transportation and Government Support".

This report presents the principal findings and conclusions of the "Trends" study in two parts: Current Status of Modes and Government Support; and Trends in Intercity Passenger Transportation. The first section covers the current situation of intercity passenger transportation in the Québec-Windsor Corridor, including the level of subsidies provided by government. The second section covers the projected future of intercity passenger transportation in the Corridor with particular emphasis on the impacts that HSR may have on the other public modes and on the potential availability of government subsidies for HSR.

A. Current status of modes and government support

1. Current status of modes

The Québec-Windsor Corridor network provides a range of transportation infrastructure and modal services that respond to the traveling public's requirements for longer and shorter trips at a range of speeds and prices.

Project research indicates that in 1992, almost 109 million intercity passenger trips were made in the Corridor, over 90% of which in a private automobile. Of the remainder, approximately 4% were made by air and about two and one-half percent each by bus and rail.

Among the public modes, air provides the most rapid service—at the highest price—and, almost without exception, the greatest frequency of service. It rivals the automobile for trips between Toronto and Montréal, carrying 40% of the traffic between those two cities. Generally, rail appeals more to travelers making longer trips while bus appeals to travelers making shorter trips.

Previous Corridor traffic data and the High Speed Rail Project research suggest that, among the public modes, air traffic has grown at the rate of approximately 2% per year since the mid 1970s, although traffic declined slightly during the period 1988-1992. Bus ridership in the Corridor reflects the more broadly experienced declining appeal of this mode for scheduled service. Rail has lost some ground too, but some of the loss has been due to cuts in service (e.g., Toronto-Kingston, Toronto-London routes).

The public mode carriers have had to struggle and adapt in recent years to meet the challenges of intermodal and intramodal competition. The air mode is recovering from massive losses in 1992. VIA Rail faces cuts to its direct subsidy.

From a financial point of view, the Corridor's public modes have all experienced challenges in recent time. Within its regulated environment, the intercity bus industry has, in spite of declining ridership, maintained its financial position. This has been due to both its exclusive rights to provide service and the additional sources of revenue found in charter and parcel express markets. VIA Rail, the only provider of scheduled conventional rail service in the Corridor, has, over the years, been under varying degrees of pressure from government to reduce its requirement for capital and operating subsidies. The Royal Commission on National Passenger Transportation recommended that subsidies to VIA be phased out completely by the year 2000. Air Canada and Canadian Airlines have experienced severe financial pressures over the past few years and incurred significant losses in 1992. Both carriers improved their financial results during 1993, and both have reported further improvements for 1994.

2. Current status of government support

Support to the Corridor's modes in the form of subsidies is most significant for VIA Rail which is the only mode that receives a direct operating subsidy. The air mode also receives a net subsidy from government, while the auto and bus modes provide a surplus to government through taxes and fees collected, excluding the effect of environmental and accident costs.*

The federal and provincial governments support the Québec-Windsor transportation network through the provision and maintenance and, in some cases, operation of infrastructure that is used by the three public modes and the private automobile. This includes the Corridor's intercity roadways, airports (those not operated by local authorities) and rail infrastructure and equipment, as well as the provision of land. The difference between the revenues that governments collect from fuel taxes,

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* *The effects of environmental and accident costs are excluded from the analyses carried out in the "Trends" study. These costs have been analyzed in a separate component study carried out by Dessau Inc.*

registration and licence fees, and landing fees and air ticket taxes at airports, and the costs incurred for the construction, operation and maintenance of the infrastructure and services provided is the public support or subsidy provided to the users of the Corridor's transportation network.

The forecasters for the HSR Project did not provide to the "Trends" Study passenger-kilometre data by mode and O-D for 1992 consistent with the rest of the ridership data supplied. Consequently, it was not possible to calculate the total dollar subsidies currently provided by governments to each of the public modes and the private automobile in the Corridor. However, the subsidies provided can be compared on a cents per passenger-kilometre basis. Excluding environmental and accident costs (which have been analyzed in a separate component study), the automobile and bus modes more than pay their share of government costs through the revenues governments collect from them. The rail and air modes, however, do not pay their share. For example, in the Toronto-Montréal segment of the Corridor, government provides a net subsidy to VIA of almost 13 cents per passenger-kilometre and a net subsidy to the air mode of almost 2.5 cents per passenger-kilometre.

B. Trends in intercity passenger transportation

1. Future of intercity passenger transportation in the Corridor without HSR

Without High Speed Rail, the Corridor's transportation network will resemble the current conditions of service frequency, fares (in current dollars) and travel times. Capacity will increase somewhat with incremental infrastructure additions and the use of higher capacity equipment.

Intercity passenger transportation in the Québec-Windsor Corridor in the first quarter of the 21st century will be influenced by socio-economic and policy factors as well as trends related to vehicle technology, fuel prices, the capacity of the Corridor's transportation network, and the traveling public's choice of mode. Key among these trends will be slower general passenger and business travel growth; indebtedness of North American governments; increased environmental sensitivities; increasing real hydrocarbon fuel prices; limited additions to the Corridor's network capacity; and the maintenance of the automobile as the dominant mode of intercity travel.

The combined effect of these trends will be a network whose current capacity, with modest upgrading, will be adequate for all modes until the latter years of the quarter-century, given the expected additions of newer design equipment at the beginning of the new century—for example, larger capacity aircraft. Frequency of service is not expected to increase, and the greater capacity of new equipment will

absorb the growth in passenger traffic. Fare levels for the public modes are projected to remain relatively constant in real terms, although intercity bus fares will decrease if the industry is deregulated. Productivity improvements will be made by all modes, but rising input costs (e.g., fuel taxes after 2005) will put some pressure on fares, including those of the airlines, in spite of their increased use of more fuel-efficient aircraft.

VIA Rail and Transport Canada project that conventional rail passenger service will continue to be provided by VIA during the planning horizon if High Speed Rail is not introduced. Operating subsidies will continue to be provided by the federal government, but will be reduced at the rate of approximately 2% per year resulting in a direct operating subsidy of $52 million in 2005, declining to $34 million by 2025 (in 1992 dollars).

Complete cost recovery will take effect during the first quarter of the 21st century as government's net subsidy in 2005 turns to a net surplus by 2025.

The subsidy burden on governments will also decrease for modes other than rail as cost recovery takes hold. The auto and bus modes—already net contributors to government coffers, excluding environmental and accident costs—will increase their shares, returning combined net annual revenues of $57 million in 2005 and $229 million in 2025 (in 1992 dollars). The subsidy to the air mode will also decrease on a per passenger-kilometre basis, generating a total annual cost of $59 million in 2005 and $64 million in 2025. Combining all modes in the Corridor, the impact on governments will change from a subsidy of $54 million in 2005 to a surplus of $131 million in 2025.

2. Future of intercity passenger transportation in the corridor with HSR

High Speed Rail will be most disruptive to the air mode, diverting up to one-half of the airlines' traffic by 2025. Air service is expected to continue, but the airlines will need to make major adjustments to operations and costs in order to remain viable. Conventional rail will essentially disappear from the Corridor.

The introduction of High Speed Rail in the Corridor will provide an attractive alternative that will cause riders to divert from the mode they would have chosen if HSR were not available. This will lead to adjustments in operations by the other public mode carriers in an attempt to retain ridership. The "composite" traffic forecasts, prepared by the Project's team of traffic planners* and provided to the

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* *The firms of Charles River Associates, Canarail/Sofrerail and TEMS prepared separate forecasts for the High Speed Rail Project which were used to develop a "composite" forecast. The composite forecast was provided to KPMG for the analysis of impacts on other modes.*

"Trends" study, did not explicitly reflect such adjustments. As a result, the evaluation of the impacts of HSR on the other public modes reported in this document includes a sensitivity analysis reflecting both 10% higher and 10% lower HSR ridership.

The traffic forecasts indicate that the addition of HSR to the Québec-Windsor Corridor will essentially replace conventional rail and will divert from one-third to one-half of the airlines' passengers (depending on the HSR technology chosen*). HSR will also entice up to 9% of auto travelers out of their private cars by the year 2025 (again, depending on the HSR technology chosen). Diversion of traffic is less severe for the bus mode, since bus operators are expected to pick up new passengers from residual rail travelers (i.e., conventional rail users who do not divert to HSR) and from the small communities that will lose rail service. In fact, bus ridership is expected to increase by 11-13% if only the Montréal-Toronto segment of the Corridor is provided with high speed service.

Conventional rail would be replaced by HSR (unless only the Montréal-Toronto segment of the Corridor were built—in which case, conventional service would still be provided at the ends of the Corridor), and net losses for intercity bus would be relatively modest, given the price sensitivity for the vast majority of bus users. It is the air mode that would be most affected by the implementation of high speed train service. The forecast loss of traffic and revenues would be a significant shock to the airlines. As a result of traffic diversions, the airlines would avoid by 2025 $550 million of annual operating expenses and $72 million of annual aircraft ownership costs. In addition, in order to counter the effect of lost revenues, they would need to reduce annual operating costs by $100 million.

Air carriers would continue to provide service within the Corridor if HSR is implemented. However, they will need to make significant adjustments to their operations to remain viable. Airlines can be expected to reduce their number of daily departures, and in some cases switch to smaller aircraft. They will also be required to make major reductions to overhead and administrative costs.

High Speed Rail will reduce or eliminate the direct subsidy to conventional rail. But sizable diversions of traffic from the air and auto modes will reduce fuel taxes, landing fees, and other sources of revenue from those modes. Thus, the short term "savings" available to support HSR will be offset in the longer term.

The redistribution of passenger traffic in the Corridor as a result of HSR will affect the revenues that governments generate (e.g., fuel taxes) and their expenses (e.g., roadway repair and maintenance costs, subsidy for VIA Rail operations). These

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* *The technologies include both 200 kph and 300 kph options. There are also options to provide service for the full length of the Corridor or to limit it to the Montréal-Toronto segment.*

changes will result in different subsidy patterns among the modes—the net subsidy will decrease in some cases and increase in others. The most significant change is the reduction/elimination of operating subsidies for conventional rail service. However, these savings would likely be offset by higher net subsidies for the air and automobile modes which, without the introduction of HSR, would be moving toward cost recovery for air and increasing cost recovery for auto. Subsidies for these modes would increase because a significant portion of highway, airport, and air navigation costs are fixed, while government revenues from these modes (e.g., fuel taxes, landing fees, air ticket taxes) are mostly variable.

If HSR were to be implemented, including the reduction or elimination of the operating subsidy to conventional rail, total government subsidies would be cut in the short term (in year 2005) by approximately $30-50 million per year, depending on the HSR technology chosen. These "savings" represent a potential source of annual government support for HSR. In the longer term, however, the savings would likely be diminished, then lost completely, as diversions from the automobile and air modes would prove costly in lost fuel taxes, landing fees, and air ticket taxes. Without HSR, governments would likely generate an annual surplus of more than $130 million by 2025, excluding the effects of accidents and pollution. With HSR, the annual surplus would be reduced by $14-38 million, depending on the HSR technology chosen, also excluding changes in the effects of accidents and pollution.

If HSR traffic were 10% lower than forecast, the impacts on the other public modes would be approximately 10% less severe, and the annual availability of incremental government support in the form of subsidies would be about 10% greater in the short term. If traffic were 10% higher, the impacts on the other public modes would be about 10% more severe, but this marginal increase in diversion would not be fatal for air services in the Corridor. An increase in HSR traffic would also result in a reduction of some 10% of incremental government support in the form of subsidies, an amount of $4-5 million per year for the full Corridor options.

C. Conclusion

The principal impacts of High Speed Rail service in the Québec-Windsor Corridor on the other public modes and on potential government support for the new service may be summarized as follows:

High Speed Rail service will have a substantial impact on the air carriers, but the effect on the bus mode will be modest and, in fact, positive in some cases. Air carriers would continue to provide service in the Corridor, especially because the traffic is relatively more profitable than some other business segments of the airlines' networks. Service would likely be somewhat reduced and smaller aircraft might be used in some cases.

During its initial years, HSR service will reduce governments' subsidies, principally by the elimination of the direct subsidy to conventional rail. In the longer term, however, the diversions of traffic to the high speed train will offset the earlier savings by an increasing loss of user tax and fee revenues over mostly fixed transportation infrastructure costs which governments will not be able to avoid. Thus, on balance, the effect of HSR on government subsidies would be neutral. As a consequence, the potential support for High Speed Rail in the form of indirect subsidies would be limited.

I

Current Status of Modes and Government Support

The current status of intercity transportation modes in the Québec-Windsor Corridor and of government support provided to those modes serves as a baseline on which future scenarios can be built to measure the potential impacts of High Speed Rail. This section describes the current status of the Corridor's transportation modes in terms of their ridership, services and financial performance and of the government support they receive in the form of subsidies.

A. Current Status of Modes

Intercity passenger transportation in the Québec-Windsor Corridor is provided by three public modes—bus, conventional rail, and air—and the private automobile. Exhibit I-1 presents a profile of estimated total passenger traffic by mode in 1992 for 21 city pairs in the Corridor.*

Exhibit I-1
Passengers by mode, 1992 (thousands)

Bus	Rail	Air	Auto	Total
2,563	2,915	4,086	98,993	108,557
2.4%	2.7%	3.8%	91.1%	100.0%

Ninety-one percent of the Corridor's total traffic is carried by automobile, with the balance (9%) carried by the public modes. However, the modal shares of intercity traffic differ by city pair. For example, whereas travel by air represents 3.8% of all trips in the

* *Detailed information for city pairs in the Corridor is available in Consumer Contact's "Travel Intercept Surveys, Final Report", October 1994.*

Corridor, it accounts for 40% of trips made between Montréal and Toronto. The shares of trips made by bus and rail are similar for the entire Corridor, with bus generally accounting for more passengers on shorter trips and with rail accounting for more passengers on longer trips.

The Corridor's public modes provide a range of service characteristics in response to the public's travel requirements. Exhibit I-2 presents selected characteristics of the Corridor's public modes for several principal city pairs (as of 1992). Air provides the most rapid service and, almost without exception, the greatest frequency of service in the Corridor. Bus provides more service than conventional rail but is slower in almost all cases.

The following sections present a brief profile of each of the public modes and of the private automobile.

1. Intercity Bus

At present, there are five carriers providing the majority of scheduled bus service in the Québec-Windsor Corridor. Entry, pricing, and exit are provincially regulated in the Canadian intercity bus industry. Typically, an intercity carrier is licensed to provide exclusive scheduled service on a lucrative route in combination with an obligation to service lower density routes, which are marginally profitable or unprofitable, in the more rural areas of the province. However, it is possible that the industry will be deregulated as has been the case in the United States since 1982.

Except where noted, all service is provided with conventional 43 or 47-seat coach equipment:

- Orléans Express provides service between Montréal and Québec City. Service is provided with a mixture of conventional and articulated equipment.

- Voyageur Colonial Ltd. provides service between the following points: Montréal-Ottawa; Ottawa-Mirabel Airport; Montréal-Toronto; Kingston-Ottawa; Kingston-Toronto; Ottawa-Belleville; and Kingston-Montréal.

- Greyhound provides service between the following points: Toronto-London; Toronto-Windsor; Toronto-Ottawa; and Toronto-Belleville.

- Chatham Coach Lines provides service between Kitchener and London and between London and Sarnia.

In 1992, intercity bus operators carried 2.6 million passengers in the Corridor. Of these, 48% made shorter haul trips between Québec-Montréal, Montréal-Ottawa, Toronto-Kitchener/Waterloo and Toronto-London. Longer haul trips, for example between Montréal-Toronto and Ottawa-Toronto, accounted for only 9% of the bus mode's total.

Scheduled intercity bus operations in Canada have experienced a long term decline in ridership levels. Statistics Canada reports that 1990 ridership was only 51.5% of ridership reported in 1980. Despite this decline, the industry overall has maintained its financial position, in part due to growth in charter and parcel express services, although profitability has varied from carrier to carrier. Bus operations in high density scheduled service and charter markets are thought to cross-subsidize services to small centres and rural areas in some instances.

Exhibit I-2
Selected public mode characteristics, 1992

City Pair	Distance (km)	Bus		Rail		Air	
		Freq/wk	Time	Freq/wk	Time	Freq/wk	Time
Québec–Montréal	255	254	3:03	54	2:55	418	0:47
Montréal–Ottawa	205	301	2:20	52	1:59	252	0:35
Montréal–Toronto	555	137	6:38	76	4:30	571	1:15
Ottawa–Toronto	435	149	5:06	50	4:06	490	1:00
Toronto–London	195	80	2:22	97	2:08	236	0:40
Toronto–Windsor	380	105	5:09	60	4:10	151	1:10

Source: Consumer Contact Limited

Note: Distances shown are for travel by highway. Frequencies represent total weekly departures (both directions). Transit times are representative, although actual transit times vary with type of service, departure time and other factors. Air frequencies include services to/from Toronto Island and Buttonville airports, but exclude services to/from Mirabel.

2. Conventional Rail

VIA Rail Canada is the only carrier operating scheduled passenger rail services in the Québec-Windsor Corridor. Service is provided on routes between the following cities: Montréal-Québec; Montréal-Ottawa; Montréal-Toronto; Ottawa-Toronto; Toronto-Windsor; Toronto-Sarnia; and Toronto-London.

In 1992, VIA Rail carried 2.9 million passengers in the Corridor. Twenty-one percent traveled between the shorter haul city-pairs that yielded 48% of the bus

carriers' traffic. However, 23% of VIA's passengers traveled between the longer haul city-pairs that yielded only 9% of the bus mode's passengers.

Conventional rail services provided by VIA Rail are dependent on capital and operating subsidies from the federal government. Analyses conducted for the Royal Commission on National Passenger Transportation show average system-wide funding of approximately $520 million per year during the 1980-1991 period. Government funding peaked at $637 million in 1988, falling to $348 million by 1993.

Cost recovery levels are generally higher in the Québec-Windsor Corridor than for other routes in the VIA. However, the Royal Commission analysis concluded that even with new equipment and a 25 percent increase in ridership, Toronto-Ottawa-Montréal services would at best recover approximately one half of their total costs (including an allowance for the cost of capital).

3. Air

The Canadian airline industry has been largely "deregulated". Air carriers wishing to provide a new service in southern Canada are only required to demonstrate that they are fit, willing and able to operate safely, that they are Canadian, and that they have the prescribed liability insurance.

Scheduled air services in the Québec-Windsor Corridor are dominated by two major carriers—Air Canada and Canadian Airlines International—and their affiliates. Two smaller carriers, Pem-Air and Air Laurentian, focus on serving smaller cities in the Corridor.

In 1992, the air carriers provided service to 4 million passengers traveling in the Corridor. Almost half of those passengers traveled between Montréal-Toronto and Ottawa-Toronto. A relatively small proportion of the air carriers' passengers made trips between other city pairs within the Corridor.

Canadian airlines have experienced severe financial pressures over the past few years—like many of their counterparts worldwide. In 1988, Air Canada and PWA Corporation (the parent of Canadian Airlines International) had combined net income of $119 million. By 1992, the two carriers suffered a combined loss of nearly $1 billion, including non-recurring restructuring costs. Both carriers improved their financial results during 1993, and both have reported further improvements for 1994.

Both Air Canada and PWA have taken steps to rebuild their equity bases. A 1993 equity issue by Air Canada provided net proceeds of $240 million. During 1993, PWA implemented a $200 million investment plan with its employees financed through wage reductions. In 1994, it also received a cash infusion of $246 million from American Airlines in exchange for a 35% share of ownership equity plus $700 million of debt restructuring to equity.

4. Auto

The vast majority of the Corridor's infrastructure capacity has been designed to serve the requirements of passenger cars, trucks and buses. The private automobile is the most popular choice of intercity passengers and accounts for more than 90% of all trips made in the Corridor. The shorter haul trips of Québec-Montréal, Montréal-Ottawa and Toronto-Kitchener/Waterloo account for 22% of the total, whereas the longer haul city pairs of Montréal-Toronto and Ottawa-Toronto represent only 3% of the total trips. Nevertheless, only the air mode rivals the private auto between Montréal and Toronto. For all other city pairs, the auto is thoroughly dominant.

Automobile ownership has increased constantly since the late 1940's and has followed the growth of personal disposable income.

B. Current Status of Government Support

1. Definition of Government Support

Various levels of government are involved in the provision and maintenance of transportation infrastructure in the Québec-Windsor Corridor that is used by the three public modes and the private automobile. Costs are incurred principally for the construction, operation and maintenance of road, airport, and rail infrastructure, as well as the provision of land. Revenues are collected from fuel taxes, registration and licence fees, and landing fees at airports, among others. The difference between the total of these costs incurred and the revenues collected by governments is the public support or subsidy provided to the users of the Corridor's transportation network.* The federal government also provides a direct subsidy to VIA Rail to defray part of its operating costs.

2. Distribution of Subsidies

Information on the costs and revenues related to the construction, operation, and maintenance of the Corridor transportation network was collected from a broad range of sources including, among others, the ministries and agencies of the provincial governments of Québec and Ontario; Statistics Canada; Energy, Mines and Resources Canada; VIA Rail; Orléans Express, Voyageur and Greyhound; Consumer Contact; and The Royal Commission on National Passenger

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* *In addition, society at large bears the costs of pollution and accidents generated by the different modes. The results of the "Trends" study described in this report do not include the impact of accidents or pollution on government support as these items are treated in a separate study carried out by Dessau Inc. The reader should refer to the results of both the "Trends" and "Environment" studies to understand fully how High Speed Rail would affect overall levels of support.*

Transportation. General information was also collected on vehicle and passenger kilometres generated in the Corridor. The information was analyzed and the results expressed in cents per passenger-kilometre, showing for each mode the excess cost borne or revenue gained by governments for each segment of the Corridor.

Exhibit I-3 summarizes the results of the distribution of modal subsidies for the base year (1992). Negative numbers are net gains to government while positive numbers are net amounts paid as subsidies. For example, for the Toronto-Montréal segment, the net cost to governments, which is the subsidy to transportation users, is as follows: Bus, -0.09 cents per passenger-kilometre; Rail, 12.81 cents per passenger-kilometre; Air, 2.49 cents per passenger-kilometre; Automobile, -0.16 cents per passenger-kilometre. In other words, excluding environmental and accident costs (which are borne by society at large), the revenues collected by governments from the bus and auto modes more than paid for the costs of construction and maintenance of the highway infrastructure in the Corridor; but the cost to governments of supporting the rail and air modes was not compensated by the revenues collected and resulted in a subsidy to users.

Exhibit I-3
Summary of current modal subsidies (cents/pass. km., 1992 $)*

	Bus	Rail	Air	Auto
Windsor-Toronto	-0.11	24.95	2.90	-0.39
Toronto-Ottawa-Montréal	-0.09	16.15	5.36	-0.22
Toronto-Montréal	-0.09	12.81	2.49	-0.16
Montréal-Québec	-0.14	22.06	1.99	-0.56

* *Excludes the effect of accident and pollution costs.*

Excluding accident and pollution costs, these results indicate the following ranking of the modes for all segments: auto users impose the least burden on others, followed by bus, air and rail users.

II

Trends in Intercity Passenger Transportation

An evaluation of the socio-economic impacts of HSR required, among other things, the identification of trends that would shape the future of the Québec-Windsor Corridor network and an analysis of the potential impacts of HSR on other modes and government support. This section describes those trends and the parameters of a baseline scenario developed to describe the future of intercity passenger transportation in the Corridor without HSR. This "Reference Scenario" was an input to the ridership forecasts which were, in turn, analyzed to estimate the likely impacts of HSR on the other public modes in respect of ridership, revenues, operating costs and investments.

A. Future of Intercity Passenger Transportation in the Corridor without HSR

In order to provide a framework for a number of the High Speed Rail Project's component studies, a description of the intercity passenger transportation infrastructure and services that would be provided in the Corridor during the project's planning timeframe was developed. The Reference Scenario is based on the principal discernible trends of importance to intercity passenger transportation and describes the following parameters of the Corridor's transportation system for all modes: network; frequency of service; in-vehicle transit time; fares; access/egress times; terminal waiting and delay times.

The Reference Scenario was the product of a comprehensive evaluation process leading to a sounding of expert opinion as well as independent analysis. This process included a comprehensive survey of the literature on trends in intercity passenger transportation; detailed discussions with representatives of government, the carriers and other stakeholders; the identification of major issues; a one-day workshop discussion of transportation experts; and an analysis of carrier operating costs and a projection of future fare levels.

The preparation of the Reference Scenario preceded the development of detailed forecasts of travel in the Corridor. Nevertheless, the scenario took account of Transport Canada's socio-economic forecasts prepared for the HSR project and other indicators of potential future traffic in the development of the scenario.

Intercity passenger transportation in the Québec-Windsor Corridor in the first quarter of the 21st century will be influenced by socio-economic and policy trends as well as other trends related to vehicle technology, fuel prices, the capacity of the Corridor's

transportation network, and the traveling public's choice of mode. Some of the more significant trends are:

- Slower economic and demographic growth than in the past that will have the general effect of slower growth in passenger transportation in the Corridor.

- Increasing integration of the North American economies that will reinforce north-south economic linkages and a likely negative effect on the growth of business travel in the Corridor, particularly between Toronto and Montréal.

- Indebtedness of all levels of government—until at least the early years of the next century—that will affect both levels of taxation and the ability to provide current levels of service and support (including subsidies to transportation, R&D funds, etc.) and the related devolution to the private sector and decentralization of powers and responsibilities of government, motivated by the need to decrease government expenditures and reduce deficits.

- Increased environmental sensitivities leading to public pressures on governments to "plan green" in transportation with the likelihood of governments setting targets for the reduction of transportation-related pollutants.

- The use of "known" vehicle technology including Stage III aircraft (and subsequent stages already in design) and high quality single-unit or articulated highway coaches. Intelligent Vehicle Highway Systems (IVHS) and Driver Information Systems (DIS) will have limited application for intercity transportation during the planning horizon.

- Increasing real hydrocarbon fuel prices (including taxes), after the year 2005, due principally to increasing costs of developing new oil deposits and the application of increased taxes as a means to reduce the level of transportation-related pollutants.

- Enhancement of the Corridor network capacity, principally through operational improvements. New runways will be added at Pearson and Québec City with pressure developing on Pearson's terminal capacity after 2015. Incremental improvements will be made to transit and access roads to airports and will limit any material increase in access times.

- Maintenance of the automobile as the dominant mode of intercity travel in spite of attempts to shift demand to public transportation.

- The possible deregulation of the intercity bus industry.

The following sections present a brief profile of the projected changes from each mode's existing situation as it stood in 1992. The parameters are summarized in Exhibits II-1 and II-2.

1. Intercity Bus

Bus will continue to provide scheduled services between all major centres in the Corridor and feeder service from outlying communities, using more comfortable equipment with more onboard amenities. In the event of deregulation, scheduled services will remain essentially as at present. The experience with deregulation in other countries supports this assumption: additional capacity, where it occurs, is soon tempered by new entrant failures and the scaling back of service to prederegulation levels. In addition, the industry will suffer no radical deregulation of fares, although entry rules are likely to be relaxed.

There will be no significant frequency changes for major markets; demand increases will be accommodated by extras, as required. Service to downtown terminals through congested urban areas will be expedited by dedicated or priority bus lanes. This will have a marginal effect on reducing trip times, depending on line haul distance.

Bus will continue to be the cheapest mode of public intercity transportation. The reduced rate of growth in passenger transportation, productivity improvements brought on in part by competition, in the event of deregulation, and other developments (including the impact of charter and parcel express services) will result in lower real fare levels.

Exhibit II-1
Selected public mode characteristics, 2005 and 2025

City Pair	Distance (km)	Bus		Rail		Air	
		Freq/wk	Time	Freq/wk	Time	Freq/wk	Time
Québec–Montréal	255	254	3:03	54	2:38	418	0:47
Montréal–Ottawa	205	301	2:20	52	1:47	252	0:35
Montréal–Toronto	555	137	6:38	76	4:03	571	1:15
Ottawa–Toronto	435	149	4:48	50	3:40	490	1:00
Toronto–London	195	80	2:22	97	1:55	236	0:40
Toronto–Windsor	380	105	5:09	60	3:45	151	1:10

Note: Distances shown are for travel by highway. Frequencies represent total weekly departures (both directions). Transit times are representative, although actual transit times vary with type of service, departure time and other factors. Air frequencies include services to/from Toronto Island and Buttonville airports, but exclude service to/from Mirabel.

Exhibit II-2
Summary of Parameters, Reference Scenario

Parameters	Bus	Rail	Air	Auto
Frequency	See Ex. II-1	See Ex. II-1	See Ex. II-1	N/A (1)
In-vehicle transit time	See Ex. II-1	See Ex. II-1	See Ex. II-1	2-5% decrease for Toronto-Ottawa
Network changes	No change	No change	Limited change	Highway 407 bypass of GTA Improved link from 401 to Ottawa Highway 30 South Shore bypass of Greater Montréal
Fares/Cost (2)				
- 2005	0.95 (0.90 if dereg)	1.00	1.00	1.00
- 2025	1.00 (0.95 if dereg)	1.00	1.10	1.15
Access/egress times	No change	No change	No change	N/A
Terminal waiting/ delays	No change	No change	Delays at Pearson after 2015	N/A

(1) N/A: Not applicable
(2) Factor x 1992 Fare/Cost

2. Conventional Rail*

The future of conventional rail services in the Corridor will depend on the fortunes of the current operator, VIA Rail Canada Inc. Transport Canada and VIA Rail project that conventional rail passenger service will continue to be provided by VIA Rail during the planning horizon, if High Speed Rail is not introduced. The current network of services in the Corridor will continue to be provided. Passengers are projected to grow at the annual rate of about 4.5% until 1997, and thereafter at the rate of about 1.5% until 2005, at which time targeted seat occupancies of 69% will be achieved. No additional capacity will be added, and growth thereafter will be limited.**

There will be no real increases in fares. Operating subsidies will continue to be provided by the federal government, but will be reduced at the rate of approximately 2% per year during the planning period. VIA will replace certain of the fleet's locomotives and cars to improve the image and increase train speeds. Train speeds will also be improved by the selective removal of slow orders and some improvements to rail plant. For example, typical Montréal-Toronto service will improve to approximately 4 hours by the year 2000. The Montréal-Toronto express service will be approaching 3 hours 30 minutes by 2005. Times for other services will be reduced by about 10% by 2005.

3. Air

An open skies air policy will result in more direct flights between Canadian and U.S. business centres which will tend to temper the growth of business travel in the Corridor. There will be no increase in the frequency of current service. With annual traffic growth rates of 1% to 2%, the use of larger, quieter and more fuel-efficient Stage III aircraft (e.g., A320s)—which will replace older aircraft by the year 2001—will accommodate the increase in demand at manageable load factors until the latter years of the planning period.***

There will be more direct service between smaller centres in the Corridor using turboprop aircraft with performance levels very close to those of jets. Larger jets will continue to be used between the major centres in the Corridor.

During the period until 2005, fuel costs will decrease as a proportion of total airline operating costs. However, after 2005, as the price of fuel rises, fuel costs will

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* *The reference scenario for conventional rail services in the Corridor was developed by Transport Canada and VIA Rail.*

** *The HSR Project's forecasters elected to use 0% growth rate for the period 1992-2005.*

*** *The HSR Project's forecasters elected to use the following annual growth rates: 2.95% for the period 1992-2005; 2.58% for the period 2005-2025.*

Exhibit II-3
Projected annual government support without HSR, (cents/pass. km, 1992 $)

	Bus	Rail	Air	Auto
Windsor-Toronto				
2005	-0.13	12.31	2.51	-0.53
2025	-0.28	8.24	1.36	-1.34
Toronto-Ottawa-Montréal				
2005	-0.11	7.94	4.57	-0.37
2025	-0.23	5.25	3.46	-1.20
Toronto-Montréal				
2005	-0.11	6.29	2.10	-0.32
2025	-0.23	4.13	1.22	-1.14
Montréal-Québec				
2005	-0.16	10.84	1.53	-0.70
2025	-0.32	7.14	-0.10	-1.56

Note: Negative figures indicate that the mode generates more revenues to governments than governments spend to construct, operate and maintain the infrastructure and services provided for that mode. Positive figures indicate that governments' costs exceed revenues.

represent an increasing proportion of airline operating costs (and fares). The increase will be tempered somewhat by the use of more fuel-efficient aircraft.

4. Auto

Governments are already under pressure to reduce highway expenditures, improve transportation efficiencies, conserve energy and reduce petroleum-based fuel emissions. By the year 2005, this pressure will be translated into practical measures to move passengers from cars to public modes, especially for urban travel. A shift of even one or two percentage points in favour of public modes would have a dramatic impact. However, auto traffic in the Corridor is expected to grow at the rate of slightly over 2% per year during the planning period.

The cost of highway infrastructure needed to accommodate the natural growth of vehicular traffic is seen to be impossible to sustain and will result in the limited extension of the provinces' networks. Ontario, however, has plans for several major developments including the Highway 407 extension to bypass the Greater Toronto Area and an improved link from the 401 to Ottawa.

At the same time that governments reduce the capital burden of infrastructure, automobiles are expected to continue to become cleaner and safer (though speed has reached its practical limit). Although fuel efficiency has improved constantly since the early 1970s, fuel use is currently rising again as a result of the popularity of larger engines and small trucks.

5. Government Support

Exhibit II-3 shows the "Trends" study's projected subsidy levels per passenger kilometre in 2005 and 2025 (excluding accident and environmental costs). Compared with current subsidies, illustrated in Exhibit I-3, all four modes show improvement in cost recovery during this time period. Relatively large negative subsidies (surpluses) are expected for the automobile mode by 2005.

Exhibit II-4 shows the estimated dollar value of subsidies in the Corridor without HSR. Two factors affect these results: unit subsidies (cents per passenger-kilometre) are expected to change as outlined in Exhibit II-3; and, traffic volumes (passenger-kilometres) are forecast to increase for all modes. Together, these changes transform a total subsidy of $53.5 million in 2005 to a net surplus (negative subsidy) of $117.2 million by 2025. The most significant effect is a large increase in the surplus generated by automobile travelers.

Exhibit II-4
Projected annual government support without HSR, millions of 1992 $

Year	Bus	Rail	Air	Auto	Total
2005	-0.6	72.9	59.2	-56.7	74.8
2025	-1.2	48.2	63.9	-228.1	-117.2

B. Future of Intercity Passenger Transportation in the Corridor with HSR

The introduction of High Speed Rail in the Québec-Windsor Corridor would provide an attractive alternative to the current mix of public modes and the private automobile that will cause riders to divert in varying degrees from the mode they would have chosen if HSR were not available. This can be expected to lead to adjustments by the other public mode carriers. Based on the traffic forecasts provided to the "Trends" study, it is assumed that the public mode carriers—particularly air—will cut back and otherwise adapt their services and likely reduce the size of their fleets, as required.*

The impacts described in this section are the result of analyses of the following four HSR ridership scenarios for the years 2005 and 2025: Québec-Windsor, 300 kph; Québec-Windsor, 200 kph; Montréal-Toronto, 300 kph; Montréal-Toronto, 200 kph.

The methodology used to estimate the impacts on other modes involved the calculation of:

- the number of diverted passengers by city pair (based on the Project's "composite" passenger forecasts without and with HSR);
- lost revenues based on diverted passengers and average fares for each city pair;
- changes in operating costs based on the number of diverted passenger kilometres by mode and each mode's unit operating costs per passenger kilometre;
- reduced investment in fleet size in response to changes in passenger levels.

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* *In recognition that the actual traffic volumes may be different from those forecast—for example, as the other public mode carriers adapt their operations to the entry of HSR in an attempt to retain ridership—we have included a sensitivity analysis of the impacts of both greater and lesser HSR ridership. The results of our analysis are reported in the final section of this report.*

Operating costs were first determined for a base year, and then adjusted to reflect changing price and efficiency levels as outlined in the Reference Scenario. The incremental operating costs shown in Exhibit II-7, below, exclude equipment depreciation, rental, and lease expenses since these items are accounted for as investment cash flows.

Calculations were made of the revenues and operating costs of each of the HSR scenarios, and these were compared with the revenues and operating costs of the Reference Scenario without HSR. The difference is the incremental revenues and operating costs attributable to HSR.

1. Impacts on Ridership

Exhibit II-5 shows the net change in Corridor passengers for each of the scenarios with the introduction of HSR. Diversion is highest for conventional rail since this service will be replaced in whole (i.e., Québec-Windsor scenarios) or in part (i.e., Montréal-Toronto scenarios). For example, if a 300 kph HSR were implemented for Montréal-Toronto only, conventional rail would lose almost 70% of its traffic in 2005. The introduction of service the full length of the Corridor would reduce traffic by 100%, regardless of the technology chosen.

Exhibit II-5
Percent change in ridership as a result of HSR

Scenario	Bus	Rail	Air	Auto
2005				
Québec–Windsor, 300 kph	(4.9%)	(100.0%)	(43.6%)	(8.2%)
Québec–Windsor, 200 kph	(2.7%)	(100.0%)	(34.2%)	(7.1%)
Montréal–Toronto, 300 kph	12.0%	(69.8%)	(35.3%)	(3.0%)
Montréal–Toronto, 200 kph	13.2%	(70.5%)	(27.5%)	(2.6%)
2025				
Québec–Windsor, 300 kph	(8.1%)	(100.0%)	(50.3%)	(9.5%)
Québec–Windsor, 200 kph	(5.2%)	(100.0%)	(40.7%)	(8.2%)
Montréal–Toronto, 300 kph	10.7%	(64.3%)	(41.8%)	(3.7%)
Montréal–Toronto, 200 kph	12.3%	(66.5%)	(33.1%)	(3.1%)

Diversion is also significant for the air mode. For the full Corridor 300 kph scenario, the air carriers would lose 44% of their projected ridership in 2005 and 50% by the year 2025. Diversion is less severe for the bus mode, since bus operators are expected to pick up new passengers from residual rail travelers (i.e., conventional rail users who do not divert to HSR) and from the small communities

that will lose rail service if HSR is implemented. In fact, bus ridership is expected to increase by 11-13% under the Montréal-Toronto scenarios.

Diversion from the private automobile is not significant in percentage terms (3-9%) but is large in absolute numbers.

2. Impacts on Operating Revenues, Costs and Investments

Exhibits II-6 and II-7 summarize the calculated incremental annual revenues and operating costs caused by the introduction of HSR.

Incremental revenues are negative in most cases because HSR reduces ridership. For example, the air carriers would lose $372 million in revenue in 2005 due to lost ridership if the full Corridor 300 kph technology were introduced, and this would grow to $727 million (in 1992 dollars) by the year 2025. On the other hand, bus revenues would increase for most of the scenarios due to gains from a portion of residual rail travelers and from those resident in small communities that would lose their rail service with the introduction of HSR.

Exhibit II-6
Incremental annual revenues, millions of 1992 $

Scenario	Bus	Rail	Air
2005			
Québec–Windsor, 300 kph	-	(128.6)	(371.5)
Québec–Windsor, 200 kph	1.4	(128.6)	(315.2)
Montréal–Toronto, 300 kph	7.4	(101.1)	(297.6)
Montréal–Toronto, 200 kph	8.6	(101.7)	(251.8)
2025			
Québec–Windsor, 300 kph	(1.4)	(128.6)	(726.7)
Québec–Windsor, 200 kph	0.6	(128.6)	(636.4)
Montréal–Toronto, 300 kph	6.9	(95.7)	(595.7)
Montréal–Toronto, 200 kph	8.3	(97.7)	(514.4)

Exhibit II-7 shows the net change in annual operating costs by mode. These changes are negative for most scenarios and modes because HSR reduces the number of passengers and, with them, the variable portion of operating costs. For example, the air carriers would be able to reduce operating costs by $250 million in the year 2005 as a direct result of the introduction of the full Corridor 300 kph option and by $556 million by 2025. On the other hand, intercity bus operators would increase their costs under the Montréal-Toronto scenarios as they expanded their service to cater to riders who would lose

conventional rail service previously provided to communities between Montréal and Toronto.

Exhibit II-7
Incremental annual operating costs, millions of 1992 $

Scenario	Bus	Rail	Air	Auto
2005				
Québec–Windsor, 300 kph	1.3	(208.1)	(249.9)	(73.3)
Québec–Windsor, 200 kph	2.6	(208.1)	(191.5)	(61.7)
Montréal–Toronto, 300 kph	6.5	(159.4)	(200.9)	(31.9)
Montréal–Toronto, 200 kph	7.5	(160.6)	(153.4)	(26.2)
2025				
Québec–Windsor, 300 kph	.5	(186.8)	(556.0)	(179.0)
Québec–Windsor, 200 kph	2.2	(186.8)	(446.4)	(150.1)
Montréal–Toronto, 300 kph	6.6	(134.8)	(458.6)	(82.5)
Montréal–Toronto, 200 kph	7.8	(137.6)	(362.8)	(66.5)

Exhibit II-8 shows the estimated changes in investments that would be made by the public mode carriers during the entire analysis period 2005-2025 as a result of the erosion of their ridership. HSR is not expected to have a significant impact on investment in road and airport infrastructure. Airport capacity will still be required to service international traffic and domestic traffic originating or terminating outside of the Québec-Windsor Corridor. For example, the reduction in the number of aircraft movements at Pearson Airport caused by HSR represents approximately 10% of its total; for Dorval Airport, the reduction amounts to approximately 15% of total aircraft movements. Similarly, highway capacity will be required to accommodate local commuters during rush hour periods and will be little affected by changes to intercity traffic.

Implementation of HSR will, however, affect the number of aircraft and buses required as well as planned conventional rail investment. VIA provided conventional rail investment projections for the Reference Scenario. HSR is assumed to replace conventional rail in the Corridor, which implies that most of VIA's projected investments will no longer be made under the Québec-Windsor HSR scenarios. For the Montréal–Toronto HSR scenarios, however, the projected investment will still be made in the Montréal–Québec and Windsor–Toronto segments of the Corridor.

The incremental effect on bus and aircraft investment are based on the following formula:

$$\Delta \text{ Investment (\$)} = \frac{\Delta \text{ Passenger-kilometres} \times \text{Cost per vehicle}}{\text{Annual passenger-kilometres per vehicle}}$$

Exhibit II-9
Incremental annual contribution to overhead and profit, millions of 1992 dollars

Scenario	Bus	Air
2005		
Québec–Windsor, 300 kph	(1.3)	(121.5)
Québec–Windsor, 200 kph	(1.2)	(123.7)
Montréal–Toronto, 300 kph	0.9	(96.7)
Montréal–Toronto, 200 kph	1.1	(98.4)
2025		
Québec-Windsor, 300 kph	(1.9)	(170.7)
Québec–Windsor, 200 kph	(1.6)	(180.0)
Montréal–Toronto, 300 kph	0.3	(137.1)
Montréal–Toronto, 200 kph	0.5	(151.6)

Exhibit II-10
Annual impact of lost traffic, millions of 1992 $ (Québec-Windsor, 300 kph, 2025)

Description	Bus	Air
A. Lost contribution to overhead and profit (Exhibit II-9)	1.9	170.7
B. Avoided investment	-0.4*	830.0
C. Mid-life asset values [B x (1 - .85/2)]	-0.2	477.3
D. Avoided capital costs (C x 15%)	–	71.6
E. Net loss (A - D)	1.9	99.1
F. Projected corridor operating costs with HSR (including equipment depreciation)	36.1	708.3
G. Further reduction in operating costs required (E ÷ F)	5.0%	14.0%

* *Less than total bus investment shown in Exhibit II-8 since equipment must be replaced between 2005 and 2025.*

As shown in the exhibit, the air mode would reduce investment as a direct result of the loss of ridership to HSR and the bus mode would increase investment to a small degree.

Exhibit II-8
Incremental investment, millions of 1992 $

Scenario	Bus	Rail	Air
Québec–Windsor, 300 kph	1.4	(647.9)	(830.0)
Québec–Windsor, 200 kph	3.8	(647.9)	(670.0)
Montréal–Toronto, 300 kph	10.8	(343.4)	(730.0)
Montréal–Toronto, 200 kph	12.9	(343.4)	(580.0)

3. Viability of Public Modes

The financial performance of the public modes' services in the Corridor will be challenged by the introduction of HSR. As can be seen from a comparison of the incremental revenues and incremental operating costs by mode, reductions in operations alone cannot cover the projected loss of revenue. Exhibit II-9 shows the incremental annual contribution to overhead and profit which, except for the Montréal-Toronto scenarios for bus, results in losses for both air and bus. The losses of contribution to overhead and profit by the airlines would be offset to some degree by an annual reduction in capital requirement as fleets are downsized (shown for the entire analysis period in Exhibit II-8).

As an example—using the Québec-Windsor, 300 kph, 2025 scenario—Exhibit II-10 shows the effect of a projected reduction in annual equipment ownership costs for the air mode of $71.6 million based on the total incremental investment that could be avoided during the period 2005-2025. With these annual reductions to expenditures, the air carriers would still have annual net losses of almost $100 million. There would have to be additional reductions to operating costs of some 14% in order for them to break even.

The loss of Corridor traffic would be a significant shock to the airlines. For example, Air Canada currently derives approximately one quarter of its domestic revenue from operations in Ontario and Québec. Although route profitability cannot be determined from publicly available data, industry specialists indicate that Corridor traffic is more profitable than some other business segments. Factors that make Corridor traffic attractive to the airlines include:

- A relatively high proportion of business travelers, which contributes to higher than average yields.

Exhibit II-11
Incremental effect on annual government support, millions of 1992$

Scenario	Bus	Rail	Air	Auto	Total
2005					
Québec–Windsor, 300 kph	–	(72.9)	20.5	9.1	(43.3)
Québec–Windsor, 200 kph	–	(72.9)	16.5	7.7	(48.8)
Montréal–Toronto, 300 kph	(0.2)	(51.8)	16.0	3.9	(32.1)
Montréal–Toronto, 200 kph	(0.2)	(52.3)	12.9	3.2	(36.4)
2025					
Québec-Windsor, 300 kph	-	(48.2)	53.5	32.3	37.6
Québec–Windsor, 200 kph	-	(48.2)	44.6	27.1	23.4
Montréal–Toronto, 300 kph	(0.3)	(31.8)	43.1	14.7	25.7
Montréal–Toronto, 200 kph	(0.4)	(32.7)	35.3	11.9	14.1

- Economies of scale in services such as baggage handling and passenger check-in.

- The ability to adjust capacity without major disruptions to other portions of their schedule (i.e., with short haul flights, aircraft can be returned in time to meet other commitments).

Air carriers would continue to provide service within the Corridor if HSR is implemented. However, they would need to make significant adjustments to their operations to remain viable. Airlines can be expected to reduce their number of daily departures, and in some cases switch to smaller aircraft. They would also be required to make major reductions to overhead and administrative costs.

HSR will have a lesser financial impact on the bus mode since passenger losses to HSR are offset by passenger gains from conventional rail travelers who do not divert to HSR and from communities that will lose their rail service. Exhibit II-10 shows that the additional savings required are $1.9 million, or about 5% of projected Corridor operating costs with HSR in place (Québec-Windsor, 300 kph, 2025 scenario). Therefore, while HSR would affect bus schedules and operations, it should not threaten the overall viability of this mode.

4. Potential Government Support

The redistribution of passenger traffic in the Corridor as a result of HSR will affect the revenues that governments generate (e.g., fuel taxes) and their expenses (e.g., roadway repair and maintenance costs, subsidy for VIA Rail operations). These changes will result in different subsidy patterns among the modes—the net subsidy will decrease in some cases and increase in others.

Exhibit II-11 summarizes the net impact by mode for each HSR scenario. The most significant change is the reduction/elimination of operating subsidies for conventional rail service. However, these savings are offset by higher net subsidies for the air and automobile modes. Subsidies for these modes increase because a significant portion of highway, airport, and air navigation costs are fixed, while government revenues from these modes (e.g., fuel taxes, landing fees, air ticket taxes) are mostly variable. The total column in the exhibit is the net change in annual operating subsidies for all modes combined. In cases where this figure is negative, it represents a potential source of government support for HSR. Thus, in 2005, there would be $32-$49 million potentially available to support HSR; by 2025, this amount would have been eroded by the offsetting losses of revenue as passengers switched from the other modes.

5. Sensitivity Analysis

The results presented in the previous sections are based on forecasts provided to the "Trends" Study for analysis. These forecasts did not explicitly reflect operational and fare adjustments that the other public modes (particularly air) would be likely to

make in an attempt to retain passengers. In recognition that the forecasts may not fully reflect such adjustments, a sensitivity analysis has been conducted to illustrate the effects of lower ridership estimates on the viability of the other public modes and on the availability of government support in the form of subsidies. In addition, an analysis has been conducted to illustrate the effects of higher ridership. The analysis has tested the effects of a 10% decrease and a 10% increase in HSR ridership for the full Corridor HSR scenario, for both 200 kph and 300 kph options.

The results of the sensitivity analysis indicate that the impacts of HSR on the other modes and on government support are generally linear if the traffic were to vary +/- 10%. For example, if HSR were to divert 10% fewer passengers from the other modes, the impacts on the viability of bus and air would be about 10% less severe; furthermore, the incremental government support available in the form of subsidies would be about 10% higher. If HSR were to divert 10% more passengers than the composite forecasts indicate, then the impacts on the viability of bus and air would be about 10% more severe, and the incremental government support available in the short term in the form of subsidies would be reduced by about 10%.

Using the 300 kph option as an example, if HSR ridership were to be 10% higher than forecast, the airlines would need to further reduce operating costs by 15-16% in 2025, after making adjustments to service and ownership costs (i.e., fewer aircraft), compared with an additional 14% reduction if the basic composite ridership forecasts were achieved.

The impact of the increased ridership loss is only marginally larger than for the composite ridership forecast, and the airlines would continue to provide service in the Corridor to transport passengers with trip-ends between Québec and Windsor as well as those whose more distant destination required a connection through one of the Corridor's hubs.

The incremental annual government support potentially available for HSR would be approximately 10% greater—by $4-5 million in 2005—if HSR's ridership were 10% lower, and approximately 10% smaller if HSR's ridership were 10% higher. This amount would decrease over time as the "savings" generated by HSR were offset by car and air mode revenue losses.

III

Conclusion

Based on the forecasts prepared for the HSR Project, it is clear that the introduction of high speed train service in the Québec-Windsor Corridor would provide an attractive alternative for travelers. This would lead to a period of competitive activity, particularly for the air carriers who would likely adjust their operations and fares in order to retain as many as possible of their clientele and to ensure positive financial performance.

The redistribution of passengers among the available modes would change as a large number of travelers switched from auto, air, and even bus to the high speed train. This movement would change the current mix of public support to the modes, including both direct operating subsidies to VIA Rail (which would be reduced to zero) and indirect subsidies to the other modes. The changes would also affect the revenues that governments generate through user taxes and fees as well as the expenses that governments incur to build, operate and maintain transportation infrastructure.

The principal impacts of High Speed Rail service in the Québec-Windsor Corridor on the other public modes and on potential government support for the new service may be summarized as follows:

- High Speed Rail service will have a substantial impact on the air carriers but the effect on the bus mode will be modest and, in fact, positive in some cases. Air carriers would continue to provide service in the Corridor, especially because the traffic is relatively more profitable than some other business segments of the airlines' networks. Service would likely be somewhat reduced and smaller aircraft might be used in some cases.

- During its initial years, HSR service will reduce governments' subsidies, principally by the elimination of the direct subsidy to conventional rail. In the longer term, however, the diversions of traffic to the high speed train will offset the earlier savings by an increasing loss of user tax and fee revenues over mostly fixed transportation infrastructure costs which governments will not be able to avoid. Thus, on balance, the effect of HSR on government subsidies would be neutral. As a consequence, the potential support for High Speed Rail in the form of indirect subsidies would be limited.