

City of Regina Transportation Initiative

Regina SK

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PROBLEM STATEMENT

Increased traffic in the City of Regina has raised concern regarding the environmental implications of city commuting. The City of Regina has hired consultants to determine several cost effective methods of reducing the growing concern of pollution within the city.

PROPOSED SOLUTION

The proposed solution includes several key points structured into short term (2 year) and long term (10 year) plans. Increasing ridership and modifying the existing fleet for overall reduced emissions is the main objective of the short term plan. In order to increase ridership, the short term plan calls for the installation of bus shelters, additional route studies, increased staff at call centres and media programs aimed at shedding the perception that public transit is slow. Modification of the existing fleet would include the installation of filters on the busses aimed at cutting out harmful emissions. At the same time, capital would be allocated to develop a program for refurbishing newer low floor busses, as the current program in use is not compatible.

The long term plan calls for the replacement of older diesel busses with new high efficiency diesel busses, implementation of a low floor bus refurbishment program, light priority systems as well as GPS tracking.

JUSTIFICATION OF SOLUTION

Over the last 20 years, ridership has been on a steady decline due to deficiencies in the current transit system. These deficiencies may include the lack of bus shelters, routes and insufficient call centre assistance; however, a major downfall to the transit program is the perception that public transit is significantly slower than personal commuting. To reverse this trend we recommend a media program aimed at showing the average commuter how much time is consumed while travelling by bus as opposed to personal vehicle travel while at the same time make public transit more accessible and comfortable by increasing call centre capacity and bus shelter availability.

As stated in the problem, environmental implications of increased traffic are of concern. Although increased ridership will reduce traffic and thus decrease emissions, using an aged fleet of diesel busses to perform this task is somewhat fruitless. By installing particulate filters on the existing busses the city would be able to produce immediate emissions reduction at minimal capital expenditure.

The need for increased busses in the future is required due to both increased ridership as well as decommissioning of older busses as they reach their maximum service life. As existing busses are removed from service and replaced with new low floor models, implementation of a low floor refurbishment program is essential to maintaining the integrity of the City of Regina transit system.

To further reduce travel time, long term plans will include bus priority systems, in which special signals at intersections will allow transit busses to circumvent congestion in busy downtown areas. Further improvements to the accessibility of the transit system will lead to GPS tracking of busses to ensure proper scheduling which in turn will maintain public confidence in the bus system.

PLAN DETAILS

SHORT TERM

REFIT EXISTING BUSES

By refitting the current bus system, the City of Regina can make an immediate impact on harmful emissions. The installation of diesel particulate filters can remove up to 85 percent of diesel particulates which contain several known carcinogens.

BUS SHELTERS

The need for bus shelters is extremely important to ensure the safety of transit users especially in the winter months when temperatures can drop below -20 degrees Celsius with the wind chill. With roughly 1200 bus stops in the Regina area, the implementation of approximately 600 shelters is recommended. By erecting bus shelters throughout the city the transit users can be sheltered from high winds while awaiting the bus arrival.

INCREASED ROUTES

As the City of Regina expands and route studies are performed, areas of the city may be identified for improved service. Two prime examples of proposed routes include a route travelling to the Regina airport, as it currently relies on taxi service to handle departure and arrival traffic and a ring road route, which allows users from outlying areas to circumvent the

downtown core when travelling from one area of the city to the next. Other examples of new routes would include areas currently under development such as the North, East and Southwest.

INCREASED CALL CENTRE STAFF

Due to the high rate of unanswered calls by the Transit RIDE Line, Regina's public transit information, an increase in staff at the call centre is recommended. By adding two additional staff members to handle the approximately 120 unanswered calls per day, the transit system can increase ridership by enabling customers to obtain schedule information.

LOW FLOOR BUS REFURBISHMENT STUDY

As specified in the initial study, the current refurbishment program is incompatible with the new low floor busses currently being phased into service. As older busses become unusable and newer low floor busses become more prominent, a study should be conducted to develop a plan for the refurbishing of newer low floor busses. By conducting this study, a program can be ready for implementation at a future date when the low floor busses approach their refurbishment dates.

TRANSIT MEDIA CAMPAIGN

As the public may not be fully aware of the new changes to the transit system; a media campaign aimed at informing the public of new upgrades and changes to routes as well as call centres will be conducted. The goal of the campaign will be to stress improvements, but most importantly attempt to change the public perception that public transit is significantly slower than personal commuting.

LONG TERM

NEW DIESEL BUSES

Significant improvements in diesel engine technology have been developed over the past 2 decades. With the City of Regina's oldest busses exceeding 30 years of age, ushering in a new era of high efficiency diesel busses will be a significant step in the reduction of emissions.

IMPLEMENT REFURBISHMENT PROGRAM

As stated earlier, having a refurbishment study conducted will allow a program to be in place when the newer low floor busses are due for refurbishment. Having this program in place will be an important step to ensuring that the City of Regina's transit system maintains its integrity and reputation for many years to come.

LIGHT PRIORITY SYSTEM

GPS TRACKING

DISCUSSION OF ALTERNATIVES

The City of Regina has many opportunities to increase the effectiveness of its public transportation system. There are positive and negative aspects to each of these opportunities. The selection of the optimal solution will be obvious once each opportunity has been scrutinized and all issues have been brought to light. The ideas and possible solutions identified as undesirable are railway systems, carpool lanes, elevated light rail system, bio-fuel conversions, electric buses and hybrid buses. The justification for the elimination of these ideas and possible solutions is included below in this section.

Railways

There are two options for implementation of a rail system. The first option is to lay new track in desirable routes to service the most people at peak commuting times. The major problem of this option is the cost and availability of land in the appropriate areas. The second option is to utilize and share the existing heavy rail system, currently used for primarily industrial freight. The major issue with this option, besides forming an agreement with the rail owners, is the hazards involved with running a public transit system on the same line as enormous industrial freight car chains. Also, the passenger trains would slow down the transportation of goods on a major industrial thoroughfare, affecting the entire economy of Saskatchewan. Neither rail system is a feasible solution, therefore they have not been considered for our idea.

Carpool Lanes

Carpool lanes are intended to decrease the travel time of motorists choosing to ride together. When multiple people ride in the same vehicle opposed to taking separate vehicles individually,

they un-clutter the roads, decrease traffic jams, and decrease net green house gas emissions per person. While these carpool lanes can work well as an incentive to drivers, the traffic flow of Regina would be negatively effected by their addition. There simply aren't enough lanes, and not enough room to add lanes, in high traffic areas. The introduction of carpool lanes would therefore require the sacrifice of one regular lane per direction. This would force all regular commuters into the remaining single lane (per direction) and cause unnecessary traffic jams. The City of Regina already has bus lanes which will remain under our solution, however due to the lack of roadway width, additional carpool lanes will not be added at this time. Carpool lanes would be an asset in larger cities that have multi-lane freeways.

Light Rail System

The implementation of an elevated light rail system, similar to the Skytrain of Greater Vancouver, would require an investment far beyond the scope of the available infrastructure budget. This system has a great effectiveness, but due to cost, is not feasible in the City of Regina.

Bio-fuel conversions

The introduction of Bio-Fuels such as Bio-Diesel for bus operation is an alternative already implemented in other climates around the world. The Bio-Fuel is supposed to have a lower net green house gas emission since it is made from some recycled materials. The problem with introducing Bio-Fuels to a cold environment, such as Regina, is that under cold conditions the fuel can congeal leading to problems with the engine's operation.

Electric and Hybrid Busses

The electric bus is the way to move the energy creation from the bus to the power plant. There are possibilities that in the near future point source carbon capture and storage may be implemented at power plants. This would make electric buses a much cleaner and greener method of transportation. The reason why electric buses are not a part of our future solution is due to the climate of Regina. The cold weather mixed with any precipitation causes freezing of the electric lines that follow the bus routes throughout the City of Regina. Frozen electric lines with even a thin film of ice cause the power lines to disconnect from the bus frequently and/or cause poor contact leading to dead batteries on the electric buses.

PROJECT ECONOMICS

CAPITAL ASSET SPENDING PROPOSALS

With a scope to increase the effectiveness and the perceived effectiveness of the mass transit system, as well as its environmental impact, the City of Regina must make some major capital investments. First of all, ten of the oldest buses should be phased out and 10 new buses should be phased in. This will increase rider satisfaction and perception of the fleet as well as reduce emissions. The buses will be new diesel ones, which cost about \$300 000 each. In addition, 15 more diesel buses would be purchased to expand the fleet to provide better service to the community. Also, all old buses that remain in the fleet will be retrofitted with diesel filters at \$5 000 each to reduce particulate emissions (it should be assumed that with new regulations, all new buses would already have the filters). Another retrofit for all buses (including new buses) is an integrated GPS transit network to track bus progress and timeliness. This system will allow real

time bus tracking by using the internet or calling an automated telephone line. The cost is estimated at approximately \$100 000. Furthermore, an extensive study should be undertaken to determine if the new low floor buses could be refurbished. For this, \$200 000 has been set aside. If the program is successful, we would begin a refurbishment process for low floor buses. If the program is not successful, new diesel buses would have to be bought to replace existing low floor buses in the future. Finally, a marketing campaign, at a cost of \$500 000, will be used to increase awareness and positive perception of transit. This totals \$8 750 000. The remaining money could go back into the city's coffers, or buy more buses, if the transit authority sees fit.

INFRASTRUCTURE SPENDING

To increase the quality of the bus system, 600 new bus shelters will be installed (roughly half of the total bus stops in Regina). The bus stops will have wind breaks as well as solar powered lighting for safety and comfort. The cost is approximately \$3000 per stop or \$1.8MM. These bus shelters will be strategically placed in the city with priority given to busy stops and transfer points. As a part of the campaign to increase positive perception of the bus system, these will have to be well maintained, but the budget for that is outside the scope of this report. In addition, a traffic light priority system will be implemented in the city such as the one in Calgary. This has an estimated cost of \$1.5MM. Furthermore, additional bus routes and stops will have to be created. Creating a bus stop at the airport and the route to downtown is estimated at \$500 000. Additional costs for creating the other stops and altering old ones are estimated to total \$2MM.

REASONS FOR FEW MAJOR CAPITAL INVESTMENTS

This proposal only spends a fraction of the amount budgeted for city infrastructure improvement. The reason for this is that there is not a real need to spend that money on mass transit. If Regina is further concerned about the environment, they could use the money for other programs, such as carbon sequestration, recycling and incentives to use cleaner vehicles. Regina is too small and too isolated to invest in a major light rail project, and it is dangerous and economically damaging to run light rail transit on a main thoroughfare for industrial trains. In order to be proper stewards of tax payer's money, the City of Regina should consider other capital projects that would have a higher return on investment than wasteful spending on a mass transit system. The current mass transit system only needs some specific improvements to make it significantly better and reduce emissions.

PROPOSED BUS ROUTES

To increase ridership and transit convenience, there are a number of new bus routes that should be implemented. The first route should follow ring road around the city (4 buses, two each way). The bus would have limited stops that intersect other bus routes from outlying areas to the downtown. This could decrease trip times for passengers travelling to areas other than downtown. For example, if someone in the northwest tried to get to the northeast, they would have to first travel downtown. This way, they only need to travel to Ring Road, catch the express bus, and transfer over to the northeast bus routes. This increases the transfers, but there could be high quality shelters on Ring road to alleviate this, and suburban routes could be timed around the ring road bus.

A second bus would be an express bus from the airport to downtown. Even if this bus is not always full, it would be an important community service to make the airport more accessible. There would be one bus that could do this route approximately every half hour to forty five minutes (very limited stops). The bus should be timed to coincide with regular major flights if possible and should have the authority to potentially wait for late flights at the Transit Authority's discretion.

The current bus routes meander around the suburbs, causing transit times to be very high. To alleviate this, three express routes to downtown should be created in the northwest, the north and the east sections of the city. These would service some of the growth areas of the city and help commuters. The south is already well serviced by college express buses.

Furthermore another suburban bus route should be put into the west to service the growth area of the city. Another alternative is to increase the size of the Dieppe bus route in the west as the city grows, and add another express route.

The combination of the express route and the ring road bus will greatly increase movement throughout the city and reduce transit times considerably. There may be more transfers necessary, which is a negative, but if the city uses high quality, well maintained bus shelters and careful scheduling, the bus transit times could be greatly reduced.

ENVIRONMENTAL IMPACT

The environmental impacts of new diesel buses may at first appear greater than the environmental impact of implementing new fuel vehicles such as the Proterra hydrogen powered bus. With a closer inspection of the price differential between new diesel buses and alternative fuel buses a new point can be made. The current ridership of the City of Regina is low due to

high wait/travel times and even higher perceived wait/travel times. The greater economic impact of the diesel buses will be offset in our solution by the extra gained ridership that more buses and faster travel times will bring. The extra buses will be available since the cost of the diesel buses is approximately three fifths that of the hydrogen powered ones. The addition of particulate capture filters on all buses also helps to decrease the environmental impact of the diesel powered public transportation system.

Increase in bus ridership will result in two things that will assist in the decrease of the City of Regina's environmental impacts. First, the decreased number of cars on the road will directly decrease the amount of green house gas emissions. Secondly, with fewer cars on the road and more commuters riding buses there is the expectation that fewer traffic jams will form. Traffic jams force motorists to drive much slower than an ideal speed and idle frequently.

With the proposed solution, the ridership of Regina residents can be expected to increase by at least 25%. This forecasted increase in ridership is derived from an inverse relationship to the provided decrease in ridership when travel conditions were tested as not favourable. The number of vehicles removed from the road by this ridership increase is tabulated in the table below. Tabulated as well is the green house gas (GHG) emission totals when using an average vehicle's GHG emissions of 5 metric tonnes annually.

Age (years)	Transit Users (%)	General Population (%)	Estimated Population	Population in age range	Transit users in age range	Increased Ridership/Cars Removed	Annual GHG per vehicle (Kg)	Saved GHG (Kg)
17 and	19	25	200,000	50,000	9,500	2,375	5,000	11,875,000

under								
18-15	27	12	200,000	24,000	6,480	1,620	5,000	8,100,000
26-39	21	21	200,000	42,000	8,820	2,205	5,000	11,025,000
40-59	20	26	200,000	52,000	10,400	2,600	5,000	13,000,000
60 plus	13	16	200,000	32,000	4,160	1,040	5,000	5,200,000
Totals				200,000	39,360	9,840		49,200,000

From this table it can be seen that approximately fifty thousand metric tonnes of green house gases are saved with this estimated percentage increase in ridership.

CONCLUSION

Conclusion

The solution presented has been chosen for its simplicity and ease of implementation. The City of Regina is not a good candidate for an early adopter of alternatively fuelled vehicles or integration of a mass transit system, because of its small size and isolation from other urban centers. The expansion of the current bus system and a glorification of public transit through marketing and improved service are expected to increase ridership. Through increased ridership on the public transit system traffic congestion is expected to decrease and fewer personal vehicles on the road will result in a decreased economic impact. The costs associated with the proposed solution are significantly lower than other alternatives, decreasing risk and exposure to failure.