

## Smoky River Transit Case - Possible Response

Robert Siddall and Susan Todd

Your response could include the following points.

### 1. **Risk: Does climate change pose significant risks to the business in the short term, longer term?**

Climate change affects transit agencies in all aspects of their operations. It can affect customers, employees and suppliers, plus businesses, schools, hospitals and residents of the community in which the agency operates. Climate change impacts may temporarily affect transit service or, in more severe cases, have long term implications for the transit agency's ability to operate. Costs related to extreme weather events may be relatively small, in the case of temporary service changes or interruptions. Costs become more significant if extreme weather events require reconstruction of services or significantly reduce the service capacity/useful life of the assets needed to provide future services.

### **General risks to transit agencies associated with extreme weather**

Examples of extreme weather and related impacts, which may become more frequent with climate change, include:

- **Extreme winds** can blow trees into transit corridors or roads or knock over bus shelters. When combined with rain or dust, wind can impact visibility for bus drivers.
- **Extreme precipitation** can lead to temporary flooding of roads and corridors in which buses and light rail operate, temporarily delaying service.
- **Thunderstorms or extreme rain conditions** can knock out power to the transit agency's operations or lead to flooding of bus or light rail routes/corridors.
- **Freezing rain** can pull down catenary lines; knock out electricity required to operate vehicles, communications, and other machinery used in operations; make bus routes extremely dangerous; and/or increase risks of passengers slipping and falling while getting on/off buses or waiting on platforms for light rail service.
- **Excessive snow** can temporarily block bus and light rail routes; increase the costs of snow removal; affect the safety of employees and customers; and lead to ice jams and flooding, when warming temperatures quickly melt the snow.
- **Extreme heat** can affect the performance of equipment and assets used in the provision of service – for example by warping rails, roads and bridges; affect service quality if air conditioners break down; and affect the health and safety of employees and customers, especially those with respiratory conditions.
- **Extreme cold** can also affect the performance of equipment and assets used in the provision of service – for example by freezing light rail switches or other machinery; reduce performance of buses; and affect the health and safety of employees and customers if they become exposed to frostbite.

Taken individually, these events could create short term or longer risks for SRT.

**Extreme changes in weather** compound operational challenges and increase health and safety risks. Extreme weather changes may require significant overtime work by employees to maintain/resume service levels. For example, temperatures may change as much as -20c to +20c and back to -20c in a period of a few days, requiring employees to deal with freezing switches one day, freezing rain with flooding potential the next day, and then back to freezing switches a day later. With rapid changes in wind and precipitation, employees may have to resolve downed catenary lines while conditions shift from extreme wind to extreme rain in a matter of minutes/hours. Extreme changes in weather can also lead to sink holes, erosion, and other impacts on transit service.

Climate change is likely to increase the long term cost of service delivery as extreme weather events become more common and the useful life of assets suffers from increased wear and tear.

Climate change can also have a significant impact on the reputation of the transit agency by affecting the quality of service the agency can provide; the safety of staff and customers can be put in greater jeopardy; and criticisms of the inability of transit agency to properly prepare or respond quickly and effectively to climate events.

### **Risks to SRT**

Projections of weather conditions vary across Canada. Without knowing the actual location of SRT, we cannot do detailed risk assessment and mitigation plans. However, information in the case does identify some key risks facing SRT:

- Flooding in any season, from the three rivers or extreme rainfall, affecting operations
- Recurrent flooding weakening the rail embankment, causing safety hazards.
- Ice jams under bridges significantly weakening these structures
- Extreme summer heat warping the rails
- Ice storm knocking down light rail catenary lines and shutting down the rail system
- Freeze-thaw cycles adversely affecting switching devices on tracks
- Loss of electrical service from the municipal hydro company causing a system outage
- Operating expenditure sensitivity to diesel fuel costs (and any taxes on fuel)
- Rising maintenance and snow clearing costs
- Increasing vehicle repair costs from salt used on municipal roads to address increase in freezing rain incidents
- Health and safety incidents for customers or employees associated with extreme weather
- Difficulty recruiting employees for challenging outdoor work
- Increasing insurance costs for business interruption and flood insurance
- Reputational damage if perception develops that SRT is not adequately prepared for climate change
- Higher exposure to climate change impacts for asset categories with useful lives greater than fifty years.

Financial information indicates that SRT's bus fleet is at the end of its useful life, which reinforces the opportunity to replace SRT's diesel buses with electric buses. However, an electrified system can be more vulnerable to power outages caused by extreme weather.

In summary, SRT is already experiencing climate change impacts that will likely worsen over time. Some impacts could be dealt with through changes to vehicles through planned replacement (e.g. with

electrified buses). Some, such as the current and future light rail lines exposure to flooding may require significant changes such as elevation of the track or rerouting.

## 2. Financial Impacts: What financial impacts might arise from these risks?

**Revenues** could be affected by changes in:

- Ridership (increase or decrease) related to customers views about system reliability, accessibility, comfort, cost and company reputation
- Funding from various levels of government
- Scope or scale of the transit system in response to public demand for transit options
- Ability to maintain farebox revenue at 31 percent of operating expenses (excluding interest and amortization) as the cost of services rise in response to climate events

**Expenses** could be affected by changes in:

- Maintenance schedule
- Need for more or sturdier bus shelters
- Costs to replace vehicles and other assets
- Amortization rates if useful lives of assets change
- Fuel costs including taxes on fuel/electricity rates
- Employee recruitment effort needed
- Employee safety training related to climate change
- Overtime costs associated with responding to climate events
- Greater absenteeism during extreme weather events
- Insurance costs for flooding and business interruption insurance

**Assets** could be affected by:

- Damage to property, plant and equipment due to extreme weather
- Permanent loss in value of property, plant and equipment to reflect changes in useful life from increased wear and tear
- Permanent loss in value of property, plant and equipment because assets need to be redesigned to meet future climate conditions or future regulations

**Liabilities** could be affected by:

- Environmental accruals (e.g. for failed culverts, unstable rail embankments, fuel spills)
- Employee benefit plan coverage to reflect future climate conditions
- Failure to meet service delivery obligations

## 3. Planning: What should Anne consider, from a climate change perspective, in capital and operational budgeting for the proposed second light rail line?

SRT is already experiencing issues related to climate change on the existing light rail line (See Risk, Question 1). As SRT has already identified these types of risks for its existing light rail service, and the proposed route is through an area that is already susceptible to flooding, SRT has the opportunity to address these issues as it completes the environmental assessment for the new light rail line.

An environmental assessment is a process to predict environmental effects of proposed initiatives before they are carried out. In completing the environmental assessment, SRT and its consultants are required to identify and document the impact of the proposed light rail line on the environment. To do this they must gather information on the current and future changes to the climate over the anticipated service life of the proposed line. Alternative designs that will reduce the impact of the service on the environment must be considered in the preparation of the environmental assessment. While alternatives might have a higher upfront construction cost to deal with environmental impacts, in the long term life cycle costs, which could be more than two thirds of the total costs of providing the service, can be significantly lower if climate change impacts are taken into consideration.

Capital budgeting will be affected by any engineering and design modifications required to ensure the rail line remains safe and serviceable throughout its planned life. The useful life of equipment may be shorter than in the past, requiring more frequent replacement of rail cars. Frequency of repair and maintenance will also be a factor for future operating budgets.

Future ridership demand is another key variable of planning any future transit services. Climate change could impact future ridership demand as the location of existing or future residential and commercial activities might not be allowed to occur in areas highly susceptible to future flooding. Design of these services can take into consideration future climate conditions allowing SRT to consider adaptation opportunities prior to construction that will reduce the risks to higher construction costs; higher repairs and maintenance; and higher operating costs (i.e., insurance, employee overtime, fuels costs, etc.).

Funding models should also be reviewed as SRT is heavily reliant on revenues from rider fares.