Adding up to a cleaner environment

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Both trolleys and Compressed Natural Gas (CNG) buses play their part in reducing pollution in the Greater Vancouver region. Along with diesel buses, they make up most of the BC Transit fleet. How do trolleys and CNG buses rate pollution wise? And how does each of these technologies compare in cost? After covering diesel buses in the February issue of Transit Exchange, we now tackle the rest of the fleet.

Trolley buses: in action since 1948

The workhorse of the transit system, electric trolley buses provide one of the most efficient, pollution-free transportation services in North America. Since the first Canadian-built Brill trolley opened its doors in August 1948, millions of Vancouver transit customers have travelled by electric power. In 1982, the state-of-the-art Flyer E902 arrived, and these buses still operate today. Transit's 244 trolleys run along 306 kilometres of overhead wires. They receive 600 volts of direct current, powered by 20 solid-state rectifier stations located throughout the city. BC transit's use of electric vehicles is among the highest of any transit system in North America, incorporating both SkyTrain and trolley buses. Of all commuters to downtown Vancouver, an estimated 65 per cent travel aboard SkyTrain or trolley buses, both powered by electricity.

Trolley pros and cons

Pros

- Trolleys are zero-emission. They don't pollute the air with exhaust and don't use fossil fuels. "This is a huge environmental benefit," says BC Transit maintenance engineer, Eric Holmberg.
- Trolleys have none of the potential fuel-handling problems associated with diesel or natural gas buses.
- Because of their long history with Transit, trolleys are a familiar technology. The cost to repair a trolley was once much higher. Now, due to many modifications made to the original buses, repairs take less time and cost less. As a result, replacement vehicles - usually less environmentally friendly, older diesel buses - are out on the road for shorter periods.
- Trolleys are quieter than other types of buses, reducing noise pollution.

Cons

- Trolleys run on electricity which is produced by damming rivers and altering the

environment.

- Trolleys are more expensive to run than diesel buses because their electronics, including the electric motor and all controls, cost more to maintain. Adding in charges for electricity, infrastructure and maintenance, trolleys become the highest- cost buses on the fleet, at least a dollar more per kilometre than CNG or diesel buses.
- The purchase price of a trolley is almost double that of a diesel bus. All trolleys must be custom-built at an estimated cost of $550,000 to $600,000 (excluding delivery, inspection, pre- service, new model maintenance, operator training costs and taxes). All existing trolley buses are due for replacement beginning in 2001.
- No "production-line" trolley buses are manufactured in North America at this time. Low demand internationally for this type of bus means that any new orders are highly developmental, which is why replacements are so costly.
- As one transit rider complained in a letter to a local newspaper, most riders want to get from A to B as fast as possible. Trolley coaches are slower than conventional buses and must slow down when going through an intersection. In addition, noted the rider, the time and cost of adding new overhead wires is a barrier to route expansion.
- Because many of BC Transit's trolleys are older models, they are increasingly more susceptible to on-road breakdowns and delays.

CNG buses: new kids on the block

British Columbia has enormous supplies of natural gas, a cleaner-burning and less expensive fuel than diesel. Three compressed natural gas-powered buses entered service in the Lower Mainland as test vehicles in 1991. They enabled Transit to gain a tremendous amount of experience in the handling, servicing, repair, fuelling and performance of natural gas vehicles. A high-speed natural gas fuelling facility was built at Port Coquitlam Transit Centre, where service started in 1992. In its ongoing commitment to environmentally friendly transportation, Transit officially launched CNG buses into regular service in December 1995. These buses - with the cleanest engines available today - replaced ageing diesel buses in the Vancouver Regional Transit System, thanks to an agreement between BC Transit and BC Gas. Monitoring of a pilot project started in 1995, to enable BC Transit to make well supported decisions regarding the expansion of natural gas vehicles in the transit system. Today, 25 of the 40-foot-long Compressed Natural Gas-powered buses operate on the road in the Vancouver region. Another 25 low-floor CNG coaches began arriving this summer.

CNG buses: pros and cons

Pros

- CNG buses emit a lower number of health-damaging particulates into the air than clean diesel buses, although the difference is not substantial (.03 versus .04). Both types of buses are five times better than the old-model diesels. Particulates, also called soot, are microscopic bits of unburnt fuel.
- Unlike diesel, there are no potential wet-fuel spills with compressed natural gas.
- CNG fuel doesn't smell as bad when burned in an engine.

- Natural gas is a cleaner fuel for transit employees to handle.
- Storage of CNG is environmentally safer than diesel which could leak into the ground and contaminate ground water.
- When converted to its equivalent in litres, the cost of natural gas fuel is approximately 29 cents a litre compared to diesel fuel at 49 cents a litre (both figures include GST).

Cons

- Compared to diesels, natural gas buses burn more fuel for the same distance travelled.
- The variance in emission levels between CNGs and diesel buses is marginal.
- CNG buses cost $75,000 more to buy than diesel buses with similar environmental advantages. The per unit cost of a 40-foot, CNG high-floor bus (excluding delivery, inspection, pre- service, new model maintenance, operator training costs and taxes) is $390,000.
- For every four CNG buses, five clean diesel buses could be purchased, replacing older, higher-polluting diesel buses faster. Some of the old diesel buses still in use date back to 1969.
- Because of the new technology, the reliability of natural gas buses is lower than clean diesels, making it necessary to replace them during repairs by older, more polluting buses. BC Transit hopes this reliability will improve with its next order scheduled to go into service in fall 1998.
- Natural gas can vent off on the road. When this happens, the fire department must cordon off an area, awaiting BC Transit mechanics to arrive and deal with the problem. In the event of a leak, the safety concern is higher, both for the public and BC Transit employees.
- There is only one CNG fuelling station, at Port Coquitlam, limiting the bus service to that area. Additional fuelling stations are too costly to install in other depots.

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