

Executive Summary:

City of Hamilton, Public Works, Fleet & Facilities Division (FFD, HSR, or the City) contracted with Marathon Technical Services (Marathon or MTS), to study the financial viability of rebuilding the CNG station and replacing and expanding the fleet of CNG buses or purchasing a fleet of Diesel/Electric Hybrid buses at their Hamilton Street Railway (HSR) Mount Hope garage. Marathon did not address any enhancement to the existing Wentworth CNG station.

The Mount Hope CNG fueling facility was constructed in the 1990s in several phases by Union Gas. The CNG station currently fuels approximately 72 CNG buses out of a total fleet of 217 CNG plus diesel buses. HSR had been on a path to eliminate the CNG fleet as buses were retired, however, with the very low cost of natural gas for the foreseeable future, HSR is considering reviving the CNG bus procurement program and replacing or upgrading their existing CNG station.

Marathon's primary role in this analysis was to work with City staff to generate the pertinent performance and cost data required, to perform the analysis and interpret the results. City staff indicated that no further upgrades to the bus garage would be required as it is already operating with CNG buses—this savings helped to make the CNG option much more economical.

The CNG and Hybrid project costs were assembled including bus, station and capital costs, as well as new or differential operating costs such as CNG station maintenance and power cost. Given the age and condition of the current CNG station, it was assumed that a new CNG station would be required to meet the increased demand of a fleet of up to 217 CNG buses over a 20 year period.

A conservative mix of costs was used for analysis over a 20 year life cycle, but based on bus replacement at 12 year increments. The Net Present Value (NPV) and payback were used as evaluation metrics. The baseline (most likely), optimistic, moderately pessimistic and pessimistic scenarios were evaluated, and a sensitivity analysis of major risk variables was conducted for both the CNG and Hybrid options.

The baseline CNG scenario had an NPV of **\$41M** and all scenarios returned positive NPVs. Although still positive NPV, the pessimistic CNG scenario is considered very unlikely as it combines high inflation and status quo diesel costs.

The baseline Hybrid scenario had an NPV of **-\$18M** and all scenarios except the Optimistic scenario returned negative NPVs.

It is recommended that the City of Hamilton proceed with a project to replace approximately 18 buses per year with new CNG buses until the fleet is all CNG with a total size of approximately 217 buses and replace the CNG station. The first buses would arrive in 2013.