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November 6, 2023

To: Grey County Clerks
Bruce County Clerks
Bruce & Grey Federations of Agriculture

Re: Regional Climate Change Mitigation

To reach carbon emission targets that have been set, we will all need to work together to find solutions.

I attach a copy of a report presented recently by our City Staff on an emerging technology that will safely inject hydrogen into diesel engines to reduce our carbon footprint and potentially reduce costs, without having to replace our municipal fleets and farm equipment before the end of its life cycle.

On September 22, 2023, more than twenty-five stakeholders gathered here in Owen Sound at Hydrogen Optimized to advance the creation of a Grey-Bruce Hydrogen Hub. Hydrogen Optimized is developing and manufacturing high-power water electrolyzers and will have the ability to produce green hydrogen for use in the region.

We look forward to working together towards our shared potential with our community stakeholders to make Grey and Bruce national leaders in clean energy use. We will continue to keep you informed with additional information as it becomes available.

For more information, please contact Paul McGrath, Manager of Community and Business Development at pmcgrath@owensound.ca or 519-376-4440 ext. 1254.

Thank you.
Sincerely,

A handwritten signature in black ink, appearing to read "Ian C. Boddy".

Ian C. Boddy
Mayor

Staff Report

Report To: Operations Committee
Report From: Paul McGrath, Manager of Community & Business Development
Meeting Date: September 21, 2023
Report Code: CM-23-014
Subject: Use of Hydrogen in City Vehicles

Recommendations:

THAT in consideration of Staff Report CM-23-014 respecting the Use of Hydrogen in City Vehicles, the Operations Committee recommends that City Council:

1. Wait to adopt Hydrogen in the use of large City vehicles to align with the creation of a distribution station in this region;
2. Provide a letter of support to Hydrogen Optimized for the development of a hydrogen distribution station at their Owen Sound location;
3. Direct staff to continue to explore hydrogen conversion kits that can work with City equipment and vehicles; and
4. Direct staff to research and recommend provincial and federal grants to offset the cost of equipment conversions.

Highlights:

- Hydrogen Optimized is moving forward with a hydrogen distribution station in Owen Sound.
- Hydrogen-injected systems will still operate if there are supply chain issues.
- Grant funding available for conversion systems.

Strategic Plan Alignment:

[Strategic Plan](#) Priority: Green City - KR1 - Offset 100 tonnes of CO2 per year by annually planting 100 hardwood tree species

Climate and Environmental Implications:

This supports the objectives of the City's Corporate Climate Change Adaptation Plan by considering climate adaptation in the development of the City's strategies, plans, and policies.

Previous Report/Authority:

[CM-22-012 Climate Action Strategy – Proposed Timeline and Deliverables](#)

[Corporate Climate Change Adaptation Plan with Appendix](#)

[Going Green in Grey - Presentation of Grey County Climate Action Plan](#)

[Service Delivery Review](#)

Background:

On May 18, 2023, the Operations Committee directed staff to provide a preliminary, exploratory report to the Operations Committee on the ability, feasibility, and potential risks of converting the ice resurfacing and sidewalk and park equipment to use Hydrogen as fuel.

Analysis:

Currently, there are no commercial hydrogen fuelling stations in our area. However, the local company Hydrogen Optimized is in the process of creating a hydrogen fueling station at their Owen Sound location. Their projected timeline for this is 12 – 16 months. Several government grants can be used to develop a hydrogen fueling station, and the City's support would aid in the application process.

As this will be the first fueling station in the region, it is recommended that the City align any adoption of hydrogen-powered equipment to the initial production capacity of this facility. Hydrogen-injected systems would allow for more flexibility, and where they would benefit from a projected blend rate of 20/80 hydrogen to diesel, the vehicles would still be able to function on pure diesel.

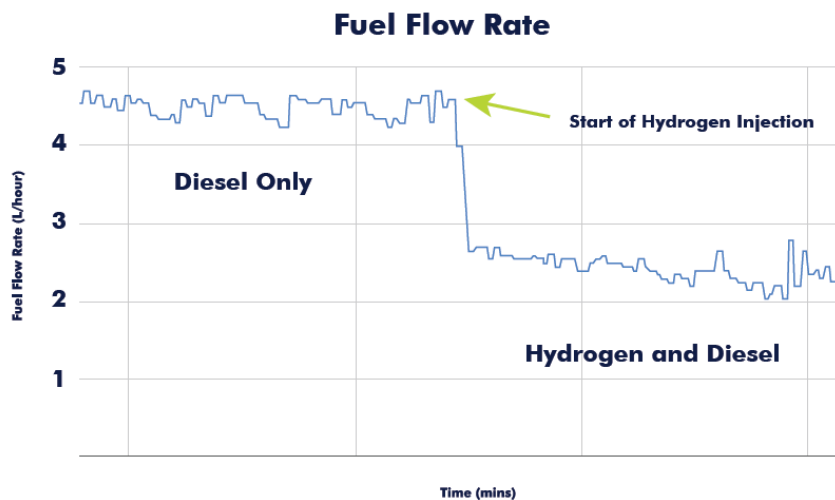
Staff has had discussions with Diesel Tech Industries (DTI) regarding their [Hydrogen Diesel Systems](#). This company is running a pilot program with the City of Edmonton for several Hydrogen-injected buses and large equipment. They recommend using injection systems on larger vehicles such as snowplows and large trucks to maximize the environmental and cost-saving benefits. The climate mitigation would depend on the number of vehicles using the systems and the total fuel used during operation.

Two different numbers are at play when DTI talks about the engine's efficiency.

Mass Replacement - This refers to the actual amount of diesel being replaced by Hydrogen. If the target mass replacement is 20 percent per 100L of diesel, then 20L of diesel would be replaced with 6.2kg of Hydrogen.

Efficiency of Engine - The addition of Hydrogen in a diesel engine allows for a more complete combustion of diesel and reduces the buildup of carbon in the engine. Replacing diesel with Hydrogen will allow the engine to travel the same distance while consuming less diesel.

The below data is based on a Volvo D13 Tier 4 Engine in a Long-Haul Class 8 application, travelling 300,000 km per year.



Each vehicle system costs approximately \$65,000, and [Government grants](#) are available to support the installation of Hydrogen-injected systems, which can cover up to 50 percent of the costs.

With the costs associated with the hydrogen injection systems, it is not feasible at this time to convert those smaller plows and winter equipment to

run on a blend of Hydrogen and diesel. Once the Hydrogen distribution has been established and the supply chain has been proven, there may be an opportunity as equipment is being replaced to utilize Hydrogen in other applications and solutions.

The company that supplies the City with sidewalk snow plows, MacLean Engineering, doesn't currently use Hydrogen in any of its equipment. However, City staff has let them know that if they are interested in adopting that technology in the future, the City may be interested in a pilot project.

Risks:

- Without a Hydrogen fueling station in the area, there would be additional costs to acquiring hydrogen fuel.
- The Hydrogen injection systems are remotely monitored but require the operator to ensure the vehicle has been refuelled with the required amount of hydrogen to maximize the blend ratio.
- City Staff would not be able to service the Hydrogen-Diesel injection system and would require the vendor to make modifications and repairs to it.
- The DTI system is not easily transferable, and if a vehicle is under maintenance for a long term, the system will be underutilized.
- The price of Hydrogen must be negotiated with the supplier. Initial discussions with Hydrogen Optimized have shown that they want to retail the Hydrogen they produce for less than or equal to the cost of the equivalent amount of diesel.

As per the service review, the City is developing a fleet strategy, and the findings of this and subsequent reports on Hydrogen may be used as a reference.

As the City builds resilience to ensure the adaptability of infrastructure and services, Hydrogen should be considered as an option to move towards Reduced or Zero-Emissions vehicles.

The City could be looking at potentially three to five years until the supply chain for hydrogen has been developed, and limitations have been removed. Once a local hydrogen distribution facility is operational, it would be beneficial to implement a pilot program using city vehicles.

Financial Implications:

Costs will be identified if the City chooses to move forward with any hydrogen or hydrogen/diesel systems.

Communication Strategy:

Communication of this report is through the posting of Committee meeting agendas on the City of Owen Sound website.

Consultation:

Lara Widdifield, Director of Public Works and Engineering

Attachments:

DTI - 5 Page Spread Hydrogen Flyer

Recommended by:

Paul McGrath, Manager of Community & Business Development

Submission approved by:

Tim Simmonds, City Manager

For more information on this report, please contact Paul McGrath, Manager of Community & Business Development at pmcgrath@owensound.ca or 519-376-4440 ext. 1254.