To: **Warden and Members of County Council**

From: **Director of Public Works**

2021-2025 Green Fleet Plan

RECOMMENDATIONS

1. **That Council adopt the targets within the *2021-2025 Green Fleet Plan*, dated May 2021, as attached to Report No. PW 2021-23 entitled "*2021-2025 Green Fleet Plan*";**

2. **And further, that Council support in principle the related initiatives outlined within the *2021-2025 Green Fleet Plan*, recognizing that implementation will be considered by Council as part of the annual Business Plan and Budget approval process.**

REPORT HIGHLIGHTS

- The purpose of this report is to adopt the proposed *2021-2025 Green Fleet Plan* and its associated reduction in fleet greenhouse gas emission targets overtime.
- Based on reporting information available, the implementation of Oxford County's first *Green Fleet Plan* (2016) achieved a 9.3% reduction in fleet greenhouse gas (GHG) emissions (226 tonnes CO_2e) when comparing 2019 levels to 2014 levels.
- Building off of the success of the *2016 Green Fleet Plan*, the *2021-2025 Green Fleet Plan* projects a GHG emissions reduction of 398 tonnes CO_2e (19% below 2015 base year levels), exceeding the emissions reduction target of 14.1% by 2025 to be achieved through the ongoing implementation of the *100% Renewable Energy (RE) Plan*.
- 82 fleet recommendations are highlighted in the *2021-2025 Green Fleet Plan*, including the replacement of 35 ½ ton pick-up trucks with hybrid electric vehicles (HEV) and the introduction of the County's first ½ ton pick-up battery electric vehicle (BEV) in 2024. The ongoing green fleet conversion seeks to increase the number of alternative-fuelled vehicles from 31 in 2020 (19% of fleet) to 76 in 2025 (47% of fleet).

Implementation Points

Upon adoption of the *2021-2025 Green Fleet Plan*, staff will proceed with the implementation of the recommendations in order to meet the goals outlined in the Plan and as permitted through approved annual budgets.

Financial Impact

The *2021-2025 Green Fleet Plan* scope covers a total of five annual budgets ranging from 2021 to 2025. The first year of the plan has been approved through the 2021 Business Plan and Budget. Table 1 summarizes the unapproved projected changes in green fleet incremental annual capital charges from 2022 to 2025.

Table 1: Summary of Annual Incremental Capital Charges

User Group	Budget Year			
	2022	2023	2024	2025
Paramedic Services	$12,167	$7,967	$7,967	$5,900
Transportation Services	76,900	21,700	17,200	17,200
Wastewater Treatment	25,267	19,867	13,067	10,000
Water Distribution & Wastewater Collection	61,100	37,100	32,400	26,400
Facilities	9,933	9,933	6,133	6,300
Water Treatment	30,667	30,667	22,367	23,300
Waste Management	28,467	28,467	24,467	6,100
Fleet Pool	$67	67	1,067	200
Construction & Engineering	-167	-167	-867	-400
Library	7,100	7,100	7,100	3,500
Water Treatment	17,500	17,500	17,500	17,500
Total	**$269,000**	**$180,200**	**$148,400**	**$116,000**

NOTE: The forecasted capital budgets are based on vehicle costs today and are subject to change as the market evolves.

These overall increases would be required to fund all currently-unapproved capital replacement recommendations outlined in the *2021-2025 Green Fleet Plan*. The 2022 budget would have the highest increase of $269,000, as all recommendations scheduled for 2022 implementation will take on the full incremental cost.

By the end of 2025, all of the green fleet conversion recommendations will have been implemented. From 2026 onward, annual incremental capital cost charges are anticipated to reach a steady state of approximately $99,000.

These annual incremental capital charges associated with the above proposed green fleet conversions are well balanced by previous historical annual fleet capital charge savings associated with fleet optimization. The 2020 Business Plan and Budget introduced two initiatives: New Initiative 01 - Snow Plow Route Optimization and New Initiative 02 - Fleet Utilization & Rationalization Implementation. These initiatives resulted in a **combined annual capital savings of $154,100**. The annual capital savings were realized by reducing the size of the County fleet by three tandem axle snow plows and six passenger vehicles.

Further, every green fleet conversion recommendation is anticipated to see operational cost savings through lower fuel consumption with the exception of those switching to biodiesel. In the case of BEVs, cost savings in maintenance is also expected in addition to the fuel savings. Due to the complexity of fleet operations and the method of calculations performed by the consultant, it is difficult to fully detail how operational costs will impact future annual budgets. As we gain experience over time with the operational maintenance costs related to green fleet vehicles, the accuracy of annual operating budgets will be more easily determined.

The recommended green fleet conversions and their associated funding resources over the 2022 to 2025 timeframe will be further considered through the respective annual budget processes.

Communications

If Council proceeds with the recommendations within this report, the *2021-2025 Green Fleet Plan* will then be published electronically to the County's Reports & Publications web section under "Environmental".

The release of the *2021-2025 Green Fleet Plan* will be promoted to the community through social media and on the County's homepage. It will also be shared with the Public Works division, Paramedic Services, Asset Management, Area Municipalities, Future Oxford and Smart Energy Oxford as information about Oxford County's progress on the goals of the *100% RE Plan* and the *Future Oxford Community Sustainability Plan.*

Strategic Plan (2020-2022)

					
WORKS WELL TOGETHER	***WELL CONNECTED***	***SHAPES THE FUTURE***	***INFORMS & ENGAGES***	***PERFORMS & DELIVERS***	***POSITIVE IMPACT***
		3.iii.	4.ii.	5.ii.	

DISCUSSION

Background

Five-year targets for energy reduction, GHG emissions and renewable energy mix (baseline year of 2015) were adopted by Council for Oxford County when the updated *Energy Management Plan* was introduced as per Report No. PW 2019-33. From this, a municipal GHG emissions reduction target of 14.1% by 2025 (when compared to 2015 levels) was established for Oxford County. Implementation measures from the County's *Green Fleet Plan, Energy Management Plan and Long Term Facilities Renewable Energy Plan* will serve to achieve this near-term target along with longer term aspirations of the *100% RE Plan*.

County Council adopted the County's first *Green Fleet Plan* (2016) through Report No. PW 2016-12. This plan outlined a 10% reduction of GHG emissions by 2019 from 2014 levels. In addition, the plan outlined 32 recommendations to guide staff in achieving this goal, including the utilization of compressed natural gas (CNG) in County vehicles and the development of an idling policy. As of 2019 year end, corporate fleet emissions were reduced from 2,426 tonnes CO_2e in 2014 to 2,200 tonnes CO_2e in 2019, a 9.3% reduction.

Currently, Oxford County maintains a fleet of approximately 194 assets utilized by Public Works, Paramedic Services and Corporate Services. Of the 194 assets, 161 are fuel-powered and 31 operate with some form of alternative fuel (i.e. electricity, CNG or hybrid). As of 2019, the corporate fleet emitted 2,200 tonnes CO_2e, a reduction of 40 tonnes CO_2e from 2015 levels. Based on the targeted 14.1% reduction from 2015 levels, this target would require the corporate fleet to reduce annual emissions to 1,924 CO_2e by 2025 or an additional 276 tonnes CO_2e from 2019 levels.

Staff retained consulting services in 2020 through a request for proposal (RFP) process to assist in the development of the *2021-2025 Green Fleet Plan*. The scope of work was focused around three main objectives:

- Identifying green fleet recommendations that would result in the County's fleet reducing GHG emissions by 14.1% (from 2015 levels) by 2025;
- Preparing a public document illustrating green fleet recommendations that could be implemented over a five year period (2021-2025); and
- CNG utilization review to determine if the County should continue with the use of passenger CNG vehicle conversions, CNG snowplows, and whether or not to proceed with the construction of a slow-fill CNG station at 59 George Johnson Blvd., Ingersoll.

The last objective stemmed from Report No. PW 2020-48 where staff recommended the delay of all new CNG-related fleet projects with the exception of the replacement of two diesel powered snow plows with CNG powered snow plows. Potential CNG fleet conversion projects were to be considered through the *2021-2025 Green Fleet Plan* to determine their viability and capacity for GHG emissions reductions.

Comments

Oxford County has established itself as a progressive organization when it comes to its ongoing corporate green fleet conversion. Through implementation of the *2016 Green Fleet Plan* and ongoing inter-departmental collaboration, a number of initiatives have been achieved, including:

- Canada's first CNG-powered tandem axle snow plows (2);
- Canada's first hybrid ambulance;
- Fleet utilization review resulting in a 6.7% rationalization reduction of fleet assets;
- Introduction of the Corporate Fleet Idling Policy; and
- 19% of fleet vehicles utilizing alternative fuels.

2021-2025 Green Fleet Plan Recommendations

The main focus in the development of the *2021-2025 Green Fleet Plan* was to take advantage of the planned replacement of 110 fleet assets as noted in the *Asset Replacement Plan* from 2021 to 2025. Of these assets, it was recommended that 65 of them be changed from their current vehicle type to a new vehicle type, resulting in anticipated GHG emissions reductions.

Table 2 shows a summary of the recommendations put forward in the plan, sorted from highest to lowest in terms of GHG emissions reduction. Over half of the asset replacements are recommended to be hybrid electric vehicles (HEV), with all cargo vans transitioning to BEVs starting in 2023. Other recommendations that did not include an asset replacement are the installation of anti-idling technology on heavy duty trucks and the switching of dyed diesel to B20 bio-diesel.

Table 2: Summary of Recommendations within the *2021-2025 Green Fleet Plan*

Opportunity	Vehicle Count	Total GHG Reduction (tonne CO_2e/year)	Capital Cost Impact	Operating Cost Impact ($/year)	Net Lifecycle Cost
Hybrid Pickup Trucks	35	91	$178,200	-$35,200	$2,200
B20 Bio-diesel (20%) for Major Equipment	N/A	76	N/A	8,800	N/A
BEV Pickup Trucks	7	67	140,000	-26,700	6,500
BEV Cargo Vans	8	44	126,100	-13,800	43,300
Hybrid Ambulances	5	38	164,500	-7,500	104,500
Anti-Idle Technology	16	31	107,200	-10,800	-800
PHEV SUVs	3	14	24,600	-4,200	-600
CNG Snowplows	2	10	104,200	-11,000	-5,800
BEV Single Axle Truck	1	8	70,000	-2,400	22,000
Dozer (with electric drive)	1	7	65,000	-4,400	-23,000
Hybrid ERV (Asset 1317)	1	6	15,000	-1,600	5,400
BEV ERV (Asset 1320)	1	4	12,500	-1,000	6,500
Hybrid ERV (Asset 1318)	1	2	5,000	-500	2,000
Total:	**81**	**398**	**$1,100,000**	**-$110,300**	**$177,200**

If all recommendations are implemented, it is expected to result in a reduction of 19%, or 398 tonnes CO_2e. That amount would represent 122 tonnes CO_2e more than what is required to meet the goal of a 14.1% reduction by 2025 (below 2015 levels). This overshoot allows for flexibility in the County reaching its goals and allows for fluctuations in annual fuel consumption (e.g. higher than usual number of winter events).

CNG Utilization Review Outcome

The review performed by WSP revealed that the approach of converting passenger vehicles (e.g. pick-up trucks, cargo vans and SUVs) to dual-fuel CNG/gasoline proved to be no longer a favourable option with the arrival of HEVs and soon-to-be BEVs for light duty fleet. In the lifecycle analysis of ½ ton pick-up trucks, dual-fuel CNG/gasoline was revealed to be the most expensive option and did not have the best GHG emissions reduction. Overall, WSP recommended not to pursue CNG conversions in light duty vehicles moving forward.

The analysis of heavy duty vehicles revealed that CNG-powered snow plow tandem axle trucks have a near-breakeven return on investment when compared to conventional diesel powered trucks and provide nearly 50 tonnes CO_2e reduction over its lifespan. For that reason, WSP recommended proceeding with CNG-powered snow plow tandem axle trucks that are located within distance to Rural Green Energy, the County's sole CNG fuel supply. The 2021 budget already reflected this recommendation for two more CNG-powered tandems to be based out of the Woodstock Patrol Yard. Following this implementation, all tandem axle snow plows at Woodstock will have been converted to CNG. Therefore, no further CNG powered recommendations were made due to the lack of proximity to Rural Green Energy.

Lastly, WSP assigned the CNG infrastructure analysis to a sub-consultant, Change Energy Services (CES), that specializes in CNG fueling and infrastructure. 59 George Johnson Blvd., Ingersoll was deemed to no longer be a viable option for a slow-fill CNG station since the majority of vehicles based near this location are light duty pick-up trucks. CES examined the County's fleet and determined that Springford Patrol Yard would be the ideal location to install a CNG fueling station given the largest number of heavy duty vehicles. However, the business case revealed a no payback situation which would tie the County to CNG for the next 20 years. Therefore, the plan does not elect to have the County pursue the building of its own CNG station. This will allow fleet staff more flexibility to utilize other technologies, specifically, hydrogen fuel cell electric vehicles when the technology becomes more readily available in the County's region.

Conclusions

In concert with the *Energy Management Plan* and the *Facilities Long Term Renewable Energy Plan*, implementation of the *2021-2025 Green Fleet Plan* will provide significant opportunities for the County to reduce its environmental footprint and support climate change mitigation, all in alignment with the County's ultimate goal of reaching 100% RE.

Individually, the *2021-2025 Green Fleet Plan* seeks to reduce municipal fleet GHG emissions by 19% (from 2015 levels) by 2025 while adequately managing increases in incremental fleet capital costs over time.

SIGNATURES

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ATTACHMENT

Attachment 1: *2021-2025 Green Fleet Plan*, May 17, 2021