

NO: **R146**

COUNCIL DATE: **June 25, 2012**

REGULAR COUNCIL

TO: **Mayor & Council**

DATE: **June 25, 2012**

FROM: **General Manager, Planning and Development**

FILE: **6630-01**

SUBJECT: **Alternative Fuel Infrastructure at Gasoline Stations**

RECOMMENDATIONS

The Planning and Development Department recommends that Council:

1. Receive this report as information;
2. Approve amendments to Surrey Zoning By-law, 1993, No. 12000, as documented in Appendix I of this report that, if adopted, will add a requirement to each of the Self-Service Gasoline Station Zone (CG-1) and the Combined Service Gasoline Station Zone (CG-2) that alternative fuel refuelling or recharging infrastructure be installed in conjunction with the construction of any gasoline station with the following being eligible alternative fuel refuelling or recharging infrastructure:
 - (a) Level-3 electric vehicle (EV) charging station (also known as a DC fast charger), or its equivalent;
 - (b) Fast-fill compressed natural gas (CNG) vehicle refuelling station;
 - (c) Hydrogen vehicle refuelling station; and/or
 - (d) Liquefied petroleum gas (propane) vehicle refuelling station;
3. Authorize the City Clerk to bring forward for the required readings the necessary amending by-law and to set a date for the related public hearing;
4. Approve as City Policy the policy entitled "Requirement for Alternative Fuel Infrastructure Related to Gasoline Stations", which is attached as Appendix II to this report, that would provide that any new Comprehensive Development Zone that permits a gasoline station require that alternative fuel infrastructure be constructed in conjunction with the construction of a gasoline station, or that a level-3 electric vehicle charging station (also known as a DC fast charger), or its equivalent, be constructed off-site at a location approved by the City, in conjunction with the construction of a gasoline station; and
5. Direct staff to review, in three years' time, the eligible alternative fuel infrastructure options as listed above considering market penetration and vehicle availability with a particular focus on the continued inclusion of liquefied petroleum gas (propane) as an eligible alternative.

INTENT

The purpose of this report is to:

- respond to a request of Council that each new or redeveloped gasoline station in the City provide an alternative fuel commodity for patrons in addition to gasoline (and diesel fuel);
- inform Council of the alternative fuels proposed to be included in the policy and the criteria that was considered in their selection;
- summarize the results of the stakeholder consultation; and
- define the means by which alternative fuel infrastructure will be required.

BACKGROUND

According to the Ministry of Environment's Community Energy and Emissions Inventory (CEEI), on-road transportation accounted for 62 percent of the Greenhouse Gas (GHG) emissions produced in Surrey in 2007. Of these, nearly two-thirds of the emissions were produced by passenger vehicles and light duty commercial vehicles operating on gasoline or diesel.

The City can play a part in reducing GHG emissions produced by the transportation sector by encouraging and supporting the adoption of alternative fuel vehicle ("AFV") technologies. A critical requirement for the mainstream uptake of AFVs is the public availability of alternative fuel refuelling and/or recharging infrastructure. The City can motivate the development of this infrastructure by requiring that gasoline stations provide alternative fuels in addition to the conventional transportation fuels that such stations currently offer.

At its Regular meeting on May 30, 2011, Council requested that staff bring forward recommendations with respect to the provision of alternative fuels at gasoline stations.

The objectives of the proposed approach are to:

- Reduce GHG emissions produced by the transportation sector by encouraging the uptake of AFVs;
- Increase consumer confidence in AFVs by supporting the proliferation of publicly accessible alternative fuel refuelling/recharging infrastructure; and
- Promote investment in and commercialization of clean technologies.

DISCUSSION

There are a number of alternative fuels in use in the transportation sector. While some alternative fuel technologies have attained a measure of acceptance in various regions of the world, all are in the early stages of commercialization in North America. Limited acceptance in the North American market has meant that the alternative fuels have been used primarily by heavy-duty vehicles, commercial fleets, after-market conversions, and for niche applications (such as ice surfacing equipment, forklifts, and the like).

Along with transit and active transportation, alternative fuel vehicles are an important component of a transition to a less carbon intense transportation future. The City can take a leadership role by facilitating the development of alternative fuel refuelling and recharging

networks, by providing alternative fuel infrastructure itself (as it has begun to do with the installation of two level-2 EV chargers and of two hydrogen refuelling stations) and by requiring or encouraging residents and businesses to provide such infrastructure.

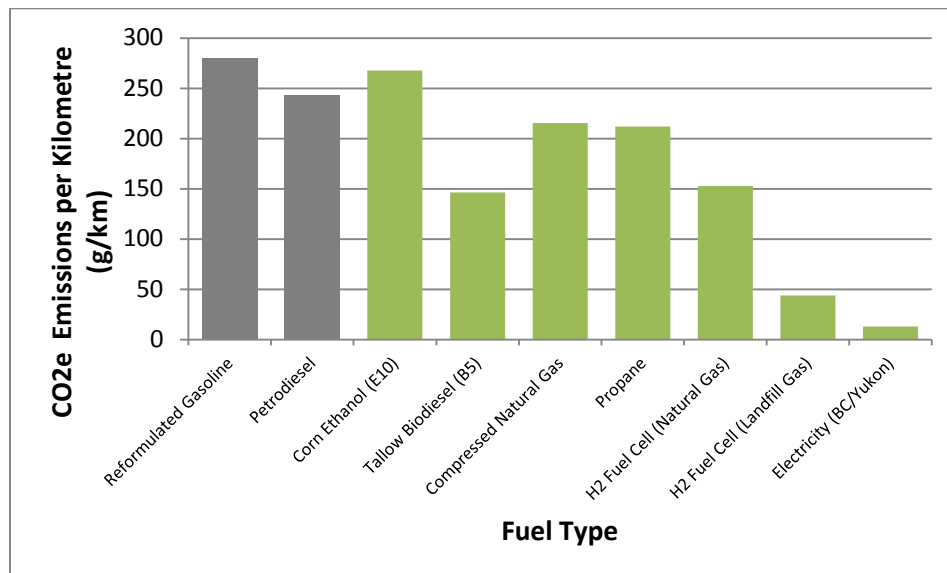
Alternative Fuel Inclusion Criteria

Staff has determined that the effectiveness of an approach requiring alternative fuel infrastructure at gasoline stations should not be diluted by allowing too broad a variety of alternative fuel options, nor should it overly restrict the options, but instead, to the extent reasonably possible, allow the market to decide for itself. Staff undertook an assessment of the alternative fuels that would be best to include currently based on the following criteria:

- Does the alternative fuel technology have lower carbon intensity than gasoline? and
- Is the technology market ready or near being market ready?

The environmental benefits of alternative fuels vary considerably (see Figure 1). "Well-to-wheel" emissions (those produced during the entire lifecycle of the fuel) depend on the feedstock, method of production and transportation, concentration (in the case of biofuels), and tailpipe emissions. Electric vehicles have the lowest carbon intensity by virtue of the predominance of hydroelectric generation in BC. Furthermore, EVs have zero tailpipe emissions. Hydrogen fuel cell vehicles have the potential for low carbon intensity and release no emissions. Natural gas and propane have more moderate GHG reductions relative to gasoline. The carbon intensity of biofuels can vary significantly based on the factors mentioned above. Unfortunately, there is no way to ensure that the biofuels available in Surrey would be produced from renewable feedstocks.

Figure 1 – Lifecycle GHG Emissions of Various Alternative Fuel Technologies



With respect to market readiness, more weight was given to alternative fuels that require some degree of support to become viable, but for which Original Equipment Manufacturer (OEM) vehicles are currently available or are close to roll-out. A number of EVs are now available on the market while many of the major automobile manufacturers are developing hydrogen fuel cell vehicles. Natural gas vehicles have been available for some years, but in the past have been limited mainly to fleet deployments, while most propane vehicles on the roads today are the

result of after-market conversions. Finally, most modern gasoline vehicles are capable of running on low concentrations of ethanol, while "flex fuel" vehicles (mostly trucks) have the ability of running on higher concentrations of ethanol. All diesel vehicles can operate on biodiesel without modification.

In addition to fuel types, staff evaluated various delivery parameters, when multiple options were available. In general, these options related to the pressure and state of the fuels and refuelling/recharging speeds.

Electric Vehicle Technology

Among the alternative fuel technologies under consideration EV technology is unique for a number of reasons that warrant special attention. Unlike the refuelling of most other alternative fuels and gasoline, EV recharging requires a considerable amount of time. There are currently three standards of EV charging stations (levels 1, 2, and 3), that have a recharging time range from under half an hour (level-3) to half a day or more (level-1) (see Figure 2).

Figure 2 – Electric Vehicle Supply Equipment (EVSE) Types

EVSE Type	Voltage	Charging Time	Cost of Installation
Level 1	120V	12-14 hours	\$1,000 - \$2,000
Level 2	240V	6-8 hours	\$4,000 - \$12,000
Level 3 DC Fast Charge	480V DC	20- 30 minutes	~ \$100,000

Another peculiarity of EV charging is that it need not occur exclusively at gasoline stations. Level-1 and level-2 charging are ideally suited for home, workplace, and retail parking lot charging scenarios. Additionally, the limited range afforded by current EV batteries presents a major psychological barrier for consumers (referred to as "range anxiety"). The maximum range of the current generation of fully electric vehicles is 120 kilometres. For gasoline station operators the inability to resell electricity (at a profit) limits EV charging-based revenue generation potential.

Despite these considerations, EV technology is arguably the most viable alternative fuel currently. There is significant momentum building with a number of vehicles coming into widespread production. At the same time, the public's awareness and understanding of EVs is growing rapidly. The EV market is also being supported by recently announced Provincial programs that offer vehicle purchase incentives and infrastructure funding.

The advantages of EV technology include the low cost of electricity and low carbon intensity. The challenge, however, is that a new battery recharging paradigm must be implemented locally, and across North America – one that differs significantly from the existing refuelling model. It is anticipated that the vast majority of charging will occur at home and at retail locations utilizing level-1 and level-2 infrastructure. However, a smaller network of level-3 "fast charge" infrastructure will also be required for range extension. Staff envisions the provision of level-3 infrastructure resting with the gasoline station industry (being the current purveyors of transportation fuels).

Stakeholder Consultation

Focussed telephone interviews were undertaken with a range of interested individuals and groups. Given that there was considerable interest generated by the Council initiative, staff also hosted a stakeholder consultation event with representatives from a variety of stakeholder groups.

Participants at a workshop on October 6, 2011 provided feedback on a draft policy presented at that time. Comments focussed primarily on the supply-side and demand-side barriers to the successful implementation of the policy. Gasoline station industry representatives highlighted the significant costs of alternative fuel infrastructure installation, prolonged EV charging times, and limited potential for revenue generation in view of the existing restrictions on the resale of electricity.

Many in attendance commented that there is little demand for alternative fuels. The limited availability of alternative fuel vehicles, their high-ticket price, and in the case of EVs, range anxiety were all cited. However, low demand for alternative fuel vehicles cannot be reason enough to stall the roll-out of alternative refuelling opportunities when the very purpose of the exercise is to increase the demand for alternative fuel vehicles.

Implementation Mechanism

As with other amenities, Council has the ability to require new gasoline stations or existing gasoline stations undergoing redevelopment to provide alternative fuel refuelling or recharging infrastructure as a condition of zoning. This would apply to sites zoned as *Self-Service Gasoline Station Zone* (CG-1), the *Combined Service Gasoline Station Zone* (CG-2), or any Comprehensive Development (CD) Zone that permits a gasoline station. To secure the installation of the alternative fuel infrastructure, the developer would be required to provide a letter of credit, which would be released upon the completed installation.

Off-Site Installation

In response to stakeholder comments related to prolonged EV charging times, it is proposed that the approach allow an option for the gasoline station proponent in conjunction with the construction of the gasoline station to install level-3 chargers off-site at a location that is acceptable to the City. No other alternative fuels are deemed suitable for off-site installation due to safety considerations. Gasoline station operators will be encouraged to partner with the City or retail establishments in relation to finding suitable locations for consumers in relation to such off-site installations.

Expected Outcomes

It is anticipated that the majority of installations resulting from this policy will be of EV charging infrastructure. A review of building permits issued since 2000 has revealed that there has been a decline in gasoline station development (from five or six permits per year to only one or two per year in the most recent years). Given the limited number of applications in any year, and the increased development costs, it is expected that deployment of level-3 charging stations in Surrey will be gradual. This combined with anecdotal information from workshop participants that gasoline stations are experiencing difficulty remaining profitable, suggests that gasoline station development may be highly vulnerable to the increased development costs associated with alternative fuel provision.

Of the 75 existing gasoline stations in Surrey 30 were constructed or redeveloped since 2000. With the proposal recommended in this report in effect the remaining gasoline stations are less likely to redevelop due to the increased costs of redevelopment, and new gasoline station development is likely to be limited to new neighbourhoods not presently served by a gasoline station. As illustrated in Appendix III this will probably include South Port Kells, Clayton and Grandview (away from the main population and commercial centres).

Zoning By-law Amendments and Related Policy

To implement the above-described approach to the installation of alternative fuel infrastructure associated with gasoline stations, two separate actions are necessary. A series of amendments are required to the Zoning By-law as documented in Appendix I and a related City Policy, as documented in Appendix II, all need to be adopted by Council. The Zoning By-law amendments will require that Council hold a public hearing in relation to such amendments.

Legal Services Review

Legal Services has reviewed this report and has no concerns.

SUSTAINABILITY CONSIDERATIONS

Requiring the installation of alternative fuel infrastructure in association with the construction of new gasoline stations and the redevelopment of existing gasoline stations will support the economic and environmental pillars of the City's Sustainability Charter under the following specific elements of the Charter:

- *EC8: Energy Security*, by supporting the availability of low-impact, renewably-sourced transportation fuels that reduce reliance on fossil fuels;
- *EC10: Green Technology Development and Businesses*, by promoting the commercialization of clean technologies associated with alternative fuels;
- *EN3: Vehicle Fleet Programs*, by increasing the availability of alternative fuels which supports the deployment of alternative fuel vehicles in Surrey's fleet; and
- *EN15: Sustainable Transportation Options*, by implementing alternative fuel initiatives that complement Provincial alternative fuel programs.

CONCLUSION

Based on the above discussion, it is recommended that Council:

- Approve amendments to Surrey Zoning By-law, 1993, No. 12000, as documented in Appendix I of this report that, if adopted, will add a requirement to each of the Self-Service Gasoline Station Zone (CG-1) and the Combined Service Gasoline Station Zone (CG-2) that alternative fuel refuelling or recharging infrastructure be installed in conjunction with the construction of any gasoline station with the following being eligible alternative fuel refuelling or recharging infrastructure:

- Level-3 electric vehicle (EV) charging station (also known as a DC fast charger), or its equivalent;
 - Fast-fill compressed natural gas (CNG) vehicle refuelling station;
 - Hydrogen vehicle refuelling station; and/or
 - Liquefied petroleum gas (propane) vehicle refuelling station;
- Authorize the City Clerk to bring forward for the required readings the necessary amending by-law and to set a date for the related public hearing;
 - Approve as City Policy the policy entitled "Requirement for Alternative Fuel Infrastructure Related to Gasoline Stations", which is attached as Appendix II to this report, that would provide that any new Comprehensive Development Zone that permits a gasoline station require that alternative fuel infrastructure be constructed in conjunction with the construction of a gasoline station, or that a level-3 electric vehicle charging station (also known as a DC fast charger), or its equivalent, be constructed off-site at a location approved by the City, in conjunction with the construction of a gasoline station; and
 - Direct staff to review, in three years' time, the eligible alternative fuel infrastructure options as listed above considering market penetration and vehicle availability with a particular focus on the continued inclusion of liquefied petroleum gas (propane) as an eligible alternative.

Original signed by
Jean Lamontagne
General Manager
Planning and Development

AD:saw

Attachments:

Appendix I: Proposed Amendments to Surrey Zoning By-law, 1993, No. 12000, as amended

Appendix II: City Policy – "Requirement for Alternative Fuel Infrastructure Related to Gasoline Stations"

Appendix III Location of Existing Gasoline Stations

**Proposed Amendments to
Surrey Zoning By-law, 1993, No. 12000, as amended**

The following amendments are proposed to Surrey Zoning By-law, 1993, No. 12000, as amended:

AMENDMENTS TO PART 1 DEFINITIONS

1. Insert after the definition of "Alcohol and Drug Recovery House" and before the definition of "Amenity Space" the following definition:

"Alternative Fuel Infrastructure

means any one of the following:

- (a) Level-3 electric *vehicle* charging station (also known as a DC fast charger), or its equivalent;
 - (b) Fast-fill compressed natural gas (CNG) *vehicle* refuelling station;
 - (c) Hydrogen *vehicle* refuelling station; and/or
 - (d) Liquefied petroleum gas (propane) *vehicle* refuelling station."
2. Amend the definition of "**Pump Island**" by deleting the word "gasoline" and inserting in its place the words "automotive fuel".

AMENDMENT TO PART 5 OFF-STREET PARKING AND LOADING/UNLOADING

1. Amend "Table C.2 Parking Requirements for Commercial Uses" by deleting the row for "Gasoline Service Stations" and inserting in its place the following:

<i>"Gasoline Station</i>	i. 2 <i>parking spaces</i> for every 100 square metres [1,075 sq. ft.] of <i>gross floor area</i>; and ii. 1 <i>parking space</i> for every car wash bay if applicable; and iii. 3 <i>parking spaces</i> for every <i>vehicle</i> service bay where such services are provided; and iv. 1 <i>parking space</i> for every electric <i>vehicle</i> charging station connector where such infrastructure is provided."
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AMENDMENT TO PART 4o SELF-SERVICE GASOLINE STATION ZONE

1. Delete paragraphs 1 and 2 under Section "B. Permitted Uses" and replace them with the following:
 - "1. Self-service *gasoline station* provided that *alternative fuel infrastructure* shall be available on the same *lot*.
 2. Full-service *gasoline station* provided that *alternative fuel infrastructure* shall be available on the same *lot*."

AMENDMENT TO PART 41 COMBINED SERVICE GASOLINE STATION ZONE

1. Delete paragraph 1 under Section "B. Permitted Uses" and replace it with the following:

"1. *Gasoline station* provided that:

- (a) *Alternative fuel infrastructure* shall be available on the same *lot*; and
- (b) Where self-service hoses are available, at least an equal number of full-service hoses shall be available on the same *lot*."

 CITY OF SURREY	City of Surrey Policy
Policy Number: Policy Title: Approval Date: Revision Date: Department:	Requirement for Alternative Fuel Infrastructure Related to Gasoline Stations Planning and Development Department

Policy Statement

The Zoning By-law was amended to add the requirement for alternative fuel infrastructure as part of the permitted uses of the Self-Service Gasoline Station Zone (CG-1) and the Combined Service Gasoline Station Zone (CG-2). Any new Comprehensive Development Zone that permits a gasoline station must require that alternative fuel infrastructure be constructed in conjunction with the gasoline station on the same lot, or that a level-3 electric vehicle charging station (also known as a DC fast charger), or its equivalent, be constructed off-site in conjunction with the construction of the gasoline station, all subject to the approval of the City of Surrey.

1. Reason for Policy

The City of Surrey strives to reduce Greenhouse Gas (GHG) emissions produced by the transportation sector by encouraging and supporting the adoption of alternative fuel vehicle technologies. A critical requirement for the mainstream uptake of alternative fuel vehicles is the public availability of alternative fuel refuelling and recharging infrastructure. The City of Surrey can motivate the development of this infrastructure by requiring gasoline stations to provide alternative fuels in addition to the conventional transportation fuels that gasoline stations currently offer.

2. Definitions

The Zoning By-law defines *Alternative Fuel Infrastructure* as any one of the following:

- Level-3 electric *vehicle* charging station (also known as a DC fast charger), or its equivalent;
- Fast-fill compressed natural gas (CNG) *vehicle* refuelling station;
- Hydrogen *vehicle* refuelling station; and/or
- Liquefied petroleum gas (propane) *vehicle* refuelling station.

3. Responsibilities

- 3.1 To secure the installation of the alternative fuel infrastructure the City of Surrey will take a letter of credit in the amount of \$75,000 from the owner of the gasoline station which will be released upon the completed installation.

Location of Existing Gasoline Stations

