

City of Mississauga
Memorandum



Date: 2022/02/18

To: Environmental Action Committee

From: Stefan Szczepanski, Director, Parks, Forestry and Environment

Meeting Date: 2022/03/01

Subject: Impacts of Residential Indoor Wood Burning Stoves/Fireplaces and Staff Recommended Next Steps

Memo Highlights

- Resolution 0232-20221 was approved by Council on Dec 8, 2021 with the direction for City staff to report to the Environmental Action Committee on concerns related to the use of residential wood burning stoves/fireplaces and their impact on the environment, health and safety and adjoining residents.
- The Environment Section worked with other City divisions (Fire, Enforcement, Legal, Planning and Building) and the Region of Peel to a) highlight the environmental impacts, and improper use, of residential indoor wood burning stoves/fireplaces, b) identify existing wood burning bylaws in other municipalities in Canada and c) make staff recommendations on next steps.
- Research shows that there are various impacts from residential indoor wood burning stoves /fireplaces on the environment which can contribute to poor air quality.
- Only two municipalities in Canada have introduced bylaws regulating indoor wood-burning stoves: Metro Vancouver and Montreal. Each of these municipalities have greater regulatory authority and tools to regulate indoor wood burning appliances than the City of Mississauga.
- It is estimated that of the 92,000 single family homes in Mississauga, approximately less than 1% of these homes have wood burning stoves as their primary source of heat (~130 dwellings).
- City staff recommend continued education on proper burning techniques and researching incentives to replace inefficient indoor wood burning appliances.

A. Background

At the December 8, 2021 Council meeting, then Councillor Karen Ras brought forward Motion 16.1 to regulate the use of wood burning stoves. Based on this motion, Resolution 0232-20221 was approved by Council with the direction for City staff to report to the Environmental Action Committee (EAC) on concerns related to the use of residential wood burning stoves/fireplaces and their impact on the environment, health and safety and adjoining residents.

A similar resolution was brought to EAC on February 5, 2013 with the recommendation to incorporate messaging into the existing Fire and Emergency Services Division's "Home Safe Home" fire safety program and work with the Region of Peel to include in their outreach tools important messaging around curtailing wood burning during poor air quality events, promote information on air quality, health impacts and tips for indoor wood burning. This information is on the Region of Peel's Public Health website along with a list of materials that should not be

burned including; plastic, magazines, rubber, cardboard, Styrofoam, treated wood (coated with preservatives or paint), plywood, particle board, wet, rotted, diseased or moldy wood.¹ From May to September 2014, fire crews went door-to-door distributing fire safety materials and conducting fire safety surveys. During this time the Home Safe Home program reached more than 32,000 Mississauga residents.

B. Comments

Research shows that there are a number of environmental impacts from residential indoor wood burning stoves /fireplaces which can contribute to poor air quality and health and safety issues. There are also varying levels of air pollution depending on the type of wood burning equipment and appliances being used (e.g. wood stoves, pellet stoves, conventional fireplaces, advanced technology fireplaces, fireplace inserts, wood cook stoves, and masonry heaters). For example, a high efficiency wood stove is cleaner burning than an open fireplace when using appropriate material to burn. Appendix 1 graphically depicts pollution levels by type.

According to Health Canada's website, wood smoke can lead to poor air quality contributing to smog and acid rain. Wood smoke can be responsible for as much as 25% of the airborne particulate matter, 8% of the volatile organic compounds, and 7% of the carbon monoxide in the air. Wood smoke also contains small quantities of other toxic compounds, including nitrogen oxides and chlorinated dioxins.² These figures relate to Canadian communities where wood heating is common. It is important to note that in Mississauga wood burning is not a common primary source to heat homes. Approximately 130 homes use wood stoves as their primary heat source, which make up approximately less than 1% of single family homes.

According to Peel Health, the most significant pollutants found in wood smoke include:

- Particulate matter – can cause and/or worsen health problems such as lung irritation and inflammation because it can be drawn deep into the lungs.
- Polyaromatic hydrocarbons – this group of chemicals are harmful to human health because they are a possible cancer risk and may also cause irritation to skin and the lungs.
- Volatile Organic Compounds (VOCs) – these chemical compounds can cause respiratory irritation and inflammation. Some VOCs released from wood-burning appliances, such as benzene, may act as cancer causing agents.
- Dioxins – are released in very small amounts when wood is burned. When materials containing chlorine, such as plastic, garbage, wood treated with pentachlorophenol, pesticides, or even bleached paper, is burned, chlorinated dioxins may be produced. Chlorinated dioxins are toxic and may cause cancer, so exposure may increase cancer risks over the long term.³

Burning wood also produces black carbon (soot) which is a contributor to climate change, however this is more of a short-lived greenhouse gas (days to weeks) as opposed to a more long-lived greenhouse gas like methane. Due to the small number of Mississauga homes using wood to heat their homes, the overall impacts of black carbon on climate change from this source is far less than in areas that rely on it more heavily.

¹ <https://www.peelregion.ca/health/enviroNew/athome/wood-smoke.htm>

² <https://www.canada.ca/en/health-canada/services/air-quality/indoor-air-contaminants/avoid-wood-smoke.html>

³ <https://www.peelregion.ca/health/enviroNew/athome/wood-smoke.htm>

There are also health and safety impacts from burning wood. There is an increased risk of people getting burned from using an indoor wood burning appliance incorrectly. In addition, improper use and improper cleaning of wood burning appliances could lead to creosote build-up, causing fire safety issues such as chimney fires. Based on chimney fire data from Mississauga Fire and Emergency Services, there were fourteen incidents in the past three years.

Impacts to Adjacent Neighbours

There are various reasons for poor air quality from indoor wood burning appliances that would impact adjacent neighbours. It could be due to poor combustion, poor wind dispersal, and other atmospheric conditions.⁴ Using wet wood or improper materials like cardboard and plastics can also lead to poor air quality and incomplete combustion causing ashes to be distributed to adjacent neighbours.

When combustion is incomplete air pollutants are emitted in greater quantities, especially when the fire is started and then again when the wood is smouldering. Visible white or gray smoke coming from the chimney is an indicator of incomplete combustion. Properly operating wood burning equipment may reduce the impacts of air emissions.⁵ Neighbours in densely populated areas may also experience a greater impact from wood smoke from their adjacent neighbours.

Existing Bylaws in other Jurisdictions

As of February 2022, only two municipalities in Canada have introduced bylaws regulating wood burning appliances in an effort to improve air quality: Metro Vancouver and Montreal. These municipalities have greater regulatory authority and tools to regulate indoor wood burning appliances than Mississauga (e.g. Metro Vancouver has authority from the Province and Montreal can use their building code). Both municipalities regulate emission standards and time of use of the wood burning appliances. Highlights of these bylaws include:

- The Metro Vancouver bylaw requires applicable residents to register their indoor wood burning appliance, provide information that the appliance meets the emissions standards, submit a declaration of compliance with best burning practices as well as a prohibition on using indoor wood burning appliances during the warm season (May 15 to September 15). The time period restrictions and emissions standards do not apply to those residents using indoor wood burning appliances as a sole source of heat but they must register their device and abide by best burning practices.⁶
- Montreal's bylaw prohibits the use of a solid-fuel-burning device unless it emits fewer than 2.5 grams of particles per hour however this does not apply to an EPA or CAN/CSA-B415.1 certified pellet device installed before the regulation came into effect. In the event of smog, the use of all solid fuel-burning devices, including certified devices, is prohibited. The above two conditions do not apply during an electrical failure that lasts more than 3 hours. The bylaw does not stipulate any exemptions for those residents using solid fuel-burning devices as a primary heat source.⁷

⁴ https://ccme.ca/en/res/code_wood_burning_e.pdf

⁵ https://ccme.ca/en/res/code_wood_burning_e.pdf

⁶ http://www.metrovancouver.org/boards/Bylaws1/MVRD_Bylaw_1303.pdf

⁷ http://ville.montreal.qc.ca/pls/portal/docs/PAGE/ENVIRO_FR/MEDIA/DOCUMENTS/CODIFICATION_15_069_AN.PDF

Fewer Mississauga residents use wood as their primary heat source compared to Metro Vancouver and Montreal. Of the estimated 92,000 single family homes in Mississauga, approximately less than 1% of dwellings (or ~130 homes) use wood burning stoves as their primary source of heat. While not a direct comparison, in Metro Vancouver there are approximately 100,000 fireplaces and woodstoves in use in the region, producing a quarter of all the fine particulate matter in their air.⁸ Both Metro Vancouver and Montreal also experience greater instances of air pollution and health concerns and continue to issue high air quality index advisories. In Mississauga, improvements in air quality due to the closure of the coal-fired Lakeview Generating Station (and closures of all coal-fired generating stations in Ontario since 2014) have resulted in much fewer instances of air quality index advisories in Mississauga and Ontario.

While Mississauga City staff support efforts to reduce wood smoke emissions, there are limitations around the use of bylaws to enforce proper usage. For example, municipal enforcement by-law officers, and Region of Peel by-law and Region of Peel public health inspectors do not have the right to enter private residences to enforce such a bylaw without consent to access the dwelling and sufficient evidence to support that the device is unsafe or is a nuisance. Fire staff can only go inside a residence if there is an immediate threat.

Regulations for New Woodstoves

In Mississauga, installation of new wood burning fireplaces and wood stoves are regulated through the building permit process as per the Ontario Building Code issued by the City's Building Division. Wood burning appliances must meet the particulate emission limits outlined in the CSA B415.1 or the EPA Code of Federal Regulations 2015 (4.5 grams per hour).

C. Staff Recommendations on Next Steps

City staff recommend revitalizing educational and communication tools on proper burning techniques and researching incentives to replace inefficient indoor wood burning appliances for residents. More specifically, City staff recommend the following:

1. City staff work with key internal and external stakeholders to create educational material on the hazards of improper use of wood burning appliances: For example, Metro Vancouver's education material contains clear instructions regarding indoor wood burning including a [tip sheet for burning smart](#) and a [wood smoke awareness brochure](#). Similar education materials can be created.
2. Organize a targeted mail drop of educational material in neighbourhoods with documented issues of wood smoke nuisance.
3. Investigate existing incentives available to Mississauga residents such as [exchange/replacement programs](#) and [home energy retrofits](#) to replace inefficient indoor wood burning appliances and promote using the City's regular communication channels (eg. webinars, workshops, social media and website).

⁸ <http://www.metrovancouver.org/media-room/video-gallery/issues/219170181>

D. Environmental Action Committee Recommended Next Steps

That staff be directed to develop and launch a Residential Indoor Wood Burning Stoves/Fireplaces educational campaign in collaboration with the Region of Peel as well as key internal and external stakeholders and to investigate existing home retrofit incentives available to City of Mississauga residents.

The educational campaign will include all that is outlined in section C.

Attachments

Appendix 1: Different Types of Wood Burning Equipment

Prepared by Diane Gibson, Supervisor, Environmental Sustainability and Dianne Zimmerman, Environment Manager

Appendix 1

Different Types of Wood Burning Equipment

There are various types of wood burning equipment including wood stoves, pellet stoves, fireplaces, conventional fireplaces, advanced technology fireplaces, fireplace inserts, wood cook stoves, and masonry heaters. Built-in masonry wood burning fireplaces have very little controls in place to reduce wood smoke emissions resulting in higher emissions. Some fireplaces have factory built-in units or fireplace inserts using the same technologies found in advanced combustion wood stoves and have lower emissions.⁹

The following graphic shown below from Metro Vancouver's Wood Smoke Awareness Brochure provides a visual representation of the air quality hierarchy regarding the different types of wood burning equipment. The graphic also highlights the benefits of replacing a wood burning appliance with natural gas or electric.



<http://www.metrovancouver.org/services/Permits-regulations-enforcement/PermitRegulationEnforcementPublications/WoodSmokeAwarenessBrochure.pdf>

⁹ https://ccme.ca/en/res/code_wood_burning_e.pdf