Mitigating the Health, Environmental, and Quality of Life Impacts of Gas-Powered Leaf Blowers

Bronxville Green Committee, Bronxville, NY June 14, 2021

Executive Summary

During much of 2020, when more residents were working and learning from home, the noise from gas-powered leaf blowers became the #1 complaint made to Village Hall. Twenty five years ago, a proposal was made to restrict the use of gas-powered leaf blowers in Bronxville. The current ordinance, enacted in 2001 and made permanent in 2002, bans gas-powered leaf blowers from June 1 until September 30. Given the heightened awareness of the negative impacts of gas-powered leaf blowers, and the robust science that now confirms it, many Westchester municipalities have enacted ordinances, or are considering ordinances, to further restrict their use in favor of electric blowers or, in some cases, limiting all leaf blowers in favor of other landscaping practices that support horticultural and environmental good health.

The Bronxville Green Committee has studied the reports made by other local municipalities, especially by Scarsdale and Bedford; we have reviewed the documents cited in these reports and added our own citations; we have confirmed information provided in a chart that compares gas and electric leaf blowers currently available for sale; and we have gathered detailed information on leaf blower ordinances in many Westchester municipalities. Finally, the Green Committee conducted two surveys soliciting opinions about leaf blowers and landscaping practices: one from residents and a second from landscapers registered in Bronxville. Of landscapers, we asked about the impact of recently enacted ordinances on their business, and the kinds of landscaping services they offer.

The Green Committee's Key Findings Are:

*Gas-powered leaf blowers pollute the air with both volatile organic compounds and with particulates, negatively impact workers' and residents' health, and operate at excessive noise levels that reduce the quality of life for residents, including students studying, adults working remotely, and all residents trying to enjoy their time at home and in the community.

*Electric leaf blowers address many, but not all, of the downsides of gas-powered leaf blowers since they release zero on-site emissions and produce significantly less penetrating noise.

*Some models of electric leaf blowers currently on the market are cost-effective and sufficient for personal and professional use during most of the year. During leaf season (October through December), however, gas leaf blowers are considered by many professional landscapers to be the most viable option.

*Both gas and electric leaf blowers have negative impacts on local wildlife, undermine the health of plants, and increase rainwater run-off and erosion. The best option is to follow Westchester County's long-running Love 'Em and Leave 'Em program: mulch leaves, allowing most of them to remain on the lawn and planting beds, where they can add nutrients to the soil.

*****Some landscapers registered in Bronxville indicated that further restrictions on leaf blowers are impacting their business; they're concerned that strict limitations on gas blowers will result in less tidy landscapers and unhappy customers.

*Enforcement of leaf blower regulation, and any amendment expanding the regulation, needs to be addressed by the Trustees to fully support the legislation.

*The current ordinance does not specifically address municipal property within the Village of Bronxville. As an incentive for compliance, we encourage the Trustees to ensure that any revised ordinance applies equally to all municipal property.

Current Regulations for Leaf Blowers in Bronxville

Bronxville currently prohibits the use of gas-powered leaf blowers from June 1 until September 30. During the non-restricted time, there are no limitations regarding day of the week or hours of operation. All commercial landscapers must be registered with the Village and receive a permit, which must be prominently displayed on their truck or equipment.

Under noise ordinances that restrict decibel levels, many municipalities specifically exempt gas leaf blowers, all of which surpass local noise ordinances. Bronxville does restrict many specific loud noises but does not mention leaf blowers.

Bronxville levies fines for violations of its leaf blower restrictions: $250 for a first offense; $500 for a second offense occurring within 365 days of the first; and $1000 for a third offense occurring within 365 days of the second.

Leaf Blower Ordinances in Other Westchester Municipalities

Many Westchester municipalities restrict gas-powered leaf blowers, and some have recently revised their ordinances, or are considering doing so, to further restrict them. An asterisk in the citations below indicates those towns.

Some municipalities will soon ban all gas blowers (*Larchmont in Jan 2022; *Irvington in Dec 2023; *Scarsdale will ban gas blowers Jan-Oct starting Feb 2022; *Croton is considering a 2022 ban from Jan-Oct; Ossining bans them on half-acre or less by Jan 2023).

Many, like Bronxville, ban gas-powered blowers during the summer (Ardsley, *Greenburgh, Hastings, Mamaroneck, *New Castle, New Rochelle, Rye, Sleepy Hollow, Tarrytown, Tuckahoe, Yonkers).

Some now further ban them during winter months (Pelham; Dobbs Ferry; White Plains; East Hampton, L.I.; *Scarsdale; Ossining; Pleasantville is considering a winter ban; Bedford is considering a winter ban).

Some ban both gas and electric except for limited spring and fall clean-up (Larchmont, Mamaroneck, Mount Vernon, Port Chester; Greenburgh is considering).

Some restrict gas to only fall clean-up and allow electric all year (Scarsdale, Dobbs Ferry, Ossining, Tuckahoe).

Many limit the days of operation during non-restricted times. Starting in February 2022, Scarsdale will allow gas blowing only Tues-Fri; many ban Sundays (Bedford, Irvington); others allow blowing during specific hours, with many limiting weekend hours.

Most impose fines for violations similar to Bronxville's; few clarify how enforcement is to be achieved.

In past years, municipalities have restricted decibel levels and made limited exemptions for gas blowers. More recently leaf blower restrictions are tied to overall environmental and health impacts.

For a complete chart of municipalities' leaf blower ordinances, created by the Green Committee, see Appendix A.

The Case Against Gas-Powered Leaf Blowers

Introduction—

Bronxville residents pride themselves on their pristine residential landscaping. To maintain that level of care, leaf blowers and the people who operate them have become ubiquitous, and they blow not just leaves but the entire lawn and planting beds free of any clippings, leaf mulch, or yard debris, year-round. But maintaining a pristine yard comes at a cost. High levels of noise and air pollution lead to diminished human health and quality of life. There is also an ecological price to pay--in reduced biodiversity, destruction of pollinator habitat, soil erosion and compaction, and loss of soil quality.

The negative public health impacts of loud, penetrating noise, air pollution from inefficient gas engines, and of particulate matter kicked up into the air affect both the workers operating the blowers and residents living in our community. Most gas leaf blowers are two-stroke engines, a machine that is light, maneuverable, and powerful, but burns very inefficiently. Four-stroke engines, the push kind of blower, is heavier, bulkier, and rarely used by professional landscapers or homeowners.

Unlike builders, landscapers and their use of landscaping equipment face relatively light regulations, yet these practices impact all of us. Current business models for landscapers provide incentives that do not align with good public health or quality of life. Like building codes, which have made homes safer and more energy efficient, leaf-blower ordinances can improve life for the public.

Noise Pollution

Gas-powered leaf blowers produce noise levels and frequencies that negatively affect the quality of life for residents and can have serious health consequences.

Gas leaf blowers currently on the market operate a decibel levels of 70-112 dBs. Electric models operate at 56-65 dBs. Actual sound levels increase exponentially with each dB of increase. An increase of 10 dBs is twice as loud; an increase of 20 dBs is four times as loud. See Appendix B for details.

According to the CDC, any noise above 70 decibels begins to cause hearing damage, while any noise above 120 dBs causes immediate hearing damage (FN1).

The CDC explicitly lists gasoline powered leaf blowers as a common cause of hearing damage on their website dedicated to hearing loss. The limit set for auditory torture in the CIA handbook is 79 decibels,

which is easily exceeded by leaf blowers (FN2). Fuel-powered leaf blower noise at close range is up to 115 dBA. (FN3).

The noise of gas leaf blowers travels long distances. In a 2017 study for the Journal of Environmental Toxicology, researchers showed what kind of noise bystanders are exposed to at varying distances of 50, 100, 200, 400, and 800 feet, from three two-stroke lawn tools (two leaf blowers and a vacuum tool). The study produced two key findings: First, even at 800 ft away, bystanders were exposed to levels of noise that exceeded the WHO's recommended community outdoor daytime sound standards (55 dBs). At 50ft, bystanders were exposed to levels of sound loud enough to cause hearing damage (above 80dBs).

The second key finding was the dominance of low-frequency sound waves in the composition of two-stroke noise. Low frequency noise penetrates windows and glass doors, such that often bystanders cannot escape the sound (FN4).

It cannot be overstated that noise hurts. Sound travels, and it impacts everyone, which is why noise ordinances are universal. The term "noise complaint" often conjures the image of people calling the police and ruining the fun of people's parties, but it is a serious issue. A recent study estimates that more than 100 million Americans are at risk for noise-related health problems, with over 145 million at potential risk of hypertension due to noise, and even more at an increased risk of heart attack (FN5).

Besides hearing loss, other negative health impacts associated with gas leaf blowers include an inability to concentrate due to impaired cognition, increased stress, and immune system suppression (FN6). The negative impact on the health of workers operating the blowers for many hours, day after day, is also an important factor when considering the benefits of additional regulation (FN7). Often workers do not wear protective gear and their near proximity to the blowers intensifies their risk.

Air Pollution From Incomplete Combustion and Its Health Impacts

The engines that power two-stroke gas leaf blowers are highly inefficient, contain no mitigating controls, and release significant amounts of toxic air pollution. In these engines, 30% of the fuel mixture fails to undergo complete combustion. As a result, the engine emits harmful pollutants directly into the air as vapor (FN8). These emissions include carbon monoxide, which contributes to ground-level ozone; nitrous oxides, which contribute to smog formation; and hydrocarbons, which can be carcinogenic (FN9). They are also powerful greenhouse gases that contribute to climate change.

The EPA has not issued updated leaf blower emissions standards since the year 2000 (FN10). This means that leaf blower emissions have not improved for over two decades. There is no reason to believe that they will spontaneously improve without policy choices. From a 2018 piece in the *Wall St. Journal*: "Most leaf blowers use two-stroke engines—lightweight, compact, cheap sources of power for lawn mowers, tree trimmers and snow blowers. The problem with these crude motors is that their intake and exhaust functions occur at the same time, meaning the fuel mixes with oil. A large share of the gasoline is then spewed out unburned, as an aerosol in the exhaust. Such fumes have been found to increase the risk of cancer, heart disease and asthma."

The environmental impact of gas leaf blowers cannot be underestimated—in fact, one study showed that under normal usage conditions, a gas leaf blower two-stroke engine emits nearly 93 times the hydrocarbons of a pickup truck and 300 times the hydrocarbons of a sedan. Crazy though it sounds,

using a two-stroke gas leaf blower for only half an hour is the equivalent of driving a pickup truck for just under 3900 miles (FN11). The emissions from gas leaf blowers have also been shown to impact the health of those using the machinery; such health concerns include chronic respiratory conditions, allergies, asthma, dizziness, headaches, heart and lung disease, cancer, and dementia (FN12).

The gas leaf blowers currently on the market that offer quieter and cleaner-burning engines are not commercial grade equipment and do not provide the power needed for landscapers. Even these models, with their limited power, produce more noise and pollution than commercial grade electric blowers.

In a study by Edmunds, the well-known car review and sales website, which compared leaf blowers to cars and trucks in a controlled laboratory setting, we can truly see that there is no clean gas-powered leaf blower. Car engines are able to achieve much cleaner emissions because they have catalytic converters. In order to make it easier to compare the two-stroke gas blower to the Ford Raptor pickup truck, the table below displays how much more of the emissions in question the leaf blowers emit, in a given timeframe. In the case of air pollution and carbon monoxide, the two-stroke (far more common in lawn cleanup) is far worse than the four-stroke.

(continues)

	Non-Methane Hydrocarbons	Nitrous Oxide	Carbon Monoxide
2011 Ford Raptor	0.005	0.005	0.276
2012 Fiat 500	0.016 (+220%)	0.010 (+100%)	0.192 (-30%)
Ryobi 4-stroke leaf blower	0.182 (+3540%)	0.031 (+520%)	3.714 (+1246%)
Echo 2-stroke leaf blower	1.495 (+29,800%)	0.010 (+100%)	6.445 (+2235%)

Notes: Original Source: Edmunds, 2011, "Emissions Test: Car vs. Truck vs. Leaf Blower" http://www.edmunds.com/car-reviews/features/emissions-test-car-vs-truck-vs-leaf-blower.html Calculations for change in pollution levels courtesy of Town of Bedford Leaf Blower Task Force checked by Bronxville Green Committee.

The Edmunds report concluded, "Distilling the above results…the two-stroke leaf blower generated 23 times the CO and nearly 300 times more NMHC than the crew cab pickup. Let's put that in perspective. To equal the hydrocarbon emissions of about a half-hour of yard work with this two-stroke leaf blower, you'd have to drive a Raptor [pickup truck] for 3,887 miles, or the distance from Northern Texas to Anchorage, Alaska."

Bedford's leaf blower report also cites studies linking air pollution to Alzheimer's disease and increased death rates from Covid-19 (FN13).

Air pollution is bad for everybody, but the air pollution harms from gas-powered leaf blowers land most heavily on the landscape workers operating the machinery, who directly breathe the fumes day in and day out. These workers are often economically disadvantaged and likely take this health risk because of economic need.

Air Pollution From Particulates and Its Health Impacts

Through incomplete combustion, and by kicking up soil into the air, leaf blowers also release another form of air pollution--particulate matter, those microscopic particles of soil, fungus, animal feces, pesticides, and other toxins that are so small (up to 2.5 microns in diameter) that they can immediately penetrate the lungs and enter the bloodstream. A recent *New York Times* article ("Brain Damage from Dirty Air," May 18, 2021) found a connection between high particulates and dementia in older white men.

Earlier studies confirm these findings: In a 2015 study by Dr. Jamie L Banks, a PhD in Health Economics, together with Robert McConnell, an EPA environmental engineer: “Extensive evidence exists on the adverse health effects of exhaust emissions and other fine particulates, which include cardiovascular disease, stroke, respiratory disease, cancer, neurological conditions, premature death, and effects on prenatal development.” (FN14). Banks and McConnell cite many sources for these claims, including the American Heart Association, American Lung Association, the United States EPA, World Health Organization, as well as half a dozen peer-reviewed scientific journal articles.

An EPA paper estimates that the two-stroke engines used in lawn equipment are responsible for the vast majority of all non-road fine particulate matter, as well as carcinogenic emissions. These fine particles are taken up into the lungs, causing inflammation and disease. Carcinogens tracked include benzene, butadiene, and formaldehyde, which are listed among the four top ranking cancer-causing compounds. In 2014 a study published in Nature Communications found that each cubic meter of exhaust from an idling two-stroke leaf blower contained 60,000 times the safe level of exposure of benzene.(FN15). However, not all potentially harmful emissions were characterized, and there may be other harmful compounds that were not identified.

Impact on Local Ecosystem

Gas leaf blowers have numerous negative impacts on the health of our local ecosystem.

*Their loud noise stresses animals and birds, which leads to decreased biodiversity (FN16).

*The blast of stronger-than-hurricane force air (up to 200 mph) coming from leaf blowers kills pollinators outright and by removing leaves around plantings, destroys habitat they rely on for many of their life stages.

*Bare ground left by blowers allows soil to become compacted and dries out trees and shrubs (FN17), undermining their health, contributing to rainwater run-off, and promoting erosion. Minimizing leaf blowers might be one step in restoring natural systems of water retention to control flooding.

Alternative to Gas Leaf Blowers: Electric Leaf Blowers

Electric leaf blowers are a better alternative to gas leaf blowers. They provide sufficient air power and are significantly quieter and less disturbing to residents. Moreover, electric leaf blowers release zero emissions at the point of use; they do not harm the user or pollute the air. They do not need to be filled with gas and oil, and do not require regular maintenance since they do not have an engine. Commercial electric leaf blowers still create sufficient airflow to efficiently handle yardwork for much of the year.

The main disadvantage of electric leaf blowers is battery life. And they still kick particulate matter into the air and have negative effects on the local ecosystem.

Because of the difference in usage time, electric leaf blowers need to be considered in two categories: those meant for professional use on multiple properties for a full workday and those sufficient for use by a homeowner on a single property.

Electric Leaf Blowers for Professional Use

During non-leaf season, commercial landscapers can successfully complete the job using most types of professional grade electric leaf blowers. Several brands available for sale have battery life and air power sufficient to handle landscaping except during spring clean-up and fall leaf season.

During leaf season, electric leaf blowers may not be able to reasonably handle the high volume of leaves. This limitation is due to the air power as measured in Cubic Feet per Minute (CFM) and battery life. None of the current electric leaf blowers have CFMs that compare to the CFMs of gas leaf blowers. This alone would not be a barrier because a landscaper could have multiple batteries for a unit and still complete the job. However, for a full workday a landscaper would need to have on hand several batteries per blower, or have the ability to recharge during the workday. This is expensive and inconvenient.

Electric Leaf Blowers for Homeowner Use

Two types of electric leaf blowers currently on the market can be used by homeowners for home use--corded and cordless. The mobility offered by cordless blowers makes them more popular, and several cordless models are readily available at local retailers for $200-$300 (including the battery and charger). Electric blowers are often preferred by homeowners as they are quieter and lighter than gas blowers, do not need to be filled with oil and gas, do not require maintenance, and release zero emissions. The batteries available for cordless leaf blowers are sufficient for use on most single properties.

Bronxville's current ordinance allows the use of electric leaf blowers throughout the year, including on weekends, which provides flexibility to residents who care for their own yards.

Comparing Sound Levels of Gas-Powered vs. Electric-Powered Leaf Blowers

An important question is: Are electric leaf blowers better than gas-powered when it comes to sound? Scarsdale's Conservation Advisory Council cites a sound analysis of comparable gas and electric blowers in a study conducted in 2018 by Arup, an acoustical consulting firm. The study finds that gas-powered leaf blowers have significantly more noise impact, even when the decibel levels are the same as an electric blower, because the low frequency at which they operate travels farther and penetrates more deeply into homes and businesses. At an 800 foot distance, all the gas blowers were distinctly audible while the electric blowers blended into the ambient noise. Please see Appendix B for details.

The Scarsdale report included a July 2018 study by the Lincoln, Massachusetts, Public Works Department, which recorded sounds at variable distances and also inside a building near a window. In the graph below, the five foot distance is obviously most significant for the workers. The 50ft window indicates the sound level inside a home near a window that is 50 feet from the blower outside.

Seven different blowers were compared: 4 battery operated and 3 gasoline operated leaf blowers:
Greenworks GBB 700 Battery

Greenworks GBB 600 Battery

Stihl BGA 100 Battery

Ego 600 Chevron Battery

Redmax EBZ8500 Gas Stihl BR 700X Gas

Echo PB760LN Gas

(NOTE: These models are still for sale; manufacture listed decibels are typically a few points less that found in the Lincoln study).

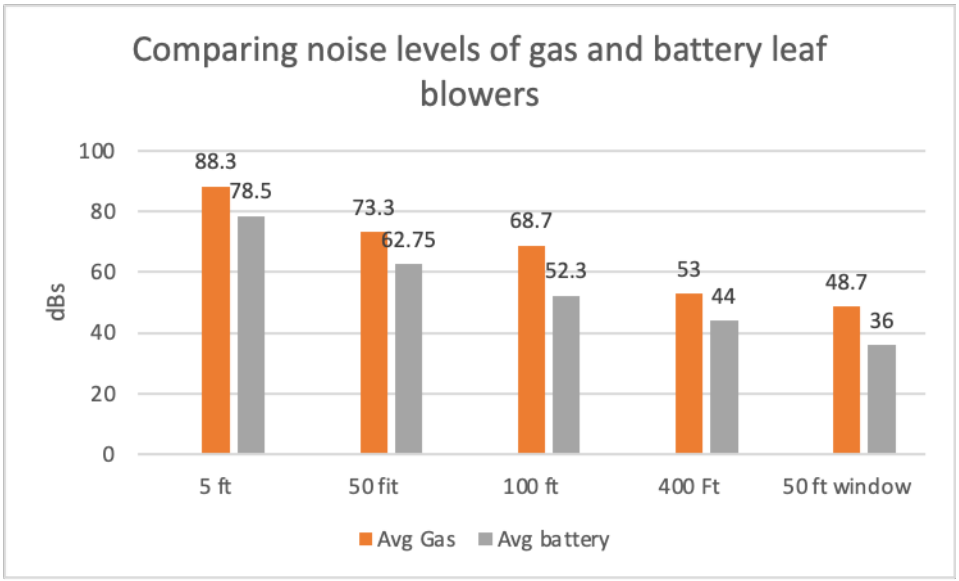

Chart created from ARUP data by Carole Upshur, Green Committee from Source: [Note (quietcleanpdx.org)]

Comparing Gas-Powered and Electric-Powered Leaf Blowers on the Market

Details and prices for a sample of leaf blowers shown below were taken from the Stihl brand website, the Northern Tools website, ACME hardware, and miscellaneous checks at Home Depot and Lowes. Note that manufacturers typically report noise level at 50ft., although the Husqvarna reports noise as it affects the worker. There are hundreds of brands and variations with different powers, features, numbers of batteries, battery life, etc. Backpack models are labelled. The others are hand-held.

Brand & model #	**Power Source**	**dBs (reported by manufacturer)**	**Wind speed mph MAX**	**Battery life (depends on speed)**	**Cost**
BATTERY OR ELECTRIC CORDED LEAF BLOWERS					
Stihl BGA86	Battery	58	130	21 min max speed	$250

Stihl BGA100 Prof*	Battery	56	100-141	Up to 6.5 hours	$380
Stihl BGA200 Prof*	Battery	59	157	Up to 9 hours	$410
Stihl BGE61	Electric cord	64	148	N/A	$99
Stihl BGE71	Electric cord	58/64	119/148	N/A	$130
Greenworks Pro 80V	Battery	60	125(variable)	12min to 1.1 hours	$236
Greenworks Pro 60V* 2419502VT	Battery	65	170 (variable)	N/A	$330
Greenworks Pro80V Backpack BPB90L2510	Battery	60	145 (variable)	12min to 1.1 hours	$350
EGO LB6504*	Battery	65	180	Up to 3 hours	$300
ECHO LB6003 Backpack	Battery	64	145	Up to 3 hours	$400
Gas Powered Leaf Blowers					
Redmax* EB28550 Backpack	Gas	110	206	N/A	$580
Stihl * BR700x Backpack	Gas	75	163-195	N/A	$500
ECHO* PB760LN (low noise) Backpack	Gas	74	214	N/A	$500
Redmax HB281	Gas	112	170	N/A	$160
Sthil BG50	Gas	70	159	N/A	$140
ECHO PB-2520	Gas	70	170	N/A	$140
ECHO 235 low noise	Gas	64	191	N/A	$150
Husqvarna 525BX	Gas	91	192	N/A	$290

- *Models tested same or similar to 2018 by Lincoln, MA, Public Works ARUP study

- NOTE: None of the gas powered brands indicate how long they run without a refill; the battery powered models' length of operation depends on speed used and most have variable speeds; also, the battery charging time is important and is as little as 30 minutes for some models

Many website reviews posted by landscapers indicate that several brands of commercial-grade electric blowers offer sufficient power to handle heavy clean-ups. Once CFMs reach 600-700, they seem to be almost as powerful as gas blowers. One noted the ease of turning electric blowers on and off, compared to gas blowers, which means that gas blowers are often left on even when not immediately in use. MowGreen, a Fairfield, CT based landscaper, uses all electric equipment; the owner, Dan Delvanthal, offered testimonials to Scarsdale's Conservation Advisory Council in support of further restrictions on gas blowers.

Results of the Community Survey

This survey was distributed to Bronxville residents through Village Hall email communications, My Hometown Bronxville articles, and was available on the Village website. The survey was conducted between April 7 and May 18, 2021, and received 343 responses. Of the 343 responses there were 38 duplicate responses included in the results.

A majority of the respondents and/or their landscapers use gas-powered leaf blowers.

A majority of the respondents stated they support:

- Extending the ban to include winter months (January-March)
- Extending the ban to include spring months (April & May)
- A complete ban on gas-powered blowers with electric blowers allowed during designated months.

A majority of the respondents did not support eliminating both gas and electric blowers.

Responders stated noise, air pollution, and particulate matter in the air as the main reasons for supporting an extension of the current ban.

Residents who do NOT support extending the ban cited these reasons:

- Heavy clean-up season requires gas-powered leaf blowers, and electric is not sufficient.
- Banning gas-powered blowers will result in increased costs for landscapers and residents.
- Village Hall should not regulate how residents maintain their property.

Results of the Landscaper Survey

The Green Committee sent a survey to 23 registered landscapers in Bronxville and received ten responses. The survey ran from May 17 until June 4th.

Of the ten responses, two offer tree services and one is a landscape design and build company, so only 7 of the 10 do weekly maintenance. Eight said that their business is already being impacted by further restrictions to leaf blower ordinances in Westchester.

Of the ten, all use gas powered leaf blowers. Seven also use electric.

We asked if landscapers use leaf blowers during the winter months. Ten responded. Forty percent said they do not use them in winter. Forty percent said they use them half as often. Ten percent said they use them only at the client's request. And ten percent said they use them just as much in winter as at other times of the year.

We asked landscapers how much they use leaf blowers on weekends. None of the ten use them on Sundays. Seven use them on Saturdays.

Several said that a complete ban on blowers would require manual work and an increase in prices; they indicated that their clients in Bronxville would not be happy with the less-than-pristine yards that would result. A couple indicated that they are already at risk of losing clients in other towns because restrictions mean they can't maintain the same level of service.

Although our survey sample was small, it does suggest the challenges that landscapers face as they seek to meet their customers' desire for pristine landscaping despite the limitations imposed by more restrictive leaf blower ordinances. It's worth noting, too, that landscapers working in several municipalities must keep track of detailed ordinances in each town.

The Green Committee's Proposals

In considering a revised ordinance on leaf blowers, the Green Committee kept several goals in mind:

We wanted an ordinance that was clear and easy for residents and landscapers to understand and implement, and for Village Hall to enforce.

We sought to incorporate community and landscaper preferences, comments, and suggestions.

We considered scientific studies and industry alternatives and guidance.

We sought to align our ordinance with those of other Westchester municipalities.

The Green Committee is offering three options for the Trustees to consider.

All of these options allow electric leaf blowers all year.

All allow gas blowers for the heavy clean-up during fall leaf season.

None of these options restrict the days of the week or time of day in which blowers can operate during the non-restricted times. We made this choice to keep the ordinance simple and easy to understand. We considered and rejected a Sunday ban—because commercial landscapers told us they never work on Sunday, and to give homeowners the flexibility to care for their own property on the weekend.

We do not suggest limiting times of operation during the day because that would make the ordinance harder to enforce.

Finally, each proposal would allow the trustees to exempt gas blowers for clean-up following an extreme weather event.

We consider Option 1 to be a Win-Win, offering the biggest reduction in noise and air pollution, while still allowing the use of blowers for residents and landscapers to effectively maintain their properties.

- Starting in January 2022, this option would allow electric blowers all year.
- It would ban gas blowers during a longer spring/summer period and during the winter months. The ban would extend from 5/15-10/1 and from 1/1-3/15.
- It would allow both gas and electric blowers for spring clean-up, from 3/16-5/14 and for fall leaf season and clean-up, from 10/1-12/31.

In January 2023 the ban on gas blowers would be extended to include the spring season, and would go from Jan 1-September 30.

There are many benefits to this option:

- It significantly minimizes noise and air pollution during much of the year. It allows the use of gas and electric blowers during difficult clean-up months, which provides landscapers and residents with the tools to manage their properties.
- It encourages the transition to electric equipment by placing no restrictions on it.
- It allows for a phased roll-out of a further restriction on gas blowers, allowing time for improvements to electric equipment.

However, it does not address pollution from particulate matter because electric blowers can be used all year.

Option 2 minimizes noise and air pollution while still allowing the use of gas and electric blowers.

- It would ban gas blowers during the same period as Option #1—from 5/15-10/1 and from 1/1-3/15.
- It also would allow electric blowers all year.
- It would allow gas blowers for spring clean-up, from 3/16-5/15, and during fall leaf season and clean-up, from 10/1-12/31.

The benefits of this proposal are that it would

- minimize noise and air pollution by banning gas blowers for many months of the year and allowing electric all year.
- It still provides landscapers and residents with the tools to manage their properties.
- And it encourages the transition to electric equipment by placing no restrictions on it.

However, it does not reduce particulate matter in the air because leaf blowers are allowed all year.

Option 3 is a modest improvement of the current ordinance.

- It would maintain the existing ordinance that allows electric blowers all year and bans gas blowers in the summer, from 6/1-9/30.

- It would add an additional ban on gas blowers during the winter, from 12/15-3/15.

The benefits are that it would

- Reduce some noise and air pollution by extending the current ban to include the winter months.
- It would allow the use of gas blowers during difficult clean-up months and would avoid blowers for months that generally do not require much clean up.

However,

- It only partially addresses noise pollution, air pollution, or particulate matter in the air.
- It does not offer significant incentives to landscapers to transition to electric equipment because the added restriction is during a time when blowers are not routinely used.

Enforcement

In listening to public hearings and speaking with those who have engaged on this issue in other Westchester municipalities, the Green Committee has concluded that enforcement is an on-going challenge. Revised ordinances attempt to address the concern by raising fines, clarifying how residents can report violations, and in the case of Scarsdale, hiring a part-time enforcement officer.

We heard from a couple of sources that fines impact landscapers very differently; a $200 fine is a burden for a small landscaper while for a larger landscaper it's merely the cost of doing business. Some municipalities are considering much higher fines to address this concern.

Other impediments to enforcement are that police are reluctant to get involved and that it's too burdensome for residents to report a violation. For example, Bedford now accepts photo and video evidence produced by residents for a trial, but the resident must appear in court, which acts as a strong deterrent to reporting.

Some municipalities add specific language in their ordinances clarifying that homeowners are legally responsible for violations by landscapers on their property, and can be fined—or even jailed—along with the landscaper. We couldn't determine whether this language is effective.

Many agree that vigilant residents who are willing to report violations can be an enormous asset in enforcing the law.

Since Bronxville requires all landscapers to register with the town, and each must display a registration number on their vehicles, residents might feel free to report a violation without directly confronting the worker, who might not be aware of the law and may take his orders from an off-site manager. Photos of the violation and the registration sticker sent to Village Hall might prompt a letter of warning from the Town Administrator's office, followed by sterner warnings and a fine if the violations continue. By avoiding direct confrontations, or involving the police, residents might be encouraged to report violations. The Village and Green Committee websites could post clearly worded procedures for reporting violations.

Conclusion and Next Steps

Since the beginning of their wide-spread use, gas-powered leaf blowers have been considered by many to be a detriment to quality of life in municipalities throughout Westchester. Yet many Bronxville homeowners enjoy the convenience they provide, and want a pristine yard similar to their neighbors. In many communities, placing restrictions on gas-powered blowers are discussed and re-discussed every few years. Now that the science confirming their widespread negative health and pollution impacts is well documented and incontrovertible, many municipalities are further restricting their use, often in favor of electric blowers. However, some landscapers in Bronxville do not believe electric blowers are practical during the heaviest clean up seasons.

The Green Committee suggests that as a next step, the trustees consider the issue over the next months and that the public be allowed to comment throughout the summer. We then propose that a second public meeting be held in September. At that time, the trustees might vote and pass a new ordinance, which would take effect in January 2022.

We propose that the new ordinance be considered a pilot with the potential for a further amendment in one to three years.

We would measure the success of a revised ordinance by continuing to review scientific studies and reports of the latest equipment, and through surveys of both residents and landscapers.

We would also continue to raise awareness in the community about the impacts of gas-powered and electric leaf blowers and provide resources for healthy yard care alternatives. Through a continuing campaign that includes articles in My Hometown Bronxville, posts on the Bronxville Green Committee website, social media posts, and community events, we hope to inform and educate residents in Bronxville so that they can make choices that improve the health and wellbeing of everyone in the community.

The Green Committee thanks the trustees for their attention on this issue.

Submitted by Ellen Edwards and Maria Terjanian of the Bronxville Green Committee, with assistance from Carole Upshur and Susan Cody.

(continued)

APPENDIX A: Leaf Blower Legislation in the State of New York (Page 1 of 3)							
Municipality *(contact)*	**Adopt/ Amend**	**Restricted Equipment**	**Restricted Dates**	**Additional Information**	**Enforcement**	**Exemptions**	**Comments**
Ardsley	Aug-09	Any power or manual equipment	May 15 – Sep 30 10 am – 5 pm only; all days Permit needed for LB use.				
Bedford *(Bedford Leaf Blower Task Force)*	May-18	GLBs	GLB Prohibited in Hamlet Zones May 15 - Sept 15 Allowed town wide Oct 1 – May 31	No more than one GLB at any time on properties in hamlet zone. GLB can operate in hamlet M-F 9-5; Sat & hols 10-4; not on Sunday; longer hours are allowed during leaf season	Considering much higher fines, which would help deter violations as "cost of doing business" by big companies		Are revisiting issue; held public meeting April 2021; will do away with distinction between town & hamlet
Buchanan		Equipment including leaf blowers	Prohibited 7pm-8am and before 10 am on Sundays				
Croton-on-Hudson	Sept. 2011	Power movers, leaf blowers, etc.	None	Can only operate M-F 8-5:30; Sat 10-5:30; Sun 10-5; no hols			Revisiting issue; their CAC has advised Jan-Oct ban on gas and total ban by 2023
Dobbs Ferry	Jul-00	GLBs	Prohibited May 2 – Sep 14 & Dec 16 – Mar 14 Allowed Mar 15 – May 1, and Sep 15 – Dec 15	Allowed M-F 8-6, Sat, Sun and hols 10-5; fines $50-$250 per incident			
Eastchester			No ordinances regulating leaf blowers				
Greenburgh		Gas Powered Lawn Mowers, Leaf blowers, or other gas powered lawn or equip					Are revisiting the issue, held public hearings March & April 2021; seek a unified law among all Greenburgh towns & villages
Hastings	May-08	Leaf Blowers	Prohibited May 16 – Oct 14, Allowed Oct 15 - May 15	can operate 9-5 weekdays		Emergencies declared by village manger	
Irvington	Dec-20	GLBs	Prohibited June 2 – Sep 14 and Dec 16 – Mar 14 Allowed Mar 15 – May 15 and Oct 1 – December 15	Mon-Fri 8am-5pm; Sat, Sun Hol, 10am - 4pm Max two blowers on 1/2 acre of less. No push behind on half acre or less. Property owner may use GLB for 30mins per week in "off" season.		Golf, tennis clubs. Muni employees but not within 100 ft of another property.	Gas banned completely by Dec 16, 2023

APPENDIX A (continued): Leaf Blower Legislation in the State of New York - (Page 2 of 3)							
Municipality *(contact)*	**Adopt/ Amend**	**Restricted Equipment**	**Restricted Dates**	**Additional Information**	**Enforcement**	**Exemptions**	**Comments**
Larchmont *(Larchmont Environmental Committee)*	Sep-20	Internal-Combustion lawn maintenance equipment including **lawn mowers and leaf blowers**	Electric blowers permitted April and October 15 - December 15.	Mon-Fri 8-5:30; Sat 10-5:30; Sun by property owners only 10-5; fines of $250/500/1000		Extreme weather clean-ups	Yaer round ban on GBL by Jan 2022
Mamaroneck	Oct-14	GLBs	All blowers banned 5/15-9/30	Mon-Fri 8-6; Sat 10-4; ban on Sun and holidays		Emergencies declared by village manager	One blower allowed per property of 5,000 sf or smaller; no more than 3 on any property
Mount Vernon	Apr-21	gas and electric blowers	Prohibited June 1-September 30 and November 16 - April 14.	Mon-Sat 9-5; ban on Sundays but residents can blow own property 9-5	Fine $500 if don't register as landscaper	Must be below 65 db at all times	
New Castle	Sep-20	GLBs	Prohibited June 1 - Sept 30	Mon-Fri 8-8; Sat 9-8; Sun and hols 9-5		Chappaqua School District, rec field, tennis courts & country clubs; homeowners assoc, golf courses and cemeteries	
New Rochelle		GLBs	Prohibited Jun 1 – Sep 30	Mon-Fri 8-5; Sat 105; none on Sun			Discussed in fall 2020 imposing further restrictions
Pelham	Mar-94	GLBs	Prohibited May 1 – Oct 14, Dec 16 – Mar 14 ; Allowed Mar 15 - Apr 30; Oct 15 – Dec 15	M-F 8-5:30; Sat, sun & hols 12-4	fine $250		
Port Chester		gas and electric blowers	Allowed 4/15-11/15; both banned rest of year due to noise	Mon-Fri 8-8; weekends & hols 10-7			
Rye	2008	GLBs	Prohibited May 1 – Sept 30, Allowed Oct 1 - Apr 30;	Mon-Fri 8-8; weekends & hols 6-10 am; Fine $250; No two blowers or blower & other lawn equipment at same time; db less than 85 db			As of 4/2021, Rye is reconsidering all aspects of its leaf blower ordinance; would tie it less to noise and more to environmental impact
Scarsdale	Mar-21	GLBs	Prohibited May 1 – Sep 30. Oct 1-April 31	Effective Feb 2022, GLBs may only be used Oct 1- Dec 1 and only Tues-Fri; no restrictions on electric	Part-time code enforcement office		
Sleepy Hollow	Jan-13	GLBs	Prohibited Memorial Friday – Sep 30	M-F 8-5:30; Sat 9-3; Sun 12-2			

APPENDIX A (continued): Leaf Blower Legislation in the State of New York - (Page 3 of 3)							
Municipality *(contact)*	**Adopt/ Amend**	**Restricted Equipment**	**Restricted Dates**	**Additional Information**	**Enforcement**	**Exemptions**	**Comments**
Tarrytown	2017	GLBs	Prohibited Jun 15 – Sep 15 AND Sat, Sun and Holidays all Year; Allowed Sep 16 – Jun 14 M - F only	Landscapers must be registered		Homeowners of single family and up to 3 units in a multi-dwelling building are exempt; can exempt for emergencies	
Town of Ossining	May-19	GBLs	Allowed 3/1-6/1 and 9/15-12/15			noise limits of 65 except during these times: Mon-Fri 8 to sundown; 9 am to sundown on Sat Sun and hols; db can not exceed 45 db at other times; only 2 back pack type on any property 1/2 acre or less at any one time	After 1/1/2022 no GLB on 1/2 acre or less
Tuckahoe	2011	Portable leaf blower, fuel or electricity	GLBs Prohibited Jun 1 – Sep 30 Allowed Oct 1 – May 31	Mon-Fri 8-6; Sat 9-5; sun and hols 12-2; no restrictions on electric; can't blow onto adjacent property	$350 for first offense		
Village of Ossining	May-19		GLBs may only be used March 1 - June 1 & Sept 15 - December 15; Two GLBs at a time on 1/2 acre and less.				
Village of Ossining Phase 2	Jan-23	No GLBs on property less than 1/2 acre					
White Plains		GLBs	Prohibited May 16 – Sep 30 & Dec 16 - March 14 Allowed Mar 15 - May 15 & Oct 1 - Dec 15				
Yonkers	Nov-07	GLBs	Prohibited Jun 1 – Sep 30 Allowed Oct 1 – May 31		$250-5,000		

Appendix B: Noise Pollution Studies; from "Mitigating the Health, Environmental, and Qualify of Life Impacts of Gas Leaf Blowers," by Scarsdale Conservation Advisory Council, December 2020

The [Scarsdale] CAC looked at the leaf blower noise study of Arup, an acoustics consulting firm, dated July 16, 2018 (https://www.quietcleanpdx.org/wp-content/uploads/2019/07/ARUP-Leaf-Blower-Noise-Testing.pdf). The study found that gas leaf blowers are significantly louder than electric leaf blowers - even when compared to electric blowers which have the same decibel level and air flow. Following are the key findings from the study:

• The sound characteristics of gas leaf blowers have a significantly greater low frequency sound component in comparison to electric leaf blowers.

• The low frequency sound energy of gas leaf blowers transmits more readily over longer distances making them more audible and of greater sound impact.

• The low frequency sound energy of gas leaf blowers transmits more easily through home windows and glass doors and sound louder indoors than electric leaf blowers.

The following is a summary of the Arup study answer to the question of why gas leaf blowers have a greater noise impact compared to electric leaf blowers and what makes the noise impact so significant.

Leaf blowers are often rated based on their airflow rate in cubic feet per minute (CFM), which is the amount of air being pushed or blown per minute. Leaf blowers also have decibel levels representing the level of sound that they emit. The grouping of leaf blowers used in the Arup study aimed to capture commercial leaf blowers used in the industry, with a specific focus on commercially used gas and electric blowers with similar CFMs and decibel levels.

From the measured data in the study, it was observed that the gas leaf blowers all exhibited a significant amount of sound energy in the low frequency bands at all distances. For electric leaf blowers, the sound energy that was observed was mainly in the high frequency range of sound energy.

The conclusions regarding the effect of the low frequency band of gas blowers versus the high frequency band of electric blowers were twofold.

First, it was concluded that gas leaf blowers have a greater audibility over larger distances. All of the gas leaf blowers tested were either clearly audible or audible at an 800' distance, while all of the electric leaf blowers were not distinguishable above the ambient community sound levels at that distance. The conclusion drawn from this test is that the character of the sound from gas leaf blowers travels over greater distances and is more audible than with electric leaf blowers. (FN18)

Second, it was concluded that audibility within houses is greater with gas leaf blowers due to their low frequency sound. Low frequency noise requires heavy construction or materials to stop the sound from transmitting. This is very clear when it comes to windows and glass doors in houses, where any low frequency sound transmits easily through windows. With gas leaf blowers, the low frequency components of their sound are what is most easily transmitted, and was shown by Arup to transmit into

houses very easily. In addition, their testing showed that the sound levels of gas leaf blowers as measured inside the house, were significantly above those of the electric leaf blowers.

The CAC also looked at a separate University of Maryland study to learn about the effect of decibel (dB) level increases. This study found that actual sound levels increase exponentially with each dB of increase.15 Thus, an increase of 10 dBs is perceived to be twice as loud. An increase of 20dBs is four times as loud. And an increase of 40dBs is perceived to be sixteen times as loud. This study is useful in interpreting the dB information in Appendix B, as the chart shows some gas leaf blowers which come close to the dBs of electric leaf blowers. This study explains why a 5 or 10 dB increase is, in fact, exponentially louder than a 1:1 increase as it would seem in a face value dB comparison.

FOOTNOTES

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