CITY OF OAKLAND

AGENDA REPORT

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SUBJECT: Legislative Report for the Ordinance Banning Combustion Engine-Powered Leaf Blowers and String Trimmers

DATE: July 16, 2020

Councilmember Kalb recommends that the City Council adopt the following:

AN ORDINANCE AN ORDINANCE ADDING OAKLAND MUNICIPAL CODE CHAPTER 8.64 TO PROHIBIT THE OPERATION OF COMBUSTION ENGINE-POWERED LEAF BLOWERS AND STRING TRIMMERS WITHIN THE TERRITORIAL LIMITS OF THE CITY OF OAKLAND; AND ADOPTING APPROPRIATE CEQA EXEMPTION FINDINGS

BACKGROUND

Many cities in California and across the country prohibit the use of combustion engine-powered leaf blowers. Some cities have even banned all leaf blowers and other similar equipment. Many residents complain about the noise and an unhealthy exhaust that is emitted from such equipment.

The Ordinance was previously scheduled for June 26, 2018 Public Works Committee but was subsequently withdrawn pending further work with city staff and stakeholders.

SUMMARY

Councilmember Kalb respectfully asks the City Council to approve this Ordinance Banning the use of Combustion Engine-Powered Leaf Blowers and String Trimmers in Oakland. The impetus for banning combustion engine leaf blowers and string trimmers in Oakland is found in numerous complaints from City residents, as well as state regulation, local policy, the city's imperative to protect its

citizens' health and safety, and the world's transition from fossil fuels to a clean energy economy, which is already underway.[1]

This legislation is consistent with the goals of Oakland Climate Action Plan and contributes to the accomplishments of its goals.

Considering significant health hazards of gas-powered blowers and string trimmers, many Californian cities already restricted, partially banned, or fully banned gas-powered leaf blowers in their jurisdictions, and implemented alternative technologies to combustion engine equipment.

BACKGROUND / LEGISLATIVE HISTORY

State Law and Local Policy

The state of California has been long on the forefront of climate protection state legislature issuing robust directives for statewide greenhouse gas (GHG) emissions reductions. AB-32 (2006) formed the foundation of the state government's approach to climate change mitigation, requiring that California reduce its GHG emissions to 1990 levels by the year 2020. SB-32 (2016) expanded upon this by setting into law Gov. Brown's Executive Order B-30-15, which mandates that California reduce its GHG emissions to 40% below 1990 levels by 2030.

Furthermore, Oakland's Energy and Climate Action Plan stipulates that Oakland reduce its GHG emissions to 36% below 2005 levels by 2020. By obviating the fossil fuel dependence of an entire class of the City's motorized landscaping machines, a ban on gasoline-powered leaf blowers and string trimmers would advance Oakland's compliance with both the state's and its own policies.

Municipal Bans on Leaf Blowers and String Trimmers to Date

At least ninety (90) Californian municipalities have enacted restrictions on leaf blowers. Most of these towns and cities restrict leaf blower usage by ordinance to certain times of the day, or through their noise regulations. Approximately thirty of these cities have explicit bans on gasoline-powered leaf blowers, while at least two cities have banned *all* motorized blowers outright.

Figure I. Sampling of Selected City Legislation

City	Restrictions	Ban Type		Remedy	Notes
		Total	Partial		
Berkeley	-	X		Administrative citation.	Bans gas-powered only.

[1] Al-Hamad, A. "Oil and the Global Economy." Group of Thirty. https://www.pkverlegerllc.com/assets/documents/OP94.pdf

Del Mar		X			Bans all motorized blowers.
Huntington Beach	Time of day, decibel, distance, duration, number & geography	-	-	Misdemeanor on first offense.	
Irvine	Distance, decibels, time of day, *mechanism, air pollution	-	-	Infraction: $100, 200, or 500 fine for subs. violations in 12 mo. period. Misdemeanor at enforcer's discretion.	
Hermosa Beach		X			Bans all motorized blowers.
Long Beach	Time of day, mechanism, distance	-	-	Infractions: offenses within 1-year period, 1. $50 2. $75 3. $100 Fourth offense within 1 year earns a misdemeanor.	
Los Angeles	Time, decibel, distance	-	X	Restraining order OR injunction by court order.	
Manhattan Beach		X			Bans all motorized blowers.
Piedmont	-		X	Infraction.	City may use gas-powered blowers on publicly owned land only.
Sacramento	Mechanism	-	-	1. Written warning issued. 2. Misdemeanor. $1000 per violation.	Technical ban: blowers permitted *only* if muffler-equipped
San Diego	50', decibel, time, mechanism	-	-		

Santa Monica	-	X		1. Infraction - $250 max OR misdemeanor - $1000 max. AND/OR 6 months' imprisonment	Bans all motorized leaf blowers.
Santa Barbara		X			Bans gas-powered blowers.

Enforcement

Most cities enforce leaf blower ordinances as infractions tied to fines, with progressive infractions leading to a misdemeanor. Some cities' enforcers have the power to issue a misdemeanor on the first offense. Fines range from $50-1000.

Current Leaf Blower Regulations in Oakland

At present, the only restriction on the use of leaf blowers in Oakland's municipal code is under OMC 8.18.010, Nuisances. Leaf blowers are classified as an "Annoying Noise," cannot be operated between the hours of 21:00 - 6:00, and their improper use may incur an infraction.

ANALYSIS

I. Human Health Impacts

Noise pollution and air pollution are residents' paramount concerns in calling for a ban on combustion engine-powered leaf blowers and string trimmers[2,3].

In 2000, a California Air Resources Board report found that the scientific literature corroborates citizens' concerns. Per the CARB report, the principal health hazards from combustion engine-powered leaf blowers are various types of particulate matter, carbon monoxide (CO), unburned fuel, ozone, and noise. [4]

[2] http://www.momscleanairforce.org/leaf-blowers-health/
[3] https://www.theguardian.com/us-news/2015/dec/20/leafblower-opponents-lawn-care-feud
[4] A Report to the California Legislature on the Potential Health and Environmental Impacts of Leaf Blowers. 2000. California Air Resources Board. https://www.arb.ca.gov/msprog/mailouts/msc0005/msc0005.pdf

Air pollution from gases and particulate matter

1. **Particulate Matter from Exhaust.** Combustion engine leaf blowers are extremely polluting. Because they utilize a gas-oil mixture, exhaust from a *single* unit can equate to as much smog as 17 cars emit in one hour, and this pollution is localized at and around the blower itself.[5] According to CARB, combustion engine leaf blowers emit 500 times the hydrocarbons and 26 times the carbon monoxide compared with newer cars. CARB also found that combustion leaf blowers emit 8-49 times the particulate matter of a light duty vehicle. Like all combustion engine-powered machines, leaf blowers emit carbon dioxide, one of the principal greenhouse gases contributing to global warming and the climate crisis. This renders these machines a priority target for decommissioning because global warming amplifies large-scale negative health impacts.

2. **Particulate Matter from Fugitive Dust.** In addition to pollution from toxic exhaust fumes, gas leaf blowers kick up several particulate matter types in the form of fugitive dust, including mold, pollen, animal feces, pesticides and fertilizers into the air. The California Air Resources Board has stated that such fugitive dust is a hazard to human health, and that leaf blowers are a principal contributor to generating fugitive dust in urban areas.

   Particles 10 microns and smaller ($<PM_{10}$) are inhalable and can remain on airway surfaces. $PM_{2.5}$ or less can infiltrate deep into the lungs, penetrating intracellular spaces. When these particles remain lodged in said tissue, it permits chemicals to interact with bodily tissues, leading to negative health impacts.

   The epidemiological literature demonstrates statistically significant associations between ambient PM levels and negative human health outcomes, including mortality, hospital admissions, respiratory symptoms, and illness. [6]

   Mold spores can cause coughing, wheezing, nasal, skin, and throat irritation, respiratory infection, and allergy attacks among sensitive individuals[7].

   Fugitive dust also contains pollen another common outdoor allergen that can wreak havoc on immune systems. Animal feces carry a wide range of pathogens, including parasites, bacteria and viruses; some of these can be fatal. For example, a single gram

[5] *Leaf Blower Pollution Hazards in Orange County*. 1999. Orange County Grand Jury. http://www.ocgrandjury.org/pdfs/leafblow.pdf
[6] *Fugitive Dust Control Self-Inspection Handbook*. CARB. https://www.arb.ca.gov/pm/fugitivedust_large.pdf
[7] https://www.poison.org/articles/2011-oct/mold-101-effects-on-human-health

of dog waste – a common feature of sidewalks and other areas where leaf blowers operate – can contain 23 million fecal coliform bacteria[8]. Dog feces can harbor the following pathogens that could cause diseases in humans: whipworms, hookworms, roundworms, tapeworms, parvovirus, coronavirus, giardia, salmonella, listeria, cryptosporidium, and campylobacter[9].

3. **Carbon Monoxide.** Carbon monoxide (CO) is a tasteless, odorless, colorless, and non-irritating gas produced when fossil fuels burn incompletely. CO can kill at high levels. Symptoms of acute CO poisoning will vary based on intensity of exposure; they include headache, dizziness, weakness, nausea, vomiting, disorientation, confusion, collapse, coma, and at very high concentrations, death. Lower doses of CO affect the central nervous system, causing decreased hand-eye coordination and attention or vigilance. One CARB study found high short-term exposures to CO in people operating small gas-powered garden equipment (ARB 1992).

4. **Unburned Fuel.** The Air Resources Board finds that several toxins enter the air when gasoline evaporates or passes through its engine in an un-combusted state. Benzene, a component of gasoline, depresses the central nervous system and causes cancer. Both burned and unburned fuel are the atmosphere's major sources of benzene. Acetaldehyde, formaldehyde, and 1,3-butadiene are other significant toxins emanating from vehicular exhaust. Acetaldehyde is classified as a Group B2 probable human carcinogen; acute exposure to it causes irritation of the eyes, skin, and respiratory tract. 1,3-Butadiene is also a probable cancer-causing substance that irritates eye and mucous membranes, leading to neurological effects at high levels. Lastly, formaldehyde is highly irritating to eye and respiratory tract tissues, triggering or exacerbating asthma.

5. **Ozone.** Ozone (O_3) – a colorless, odorless gas – is the principal element of urban smog. According to CARB, it is California's "most persistent and widespread air quality problem." This gas forms when sunlight reacts with hydrocarbons and nitrogen dioxide. Leaf blowers and string trimmers release substantial quantities of hydrocarbons, mainly from un-combusted fuel, which can lead to ozone formation. With respect to health impacts, short-term ozone exposure can lead to airway constriction, coughing, sore throat, and shortness of breath. O_3 can exacerbate existing diseases such as emphysema, bronchitis, and asthma, possibly damaging

[8] https://www.eugene-or.gov/DocumentCenter/View/17001
[9] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3564131/

deep portions of the lung even after symptoms go away. Permanent damage to the lung can occur over time.

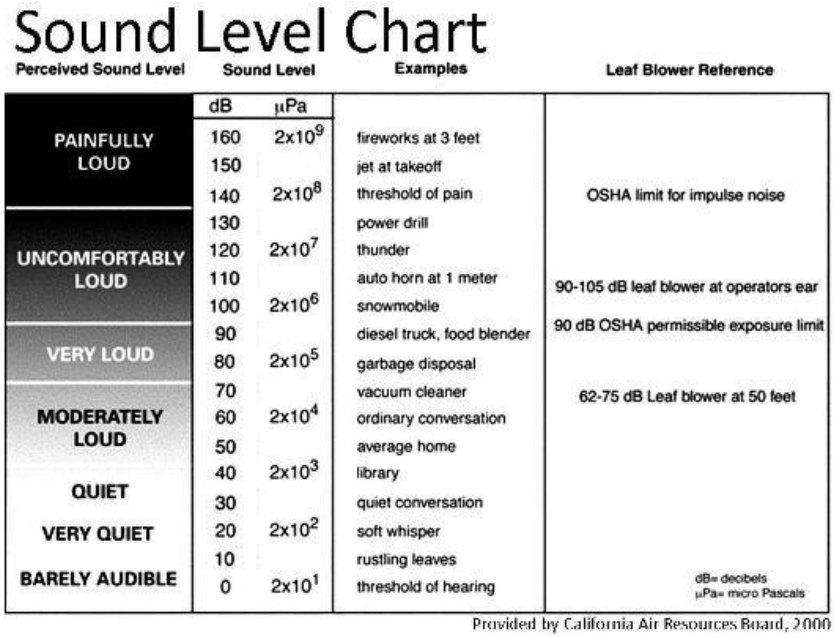
II. Environmental Impacts

Urban air pollution negatively impacts plants and animals through photochemical oxidants, atmospheric metals, acidifying air pollutants, and miscellaneous urban air pollutants.[10] Oakland is home to a handful of regionally important ecosystems, including Lake Merritt, the nation's oldest wildlife sanctuary, the SF Bay shoreline and the redwood groves of the hills. Curbing the use of fossil fuel-powered leaf blowers in favor of exhaust-free alternatives would be a protective measure in favor of the health of humans as well as the City's non-human life forms and habitats.

III. Noise pollution

The USEPA defines noise as an unwanted or disturbing sound. Persistent and escalating sources of sound can often be considered an annoyance. A noise level exposure of 85 decibels (dB) for 8 hours in one day is the threshold beyond which government research indicates damage is probable.[11,12] Cal OSHA has set the permissible exposure limit to 90 dB (see Figure I).

Figure II.



[10] The effects of air pollution and acid rain on fish, wildlife, and their habitats. Office of Research & Development, U.S. EPA. FWS/OBS-80/40/10. June 1982. Air Pollution and Acid Rain, Report No. 10. http://bit.ly/2zYVbNS
[11] https://www.hearinglink.org/your-hearing/about-deafness-hearing-loss/protecting-your-hearing/
[12] https://www.nidcd.nih.gov/health/noise-induced-hearing-loss

Additionally, OSHA and Cal OSHA set an 8-hour time weighted average (TWA) for 85 decibels measured on the A scale, slow response for workers (29CFR 1910.95(c)(2); Title 8 §5095). Early models of leaf blowers used to average about 78 decibels, with some machines measuring even louder. However, many new blowers – especially the electric-powered models – are at or below 65 decibels (a conversation is typically around 60 dB). For every 6 dB reduction, sound intensity is actually reduced by 50 percent. That means many of today's units are four times quieter than older blowers. Typically, 67 to 69 decibels, when measured from 50 feet, is considered an acceptable noise level in most U.S cities and municipalities.

Health hazards of noise pollution

As the CARB reports, "Exposure of adults to excessive noise results in noise-induced hearing loss that shows a dose-response relationship between its incidence, the intensity of exposure, and duration of exposure." Noise-induced stimulation – even at night – has been reported to result in elevated stress levels, elevated blood pressure, gastrointestinal problems, interrupted sleep, depressed immunity, behavioral changes, and cardiovascular disease[13,14,15].

ALTERNATIVE TECHNOLOGIES

Three classes of alternative technologies exist for gasoline-powered blowers and string trimmers. They are (1) corded electric blowers/trimmers, (2) cordless electric blowers/trimmers, (3) rakes and brooms, and for weed whackers, (4) handheld trimmers[16]. Corded electric blowers may not be practical for City purposes because they need to be plugged in. Because of their portability, cordless electric blowers may make the most sense of the non-fossil fuel-powered alternatives. Cordless electric leaf blowers and string trimmers require approximately 30-200 minutes' charging time. A fully charged blower or trimmer can run for 30-70 minutes on the lowest setting.[17,18]

Cordless blowers feature either Nickel-cadmium (NiCd or NiCad) or lithium ion (Li-ion) batteries.[19] The latter is lighter, more widespread, and can hold a charge for months between uses. Some larger Battery-powered machines can be heavier.

Although electric leaf blowers and string trimmers are definitively more public health-based and ecologically sound than their fossil fueled counterparts, a life-cycle assessment may be prudent by the state to get further information.

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[13] Basner, Mathias et al. "Auditory and Non-Auditory Effects of Noise on Health." *Lancet* 383.9925 (2014): 1325–1332. *PMC*. Web. 26 Oct. 2017.
[14] "Fact Sheet: Too Loud! For Too Long! Loud noises damage hearing." Centers for Disease Control. February 2017. https://www.cdc.gov/vitalsigns/pdf/2017-02-vitalsigns.pdf
[15] Environmental Health Criterion 12. International Program on Chemical Safety, World Health Organization. 1980. http://www.who.int/ipcs/publications/ehc/ehc_numerical/en/
[16] https://www.powerequipmentdirect.com/stories/760-How-To-Pick-The-Perfect-Cordless-String-Trimmer.html
[17] https://www.powerequipmentdirect.com/stories/385-How-to-Pick-the-Perfect-Electric-Leaf-Blower.html
[18] http://www.chainsawjournal.com/best-battery-powered-leaf-blower/
[19] https://www.lowes.com/projects/lawn-and-garden/leaf-blower-buying-guide/project

PUBLIC OUTREACH/INTEREST

Numerous constituents contacted the office of Councilmember Kalb to express their aghast because of continuous use of this antiquated and unhealthy equipment. They expressed great support and requested this legislation to be drafted and passed.

Several organizations that work on air pollution, worker rights, immigrants' rights, public health, hardware stores, neighborhood, and homeowners' associations were contacted and notified about this legislation.

Upon adoption of this legislation wide outreach would need to be done to inform residents and relevant businesses of this new law.

COORDINATION

The City Attorney's office was extensively consulted in the development of the legislation. The author of the legislation also met with the Public Works Director and staff several times to discuss this legislation and obtained information relevant to the legislation from the Public Works Department.

FISCAL IMPACT:

Fiscal impacts fall into four categories:

1. Purchase of new equipment (approximately $400 – Leaf Blower)
   To replace the existing blowers and string trimmers could cost approximately $60,000-80,000 over time.
2. Purchase of extra and replacement batteries and other disposable parts ($400 (4 batteries per blower at $100 per battery)
3. One-time costs of building electrical upgrades at three major facilities (Lakeside Park, Municipal Service Center (MSC) at Edgewater dr., Joaquin Miller park) (estimated costs $25,000)
4. Retrofitting a few trucks to charge batteries

Figure 5. Life cycle estimates of handheld landscape maintenance equipment.

MAINTENANCE EQUIPMENT INVENTORY – City of Oakland

Maintenance Activity	Equipment	Inventory	Equipment Life Cycle
Various	Gas Powered Blowers	42	3-5 YEARS
Various	Electric Leaf Blowers	16	3-5 YEARS
Various	Gas Weed Trimmers	63	3-5 YEARS
Various	Electric Weed Trimmers	15	3-5 YEARS

If the City transitions to battery-powered equipment, battery-powered is not yet as powerful as gas powered. Although there are continual technological advancements, it is still not there yet. Staff will adjust over time. Currently the city has one or two battery "suitcases" at each location (MSC, Joaquin Miller, and Lakeside) which can charge six batteries at a time. Since batteries do not last a full day use, staff must have several batteries for each piece of equipment. More chargers, electrical outlets at each location are required. The backpack blower uses two batteries, with the runtime of around 45 minutes. The String Trimmer uses one battery and runs for about 30 minutes. A budget is needed for replacement batteries as they come to their end of life.

The Public Works Department estimates that replacing the City's combustion engine-powered leaf blowers and string trimmers will cost approximately $60,000-80,000. To expand the City's charging stations and outlets to accommodate the new electric equipment would cost as much as$25,000. However, eliminating fossil fuel-powered leaf blowers and string trimmers would earn City immediate savings by obviating the need to purchase liquid fuel. Projected recurring expenditures for electric leaf blowers include replacing batteries. Electric blower/trimmer batteries cost between approximately $50-300 per unit to replace.

FUNDING

Grants for East Bay municipalities to replace gasoline-powered landscaping equipment with battery-powered machines are available on a first-come first-serve basis through the Bay Area Air Quality Management District's Commercial Lawn & Garden Equipment Exchange program.[20] Additional sources of funding could be identified through the Bay Area Air Quality Management District and the California Energy Commission. Measure KK Funds are eligible to be used for minor implementing necessary building upgrades.

SUSTAINABILITY ASSESSMENT

[20] Commercial Lawn & Garden Equipment Exchange Program. http://www.baaqmd.gov/grant-funding/businesses-and-fleets/lawn-and-garden

Environmental: Banning combustion engine-powered leaf blowers and string trimmers in Oakland will improve environmental health by decreasing the City's reliance on fossil fuels, reducing climate change-inducing pollution, and reducing point source emissions of carbon monoxide, hydrocarbons, and nitrous oxides pollutants. Nitrous oxides contribute to smog formation and acid rain, while hydrocarbons are also smog-forming as well as carcinogenic.[21,22]

Regardless of power source, all leaf blowers emit powerful air streams that kick up ground-level dust and particulate pollution. Therefore, even if electric blowers are not themselves point sources of exhaust pollution, their use will invariably cause non-point source pollutants to enter the air.

This ordinance is consistent with the goals of the city's 2012 Energy and Climate Action Plan. The most environmentally sound option would be to use some combination of brooms, rakes, and vacuums because they have lower environmental footprints compared to mechanical devices; they can be produced using materials from the immediate ecoregion such as wood and fiber, and without plastic; they kick up dust, debris and particulates to a smaller degree than motorized blowers; they produce noise that falls under the 45-55 dB safety limit;[23,24] and they are relatively easy to repair or replace compared to higher technologies. However, because the increased labor costs from this approach may be prohibitive, therefore, it is advisable to focus on allowing the use of electric blowers for City and private use.

Economic: A total citywide ban on all motorized leaf blowers would reduce maintenance and purchasing overhead, but could impact the gardening industry, as one case study indicates.[25] If a citywide ban on fossil fuel-powered blowers and string trimmers were to take effect, an effort assisting households and private businesses to replace their machines could be advisable. Electric leaf blower lifespans are approximately 3-5 years, according to Black & Decker.

Social: Indicators of well-being locally and regionally are projected to improve with a reduction in ambient noise and air pollution. Reduction in fossil fuel extraction also contributes positively not only to local communities, but to communities around the country and around the world where those fuels are extracted and mined..

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[21] Dimitriades, B. Effects of hydrocarbon and nitrous oxides on photochemical smog formation. 1972. http://pubs.acs.org/doi/abs/10.1021/es60062a003
[22] Polycyclic Aromatic Hydrocarbons (PAHs). Centers for Disease Control. https://www.atsdr.cdc.gov/csem/csem.asp?csem=13&po=11
[23] "Noise … has nonauditory health impacts—increases in stress hormones, hypertension, obesity, cardiac disease, and mortality—at average daily exposures of only 55 decibels, with activity interference beginning at 45 decibels." Fink, D. What is a Safe Noise Level for the Public? https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5308171/
[24] *Night Noise Guidelines for Europe.* World Health Organization. http://www.euro.who.int/__data/assets/pdf_file/0017/43316/E92845.pdf
[25] "Ground Zero in Leaf Blower Battle." 1996. *Daily News (Los Angeles)* https://www.thefreelibrary.com/GROUND+ZERO+IN+LEAF+BLOWER+BATTLE+%3A+RAKE+AND+BROOM+VS.+GAS-POWERED...-a084037667

Governance/Cultural: Evidence exists that demonstrates negligible differences in work completion times between leaf blower- and rake-outfitted personnel. A "well-designed" test by the Los Angeles Department of Water & Power found that subjects using brooms and/or rakes to clear leaves and debris took only 32 seconds longer than subjects utilizing leaf blowers.[26] It may be prudent to have a well-designed performance testing of electric leaf blowers versus rakes & brooms for City of Oakland properties to discern the efficiency differential.

For questions regarding this report, please contact Olga Bolotina, Special Advisor, Office of Councilmember Dan Kalb at obolotina@oaklandca.gov.

Respectfully submitted,

Dan Kalb

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Council President Pro Tempore Kalb

Prepared by:
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[26] Assessment and Performance Testing. LA Dept. of Water & Power Leaf Blower Task Force. 1998. http://www.zapla.org/present/dwptest.html