



**CITY OF BOULDER  
CITY COUNCIL AGENDA ITEM**

**MEETING DATE: May 16, 2024**

**AGENDA TITLE**

Addressing the Impacts of Gas-Powered Landscape Equipment

**PRESENTER(S)**

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**EXECUTIVE SUMMARY**

Commercial landscaping companies provide a variety of lawn and plant care services to residents and commercial businesses. While these services are an important part of the local economy, they are also a source of routine concern among some community members. Two-stroke engines, such as those commonly found in leaf blowers, are the most cited area of concern due largely to their noise. While this concern has been longstanding, recent years have seen a heightened level of interest, due to an increased number of people working from home during and following the pandemic. In addition to noise pollution, there is also a growing understanding of gas-powered landscaping equipment's contribution to air pollution, particularly ground-level ozone.

In 2022, staff launched the Addressing the Impacts of Landscaping Equipment Project to better understand the local impacts and opportunities presented by gas-powered landscaping equipment use in Boulder. On April 27, 2023, City Council held a study session to provide staff with feedback on the direction for the project. The [staff memo](#)

from that study session provides analysis of the emissions contribution of landscaping, best practices from other jurisdictions, results of the Be Heard Boulder community survey, and the racial equity analysis. Also included is a summary of the pilot project the city launched in partnership with Boulder County to support small landscaping business adoption of electric solutions.

Council's feedback from the study session was to prioritize education and outreach, support voluntary electrification through the pilot voucher program, monitor state regulatory changes and return to council in early 2024 for further discussions of potential local regulation. Council identified phased-in restrictions on the use of gas equipment and a potential local sales ban as regulatory strategies to be further explored. For use restrictions, council was largely supportive of continuing to allow the use of gas-powered leaf blowers for some years but restricting this allowance to a limited number of weeks in the spring and fall. This consideration recognized feedback from the landscaping industry about potential productivity losses during heavy debris seasons should they be restricted only to electric or manual solutions.

Based on council's original feedback, staff continued to explore strategies to drive the transition of landscaping equipment from gasoline to electric. The purpose of this memo is to provide council with an update on the project to include:

- Final results from the cost and pollution impact analysis.
- Year 1 results and Year 2 planned efforts for the landscaping equipment pilot program.
- State regulatory changes and programs.
- Regulatory strategy resource needs analysis.

The key issues to be discussed include:

- Equity considerations and potential disparate impacts of regulatory strategies;
- Technology readiness, cost and risks associated with electric equipment alternatives;
- Overall contribution to local pollution;
- Best practices and lessons learned from other jurisdictions; and
- Holistic strategies in coordination with other code and regulation updates.

## **QUESTIONS FOR COUNCIL**

1. Does council wish to pursue a regulatory strategy at this time? If so:
  - a. Does council still support a phased in strategy that would continue to allow some gas-powered leaf blower use?
  - b. Does council have feedback on the timeline for ordinance adoption and enforcement?
2. Does council still have interest in pursuing a sales ban? If so, what equipment should be included in such a ban? (see **Table 2** in Analysis section)

## **BACKGROUND**

Landscaping service is synonymous with entrepreneurship. Since there has been the suburban lawn, there has been the kid from the neighborhood who starts by earning extra money mowing their neighbors' lawns and then ends up with a career in the landscaping industry. Other than acquiring the landscaping equipment, there are little to no other overhead costs, allowing business owners to enter the industry with a small capital investment, usually starting with used equipment, and then growing their business and adding more workforce over time.

While landscaping service is a successful entrepreneurial industry, the margins are thin, particularly for smaller businesses. Earnings are limited to the months during which they operate, late spring to early fall. Because of the small business nature of the industry, there are many businesses competing for work, keeping the price of service relatively low. Margins are based on productivity and reliability. This push for increasing efficiency led naturally to increasingly mechanized approaches including the evolution of the leaf blower. The powerful leaf blower reduced wear and tear on workforce in an industry that requires crews to service 100 to 200 yards per week to break even, much less be profitable.

It is estimated that 2000-2500 commercial landscaping companies provide a variety of lawn and plant care services to residents and commercial businesses in Boulder County, including the City of Boulder. Businesses range in size from larger, multi-crew corporations that tend to serve Homeowners Associations (HOA) and large campuses throughout the front range, to microbusinesses with a sole owner operator who tend to serve many individual residences and businesses locally. Approximately 80 percent of the workforce is Hispanic, and it is estimated that more than half the businesses are minority owned.

While a vital component of the local and regional economy, landscaping services are a frequent source of concern within the community. While climate advocacy is a component of this concern, other environmental impacts, specifically noise and dust are the more common cited issues, with both issues specifically centered on commercial grade leaf blowers.

In response to ongoing concerns, staff launched the Addressing Impacts of Landscaping Equipment Project in early 2022 to explore options that might be suitable for the city to pursue to mitigate the impacts of landscaping equipment. This includes better understanding of the actual impacts of landscaping services within Boulder, where other communities have been successful with regulatory approaches or run into challenges, and assessing the potential local and regional impacts adopting a more restrictive code might present to Boulder residents, businesses, and to service providers and their workforce in the event such a strategy were to be pursued.

To support the project, the city hired American Green Zone Alliance (AGZA). Based out of Los Angeles, AGZA specializes in training, education, strategic planning and

implementation of low-impact solutions for municipalities, land care operators and property managers to transition from gas-powered land care to low-impact, zero-emissions operations. Of note, the State of California selected AGZA to lead its engagement efforts for California's Clean Off-Road Equipment Voucher Incentive Project (CORE). The goal of that particular effort is to connect with professional landscapers by organizing in-person and online events where landscapers can test out zero-emission professional landscaping equipment, connect with industry professionals and learn more about CORE voucher incentives.

In addition to bringing on AGZA as an expert consultant, staff also partnered with Boulder County's Partners for a Clean Environment (PACE) team to design and implement a pilot program aimed at supporting early adoption of electric equipment. Launched in 2023, the pilot uses a multi-pronged approach of education and outreach, partnership with local retailers and equipment buy downs to drive adoption of electric equipment for small landscaping businesses. Staff were successful in obtaining an initial grant of \$211,774 through Boulder County's Sustainability Grants Program to fund the pilot. Staff have since successfully secured another \$165,990 grant to continue the pilot through at least 2024. Participating businesses receive a voucher for up to 80% of cost for electric landscaping tools, a smart charging box to provide for safe managed charging, two fire extinguishers and a fire blanket.

The project has prioritized extensive engagement with the community as a whole, customers of landscaping services, landscaping businesses and wholesale and retail equipment suppliers. The Boulder County Latino Chamber of Commerce has also been an active participant, as well as liaison to businesses. Activities have included business shadowing, hosted workshops and training, and offering of on-line certification programs. Staff reviewed jurisdictional programs from around the country and interviewed several officials implementing those programs.

The scope of this project has focused on commercial landscaping services, which is inclusive of both service providers that serve many customers and self-served large property owners who perform daily landscaping maintenance, such as municipal governments, universities, and larger homeowners' associations. While gas equipment is also owned and operated by individual property owners and tenants, the impact from this equipment is far less given the limited duty hours of use each year. Additionally, the residential equipment market is already largely transforming given that available electric equipment is more accessible and often superior to gas counterparts.

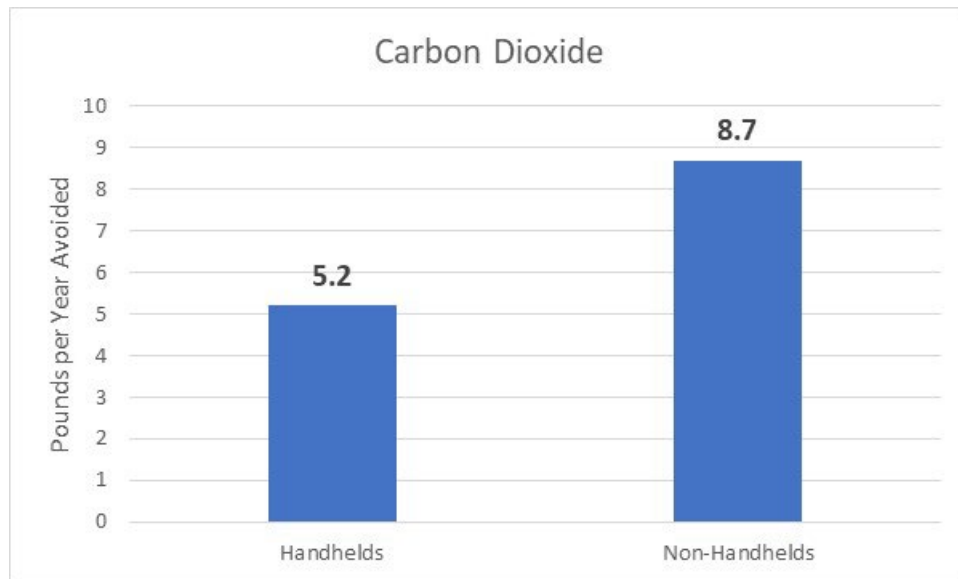
## **ANALYSIS**

### **Pollution Reduction Benefits**

To better quantify the potential pollution reduction benefits of transitioning landscaping equipment from gas to electric, AGZA shadowed local businesses to understand the typical services performed and, thus, the duty hours for the different equipment being used. They then modeled the emissions reduction for the full electrification of 100 service

crews servicing residential properties, excluding electrification of larger riding and deck mowers for which there are no electric alternatives that are readily available. The results of this analysis are shown in Figure 1. Based on the analysis, converting all handhelds, which includes leaf blowers, for 100 service crews, would yield a greenhouse gas (GHG) savings of 5.2 tons per year. By comparison, this is roughly equivalent to the annual emissions of just one residential gas furnace. Because mowers have more duty hours of use during the season, electrifying push mowers would yield a somewhat higher GHG reduction, albeit a relatively small reduction compared to other GHG reduction strategies.

**Figure 1 – Analysis of Annual Greenhouse Gas (GHG) emissions for 100 Typical Boulder Residential Landscaping Service Crews**

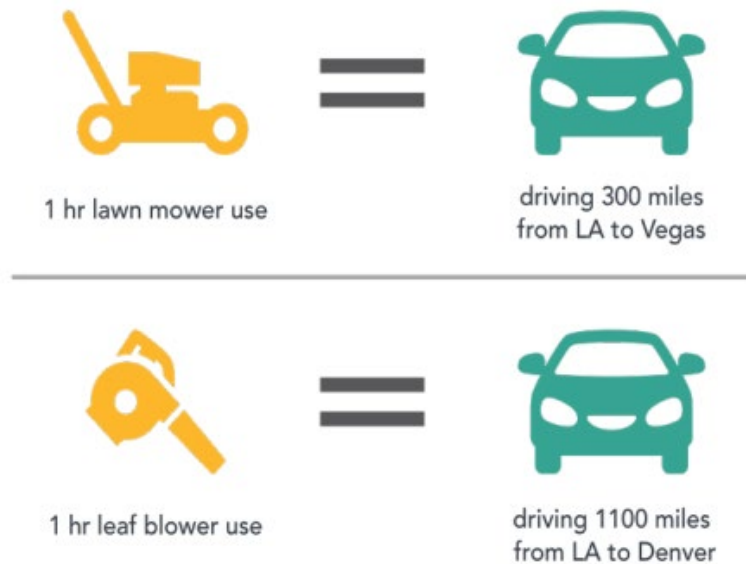


While landscaping equipment has a relatively small GHG impact, the contribution to other pollutants is more notable. EPA estimates that, nationally, gas-powered landscaping equipment is responsible for nearly 4% of volatile organic chemical (VOC) and 12% of carbon monoxide (CO) emissions.<sup>1</sup> Landscaping equipment also produces particulate matter (PM) and nitrogen oxide (NOx) emissions. One study estimates that operating a commercial gas-powered lawn mower for one hour emits as much smog-forming pollution as driving a new light-duty passenger car about 300 miles – about the distance from Los Angeles to Las Vegas, more than four hours of drive time. For a commercial leaf blower, one hour of operation emits smog-forming pollution comparable to driving a new light-duty passenger car about 1,100 miles – about the distance from Los Angeles to Denver, over 15 hours of driving.<sup>2</sup>

<sup>1</sup> <https://www.epa.gov/sites/default/files/2015-09/documents/banks.pdf>

<sup>2</sup> <https://ww2.arb.ca.gov/resources/fact-sheets/sore-small-engine-fact-sheet>

**Figure 2 – Comparison of Landscaping Equipment Use and Passenger Vehicle Travel**



Ground-level ozone forms when NO<sub>x</sub> and VOC compounds react with each other in sunlight and hot temperatures. Given that landscaping equipment use occurs during the sunniest and hottest months of the year, the emissions from gas-powered landscaping equipment are a leading contributor to Denver Metropolitan/Northern Front Range (DM/NFR) ozone. The EPA acceptable standard for ozone is 70 parts per billion (ppb), a value the DM/NFR has exceeded based on recent 3-year averages.<sup>3</sup> Table 1 provides a summary of the general contributors to summertime ozone in the DM/NFR. Landscaping equipment represents approximately 3% of all ozone sources and approximately 8% of sources targeted for pollution control (sources other than background and naturally occurring).

Landscaping equipment is a broad term that includes mowers (40%), trimmers (18%), tractors (14%), leaf blowers (9%), chainsaws (7%), snow blowers (6%) and other types of equipment (7%).<sup>4</sup> While mowers have a lower emissions impact on a per hour basis, their annual run hours are two or more times that of other equipment. Trimmers have comparable fuel combustion emissions as leaf blowers and have comparatively higher run hours during summer months.

<sup>3</sup> The EPA 8-hour ozone standard is written such that attainment is met if the 3-year average of the 4th max. value from each of the 3 years is less than or equal to 70 ppb.

<sup>4</sup> National estimates (<https://www.epa.gov/sites/default/files/2015-09/documents/banks.pdf>)

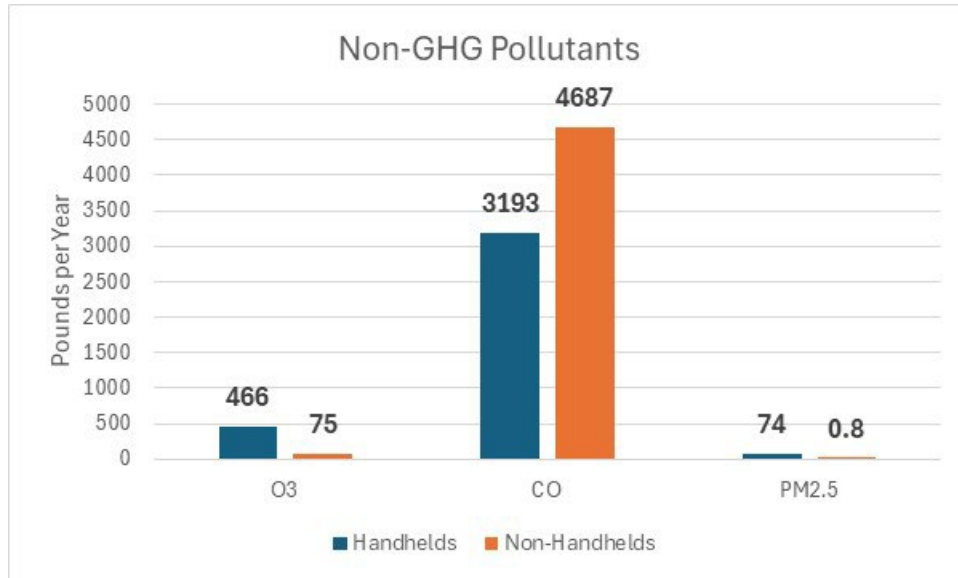
**Table 1 – Regional Air Quality Council: General Contribution to Front Range Summertime Ozone Concentrations<sup>5</sup> reported as parts per billion (ppb)**

<b>Ozone Source</b>	<b>Contribution</b>	<b>Includes</b>
Oil & Gas	8.6 ppb	Area and point sources (operation, storage facilities, drilling, trucking and engine exhaust)
On-Road Vehicles	6.8 ppb	Light/Medium/Heavy Duty vehicles (SUVs, cars, pickup trucks)
Non-Road Sources	5.4 ppb	Construction operations, rail/train operations, agriculture
Point Sources	5.3 ppb	Industrial sources and electricity generation
Lawn & Garden	2.5 ppb	Commercial lawn equipment and residential lawn and garden equipment (mowers, leaf blowers, trimmers, etc.)
Area	1.2 ppb	Personal care products, cleaning products, paints and solvents
Background and Natural	48.6 ppb	Background ozone, transport, local fires, plant-based emissions

Using the same shadowing data and methodology that assumes full electrification of 100 residential landscaping service providers, AGZA developed a Boulder-specific model for non-GHG pollutant reductions. The results from that model are shown in Figure 3. Based on this analysis, electrification of all handhelds could yield a 466 pound per year reduction in ozone forming pollutants and 74 pounds per year reduction of particulate matter.

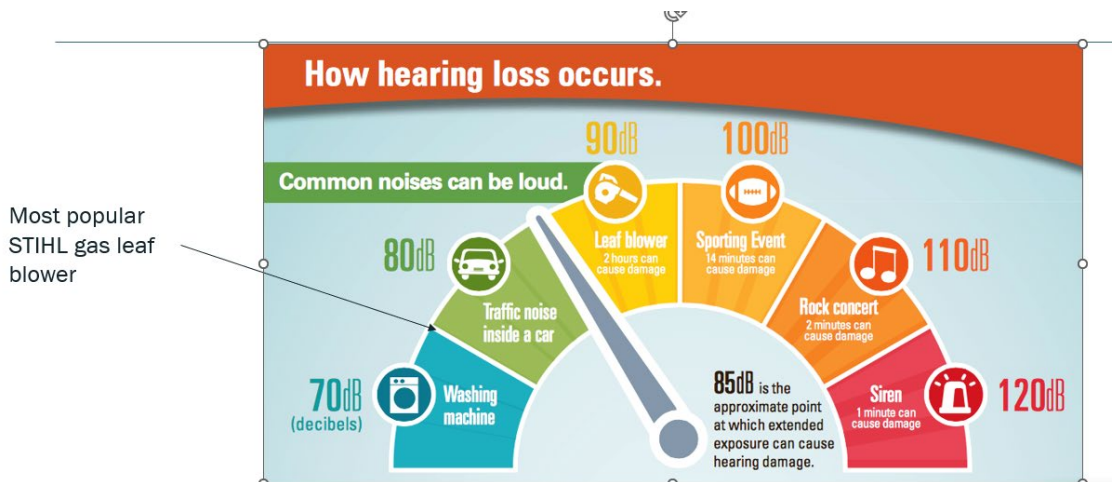
<sup>5</sup> Source: Screenshot of Regional Air Quality Council (RAQC) presentation dated 8/18/22 and labeled AQCC Presentation SIP Planning Process published by the Colorado Sun (<https://coloradosun.com/wp-content/uploads/2022/08/Screen-Shot-2022-08-23-at-1.21.25-PM.png?w=710>)

**Figure 3 – Analysis of Annual Non-GHG Pollutants for 100 Typical Boulder Residential Landscaping Service Crews**



For noise pollution, Figure 4 illustrates the decibel ratings of common noise exposures. The actual decibel exposure will depend on the distance of the individual from the source of the noise. For example, the operator of a leaf blower will experience the full decibel exposure, but someone standing at a distance away or inside an adjacent building will still hear the sound, but the actual decibel exposure will be diminished. Gas equipment continues to evolve in terms of sound dampening. As highlighted, the most popular STIHL leaf blower in use is far quieter than the historical average. Electric leaf blowers are quieter than gas, but still exceed the noise thresholds established in the city’s noise ordinance for residential areas.

**Figure 4 – Decibel Ratings of Common Exposures**





Cost Analysis

Based on shadowing data, service provider interviews and other experience, AGZA developed an average equipment inventory for service crews for the types of equipment that can be more readily electrified (so, again, excludes larger deck mowers). This was then used for cost analysis and comparison, the results of which are shown in Table 2. As shown, a fully electric setup is more than three times the cost of a gas setup. The main contributor to this is battery cost. Due to battery life and service reliability concerns, the industry best practice is to have at least two batteries per piece of equipment. In addition to the incremental cost difference overall, another area of concern is the absence of a used electric equipment inventory. As noted previously in this memo, many small business entrants into the landscaping service market start by purchasing lower cost, used equipment.

**Table 2 – Cost comparison between gas-powered and all-electric landscaping equipment typically used by landscapers (excludes riding mowers)**

	<b>Quantity</b>	<b>Gas</b>	<b>Electric<sup>6</sup></b>
Blower (backpack)	2	\$840	\$840
Blower (handheld)	1	\$280	\$280
String Trimmer	2	\$820	\$1000
Hedge Trimmer	1	\$550	\$550
Hedge Trimmer (extended)	1	\$480	\$450
Pole Saw	1	\$690	\$620
Chainsaw	1	\$370	\$370
Self-propelled Mower	1	\$850	\$850
Backpack Batteries	4	n/a	\$6000
Standard Batteries	12	n/a	\$3000
Fast Charger	6	n/a	\$990
Standard Charger	10	n/a	\$1000
<b>Total (sales tax not included):</b>		<b>\$4,880</b>	<b>\$15,950</b>

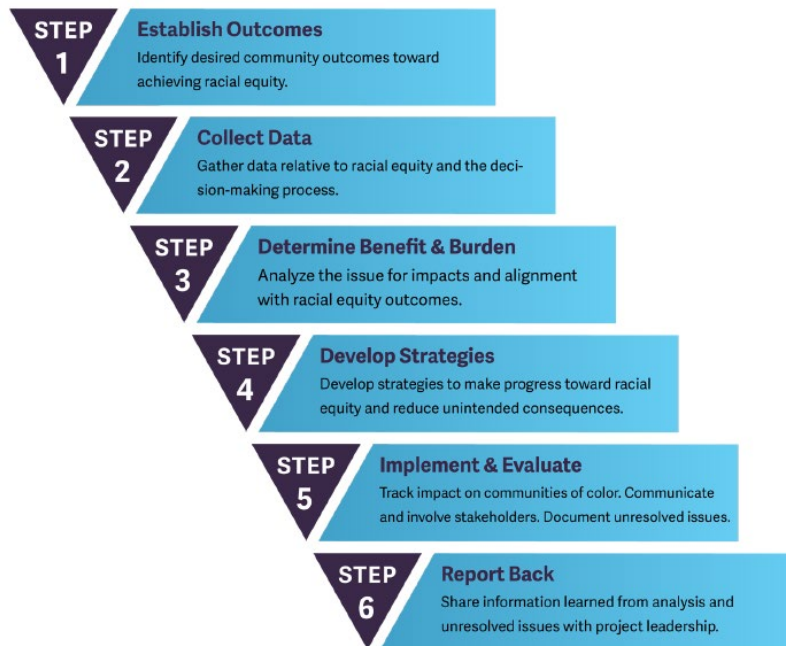
Consistent with models developed in California, making electrification accessible to under-resourced small businesses requires incentives that can lower equipment costs to be comparable to their gas alternatives. AGZA recommends a voucher that can cover 70 percent of the cost of equipment. For the city’s current pilot, an 80 percent voucher is being offered to compensate for the sales tax differential that is realized on top of the base equipment cost. Following this model, roughly \$1.4 million in vouchers would be needed to support 100 businesses fully electrifying. However, as noted, there are 2000-2500 total businesses that serve Boulder County as a whole. While the exact count of businesses serving Boulder is unknown, it is reasonable to assume that in excess of 1000 businesses would need to electrify equipment were Boulder to adopt electric-equipment only requirements. Given the substantial cost differential, failure to assist in buying down

<sup>6</sup> Battery cost is excluded from the equipment cost and shown as a separate line item.

the cost of equipment would likely result in both substantial increase in cost of service for landscaping service customers in Boulder, as well as many businesses simply forgoing serving customers in Boulder.

## **RACIAL EQUITY**

The city’s Racial Equity Instrument was used throughout the course of this project. The instrument is made up of the following six steps:



The Team started by defining the desired outcome as:

*All Boulder residents will benefit from reduced air and noise pollution; the community and service workers will experience improved health and wellbeing; landscaping businesses will retain or even grow their profitability; and the workforce will realize benefits through higher earning potential as part of a “green collar” workforce.*

In considering all data and influencing factors, substantial risk exists associated with trying to achieve this ideal. Racial disparity already exists within the current baseline of landscaping services. Demographically, the majority of customers in Boulder receiving landscaping services are Caucasian and many would also be considered affluent. In contrast, 80% or more of the landscaping workforce are Hispanic and most business owners and workers earn well below the area median income. In addition to the high potential for negative impacts on Hispanic-owned businesses and workforce, there are customer segments that could also realize disparate impact. For example, fixed-income seniors routinely rely on landscaping services and may lack the financial capacity to bear an increased cost of service. Similarly, landscaping service costs already represent a significant portion of Homeowner Association (HOA) dues for multifamily properties. Dues increases can further impact housing affordability for renters and owners. Finally, the majority of landscaping service providers and equipment retailers and distributors are

based in surrounding communities, such as Longmont. These communities could benefit from increased sales revenue associated with electric equipment purchases but could also realize harm due to economic impacts on businesses and workers.

### Engagement Results

The city launched three questionnaires on its online engagement platform, Be Heard Boulder, to evaluate community concerns regarding the use of landscaping equipment. The city sought feedback from three groups: those who live and work in Boulder, rental property owners, and owners/workers of landscaping businesses that operate in Boulder. The results of this engagement were presented at the April 27, 2023, council study session. Overall, survey respondents were supportive of education, outreach and voluntary programs for small businesses. There were also consistent views that a local sales ban would be ineffective. There was wide disparity in opinions regarding strategies such as use restrictions.

There is no single means for identifying or connecting with landscaping businesses serving customers in Boulder. In addition to some responses to the Be Heard Boulder survey, the project team has utilized several other tactics. This included an on-site visit to Western Disposal and interviews with businesses during yard waste and debris disposal, company shadowing (including shadowing all-electric business), interviews with equipment distributors and retailers, outreach through the Latino Chamber and referrals. The city also hosted a series of workshops that included equipment demonstrations and educational seminars. Highlights of some of the feedback obtained include:

- Productivity is critical to their bottom line.
  - Less powerful equipment slows them down.
  - They cannot afford to waste time in the field.
- There is a lack of trust that electric equipment will be reliable.
  - No way to charge batteries in the field and/or recharging takes too long and slows them down.
  - Less knowledge of how to troubleshoot equipment when it isn't working.
- There is a high degree of concern over cost impacts.
  - High first cost of equipment.
  - Need to charge more for service due to higher-cost equipment and lower productivity.
  - High cost of battery replacement.
- Their customers care about the bottom line and quality of service, not the equipment they use.
  - Customers unwilling to pay premium for electric service.<sup>7</sup>
  - Customers complain if there is debris left on the lawn or walk.
- There is concern about how the operational model will work.
  - Workers must charge batteries in their homes.

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<sup>7</sup> One business reported that they started as an all-electric company but converted to gas because they were losing jobs.

## Pilot Voucher Program

In 2023, staff were successful in obtaining a \$211,774 grant through Boulder County's Sustainability Grants Program to implement a pilot rebate program for landscaping equipment. The pilot is being administered through Boulder County's PACE program. The PACE team worked with AGZA, the Latino Chamber and Boulder County distributors and retailers in developing the program. Under the pilot, small landscaping businesses receive a voucher for up to 80% of cost for electric landscaping tools. Participating businesses also receive, at no cost, a smart charging box to provide for safe managed charging, two fire extinguishers and a fire blanket. The goal of the pilot was to test the program design, increase experience with electric equipment and to drive additional participation by landscaping service providers in the city's engagement efforts.

Prior to being able to enroll businesses in the pilot, the team spent time researching program design and assessing equipment availability. Contracts also had to be negotiated with local retailers since the voucher design buys down the cost at the point of sale, rather than working as a post-purchase rebate. Enrollments began over the summer with 33 businesses signing up to participate. One of the biggest challenges encountered was the long lead time for ordering equipment. For this reason, some businesses elected not to use their voucher and those who did acquire equipment had limited operational hours with that equipment.

In fall 2023, businesses were asked to participate in a survey and one-on-one interviews. Businesses were asked a range of questions, including overall satisfaction with the program, what they liked, where they encountered barriers and for recommendations to improve the program. Overall, businesses found the program design and voucher appropriate. Many businesses reported barriers of equipment availability and equipment choice, recommending an expanded offering across more manufacturers. Of those who had successfully purchased equipment and gained some use experience, they found the electric leaf blowers inadequate for fall clean up. Businesses were also asked about perceptions around potential restrictions that could be imposed by the state or Boulder. Concerns expressed included lack of equipment suitable to the job, high cost of battery replacement, impacts on livelihood due to equipment cost and productivity loss, creating an environment that is more hostile and unproductive and a lack of workforce training.

In 2024, staff were able to secure a second grant for an additional \$165,990 to allow the program to be extended and expanded for another year. This will allow a full season of experience with equipment purchased in 2023, as well as expanding the number of program participants overall. The 2024 program kicked off with a demonstration event at the end of April.

## State of Colorado Regulation

As discussed with council at the April 27, 2023, study session, Colorado's Air Quality Control Commission (AQCC) was in the process of developing rules that would cover

landscaping equipment use in the ozone non-attainment region. AQCC Rule 29 has since been adopted with the following restrictions:

- Beginning June 1, 2025, no state government agency in Colorado can use gasoline-powered push and hand-held lawn and garden equipment with an internal combustion engine smaller than 19 kW (25 horsepower) between June 1 and August 31 of each year.
- Beginning June 1, 2025, neither the federal government nor any local government can use gasoline-powered push and held-held lawn and garden equipment with an internal combustion engine smaller than 7 kW (10 horsepower) between June 1 and August 31 of each year in the ozone nonattainment area.
- The restrictions also apply to lawn and garden services contracted for and provided to the federal government, a state government agency, or a local government.

The rules do have exemptions for activities related to fire mitigation.

While AQCC considered restrictions beyond public agencies, including a potential regional sales ban, they elected to limit the initial rule due to concerns over supply chain constraints, costs, and regulatory complexity. It is expected that expansion of the rule will be considered at a future date.

### City Resource Needs

In response to council's interest in a potential regulatory strategy, staff evaluated the resource strategies adopted by other jurisdictions. The best practice identified is the establishment of a dedicated compliance manager, who would focus on identifying businesses and conducting education and outreach during the first years of launch. Based on discussions with city's code enforcement team, staff believe the Boulder compliance manager could be a fixed term position, with the term determined based on the timeline established for education and soft launch (e.g., time period established for just warnings and education). The existing code enforcement team would assume responsibility for ongoing enforcement once that term ended.

### **STAFF RECOMMENDATIONS**

Staff remain concerned about adopting a regulatory strategy at this time. Staff cite the potential for significant equity impacts. Staff are also concerned about limited equipment availability and the complexities of regulatory enforcement through noise ordinance. To the extent council wishes to proceed with adopting regulation, staff would make the following recommendations:

- Enforcement should be directed towards property owners and any tenants who procure the landscaping services, not on the landscaping businesses.
- A minimum two-year phase in should be adopted, where year one would be focused solely on education and outreach and year two would be limited to warnings and further education.
- The enforcement timeline should be flexible and adaptable to any supply chain constraints.

## **NEXT STEPS**

Staff will continue to provide updates to council on the results of the ongoing pilot, as well as any changes at the state level. Should council wish to pursue a regulatory approach at this time, staff would begin ordinance development and would return to council for adoption based on council's feedback and desired components for that regulation.