

ENVIRONMENTAL JUSTICE FOR VENDORS, BY VENDORS

April 2025



**URBAN
JUSTICE
CENTER**


Street
Vendor
Project

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We are grateful to James McIntyre, at Inclusive Prosperity Capital, and McGowan Southworth, who have helped us think big.

INTRODUCTION

THE CHALLENGE TODAY

There are approximately 23,000 vendors in New York City. Approximately 20,500 of those vendors sell food. The vending community overwhelmingly includes members of NYC's diverse immigrant population, with vendors hailing from Mexico, Ecuador, Egypt, Senegal, Bangladesh, and other countries all over the world. The community includes women, military veterans, and people of color of all ages.¹

Vending is hard, precarious work. Vendors usually work long days with multiple shifts, year-round in all weather conditions. They do not have benefits, they have difficulty finding restrooms, and they must daily navigate a challenging regulatory and policing environment in the city. However, many vendors see vending as a low-barrier opportunity to start their own business and earn a livelihood. The work is rewarding, and most vendors operate their businesses for years as a primary source of income. 95% of vendors report that they love running their businesses.² And in addition to providing food on a daily basis, vendors have served as vital community resources and food sources during times of crisis—as after Superstorm Sandy and the COVID-19 pandemic.

Today, most vendors use gasoline-powered generators and propane to power their carts. These generators emit harmful air pollutants that negatively impact vendors' health and the broader environment. However, vendors lack clear and affordable alternative technologies to reduce these emissions. Thanks to leadership and innovation from the private and public sector, the adoption of hybrid and zero-emission electric vehicles is accelerating. But vendors have been left out of this transition so far. Now is the time to ensure vendors have access to affordable, safe, and convenient electrification technology for their carts and trucks.

WHAT IS THE STREET VENDOR PROJECT?

The Street Vendor Project is a vendor-led organization under the Urban Justice Center with 3,000 members, SVP serves as the organized voice of the estimated 23,000 people who make a living selling from tables, carts and trucks on the streets and sidewalks of New York City. SVP not only provides vendors with legal services and other support to help them sustain and grow their businesses but also provides political education and training so vendors can play strong leadership roles in the organization and in broader economic justice movements. SVP's previous campaigns have focused primarily on economic and legal justice for vendors, including recent wins to increase the number of vendor permits from the City.³

Vendor leaders have increasingly recognized the need to make their businesses healthier for workers, consumers, and the public, to use technologies with lower environmental impacts, and to build their resilience to the impacts of climate change. Therefore, SVP launched an ambitious new project—Environmental Justice for Vendors, by Vendors—with the goal of transforming New York City's street food carts into a green and resilient industry.

¹ [Immigration Research Initiative](#) (2024)

² [Immigration Research Initiative](#) (2024)

³ [Grubstreet](#) (2021)

ENVIRONMENTAL JUSTICE FOR VENDORS, BY VENDORS

Launched in 2021, Environmental Justice for Vendors, by Vendors is a collaborative effort to design, build, and ensure access to more environmentally sustainable and healthy vending technology to reduce the environmental footprint of New York City’s food carts and trucks. The transition to green vending carts will support vendors’ physical wellbeing, enhance their business financial health, protect the crucial economic role they play in their communities, and build up resilience to extreme weather events. EJVV aims to transform technology and business practices within New York City’s street vending sector by:

- Dramatically **reducing energy consumption** and the **emission of greenhouse gases and pollutants** from street food vending carts, in line with the City’s overall emissions reduction goals.
- Helping vendors **adopt waste management practices** that reduce solid waste, minimize the use of plastics, and maximize recyclable and compostable items, helping the City achieve its goal of reducing the amount of waste sent to landfills.
- Integrating street vendors in planning for **urban resilience** through a robust understanding of street vendors’ climate vulnerability and the ways they can contribute to New York City’s adaptive capacity.

SVP undertook Environmental Justice for Vendors, by Vendors in three steps:

1. Defining Vendor Conditions and Needs	
What We Did	What We Learned
<ul style="list-style-type: none"> ▪ Surveyed 200 street food vendors on their energy needs and challenges. ▪ Engaged 14 vendors + experts in a 2-day design lab. ▪ Researched 4 alternative power sources: renewable natural gas, solar power, grid, and rechargeable batteries. ▪ Inventoried gas and electricity needs of 4 cart types. 	<ul style="list-style-type: none"> ▪ Evaluated 4 alternative power sources: renewable natural gas, solar power, grid connection, and rechargeable batteries. ▪ Rechargeable batteries are a near-term solution that can help street food cart vendors reduce their emissions and improve their health.
2. Scoping a Rechargeable Battery Solution	
Process	Outcomes
<ul style="list-style-type: none"> ▪ Assessed market of batteries that could serve vendors. <ul style="list-style-type: none"> ○ Contacted 20 cart manufacturers. ○ Contacted 75+ battery and electric vehicle companies and experts. 	<ul style="list-style-type: none"> ▪ Proposed pilot program to test batteries in operating food carts. ▪ Shortlisted battery companies to participate in pilot on a rolling basis.
3. Testing and Demonstrating Proof of Concept	
Process	Outcomes
<ul style="list-style-type: none"> ▪ Created 5 partnerships with battery companies to test batteries with vendors. ▪ Completed multi-month pilot program with 5 vendors. 	<ul style="list-style-type: none"> ▪ Benefits included reduced air and noise pollution, increased convenience, and lower operating costs. ▪ Challenges included balancing battery charging times with long operating schedules and a lack of charging infrastructure.

CHALLENGES TODAY & TOMORROW

Despite street vendors' rich contributions to the economic, social, and cultural fabric of New York City, vendors have been left out of efforts to make New York City a sustainable and resilient place to live and work. Innovations to conserve energy, reduce greenhouse gas (GHG) emissions, and manage waste are still emerging, and vendors have relatively few options to reduce their environmental impacts, protect their health, and reduce their operating costs. On top of this, New York City's vendors face compounding challenges: the slow return of workers to office spaces after Covid-19 and a system of strict fines, abusive enforcement, and complicated regulations that deny the legitimacy of vendor livelihoods.

Vendors are chronically exposed to high levels of air pollution. New York City's buildings and on-road vehicles produce the majority of pollution and GHG emissions in the city, including particulate matter (PM2.5) and Ozone (O3). Due to the inherently outdoor nature of their work, vendors face prolonged exposure to this ambient pollution. Furthermore, vendors inhale fumes from their own power and cooking equipment. Gasoline-powered generators are not regulated for emission controls and release harmful pollutants like particulate matter (PM2.5), carbon monoxide (CO), and nitrous oxide (NOx). With respect to GHGs, a 2,000W portable generator operating for one year might generate 13,400 lbs. of carbon dioxide and equivalent GHGs (lbsCO_{2e}); a larger 3,000W model operating for one year might produce between 18,000 to 23,000 lbsCO_{2e}.⁴

The long-term health impacts of exposure to these pollutants are severe and well documented.^{5,6,7} And unfortunately, vendors have already anecdotally shared complaints about developing respiratory ailments. Helping vendors transition to cleaner-burning generators—to say nothing of helping them access advanced battery, solar, or grid-based technologies—would significantly improve the health outcomes of vendors and their neighbors.

SURVEY METHODOLOGY

EJVJ conducted an energy usage and climate vulnerability survey of 200 food vendors in New York City. This survey was delivered as part of a larger member census of the SVP vendor network, which sampled over 2,000 vendors. Participants could take the survey over the phone in six languages: English, Spanish, Arabic, Mandarin, Bengali, and Wolof. The census portion of the survey included questions about vendor demographics, their business, and their needs. Example questions included:

- What is the main category of goods you sell?
- How would you rate your proficiency with English?
- How many people do you help support with your earnings?
- How much do you typically spend on cart maintenance each year?

If vendors indicated that their cart used an electric or gasoline-powered generator, they could complete the Environmental Justice portion of the survey, which included questions on power sources, exhaust technology,

⁴ Joule Case interview. 2023.

⁵ [World Health Organization](#)

⁶ Manisalidis I, Stavropoulou E, Stavropoulos A, Bezirtzoglou E. Environmental and Health Impacts of Air Pollution: A Review. *Front Public Health*. 2020 Feb 20; 8:14. doi: 10.3389/fpubh.2020.00014. PMID: 32154200; PMCID: PMC7044178.

⁷ [Onyx Power](#) (2021)

waste management practices, health and safety practices, and experience with climate hazards such as extreme weather. Example questions included:

- What were the two most important factors you considered when choosing your generator model?
- Where do you dispose of the majority of your collected waste?
- Have you ever had to end your business day early, or suspend business operations for at least one day, because of a weather-related incident?

SURVEY FINDINGS

Technological and manufacturing constraints are preventing clean, sustainable, and climate-resilient street food vendor operation.

- **Vendors are overwhelmingly reliant on gasoline and propane as fuel sources** as opposed to renewable, clean energy sources that are potentially cheaper and safer over the long term. 97% of street food vendors rely on gas-powered generators.
- **Vendors are interested in affordable, environmentally friendlier fuel alternatives**, and 90% of vendors were interested in direct connection to the grid. However, vendors are generally not familiar with the clear and affordable technology that can make this transition possible.
- **Vendors are exposed to unsafe and disruptive extreme weather events.** The frequency and severity of these events are already worsening due to climate change.
- **Cart designs are generally not portable, and they are inconvenient for women and aging vendors.** Women and older respondents shared that carts have become heavier as they have transformed from small push carts to mobile kitchens with modern equipment, plumbing, and lighting. Food storage and preparation equipment add to the weight and energy usage of the carts.
- **Existing waste management systems make it difficult for vendors to collect and separate waste properly.** Vendors do not have the necessary equipment to separate and dispose of their waste onsite. Vendors have expressed the difficulties in separating their recycling from trash after the fact.

In addition to the challenges listed above, vendors are wrestling with larger political, infrastructural, and economic obstacles. SVP's approach to environmental justice recognizes that in addition to solving the day-to-day challenges of operating a green mobile vending cart, solutions must tackle systemic change.

- **The City must expand the accessibility and availability of permits.** In New York City, despite the fact there are about 20,500 mobile food vendors, about 75% of vendors do not have permits. Out of the 2,400 general merchandise vendors, about 63% have permits.⁸ Obtaining a permit is still one of the biggest operational hurdles for vendors. Vendors with permits enjoy significantly higher levels of profitability than non-permitted vendors,⁹ and vendors without permits also face hefty fines from the City. The City's cap on permits has created a black market where permits can cost between \$20,000 and \$30,000 for a two-year period.¹⁰ Eliminating the need for an underground permit rental system would allow vendors to use this money towards their operating costs.

⁸ Gothamist (2024)

⁹ [Immigration Research Initiative](#) (2024)

¹⁰ [Bloomberg](#) (2020)

- **Vendors were profoundly affected by the Covid-19 pandemic and are still recovering from the economic impacts.** During the pandemic, vendors played critical roles by providing affordable food and spreading information in low-income immigrant neighborhoods. Unfortunately, vendors' customer base and earnings decreased as office employees started to work from home, especially in commercial business centers like the Financial District and Midtown. During the crisis, many vendors were left out of government relief programs because they did not have the necessary financial documentation to apply or because they were undocumented.¹¹ Due to lasting work-from-home trends, vendor business health is still being impacted.
- **In addition to permit caps, there are multiple spheres of agency governance and regulation that subject vendors to legal grey areas that frustrate, delegitimize, or outright criminalize vending businesses.** Vendors must navigate sharing sidewalk space with restaurants, pedestrians, and other users. Depending on their vending location, vendors negotiate with and follow regulations from various departments like the Department of Transportation, Parks Department, BIDs, and even private property owners.
- **Vendors face a “catch-22” when it comes to safely storing their fuel.** Vendors store their carts and fuel in commissaries overnight. However, fire code regulations prohibit vendors from storing propane indoors. Unfortunately, because of the current technology and infrastructure available for vendors, there is no other viable option for fuel storage and fuel usage.

Street Vendor Project Policy Advocacy

The Street Vendor Project has made progress on increasing the number of vendor licenses.

In 2021, due to SVP's effective advocacy, New York City Council passed a bill (Intro. 1116-B) to create 4,000 new permits for street vendors over the next decade.¹² SVP continues the fight to eliminate the cap on vendor licenses at the State level. Despite its importance, this progress represents incremental and long-term improvement to an acute problem that faces vendors today. Instead of giving opportunities for vendors to formalize their businesses, permit limits continue to criminalize vendors who are unable to obtain one.

In addition to permits, Intro. 1116-B also created an independent, civilian enforcement unit (Department of Consumer and Worker Protection) to oversee the street vending community. However, despite a shift away from NYPD enforcement, NYC street vendor tickets have returned to pre-pandemic levels.¹³

POLICY ELEMENTS: INTRO 1116-B

Intro. 1116-B was approved by the New York City Council in 2021. Starting July 2022, City will hand out 400 licenses each year for 10 years. Other measures included in the bill:

- Dedicated vendor enforcement unit.
- New advisory board.
- Creation of a training program so vendors can familiarize themselves with vending rules.
- Expansion of the green cart program, which aims to increase the number of fruit and vegetable vendors across the city.
- Creation of a website and mobile app that would allow vendors to view a map of legal places to set up and operate.
- Maintenance of the requirement that vendors stay at least 20 feet away from sidewalk cafes.

¹¹ [Eater NY](#) (2021)

¹² [Eater NY](#) (2021)

¹³ [City Limits](#) (2022); [WIEGO & SVP](#) (2021)

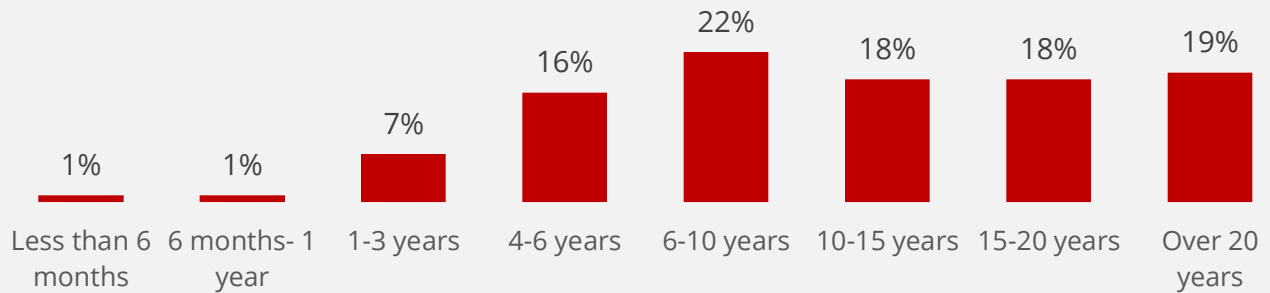
ENVIRONMENTAL JUSTICE FOR VENDORS, BY VENDORS: SAMPLED SURVEY RESULTS

VENDOR DEMOGRAPHICS

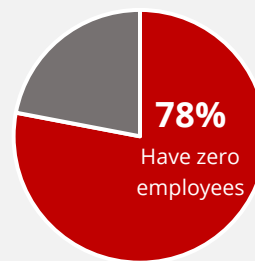
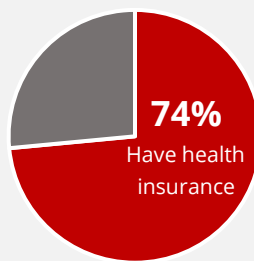
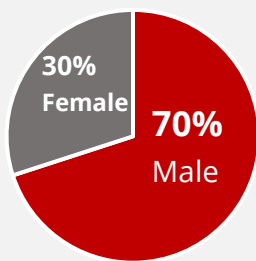
200
survey responses

- Respondents represented **24** different neighborhoods.
- Over **two thirds (67.2%)** operated in the borough of Manhattan.
- **43%** of vendors identified as Middle Eastern and North African.
- **32.5%** identified as Hispanic or Latino.
- **54%** of respondents have operated in NYC for more than 10 years.

How long have you been vending in NYC?



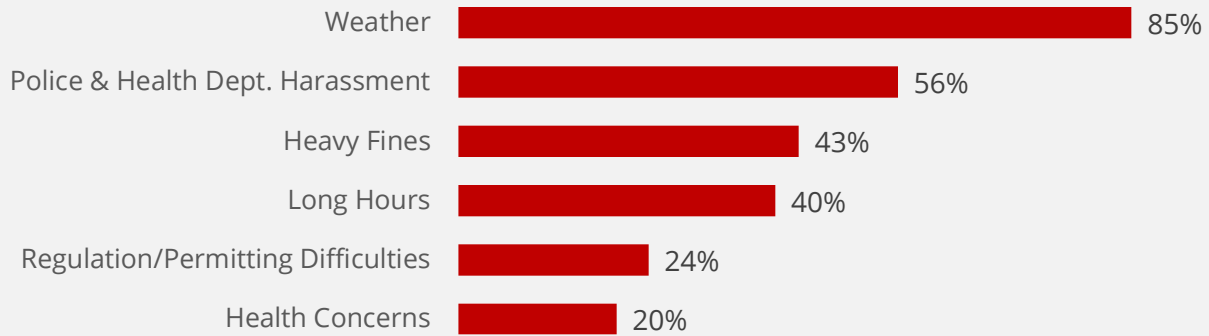
Vendor Respondent Characteristics



OPERATING CHALLENGES

Vendors were asked to select the three most challenging aspects of being a street vendor. Weather (**85%**) and harassment from the police and health department (**56%**) were top concerns for vendors. Health was only a concern for **20%** of respondents.

What are the three most challenging aspects of being a street vendor?



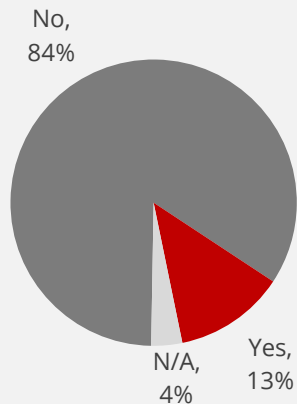
HEALTH IMPACTS

Most vendors are not concerned about noise or air-based emissions, nor are they concerned about associated health impacts concerning their cart or generator. 82% of vendors responded “No” to the question: “Do you have any health and safety concerns about your cart or the generator/cooking methods you use?”.

Considering the length of an average vendor shift (6-12 hours), vendors are in close contact with these noise and air-based emissions for long periods of time and could potentially develop adverse health conditions. A green transition for vendors must both significantly reduce harmful emissions from these generators and educate vendors on the importance of protecting their health and safety.

Have you noticed any air-based emissions (smoke, exhaust) or noise emissions from your generator leading to discomfort for you, staff, customers, pedestrians, or nearby brick and mortar businesses?

Air-Based Emissions



Noise Emissions

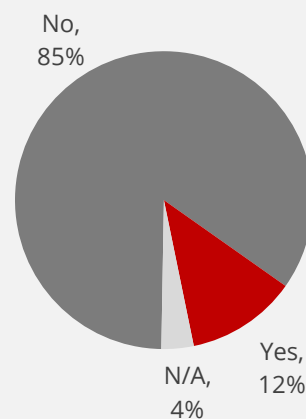




Image Source: Lowes

Generator Model Data

The Honda EU2000i—the generator most used by NYC mobile food vendors—emits carbon monoxide (CO), nitric oxide and nitrogen dioxide (NO_x), and particulate matter (PM), which are pollutants that negatively impact human health and result in chronic health conditions like asthma and cardiovascular disease. These generators also emit carbon dioxide (CO₂), which contributes to global warming. While more efficient and clean gasoline-powered generators are available, food vendors often do not have the capital to invest in this more expensive equipment.

In addition to generators, some vendors use charcoal to grill meat—shish kabobs, for example—over an open flame. Open-flame grilling is traditional, cheap, and is believed by many vendors to entice customers via the smell of grilled meat. However, char-broil grilling of meat produces significant amounts of particulate matter.

CLIMATE THREATS

Over 66% of vendors believe that climate change is going to be a threat to their business, and many have already felt the impacts from increasingly frequent and severe extreme weather events.

- **92%** of vendors have had to end their business day early, or suspend business operations for at least one day, because of an extreme weather-related incident in the last year.
- **67.5%** of vendors have had to repair or replace their assets (e.g. cart, generator, umbrellas, signage, etc.) or inventory as a result of weather damage and impacts.
- However, over three fourths of vendors (**76.5%**) do not have insurance for their assets (e.g. carts, generators, signage, etc.), meaning they cannot immediately recoup the value of assets damaged by weather impacts.



Source: Street Vendor Project

Vendors have already played critical roles in the aftermath of disaster. After Superstorm Sandy, for example, vendors continued to operate and provide streetlight across the city, charged phones for people who had lost electricity, and delivered meals and vital supplies in cooperation with city agencies. Empowering vendors to prepare for climate disasters will benefit the broader New York City community.

WASTE MANAGEMENT

Most vendors (71.5%) collect 1-2 household kitchen garbage bags worth of waste in a day. (One bag is approximately 10 gallons). There are two main sources for vendor waste: food preparation and to-go meal packaging. Paper (napkins, paper bags, plates), food scraps (organic waste), and plastic (gloves, bags, utensils) are the most common types of waste generated from food preparation. Tin foil, recycled paper, and plastic are the three most common types of packaging vendors use for to-go meals.

What type of waste gets generated from your food preparation process?



Paper

77%



Food Scraps

72%



Plastic

68%

What type of packaging do you use for to-go meals?



Tin Foil

59.5%



Recycled Paper

41.5%



Plastic

27%

Half of surveyed vendors can separate their waste into compost, recyclable, and non-recyclable categories. Of vendors that separate their waste, **45.5%** of respondents provide separate bins for disposal. A majority (**75%**) dispose of their waste at the commissary. Vendors shared that it is difficult to sort their trash after they return to the commissary and that providing sorting options on the cart itself is the most convenient option.

TECHNICAL LANDSCAPE AND A PATH FORWARD

RESEARCH & EXPERT CONSULTATION

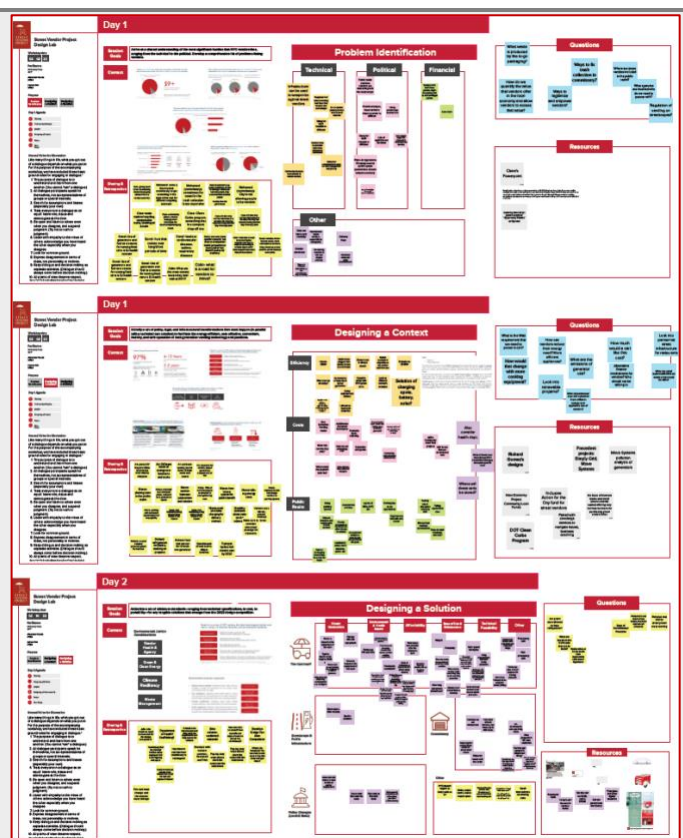
We conducted an analysis on the viability of four alternative power sources: renewable natural gas, solar power, rechargeable batteries, and connection to the grid. Based on our research, we evaluated each energy source based on how well it satisfies vendor needs as we understood them from the survey and from SVP's deep experience in street food vending. (See following pages for an analysis for each energy source.)

To test our conclusions and broaden our thinking, we then brought our initial research and hypotheses to an interdisciplinary group of experts—ranging from experienced street food vendors to academics. Our experts convened in a **two-day, virtual problem-solving and goal-setting session in February 2022**. Their intent was not to design solutions, but to lay the groundwork, establish measurable criteria, and set goals for the selection of technology—and the identification of parallel policy changes and infrastructure investments—that would help vendors shift to clean, green technology. Specifically, design lab had three goals:

1. Arrive at a shared understanding of the most significant hurdles that NYC vendors face, ranging from technical barriers to political barriers.
2. Articulate a set of minimum standards—ranging from technical specifications, to cost, to portability—for any alternative energy solutions.
3. Identify a set of policy, legal, and infrastructural transformations that must also happen to facilitate adoption of green vending technology and practices.

Design lab participants represented diverse stakeholders involved in environmental justice, energy efficiency, urban design, and worker advocacy. We are thankful for their enthusiasm and willingness to share their time and knowledge with us. Experts included:

- Ari Kahn, RMI
- Clare Mifflin, Founder, Center for Zero Waste Design
- Colin Montoute, Director of Architecture, WXY Studio
- Deyanira Del Rio, Co-Director, New Economy Project
- James Francisco, Senior Urban Designer and Planner, Arup
- Julie Torres Moskovitz, Founding Principal, Fete Nature Architecture
- Kelebohile Nkhereanye, vendor and advocate
- Lyric Kelkar, Policy Director, Inclusive Action for the City
- Marco Conner Diaquoi, Deputy Director, Transportation Alternatives
- Mohamed El-Khatib, Commissary Owner
- Mohamed Megahed, vendor and advocate
- Richard Gomez, Revolution Carts
- Rob Daurio, Associate, WXY Studio
- Sonal Jessel, Director of Policy, WE ACT for Environmental Justice



EJV Discussion Board Records (2022)

BASELINE TECHNOLOGICAL REQUIREMENTS

Based on SVP’s survey data, research, and consultation with our trusted experts, EJVV aligned on the following set of baseline conditions that any green energy technology must meet in order to improve environmental and health conditions while also enabling vendors to operate their businesses successfully:

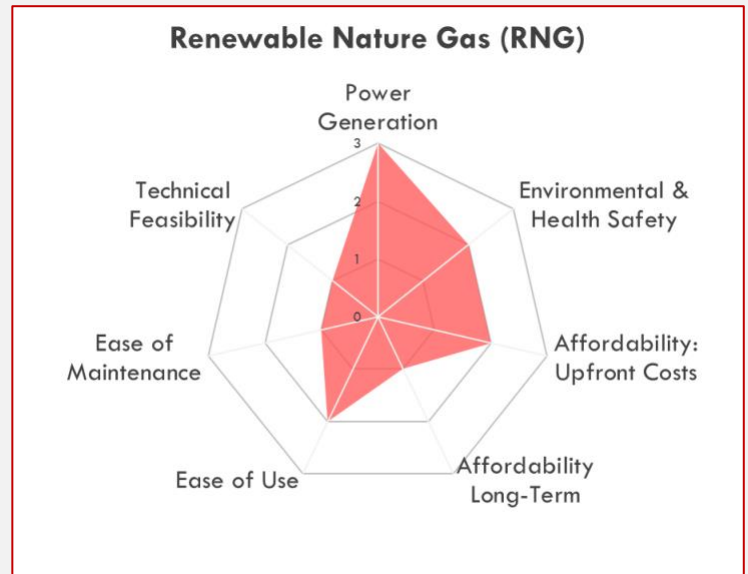
1. **Power.** Alternative technology must provide consistent and sufficient power to operate multiple pieces of demanding cooking, ventilation, and lighting equipment during long shifts.
2. **Environmental & Health Impact.** Alternative technology must achieve meaningful reductions to fossil fuel consumption, GHG emissions, and the emission of other dangerous pollutants.
3. **Affordability.** Alternative technology must be cost-effective over time, resulting in operating savings that make up for upfront capital costs that exceed that of a traditional gas-powered generator.
4. **Ease of Use & Maintenance.** Alternative technology must be easy to use and maintain, easy to physically maneuver, and maintainable by technicians local to New York City.
5. **Technical Feasibility.** Given the size of the street food vendor market in New York, alternative technology must be feasible to deploy at scale despite constraints in the public realm, where vendors operate during the day, and infrastructural constraints in commissaries.

Standards	Vendor Current State	Vendor Needs
Power	<ul style="list-style-type: none"> ▪ Most vendors use their generators for 6-12 hours (one shift). However, carts can be operated by multiple vendors during the day, so carts need to be able to operate for 12-18 hours. ▪ Vendors power more than one piece of demanding equipment at the same time, including cooking, ventilation, and lighting equipment. 	<ul style="list-style-type: none"> ▪ Alternative technology must provide enough reliable, uninterrupted power to fuel multiple pieces of equipment for 12-18 hours a day. ▪ Vendors are ultimately interested in connecting to the grid. Over 91% of vendors would prefer their cart to connect to the local electric grid.
Environmental & Health Impact	<ul style="list-style-type: none"> ▪ 97% of survey respondents power their generators with gasoline. 	<ul style="list-style-type: none"> ▪ Alternative technology should reduce or eliminate GHGs and other harmful pollutants.
Affordability	<ul style="list-style-type: none"> ▪ The average cost of gasoline for a generator is about \$9 or less per day, but gas pricing is volatile. ▪ Yearly maintenance costs for generators are about \$375 or less. 	<ul style="list-style-type: none"> ▪ Alternative technology should ideally entail reasonable upfront investments, or reduced fuel and maintenance costs over time. ▪ Alternative technology should entail less volatile energy costs than gasoline.
Ease of Use & Maintenance	<ul style="list-style-type: none"> ▪ Most vendors estimate generators last 2 to 5 years before needing to be replaced. ▪ Over half (52.5%) of respondents noted that very cold or very hot weather reduces the performance of their generators. 	<ul style="list-style-type: none"> ▪ Alternative technology should be easy to use day-to-day and have simple and low-cost maintenance and repair requirements. ▪ Vendors need to have local access to mechanical and technical support as needed. ▪ Alternative technology should be portable and not too heavy.
Technical Feasibility		<ul style="list-style-type: none"> ▪ Alternative technology needs to be ready to deploy ideally at scale, given city infrastructure and electrical infrastructure in commissaries.

TECHNOLOGY EVALUATION

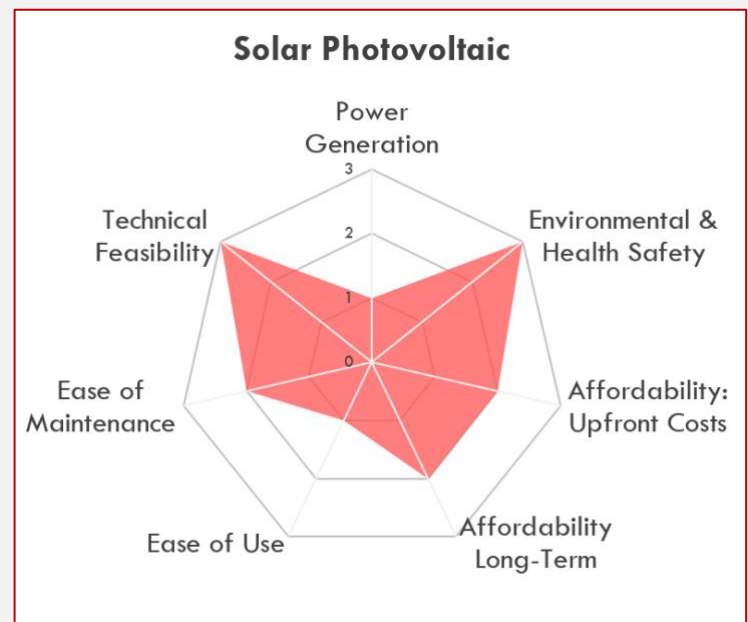
Renewable natural gas (RNG) falls short of delivering the cost savings and environmental benefits that the vending community needs.

Power Generation	Interchangeable with conventional natural gas
Environmental & Health Safety	Reduces but still releases local emissions and pollutants
Affordability Upfront	No additional upfront costs
Affordability Long Term	Expensive to refuel, although costs are decreasing
Ease of Use	RNG is compatible with existing natural gas generators
Ease of Maintenance	Can be hard to use in cold weather
Technical Feasibility	Limited sourcing; few local vehicle fleets currently use RNG



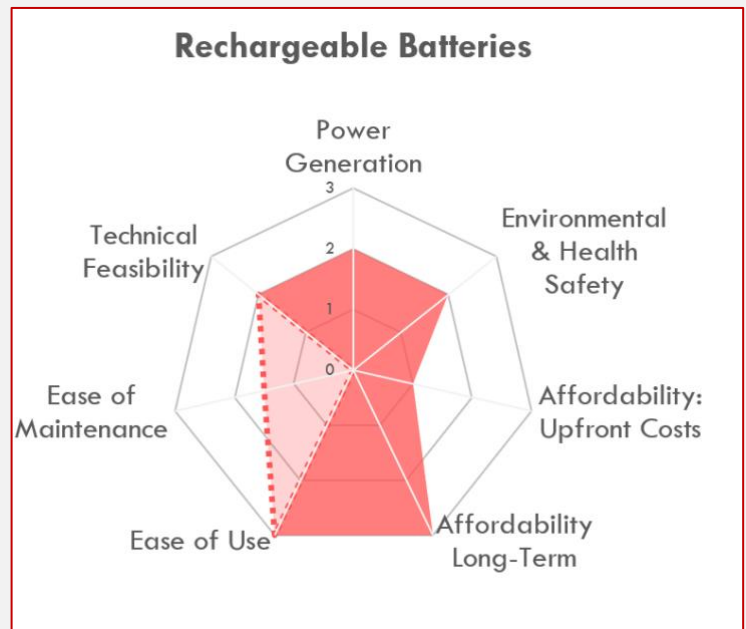
Solar Photovoltaic is proven technology with clear environmental benefits, but high upfront costs and variable weather conditions make it impractical for street food vending in New York City.

Power Generation	Difficult to power more than one piece of equipment at a time
Environmental & Health Safety	Completely renewable; no local emissions or pollutants
Affordability Upfront	High initial investment; however, costs continue to decline
Affordability Long Term	No fuel costs; maintenance may be expensive
Ease of Use	Unreliable in inclement weather or in areas shaded by tall buildings
Ease of Maintenance	Repairing solar panels might be challenging and require specialized technical expertise
Technical Feasibility	Solar is an established industry; adoption could benefit from existing incentives



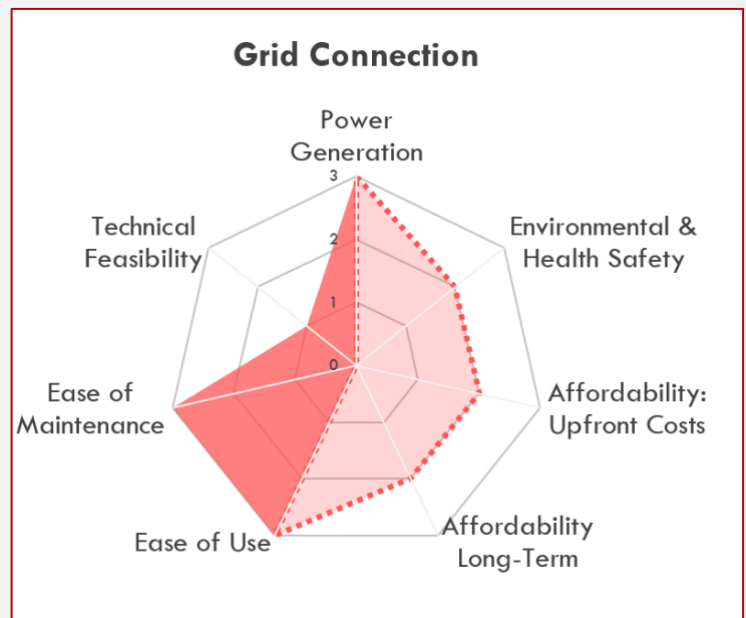
Rechargeable batteries remain costly upfront, but technology continues to improve, and they are emerging as a promising power source for carts because of their reliability and relative ease of use. Crucially, batteries must be independently certified to minimize the possibility of fires.¹⁴

Power Generation	Reliable source of energy; chargeable by mix of sources (solar, wind, gas, grid power)
Environmental & Health Safety	Battery development may be carbon-intensive; other impacts over time depend on electricity source
Affordability Upfront	Potentially greatest upfront costs
Affordability Long Term	Low fuel costs (assuming greater availability of electric chargers)
Ease of Use	Very easy to use short-term; more research needed on battery lifespans as technology improves
Ease of Maintenance	May require access to specialized technicians for maintenance
Technical Feasibility	Emerging precedents suggest growing feasibility



Grid connection would be a consistent and convenient power source, but implementation requires trailblazing levels political and technical support and infrastructure investment.

Power Generation	Very reliable
Environmental & Health Safety	Dependent on the rate at which grid shifts towards renewable energy
Affordability Upfront	Low upfront costs (for vendors), excluding updates to cooking assets.
Affordability Long Term	Metered energy costs are variable and require more research
Ease of Use	Theoretically easy to use
Ease of Maintenance	Little to no maintenance costs (aside from standard cart maintenance)
Technical Feasibility	May face policy, budgetary, and technical hurdles at City/State level; Public EV charging availability is only beginning to scale in New York City



¹⁴ [S.1008 - Setting Consumer Standards for Lithium-Ion Batteries Act](#) (2024)

TECHNICAL CONCLUSIONS

Based on vendor technology needs as well as the current state of research and development on the various alternative technologies we considered, a combination of rechargeable batteries and hybrid generators could be a viable solution for vendors in the near term.

- **Rechargeable Batteries.** Rechargeable lithium-ion batteries are currently cost-competitive with propane-powered generators *if* vendors factor in ongoing long-term, highly variable generator operating costs (including gas, maintenance, and replacement costs). The potential for vendors to replace generators relatively cheaply with reliable battery technology is a clear opportunity for EJVV to engage most of the NYC street vending market. Portable, suitcase-sized batteries (and even smaller batteries) already exist on the market. Plugging batteries into carts instead of a generator could be a temporary solution that brings immediate benefits to vendors and the public.
- **Hybrid Generators.** Neither renewable natural gas nor solar are sufficiently impactful on their own. However, these technologies are improving and becoming more affordable over time. Hybrid solutions—such as a battery connected to solar, supplemented with RNG or another biofuel product—could moderate the tradeoffs and combine the benefits of these individual sources.
- **Safety and Third-Party Certification.** A proliferation of lithium-ion battery-powered e-bikes and other technology has inadvertently led to fires due to improper battery care and a failure to adopt safe, independently certified battery technology. Organizations like UL Research Institutes: Standards & Engagement offer third-party verification of batteries in e-mobility devices. UL certification for e-mobility equipment and batteries is now required in New York City, and since the requirement came into effect, deaths and injuries from batteries have fallen.¹⁵ Any battery solution for street food vendors must achieve UL certification or the equivalent. Above and beyond third-party certification, battery users need to become informed on proper ways to charge batteries and store them, especially during periods of intense heat or cold, in order to prevent battery damage that can lead to greater fire risk.
- **Energy efficiency.** Any green cart design that adopts renewable power should also consider ways to reduce the energy load of cooking, ventilation, and lighting equipment, so that the renewable energy the vendor pays for can last longer during the day. Many of the devices that vendors use (especially in food carts) are designed to operate in restaurant settings and not in mobile settings.
- **Sustainable Production.** A holistic approach to green cart design and operations must consider the complete life cycle of the cart, from manufacture to disposal. Carbon and other greenhouse gas emissions produced along the full production cycle of a building or piece of equipment is sometimes referred to as “embodied carbon.”¹⁶ For example, batteries might reduce emissions during their use, but the production of batteries entails significant embodied carbon emissions.¹⁷
- **Food truck electrification.** Compared to food carts, food trucks face a more challenging path to electrification. Truck electrification requires substantial capital, given the significantly greater energy intensity of these diesel-powered vehicles. And refrigerated trucks, which serve cooled food or ice cream, represent the highest energy intensity of vehicles in the street food vending landscape. While replacing propane-powered generators in these vehicles would make some dent in their overall energy usage, full electrification would require substantially greater financial resources as well as more time to pilot and test different technological approaches.

¹⁵ [UL Standards and Engagement](#) (2024)

¹⁶ [Carbon Leadership Forum](#) (2020)

¹⁷ [Nature](#) (2021)

POLICY, INFRASTRUCTURAL, AND FUNDING OPPORTUNITIES

A series of infrastructural, policy, and financial solutions—in parallel with renewable and energy-efficient technical innovation—will help vendors access new green technology and continue to thrive economically.

POLICY CHANGES

Addressing Licensing and Permit Issues

Permitting issues are a major obstacle for vendors and this will continue to threaten the legitimacy of their businesses until this is resolved. Alongside the Environmental Justice for Vendors, by Vendors project, SVP continues to fight for increasing permit availability at the city level.

Partnerships with City Agencies & Other Institutions

Because vendors share the street with pedestrians and other users, they must advocate to protect their space in the public realm. Conversations with the NYC Department of Transportation (DOT) could explore opportunities to utilize parking spaces for vendors. And in consultation with business improvement districts (BIDs) or private property owners that operate privately owned public spaces (POPs), vendors would benefit greatly from incentives that allow them to access certain spaces with lots of foot traffic at a reduced rate.

Food Vendor Air Quality Requirements

The federal government, which might otherwise require OSHA training for vendors and guide them toward best practices such as wearing masks to protect themselves from charcoal smoke, does not consider vendors to be “workers” and therefore exempts them from OSHA requirements and resources. Vendors need education on the health benefits of adopting new cleaner, greener carts technology.

INFRASTRUCTURAL TRANSFORMATION

Although vendors demonstrated an overwhelming interest in connecting to the grid, large-scale grid connection would require political leadership and considerable investment. New York State and New York City are already under pressure to vastly accelerate the installation of electric vehicle charging equipment to keep up with State climate goals.^{18,19}

In the meantime, portable rechargeable batteries are a short-term, viable technology that vendors can start to use today. However, batteries still require daily charging. Access to charging would require the cooperation of commissaries—or equivalent locations (e.g., micro-distribution centers, which are now allowed in more places due to zoning changes resulting from “City of Yes for Economic Opportunity”)²⁰—to serve as locations where vendors can securely charge their equipment. Commissaries are already places where vendors store their carts overnight, so installing charging infrastructure inside commissaries could conveniently solve electrical charging challenges for vendors relying on hybrid carts. In the future, as long as public and private investment expands the amount of electricity supplied to commissaries, they could serve a dual purpose as both charging and waste management hubs for vendors.

¹⁸ [Democrat and Chronicle](#) (2025)

¹⁹ [NY1](#) (2024)

²⁰ [New York City Department of City Planning](#) (2024)



Source: Revolution Carts

Case Study: Revolution Carts

The impetus for what would become Revolution Carts occurred in the spring of 2018, when the State of California passed the Safe Sidewalk Vending Act, effectively decriminalizing street vending. While the measure represented a legal breakthrough for street vendors, industry veterans like Richard Gomez recognized that prospective food carts and trucks still faced a massive problem, in the form of Los Angeles County's archaic and complex permitting process. Existing statutes for mobile food vendors treated them the same as brick-and-mortar restaurants. As a result, food carts built to LA County standards would have required ventilation, sinks with multiple compartments, and even plumbing. Richard Gomez, a food cart engineer with 17 years of experience, decided to form a five-person team of engineers, called Revolution Carts, with the aim of building a food cart that could successfully navigate the permitting process and unlock the potential of a newly favorable legal landscape for street vendors.

Initially, Revolution Carts aspired to build a more traditional cooking cart that could produce iconic LA street food staples (bacon-wrapped hot dogs, for instance). However, it became clear that most of the equipment needed to cook food was going to be prohibitive due to its size and cost. Crucially, Gomez and his team learned that tamales fell under the category of "prepackaged foods" in the State's food code, which reduced the amount of equipment needed for a prospective cart. Interviews with dozens of street vendors, many of whom sold tamales, were able to affirm the need, and confirm the specifications, for what would become known as "the Tamalero". Gomez and his team learned that most tamale vendors only needed enough fuel to operate for six hours, and that many vendors at the time pushed small carts with limited storage and heating capacity. With the addition of shelves, and minimal heating equipment, the Tamalero could improve the profitability and capacity of tamale vendors. The end product measured four feet in length, 2.5 feet in height, and had the capacity to heat 336 tamales at any given time.

Even with the design parameters in hand, and a prospective market of several thousand tamale vendors, Revolution Carts encountered numerous challenges obtaining City approval for the Tamalero prototype. Navigating city ordinances, Health Department officials, and City Council proved time-consuming. Initially, the Health Department insisted that the Tamalero include a built-in microwave, and it took months before Gomez's team received an exemption from this requirement. After 15 different design proposals, the Tamalero finally became Los Angeles County's first permitted hot food cart in early 2021. Gomez and his team looked for corporate sponsorship to obtain the capital to build an initial pilot of the carts and found Rockstar Energy a willing partner. Rockstar found the carts to be enticing branding vehicles and partnered with five different local artists to customize the first five Tamaleros. From Rockstar's vantage point, the pilot appears to have been a valuable opportunity to build goodwill in the Los Angeles area. The initial five-model pilot proved to be successful, and Revolution Carts was subsequently able to secure 28 orders for a follow-up run of production.²¹

²¹ [The Counter](#) (2021); [La Taco](#) (2022); interview with Richard Gomez, 6/8/2022.

Case Study: Simply Grid

Simply Grid was an initiative launched in NYC in 2014 to help transition vendors away from gasoline-powered generators. Simply Grid was a system of **curbside pedestals connected to the electrical grid** that vendors could plug into. Vendors would be charged based on the amount of power used while they are plugged in. Although Simply Grid is not operating today, it demonstrated an exciting idea to connect vendors to reliable electricity. Future efforts to connect vendors to the grid at scale will require significant political and financial support and should learn from Simply Grid's efforts.

INTEGRATED WASTE MANAGEMENT

Vendors could benefit from partnerships with City agencies to streamline waste management practices on their carts and in their vending space. Waste management solutions should be integrated with models for connecting vendors to recharging facilities for alternative energy sources. Possible options include the use of reusable containers or the provision of food waste and recycling containers for vendors to use.

Case Study: GO Box

GO Box is an initiative in Portland, OR that offers **reusable containers to vendors and customers**. In addition to packaging, GO Box also helps vendors with logistics, educational materials, and cleaning services. Customers can drop off their used containers at designated drop sites. As needed, GoBox will deliver additional stock of clean reusable containers to participating vendors. GO Box reusable containers are available at over 100 establishments, including restaurants, food carts, cafes, and grocery stores.

FUNDING AND FINANCING OPPORTUNITIES

Funding new technology will be challenge for most vendors. Vendors typically have little access to credit and would need financial support to update their carts or other equipment. A combination of microloans, small grants, and contracting agreements are more likely to motivate green tech adoption among vendors.

Potential funding and financing solutions:

- **Low-interest microloans or forgivable microloans** could work for vendors, but lenders need a plan to minimize their risk while still making products accessible to vendors despite vendors' lack of experience with lending.
- **Miniature grants, equipment discounts, or license discounts** could offset the cost of small-scale interventions for businesses, such as batteries, energy-efficient lighting, efficient AC, etc.
- **Public or private contracting agreements**—including City procurement, philanthropy, or industry purchase agreements—reduce risk for inventors and can efficiently scale tech across a fleet or network, but these would require buy-in from major public or private institutions.

Less feasible solutions:

- **Utility discounts and rebates** are of limited use unless vendors connect to the grid.
- **Venture capital** could attract existing or new cart manufacturers, but there are no clear precedents for VC in this sector, and the need for high financial returns may be challenging.

Aside from the above models, the 2022 EJVV multidisciplinary design lab discussed the importance of “non-extractive” financing models that are controlled by community members. In a non-extractive loan, a lender charges low interest rates, such that the lender is not making more profit than they are helping the borrower to generate. A non-extractive loan would also allow flexible repayment schedules; for instance, a loan might not require repayment of principal until a project meets predefined success thresholds agreed upon by the lender and borrower. Building flexible, community-led loan funds that provide subsidized capital and negotiating generous, flexible loan terms could provide access to much-needed capital for vendors.

ENVIRONMENTAL JUSTICE BATTERY PILOT

In early 2023, building on everything learned from surveyed vendors, expert consultation, market outreach, and research, SVP launched a pilot program to test alternative battery solutions against gasoline-powered generators used in the certain street food vending carts.

To minimize vendor risks, SVP estimated each vendor’s electricity needs by cataloging their equipment, gave each vendor a stipend, and provided technical assistance for troubleshooting during the pilot. Five vendors participated in the pilot program. Vendor participants were interviewed before and after the testing period.



EJVV Pilot participant, Mahmoud, with his battery²²

SVP ultimately partnered with five battery companies to pilot their solutions with vendors in New York City:



AltE (Gigawatt)	BioLite	EcoFlow	Fernhay Solutions	Joule Case
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The pilot was covered by [The City](#), and received substantial attention from several stakeholders and elected officials, such as Representative Alexandria Ocasio-Cortez, Councilmembers Gale Brewer, Alexa Aviles, and Lincoln Restler, Queens Borough President Donovan Richards, the Mayor’s Office of Climate and Environmental Justice, and other stakeholders.

²² [The City](#) (2023)

PILOT FINDINGS

Positive Experiences

Overall, vendors had a positive experience participating in the pilot program.

- **Clean and quiet operation.** Vendors appreciated rechargeable batteries for their noise-free and emissions-free operation, which contributed to a more pleasant work environment.
- **Operating cost savings.** Vendors also noted significant savings in operational costs, such as reduced gasoline expenses and lower maintenance requirements for generators.
- **Power in hybrid power solutions.** Hybrid solutions, which combined batteries with smart generators, were beneficial for vendors with limited energy needs, demonstrating the potential for more flexible and sustainable solutions in the future.

Challenges

Despite the benefits, individual vendors encountered several issues with the carts and batteries:

- **Limited battery capacity.** The limited capacity of the batteries often fell short of the day-long energy demands of food vending operations. Battery charging times also posed problems, as vendors working long shifts had limited hours to park at commissaries for recharging.
- **Upfront costs.** Batteries were loaned to vendors free of cost, and vendors only had to pay for electricity to charge the battery. However, if vendors had had to buy the pilot batteries themselves, the high upfront costs of the batteries—typically five times that of a generator—would have posed a challenging or even prohibitive financial hurdle for many vendors.
- **Battery weight.** Furthermore, the batteries were heavy, adding significant weight to carts and trucks, which made transportation more difficult.
- **Battery placement.** Some vending carts required adjustments to design in order to physically accommodate the rechargeable batteries.

And while the pilot was feasible on a small scale, vendors and SVP recognize that large-scale adoption of batteries will require infrastructural upgrades and local market-building:

- **Commissary infrastructure constraints.** The electrical charging constraints of commissaries presents a structural issue to large-scale vending electrification. Many commissaries are equipped with outdated or insufficient electrical hookups, making it difficult to support large-scale battery charging by more than a few vendors at a time. This constraint did not affect pilot participants, but it will become an issue once battery adoption and equipment electrification increase.
- **Lack of technical support.** SVP served as on-demand technical support to pilot participants, but playing this role will not be possible as adoption increases. The absence of alternative, local technical support provided by battery manufacturers would have left vendors without accessible, on-the-ground assistance for troubleshooting and maintenance. And hybrid solutions, while promising, required substantial technical support to navigate the unfamiliar technology and associated software applications, which some vendors found intimidating.

CONCLUSION AND NEXT STEPS

Environmental Justice for Vendors, by Vendors has begun to define the obstacles and opportunities for vendors to adopt green vending technology that decreases pollution, improves vendor resilience to climate impacts, and integrates into waste management systems. Continued leadership, advocacy, trust-building, and experimentation—which will require additional generous philanthropic support—will allow EJVV to expand its impact and transform the operations of street food vendors for the better.

POTENTIAL IMPACTS

Electrifying vendors will change lives by improving vendor personal and business health. And at the scale of the entire vending economy in New York City, mass adoption of equipment such as batteries could result in transformative improvements to public health and environmental health as well as notable positive economic impacts.

Food carts tend to rely on 2,000W-3,000W generators, whereas food trucks rely on larger generators (7,000W or greater). Replacing a 2,000W generator that runs during a long 12–18-hour vendor shift year-round could remove **13,400 lbsCO_{2e}** from the atmosphere each year; replacing a 3,000W generator could remove **18,000-23,000 lbsCO_{2e}** per year. If even half of the currently 6,000+ permitted street food vending carts each replaced 2,000-3,000W generators with batteries, this could result in the annual removal of **23,000 to 26,000 metric tons of CO_{2e}** per year.

This is the same as:

- **6,200** gas-powered passenger vehicles driven for one year, or
- **3,600** homes' energy use for one year.²³

Additionally, the cost savings for vendors would be considerable, given that generators are as expensive to maintain and replace. The replacement of a gas generator with a battery could save a vendor between **\$15,200 and \$22,800** in maintenance and placement costs over five years.²⁴ Scaled across half of permitted vendors, this could entail up to **\$65 million in avoided business spending over five years**, which vendors could reinvest in other business expenditures, unrelated spending, and savings.

SCALE GENERATOR REPLACEMENT AND BUILD A LOCAL MARKET

The near-term goal of EJVV is to scale the replacement of gas-powered generators by piloting batteries, and other green technology, with a broader range of vendors. Continued experimentation will inform the innovation needed to resolve the remaining challenges with using rechargeable batteries, drive down battery costs, and build further credibility in batteries as a solution. In parallel with expanded testing, building a more mature market for batteries in New York City will be crucial to scaling their adoption. Market-building will mean providing trustworthy and clear resources to vendors interested in switching to green technology; working with the public and private sectors to expand funding, affordable financing, and targeted incentives for green technology adoption; and developing an investment plan for charging infrastructure that is accessible to vendors on the street and in commissaries.

²³ [EPA Greenhouse Gas Equivalencies Calculator](#) (2024)

²⁴ Joule Case interview (2023).

- **Test the impacts and feasibility of more batteries in a greater variety of street food carts.** EJVV intends to continue to scale battery pilots for street food vendors to test battery feasibility, cost savings, emissions reductions, noise reductions, and vendor satisfaction in a wider range of food vending carts. For larger, more energy-intensive carts where off-the-shelf batteries are not yet a feasible option, EJVV would like to bring together street food vendors, cart manufacturers, and engineers to collaborate on the design, prototyping, and testing of a workable model.
- **Design funding, financing, and incentives that create affordable green technology adoption pathways.** EJVV intends to work with the City and State to design accessible incentives and subsidies—such as permitting discounts, accelerated permitting processes, subsidies for business equipment insurance, etc.—to support vendors who adopt safe alternatives to gas-powered generators. EJVV will work with philanthropic institutions and mission-driven lenders to craft and deploy non-extractive microfinance that helps vendors affordably navigate the upfront cost of low-carbon and carbon-free equipment. These lending products should provide flexible underwriting standards or targeted technical assistance that acknowledges street food vendors’ historical lack of access to credit and other barriers.
- **Prepare information that equips street food vendors to be savvy and responsible consumers of green energy technology.** EJVV seeks to launch and maintain up-to-date, multilingual educational materials that share the rationale for adopting energy-efficient and low-carbon equipment, emphasize the importance of using safe UL-certified batteries, circulate credible technology options on the market, introduce best practices for using and maintaining batteries and other related equipment, explain existing subsidies and affordable lending options, and equip vendors to advocate for even greater support in vending electrification market-building.
- **Assemble an investment plan for electrification infrastructure that includes vendor needs.** The City and State are already making investments to accelerate deployment of electric vehicle charging infrastructure by leveraging public land and working with private landowners, but to date, these plans have not contemplated potential demand from the street food vending industry. To contribute to planning and ensure public and private-sector infrastructure investment accounts for the needs of street food vendors, EJVV seeks to estimate the size and geographic distribution of potential demand for additional street electrical plugs and charging infrastructure in commissaries or equivalent locations in New York City. An analysis would culminate in the identification of priority locations that are high-need (i.e., due to a high concentration of vendors currently without access to charging) or present unique opportunities (e.g., underutilized land, City rights-of-way, public spaces, planned City or private-sector infrastructure or decarbonization projects) to install charging infrastructure near where vendors work or store their carts.
- **Provide legal and business planning support to green street food vending innovators.** As vendors and vending cart manufacturers innovate new cart designs, energy-efficient equipment, and renewable power technology, they will have the opportunity to profit from these inventions and build their wealth. EJVV believes technical assistance should be in place to help vendors with legal support with patenting, in addition to business planning support. In addition to traditional business models, EJVV sees an opportunity to cultivate—when appropriate—cooperative business models, in which collaborating vendors and manufacturers jointly own intellectual property and benefit from the proceeds it generates.

LONG-TERM INNOVATION AND INFRASTRUCTURE INVESTMENT

In addition to the testing, policy updates, and market-building activities described above, which will likely take more than a year, truly scaling green technology to anywhere close to the full population of street food vendors in New York City will require capital-intensive investments in more advanced technology and city-scale infrastructure updates.

- **Electrify energy-intensive food trucks.** Compared to food carts, food trucks will require greater technological innovation and substantial levels of capital because their kitchens have higher energy needs. As a longer-term step, EJVV aims to determine the technical feasibility and financing pathway to electrify the cooking, lighting, and ventilation operations of a food truck or refrigerated food truck. A successful truck electrification pilot would be a vital proof of concept and could spur further investment by the private sector.
- **Invest in decarbonization infrastructure to scale electrically powered street food vending.** Following an investment plan that considers demand for electrification by street food vendors over time, EJVV looks to the City and State to at least partly fund the deployment electric vehicle charging and safe battery storage infrastructure on streets and in commissary garages.