

# SoCalREN

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## Food Desert Energy Efficiency Equity Program Market Study

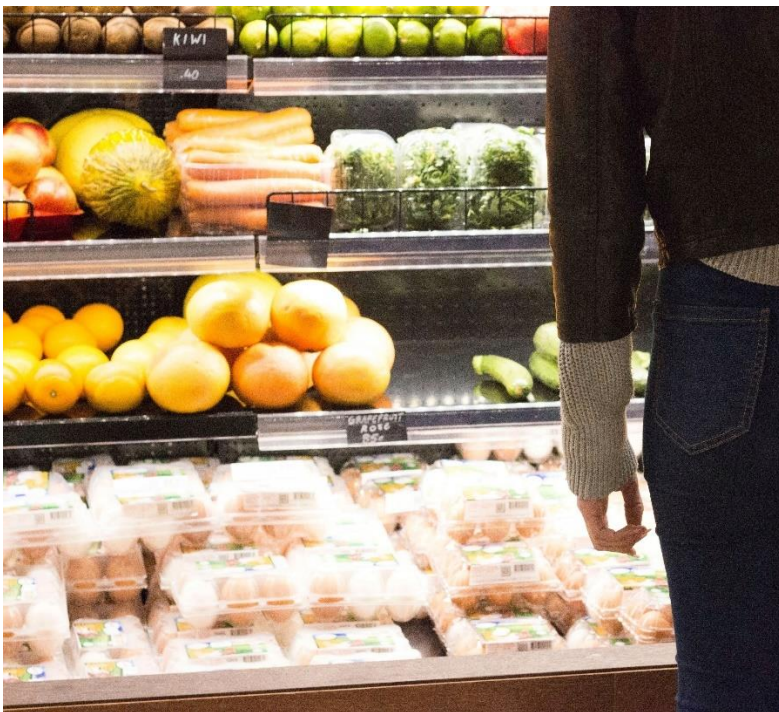


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# Table of Contents

<b>Executive Summary</b> .....	<b>1</b>
<b>Program Overview</b> .....	<b>4</b>
<b>Study Overview</b> .....	<b>5</b>
Objectives and Research Questions .....	5
Research Approach.....	5
Study Limitations .....	8
<b>Findings and Recommendations</b> .....	<b>9</b>
Terminology.....	9
Recommendations Related to Terminology.....	10
Program Targeting through Mapping.....	10
Recommendations Related to Targeting.....	12
Languages Spoken .....	13
Recommendations Related to Languages .....	14
Energy Burden .....	14
Recommendations Related to Energy Burden .....	14
Refrigeration Equipment, Habits, and Considerations.....	14
Recommendations Related to Refrigeration Equipment, Habits, and Considerations.....	16
Barriers .....	16
Recommendations to Overcome Barriers.....	17
Potential Partners: Food Banks and Food Access Organizations .....	18
Recommendations Related to Potential Partners.....	19
<b>Appendix A: Discovery Research Sources</b> .....	<b>20</b>
<b>Appendix B: Discovery Research, Food Desert Terms</b> .....	<b>23</b>
<b>Appendix C: Spatial Data Analysis</b> .....	<b>27</b>
<b>Appendix D: Mapping</b> .....	<b>29</b>
<b>Appendix E: Corner Store Interview Respondents</b> .....	<b>30</b>
<b>Appendix F: Food Bank Outreach</b> .....	<b>31</b>
<b>Appendix G: Peer Organizations</b> .....	<b>32</b>

# Executive Summary

In partnership with the County of Los Angeles, this study provides SoCalREN with market information to support the implementation of the SoCalREN Food Desert Energy Efficiency Equity Program (which we refer to as the “FDEEE” throughout this report). Through secondary data (e.g., [USDA ERS Food Access Research Atlas](#)), a literature review, a GIS mapping, and a small number of in-depth interviews with corner store owners (n=11), we provide information about food insecurity and potential program participants, as well as considerations to inform FDEEE program design and implementation. The evaluation team focused specifically on Los Angeles County, as the SoCalREN team will likely start FDEEE outreach efforts there. We outline our key findings in the table below.

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High energy burden, low food access, and low income mapping can be used to identify communities of interest for marketing and program implementation.

*Where do food deserts exist within the area served by SoCalREN?*

Our team mapped various demographic data to understand the relationship of various community characteristics. We found that 27% of the census tracts in SoCalREN’s region are low / income low access (LILA), our proxy for food deserts, and roughly 8% of all census tracts are both LILA and are in an area where households experience a high energy burden. As such, stores in those census tracts are also likely to experience high energy burden.

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There is a need for program communication in Spanish, both verbally and in written marketing materials.

*What are the most common languages spoken among customer groups?*

Through both the data analysis and our on-site interviews, Spanish-speakers appear to be even more prevalent than English speakers. In LILA areas, 51% of all individuals are Spanish-speakers and we found that about half of our corner store interview respondents also were Spanish-speaking.

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Corner store owners are concerned about high electric bills driven by refrigeration equipment, demonstrating a need for a program like the FDEEE in Los Angeles County.

*What is the typical energy cost versus operation costs of these prospective businesses/food banks?*

Prior studies cite that refrigeration makes up 40% of the total energy use in supermarkets, grocery stores, and convenience stores. Los Angeles store owners also expressed concern about high electric bills driven by refrigeration equipment, stating that it is one of the top expenses or makes up the majority of their energy use. This indicates that energy costs are a burden to store owners’ overall operational costs.

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Refrigeration equipment used in corner stores varies, though cost is uniformly a priority for store owners when it comes to purchasing practices and/or maintenance.

*What type and quantities of refrigeration products are used by markets and food markets?*

Through corner store visits, we observed refrigerators across a mix of brands, types, and conditions. Even within the same store, we rarely saw uniformity across the units. We most often observed cases with doors – there was only one open case, which was used for produce – some of which had sliding doors and others with a pull handle.

*What percentage of space (refrigerated/non-refrigerated) is allocated to “healthy food” in markets?*

In the stores we visited, only a small percentage of space was allocated to healthy foods. We observed that stores sell both refrigerated produce and other healthy foods, including frozen and premade meals. Stores varied in the amount of fresh produce sold, and most stores had one or two refrigerated cases for produce. Additionally, some store owners kept all

produce refrigerated while others had open areas for more shelf-stable produce. One store had an open-air refrigerated case for produce.

*How often do prospective businesses repair or replace the refrigeration products?*

Based on our interviews, nearly all corner stores have experience repairing refrigeration equipment to prolong its life, and many state that they have not replaced their older refrigeration due to cost concerns.

*Where would these businesses go for refrigeration equipment and what would they do with older equipment?*

The corner stores that had replaced equipment cited they purchased them from a variety of locations, including online, Costco, Jetro, and Anthony Doors. Store owners also remove their old refrigeration in a variety of ways: two gave away their old equipment while three had scrap metal/recycling services pick up their equipment.

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While ‘food deserts’ is a common term to describe food insecurity, other terminology may be more meaningful and relevant to targeted communities.

*How are food deserts defined nationally, within California, and within the communities SoCalREN serves?*

We found that while the term “food desert” is still commonly used and recognizable, community members and activists often prefer to describe food insecurity in other ways. Critics of the term argue that it does not properly capture how systemic issues, such as racism and poverty, contribute to inadequate food access within a community. “Healthy” is also ambiguous and may have different and may have different meanings to different communities

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Store owners are interested in selling more healthy food options, but face challenges.

*What are the barriers to selling fresh food in food deserts?*

The top barriers are around customer interest and demand – but some store owners were also worried about spoilage if they stocked more healthy foods. A few store owners also noted they don’t have space for additional refrigeration.

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SoCalREN can learn from and partner with other organizations aiming to distribute healthy food throughout Southern California.

*How many food banks are there within the area served by SoCalREN?*

There are multiple food banks in Southern California. We found 11 within SoCalREN’s area – two of which provided insights about the need for both healthy food options and energy-efficient refrigeration through our survey.

*How have other initiatives sought to address food access issues through refrigeration support in food deserts?*

Our research found only one program (in Pennsylvania) that directly sought to address both refrigeration and food access, though there are many other programs that try to address healthy food and provide loans or grants, which could be used for equipment if a participating store desired.

When we asked whether corner stores or food banks were aware of any existing programs that focus on refrigeration, none were mentioned. We note that in 2021, there were three CPUC-funded investor-owned utility (IOU) programs that provided support for energy-efficient reach-in refrigeration to commercial customers, though two are in PG&E territory: Statewide Point-of-Sale Food Service, PG&E’s Commercial Deemed, and PG&E’s Local Government K-12.

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Based on our findings, we document several considerations for SoCalREN to consider as the FDEEE launches.

## Terminology

- Use language like “partner with SoCalREN to stock your store with healthy food” or “source healthy food for your community” instead of specific terms like “food desert” in FDEEE marketing.
- Better define what constitutes “healthy” by gathering input from the community.

### **Program Targeting through Mapping**

- Leveraging the maps created through this study, prioritize initial FDEEE program outreach on the 8% of census tracts in SoCalREN’s territory that are low income/low access with high electric energy burden.

### **Languages Spoken**

- Ensure that all FDEEE materials are available in English and Spanish and use straightforward, accessible language. In addition, ensure FDEEE program outreach staff can speak both English and Spanish.

### **Energy Burden**

- Market the FDEEE as a way to save on energy bills by creating flyers and resources that explain the cost-saving benefits associated with energy-efficient refrigeration.

### **Refrigeration Equipment, Habits, and Considerations**

- Working from the resources offered through the HSRP pilot, refine outreach materials to clearly outline refrigeration options. Include key elements store owners should consider (i.e., unit footprint, load capability, intended food/drink products) as they decide which unit is best for them.
- Since there is no single, clear method for store owners to purchase, maintain, and dispose of fridges, SoCalREN should market the FDEEE as an easy, streamlined alternative to a complex process for store owners.

### **Addressing Barriers**

- Highlight other program benefits that address the barriers we identified in this study (e.g., cost savings, higher profits, happier customers, lower spoilage of produce if refrigerated) – in addition to benefits around “healthy food” or “food access” in FDEEE messaging.
- Gain meaningful community feedback from residential households in the community to understand their preferences and needs related to healthy, perishable food.

### **Potential Partners: Food Banks and Food Access Organizations**

- Partner with local food banks and distribution organizations, specifically to leverage what they have learned about promoting healthy food to the community.
- Consider partnering with corporations that already provide small businesses with refrigeration, especially as these companies become more concerned with social impact and community involvement.

# Program Overview

SoCalREN is launching the Food Desert Energy Efficiency Equity Program (which we refer to as the “FDEEE” in this report) in 2024 “to provide meaningful opportunities and access to the benefits of energy efficiency to equity targeted, small and medium commercial business owners.”<sup>1</sup> The program design intends to advance the directives in the Commission’s Environmental and Social Justice (ESJ) Action Plan. We show the FDEEE program objectives in Table 1.

**Table 1. FDEEE Program Objectives**

FDEEE Program Objective
Objective #1: Addressing the current challenges that exist within food deserts
Objective #2: Installing energy efficiency measures that would reduce peak demand savings including the removal of old, inefficient refrigerators that are costly to operate and maintain and require higher demands from the electricity grid than necessary.
Objective #3: Reducing GHG emissions, eliminating hydrofluorocarbons (HFCs) while simultaneously promoting options for healthy food options within low-income neighborhoods, DACs, and food deserts.
Objective #4: Providing education, outreach, and support to hard-to-reach small commercial businesses and food distribution centers regarding energy-efficient upgrades and the benefits of offering healthy food options.
Objective #5: Assisting small commercial businesses to overcome common barriers within their energy efficiency segment by offering no-cost energy efficiency upgrades and supporting connections to other energy programs.
Objective #6: Assessing intervention strategies and promoting strategies to align financial, energy, and community benefits for small commercial owners.

Source: Food Desert Energy Efficiency Equity Program: 2024 Program Implementation Plan

**Target participants:** The FDEEE aims to improve access to energy efficiency and healthy foods in targeted areas.<sup>2</sup> The program funds the installation of energy-efficient glass/solid door refrigeration units in eligible corner stores, neighborhood stores, bodegas, convenience stores, or mom and pop stores – all of which we broadly refer to as “corner stores” throughout this report.

**Precursor pilot program:** The FDEEE will leverage the learnings from the Healthy Stores Refrigeration Pilot (HSRP) run by Los Angeles County in 2021. The HSRP was administered by the County of Los Angeles, funded by the California Department of Food and Agriculture (CDFA), and implemented by the Energy Coalition, a local nonprofit. It targeted corner stores and small businesses in food deserts and provided participants with energy-efficient refrigerators. The HSRP also provided participants with support and educational resources to source, market, and sell healthy food options.

**Key program activities:** In the short term, the FDEEE seeks to provide corner stores with energy efficiency refrigeration retrofits that replace old equipment. Working with a network of local partners, the FDEEE will encourage store owners to use their new energy-efficient refrigeration units to distribute healthy food options. After installation, the FDEEE will also work alongside store owners to provide educational opportunities for their communities using signs, pop-up events, and other activities to help teach community members about energy efficiency.

<sup>1</sup> Food Desert Energy Efficiency Equity Program: 2024 Program Implementation Plan

<sup>2</sup> “Targeted areas” are defined in the Implementation Plan as “hard-to-reach, disadvantaged, and/or underserved individuals, households, businesses, and communities.”

The FDEEE hopes to use these short-term efforts to establish trust with communities that need support with energy efficiency and resilience. The FDEEE is a long-term effort that hopes to encourage long-term benefits from energy savings and healthy food access within local communities in many ways. For example, after establishing relationships with store owners, the FDEEE aims to encourage further energy efficiency upgrades through other utility partner energy efficiency small business programs, such as the Southern California Gas Company Small Business Direct Install programs.

## Study Overview

To support the implementation of the proposed PY24 FDEEE, this study seeks to provide SoCalREN with market information about refrigeration in corner stores located in food deserts. Food deserts are defined as geographic areas where low-income households lack access to fresh foods and to supermarkets.

### Objectives and Research Questions

This study sought to help SoCalREN develop an understanding of food insecurity and the barriers and opportunities in using energy-efficient refrigeration technology to address it. We organize the research questions by overall study objectives below.

Objective #1: Develop an understanding of terminology around a potential future program.

- How are food deserts defined nationally, within California, and within the communities SoCalREN serves?

Objective #2: Identify areas for SoCalREN to prioritize for program outreach for an energy efficiency intervention targeting small corner stores. (Targeting through mapping and understanding languages spoken).

- Where do food deserts exist within the area served by SoCalREN?
- What are the most common languages spoken among customer groups?

Objective #3: Understand the potential participant segment including energy burden, considerations around refrigeration products, and barriers to selling fresh food.

- What is the typical energy cost versus operation costs of these prospective businesses/food banks?
- How often do prospective businesses repair or replace the refrigeration products?
- What type and quantities of refrigeration products are used by markets and food markets?
- What percentage of space (refrigerated/non-refrigerated) is allocated to “healthy food” in markets?
- Where would these businesses go for refrigeration equipment (primary or secondary market, specific suppliers, or distributors) and what would they do with older equipment?
- What are the barriers to selling fresh food in food deserts?

Objective #4: Understand related programs and potential partners.

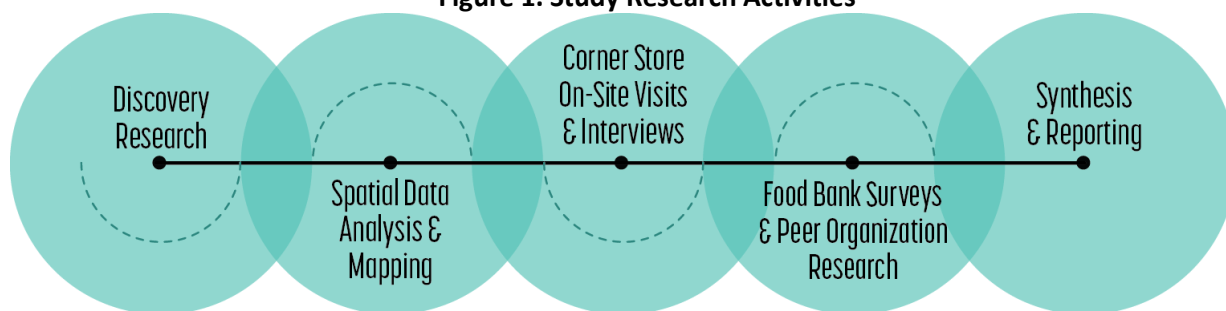
- How many food banks are there within the area served by SoCalREN?
- How have other initiatives sought to address food access issues through refrigeration support in food deserts?

### Research Approach

To answer the four research objectives, the study team completed several discrete research activities, shown in Figure 1 and described below.



**Figure 1. Study Research Activities**

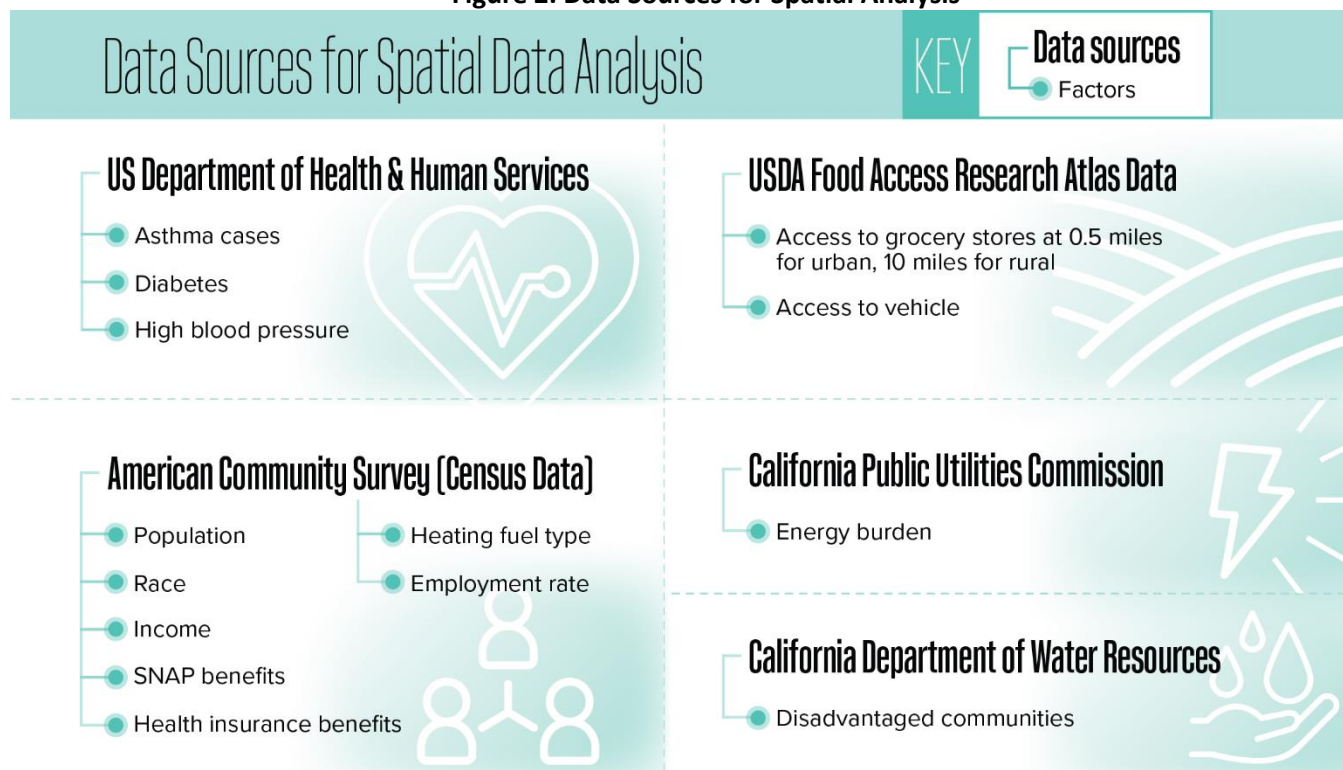


**Discovery Research.** First, we conducted a demographic analysis to understand key elements of the service territory (e.g., language, race and ethnicity, income). We also reviewed existing literature to understand the landscape of food insecurity and how it intersects with energy. Specifically, we used our discovery phase to 1) understand how food deserts are defined, and 2) explore how other entities have sought to address food access issues through energy efficiency interventions. Our full list of discovery sources is documented in Appendix A: Discovery Research Sources, and our summary of key terminology is available in Appendix B: Discovery Research, Food Desert Terms.

**Spatial Data Analysis and Mapping.** Next, to better understand the intersection between food insecurity and energy burden, we conducted a spatial data analysis. We used this effort to understand how many food deserts exist in the SoCalREN territory—and where—to identify where SoCalREN should target its efforts to address food access issues.

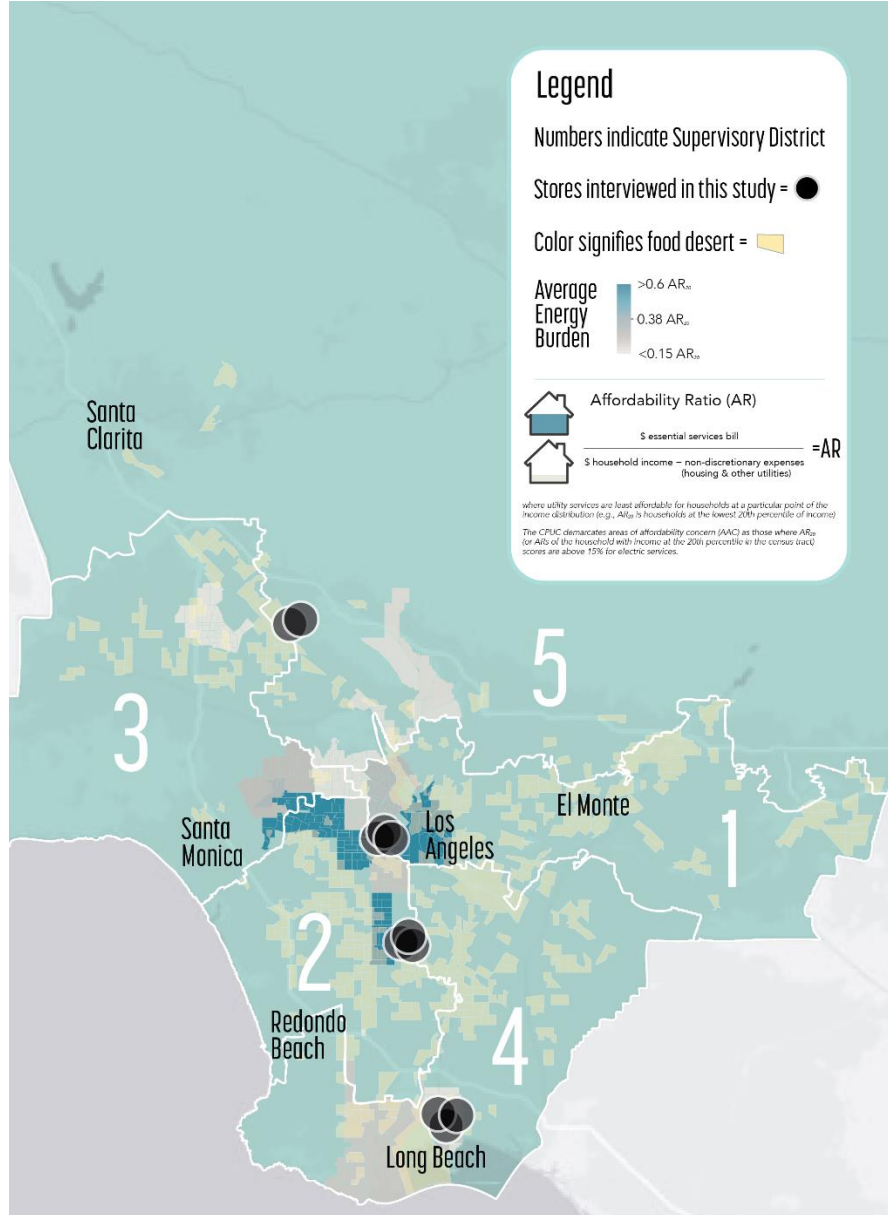
Using data from the Census, USDA, California Public Utilities Commission (CPUC), and a variety of other government and research sources (see Figure 2 and Appendix C: Spatial Data Analysis for a full list of data sources), we created interactive maps that visually display the relationship between food insecurity and various demographic factors, including average energy burden, across the SoCalREN service territory.

**Figure 2. Data Sources for Spatial Analysis**



As illustrated in Figure 3, our team used the spatial data analysis to identify communities of interest that might experience higher barriers to healthy food access and could be priority areas for FDEEE program outreach. To do this, we selected census tracts of interest based on classification as a) high average energy burden, and b) low-income/low food access classification according to the USDA Food Atlas tool.<sup>3,4</sup> We provide instructions in Appendix D: Mapping on how to leverage the maps we created.

**Figure 3. Areas of Interest and Corner Stores Visited**



<sup>3</sup> We used CPUC data to identify the average electric energy burdens in the census tracts we mapped. We then looked within each of the first four supervisory districts for census tracts that were categorized as low-income and low access at 0.5 miles for urban areas and 10 miles for rural areas. Among these tracts, we identified areas that had average energy burdens higher than the California affordability demarcation of 15%. Since we wanted to represent the 4 closest supervisory districts, these numbers are different depending on area.

<sup>4</sup> "Food Access Research Atlas," Economic Research Service (ERS), U.S. Department of Agriculture (USDA, <https://www.ers.usda.gov/data-products/food-access-research-atlas/>). Low access census tracts are those demarcated in the Food Access Research Atlas as being ½ mile or 1-mile from the nearest supermarket in urban areas and 10-mile or 20-miles for tracts in rural areas. For this study, we used ½ mile demarcations for urban areas and 10-mile demarcations for rural areas. Low-income census tracts in the Atlas are those with a poverty rate of 20% or higher, median family income less than or equal to 80% of the state-wide median family income, or a metropolitan tract with a median family income less than or equal to 80% of the metropolitan area's median family income.

**Corner Store On-Site Visits and Interviews.** After mapping and identifying tracts of interest, we selected neighborhoods and corner stores to visit for our on-site interviews and store visits (n=11). We also considered supervisorial districts while selecting stores to interview to ensure representation across Los Angeles County. Due to distance and time constraints, we interviewed store owners across Supervisorial Districts 1 – 4.<sup>5</sup> We used these discussions to understand how corner stores purchase, repair, or replace refrigeration products and to assess overall attitudes towards refrigeration and food access. In addition, these interviews provided an understanding of energy and operation costs, barriers to selling food and energy efficiency, and other local programs available to help with energy costs or food access. We summarize the on-site visits in Appendix E: Corner Store Interview Respondents.

**Food Bank Survey and Peer Organization Research.** The research team also conducted an online survey with food banks and other food distribution organizations in the SoCalREN service territory (n=2). The purpose of this survey was to gain a better understanding of how California food distributors conceptualize refrigeration, food access, and food distribution. There were only two responses to our online survey, but Appendix F: Food Bank Outreach provides the full list of food banks contacted. The research team focused on outreach in areas that experience difficulties with food access, as identified in our spatial data analysis. In addition, our team researched peer organizations working in the food access space. A full list of the organizations we reviewed can be found in Appendix G: Peer Organizations.

Findings from our various research activities have been compiled in this report, which provides background on the food access landscape and corner store owner experiences and attitudes. We also include recommendations for SoCalREN to consider as it implements the FDEEE.

## Study Limitations

**When selecting corner stores to visit, we defined ‘food deserts’ in a way that might not be how others—or a future program—would define the term.** The research team used the United States Department of Agriculture (USDA)’s criteria for food deserts to identify potential target areas for the FDEEE to pursue program outreach in Los Angeles County. For our recruiting and interviewing efforts, we identified and visited census tracts that were categorized as low-income and low food access by the USDA Food Access Research Atlas.<sup>6</sup> This definition based on access and income alone is limited. As we describe in the body of this report, there are many other systemic factors (e.g., systemic racism and racial discrimination, poverty, and access to transportation) that contribute to food insecurity within an area. It is important to note that since we identified food insecure areas based on income and access alone, our findings may not fully capture the complexities of food insecurity.

**Our research represents the perspectives of a limited number of corner stores and food banks and does not represent a full market test of concepts.** Our research is exploratory in nature and may not be fully representative. We completed a limited number of in-person interviews (n=11) and online surveys (n=2), which may not fully represent the range of perspectives from corner stores or food banks. Further interviewing and data collection can strengthen, challenge, or add context to findings. Our team strongly encourages SoCalREN to further explore community perspectives as they roll out the FDEEE.

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<sup>5</sup> Los Angeles County has 5 supervisorial districts. See [here](#) for a map of supervisorial districts in LA County.

<sup>6</sup> Food Access Research Atlas,” Economic Research Service (ERS), U.S. Department of Agriculture (USDA), <https://www.ers.usda.gov/data-products/food-access-research-atlas/>. Low access census tracts are those demarcated in the Food Access Research Atlas as being ½ mile or 1-mile from the nearest supermarket in urban areas and 10-mile or 20-miles for tracts in rural areas. For this study, we used ½ mile demarcations for urban areas and 10-mile demarcations for rural areas. Low-income census tracts in the Atlas are those with a poverty rate of 20% or higher, median family income less than or equal to 80% of the state-wide median family income, or a metropolitan tract with a median family income less than or equal to 80% of the metropolitan area’s median family income.

# Findings and Recommendations

Through the FDEEE, the SoCalREN team seeks to use refrigeration as a point of access to address two complex issues: food insecurity and energy efficiency in corner stores. As our findings below demonstrate, food insecurity is a complex and nuanced topic that will never have a one-size-fits-all solution. Improving refrigeration efficiency will not comprehensively address food insecurity, but the FDEEE can provide energy savings as well as non-energy benefits that are desired by the target communities (that is, to both store owners and the community). The FDEEE also offers the opportunity to help launch deeper conversations and brainstorm with store owners about what strategies can improve healthy food access in their communities. We note that overcoming some of the barriers and needs discussed below may be within SoCalREN's sphere of control (i.e., improving access to efficient refrigeration and addressing high energy costs), while others may not (i.e., sourcing low-cost, local, healthy food and changing community attitudes towards nutrition). For the strategies outside SoCalREN's sphere of control, SoCalREN may wish to share the findings in this report with other organizations, partners, and community members who can work beside SoCalREN to address those needs.

Below we discuss our findings by research topic. We also present recommendations to help guide the development of SoCalREN's FDEEE program.

## Terminology

While 'food deserts' is a common term to describe food insecurity, other terminology may be more meaningful and relevant to targeted communities.

To help SoCalREN better understand how communities may conceptualize about food access, the research team conducted secondary research on the history of the term "food desert." We also researched how communities who may lack access to fresh, healthy foods talk about food access or food insecurity. We found that while 'food desert' is still commonly used and recognizable, community members and activists often prefer to describe food insecurity in other ways. Critics of the term argue that it does not properly capture how systemic issues, such as racism and poverty, contribute to inadequate food access within a community. Food insecurity is a broad topic, and potential FDEEE participants may have differing views about the concept of food access and related terms.

Popularized by the U.S. Department of Agriculture (USDA) in 2010, the United States has historically used the term 'food desert' to describe low-income areas where a significant portion of the population lacks access to fresh and healthy foods.<sup>7</sup> Community members, academics, and local activists have criticized the term 'food desert' for a variety of reasons. They often argue that the term overemphasizes access as the primary driver of food insecurity, ignoring the structural inequalities (e.g., income, education, nutritional knowledge, and race) that impact food access itself.<sup>8</sup> Others claim that the term is not used by individuals that experience food insecurity, or that the term 'desert' unfairly burdens communities with a negative connotation.<sup>9</sup>

Food activists and academics have proposed a variety of alternative terms, including "food apartheid," "food oppression," and "low-income" or "low access" areas. While there is currently no singular universally agreed upon alternative term, researchers and activists hope these proposed terms better capture how discriminatory practices have shaped food access in the U.S. Other researchers have incorporated community feedback to create new terminology, which is how Baltimore began using the term "Healthy Food Priority Areas."<sup>10</sup>

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<sup>7</sup> Byrne, Christine, "It's Great That We Talk About 'Food Deserts' — But It Might Be Time To Stop," *Huff Post*, July 4, 2019, [https://www.huffpost.com/entry/food-desert-problem-access-healthy-options\\_n\\_5d1b910ee4b082e55370dee5](https://www.huffpost.com/entry/food-desert-problem-access-healthy-options_n_5d1b910ee4b082e55370dee5).

<sup>8</sup> Lu, Isabel, "Food Apartheid: What Does Food Access Mean In America?," T. Colin Campbell Center for Nutrition Studies, December 14, 2020, <https://nutritionstudies.org/food-apartheid-what-does-food-access-mean-in-america/>.

<sup>9</sup> "'Food Apartheid' (Not 'Desert')," UT Austin CEC, accessed on March 13, 2023, <https://utenvironment.org/projects/microfarm/food-justice/glossary/food-apartheid-not-desert/>.

<sup>10</sup> "Report: 'Food Desert' Gets a Name Change in Response to Baltimore Community Feedback," Johns Hopkins Center for a Livable Future, January 17, 2018, <https://clf.jhsph.edu/about-us/news/news-2018/report-food-desert-gets-name-change-response-baltimore-community-feedback>.

Food access is a complicated subject impacted by many factors. Individual communities have their own unique histories that shape current attitudes towards food. Through our discussions with staff at the 11 corner stores, the team discovered that “healthy” is also a nebulous term that has community- and culturally-specific meaning. We asked store owners about access to healthy foods, and most noted a need for more healthy foods in their neighborhoods. However, store owners had different ideas for what kinds of healthy food they could sell, which included food beyond fresh fruits and vegetables. One store manager spoke about how customers come in looking for protein bars and low sugar drink options. Another store owner who specifically aims to improve food access in her community sells cooked rice and beans as a healthy food option.

### Recommendations Related to Terminology

- **Use language like “partner with SoCalREN to stock your store with healthy food” or “source healthy food for your community” instead of specific terms like “food desert” in FDEEE marketing.** After conducting in-person interviews, the research team found that store owners do not always associate their location as being in a “food desert,” but they do think about the healthy food options they can sell in their stores. Ensure that marketing materials feel relevant to store owners by using broader language. With accessible marketing materials, store owners who have been looking to sell healthier food can easily identify the FDEEE as a program of interest.
- **Better define what constitutes “healthy” by gathering input from the community.** “Healthy” may look different to different communities and may not just include produce, fruits, and vegetables; it may also include important cultural or community-specific items like homemade burritos, noodles, rice and beans, prepared meats, and others. Community input is crucial to this work, so SoCalREN should continue to solicit feedback to understand how community members define healthy food (and specifically food that needs to be refrigerated) in intervention areas. SoCalREN could stop by stores to chat, hang up posters/flyers at stores and at community landmarks (churches, nonprofits, food banks, etc.) asking for feedback, interview people on the streets, and host larger town halls/meetings to understand how community members define healthy perishable food. SoCalREN could also host a picnic or event with fresh, healthy foods to help start the conversation. Working with these community members, create a “healthy food wish list” to help store owners stock their new fridges with healthy foods.

### Program Targeting through Mapping

High energy burden, low food access, and low-income mapping can be used to identify communities of interest for marketing and program implementation.

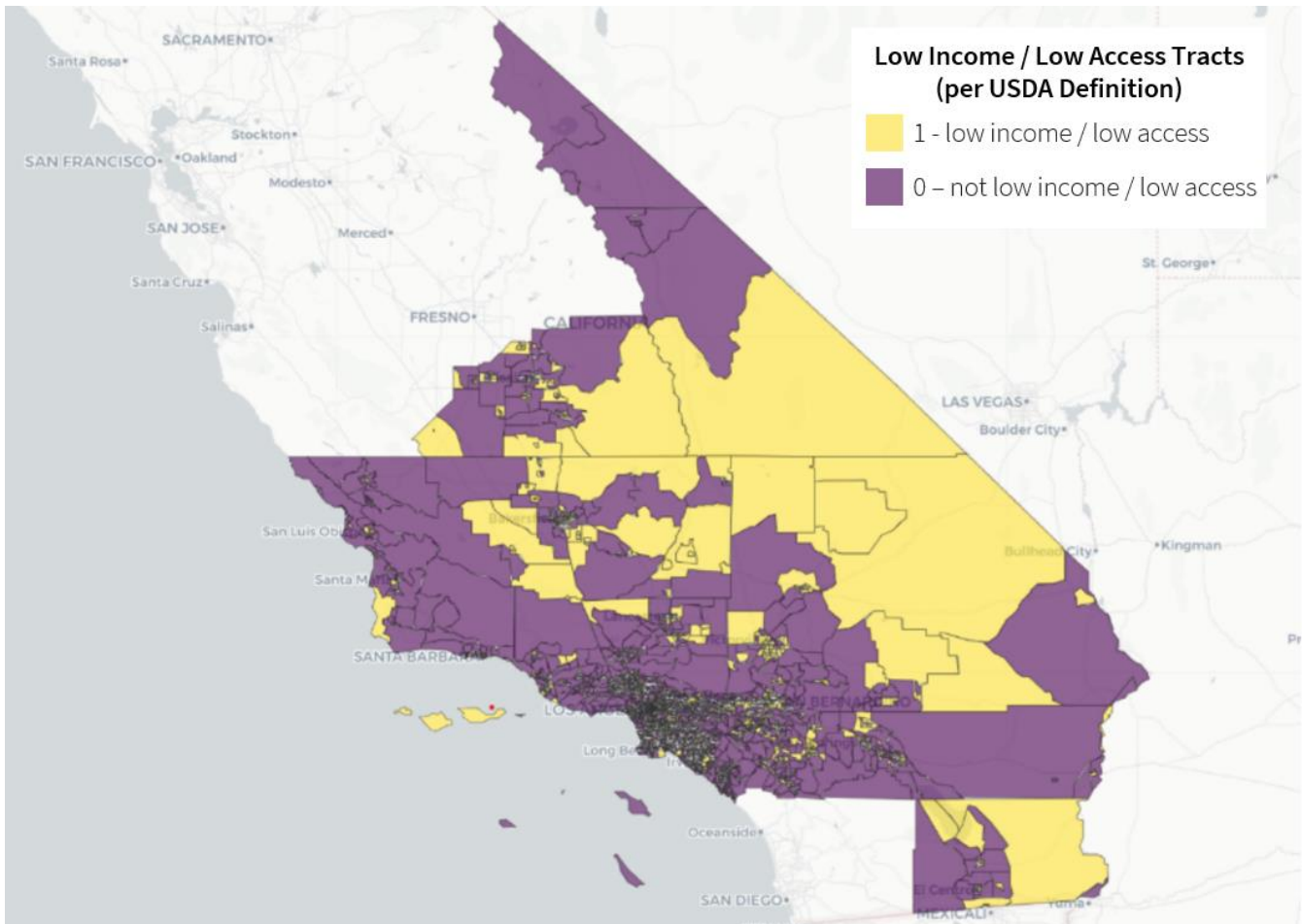
The team used spatial data analysis to determine the number of households located in food deserts within the SoCalREN service territory. We found that there are roughly 4,348 census tracts in the territory, of which 1,174 (27%) are low-income/low access (LILA), our proxy for food deserts. We also found that 1,742,368 total households are living in food deserts in the counties that SoCalREN serves, which accounts for about 25% of the households in the service area. Numbers were calculated using the Census American Community Survey data. The high number of households living in food deserts within the SoCalREN service territory indicates that there is a need for a food access intervention like the FDEEE.

Since food insecurity is a multi-faceted issue, we mapped many of the factors that can impact access to healthy food in a community. Our team created maps to allow us to visualize the relationship between factors such as race, income, transportation access, employment, and food insecurity (measured by the USDA’s LILA variable). The maps identify areas of high overlap between food insecurity and other variables.

The team used logistic regression model to determine the relationship between mapped factors and food insecurity (see boxplots in Appendix C: Spatial Data Analysis for results). We found that a tract’s non-white population, crude asthma cases, percentage of households receiving government assistance, and poverty ratio are correlated with food access in that tract. For example, tracts with a higher non-white population are more likely to be flagged as both low-income and low access tracts in the USDA Food Atlas.

We also reviewed LILA census tracts. Tracts are designated as low access by the USDA Food Access Research Atlas when more than 500 individuals or 33% or more of the population located half-mile or one-mile from the nearest supermarket in urban areas and 10-mile or 20-miles for tracts in rural areas. Low-income census tracts in the Atlas are those with a poverty rate of 20% or higher, median family income less than or equal to 80% of the state-wide median family income, or a metropolitan tract with a median family income less than or equal to 80% of the metropolitan area’s median family income. We depict LILA census tracts in Los Angeles County in Figure 4. In this map, tracts are demarcated as ‘1’ if they are identified as LILA at half-mile demarcations for urban areas and 10-mile demarcations for rural areas.

**Figure 4. Low Access / Low-income Census Tracts in Los Angeles County<sup>11</sup>**



<sup>11</sup> LILA: Low access census tracts are those demarcated in the Food Access Research Atlas as being half-mile or one-mile from the nearest supermarket in urban areas and 10-mile or 20-miles for tracts in rural areas. Low-income census tracts in the Atlas are those with a poverty rate of 20% or higher, median family income less than or equal to 80% of the state-wide median family income, or a metropolitan tract with a median family income less than or equal to 80% of the metropolitan area’s median family income. In this map, tracts are demarcated as ‘1’ if they are identified as low-income and low access at half-mile demarcations for urban areas and 10-mile demarcations for rural areas. Electric AR<sub>20</sub>: The electric affordability ratio (AR) measures the percentage of a household’s income that is spent on electric utility bills. AR<sub>20</sub> represents the household with income at the 20<sup>th</sup> percentile in a tract. Electric areas of affordability concern have been designated by the CPUC as those with AR<sub>20</sub> scores greater than 15%.

When identifying potential interview sites, the research team also assessed energy burden. To do this, we focused on census tracts identified as areas of affordability concern (AAC) by the California Public Utilities Commission (CPUC). The CPUC measures energy burden using affordability ratios (AR), which measure the percentage a representative household spends on essential energy services out of their total income, minus essential expenses. For electricity, the CPUC defines these areas as those with an AR20 score (the affordability ratio for the household representative of the 20<sup>th</sup> percentile of income in the area) of 15% or above. There are 1,087 census tracts across California that are identified as areas of affordability concern based on spending electric services. Of the 1,174 LILA census tracts in the SoCalREN service territory, 341 (29% of LILA tracts or 8% of all tracts in SoCalREN's region) face high electric energy burden. As a reminder, we document areas with high energy burden in Figure 3.

According to the FDEEE implementation plan, the team aims to engage 500 businesses between 2024 and 2027, with 425 projects installed.<sup>12</sup> Census tracts with high energy burden are likely to contain communities where corner stores are most affected by energy costs.<sup>13</sup> More than 13% of Californians spend more than 15% of their income on electric utilities, and many of these Californians live in low-income areas in Los Angeles County, which has some of the highest affordability ratios in the state.<sup>14</sup> Interviewed store owners in Los Angeles County who reside in census tracts with high electric energy burden also indicate that electricity bills are a major store expense, especially given expenses related to running refrigeration. These store owners will likely benefit the most from the FDEEE so it will be valuable to target them for future FDEEE cohorts.

Secondary research also documents this relationship between energy prices and food access. In 2017, Tuttle and Beatty (USDA) found that energy price shocks, or sudden increases in energy prices, contribute to struggles with food access.<sup>15</sup> When households experience energy price shocks, they have less money to spend on food for their house. After a sudden increase in energy bills, households are more likely to indicate that they need extra money to feed their families. These price shocks are especially impactful for low-income households, which are already more likely to face high energy burden and food access issues. Additionally, experts at the World Economic Forum have argued that food and energy crises are interrelated because of how energy impacts food production.<sup>16</sup> When energy prices increase, food production is impacted because energy is needed for all aspects of food production. As energy prices have risen in recent years, it has also become increasingly expensive to produce fertilizer, constricting food production.

### Recommendations Related to Targeting

**Leveraging the maps created through this study, prioritize initial FDEEE program outreach on the 8% of census tracts in SoCalREN's territory that are low income/low access with high electric energy burden.** As we described in the research approach, the team used our maps to identify communities to visit for on-site corner store interviews. We document areas that are low-income/low access and face high energy burden (8% of census tracts within the SoCalREN service territory). The FDEEE team could use these maps similarly to identify priority areas to target outreach efforts, develop community partnerships, and recruit program participants. SoCalREN can also use the maps to visualize and understand the overlap between variables of interest and food insecurity. Then, SoCalREN can identify tracts of special interest based on race, transportation access, or other factors that have historically contributed to a community's ability to access healthy foods.

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<sup>12</sup>Goal numbers from Food Desert Energy Efficiency Equity Program: 2024 Program Implementation Plan

<sup>13</sup> While our statistical model did not suggest correlation between energy burden and food access, it is important to note that this is based on two variables and may not capture all the nuances related to energy burden and food insecurity. As detailed in this section, secondary research does suggest a relationship between energy prices and food security.

<sup>14</sup> California Public Utilities Commission, "CPUC Issues Affordability Report Highlighting Trends in Affordability of Combined Essential Utility Services," CA.gov, April 29, 2021, <https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-issues-affordability-report-highlighting-trends-in-affordability>.

<sup>15</sup> Tuttle, Charlotte J., and Timothy K.M. Beatty, "The Effects of Energy Price Shocks on Household Food Security in Low-Income Households," ERR-233, U.S. Department of Agriculture, Economic Research Service, July 2017, <https://www.ers.usda.gov/webdocs/publications/84241/err-233.pdf?v=0>.

<sup>16</sup> Whiting, Kate, "Here's how the food and energy crises are connected," World Economic Forum, September 20, 2022, <https://www.weforum.org/agenda/2022/09/heres-how-the-food-and-energy-crises-are-connected/>.

FDEEE can leverage the instructions in Appendix D: Mapping to use the maps. As the FDEEE continues, we encourage SoCalREN to work with local leaders and community members to discuss how they would like to see nutrition and healthy food access grow in their communities. As these conversations and partnerships develop, SoCalREN may discover more potential factors of interest to examine more closely on these maps.

### Languages Spoken

There is a need for program communication in Spanish, both verbally and in written marketing materials.

ILLUME selected stores without consideration of language spoken and found that 5 of the 11 were Spanish-speaking.<sup>17</sup> This is in line with demographic trends; the 2022 Census reports that 49% of LA County’s population is Latino or Hispanic.<sup>18</sup> We document the breakdown of English and Spanish speakers in the SoCalREN service territory in Table 2 below. Other languages are spoken in Los Angeles County, but at relatively small percentages compared to English and Spanish. Those living in areas designated as food deserts are more likely to be Spanish speakers (51% v 36%). There are also more people in food deserts who speak both Spanish and English, but speak English less than “very well,” suggesting the importance of Spanish communication for the FDEEE.

**Table 2. Language Breakdown in SoCalREN Service Territory<sup>19</sup>**

	Language	Percentage
Total Population in Service Territory	English only	51%
	Spanish	36%
	<i>Spanish, speaks English “very well”</i>	21%
	<i>Spanish, speaks English less than “very well”</i>	14%
	Other language	14%
Population Living in Food Deserts in Service Territory	English only	40%
	Spanish	51%
	<i>Spanish, speaks English “very well”</i>	30%
	<i>Spanish, speaks English less than “very well”</i>	23%
	Other language	9%

We also note that due to language, for some of the interviewed store owners, the interview team had to explain the gift card instructions verbally because the instructions were only available in English because the store owners did not understand English well. Additionally, small corner store owners are often very busy, and many of the owners we interviewed were also stocking shelves, helping customers, or handling other store business.

<sup>17</sup> ILLUME conducted these interviews in Spanish.

<sup>18</sup> U.S. Census Bureau, “Population Estimates, Los Angeles County, CA, V2022,” *Quick Facts*, <https://www.census.gov/quickfacts/fact/table/losangelescountycalifornia/RHI725222#RHI725222>.

<sup>19</sup> U.S. Census Bureau, “American Community Survey 5-Year Data 2019,” <https://www.census.gov/data/developers/data-sets/acs-5year/2019.html>.



## Recommendations Related to Languages

- **Ensure that all FDEEE materials are available in English and Spanish and use straightforward, accessible language. In addition, ensure FDEEE program outreach staff can speak both English and Spanish.** Have Spanish and English materials on-hand when conducting FDEEE outreach to demonstrate how the program will directly and tangibly help store owners. The FDEEE would also benefit from having outreach staff who speak Spanish to build stronger relationships with Spanish-speaking corner store owners. To be mindful of their time and priorities, the SoCalREN team could use clear and accessible language in marketing materials that is easy to interpret at first glance.

## Energy Burden

Corner store owners are concerned about high electric bills driven by refrigeration equipment, demonstrating a need for a program like the FDEEE in Los Angeles County.

Corner store owners feel burdened by high electricity bills associated with refrigeration. Many of the corner store owners we interviewed mentioned having high electricity bills. Of our 11 interview participants, 8 directly mentioned electricity/power as one of the top expenses associated with running their business, while two mentioned that most of their electricity bills come from running their refrigeration. High electricity bills can limit store owners from pursuing other desired business operations, especially since refrigeration is a necessity. One owner said, “If I didn’t pay so much in electricity, I would lower the prices [of store stock].” Another store owner said that most of their bills come from the refrigeration because “that is what we use the most.” This study-specific finding aligns with findings from larger studies that have shown that small business owners cite energy costs as a major, unpredictable expense, with refrigeration making up to 40% of supermarkets, grocery stores, or convenience stores total energy usage.<sup>12</sup>

Additionally, recent inflation and supply chain issues have impacted small business owners, who have seen higher prices and lower stock of goods for their stores. In 2022, the U.S. Chamber of Commerce published a study that revealed 85% of small business owners are concerned about inflation.<sup>20</sup> Of the 11 store owners interviewed, 8 mentioned that they have seen inflation and/or supply chain impacts to their business. Six store owners mentioned they were facing shortages of items, and seven have had to increase prices to keep up. Store owners now must play a difficult balancing act between serving their customers and maintaining their own financial health. For example, one corner store owner said they increased prices because even though “clients don’t want an increase in prices,” as a store owner, “you can’t live like that.”

## Recommendations Related to Energy Burden

- **Market the FDEEE to save on energy bills by creating flyers and resources that explain the cost-saving benefits associated with energy-efficient refrigeration.** Corner store owners are looking for ways to save money, and the FDEEE provides a tangible opportunity to help them. For example, SoCalREN could illustrate the cost savings potential by documenting the following on FDEEE marketing materials: average energy and bill savings after switching to an energy-efficient refrigerator model, a comparison of the quality of energy-efficient refrigeration and their overall lifespans, and a depiction how additional efficient features like temperature control can expand shelf life for produce.

## Refrigeration Equipment, Habits, and Considerations

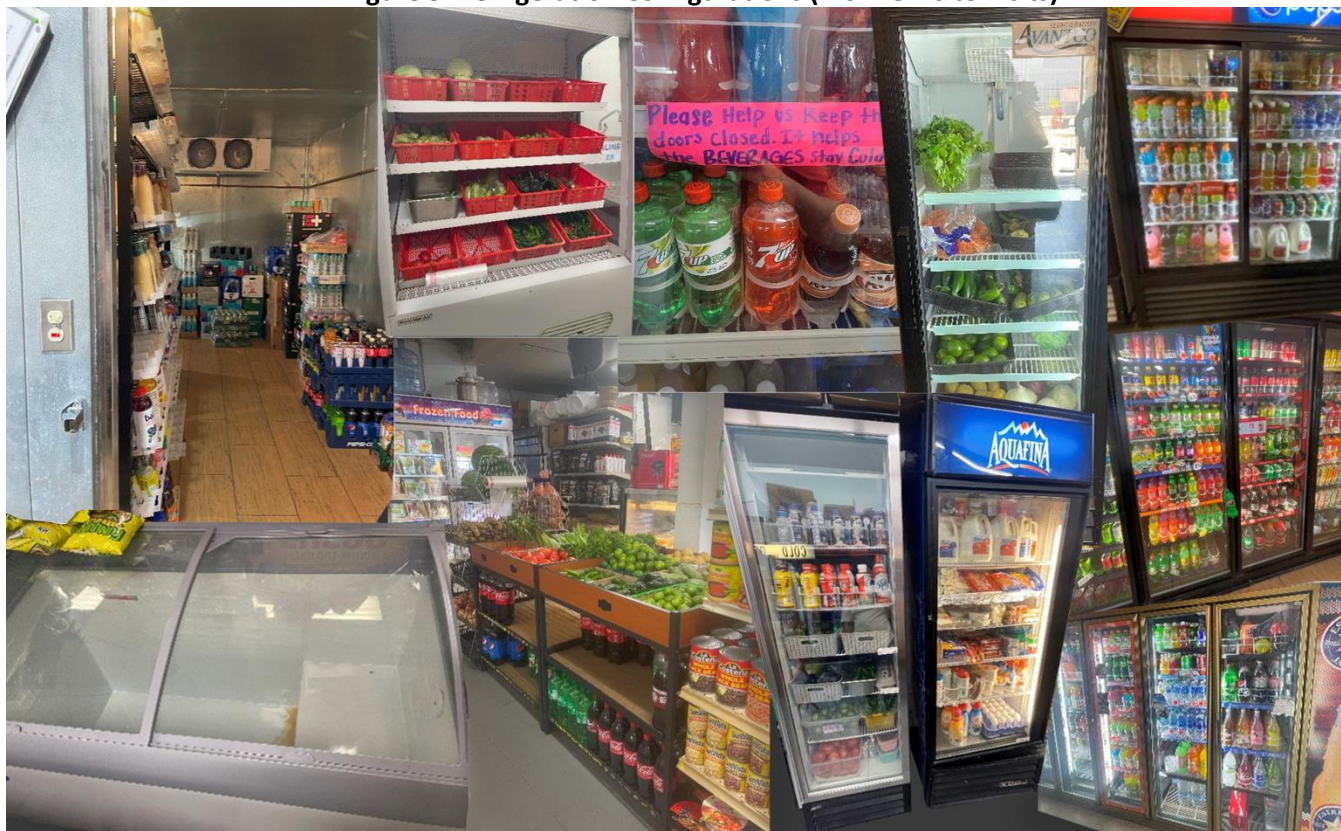
Refrigeration equipment used in corner stores varies, though cost is uniformly a priority for store owners when it comes to purchasing practices and/or maintenance.

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<sup>20</sup> “Special Report on Inflation and Supply Chain Shocks on Small Business,” U.S. Chamber of Commerce, March 3, 2022, <https://www.uschamber.com/small-business/special-report-on-inflation-and-supply-chain-shocks-on-small-business>.

All corner store owners we interviewed (11) had refrigeration in their store. We saw refrigerators across a mix of brands, types, and conditions. Even within the same store, we rarely saw uniformity across the cases. We most often observed cases with doors (there was only one open case, which was used for produce), some of which had sliding doors and others with a pull handle. We illustrate a selection of observed units in Figure 5.

**Figure 5. Refrigeration Configurations (From On-site Visits)**



The corner stores we visited sell both refrigerated produce and other healthy foods, including frozen and premade meals. We observed various types of produce, including tomatoes, avocados, lettuce, as well as rice, beans, and marinated meats, especially in the stores that also had carnicerias (butcher's shop). A few interviewed store owners take special pride in providing healthier options for their communities. Stores varied in the amount of fresh produce sold, and most stores had one or two refrigerated cases for produce. Additionally, some store owners kept all produce refrigerated while others had open areas for more shelf-stable produce. One store had an open-air refrigerated case for produce. The corner stores with carnicerias tended to have long refrigerated cases for meat and larger produce sections.

Store owners have used a variety of methods to purchase, maintain, and throw away refrigerators. Almost all—10 of the 11—interviewees mentioned that they have repaired their refrigeration equipment (the other person wasn't sure).

Some store owners have not replaced their older refrigeration, or had replaced older refrigeration with used equipment, due to cost concerns. One store owner replaced their broken refrigerator with a used one to save on costs, and another said that they want to replace their current cases because they are "old," and noted that customers complain about warm beer. This owner investigated replacing his fridge last year but "held off because it was pricey."

Additionally, six store owners have replaced their refrigeration equipment. Store owners shop at a variety of places to purchase new refrigeration equipment, including online, Costco, Jetro, and Anthony Doors. They also remove their old refrigeration in a variety of ways: two store owners gave their old equipment away, while three had scrap metal/recycling services pick up their equipment. The HSRP partnered with the Los Angeles Food Policy Council and ARCA, a refrigeration recycling company, to help recycle old refrigeration equipment.

When thinking about new refrigeration, store owners expressed concerns around the unit footprint (i.e., space available, load capacity and use of the refrigerator). While administering the HSRP, the city of Los Angeles compiled resources to help identify energy-efficient refrigeration products and share options with participants. According to the HSRP pilot, HSRP “vetted refrigerator options and provided store owners with a simple list of twelve pre-approved refrigeration units, each with various size options and pre-negotiated pricing.” These materials provided comprehensive technical specs but did not include documentation around key elements store owners should consider in their decision-making process (i.e., unit footprint, load capability, intended stock). As we found in our on-site interviews, store owners were concerned about finding equipment that met the square footage of their store and met their stocking needs.

### Recommendations Related to Refrigeration Equipment, Habits, and Considerations

- **Working from the resources offered through the HSRP pilot, refine outreach materials to clearly outline refrigeration options. Include key elements store owners should consider (i.e., unit footprint, load capability, intended food/drink products) as they decide which unit is best for them.** The HSRP outreach team offered materials that documented refrigeration options. The SoCalREN team should leverage similar resources for the FDEEE; in addition to providing an overview of technical specs, these materials should guide participants through key questions they should ask themselves in the decision-making process. For example, the program team could put together a one-page decision tree flyer that clearly lays out refrigeration options and key considerations for store owners.
- **Since there is no single, clear method for store owners to purchase, maintain, and dispose of fridges, SoCalREN should market the FDEEE as an easy, streamlined alternative to a complex process for store owners.** Market the FDEEE as a ‘concierge’ offering and continue to highlight in marketing materials that SoCalREN will manage participants’ energy-efficient refrigeration journey from start to finish. The program team can highlight that it will help by measuring and preparing for the new refrigeration unit, installing the new unit at no cost, maintaining and/or calling repair firms to maintain the unit, and coordinating with and/or providing an appliance recycling service to remove older products. For example, the FDEEE might want to follow the HSRP’s lead and explore partnerships with Los Angeles Food Policy Council and ARCA, a refrigeration recycling company, to help recycle old refrigeration equipment.

## Barriers

Store owners are interested in selling more healthy food options, but face challenges.

Store owners felt that getting healthy food is a challenge for their communities. Many store owners (n=6) mentioned difficulties accessing healthy food and groceries in the area. Several store owners also mentioned issues with their communities not having enough grocery stores (n=4).

When asked about selling more healthy food in their stores, all 11 interviewed store owners are at least somewhat interested in selling more healthy food and produce but face limitations. While several business owners mentioned that having another refrigerator would help them:

- Some believe they don’t have the space (n=2).
- Some were concerned about customer interest (n=3) or demand for healthy food options. Similarly, some (n=5) store owners expressed concern about marketing healthy food, mentioning that they would need to figure out how to attract more customers, either through marketing, advertising, or renovations to their stores to sell more produce.

- Others are worried about spoilage (n=2), indicating the importance of both helping them have refrigerated space to maintain the healthy food, but also the importance of helping them make sure that there is community demand for the healthy food.

The top barriers are around customer interest (and raising interest through marketing), and as such, community habits and attitudes impact healthy food access. One interview respondent explicitly said that the issue is that their neighborhood does not “have the habit” of eating healthy food. Another store owner said that they are the “only one who has healthy food” in the area, and they take care to make healthy foods more accessible to their customers, such as by cooking beans and rice and portioning them to sell in affordable packages.

When we asked store owners about healthy food access in their community, some initially told us that there was no issue, or that people who want healthy food can purchase it. However, as the conversation continued, and as the researchers followed up with probing questions, three store owners highlighted limitations to accessing healthy food in their neighborhood. This may be because food access is a complex subject with many different associated factors. The terms “access” and “healthy food” are abstract, complex, and can have different meanings to different individuals, so it is helpful to narrow down the conversation to specific aspects of food access. Additionally, some individuals may not feel comfortable discussing complex issues within their communities at first, highlighting the need to build trusting relationships with potential FDEEE participants. Some store owners shared obstacles to accessing healthy food after we specifically asked about prevalence of grocery stores and produce in the area. One store owner first told us that he hasn’t heard any complaints because people can go online and get healthy food delivered. However, when we asked him about grocery stores in the area, he told us that he has heard customers complain that getting healthy food used to be easier because the only supermarket in the area closed.

Even though barriers to healthy food access exist, SoCalREN can be encouraged by the findings of this study. Many store owners would like to sell more healthy goods if these limitations (i.e., space and equipment, sourcing support, and customer interest) are removed. Additionally, there is customer demand for healthy food in these areas, so the FDEEE would be helping to meet a need. A few store owners (three) mentioned they have had customers request produce and healthier options. One food bank staff member surveyed also indicated that fresh produce is the top good that customers wish to receive.

### Recommendations to Overcome Barriers

- **Highlight other program benefits that address the barriers mentioned above (e.g., cost savings, higher profits, happier customers, lower spoilage of produce if refrigerated) in addition to benefits around “healthy food” or “food access” in FDEEE messaging.** While the FDEEE will not be able to overcome all barriers (e.g., store owners not having enough space in their store), store owners may be more apt to participate in the FDEEE if they understand the program’s near-term benefits to their business. Many store owners may not think about food access often, so providing background information or scheduling topic-specific community meetings can help SoCalREN better understand the nuances of food access within communities of interest.
- **Gain meaningful community feedback from residential households in the community to understand their preferences and needs related to healthy, perishable food.** While our research sought to gather feedback from corner stores, we did not reach out to residential households in the community. As the FDEEE launches, SoCalREN might consider participating in further community engagement (in Spanish and English) to better understand the unique needs of those living within areas of low grocery stores and/or limited healthy food access. There are a variety of attitudes towards healthy food and food access within these communities, and the nuances cannot be fully understood and addressed without including community members in this work. The outreach team could then explore strategies to incorporate community input in decision-making such as organizing town halls and working with local food banks, churches, and other community-based organizations to learn more about community history and needs.

## Potential Partners: Food Banks and Food Access Organizations

SoCalREN can learn from and partner with other organizations aiming to distribute healthy food throughout Southern California.

Organizations that encourage healthy food and work to increase food access are good partners for the FDEEE. The HSRP pilot has already built connections with some relevant organizations. For example, the Los Angeles Food Policy Council, a peer organization dedicated to fighting hunger and promoting food access, was an early partner on the HSRP. Our team also identified several organizations—some in California, some in other states—that have similar goals to the FDEEE. One of these efforts, the Pennsylvania Fresh Food Financing Initiative (PA FFFI), supported both healthy foods and refrigeration.<sup>21</sup> The PA FFFI is overseen by the PA Department of Community & Economic Development and administered by the Food Trust in partnership with local financing organizations. The program provides one-time grants and loans to stores in low- or moderate-income communities in Pennsylvania up to \$50,000. Store owners use this funding for a variety of reasons, including equipment, capital, real estate, inventory, and infrastructure improvements. A few participants have chosen to upgrade their refrigeration setup through the program, allowing them to sell more fresh produce and perishable items. The Food Trust also partners with local organizations to administer the Healthy Corner Store Initiative (HCSI).<sup>22</sup> In conjunction with the Food Trust’s nutrition education program Heart Smarts, the HCSI aims to increase access to healthy and nutritious food in Philadelphia. The HCSI and Heart Smarts provide small, independent grocery stores and corner stores with nutrition training, equipment (including refrigeration), and marketing materials. We summarize more local organizations focused on healthy food access in Appendix G: Peer Organizations.

Local food banks may be good partners since they have experience promoting healthy food and reaching out to the target communities. There are multiple food banks in Southern California. In our search, we found 11 within SoCalREN’s area – two of which provided insights about the need for both healthy food options and energy-efficient refrigeration through our survey (see Appendix F: Food Bank Outreach for the list of food banks).

The food banks we surveyed spoke of barriers to healthy food access – specifically related to the challenges around promoting healthy food to the community. Echoing the comments from corner stores, one food bank survey respondent mentioned they have healthy food to distribute, but need additional promotion so that people will come pick it up. They claim that “healthy food is accessible” in the area but “people have to overcome their pride and just come out” to the food bank for help.

We note that these food banks also expressed the need for refrigeration in the community (and in food banks). From our limited food bank survey data (n=2), we learned that food banks also need support with refrigeration equipment and costs. One food bank employee reported that 60% of their electricity bills comes from refrigeration, as they distribute fresh produce and perishable refrigerated goods. They stated that additional “refrigeration capacity both at the food bank and pantry level” is needed to improve access to healthy food, as their food bank “has an abundance of produce available to feed our community but it needs to be kept cool to maximize its useful life.” Additionally, the interview team ran into someone running a local nonprofit food distribution organization when interviewing a store owner. They also would like additional refrigeration, as they want to be able to distribute more produce but have been holding off on new refrigeration purchases because of expenses. The FDEEE may identify opportunities to upgrade existing low-efficiency refrigeration equipment in food banks – but should take care to not add additional refrigeration that will expand food banks’ energy loads beyond their current need.

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<sup>21</sup> The Food Trust, “Pennsylvania Fresh Food Financing Initiative,” The Food Trust, 2022, <https://thefoodtrust.org/what-we-do/hffi/pa/>.

<sup>22</sup> The Food Trust, “Healthy Corner Store Initiative,” The Food Trust, 2022, <https://thefoodtrust.org/what-we-do/hffi/pa/>.

When we asked whether corner stores or food banks were aware of any existing programs that focus on refrigeration, none were mentioned, suggesting SoCalREN may be able to uniquely support an existing need. We do note that there are several CPUC-funded investor-owned utility (IOU) programs that provide installation of energy-efficient reach-in refrigeration to commercial customers. For example, in 2021, reach-in refrigerator deemed savings came from three programs: Statewide Point-of-Sale Food Service, PG&E’s Commercial Deemed, and PG&E’s Local Government K-12. Note that two of these are in PG&E’s territory, which is mostly more Northern than the SoCalREN region. While these programs exist, we acknowledge that small businesses may lack capacity or program knowledge and therefore may be unlikely to participate in them without extra support.

While interviewed store owners were not aware of peer organizations, these stores do already have refrigeration onsite, some of which are provided by beverage retailers (e.g., Pepsi, Coca-Cola). These retailers provide corner stores with refrigeration to sell their goods. They also maintain the refrigeration units and replace them when needed (see Figure 6 for an example we captured during the onsite interview effort). One store owner said that Pepsi and Coca-Cola usually come in about once a month to “fill up drinks, check on the refrigeration, and send a tech the next day if there is a problem.” When we were visiting another store, a Pepsi representative came in to talk to the store owner about maintaining their Pepsi fridges.

**Figure 6. Coca-Cola Maintenance Sticker (From Onsite Visits Visits)**



Local community-based organizations (CBOs) or workforce programs may also be good partners to help with outreach due to the need to be on the ground visiting sites in the community. Note that in the HSRP pilot Los Angeles County partnered with SoCalREN’s Green Path Career Program, which provided two Green Path Career Fellows to support program engagement.

#### Recommendations Related to Potential Partners

- **Partner with local food banks and distribution organizations, specifically to leverage what they have learned about promoting healthy food to the community.** Continue to have conversations with these organizations about challenges and successes related to similar programs and distribution methods. Use findings from these conversations to inform program refinements to the FDEEE to overcome the barriers we identified in this study.
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# Appendix A: Discovery Research Sources

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## Appendix B: Discovery Research, Food Desert Terms

Term	Definition	Used By	Critiques/Limitations	Common Solutions in Response to Issue	Source(s)
<b>Food Desert</b>	Low-income areas where a significant portion of the population does not have access to fresh, healthy foods Often defined by # / distance from grocery stores in area	Formerly USDA Many organizations now mention the term with the caveat that it is not the most useful	Critics argue that centering access alone ignores the complex systemic issues/structural inequalities (income, race, nutritional knowledge, etc.) related to food insecurity Additionally, the term 'desert' may imply that this is naturally occurring rather than caused by systemic issues and can imply negative connotations towards the people living in the area	Increasing number of grocery stores and helping stores stock healthy foods	<a href="#">Critics say it's time to stop using the term "food deserts"   The Counter</a> <a href="#">Food Apartheid: Racialized Access to Healthy Affordable Food   NRDC</a>
<b>Food Mirage</b>	Census tracts where residents have limited food access due to lack of healthy and affordable options, not access to grocery stores	Academic term used in academic articles - seemingly not used a lot outside of academia. Used by researchers and sociologists.	Similar critiques to food deserts in terms of negative connotation and the inherent implications about the people living in these areas	Focus on solutions surrounding income, food prices, and food budgets	<a href="#">Food Apartheid: Racialized Access to Healthy Affordable Food   NRDC</a> <a href="#">Food mirages: Geographic and economic barriers to healthful food access in Portland, Oregon - ScienceDirect</a> <a href="#">Food mirages leave Canadians knocking on food bank doors   CBC News</a>

Term	Definition	Used By	Critiques/Limitations	Common Solutions in Response to Issue	Source(s)
<b>Food Swamp</b>	Areas where grocery stores/food establishments sell unhealthy, "junk" food at much higher rates than healthy/nutritious food	Some public health experts and other academics	Similar critiques to food deserts in terms of negative connotation and the inherent implications about the people living in these areas Calling these areas "swamps" may be unfair given how food systems negatively impact both individual health and the environment (pollution, greenhouse gas emissions, erosion, etc.) - ignores the impact that humans have on nature	Increasing amount of healthy food available in area - The Food Trust has worked with many cities to help small markets sell fresh produce	<a href="#">Food Swamps Predict Obesity Rates Better Than Food Deserts in the United States - PMC (nih.gov)</a>  <a href="#">Food Swamps and Food Deserts in Poor Communities (healthline.com)</a>  <a href="#">Please don't call it a food swamp (theconversation.com)</a>
<b>Food Insecurity</b>	HH indicator - lack of access to adequate healthy and nutritious food. Impacts HH members health	USDA, Feeding America, news journals, and other organizations - popular catch-all term	Not very many specific critiques, but this is a rather broad term	Solving nation-wide food insecurity involves looking at underlying, systemic causes related to access to healthy food - segregation, racism, economic injustice, employment disparities, etc. Community-led efforts include gardens, food pantries, and free food fridges	<a href="#">USDA ERS - Definitions of Food Security</a>  <a href="#">What is Food Insecurity?   Feeding America</a>  <a href="#">What is food insecurity and how does it affect the Philly region? (inquirer.com)</a>

Term	Definition	Used By	Critiques/Limitations	Common Solutions in Response to Issue	Source(s)
<b>Food Oppression</b>	Food policy or institutional action that harms marginalized communities Frames the issue as a systemic one caused by US policies rather than individual fault	Another academic term - led by law professor Andrea Freeman	Not used a lot outside of this specific professor and her work	Legal term, legal strategies - lobbying to change food policies, lawsuits against state and national government for discriminatory policies	<a href="https://www.gresham.ac.uk/food-oppression">Food Oppression (gresham.ac.uk)</a>  <a href="#">Microsoft Word - UCILR V3I4 Assembled v15.1</a>
<b>Food Apartheid</b>	System of segregation related to food policy that has resulted in inadequate access to nutritious food in minority communities and in increased chronic health disease rates - Black, Indigenous, and other communities of color.	Embraced by many local activists - those who live in food apartheid communities	Some people are made uncomfortable by the term 'apartheid' due to its use in South African history, but some activists argue that is exactly why it is an ideal term - these areas have also suffered due to racial segregation and racist policies, which are directly related to food access/healthy food consumption	Economic justice focus - providing cheaper options or free food for community members through local organizations Community-driven movements Aligned with idea of 'food sovereignty' - individuals deserve control over their own food choices, should be able to design their own food system with access to healthy foods	<a href="#">Food Apartheid   Project Regeneration</a>  <a href="#">Food Apartheid and San Bernardino, California, Residents' Quest for Fresh, Healthy Food as COVID-19 Persists   Local News   stlamerican.com</a>

Term	Definition	Used By	Critiques/Limitations	Common Solutions in Response to Issue	Source(s)
<b>Healthy Food Priority Areas</b>	According to Baltimore food policy, "an area where the average Healthy Food Availability Index (HFAI) score for all food stores is low (0-9.5), the median household income is at or below 185 percent of the Federal Poverty Level, over 30 percent of households have no vehicle available, and the distance to a supermarket is more than 1/4 mile"	Used in Baltimore, developed by JHU public health scholars with input from the community	Not really used outside of Baltimore so far	Baltimore policy changes around food, working to incentivize grocery stores to build stores in these areas Nutrition assistance programs, etc. are being implemented Working on mapping and identifying various factors related	<a href="http://pgcfec.org">Healthy Food Priority Areas – FEC (pgcfec.org)</a>
<b>Low-Income Area/Low Access Area</b>	Low-income - based on average income of Census tract Low access area - based on proximity/distance to supermarket and family/neighborhood resource access (income and transportation)	USDA - Food Access Research Atlas - now uses these terms instead of 'food desert'	Does not necessarily mention/highlight the systemic/racist nature of the issue	Atlas maps these areas along with other factors like neighborhood income, access to public transport or a vehicle, and HHI	<a href="http://www.ers.usda.gov">USDA ERS - About the Atlas</a>
<b>Limited Food Access</b>	Limited in food access due to proximity to grocery stores/healthy food options, as well as lack of access to a variety of quality and affordable foods	California FDA	Does not necessarily mention/highlight the systemic/racist nature of the issue	Improving food distribution, expanding healthy food retail options, supporting low-income residents with purchasing healthy food, improving school lunches	<a href="http://www.cdpr.ca.gov">Improving Food Access In California</a>

# Appendix C: Spatial Data Analysis

Since food insecurity is a multi-faceted issue, we mapped many of the factors that can impact access to healthy food in a community. These maps allow us to visualize the relationship between important factors such as race, income, transportation access, employment, and food insecurity (measured by the USDA’s low-income and low access variable). The maps also identify areas of high overlap between food insecurity and other variables. Table 3 below shows the full list of factors examined and the corresponding data sources.

**Table 3. Data Sources for Spatial Data Analysis**

Factor	Data Source	Link to Data Source	Year
Population			
Race			
Income	American Community Survey (Census Data)	2015-2019 ACS Data through Tidycensus	2015-2019
SNAP benefits			
Lack of health insurance			
Heating fuel type			
Employment rate			
Access to grocery stores at 0.5 miles for urban, 10 miles for rural	USDA Food Access Research Atlas Data	<a href="#">USDA ERS – Download the Data</a>	2019
Access to vehicle			
Asthma cases	US Department of Health & Human Services	<a href="#">PLACES: Census Tract Data (GIS Friendly Format), 2022 release – Catalog</a>	2019/2020
Diabetes			
High blood pressure			
Energy burden	California Public Utilities Commission	<a href="https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/affordability/2020-annual-affordability-report">https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/affordability/2020-annual-affordability-report</a>	2020
Disadvantaged communities	California Department of Water Resources	<a href="#">i16 Census Tract Disadvantaged Communities 2020 – Datasets – California Natural Resources Agency Open Data</a>	2020

We analyzed factors commonly interwoven with food insecurity (such as race, government assistance, and access to transportation). We also looked at factors related to energy burden and energy use because the FDEE is centered around energy efficiency improvements. We used the California Energy Commission (CEC) energy equity indicators to help identify other factors that relate to clean energy use.

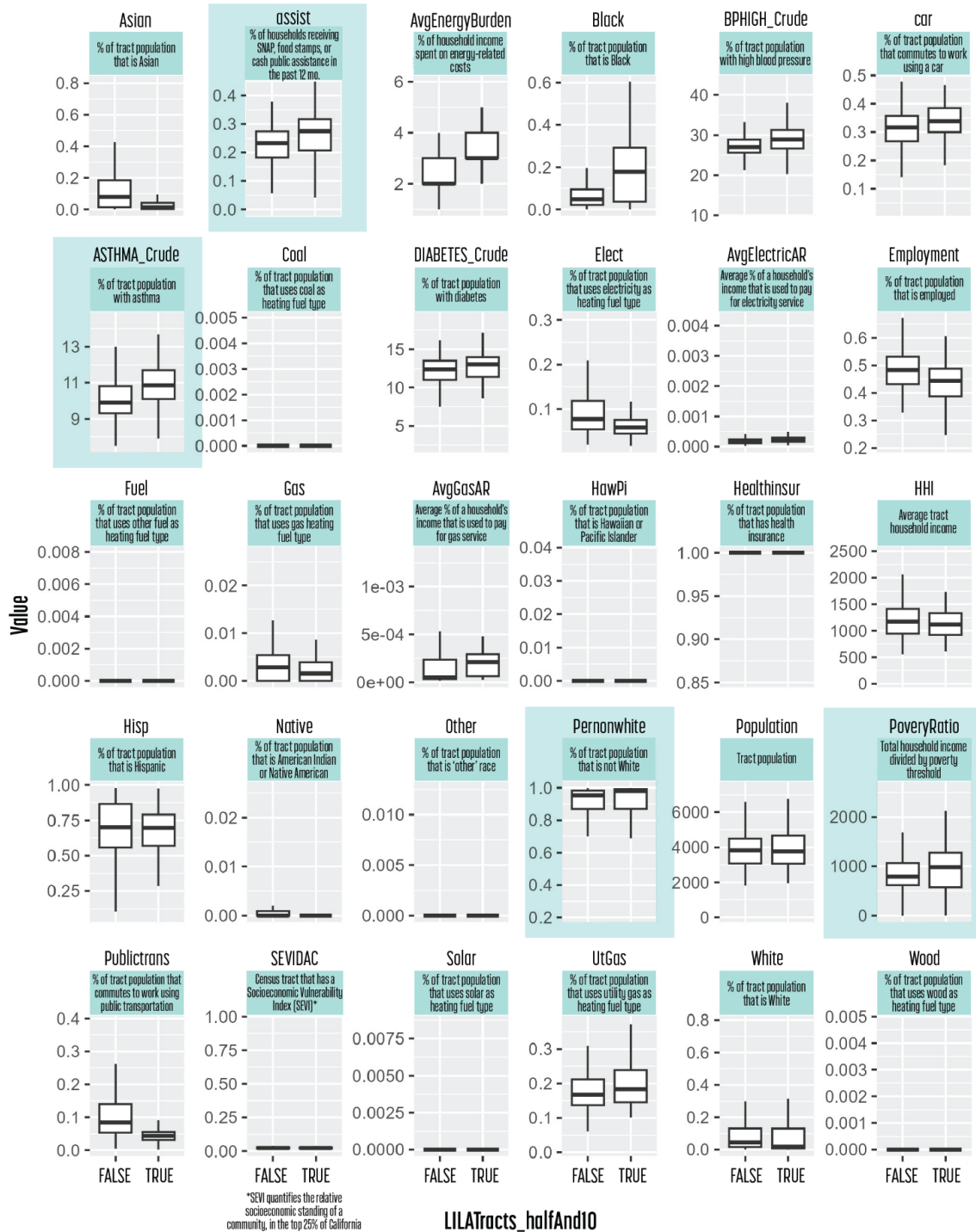
Data was mapped in R using the mapview package, which allows users to visually display spatial data in an interactive manner. Data was mapped on the Census tract level, and all Census tracts (with available data) within the SoCalREN service territory are shown on the maps.

A logistic regression was run to determine which factors were correlated with the USDA’s ‘Low-income and Low access Tract’ food desert indicator. The boxplots below show how various factors correlate with low-income and low access tract designations. Government assistance, crude asthma cases, non-white population, and the poverty ratio were the most positively statistically correlated with food insecurity.<sup>23</sup> The boxplots highlighted in teal below are the factors that are statistically related to income and food access.

<sup>23</sup> The research team included asthma because the [California Energy Commission](#) identified it as an energy equity indicator, as asthma is related to air quality, which is often related to clean energy use (or lack of).

The boxplots indicate the differences between tracts that are identified as LILA (as defined by the USDA) and those that are not. They examine and document the differences between tracts that are LILA versus those that are not; the true/false corresponds to if the tract is LILA (true) or not (false).

These boxplots show how factors that may be related to food insecurity differ in tracts that are demarcated as low income and low access tracts in the USDA Food Access Research Atlas (TRUE) and those that are not (FALSE). Boxplots highlighted in teal are the factors related to income and food access.



Low Income and low access - access and income are used by the USDA in their Food Access Research Atlas to define food desert tracts. "Low Income" tracts were those defined as low-income by the US Department of Treasury's New Markets Tax Credits program: • The tract's poverty rate is 20 percent or greater; the tract's median family income is less than or equal to 80 percent of the State-wide median family income; or the tract is in a metropolitan area and has a median family income less than or equal to 80 percent of the metropolitan area's median family income. In this exercise, low access tracts were those in which a significant portion of the population (33% or >500) 0.5 miles from a supermarket for urban areas and 10 miles for rural areas.

# Appendix D: Mapping

The instructions below provide instructions on how to leverage the maps the research team created as part of this study.

1. Download the map files from the SharePoint folder.
  - a. [Energy Map](#)
  - b. [Factors of Interest Map](#)
  - c. [Overview of Instructions and Data Dictionary](#)
2. To use the maps, make sure to open them in Microsoft Edge, as they are .html files.
3. You can zoom in and out of the maps, as well as drag the maps around to focus on certain census tracts.
4. On the maps with multiple variables layered onto each other, the layer button allows you to toggle between layers, as you can check whichever variables you wish to see.
5. For the side-by-side maps, you can zoom in on one map, and the other maps will zoom in on the same spot, allowing you to easily compare variables within the same tract.



# Appendix E: Corner Store Interview Respondents

Table 4 below summarizes the characteristics of the corner stores we interviewed as part of the onsite data collection effort.

**Table 4. Summary of Corner Store Interview Respondent**

Store Number	Area/Neighborhood	Interviewed	Language	Supervisory District	Average Electric Energy Burden
1	Long Beach	Manager	English	4	15%
2	Long Beach	Owner	English	4	15%
3	Long Beach	Employee	English	4	15%
4	Mission Hills	Manager	English	3	15%
5	Mission Hills	Manager	Spanish	3	15%
6	South Central/Watts	Owner	Spanish	2	100%
7	South Central/Watts	Owner	Spanish	2	100%
8	South Central/Watts	Owner	English	2	100%
9	East Central/Boyle Heights	Parents of owner	Spanish	1	74%
10	East Central/Boyle Heights	Owner	Spanish	1	74%
11	East Central/Boyle Heights	Manager	English	1	74%

## Appendix F: Food Bank Outreach

Table 5 summarizes the food banks and food distribution centers we reached out to as part of our survey effort.

**Table 5. List of Food Banks / Food Distribution Organizations for Outreach**

Food Bank/Food Distributor	County	Short Description
<a href="#"><u>LA Regional Food Bank</u></a>	LA	Distributing food throughout LA county, supporting policies that reduce hunger. Traditional food bank.
<a href="#"><u>Foodbank of Southern California</u></a>	LA	Fighting against hunger in Southern California. Work with local partners for distribution. Traditional food bank.
<a href="#"><u>LA Compost</u></a>	LA	Decentralized compost hubs through LA county, compost education, partnering with local orgs and communities. Goal to reduce food waste.
<a href="#"><u>Imperial Valley Food Bank</u></a>	Imperial	Distribution of food, nutritional education in Imperial County (high rates of food insecurity in Imperial).
<a href="#"><u>LA Community Fridges</u></a>	LA	Fridges are run by community members and designed to anonymously provide food to those in need, hosted by local businesses/buildings who provide the outlet.
<a href="#"><u>Food Link Tulare County</u></a>	Tulare	Partners with local agencies and organizations to distribute food, educate on nutrition.
<a href="#"><u>Meals on Wheels</u></a>	Tulare	Deliver nutritious meals to homebound senior citizens in Tulare.
<a href="#"><u>Community Action Partnership of Kern Food Bank</u></a>	Kern	Distributing food in Kern, senior citizens program.
<a href="#"><u>Food Share of Ventura County</u></a>	Ventura	Fighting hunger in Ventura County, part of Feeding America network, focus on food distribution.
<a href="#"><u>LA Community Gardens</u></a>	LA	Empowering communities to grow healthy food and learn more about food and nutrition.

## Appendix G: Peer Organizations

Table 6 summarizes the peer organizations we researched who are seeking to address food insecurity. Several of these programs are in southern California, while others are in other states and may serve as a model for potential program design elements.

**Table 6. List of Peer Organizations – Seeking to Address Food Insecurity**

Program Administrator	Program Name	Program Goal/Mission
Los Angeles Food Policy Council	<a href="#">Healthy Neighborhood Market Network</a>	Focused on bringing healthy food options through small business owners in low-income neighborhoods. Focused on corner stores/neighborhood markets. Provide retail training and technical assistance - service, social media, merchandising/display, pricing/profitability, etc.
Los Angeles Food Policy Council	<a href="#">Food Leaders Lab</a>	10-week virtual training program about food justice, systems change, and community health. Equipping participants to become leaders in this space in the community.
New Jersey Economic Development Authority	<a href="#">Food Desert Relief Program</a>	Provides supermarkets in designated food desert areas with tax credits, technical assistance, and grants/loans. Help equip supermarket owners to sell nutritious foods and pay for store changes and costs related to changes - up to \$40M.
World Food Programme	<a href="#">Energy for food security</a>	Supports people across the world in food assistance - energy vouchers for cooking solutions, cooking programs in schools, providing energy solutions to agriculture (water pumps) and for cooking (preservation equipment and processes- including solar powered fridges). Ultimate goal is to end world hunger.
Emerson/Gem City Market	<a href="#">Emerson Fund</a>	Gem City Market is a supermarket located in downtown Dayton to address food insecurity. Emerson donated its low global warming Copeland Scroll Boost refrigerant technology to promote sustainability in their refrigeration methods in the store.
The Food Trust (collaborating w/ partner orgs)	<a href="#">Pennsylvania Fresh Food Financing Initiative</a>	Designed to help business owners open or expand healthy food stores in low or moderate-income communities in PA. Provide one-time grant and loans. \$50,000 (most common) to \$150,000. Money can be used for equipment, capital, real estate, inventory, infrastructure, etc.

Program Administrator	Program Name	Program Goal/Mission
<b>The Food Trust (collaborating w/ partner orgs)</b>	<a href="#">Healthy Corner Store Initiative (HCSI) and Heart Smarts</a>	Increasing access to healthy and nutritious food in Philadelphia. Provide small, independent grocery stores/corner stores with training, equipment (including refrigeration), and marketing materials. Heart Smarts - live trainings at corner stores, educating on healthy food and buying nutritious food on a budget.
<b>The Food Trust/ Hope Enterprise Corporation</b>	<a href="#">Mid-South Healthy Food</a>	Finances food retailers to increase access to produce/fresh food in low-income communities in Louisiana, Mississippi, Arkansas, and West Tennessee. Can be used for equipment, development, real estate, construction, training, loans, etc.
<b>Michigan Good Food Fund</b>	<a href="#">Michigan Good Food Fund</a>	A \$30M statewide loan fund provides loans to increase access to healthy food and encourage economic growth in low- to moderate-income communities. Provide technical support and assistance to stores. Focus on equity (business owners of color), sustainability in sourcing (across food value chain), community growth - push to install energy-efficient and sustainable metrics. Grocery stores, distributors, production, processing businesses - any enterprises involved in food value chain dedicated to increasing healthy food options in low-income areas.
<b>Local Initiatives Support Corporation/HFFI</b>	<a href="#">Healthy Food Initiatives</a>	Low-cost loans for healthy food projects that promote healthy food access in food deserts in cities throughout the USA. Loans have been used for store upgrades and expansions, new stores, etc. Education of community members is important to this programming as well.
<b>Massachusetts Food Trust</b>	<a href="#">Massachusetts Food Trust Program</a>	Provides loans and grants for projects dedicated to increased access to healthy food in low-income communities. Loans from \$15,000 to \$300,000. Grants from \$5,000 to \$25,000. Funds can be used for equipment, infrastructure, and general operational costs. Focus on promoting local food sourcing. Grocery stores, co-ops, any businesses that prepare and sell healthy food to the community. Projects must also promote economic growth in the area.
<b>Kansas Healthy Food Initiative</b>	<a href="#">Kansas Healthy Food Initiative</a>	Provides funding and technical assistance to increase access to healthy food to low-income communities in Kansas. Store improvements, business development, distribution contacts, produce/food safety training, food access info, technology, connections in community. Focus on racial equity.