

[Soup Kitchen]
Energy Efficiency Assessment Report & Recommendations
13 March 2024

Introduction

Sarah Lynn Cunningham, PE, Monique Tilford, Glen Dentinger and James Chism of the Louisville Climate Action Network (LCAN) visited the [Soup Kitchen] inner-city campus to assess opportunities to, “spend less on utilities, more on mission.”

[Soup Kitchen]’s Advancement Coordinator, board chair and Warehouse Manager accompanied and assisted LCAN graciously during the formal assessment visit and subsequent visits between then and the finalization of this report.

Form and Function

The facilities consist of two rectangular buildings, tied together: The northernmost older building was built about 30-40 years ago, and has a second-floor storage space. The newer, southernmost addition was built in 20xx. Total square footage is approximately 12,350 sq. ft. Both buildings are constructed of concrete block and have Fiberglas shingles on gabled roofs, oriented on the east-west axis.

The building is occupied from 6am to 4pm daily, with peak operation from 8am to 1pm, Monday through Saturday.

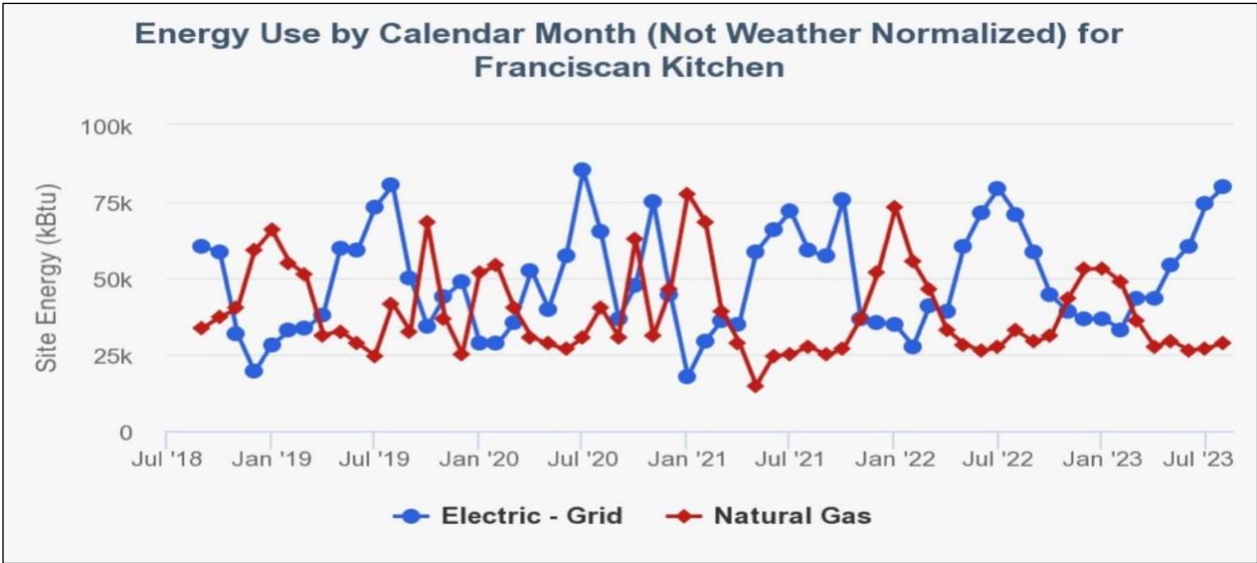
Five or six part-time staff—plus crews of 15-25 volunteers—serve 600-750 meals between 10:30am-12:30pm. Each of the several volunteer crews works one particular weekday of each week or one Saturday each month—making active, effective communication critical to the successful implementation of adopted recommendations, especially changes in behavioral practices.

Baseline Benchmarking

Beginning 15 March 2020 due to the COVID-19 pandemic, meals had to be shifted from dine-in to a take-out model (for all but physically disabled guests). That protocol remains in effect and means both the entrance and exit doors to the dining room tend to stay open for most of the two-hour serving period. It also requires increased use of the heating, ventilation and air conditioning (HVAC) systems plus auxiliary fans during the cooling and heating seasons to keep staff and guests comfortable and healthy.

To create a representative picture, including before the pandemic protocol, LCAN entered five years of [Soup Kitchen]’s gas and electric bills into the USEPA’s Energy Star Portfolio Manager® software. It yielded a **benchmark Energy Use Index of 169 kBTU/ft²**—68% lower than the median for food-service establishments.

However, because [Soup Kitchen] isn’t conditioning an indoor dining room for most guests, is operating many fewer hours than most food-service establishments and has a relatively large warehouse, its comparative ranking should be kept in perspective.



Energy usage for [Soup Kitchen] during the analyzed five-year period includes some atypical spikes and dips compared to usual seasonal patterns that could indicate one or more problems. They also could be due to pandemic protocols, irregular use of energy-intensive cooking equipment and/or other necessary activities. Since [Soup Kitchen]’s power and fuel usage have been typical since the summer of 2022, LCAN will not try to figure out the cause(s) of those historical spikes and dips.

Instead, LCAN offers to have our energy analyst start monitoring [Soup Kitchen]’s gas and electricity usage now that LG&E has installed smart meters there (in late-spring 2023). See related discussion in the Overall Gas and Electricity Usage section, below.

Commendations

Besides being super impressed by the team spirit of the crews who were serving our less fortunate neighbors during our visits, LCAN observed [Soup Kitchen] numerous steps toward a more efficient and greener operation, including the following examples:

- [Soup Kitchen] reuses large quantities of food donated by grocers that otherwise may have ended up in the landfill, where it would create the greenhouse-gases.
- A high percentage of its major appliances are ENERGY STAR® rated.
- Lighting in two spaces is controlled by occupancy sensors. When fluorescent lamps fail, they are upgraded to LED.
- Volunteers deliver recycling to the nearest fire station each week, reducing dumpster and landfill use and related costs.
- Premise sanitation was high, even where it's difficult to maintain.
- Condiments are offered via pump jugs, rather than individual packets, and utensils are no longer wrapped in plastic.

Recommendations

We offer the following recommendations for [Soup Kitchen]'s consideration:

Overall Gas and Electricity Usage

The new smart meters that LG&E recently installed at [Soup Kitchen] allow customers to see their gas and power usage in near real time, including after everyone has gone home for the day. LCAN has an energy analyst ¹ who studies smart-meter data to find savings opportunities, often via low-to-no-cost refinements to equipment operating schedules, thermostat temperature settings, etc. If [Soup Kitchen] granted him access to its smart meters' data, we're optimistic he can find relatively painless savings opportunities.

Lighting

Lighting touches everyone, illustrating to them [Soup Kitchen]'s commitment to efficiency. Relamping can bring attractive rebates from LG&E, leading to payback periods of about one year.

1. Relamp the entire facility using ENERGY STAR® rated LED bulb and tube lamps, keeping the following tips in mind:

¹ He won an award a few years ago for how well he lowered another local nonprofit's utility bills.

- a. Consult the attached LCAN document entitled, *Top Tips for Relamping*[®].
 - b. Choose DLC Qualified Products, as these products are tested to be high performing, especially energy efficient and qualify for LG&E rebates.
 - c. Standardize both bulb and tube lamps to simplify stocking and maintain a uniform look.
 - d. Choose a standard color (or “temperature”) of light, measured in degrees Kelvin (K°). The higher the temperature, the greater visual acuity and the more alert are our brains.
 - e. Reduce the number of lamps within a fixture, known as “delamping,” where no detailed work occurs or any areas currently over-lit. Another approach is to reduce the brightness (lumens) of the new lamps.
 - f. Replace fluorescent tube-lamp fixtures only if the ability to dim is important. If replacing only the lamps, you must wire around the ballast or, better, altogether remove the ballast from the fixture and dispose of it properly. Again, see attached LCAN guidance.
 - g. Dispose of old fluorescent bulb and tube lamps properly. They all contain mercury—even the green capped ones—posing a significant health risk when broken. Rather than (illegally) placing spent lamps in the trash, order prepaid boxes for shipping them for proper disposal OR ensure that your lighting vendor includes that service. LCAN can assist with arrangements, so they are recycled at the regional facility with the best track record.
2. Add occupancy sensors where lights tend to be left on. (Occupancy sensor options are more complicated than is obvious; consult a reliable vendor for the appropriate products.) Given the rotating crews of part-time and volunteer staff and how long lights are on in unoccupied spaces, additional lighting automation would boost convenience and efficiency, especially in the following locations:
- a. Main warehouse (According to the USEPA, adding occupancy sensors to a warehouse can lead to between 35%-54% lighting energy savings.)
 - b. Pantry immediately adjacent to the kitchen, which will require relocating the light switch from the second floor stairwell to the pantry itself; an electrician could relocate it while there to install the occupancy sensor.
 - c. Break room immediately to the right of the volunteer entrance
 - d. Laundry room

Envelope

Since March of 2020, [Soup Kitchen] has added protocols to protect the health of volunteers and guests from COVID-19. While those protocols remain necessary, LCAN identified other areas where the efficiency of the building envelope could be improved.

1. Replace weatherstripping on exterior doors where light is visible around them, since air leaks there, too, plus around the access panel/door from second floor storage area into the attic.
2. Insulate the second-floor storage space if its contents and activities cannot be relocated downstairs or off-site. It lacks insulation on its walls and ceiling, yet is conditioned, without its own thermostat or a return duct. Volunteers working there not surprisingly reported being very uncomfortable in the summer.

Insulating also would better protect the fire suppression system and increase comfort for the volunteers who work there, as well as reduce humidity; if done well, insulating the attic could improve comfort on the first floor, too. (LCAN's additional guidance on insulating is available upon request.)

If the space were no longer used as a workspace and used only for storage, its HVAC could be reduced significantly IF thermostat-controlled heat tape wrapped the fire suppression system to protect it from freezing.

Plumbing and Water Consumption

While water usage for [Soup Kitchen] does not immediately seem out of the ordinary for a food-service establishment, LCAN offers these opportunities for reducing water use and wastewater costs:

1. Dial back the pressure on restroom faucets to reduce water waste.
2. Check faucets for aerators. If aerators are missing, add USEPA WaterSense labeled aerators.
3. Replace any toilets using greater than 3.6 gallons per flush. New WaterSense toilets use 1.6 gallons per flush—some use as little as 1.28 gallons per flush—which could reduce water used for toilets by 20% to 60%. (*Consumer Reports* most recently published evaluations of floor and wall-mounted options.) (We do not recommend waterless urinals.)
4. Fix or replace the leaking temperature-relief valve on the domestic water heater in the utility room off the kitchen.

Heating, Ventilation and Air Conditioning (HVAC)

Typically, the natural gas and electricity used by HVAC systems are the source of most commercial (and residential) customers' biggest utility costs and source of carbon emissions. The following recommendations would lower them:

1. Replace all programmable thermostats with either WiFi-connected programmable thermostats or “smart thermostats” that use programming *and* occupancy sensors to adjust temperature when those spaces are unoccupied. (At least one of the existing thermostats was not running on a schedule when checked.) They also can be controlled remotely, allowing someone at home to return the system to night/weekend set-backs at the end of each day, as well as whenever the building must be closed due to inclement weather.

Note: Such thermostats are eligible for an LG&E “custom rebate.” However, [Soup Kitchen] must apply for and receive approval prior to purchase and installation. LCAN would assist [Soup Kitchen] with applying and, if approved, selecting and programming thermostats.²

2. Secure the thermostats so volunteers cannot adjust them themselves; assign control and monitoring of thermostats to one or two responsible staff member(s).
3. Replace the failed pipe wrap around refrigerant lines with the same closed-cell foam used elsewhere. (It’s the best product for the job.) Cut bevels around “ell” and “tee” joints; glue joints with the manufacturer’s specified “dope” (glue).
4. Re-evaluate conditioning needs within the warehouse vis-à-vis canned goods; program thermostats to prevent freezing in the winter yet ensure efficient operation of walk-in freezers and refrigerators in summer.
5. Install a “smart relay” HVAC control on the garage door in the main warehouse. It would turn the HVAC off automatically whenever the garage door is open, and back on once that door is closed again. [Click here for one off-the-shelf example.](#) LCAN would be willing to try to arrange for a local contractor to design such a system and, either way, to consider paying for it as a demonstration project.
6. Change HVAC filters on a schedule, paying particular attention to the one closest to the kitchen, which clogs faster and may need to be changed monthly, if not more frequently. Assign monitoring and changing of furnace filters to someone and post a replacement log near each HVAC system.
7. Replace exterior portion of dryer vent to prevent outdoor air and pest intrusion.
8. Determine whether [Soup Kitchen]’s indoor walk-in refrigerators and freezers are venting waste heat into the building or outdoors. Either way, consider splitting to send heat into the building during the heating season and otherwise outdoors.

² The rebate would provide \$0.03/kWh saved during the first operating year; the amount may not exceed 75% of the thermostats’ purchase cost.

Waste Management

[Soup Kitchen] expressed interest in reducing its use of (five-compartment) Styrofoam[™] (polystyrene or PS) trays, especially given the number of them that end up as litter on nearby streets, leading to complaints from neighbors. Trays placed in on-site trash bins and the rest of [Soup Kitchen]’s solid waste currently requires a fairly large dumpster.

1. Continue recycling food containers, e.g., shipping cartons, pizza boxes, cans and jugs per the “Last Bite Rule.” For example, pizza boxes may have some grease on them if there’s no more than one bite of pizza left in them; better, shake out that last bite. Similarly, jars with no more than a spoon of peanut butter, mayo, etc., are recyclable. If LCAN understands correctly, that [Soup Kitchen] has switched from PS cups to paper cups, [Soup Kitchen] has the option of recycling them.

Contact Glen Dentinger if [Soup Kitchen] would like LCAN to arrange for someone with WestRock, Inc., to determine whether [Soup Kitchen] might be paid for its recyclables.

2. Consider transitioning from PS trays to trays or plates made of recyclable cardboard or compostable plant waste for the above and other environmental and health reasons.³ One source of affordable alternatives, made from compostable sugarcane (or “bagasse”), is www.webstaurantstore.com. As examples, it offers a 9”, three-compartment [EcoChoice-brand plate](#) for 7.3 cents each, and a [World Centric-brand, five-compartment tray](#) (10”x8½”)—comparable to the 9-cent PS tray that [Soup Kitchen] currently uses—for just over 11 cents each.

If [Soup Kitchen] opted for a recyclable or compostable serving tray or plate, it would generate much less trash and might be able to maintain with a smaller dumpster, the savings for which could offset any additional tray costs.

3. Compost food waste via LCAN member, Louisville Compost Co-op (LCC), whose founder, [Soup Kitchen] and LCAN met recently. [Soup Kitchen] would choose between 5-gal buckets or 20-gal totes for containing the food waste between weekly pick-ups, and figure out a cool place to store them between pick-ups. If [Soup Kitchen] were to switch to biodegradable bagasse trays, they could go into the same bins as food wastes. (LCC tolerates the random fork or other contaminant.)
4. The Louisville Solid Waste Management Services’ [civil servant’s name and email address] can design signage for guiding volunteers and guests on what to put where; [Soup Kitchen] would have to print, laminate and post them.

³ The production of Styrofoam results in greenhouse-gas emissions; Styrofoam can leach toxic chemicals into food depending on the food’s temperature; it takes at least 500 years to degrade.

5. Consider planting more trees on the south edge of the open area where guests may eat their meals. (There already are five-six deciduous conifers along the south property line.) If [Soup Kitchen] were to plant a few more deciduous trees—that wouldn't get so tall as to shade solar panels—they would increase shade and comfort when eating there, as would adding some benches beneath them.⁴

If more guests ate on site, they'd more likely put their trash in the proper bins on their way out, instead of littering. Trees Louisville, Inc., likely would provide the trees, and LCAN would try to recruit volunteers to plant them.

6. Remove the litter blocking the concrete drainage outlets—along the drainage swale on the south property boundary—as often as necessary to allow proper drainage and prevent standing water that likely supports mosquito breeding, potentially dissuading guests from eating in the side yard.
7. Ask the business to your west if it would pick up the abandoned Oil Tech drum and add its contents to their waste oil container IF it were sufficiently compatible. Ask your waste hauler if you may place the large steel drum into your dumpster as it likely is too contaminated to be recycled.

Solar Power

Your best and therefore priority investment should be in energy efficiency, followed by solar power. [Soup Kitchen]'s roofs, especially its newer, southernmost building, has superior solar potential that, if tapped, would lower its electric bills for decades.

Please review the attached LCAN hand-outs before soliciting bids from reliable, appropriately credentialed solar installers. LCAN can assist with identifying the best installers, procuring and evaluating their bids, applying for the rebates—of 30% to 40% of project costs—from the federal government, etc.

Note: We are still gathering information on the mechanics, legality, etc., of a new mechanism for providing most or all of the capital costs of going solar on nonprofit organizations' facilities. We will let you know if we conclude it might make sense for [Soup Kitchen].

⁴ Benches could be a Boy Scout, Girl Scout or Explorer project.

Further Assistance

LCAN is available to assist [Soup Kitchen] as desired with the above items, e.g., finding the right product, soliciting and evaluating bids and confirming that installations or repairs are correct before you pay invoices.⁵

Should [Soup Kitchen] implement any of our recommendations that earn a rebate from LG&E, LCAN will execute the application process on [Soup Kitchen]'s behalf if desired.

Lastly, because we monitor what we measure, we highly recommend continuing to track utilities usage and costs in Portfolio Manager[®]. After our analyst monitors [Soup Kitchen]'s smart meters' data and [Soup Kitchen] implements as many of the above recommendations as it chooses to do in the near-term, LCAN will continue to provide that tracking for 24 months.

⁵ LCAN's Executive Director is a licensed professional engineer who could lose her license if she accepted a finder's fee. You may rest assured that LCAN's counsel is based on professional experience, never kick-backs.