Energy Efficiency and Renewable Energy Strategies

Problem Statement

Like all modern organizations, businesses at The Plant require energy for their day-to-day operations. While we are exploring ways to produce renewable energy on-site, we do not anticipate being able to generate enough renewable energy for the building's use, given the significant power needs that food production requires. What is the next best option open to us and others interested in divestment from damaging fossil fuels? What other strategies can reduce the impacts of our energy usage?

In 2017-18, Testa Produce in the adjacent Stockyards Industrial District reported that its turbine generated enough energy to power their entire building on multiple days.
Photo by Johanna Pacyga.

Hypothesis

Navigating renewable energy options can be a confusing process, but there are options to choose more sustainable power. We believe that the best option open to general consumers, who don't have the ability to produce all their own energy, is sourcing their power from renewable sources through Renewable Energy Certificates (RECs). RECs may be purchased by commercial and residential energy users alike, and they provide an excellent way to support the burgeoning renewable energy sector while reducing the impact of energy needs.

But before you start: decrease your demand!

Importantly, it is critical to establish energy strategies that don't simply focus on procuring renewable power sources, but that reduce energy needs to the extent possible. Keep in mind that renewable technologies would not be possible without reliance on non-renewable resources that produce, store, and transport the energy.

For example, electric vehicles may or may not reduce dependence on fossil fuels, depending on your power source, but they rely on batteries and technology utilizing non-renewable materials. Consider also the negative impacts of driving: traffic, reduced pedestrian safety and comfort, and an enormous amount of paved space required for parking, which increases the urban heat island effect. That electric vehicle or hybrid may be more efficient than a gas-powered car, but walking, biking, and public transportation are always better choices when weighing energy usage as well as the quality of life in cities.

Rationale

According to the U.S. Environmental Protection Agency, the burning of fossil fuels for electricity is one of the largest sources of greenhouse gases in the United States. In 2020, 79% of energy consumed in the U.S. came from fossil fuels and 12% from renewable energy sources. About 17% of all energy produced is used to power residential buildings, with the rest being used for industry, transportation, and commercial purposes. As has been echoed by climate scientists time and time again, the way we source and use energy is a big problem for our environment and is the main cause of climate change. We are already feeling the effects of this changing climate in the form of unpredictable storms and weather. We suffer from extreme heat in the summer, wildfires, flooding, failed crops, hurricanes, rising sea levels, and other natural disasters.

Our anaerobic digester, currently in development, will produce biogas that will be used on-site at The Plant… but we will still need more power for our buildings' needs due to the high energy requirements for producing and storing food.

While Bubbly Dynamics is not yet producing energy on site at The Plant, we are committed to supporting the development and use of renewable energy sources through RECs. While our plan is to use biogas from the anaerobic digester in development within the building for boilers, roasters, and similar equipment, we do not anticipate producing enough renewable energy on-site at either The Plant or Bubbly for all of the heavy power needs in our buildings. (See the Toolkit entry on the anaerobic digester for information on that technology, opportunity for generating energy with a combined heat and power system where local energy codes allow, and more.)

Power companies can not directly provide renewable energy to an individual home or business since the electricity that flows through the grid is powered by a mix of fossil fuels, nuclear energy, and renewables. RECs were created as a mechanism to allow energy customers to select more sustainable sources for their power. Each REC represents a specific

Suppliers vs. Providers

The jargon can get confusing. Consumers only have a choice about their energy **supplier.** However, their **provider** is their local utility company that **provides the infrastructure** that delivers the energy to their property.

amount of energy that has been produced from renewable sources. An energy consumer can opt into purchasing RECs from certified suppliers. After the REC is purchased, the certificate is retired so it may not be sold again, thereby eliminating double-counting of the renewable energy produced. By purchasing RECs, consumers support the use of renewable energy over fossil fuels without having to take the action of running their own wind or solar farm.

Implementation, Part 1: First, Reduce Demand

Even before getting in the weeds of researching energy suppliers that provide renewable sources, start with some basic tips to start reducing your energy consumption immediately, all of which Bubbly Dynamics utilizes and encourages in our buildings as well as personally at our own homes.

- **Power down.** Turn devices off, and unplug appliances when they're not in use. Use a power strip to turn off multiple devices at the same time, avoiding "vampire loads" drawn by idle devices in standby. And turn off lights when you leave the room!
- **Pick better bulbs.** As lightbulbs burn out, replace them with LEDs, which have long lives and use less electricity than conventional incandescents, without the toxic mercury contained in compact florescent bulbs.
- **Choose efficient appliances**. Look for EnergyStar-certified appliances, and run appliances in "eco" mode to save power and water.
- **Insulate**. Work with the weather throughout the seasons. In the fall, check that windows are fully closed and latched to maximize their seals. This is a good time to check for drafty windows or gaps at doors, and caulk or weatherstrip as needed. In summer, open windows on the shady side of the building to let in cool morning air, but be sure to close them as well as shutters or curtains by late morning.
- **Automate.** Thermostats with timers and devices with sensors help keep energy usage low when no one's around. See the Toolkit entry on Smart Metering for a deeper look at building automation systems at The Plant.

Another approach: Hourly pricing

Hourly pricing is a supply rate that allows electricity consumers to pay the market price for electricity in real time instead of a fixed-price rate. Participants can save money by shifting their energy use to times when real-time prices are lower, which is particularly useful during heat waves when energy needs are at their peak.

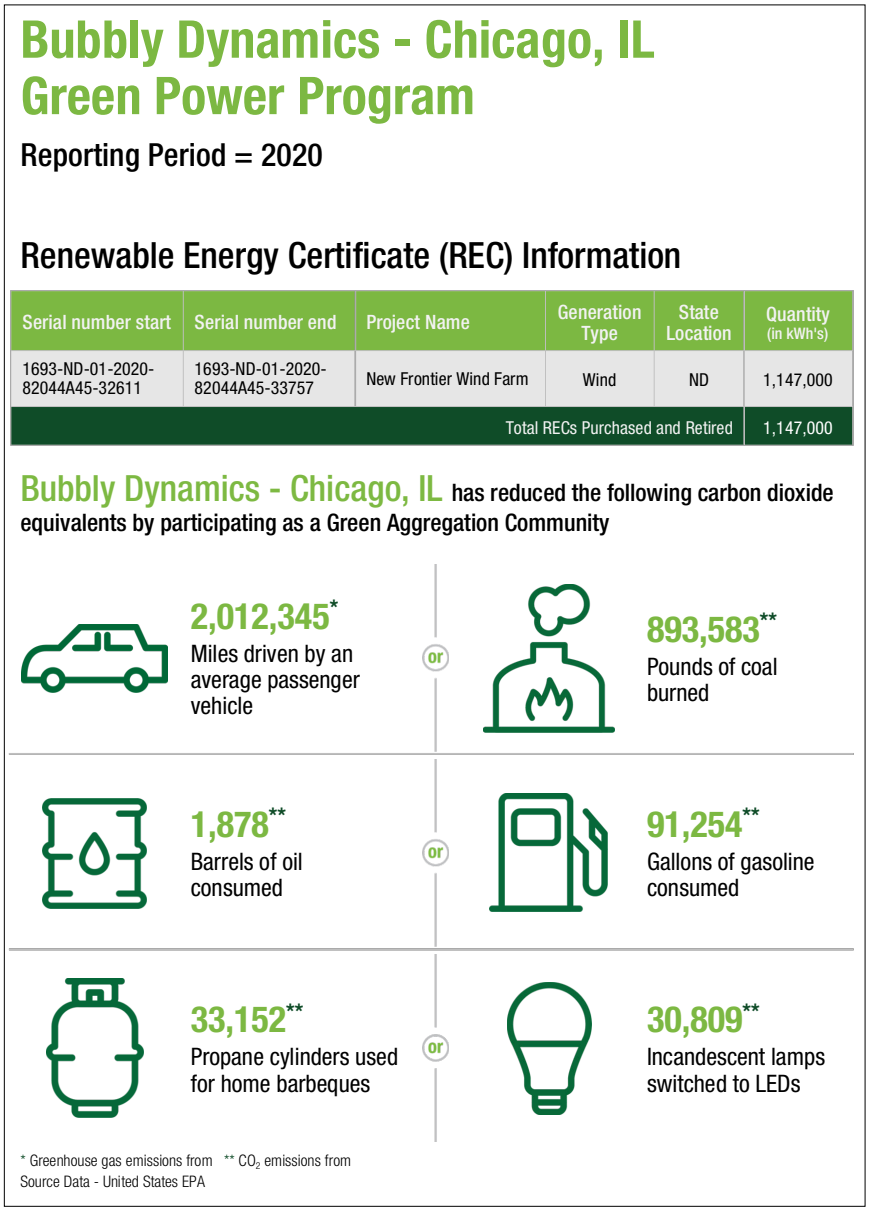
Hourly pricing is typically not an option for commercial or industrial users that have round-the-clock utility needs and are unable to cut usage during those peak times, though it's worth exploring for residential users. See the Resources at the bottom of this document for info on hourly pricing, solar services, and more.

Implementation, Part 2: Exploring Renewable Options

You don't need to be a property owner to be able to choose **renewable energy**. We have learned first-hand that the search for a renewable energy supplier can be a confusing process, but some basic resources can help a consumer navigate the renewable energy options for more sustainable choices. Purchasing RECs for a home or business generally costs slightly more than conventional power, but Bubbly Dynamics was able to find a surprisingly cost-effective solution with a bit of research.

The EPA defines "green power" as energy made from sources that are not just renewable, but also the best possible options in terms of environmental impact. Green power must be sourced from solar, wind, geothermal, biogas, eligible biomass, and low-impact small hydroelectric sources. Because consumers are not able to directly confirm the source of their energy, the EPA recommends first locating green energy suppliers through their website:
https://www.epa.gov/greenpower/locate-green-power-suppliers

After potential suppliers are identified, verify whether the supplier is **Green-e Certified** by checking a database run by the Center for Resource Solutions, a non-profit third-party certifier which works towards consumer protections in the renewable energy market. CRS certifies and independently verifies green power and REC programs annually, confirming that they are legitimate: https://www.green-e.org/certified-resources



Bubbly Dynamics - Chicago, IL
Green Power Program

Reporting Period = 2020

Renewable Energy Certificate (REC) Information

Serial number start	Serial number end	Project Name	Generation Type	State Location	Quantity (in kWh's)
1693-ND-01-2020-82044A45-32611	1693-ND-01-2020-82044A45-33757	New Frontier Wind Farm	Wind	ND	1,147,000
				Total RECs Purchased and Retired	1,147,000

Bubbly Dynamics - Chicago, IL has reduced the following carbon dioxide equivalents by participating as a Green Aggregation Community

2,012,345* Miles driven by an average passenger vehicle
or
893,583** Pounds of coal burned

1,878** Barrels of oil consumed
or
91,254** Gallons of gasoline consumed

33,152** Propane cylinders used for home barbeques
or
30,809** Incandescent lamps switched to LEDs

* Greenhouse gas emissions from ** CO_2 emissions from
Source Data - United States EPA

Courtesy of MC Squared Energy Services.

Project Benefits

Choosing renewable energy sources creates many benefits and efficiencies; producing your own renewable energy is even better! Consider seeking incentives if you are a relatively small (that is, a household or office) user. And don't forget to take action to reduce your energy usage!

Energy Efficiencies

Renewable energy is the only way to ensure that our need for power doesn't destroy our planet. RECs are a simple way for energy users of all types to influence a move away from fossil fuels and reduce the impact of their household or business.

Materials + Resource Efficiencies

Fossil fuels are a finite resource. Renewable energy is the way forward for economic, national security, environmental, and other reasons. But remember that reducing your energy usage is part of the equation: renewable energy is not a substitute for energy reduction! Reduced energy usage also decreases reliance on non-renewable materials needed to produce, store, and transfer energy – think of the enormous amount of battery horsepower needed to power electric vehicles, or to store renewable energy once generated!

Land Use Efficiencies

Choosing renewable energy helps reduce one's environmental impact including the amount of land used for the production of fossil fuels such as coal and oil. As renewable energy becomes more widely used, fragile pipelines that are prone to leaking and environmental contamination will be less common. Keep in mind that reducing energy usage also decreases the amount of non-renewable resources required to provide power from either renewables or fossil fuels.

Air Quality Benefits

The burning of fossil fuels releases particles into the air that are unhealthy to breathe. A switch to renewables would remove a major source of air pollution.

Social Benefits

Using renewable energy ensures a healthier environment and cleaner air for all, especially those in disinvested and minority communities, which tend to be located closer to coal- and oil-powered power plants.

Additional Resources

Renewable Energy

Elevate Energy. (2022). *Smart electricity options*. https://www.elevatenp.org/smart-electricity-options/

Elevate Energy. (2022). *Solar property services*. https://www.elevatenp.org/solar-property-services/

Center for Resource Solutions. (2022). *Find Green-e certified products and companies*. https://www.green-e.org/certified-resources

Testa Produce. (2018). *Our facility; energy news*. http://www.testaproduce.com/warehouse.html

United States Energy Information Administration. (2021, May 14). *U.S. energy facts explained – consumption and production*. Retrieved July 30, 2021 from https://www.eia.gov/energyexplained/us-energy-facts

United States Environmental Protection Agency. (2021). *Climate change indicators: residential energy use*. Retrieved July 30, 2021 from https://www.epa.gov/climate-indicators/climate-change-indicators-residential-energy-use

Energy Efficiency

Elevate Energy. (2022). *Energy Efficiency*. https://www.elevatenp.org/energy-efficiency/

EnergySage. (2022, February 22). *Reducing energy use and costs*. https://www.energysage.com/energy-efficiency/101/ways-to-save-energy/

Lagas, B. (2017, May 17). Seven tips to reduce energy costs. *Manufacturing Innovation Blog of the National Institute of Standards and Technology, United States Department of Commerce*. https://www.nist.gov/blogs/manufacturing-innovation-blog/7-tips-reduce-energy-costs

United States Department of Energy. (n.d.). *Reducing energy use and costs*. https://www.energy.gov/energysaver/reducing-electricity-use-and-costs

United States Environmental Protection Agency. (2016). *Climate footprint calculator*. https://www3.epa.gov/carbon-footprint-calculator/

United States Environmental Protection Agency and Department of Energy. (n.d.). *Energy Star*. https://www.energystar.gov/

Lessons learned: Researching green energy supply options

When Bubbly Dynamics started the process of seeking a green energy supplier, we came across company reps who were poorly equipped to answer questions about their renewable options. If the sales reps can't clearly explain their options, try another company!

For Illinois, we like Chicago-based MC Squared Energy Services, which we've used for our buildings since 2019. They offer 100% wind through their Green Option Price Plan, and they provide clear end-of-year reporting that explains the power of our RECs. The price for RECs has gone up in recent years to reflect the demand created by corporate and governmental sustainability policies, but it can still be quite reasonable to use RECs for at least a portion of supply needs.