Case Study at GrowGood

A Study Conducted by:

A Navigant Consulting Program,
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The California Sustainability Alliance (the Alliance) is an innovative market transformation program funded by California utility customers under the auspices of the California Public Utilities Commission. The Alliance leverages action on environmental initiatives such as climate, smart land use and growth, renewable energy, waste management, water use efficiency and transportation planning to help the State of California achieve its aggressive energy efficiency goals more effectively and economically. In partnership with public and private organizations throughout California, the Alliance precipitates widespread market transformation by tackling major barriers to sustainability.

For information about the California Sustainability Alliance, go to:

www.sustainca.org

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EXECUTIVE SUMMARY

Background
The research team conducted a case study at GrowGood in Bell, California in the fall of 2016. Included in this case study is an overview of GrowGood’s operations and its current and future infrastructure, challenges, and opportunities. The primary driver behind this case study is to highlight an urban farm in Los Angeles (LA) and to share its best practices, lessons learned, and areas of opportunity.

GrowGood is a non-profit organization that partners with the Salvation Army Bell Shelter to provide fresh produce from a 1.5 acre plot of land to the shelter kitchen. GrowGood started in 2012 with unused land that the Salvation Army lent to Brad Pregerson. With the help of volunteers, the organization started constructing vegetable gardens and has been progressing ever since with new people taking the helm of the farm. Due to the flexibility of the shelter, GrowGood is able to constantly expand its operations. In 2016, the farm produced 6,000 pounds of food and has plans to produce more than 18,000 pounds of food in 2017. The primary crops grown at GrowGood include cucumber, tomatoes, squash, lettuce, carrots, and beets. A majority of the produce grown at GrowGood goes to feed the 300 individuals served by the shelter kitchen, but the farm operators have plans to start generating a profit on the side with their excess produce.

Significant Findings
The primary findings from this case study are summarized below.

GrowGood uses minimal energy onsite, which is similar to other urban farms in LA. It is common for urban farmers in LA to primarily rely on water onsite and to have minimal energy needs. GrowGood has plans to expand its operations, which will introduce new energy requirements such as greenhouse fans. Almost all urban farmers lack dedicated metering of water and energy usage although they readily admit the need to track usage to monitor efficiencies of irrigation and associated growing and processing systems.

Subsidies and grants are critical to securing the long-lasting success of urban farms. Limited funds are one of the biggest bottlenecks at GrowGood and other urban farming operations because it restricts their ability to upgrade the efficiency of operations. GrowGood is interested in learning about ways to improve its energy and water efficiency onsite, but the organization has limited funds to execute all of the improvements that it would like.

Urban farms can have a large social impact. Urban farms like GrowGood are a great way to bring the community closer to the source of their food. There are many areas of
opportunity for increasing the impact of urban farms on the community, such as hosting workshops, farm-to-table dinners, and school field trips.

**GrowGood has minimal communication with its utilities.** Since GrowGood operates under the umbrella of the Salvation Army, it does not see utility bills or communicate with utility representatives. In the future, GrowGood would like to establish a relationship with its utilities to determine ways to improve the efficiency of its operations and to more easily expand its operations. The most significant contribution that utilities can offer to current and potential urban farmers is a coordinated effort to provide education to growers on how to optimize energy and water resources.

**The zoning and permitting process is cumbersome and time intensive.** Zoning and permitting is a significant barrier to entry for urban farmers. GrowGood is in the design phase of building a new greenhouse onsite, and the zoning and permitting process has been incredibly cumbersome, which is a common experience for urban farmers in LA.

**There is limited sharing of information among urban farmers.** Over the years, GrowGood has encountered many obstacles and has determined many best practices, but there is not a centralized platform to share this information with other farmers. There is a significant opportunity to increase the collaboration between urban farmers, suppliers, utilities, government officials, and subject matter experts.

**Organization of the Report**
The report is organized into the following sections:

- **SECTION 1: Introduction** provides a summary of the case study, the methodology for data collection, and an overview of the sections covered in the guidebook.
- **The primary goal of the** case study at GrowGood is to provide utility managers with an example of a successful and representative urban farm in Los Angeles (LA) and to inform them of the infrastructure, challenges, and areas of opportunity for urban agriculture in LA. The research team conducted a case study at GrowGood in the fall of 2016, which involved multiple phone conversations, as well as several walkthrough visits of the facility. The primary source of the information came from interviews with Corinne McAndrews, a farmer and manager at GrowGood. The research team also spoke with Jayne Torres, the program cultivator at GrowGood.

Throughout the course of the various touchpoints with GrowGood, the research team gathered information about the organization’s annual production, infrastructure, plans for expansion, crop rotation, energy and water use, challenges, interaction with utilities, post-harvest processing, and areas of opportunity. The research team also leveraged the
analysis done by a Whittier College undergraduate student that interned at GrowGood in 2015 and collected detailed data on the farm’s infrastructure and irrigation habits.

- **SECTION 2: Overview of GrowGood** provides an overview of GrowGood, including the organization’s history, crop rotation, and how it operates.
- **Source: GrowGood** ([http://www.grow-good.org/what-we-do/](http://www.grow-good.org/what-we-do/))

Almost all of the food production is used to support meals at the Salvation Army facility, however GrowGood has future plans to sell high-value agricultural products to upscale markets, restaurants, farmers markets, and other distribution points. The largest expense at GrowGood is labor—the second largest expense is tools and seeds. The organization has started to offset expenses by selling tea leaves and small greens on the side, but it plans to increase profits over the next few months as it expands operations. Figure 2 shows the greenhouse that GrowGood currently uses for seedlings, but the organization plans to add a second, more robust greenhouse in 2017 that will be funded by a grant from Disney.

**Figure 2: Photo of the current greenhouse at GrowGood. The organization plans to add a second greenhouse in 2017.**

Source: **Alliance**

- **SECTION 3: Infrastructure at GrowGood** provides an overview of the current and future infrastructure at GrowGood.
- **GrowGood received an Urban Farms** designation by the City of Bell in late 2016 that made the organization “official” in respect to its relationship with the city. GrowGood is in the design and development phase of constructing a second, more robust greenhouse, which has required many discussions with the City of Bell. The new greenhouse will be sized to fit an empty parking area adjacent to the growing section. The local Salvation Army management has been very supportive of the initiative to plan and operate a new greenhouse to increase food production and provide skills training.

**The New Greenhouse**

Corinne McAndrews of GrowGood has served as the lead plan developer to install the new greenhouse. Corrine identified and subsequently negotiated a greenhouse construction bid through Conley’s, a large and innovate greenhouse manufacturer located in Montclair, California. GrowGood submitted the proposed greenhouse plans to the City of Bell and unless there are unexpected delays, the goal is to start construction as soon as possible in 2017.

GrowGood plans to install a Gable Series 7500 greenhouse by early spring 2017, illustrated in Figure 6 below. The proposed Gable Series 7500 greenhouse will include the following design features:

- 30’ wide by 48’ long with 8’ gutter height
- Galvanized steel frame with pre-punched hole and bolt design
• Engineered to withstand 85 mph winds
• Two 24” single speed exhaust fans and four horizontal airflow fans
• One 4’ tall by 30’ long 6” evaporative cooling system
• Heat system not yet required or requested
• Tentative plan to install dedicated water and natural gas meters

Figure 6: Example of a Gable Series 7500 greenhouse

Assuming that the greenhouse uses mobile benches for growing operations, Conley’s estimates that 85% of the 1,440 square foot greenhouse will be used for growing purposes. The remaining space is typically used for walkways, tools, and equipment.

Crop Strategy
In respect to its crop strategy, GrowGood believes in the eight principles that constitute biointensive agriculture and hopes to actualize them in the new greenhouse operation. Biointensive agriculture is an organic agricultural system that focuses on achieving maximum yields from a minimum area of land, while simultaneously increasing biodiversity and sustaining the fertility of the soil. The eight principles of biointensive planting include:

1. Deep Soil Preparation, typically to a depth of 24” for aeration, so that the roots can access more nutrients, hold more water, and generally have more room to grow.
2. Composting using cured compost that replenishes plant beds by nourishing the good soil microbes by unlocking nutrients and buffering PH.

3. Intensive Planting by often planting hexagonally and maximizing the amount of production calories.

4. Carbon Farming, which is an extension of growing compost as plants take carbon from the air and turn it into physical plant material.

5. Calorie Farming, which focuses on growing crops that are high in calories and that support long-term fertility.

6. Companion Planting, which supports well-balanced growing that helps fix nitrogen and shading the soil with the goal of creating as much biodiversity as possible and leveraging the unique characteristics of each crop.

7. Open Pollinated Seeds that are pollinated naturally and allow seed selection from the best and most vigorous plants.

8. Finally, the Whole System Method, which is based on integrating all of the principles to grow significant amounts of food and sustain/enhance soil fertility.

By using the biointensive approach, the new greenhouse could support up to eight crop rotations, ranging from three tomato rotations in a year to eight micro-green or other short crop rotations.

**Greenhouse Energy and Water Use Considerations**

The lifecycle for a properly maintained greenhouse is about 20 years, although some “reskinning” of the side walls may be required throughout the lifetime of the greenhouse. The Gable 7500 is considered highly customizable and can accommodate both stationary and mobile growing benches. There are many variables that can significantly affect the water and energy usage of a greenhouse, including tailoring irrigation technologies to specific plant types and weather conditions. The research team gathered the following insight on greenhouses based on discussions with manufacturers, researchers at the University of California, experts at the County Ag Extension, and urban farmers.

- Greenhouses require daily irrigation and have the potential for optimizing water use and recycling approaches, including collection structures and disinfection practices.
- The use of drip systems versus overhead/misting systems can result in water savings of 30% to 40%, with the potential for savings as high as 70% to 80% for advanced drip systems.
A 30 foot by 48 foot greenhouse using rolling benches could allow for 80% to 85% of the square footage to be used for growing crops, with the remaining space being used for aisles, storage, etc. Fixed benches would probably support 60% to 70% of the growing space to be used for growing crops.

Greenhouse heating and cooling is far more efficient when using natural gas than propane (15% to 20% more efficient) in addition to reducing delivery and tank costs that add to operating expenses.

The use of a condensing style boiler could operate between 83% and 88% efficiency, although some leading edge units can reach about 92% efficiency.

Another possible option to increase natural gas efficiency is to use a gas-fired radiating type boiler with aluminum under bench fin tubes that can circulate warm water to enhance soil and growing conditions.

The other standard option is to use an overhead boiler; in greenhouses, external temperatures vary significantly as overhead boilers can boost soil temperatures between 25% and 30% over ambient air temperature.

**SECTION 4: Challenges** provides the challenges encountered at GrowGood, including permitting, financials, and zoning.

**SECTION 5: Opportunities** provides areas of opportunity to address the challenges encountered at GrowGood, including education and partnerships.

*GrowGood provides a clear demonstration* that vision and social commitment are powerful ingredients in making urban farms successful. There are many roadblocks that can hinder the lifespan of urban farms of any size and scope. Local utilities have the unique opportunity to contribute to the establishment and progress of said activities. For example, GrowGood would benefit from an efficiency program and technical support from its natural gas, electric, and local water utilities. Specifically, a collaborative partnership could include representatives from Southern California Gas Company, Southern California Edison, local water retailers (California Water Company and Golden State Water Company), and the Central Basin Municipal Water District (wholesaler). Another key potential partner would include one of the environmental representatives available from Supervisor Hilda Solis’ office, as these representatives have been actively engaged with other urban agriculture projects in the Supervisor’s district.

GrowGood has developed strong relationships with several key equipment providers such as Netafim (irrigation specialists), and it is anticipated that other equipment and system providers will be consulted as the organization’s new greenhouse takes shape. In addition to the equipment providers, GrowGood has developed an ongoing relationship with Whittier College who has provided interns and volunteers to help on the farm. GrowGood has served as a hands-on field classroom for several classes in environmental science and studies at the college. Whittier College professors have partnered with GrowGood both in the classroom and in the field. GrowGood plans to develop similar relationships with other educational institutions, including East Los Angeles City
College and several of the local high schools seeking new learning venues for their students.

The new greenhouse installation provides an excellent opportunity for GrowGood and its Salvation Army supporters to promote sustainable urban agriculture that nourishes people while being environmentally responsible and generating economic value. GrowGood anticipates providing 6- to 12-month job skill training opportunities for up to 10 individuals per training cycle. A key goal of the organization’s new greenhouse is to empower individuals who are recovering from various life distresses so that they can contribute and learn from holistic growing operations. GrowGood anticipates productions that support external sales to restaurants, food distributors, and other agencies that will open employment opportunities.

- SECTION 6: Conclusions and Recommendations provides conclusions and recommendations based on the research conducted as part of the case study.
SECTION 1: Introduction

The primary goal of the case study at GrowGood is to provide utility managers with an example of a successful and representative urban farm in Los Angeles (LA) and to inform them of the infrastructure, challenges, and areas of opportunity for urban agriculture in LA. The research team conducted a case study at GrowGood in the fall of 2016, which involved multiple phone conversations, as well as several walkthrough visits of the facility. The primary source of the information came from interviews with Corinne McAndrews, a farmer and manager at GrowGood. The research team also spoke with Jayne Torres, the program cultivator at GrowGood.

Throughout the course of the various touchpoints with GrowGood, the research team gathered information about the organization’s annual production, infrastructure, plans for expansion, crop rotation, energy and water use, challenges, interaction with utilities, post-harvest processing, and areas of opportunity. The research team also leveraged the analysis done by a Whittier College undergraduate student that interned at GrowGood in 2015 and collected detailed data on the farm’s infrastructure and irrigation habits.

SECTION 2: Overview of GrowGood

GrowGood is a non-profit organization that partners with the Salvation Army Bell Shelter to provide fresh produce from a 1.5 acre plot of land to the shelter kitchen. The Salvation Army Bell Shelter opened in January 1988 with help from Judge Harry Pregerson, who recognized a critical need for an emergency shelter for homeless people in southeast LA County. The shelter is located in a converted 40,000 square foot hangar formerly used as a US Army air base in the City of Bell. GrowGood started in 2012 with unused land that the Salvation Army lent to Brad Pregerson. With help from volunteers, the organization started constructing vegetable gardens and has been progressing ever since with new people taking the helm of the farm.

Brad Pregerson was a volunteer at the homeless shelter and noticed that with a budget of $200 for fresh produce, the shelter was serving 6,000 meals a week. Brad and his friend Andrew Hunt went to work on the vacant lot adjacent to Building B of the Bell Shelter. In 2009, Brad constructed 12 raised beds for vegetables in the 1.5 acre plot adjacent to the shelter. Slowly, the garden started to supply some fresh organic produce to the shelter. In 2011, GrowGood was founded to provide food for the shelter’s kitchen, to help the residents by employing and training them, and to have a therapeutic green space for healing.

There is an average of four full-time people working on the farm at any given point in the year, but the number of employees is constantly changing because of employees coming and going due to other opportunities. Jayne Torres and Corinne McAndrews have taken over the farm and are constantly expanding it to grow more produce and conserve more resources. The Salvation Army supplies veterans to volunteer at the farm,
which allows Jayne and Corinne to more easily execute their plans for expansion. All members of the urban farm team are provided a core education about soil health and maintenance, as well as instruction on how to maintain row beds and other growing operations.

GrowGood grows a wide variety of crops throughout the year. In the summer, the farm’s primary crops are cucumber, tomatoes, and squash. Over the winter, its primary crops are lettuce, carrots, and beets. Other common crops include spices, fava beans, turnips, garlic, onions, and native plants. GrowGood also grows unusual herbs and homeopathic remedies, including several types of teas and other remedies used by the local population. The annual production of the farm at GrowGood has continued to increase over the years. As seen in Figure 1, GrowGood produced 2,000 pounds in 2015 and by 2017 plans to produce 18,000 pounds of food.

Figure 1: Food production at GrowGood between 2015 and 2017

![Food Production at GrowGood](image)

Source: GrowGood (http://www.grow-good.org/what-we-do/)

Almost all of the food production is used to support meals at the Salvation Army facility, however GrowGood has future plans to sell high-value agricultural products to upscale markets, restaurants, farmers markets, and other distribution points. The largest expense at GrowGood is labor—the second largest expense is tools and seeds. The organization has started to offset expenses by selling tea leaves and small greens on the side, but it plans to increase profits over the next few months as it expands operations. Figure 2 shows the greenhouse that GrowGood currently uses for seedlings, but the organization plans to add a second, more robust greenhouse in 2017 that will be funded by a grant from Disney.
SECTION 3: Infrastructure at GrowGood

This section discusses the current infrastructure at GrowGood as well as plans to build a second greenhouse in 2017 that will greatly increase the farm’s annual food production.

Current Infrastructure

GrowGood started out by having raised beds as its primary infrastructure for growing crops. GrowGood began its operations with crops that are easier to grow, such as lettuce, before expanding into more complex crops. Due to its early success with simple crops, the organization expanded to larger plots and a more diverse array of crops. GrowGood is constantly expanding and improving its infrastructure. Its current infrastructure includes raised beds, trellises, and a small greenhouse for seedlings. GrowGood plans to add a second, more robust greenhouse in 2017 using a grant received from Disney. Figure 3 shows a diagram of the infrastructure at GrowGood, which was last updated in 2015.
The irrigation needs at GrowGood are met through the use of drip tape,\(^1\) hoses, and sprinklers. GrowGood is constantly increasing the amount of drip tape and replacing damaged drip tape throughout the farm to ensure it is adequately meeting all crop needs. The drip tape is currently on a Rain Bird timer to ensure that the crops are being irrigated at the right time with the optimal amount of water, but the farm has plans to upgrade to a more sophisticated system in the near future.

\(^1\) Drip tape is a type of drip irrigation.
Figure 4: Trellises (brown posts) and drip tape (black hoses) at GrowGood

The primary resource used onsite is water, but the farm has plans to use energy in a new greenhouse that will be installed in 2017. The water bills for the farm are paid by Salvation Army, and therefore GrowGood is unable to closely monitor its water consumption. In the future, GrowGood would like to track its water use to make sure it is using resources as efficiently as possible. GrowGood does not currently track its energy use because the organization uses such a minimal amount and the utility bills are paid by the shelter. The only parts of GrowGood’s operations that use energy are the the irrigation timers. The new greenhouse will rely on energy to power fans, as well as for heating.

During the summer of 2015, an undergraduate student at Whittier College completed an internship at GrowGood where they characterized the irrigation systems and determined the water applied per week to each section of the farm. When the undergraduate student completed the 2015 study, the farm was 46,000 square feet. GrowGood has now expanded to 65,000 square feet and as a result current water consumption is higher, but this information gives a sense for the size and complexity of the farm’s operations. Table 1 provides a summary of the size, management strategy, irrigation system, and water consumption of each section in the farm. As seen below, the row crops consume the largest amount of water each week, followed by the orchards. The consumption data below could be used by utility program managers to determine ways to improve the organization’s water management strategies. GrowGood does not have access to its water meter, so the 2015 study done is the only detailed information available for the farm. In future years, GrowGood would like to more closely monitor its water consumption.
Table 1: Infrastructure and water consumption data for GrowGood

<table>
<thead>
<tr>
<th>Section</th>
<th>Size (ft²)</th>
<th>Management</th>
<th>Irrigation System</th>
<th>Gallons of Water/Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garden</td>
<td>1,440</td>
<td>16 raised beds (12 ft x 5 ft)</td>
<td>Brown drip tape (0.9 gal/hr)</td>
<td>792</td>
</tr>
<tr>
<td>Section A</td>
<td>4,000</td>
<td>Row crop</td>
<td>Black drip tape (0.6 gal/hr)</td>
<td>1,200</td>
</tr>
<tr>
<td>Section B</td>
<td>4,800</td>
<td>Row crop</td>
<td>Black drip tape (0.6 gal/hr)</td>
<td>1,728</td>
</tr>
<tr>
<td>Section C</td>
<td>3,200</td>
<td>Row crop</td>
<td>Black drip tape (0.6 gal/hr)</td>
<td>1,152</td>
</tr>
<tr>
<td>Natives</td>
<td>11,000</td>
<td>Natural growth</td>
<td>Hand watered (2 gal/ plant, 2x/week)</td>
<td>150</td>
</tr>
<tr>
<td>Orchard</td>
<td>22,000</td>
<td>69 fruit trees</td>
<td>Circular drip tape (0.9 gal/hr)</td>
<td>1,304</td>
</tr>
<tr>
<td>Hoop House</td>
<td>900</td>
<td>Starters</td>
<td>Misters (10 gal/hr, 10 min/day)</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>47,340</td>
<td>Varying</td>
<td></td>
<td>6,370</td>
</tr>
</tbody>
</table>

Source: Whittier College undergraduate student.

Six years after Brad Pregerson first initiated the garden, the farm now looks very different. Currently, the farm accounts for 16 raised vegetable beds measuring 12 feet by 5 feet each that comprehensively cover a surface of approximately 1,440 square feet (see Figure 5). The farm also includes a hoop house greenhouse, which is a 900 square foot tent-like structure that is currently utilized to grow seedlings in preparation for field planting. The farm also includes a native plants section, an orchard, three different sections with about 20 or more rows of cultivated produce, and a chicken coop.

Figure 5: Raised beds (left) and hoop house (right) used for seedling production

Source: Alliance
As of 2016, the orchard section includes 69 fruit trees of various species, including several citrus plants. The native plants section spans over approximately 11,000 square feet of land. The overall layout of the farm covers a total surface of 1.5 acres, which is constantly increasing as GrowGood expands its operations.

**Future Infrastructure**

GrowGood received an Urban Farms designation by the City of Bell in late 2016 that made the organization “official” in respect to its relationship with the city. GrowGood is in the design and development phase of constructing a second, more robust greenhouse, which has required many discussions with the City of Bell. The new greenhouse will be sized to fit an empty parking area adjacent to the growing section. The local Salvation Army management has been very supportive of the initiative to plan and operate a new greenhouse to increase food production and provide skills training.

**The New Greenhouse**

Corinne McAndrews of GrowGood has served as the lead plan developer to install the new greenhouse. Corrine identified and subsequently negotiated a greenhouse construction bid through Conley’s, a large and innovate greenhouse manufacturer located in Montclair, California. GrowGood submitted the proposed greenhouse plans to the City of Bell and unless there are unexpected delays, the goal is to start construction as soon as possible in 2017.

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- One 4’ tall by 30’ long 6” evaporative cooling system
- Heat system not yet required or requested
- Tentative plan to install dedicated water and natural gas meters
Figure 6: Example of a Gable Series 7500 greenhouse

Source: Conley’s Greenhouses Manufacturing and Sales.

Assuming that the greenhouse uses mobile benches for growing operations, Conley’s estimates that 85% of the 1,440 square foot greenhouse will be used for growing purposes. The remaining space is typically used for walkways, tools, and equipment.

**Crop Strategy**

In respect to its crop strategy, GrowGood believes in the eight principles that constitute biointensive agriculture and hopes to actualize them in the new greenhouse operation. Biointensive agriculture is an organic agricultural system that focuses on achieving maximum yields from a minimum area of land, while simultaneously increasing biodiversity and sustaining the fertility of the soil. The eight principles of biointensive planting include:

9. Deep Soil Preparation, typically to a depth of 24” for aeration, so that the roots can access more nutrients, hold more water, and generally have more room to grow.

10. Composting using cured compost that replenishes plant beds by nourishing the good soil microbes by unlocking nutrients and buffering pH.

11. Intensive Planting by often planting hexagonally and maximizing the amount of production calories.
12. Carbon Farming, which is an extension of growing compost as plants take carbon from the air and turn it into physical plant material.

13. Calorie Farming, which focuses on growing crops that are high in calories and that support long-term fertility.

14. Companion Planting, which supports well-balanced growing that helps fix nitrogen and shading the soil with the goal of creating as much biodiversity as possible and leveraging the unique characteristics of each crop.

15. Open Pollinated Seeds that are pollinated naturally and allow seed selection from the best and most vigorous plants.

16. Finally, the Whole System Method, which is based on integrating all of the principles to grow significant amounts of food and sustain/enhance soil fertility.

By using the biointensive approach, the new greenhouse could support up to eight crop rotations, ranging from three tomato rotations in a year to eight micro-green or other short crop rotations.

**Greenhouse Energy and Water Use Considerations**

The lifecycle for a properly maintained greenhouse is about 20 years, although some “reskinning” of the side walls may be required throughout the lifetime of the greenhouse. The Gable 7500 is considered highly customizable and can accommodate both stationary and mobile growing benches. There are many variables that can significantly affect the water and energy usage of a greenhouse, including tailoring irrigation technologies to specific plant types and weather conditions. The research team gathered the following insight on greenhouses based on discussions with manufacturers, researchers at the University of California, experts at the County Ag Extension, and urban farmers.

- Greenhouses require daily irrigation and have the potential for optimizing water use and recycling approaches, including collection structures and disinfection practices.
- The use of drip systems versus overhead/misting systems can result in water savings of 30% to 40%, with the potential for savings as high as 70% to 80% for advanced drip systems.
- A 30 foot by 48 foot greenhouse using rolling benches could allow for 80% to 85% of the square footage to be used for growing crops, with the remaining space being used for aisles, storage, etc. Fixed benches would probably support 60% to 70% of the growing space to be used for growing crops.
• Greenhouse heating and cooling is far more efficient when using natural gas than propane (15% to 20% more efficient) in addition to reducing delivery and tank costs that add to operating expenses.
• The use of a condensing style boiler could operate between 83% and 88% efficiency, although some leading edge units can reach about 92% efficiency.
• Another possible option to increase natural gas efficiency is to use a gas-fired radiating type boiler with aluminum under bench fin tubes that can circulate warm water to enhance soil and growing conditions.
• The other standard option is to use an overhead boiler; in greenhouses, external temperatures vary significantly as overhead boilers can boost soil temperatures between 25% and 30% over ambient air temperature.

SECTION 4: Challenges
Since GrowGood opened in 2012, the organization has encountered many challenges along the way. The challenges below are a combination of obstacles that GrowGood has specifically encountered, as well as obstacles that other urban farmers in LA have encountered.

Short leases make it difficult for long-term planning. Agriculture leases range between 1 and 5 years on average, which is not long considering all of the time and money required to start an urban farm. GrowGood suggests that agriculture leases be longer than 1 year and preferably longer than 5 years. Short leases make it difficult for urban farmers to make long-term investments in their infrastructure.

Limited availability of skilled labor. There is a shortage of skilled labor in urban farming, which makes it difficult for urban farms like GrowGood to maintain crops. GrowGood invests a lot of time bringing workers up to speed on its operations, but it would be helpful if there was a program in place to develop skilled laborers in urban farming instead of the urban farmers carrying that burden themselves.

Small profit margins. It is hard for small farms to compete with large farms, making it difficult for urban farmers to make a profit. It would be helpful if there were incentives available to small urban farmers that would help cut their costs and make them more competitive with larger farms.

Limited accessibility to land. Most urban farmers operate on a 1 acre plot and do not have the option to expand. GrowGood is fortunate in its setup because the organization is located on the property of the Salvation Army, which makes expansion efforts more easy to implement. Most small farmers have to go through many hurdles to expand their operations.

Zoning and permitting process is complex and time intensive. GrowGood has had to go through many hurdles to get its new greenhouse approved by the city. The zoning...
and permitting process takes a lot of time and money to get approval on new projects. It would be helpful if the permitting process was simpler or if the growers were provided assistance from the county to fill out the necessary paperwork.

**Limited sharing of information.** There is not a centralized channel for the sharing of information, which makes it difficult to stay on top of best practices. It would be easier if there was a better platform for the sharing of information, such as a centralized website with a forum that urban farmers, suppliers, utilities, and subject matter experts can contribute to.

**SECTION 5: Opportunities**

GrowGood provides a clear demonstration that vision and social commitment are powerful ingredients in making urban farms successful. There are many roadblocks that can hinder the lifespan of urban farms of any size and scope. Local utilities have the unique opportunity to contribute to the establishment and progress of said activities. For example, GrowGood would benefit from an efficiency program and technical support from its natural gas, electric, and local water utilities. Specifically, a collaborative partnership could include representatives from Southern California Gas Company, Southern California Edison, local water retailers (California Water Company and Golden State Water Company), and the Central Basin Municipal Water District (wholesaler). Another key potential partner would include one of the environmental representatives available from Supervisor Hilda Solis’ office, as these representatives have been actively engaged with other urban agriculture projects in the Supervisor’s district.

GrowGood has developed strong relationships with several key equipment providers such as Netafim (irrigation specialists), and it is anticipated that other equipment and system providers will be consulted as the organization’s new greenhouse takes shape. In addition to the equipment providers, GrowGood has developed an ongoing relationship with Whittier College who has provided interns and volunteers to help on the farm. GrowGood has served as a hands-on field classroom for several classes in environmental science and studies at the college. Whittier College professors have partnered with GrowGood both in the classroom and in the field. GrowGood plans to develop similar relationships with other educational institutions, including East Los Angeles City College and several of the local high schools seeking new learning venues for their students.

The new greenhouse installation provides an excellent opportunity for GrowGood and its Salvation Army supporters to promote sustainable urban agriculture that nourishes people while being environmentally responsible and generating economic value. GrowGood anticipates providing 6- to 12-month job skill training opportunities for up to 10 individuals per training cycle. A key goal of the organization’s new greenhouse is to empower individuals who are recovering from various life distresses so that they can...
Contribute and learn from holistic growing operations. GrowGood anticipates productions that support external sales to restaurants, food distributors, and other agencies that will open employment opportunities.

SECTION 6: Conclusions and Recommendations

GrowGood has seen exponential growth in its farming operations over the past few years and will continue to increase in size in the coming years. Over the years, GrowGood has encountered many hurdles that it hopes to share with other urban farmers in the area. Below are key conclusions and recommendations that the research team has developed through the case study at GrowGood.

Conclusions

The GrowGood story is a testimony to the efforts of a small group of individuals to live and breathe the Triple Bottom Line of People, Planet, and Profits. GrowGood’s strategy with its new greenhouse is to provide a customized learning platform that includes compost piles, outdoor row crops, and a state-of-the-art greenhouse that can double or triple the number of individuals who can learn transferrable job skills that will allow them to return to the world beyond their current conditions. In addition to providing food and job skills to people at the shelter, GrowGood also provides a safe space for individuals suffering from post-traumatic stress disorder.

GrowGood demonstrates that it is possible to do the right thing and to do it well. The new greenhouse will help demonstrate how urban agriculture in the LA area can go beyond providing locally sourced food to members of the community. The GrowGood team is focused on building a microclimate and resilient food growing system that works in harmony with the local population and builds on their indigenous knowledge.

The GrowGood greenhouse project demonstrates the need for other urban agriculture planners seeking to expand operations to partner with local city officials and educational institutions to address the many hurdles encountered by urban farmers. For example, it was critical for GrowGood to receive the Urban Farm designation to avoid zoning and related space planning issues.

GrowGood will continue to evolve into a more efficient and sustainable operation focused on growing local food for the members of the community. As GrowGood expands its operations, there will be a growing need identify ways to improve the efficiency of energy and water use onsite, which will need to be monitored with dedicated meters and control systems. The qualitative impact of GrowGood’s job skills training and the impact on the psychological well-being of the new urban farmers cannot be as readily measured as energy and water savings, but these impacts will constitute the real measure of success.
Recommendations

Listed below are recommendations that the research team developed to break down the barriers encountered by urban farmers looking to expand or start operations in LA.

**Increased communication among urban farmers and other entities.** Urban farmers would benefit from a more robust sharing of information between urban farmers, suppliers, utilities, and subject matter experts. This could take the form of a centralizing website with a forum, workshops held by suppliers, workshops held at urban farm locations, conferences, etc. Institutions like Whittier College have been collaborating with urban farmers through learning sessions and visits to the field, but there are many more areas of opportunity for partnerships between universities, urban agriculture alliances, and urban farmers.

**Increased collaboration between urban farmers and utilities.** Few urban farmers communicate with their utility, which is why this partnership is a significant area of opportunity. Urban farms do not consume a significant amount of energy, but many urban farmers have plans to expand their operations in the future, which will increase their energy needs and subsequently their energy consumption. A majority of urban farmers have minimal to no knowledge of the energy and water use metrics of their operations. There is a significant opportunity for energy and water utilities to work with the larger urban farms to track energy and water usage, especially for controlled growing environments such as greenhouses. It is recommended that the energy and water utilities develop and offer forums for urban growers that are supported by city planning and environmental monitoring agencies.

**Reduce the complexity of the zoning and permitting process.** Zoning and permitting is a complex and time intensive process. Urban farmers have limited time and resources to go through all of the motions of the zoning and permitting processes, which is why they could benefit from a more streamlined, simple process. At a minimum, it would be helpful if the city and county officials could assign a representative to each urban farmer to step them through the process and be upfront with the process from the beginning.

**Providing grants and subsidies to offset costs.** The profit margins for urban farmers are small and they have a hard time competing with large commercial farms. Therefore, grants and subsidies would allow small urban farms to be on the same playing field as larger farms. GrowGood was fortunate to receive a grant from Disney to build its new greenhouse, but other urban farmers are not as fortunate.