

**Controlled Environmental Farming Inc. Business Plan**

for

**Carlton, Minnesota**

**A Controlled Environment Food Production Business that Integrates Sustainable, Closed Loop Technology with Resource Conservation to Locally Cultivate, Process and Distribute Affordable, Nutritious Food Year-Round**

**Current Address:**

Controlled Environmental Farming Inc.

PO Box 3

Lutsen, MN 55612

Phone: 218.370.2005

www.cefarming.com

**Future Address:**

514 South Avenue

Carlton, MN 55718

Date: February 01, 2019

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**Controlled Environmental Farming Inc. Executive Summary for Carlton, MN**

February 01, 2019

***“Without food production, no city can emulate the virtues of a functional, intact ecosystem”*** Dr. Dickson Despommier, The Vertical Farm, Thomas Dunne Books 2010

Controlled Environmental Farming Inc. (CEF) is a C Corporation registered in the State of Minnesota, USA. CEF’s mission is to engineer, construct and operate agricultural facilities that contain the optimum growing environment for the cultivation of locally grown fresh vegetables, fruit, herbs and fish year-round. The first stage is to begin operations in Carlton, MN through the leasing of land in the City of Carlton, MN near Interstate 35. Constructing a 10,000-sf single level-controlled environment facility, beginning food production operations within that facility that replicates and demonstrates the patent pending technology for enhanced, localized, organic food production, year-round.

According to a study released by Michigan State University, ***7 Benefits of Eating Local Foods,*** (April 13, 2013)there are significant reasons for cultivating and eating locally grown food. Freshness, Flavor, Nutritional Value, Economic Development, Environmental Stewardship, Food Safety and Knowing Who the Farmer Is. Cultivating locally helps all sectors of a local economy, from restaurants, grocery stores to public institutions. Schools are engaged in “Farm to School” programs that provide nutritional food to schools to help fight childhood obesity. A review of the local ***“Farm to School Census”*** (USDA) demonstrates that over 50% of Minnesota Schools participate in the Farm to School activities. The review also documents that the schools are hampered by inconsistent / seasonal procurement, inconsistent pricing, minimal product variety, inconsistent product quality and quantity.

CEF intends to address the demand for locally grown, year-round nutritious quality food at competitive and consistent pricing through the construction of a new, patent pending, organic food production facility. The facility, engineered as a kit, can be placed anywhere geographically and permits the cultivation of a wide range of fruits, vegetables, herbs and fish.

In CEF facilities, product cultivation occurs through a proprietary closed loop, aquaponic water flow system that uses fish waste to provide nutrients (food) to the fruits, vegetables and herbs. The system is contained in a controlled environment facility, which has the benefit of consolidating and intensifying sustainable product growth while eliminating the risk factors that affect product quality, quantity and pricing. Processing and distribution operations are also contained within the facility which has the benefit of streamlining operations and increasing food safety.

In late spring 2019, CEF plans to build a 10,000-square foot facility in Carlton, MN which will produce annually, 240,000 pounds of fruits, vegetables and herbs to schools, hospitals, food distributors restaurants and grocery stores. CEF will also supply 24,000 pounds of tilapia to a fish processor for value-added filleting and distribution.

Bulk sale revenues are projected to be $1,660,800 annually with a minimum margin of 40.0 %. The newly constructed, Carlton facility, will be the first part of a larger plan to serve the fast growing and locally underserved fresh food market. The highly scalable business model requires low capital investment. CEF is seeking to secure $4.0M USD to lease the land, construct the facility, purchase the equipment and provide the working capital to start construction June 1, 2019 and sales October 1st, 2019.

**Business Overview**

**DESCRIPTION OF BUSINESS:**

CEF is an indoor, year-round, agricultural food production business that integrates sustainable, aquaponic, closed loop technology with a controlled environment facility to locally cultivate, process and distribute affordable, nutritious food. The company mission is to engineer, construct and operate agricultural facilities that contain the optimum growing environment for the cultivation of locally grown fish, produce, and herbs. Processing and distribution operations are also contained within the 10,000 square foot facility. The initial facility will be located in the City of Carlton, MN. It will replicate the successful aquaponic operations of a similar facility in Silver Bay, MN which was a Public – Public, Proof of Concept project. (<http://youtu.be/L1YnmviNXkk>).

Market opportunity is created by cultivating, processing and distributing fruits, vegetables, herbs and fish that are currently outsourced from suppliers that are seasonally and geographically challenged to meet the “locally grown” product demand.

The CEF Product Guide, attached, provides information on the products that will be cultivated in the new facility. Annually, 240,000 pounds of fruits, vegetables and herbs will be cultivated within the facility for local distribution to schools, hospitals, grocery stores and restaurants. 24,000 pounds of fish will also be harvested and supplied to a fish processor for filleting and distribution, promoting economic diversity within the localized food production sector while creating sustainable jobs.

CEF facilities contain patent pending cultivation concepts, including software development, that will integrate the most critical aspect of closed loop aquaponics: nutrient water purification and oxygenation. Product cultivation occurs through a closed loop, aquaponics water flow system that uses the fish waste to provide nutrients for plant growth. The fish waste is cycled through mechanical and microbial filtering equipment, eventually being dissolved within the nutrient water system. The ability to consolidate and intensify this process, within the controlled environment facility, provides for enhanced water conservation. The facilities are engineered to operate successfully by producing nutritious, quality consistent product, in consistent quantities, with consistent pricing, year-round.

The system’s primary equipment components are: 3 different sized tanks for fish growth, clarifying tanks to remove solids, drum filters for secondary solids removal, biofiltration tanks for microbial growth and oxygen saturation. Two methods of heating the facility are used. Natural gas boilers heat the nutrient water via a heat exchanger year-round and the greenhouse area is heated with a biomass furnace that supplies dry heat, reducing humidity in the winter. In the summer, the blower of the biomass furnace is used to provide cooling ventilation to the greenhouse. The entire water flow system in controlled by software that opens and closes valves to create a flood and drain cycle for the nutrient water under gravitational flow. This minimizes the need for pumps and electricity reducing operational costs.

**COMPANY HISTORY**

The cornerstone for the development of CEF was the Silver Bay Greenhouse, 120 Mensing Drive, Silver Bay, Minnesota (See YouTube Link Above) Construction was completed in July of 2012 and soon after a Public – Public Partnership was created between the University of Minnesota – Duluth and the City of Silver Bay to maintain operations and conduct research at the facility. Bruce Carman was the Consultant - Project Manager for developing the concept, sourcing funding, managing construction and overseeing operations of the facility from the initial feasibility studies in 2008 until his departure as the Cities’ consultant in March of 2014.

The facility operated as both an aquaponics and hydroponics, organic, food production facility. Many of the fruits, vegetables and herbs grown successfully in the Silver Bay Greenhouse will be grown in the Carlton, MN CEF facility. This includes two species of fish; Tilapia and Bluegill. It was the only aquaponic, organically certified, food production facility in MN at the time of certification in 2013. The Midwest Organic Services Association was the certifying agent.

Products grown were successfully sold and distributed within 65 miles of the facility. Grocery stores: Gene’s IGA in Grand Marais, MN, Mount Royal Fine Foods in Duluth, MN and restaurants such as: The Angry Trout Café in Grand Marais, MN and Lake Ave. Café, Duluth, MN were some of the customers. Additionally, a Saturday Morning Farmer’s Market was also a part of the operations. The facility demonstrated a profit, (see UMD Report Attached) while doing non-revenue producing research on future products / methods and paying all its employees.

The “proof of concept facility” provided data on required beneficial improvements. Spatial layout, heating, fish cultivation, lighting, air ventilation / circulation, biofiltration and nutrient water flow are reflected in the improvements and technology of the CEF facility for Carlton, MN. Additionally, many of the improvements are reflected in the Provisional Patent IP that will be integrated into the Carlton facility.

**LEGAL STRUCTURE**

Controlled Environmental Farming Inc. (CEF) is a C Corporation, registered in the State of Minnesota, USA. CEF - Articles of Incorporation and the By-Laws are attached.

Current selection for Legal Counsel:

Mr Matthew Schaap

Dougherty, Molenda, Solfest, Hills & Bauer

14985 Glazier Avenue, Suite 525

Apple Valley, MN 55124

**MANAGEMENT:**

The initial management team will consist of 4 members. Each member will have expertise in agriculture, food production, food distribution, financing, business development, real estate or other specializations consistent with the operations of CEF. Currently the members are:

CEO: Ms Kristen Osgood – Stern Produce – Regenerative Strategy Manager

CFO: Mr Steve Perry – Agri-One Financial - President

Director of Business Development: Mr Blair Mowery – Owner of Ameritech International

Director of Technology: Mr Bruce Carman – Owner of Cedar Tree Enterprises Inc

General Manager: Mr Jacob Dawson – Graduate Student

CEF desires to seek out a permanent management group that is associated within the food distribution industry, containing an ideology for expanding the locally grown food cultivation and distribution concept that is growing rapidly.

Committees will be formed on an “as needed” basis to be pro-active in the resolution of issues as they arise or to formulate policy on future / predicted issues that are foreseen. The length and frequency of Board meetings is provided for by the By-Laws. (see Legal Structure) Expansion in the US and internationally, Canada, are possible. (North and South Carolina, Tucson, Az, Spirit Lake, Iowa, Thunder Bay, ON and several locations in Minnesota.

**ROLES AND RESPONSIBILITIES OF EACH POSITION:**

**Board of Director(s):** Major Responsibilities

1. Provide continuity for corporation and to represent corporation’s mission and purpose.

2. Select and appoint the Chief Executive who is responsible for the administration of the corporation, to review his/her performance with respect to executive relations with the board, leadership, product service, planning and implementation and management of the corporation.

3. Govern the corporation through policies and objectives formulated, agreed upon and prioritized.

4. Ensure Effective Organizational Planning

5. Ensure Adequate Resources

6. Manage Resources Effectively

7. Determine and Monitor the Corporation’s Products, Services and Polices

8. Enhance the Corporation’s Public Image

9. Serve as a Court of Appeal

10. Asses Its Own Performance

**Chief Executive Officer:** Major Responsibilities

1. Board Administration: Supports operations and administration of the Board by advising and informing Board members, interfacing with the Board and staff

2. Operations, Product Quality and Distribution Service: Oversees design, marketing, promotion, delivery, cultivation methods, product quality and services

3. Financial and Facility Management: Recommends yearly budget for the Board approval and prudently manages corporation’s resources within current guidelines and regulations

4. Human Resource Management: Effectively manages the human resources of the organization according to personnel policies and procedures that fully confirm to laws and regulations

5. Community and Public Relations: Assures the corporation and its mission, cultivation methods, product quality and localized distribution

6. Resource Acquisition: Ensure adequate resources are available for obtaining the corporation’s mission

**Chief Financial Officer:** Major Responsibilities

1. Is accountable for the administrative, financial, and risk management operations of the corporation

2. Assist in formulating the corporation’s future direction and tactical initiatives

3. Monitor and direct the implementation of strategic business plans

4. Development of financial and tax strategies

5. Manage the capital request and budgeting processes

6. Develop performance measures to support the corporation’s mission and purpose

7. Maintain in-depth relations with all members of the management team

8. Participate in key decisions as a member of the executive management team

9. Supervise acquisition due diligence and negotiate acquisitions

**Director of Business Development Marketing & Sales:** Major Responsibilities

1. Participating on the CEO-led team that creates the corporation’s overall vision, mission, values, beliefs and strategic goals

2. Formulating and implementing the strategic plan that guides the direction of business for their area of functional responsibility, such as the marketing strategic plan

3. Achieving the corporations overall strategic and sales goals, contributing to sales and profitability

4. Forming, staffing, guiding, leading and managing the facilities within his/her responsibility

5. Evaluating the success of the organization under his direction and strategic plan

6. Maintaining awareness of both the external and internal competitive landscape, opportunities for expansion, customer satisfaction, product improvement, distribution improvement and cultivation improvement

7. New industry standards and regulatory regulations

8. Opportunities the corporation can leverage

9. Performing other responsibilities as assigned by the CEO

**Manager Employee Education and Training:**

1. Boost employee work place performance in alliance with the company’s methods and operations

2. Identify education and training needs by evaluating strengths and weaknesses

3. Prepare employees for the next step in their career CEF path

4. Build beginning, intermediate and annual training programs / teaching plans

5. Develop and direct structured learning experiences

6. Acclimate new hires to the business and conduct orientation

7. Develop and direct learning programs on the corporation’s SOPs

8. Asses all training programs and SOP’s for effectiveness

9. Stay abreast of new trends, methods, processes and equipment in all phases of facility operation

**Director of Technology: Research, Development and Engineering:**

1. Lead key projects to support the corporation’s mission and goals

2. Develop concepts, products, solutions and methods for increased efficiency in operations

3. Understand customer demand and expectations

4. Establish and understand product goals by collaborating with Marketing and Operational teams

5. Research, design and evaluate materials, processes, product production and equipment

6. Collaborate with Employee Education and Training

7. Investigate new methods, technologies and operations

6. Develop performance measures to support the corporation’s mission and purpose

7. Maintain in-depth relations with all members of the management team

8. Participate in key decisions as a member of the executive management team

9. Supervise acquisition due diligence and negotiate acquisitions

**HUMAN RESOURCES IN EACH FACILITY**

When the facility is running at 100% production, CEF will employ 6-8 full time employees. Another 2-4 part-time employees may also be employed. Final employment needs will be determined by product diversity, packaging and distribution requirements. Currently, CEF does not anticipate any seasonal employment. CEF uses four levels of classification for employees:

**Level I:** Entry level employee, may or may not be in the CEF Education Program. Responsibilities include but not limited to, shipping and receiving, plant seeding and germination, facility cleaning, food packaging and on-site sales. Annual rate of pay: $32,240 – 36,000

**Level II:** Mid-level employee, will be in the CEF Education Program. Responsibilities include but not limited to Level I activities, harvesting produce, planting in troughs / vertical apparatus, processing all cultivated produce, packaging all cultivated produce and some aquaculture activities. Annual rate of pay: $37,440 – 41,600

**Assistant General Manager:** 80% completion of the CEF Education Program. Responsibilities include but not limited to Level I and Level II activities, overall facility operation, fish cultivation, all product orders and distribution, assists GM on all activities, on call status and is the secondary in control. Annual rate of pay: $55,000 – 65,000

**General Manager:** Completion of the CEF Education Program. Responsibilities include but not limited to Level I, Level II and Assist GM activities, overall facility operation, financials, employees, maintenance, fish cultivation, all product orders and distribution, on call status and is the primary in control. Annual rate of pay: $65,000 – 75,000

The CEF Education Program and possible Aquaponics Certificate is awarded upon the successful completion of a culmination of a series of courses that center on professional and scientific competence and proficiency in the field of aquaponics. Due to the increased desire for healthy, sustainable food sources that support the local economy, aquaponics is a viable, growing industry on a business level as well as with the private small-scale food producer. The Aquaponics Certificate will provide a foundational knowledge of fish and plants in a sustainable closed-loop system. Program participants will acquire the ability to scientifically understand the roles of water, bacteria, plants and fish in a sustainable, integrated, controlled environment, food production system. Individuals such as college students, life-long learners, and those seeking workforce training may participate in and complete the course requirements.

Our goal is to coordinate employee development and interest with local colleges and universities to provide an educational / employment program for individuals who possess an interest in this unique occupation.

**THE MARKET**

**AN OVERVIEW OF SUPPLY MARKET**

Climate change, fresh water availability, growing populations, rising transportation costs and risk management are current issues demanding us to examine our existing agricultural systems. Sustainable agriculture is no longer a fantasy or passing thought, it **IS** the future if we are going to minimize the effects of these issues.

Traditional agriculture is a linear product production system. There are wastes, emissions, fossil fuel usage and environmental degradation resulting from farm chemical run-off. Our lakes, rivers and estuaries are becoming poisoned by the very industry that is relied upon to support life. Additionally, traditional agriculture has the risks associated with weather / changing weather patterns, disease and insects while also coping with limited land availability.

CEF believes that the new and emerging indoor, controlled environment, agriculture industry will be able to respond to these issues. The CEF futuristic vision of organic, localized agriculture creates a circular flow of resources and re-purposed products that is completely sustainable. Capable of maximizing production through year-round operation, while producing minimal wastes, emissions and pollution. A CEF facility can be replicated anywhere geographically and is the future of sustainable food production.

According to a study released by Michigan State University, ***7 Benefits of Eating Local Foods,*** (April 13, 2013)there are significant reasons for cultivating and eating locally grown food. Freshness, Flavor, Nutritional Value, Economic Development, Environmental Stewardship, Food Safety and Knowing Who the Farmer Is. Cultivating locally helps all sectors of a local economy, from restaurants, grocery stores to public institutions. Schools are engaged in “Farm to School” programs that provide nutritional food to schools to help fight childhood obesity. A review of the ***“Farm to School Census”*** (USDA) demonstrates that over 50% of Minnesota Schools participate in the Farm to School activities. The review also documents that the schools are hampered by inconsistent / seasonal procurement, inconsistent pricing, minimal product variety, inconsistent product quality and quantity.

CEF intends to address the demand for locally grown, year-round nutritious quality food at competitive and consistent pricing through the construction and operation of a new, patent pending, organic food production facility. The facility, engineered as a kit, can be placed anywhere geographically and permits the cultivation of a wide range of fruits, vegetables and herbs with consistent, superior quality, quantity and affordability. CEF will help meet the local demand for these products, creating sustainable jobs and providing the local community with nutritious food without disrupting the existing localized food production market. CEF will work with local producers to enhance and grow the localized market share.

Products that will be grown in the CEF facility and available for local distribution, depending on demand, are identified in the CEF: **Proposed Organically Grown Fruits, Vegetables, Herbs and Fish Product Guide for Localized Distribution from the Carlton, MN Facility**

**DISTRIBUTION, MARKET TRENDS AND PRICING****:**

Distribution of products from the CEF facility will primarily be to schools, hospitals, restaurants, food distributors and grocery stores. Product distributed to schools, hospitals and restaurants will be in the form of bulk packaging, sealable plastic totes or sealable plastic bags. Grocery stores will receive product packaged in 5oz and 10oz clam shell containers or similar packaging. CEF uses the United States Dept. of Agriculture – National Organic Program standards for cultivation, processing and handling, providing a unifying standard for all its facilities. Within this program are standards for packaging which CEF will adhere to.

Recent trends in consumer demand for food safety and protection from food borne illnesses demonstrates that produce should be packaged in either sealed plastic bags or in clam shell, biodegradable plastic containers. The ***Thunder Bay and Area Food & Agriculture Market Study*** recognizes this trend with 94% of the respondents signifying that food safety was Important or Very Important when buying food. Only food quality was more important than food safety. Additionally, small quantity packaging, 5oz or 10oz, adds value to the product sold, sometimes as much as 100%.

CEF’s intention of wholesale distribution to food processors and grocery stores enables wholesale pricing to be integrated with product demand and product packaging. Using an average sales point and an average volume of product sold, CEF focuses on products, currently outsourced, at affordable pricing to meet local demand. The average sales point and average volume result from CEF’s ability to grow a wide range of product within its facility thereby providing revenue security to CEF and food security to the local community.

The economic model for Tilapia is to achieve an average price point of $2.00/lb/whole fish with distribution to a local processor for value added filleting.

The current economic model being used by CEF is to achieve an average price point of $0.42/oz of product sold, an average production rate of 20,000 lbs /month, providing a gross revenue of $1,612,800.00 annually. Within these criteria, all product is sold in bulk or clam shell. When small size packaging is integrated, average price point increases, average production remains the same and labor requirements increase. Gross expenses increase but not as much as gross revenues therefore profitability increases with small scale packaging.

The proposed CEF facility for Carlton, MN is designed and budgeted for 100% bulk sales, 100% small quantity sales or any combination of sales in between. As contacts with consumers within the wholesale sales market, are made and product demand is defined, CEF will determine the products to be cultivated, the required quantities and the packaging required for each product.

CEF will also use a “Guaranteed Contract” with each consumer for sales operation. The “Guaranteed Contract” provides the consumer product delivery, in the quantity they require, within a defined delivery schedule, for a fixed price and a fixed term. CEF benefits from a consistent and defined distribution of product with a guaranteed revenue stream and the predictability of expenses. Both the consumer and CEF benefit from the consistency of product delivery and the associated revenue stream enabling both to achieve economic sustainability. CEF can offer this service because of the controlled environment facility that maximizes optimal growth and minimizes external risks providing consistent quality, quantity and affordability of product.

**RISK FACTORS**

Within the operation of a CEF facility there can still be risks. Disease, insects and contamination are still possible. CEF recognizes these potential risks and minimizes their chance of occurrence by providing a pressurized greenhouse production environment. Outside air is introduced into the facility through ductwork connected to the biomass furnace located in the greenhouse portion of the facility. The air is then distributed throughout the greenhouse, over the deep-water troughs, creating equalized, positive pressure that then exits the facility. The positive pressure helps minimize air-borne disease and insects from entering the facility. It also provides uniform ventilation to reduce excess heat and humidity from the greenhouse space.

Contamination risks are also minimized through proper Food Safety protocol and practices. This includes securing the facility so that only employees from CEF are allowed in the facility’s food production, processing and packaging areas. Frequent hand washing, and air drying are a part of the SOP’s for CEF employees as is the use of shoe sanitation baths before entering any of the secured areas.

Contamination of the fish, although possible, is reduced through the sourcing of fingerlings from one certified facility. Sourcing from one supply entity helps ensure water chemistry security and reduces the introduction of harmful bacteria into the nutrient water supply. Closed loop aquaponics has demonstrated that the produce and fish cultivated are consistently safe.

**Government Regulation:**

CEF will follow all applicable regulations for fresh produce sales directly from its location in the Carlton, MN. CEF will apply for and seek full USDA – NOP certification for all aspects of its operations. This will include the aquaculture operations and will be the second or third organically certified food production operation in the state of Minnesota. Certification will be provided by the Minnesota Crop Improvement Association (MCIA).

**PROJECT DESCRIPTION and IMPLEMENTATION**

**Land Required:**

CEF will be leasing land, within the City of Carlton, MN. All regulatory permits will be acquired.

See documentation provided

**Building Required:**

CEF will initially construct a 10,000sf controlled environment aquaponic food production structure. See engineered drawings attached. A local contractor will be used for the construction of the facility.

**Equipment Required:**

See Equipment List Attached

**PROJECT MANAGEMENT OVERVIEW:**

Project Management overview will be the responsibility of the Director of Technology: Bruce Carman working in unison with the General Manager and Assist. General Manager for the facility. This will educate and provide valuable “hands on” experience to the two new employees for the CEF facility.

The Education and RDE Managers will also be on site, at critical times, to insure a smooth transition from early system(s) installation and full-scale operation / production.

Budget Estimate: $4.0M

**Production Plan**

**FISH AND PRODUCE CULTIVATION**

Upon possession of the newly constructed facility, the following chronological order of tasks will occur.

***Week One***: Initial operations will consist of installing the germination carts with the LED light fixtures, germination containers and planting the first crops, primarily leafy greens. Other crops with longer germination periods are also planted. Organic fertilizer is used in a hydroponic cultivation method to start crop production. This starts the revenue generating aspect of operations.

Once the leafy green crop is planted, to be harvested in 5 to 6 weeks, attention turns to preparing the first deep water trough for long term grow out in the Greenhouse space. Preparation consists of LED light fixture placement, vertical apparatus installation, reflective sheathing and trough lining placement with the two-level floor system for plant cultivation and water storage. Simultaneous construction of the Fish Cultivation room also occurs with the new fish isolation space being the priority. The floor system installation and placement of the fish growth tanks also takes place. The Processing Room equipment is installed as required by the trades.

***Weeks Two and Three***: Are essentially a repeat of the first week, with priority given to plant germination and the completion of the deep-water troughs.

***Week Four***: Starts with the first transplanting of the germinated crops from week one to the deep-water troughs. Once transplanting is completed, the priority is to complete the processing room and then to complete any remaining work on the deep-water troughs and the nutrient water system. The first 1250 fingerlings arrive and are placed in the isolation tanks for observation for about eight weeks. At the beginning of every month from now on, 1250 fingerlings will arrive.

***Weeks Five through Eight***: Are a replication of Week Four. All spaces should be completed or nearly completed, and the nutrient water system should be very close to initial start-up. The Processing Room receives a thorough cleaning and in Week Six the first harvest, processing and distribution of leafy greens occurs.

***Weeks Nine through Eleven***: The nutrient water system is started and the three to four-week nitrification process begins. Germination, transplanting, harvesting, processing and distribution of produce is in full scale operations. Currently, even the 90-day plants are very close to harvest.

***Week twelve through fourteen***: The nutrient water system is now ready for the introduction of the one and two-month-old fingerlings. The hydroponic phase of the initial operation is slowly removed, and the pure aquaponics operation is gradually introduced and increased.

***Week fifteen through thirty-two***: The nutrient water system decreases its reliance on hydroponics and at week 32 the system becomes 100% aquaponic.

***Week thirty-three:*** The first harvest of Tilapia is possible using the guideline for harvest at 1.5 lb to 1.75 lb per fish. The system is at 100% operation and will be producing an average of 20,000 lbs /mth of produce and 2000 lbs /mth of fish.

The system’s primary equipment components are: 3 different sized tanks for fish growth, clarifying tanks to remove solids, drum filters for secondary solids removal, biofiltration tanks for microbial growth and oxygen saturation. Two methods of heating the facility are used. Natural gas boilers (by SLP) heat the nutrient water via a heat exchanger year-round and the greenhouse area is heated with a biomass furnace that supplies dry heat, reducing humidity in the winter. In the summer, the blower of the biomass furnace is used to provide cooling ventilation to the greenhouse. The entire water flow system in controlled by software that opens and closes valves to create a flood and drain cycle for the water under gravitational flow. This reduces the need for pumps and electricity. A detailed Equipment Budget and Equipment Item Description is attached.

**Service Providers:**

The only service provider CEF would use would be a delivery service to distribute product.

**Financials for Years 1-5**

Attached

**Human Resources**

**HUMAN RESOURCES IN EACH FACILITY**

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