



**Overview Presentation of the GROWTEC Technology Application on
Food Security in Northern Communities**

Prepared for the

Standing Committee on Indigenous and Northern Affairs

Prepared by

Frank Suraci

President FJJ GROWTEC

and Partners

**Canadore College of Applied Arts and Technology and EnerDynamic
Hybrid Technologies**

March 9, 2021

Table of Contents

Introduction	2
The Solution	3
How GROWTEC UNITS Work	4
Economic and Environmental Benefits	7
Proof of Concept Project	8
Carbon Credit Calculations	9
Implementation Plan for Proof of Concept Project	10
Private Sector Partnerships	11
Finance Program	13

Introduction

Currently, nearly all fresh produce is flown into these far north Indigenous communities under the Nutrition North program. “Food insecurity” in these regions has become one of the primary factors that have negatively impacted the well-being of residents living in Indigenous communities. The produce shipped to these communities is sold at prices 300% to 500% higher in comparison to the same produce sold in larger more populated areas of Canada. Often shipments of produce transported to the Indigenous communities arrive spoiled and degraded to having minimal nutritional value. The lack of fresh produce has created documented morbidities that affect the Indigenous population with malnutrition, diabetes and other associated illnesses that are manifested from a poor diet. To further compound the affordability issues of high produce prices the income levels within this general population are among the lowest in Canada.

Government and Indigenous communities are looking for a viable innovative solution to address the negative impact of “Food Insecurity”. Our team members have analyzed various transportation concepts to ship fresh produce to these regions. Our conclusion indicates many of these transportation modes are cost prohibitive without significant subsidies and concern of the supply chain to deliver fresh produce at affordable prices. Ideas that range from building strategic food terminals in the far north to moving volumes of produce in containers fail to provide the fresh produce at affordable prices.

The shipping container proposal maintains a high transportation cost component with physical threat to the freshness of the produce during transportation. The threat to freshness is caused by a natural release of gases emitted by fruits and vegetables which initiates a chemical reaction to expedite the over ripening process among other fruits and vegetables. Ultimately this result in premature spoilage and therefore significantly reducing shelf life and nutritional value of the food shipped in.

THE SOLUTION

The ultimate solution is to provide a technology that enables communities in the far north to grow their produce requirements locally. FJJ GROWTEC along with its partners Canadore College of Applied Arts and Technology (North Bay) and EnerDynamics Hybrid Technologies (EHT) will provide a turnkey commercial grade indoor growing facility that can withstand the weather issues and a shorter growing season growing with minimal impact to the environment. The solution provides an indoor growing facility powered by renewable energy to protect the environment and minimize dependency on the community's electrical grid system.

The program includes an educational component to create the skill sets for employment and opportunities to expand the indoor cultivation program for commercialization in the future. For the Indigenous communities the system provides agricultural opportunities to grow produce to meet their specific requirements. Virtually any vegetable crop can be grown to meet community preferences. The program addresses sustainable means to improve food security in northern communities along with developing the following;

- A. Physical assets to growing commercial levels of produce to feed the local population**
- B. Training and education to create an economic develop stimulus for the communities**
- C. Zero based impact on the environment**
- D. Creation of physical electrical infrastructure as back- up systems for the community**

Our "Food Security Initiative" for Indigenous communities located in the north increase access to locally grow fresh produce at commercial volumes. As an example, one our 6,000 square feet "GROWTEC UNITS" can produce an estimated 30,000 heads of romaine lettuce annually at an average cost of \$1.50 per head. Lettuce in the far north can cost up to \$7.00 per head.

FJJ GROWTEC will provide the business model to expand the opportunity to create partnerships with private sector partners to create economic development opportunities and employment to participate in the Canadian agriculture and agri-food sector in the far north.

Our "Food Security Initiative for Indigenous communities" includes skills training that will be offered by Canadore College in a unique curriculum featuring hydroponic agriculture. The curriculum will have a number of courses including food safety handling to meet Canadian safety certifications and requirements. Other subject matters include the GROWTEC UNIT

maintenance and operation courses, a key instruction to manage the cultivation program in the communities. The curriculum will include hands on practicum period where students actually work in a GROWTEC UNIT on campus and learn the complete operational requirements of the technology.

EnerDynamic Hybrid Technologies is the manufacturer of this highly innovative hydroponic technology offering a controlled indoor growing environment to cultivate produce at commercial levels in the remotest regions of northern Canada. The units feature a unique wall system that provides up to R-55 insulation with an interior membrane resistant to mold and mildew. The exterior consists of fused solar panels that are part of the actual building structure. "GROWTEC UNITS" are designed and manufactured in Canada.



How GROWTEC UNITS Work

GROWTEC UNITS are available in customized sizes and scalable. For the indigenous community a 6,000 square foot unit is recommended which provides approximately 5,000 square feet of actual cultivation space on two tiers. Each GROWTEC UNIT generates its renewable energy to power all of the infrastructure systems including heating, cooling and lighting with the use of solar panels. During the winter months when sun exposure is at a minimum, a 10 KW/h wind turbine is used to supplement each unit's power requirements. The combined system will also include battery storage technology to ensure 3-5 days of full autonomy.

GROWTEC UNITS can produce higher yields for the following reasons;

- The environment the GROWTEC UNITS deliver is precisely controlled, and can be customized for specific crops. It is far superior to that of a greenhouse with an all year round growing season. The system uses less costly renewable energy produced within a fully insulated unit. These factors alone contribute to substantial yield increases.
- The GROWTEC UNIT technology is not limited by single levels as found in traditional greenhouses. In a standard GROWTEC UNIT cultivation areas can be stacked up to a three-unit vertical configuration. This minimizes the cultivation footprint and expands the available cultivation area a minimal cost. The configuration also centralizes the solar and wind generation requirements.

The following chart compares the performance yields of greenhouse and the GROWTEC UNIT based on an annual yield per square meter.

Current Greenhouse Output Averages (Kg per square meter annually)	
Tomato	44 kg
Pepper	37 kg
Cucumber	32 kg

Grow Pods Output Averages (Kg per square meter annually)	
Tomato	132 kg
Pepper	111 kg
Cucumber	96 kg

Cultivation rooms can be isolated or expanded as needed



Utility Rooms – Battery Storage



Electrical room



Internal isolated growing rooms





Economic and Environmental Benefits

Economic Benefit	Environmental Benefit
<ul style="list-style-type: none"> Communities develop capacity to participate in food sector 	<ul style="list-style-type: none"> Put in practice sustainable agricultural practices to minimize negative impacts to the land, water, and air
<ul style="list-style-type: none"> Evolve into independence where they supply affordable food to community members 	<ul style="list-style-type: none"> Contribute in the reduction of 11,500 tonnes of greenhouse gases over the 25 year lifecycle of the units
<ul style="list-style-type: none"> Actively reduce health crisis and healthcare costs by improving nutritious diets of locally grown produce 	<ul style="list-style-type: none"> Carbon credits worth approximately \$1.8 Million over the lifecycle of the project.
<ul style="list-style-type: none"> Reduce cost for the Federal government to subsidize food transportation through Nutrition North Food program 	<ul style="list-style-type: none"> Reduction of grid dependency further reducing greenhouse gases where community power is generated by diesel fuel
<ul style="list-style-type: none"> Create local employment and business opportunities by evolving food sector in the north 	<ul style="list-style-type: none"> Reduction of peak demand requirements on the electrical grid utilizing GROWTEC renewable energy sources
<ul style="list-style-type: none"> Service non-Indigenous communities, including mine sites and oils sands with First Nation produce and food products 	<ul style="list-style-type: none"> Water conservation is heightened with the use of hydroponics
<ul style="list-style-type: none"> Expand to food processing of produce to sell enabling them to participate in Canadian and Provincial economies 	<ul style="list-style-type: none"> Minimizing soil contamination with fertilizer spillage on the soil

<ul style="list-style-type: none"> Develop opportunities to partner with established private sector companies to evolve food sector in the far North 	<ul style="list-style-type: none"> No use of pesticides and herbicides with the GROWTEC UNIT
<ul style="list-style-type: none"> Reallocate portion of the Nutrition North funding to subsidize sustainable agriculture program on one time basis for First Nation communities 	<ul style="list-style-type: none"> Higher crop yields per square foot than greenhouses. Grow units are used 24/7 /365 and are heated by renewable energy. Greenhouses are not used during the winter season as they are too costly to heat
<ul style="list-style-type: none"> Food grown in the GROW UNITS is equal or less costly than greenhouses 	<ul style="list-style-type: none"> Food grown in Grow Units are as nutritious as organic graded food
<ul style="list-style-type: none"> Greenhouses cost approximately \$750/ square foot to construct. Whereas GROWTEC UNITS average \$225/per square foot to construct. 	

Proof of Concept Project

The GROWTEC UNIT technology to grow produce locally in the Indigenous communities in the north was introduced to Indigenous and Northern Affairs Canada. Upon review the Ministry suggested we solicit interest from various indigenous communities that would participate and commit to undertaking a “Proof of Concept” initiative. The purpose of the “Proof of Concept” would enable ongoing analysis of any shortfalls in the technology and evaluate the preparedness requirements of communities to undertake the accountability and responsibility of managing this community based agricultural program.

To date FJJ Growtec has secured letters of support from 4 communities with a fifth community in the Northwest Territories that has indicated interest through INAC. The communities are as follows;

- 1) Big Trout Lake First Nation- Ontario (remote community)
- 2) Lac Seul First Nation-Ontario
- 3) Whitefish First Nation-Alberta
- 4) First Nation Community in the North West Territory (**recommended by the Ministry**)
- 5) Citxw Nlaka’pamux Assembly British Columbia

Further FJJ Growtec was requested to prepare a cost analysis for the “Proof of Concept” initiative. The following chart highlights an updated version of the total cost requirements. It should be noted transporting the units to areas where road accessibility is available does not

impact delivery schedules. However in the case of Big Trout Lake First Nation the delivery dates are dependent on the accessibility of the ice roads.

Inclusive of the “Proof of Concept” costs are the travel and education costs for approximately 25 students (five from each community) to attend Canadore College’s one year training program.

The total anticipated cost for the initiative is just over \$8,753,500. To offset costs, a program will be implemented to solicit corporate contributions to minimize the program by a minimum of \$400,000 of the total project cost. This would lower the cost obligation of the program for the Federal government to approximately \$8,353,500 or \$1,670,700 per community.

PROOF OF CONCEPT PROJECT COSTS			
Description of Cost Estimate	Per Community Cost	5 Community Cost	
Cost per GROWTEC UNIT	\$ 1,500,000	\$ 7,500,000	
Frieght cost per unit	\$ 50,000	\$ 250,000	
3 year monitoring service	\$ 43,200.00	\$ 216,000	
Crew Travel costs for assembly and commissioning of each unit	\$ 50,000.00	\$ 250,000	
Sub Total	\$ 1,643,200	\$ 8,216,000	\$ 8,216,000
Estimated Education Costs	Per student	25 Students	
5 students percommunity project			
Estimated Tuition costs	\$ 8,000	\$ 200,000	
Estimated flights	\$ 1,500.00	\$ 37,500	
Estimated accomodations and food	\$ 12,000.00	\$ 300,000	
Sub Total of Education costs	\$ 21,500	\$ 537,500	\$ 537,500
Sub Total of all costs	\$ 1,750,700		\$ 8,753,500
less Corporate donations	\$ 80,000		\$ 400,000
Est. Total cost of Proof of Concept project	\$ 1,670,700	\$ 8,353,500	\$ 8,353,500
Note: costs are subject to change			
Costs are estimates at the time of writing			

Carbon Credits Calculations

The calculation for the GHG reduction of a 6,000 square foot GROWTEC UNIT is based on the Ontario average of the tons of greenhouse gases (GHG) the unit would offset from utilizing fossil fuels to generate electricity to operate the unit. The lifecycle used for the GROWTEC UNIT is based on 25 years. Therefore the revenues generated from the carbon credits generated from the offset of GHG are as follows.

Tonnes GHG offset annually per Unit	Number of Units	GROWTEC UNIT Lifecycle (Yrs.)	Value of GHG per Tonnes 2022 to 2024	Carbon Credit Value	Value of GHG per Tonnes 2025 to 2048	Carbon Credit Value	Total Value of Carbon Credits over 25 Yrs.	Total Offset of Tonnes of GHG over 25 Yrs.
92	5	25	\$ 20.00	\$ 18,400.00	\$ 170.00	\$ 1,798,600.00	\$ 1,817,000.00	11,500
note: Government of Canada indicated tha a tonne GHG will be valued at \$170.00/ tonne in 20225								
GHG- Green House Gas								
Estimates only								

The offset occurrence of using renewable energy would displace 11,500 tons of GHG over 25 years. This indicates the overall benefit to the environment with the deployment of the GROWTEC UNITS utilizing renewable energy as the technology’s primary power source. The renewable energy capability also eliminates the dependency on the already stressed electrical grids that exist in many Indigenous communities in the north. What is not calculated in the GHG offset are the carbon foot print reductions of the airplanes and trucks that would have shipped the majority of the fresh produce to these communities. The value of the carbon credits eligible to be monetized is in excess of \$1.8 Million over a 25 year lifecycle of the project.

The following chart describes the steps and reviews required to ensure community preparedness to manage and operate the business and cultivation model for this “Proof of Concept” initiative.

IMPLEMENTATION PLAN PROOF OF CONCEPT PROJECT

Week	Steps to be completed
Week 1	<ul style="list-style-type: none"> • Establish community and leadership commitment in a contractual arrangement with the Federal Government • Meet with Community membership to establish understanding of the project (Under COVID-19 protocol this would be conducted on a virtual conference call)
Week 2	<ul style="list-style-type: none"> • Meet with community leaders to determine population size and preferred produce to be grown. • Development of growing strategy (virtual conference call)
Week 3	<ul style="list-style-type: none"> • Work with community infrastructure team to discuss unit layout and design and location within the community for PV panels and water availability including WIFI signal for 24/7 monitoring • Select community liaise person to keep open lines of communication to keep everyone apprised of project timelines, project activities, objectives and goals • If permitted one person from EHT would go to the community to determine best location for the unit
Week 4	<ul style="list-style-type: none"> • Understanding of roadways and paths for delivery are viable especially important for remote locations i.e. ice roads • Determination of accommodations and lifting equipment availability for deliverables and community access in all weather • Begin selection of students to attend courses for Canadore College • May have to consider on-line courses due to covid protocol

Week 5	<ul style="list-style-type: none"> • Design and produce plans for grow units specific for each “Proof of Concept’ application- Share design with community leaders
Week 6	<ul style="list-style-type: none"> • Finalize Grow Unit Drawings • Students to begin online or on campus training to be determined for 10 week course
Week 7	<ul style="list-style-type: none"> • Grow Unit Manufacturing commences 12 weeks • Community prepares site clearing for placement of grow units under EHT supervision
Week 20	<ul style="list-style-type: none"> • Anticipate units shipped to site
Week 21	<ul style="list-style-type: none"> • 2 week assembly period on site • Students are requested to be part of the construction and assembly process • Grow Unit Orientation begins this week
Week 22	<ul style="list-style-type: none"> • Train on site community growers how to best setup in a hydroponic facility • Train staff how to clean and purge facility reservoirs when needed • Explain monitoring methods for pH, EC, temperature, and how to mitigate for potential issues
Week 23	<ul style="list-style-type: none"> • Discuss plans, financial requirements to operate unit i.e. future purchases of supplies and sustainability plans going forward
Week 24	<ul style="list-style-type: none"> • Testing and Commissioning of grow units • Final walk through/completion and approval of finished project with community • Planting of first crops

Part of our sustainable business model is to make available private sector corporations to mentor and guide communities with their projects and where possible partner on potential business ventures as an economic development opportunity utilizing their agriculture cultivation projects.

Private Sector Partnerships

Ripple Farms

Ripple Farms is an agri-tech start-up dedicated to tackling food insecurity through aquaponics. Bringing farm to city, the social enterprise merges aquaculture and hydroponics to provide a new and alternative approach to a fully sustainable method of food production. Ripple Farms has been offering a green solution to food insecurity since launching in 2016.

Ripple Farms provides an “integrated” solution to food insecurity. Through the self-contained and self-perpetuating food production spaces for food production developed for their clients, the solutions devised by Ripple Farms also provide additional opportunities from employment and retail to education programs. Integrated, it seems, is the perfect word for the innovative start-up.

Ripple Farms has since focused on growing by creating sustainable solutions for various partners and community organizations. It has partnered with Ontario’s largest trout farm, Blue Spring Trout Farms, and Seneca College, and have delivered education sessions on urban agriculture and sustainable business models to students and Indigenous communities.

The owners of Ripple Farms have been the providers for the outline of the educational curriculum that will be offered at Canadore College and requirement in preparing First Nation communities in developing local capacity to operate, maintain and manage the food security “Proof of Concept” project.

La Heurta Imports

La Heurta Imports is a Canadian owned internationally known importers and exporters of fruits and produce to the international markets. President and CEO Jim Bruce has been a supporter in developing a solution to the ongoing food security issues plaguing the First Nation communities in the far north regions of Canada.

Jim will bring a realistic approach to the Food Security Initiative for Indigenous Communities in the Far Northern Regions of Canada in regard to the skill set development requirements to meet, food handling certifications and capabilities to distribute produce generated in methods that preserve the nutritional value of the produce grown.

Jim brings market intelligence to the communities that want to take the next step to developing a food sector in processing fresh produce to extend shelf life without compromising the integrity of the produce grown in each grow unit.

The company provides a realistic approach to developing the business opportunity mindful of the costs and challenges presented by the regional geography and population requirements.

Other Contributing Partnerships

Apothio LLC- Plant growth utilizing hydroponics and aquaponics

Enerdynamics Hybrid Technologies- Angela Proudfoot –Specialist in hydroponic growing application

Canadore College of Applied Arts and Technology- Educational curriculum

Financial Program

FJJ Growtec and EHT have prepared options for the Government of Canada to underwrite the cost of the "Proof of Concept" projects and perhaps extend the opportunities to more communities in the far north.

Recently we have secured \$250,000,000 that we can utilize for several financing and loans scenarios for other projects. However, for this particular application we have been assured that we can apply the capital requirement for the "Proof of Concept" as a P-Three program which will include FJJ Growtec and EHT to administrate the project on behalf of the government.

Should you wish to discuss this matter or any part of the proposal regarding Food Security for the Northern Communities please contact

Frank Suraci

President FJJ GROWTEC

Cell 905 301 3714

Email frank@maplekeyhealthgroup.com