Lesvos Spirulina

Project Proposal and Overview of Findings

Agenda

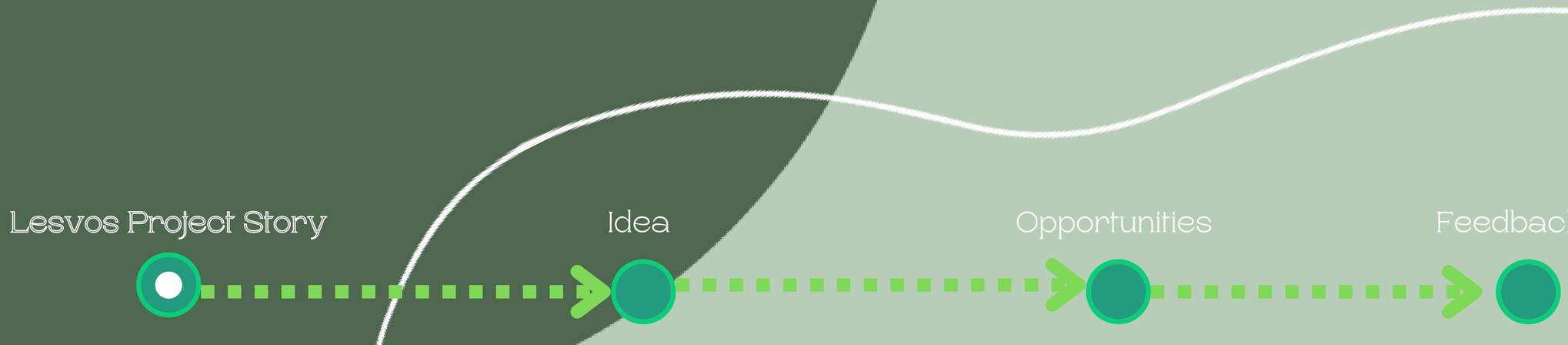
Topics Covered

Lesvos Project Story

Idea

Value Add & Possibilities

Thoughts & Feedback



Lesvos Project Story

2016-2020

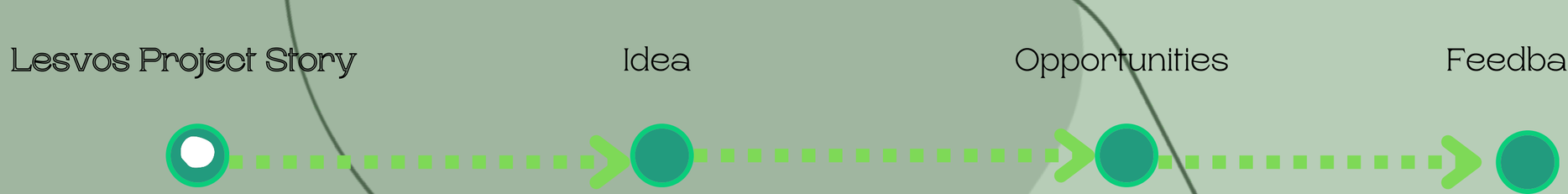
Lesvos Project Story — Idea — Opportunities — Feedback

Beautiful Lesvos

A Compassionate People


USC University of
Southern California

2016 Partnership with Lesvos



USC Team in Lesvos

Lesvos Project Story → Idea → Opportunities → Feedback

Lesvos Project Story → Idea → Opportunities → Feedback

Levos Aquaculture Team

Lesvos Project Story → Idea → Opportunities → Feedback

Summary of 2020 Work

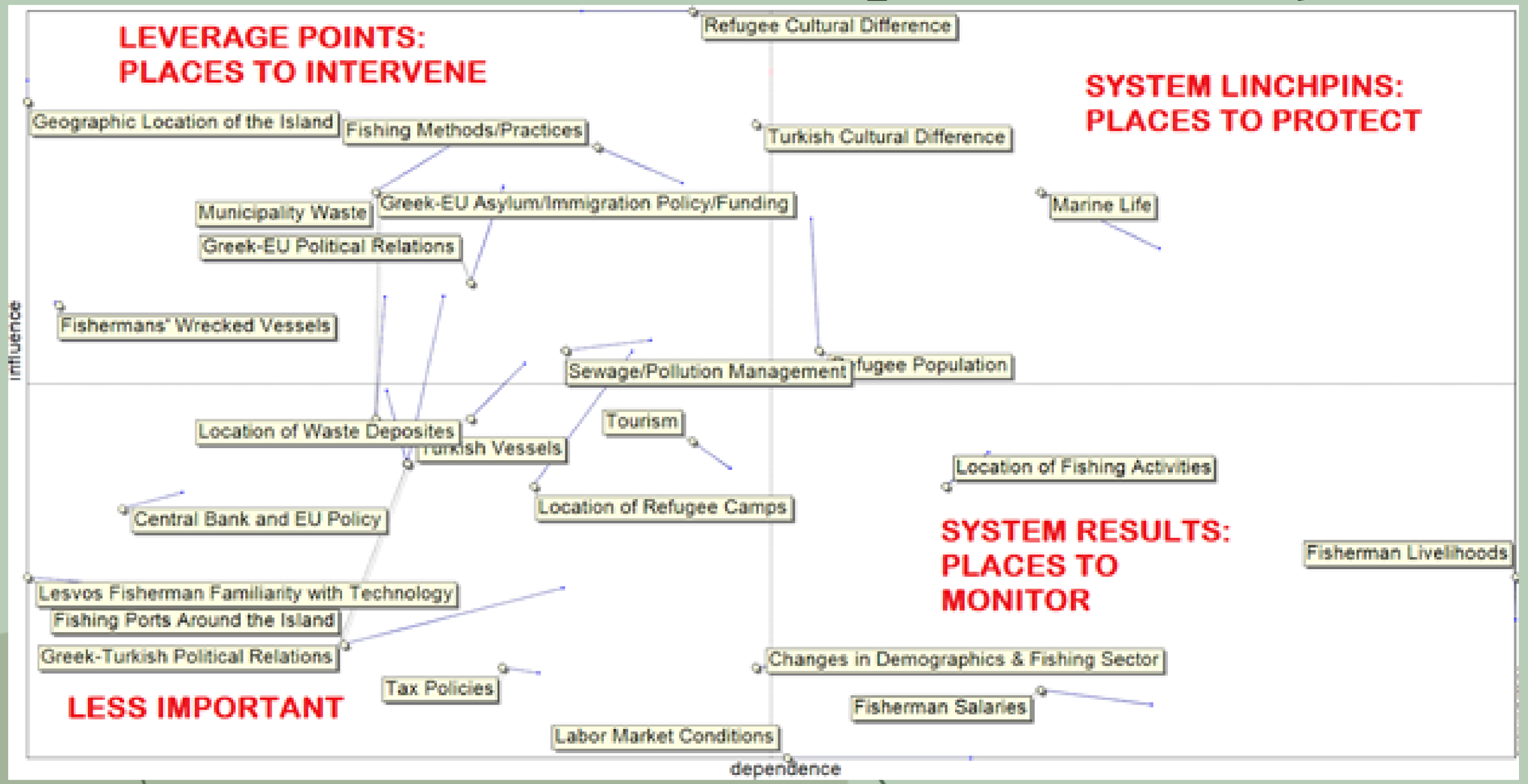
Why?
Culture Study
Feasibility Study
Final Proposal

Our Why

Culture Study

Lesvos Project Story → Idea → Opportunities → Feedback

Factor Map Study



Lesvos Project Story → Idea → Opportunities → Feedback

Final Proposal

Lesvos Project Story → Idea → Opportunities → Feedback

Lesvos Aquaculture Team 21-22

Summary of 2021 Work

Evaluation of 2020 Work
Our Top Three Ideas
Final Proposal

Evaluation of 2020 Work

Research

Polytropic Aquaculture

Canning & Processing

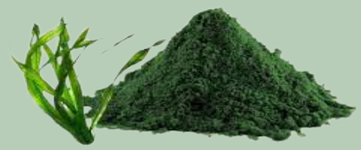
Spirulina

Top Three

PROCESSING

CRAYFISH

SPIRULINA



Spirulina Proposal to Stakeholders

Maria Hatziantoniou
Professor at University of Aegean

Tasos Perimenis
General Manager at ETAL S.A.

Daniel Druhora
Global Innovation + Filmmaking

Theodorus

Dr. John Batzakas

Christos Anastasiadis
Founder of Spirulina Nigrita

Spirulina

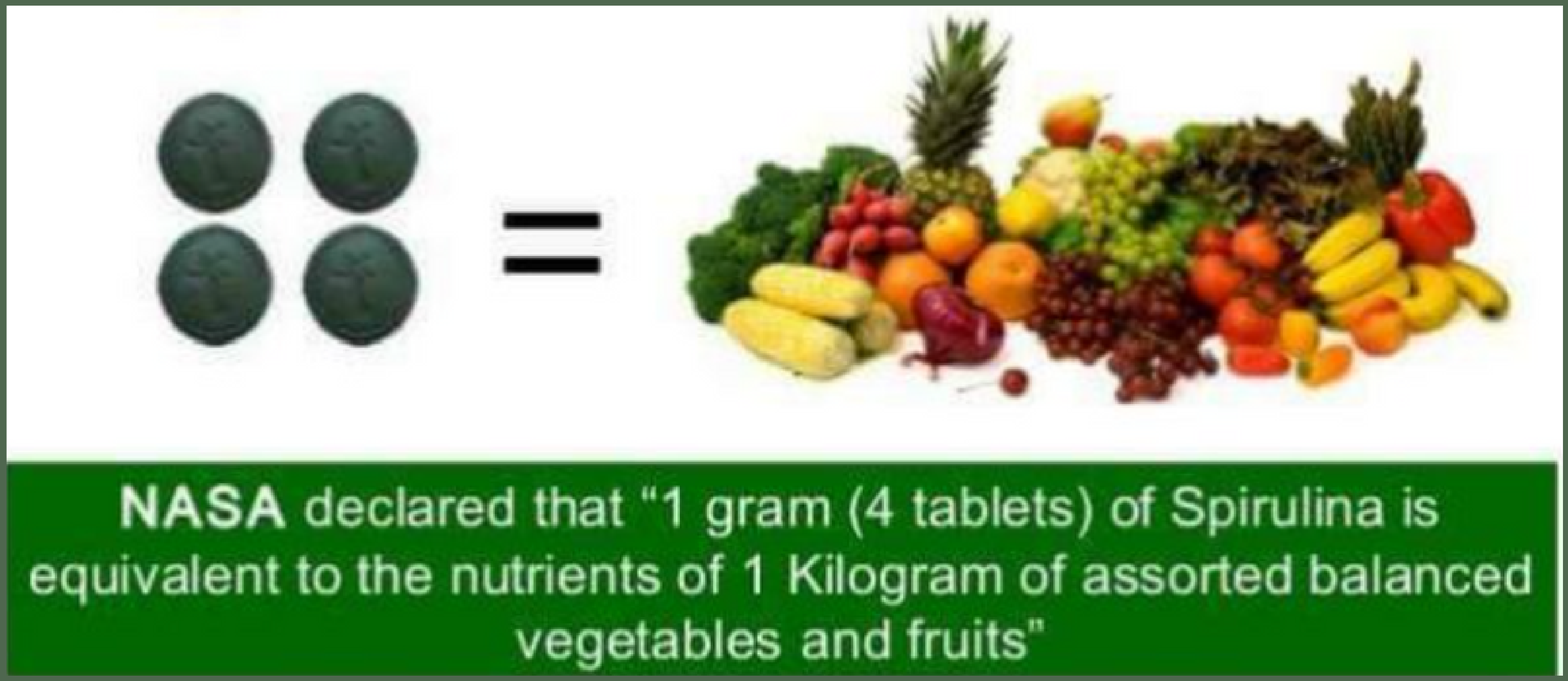
Design Proposal
Start-Up Estimates
Financial Projection

Lesvos Project Story → Idea → Opportunities → Feedback

History

Benefits of Spirulina

Popularization by NASA



Pros of Spirulina

-

Simple to grow
Increased demand
Leverages natural resources
Scalable

-

Simple to Grow

Increased Demand

Leverages Natural Resources

Scalable

Growing Process

Harvesting Process

Drying Process

Final Product Operations

Sale + Distribution

LESVOS

Spirulina

All efforts contribute to the advancement of the Lesvos Community.

Growing Process

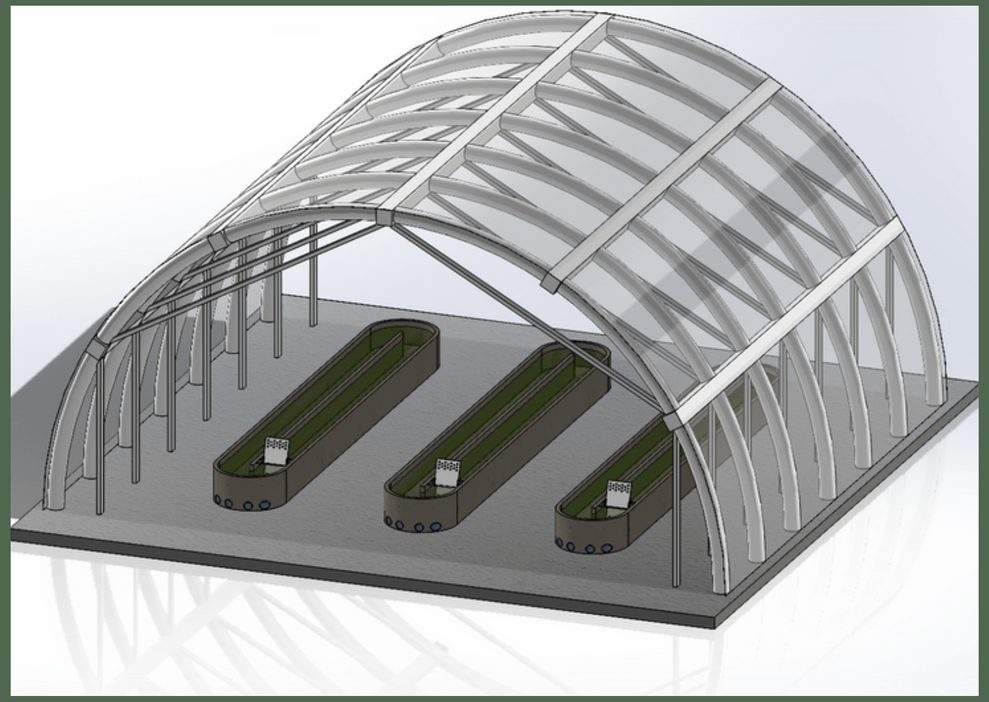
Lesvos Project Story

Idea

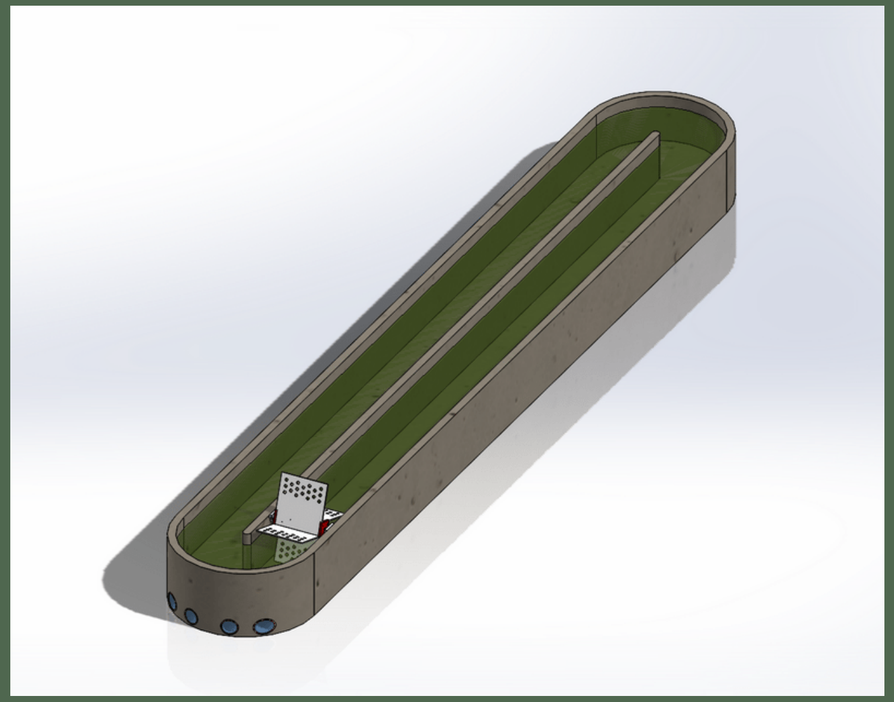
Opportunities

Feedback

Growing Facility



Greenhouse facility houses tanks



Open Raceway tanks are propelled and airated with a motorized paddlewheel

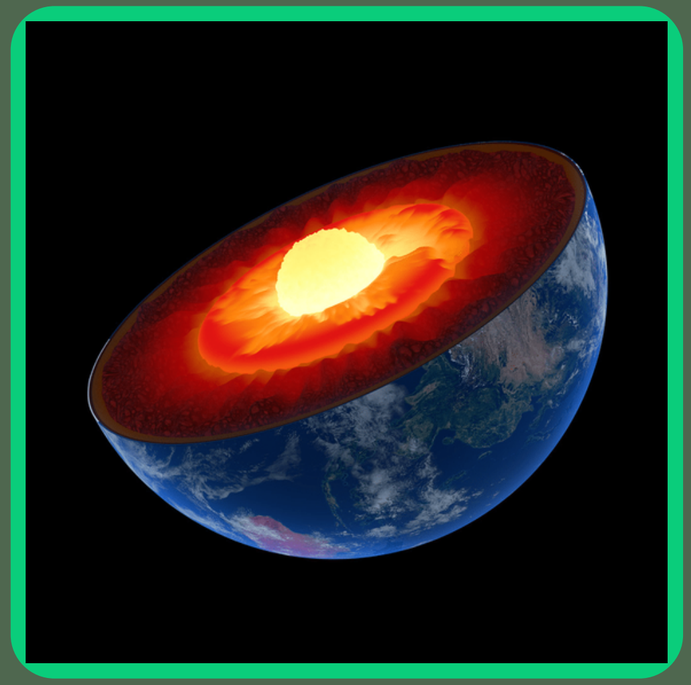
Nutrients


Modified Zarrouk's
Liquid Component
Modified Zarrouk's
Dry Component Mix
Post-Harvest
Nutrients

Lighting

System Heating

Culture Temperature = 30-35 C



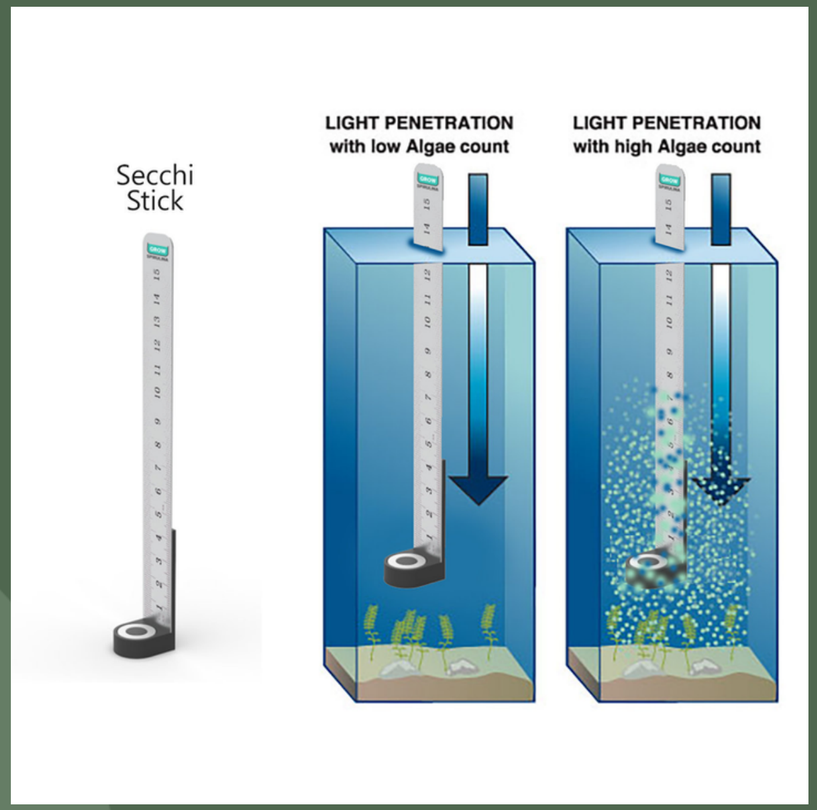
Testing and Quality Control

Culture density can be monitored visually

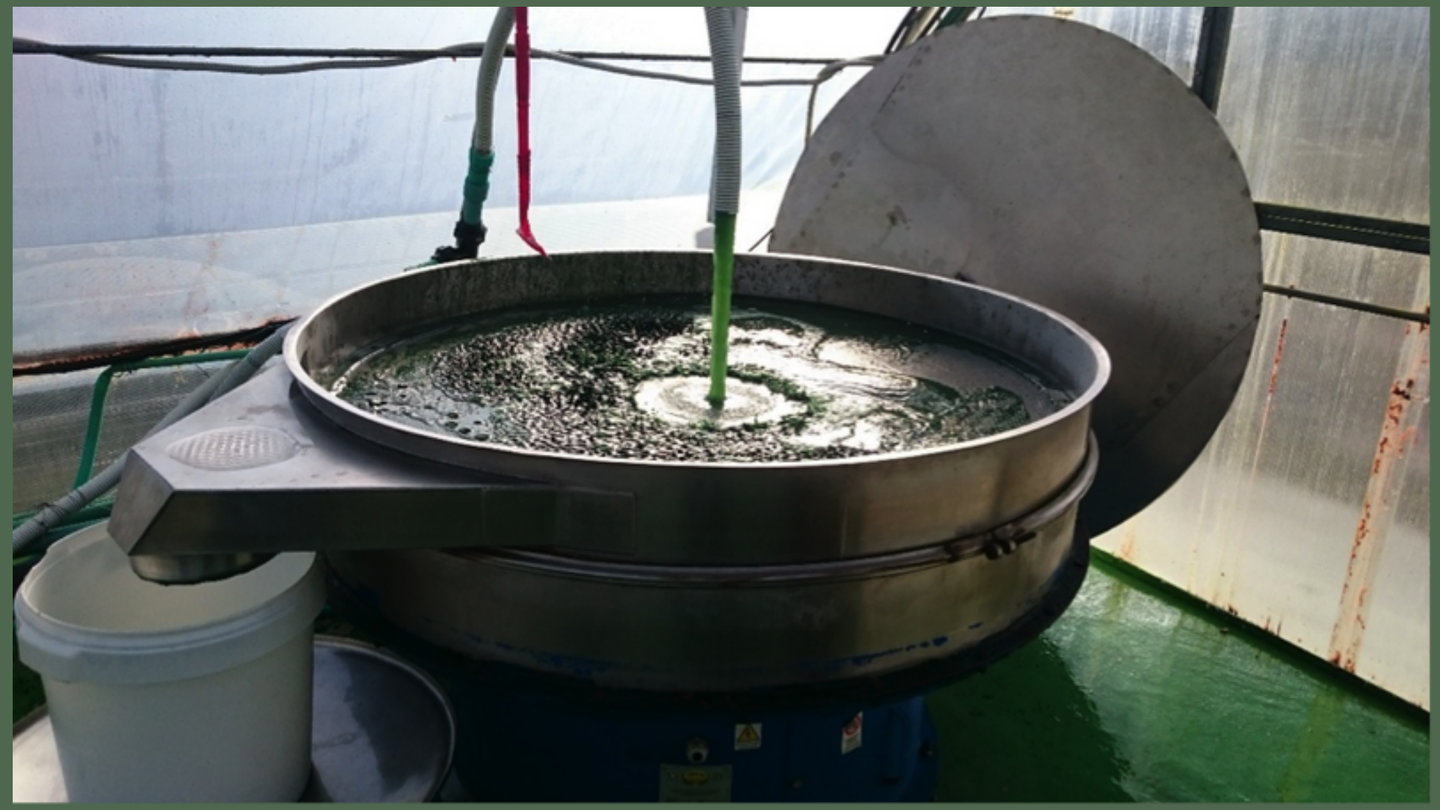
Nutrient levels of culture and pH can be monitored with testing strips

Final product will be sent to labs to be tested for quality and nutrient content

Harvesting



Secchi Disk



Spirulina Screen Harvester

Processing

Spirulina Mesh Belt Dryer

Stainless Steel Spirulina Air Dryer


Growing Process
Harvesting Process
Drying Process
Final Product Operations
Sale + Distribution
LESVOS
ORGANIC SUPERFOODS
ORGANIC
SPIRULINA
POWDER
Net. Wt. 4 OZ. (113 g)
LESVOS
SPIRULINA
POWDER
RECIPE
Nutrition Facts
Calories
35
LESVOS
Organic cold pressed spirulina beverage

Global **Spirulina** Market

OPPORTUNITIES AND FORECAST, 2020-2027

Global Spirulina Market is projected to reach **$897.61 Million** by 2027

Growing at a **CAGR of 10.5%** (2020-2027)

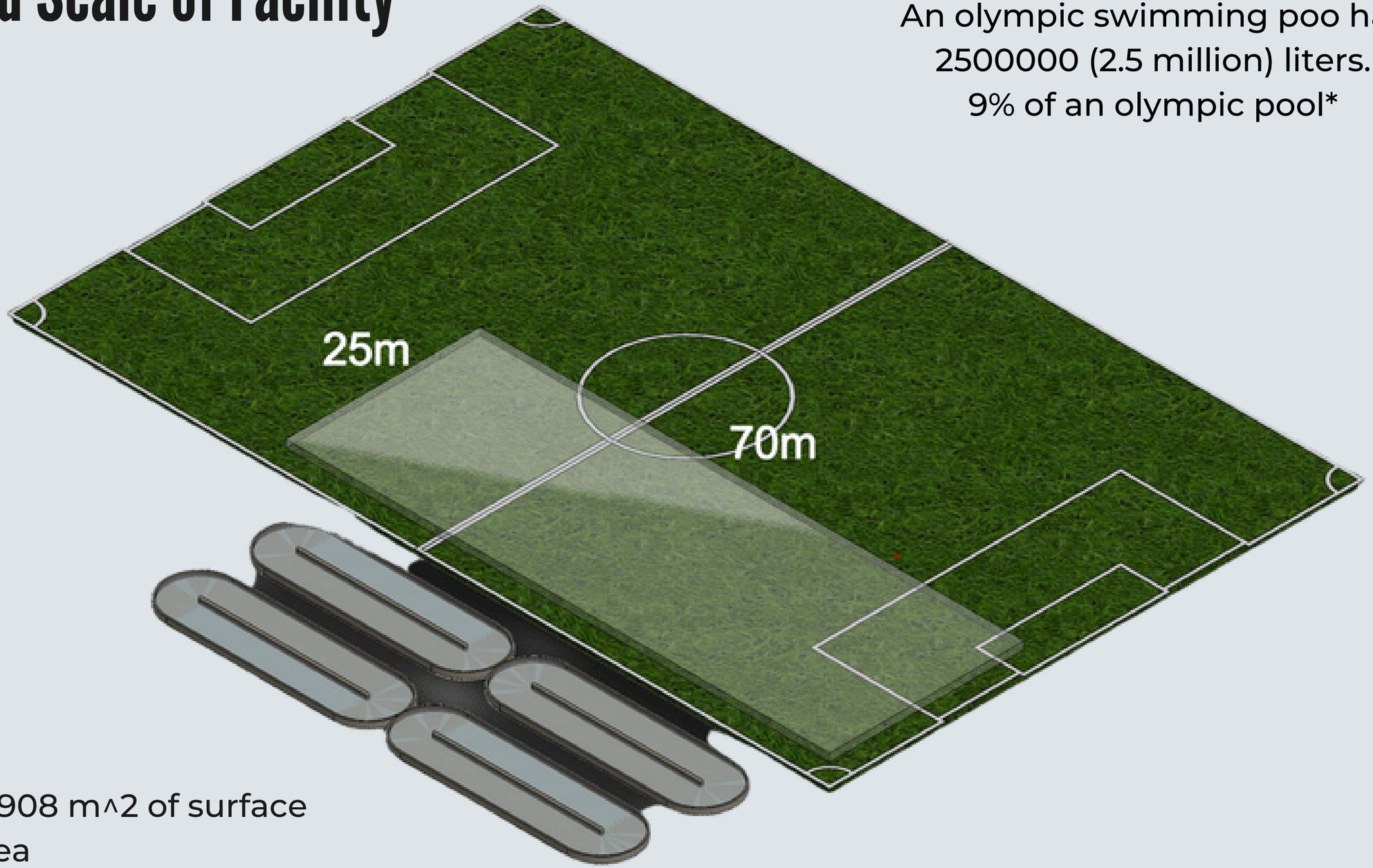
Value Add Possibilities

Financial Analysis, Value Add, and Marketing Opportunities

Lesvos Project Story → Idea → Opportunities → Feedback

Visual Size and Scale of Facility

Total liters: 227,000 (L)
An olympic swimming poo has 2500000 (2.5 million) liters.
9% of an olympic pool*



4 raceway ponds = 908 m^2 of surface area

Estimated Yields

27 Harvests per Month
12 g per harvest per m^2

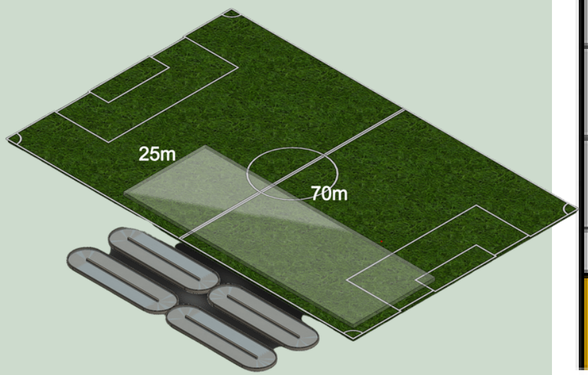
1g = $.135

Each g will sell for an estimated 13.5 cents

Est. Partial Income Statment

lg = $.135

12g



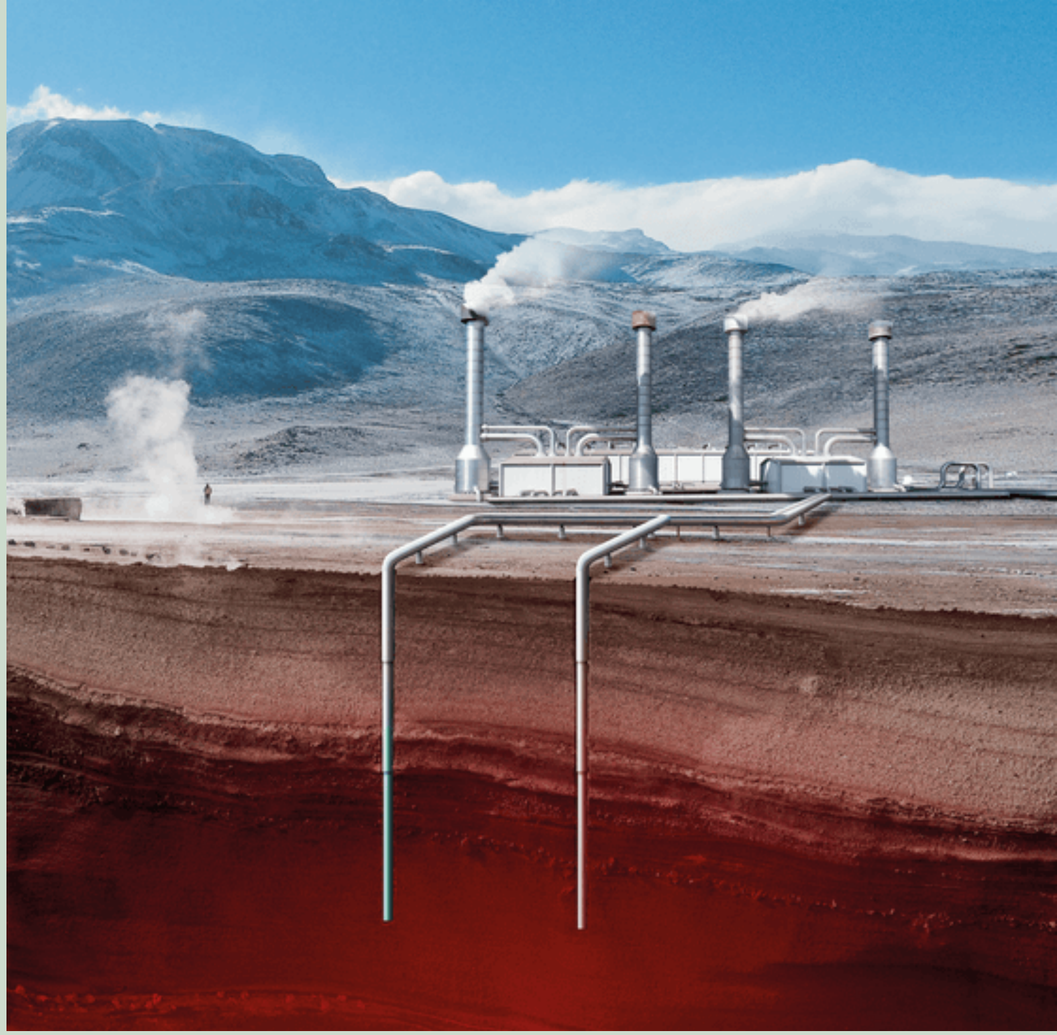
Estimated Partial Monthly Operating Income Statement	
Estimated Monthly Gross Revenue	
Est. Processed Powder Grams Per Month	294,192.00
Est. Final Sale Price Per Gram	$0.135
Est. Gross Revenue	$39,715.92
Estimated Monthly Reccuring/Operating Expenses	
Est. Monthly Labor Cost (Est. at 21% of Est. Monthly Gross Revenue)	$8,340.34
Est. Monthly Medium Replacment Costs	$2,131.55
Est. Projected Monthly Fixed Overhead	$0.00
Est. Shipping Costs	$0.00
Est. Total Energy Costs Per Month (heating, harvesting, and packaging) w HEAT PUMP	$21,482.91
Est. Partial Total Earnings (Profit) Monthly (Heat Pump)	$7,761.11

Geothermal Heating Option

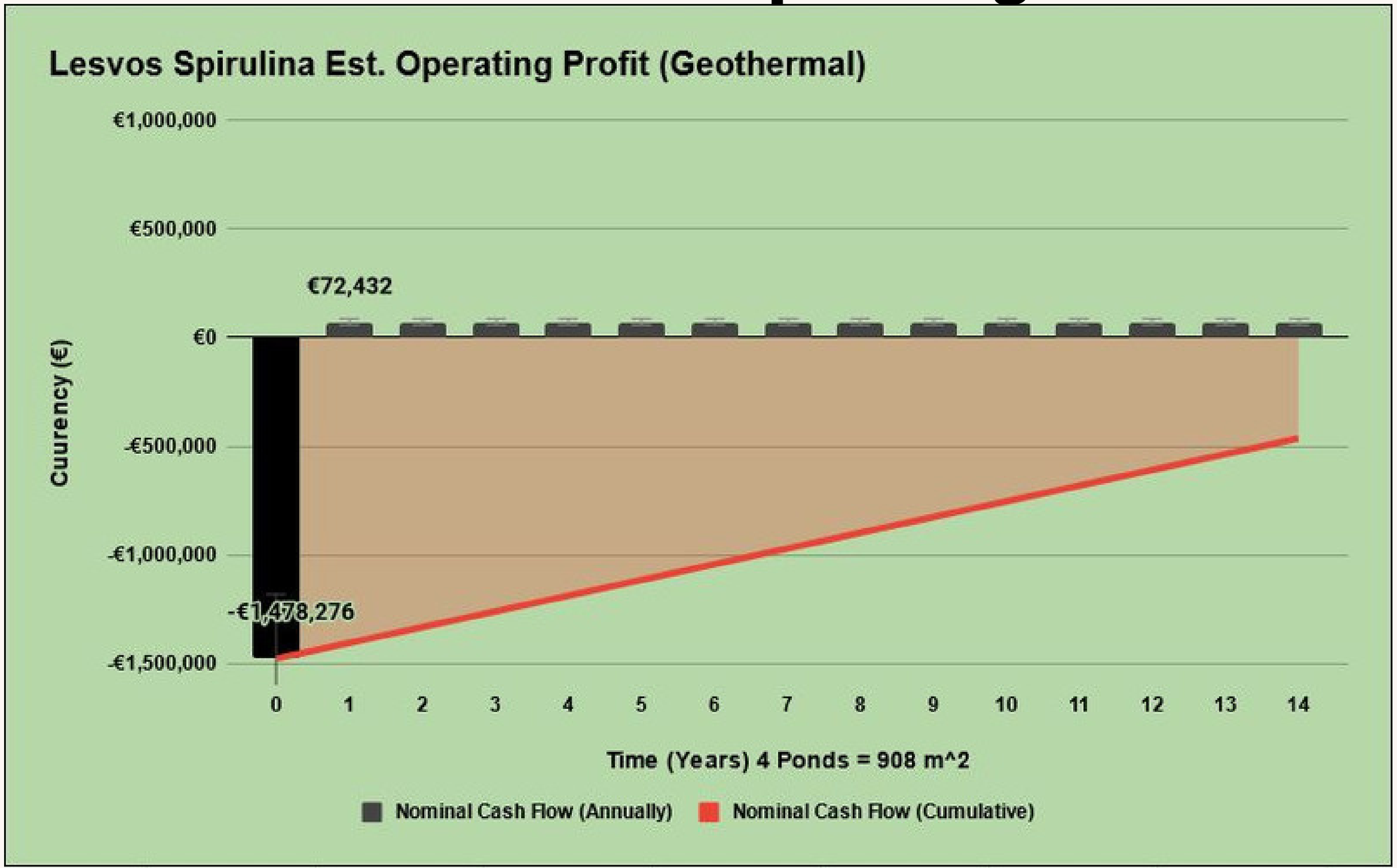
Annual Estimated Operating Profit Range:

$72,432<------>$90,540

Start-Up Costs: $1,478,276 before grants



Geothermal Estimated Operating Cash Flows



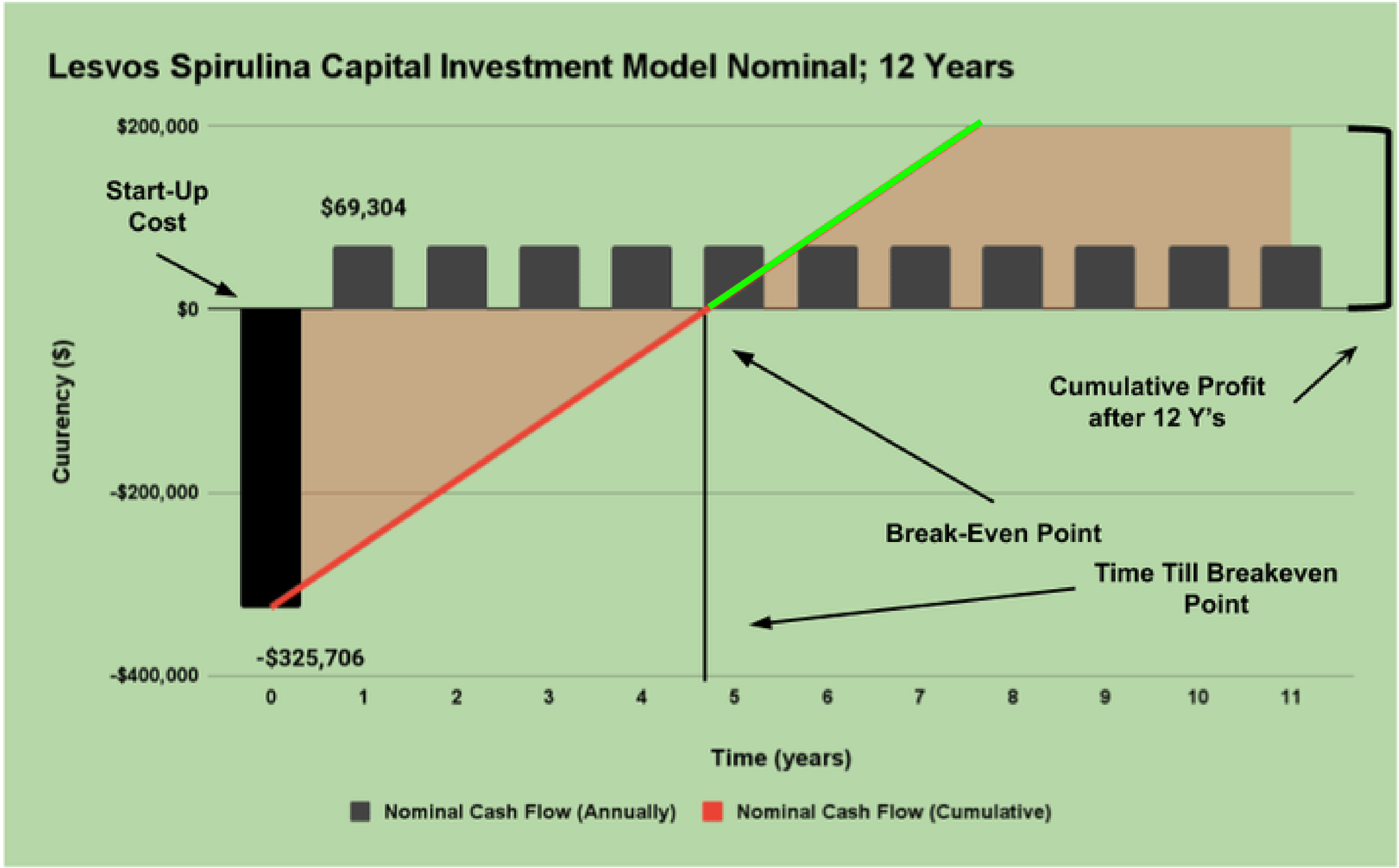
Heat Pump Heating Option

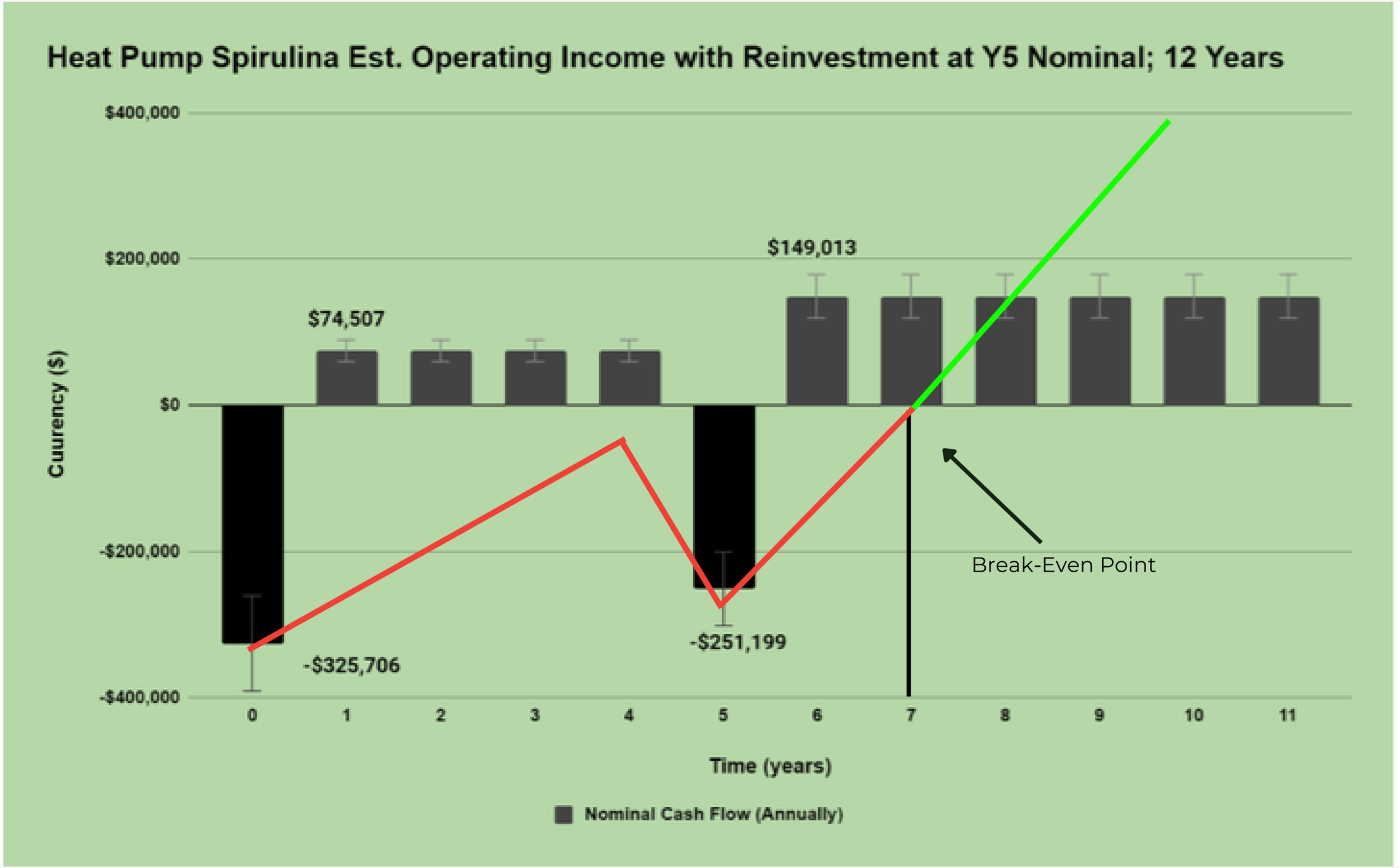
Annual Estimated Operating Profit Range:

$74,507<------>$93,133

Start-Up Costs: $325,706

Heat Pump Estimated Operating Cash Flows

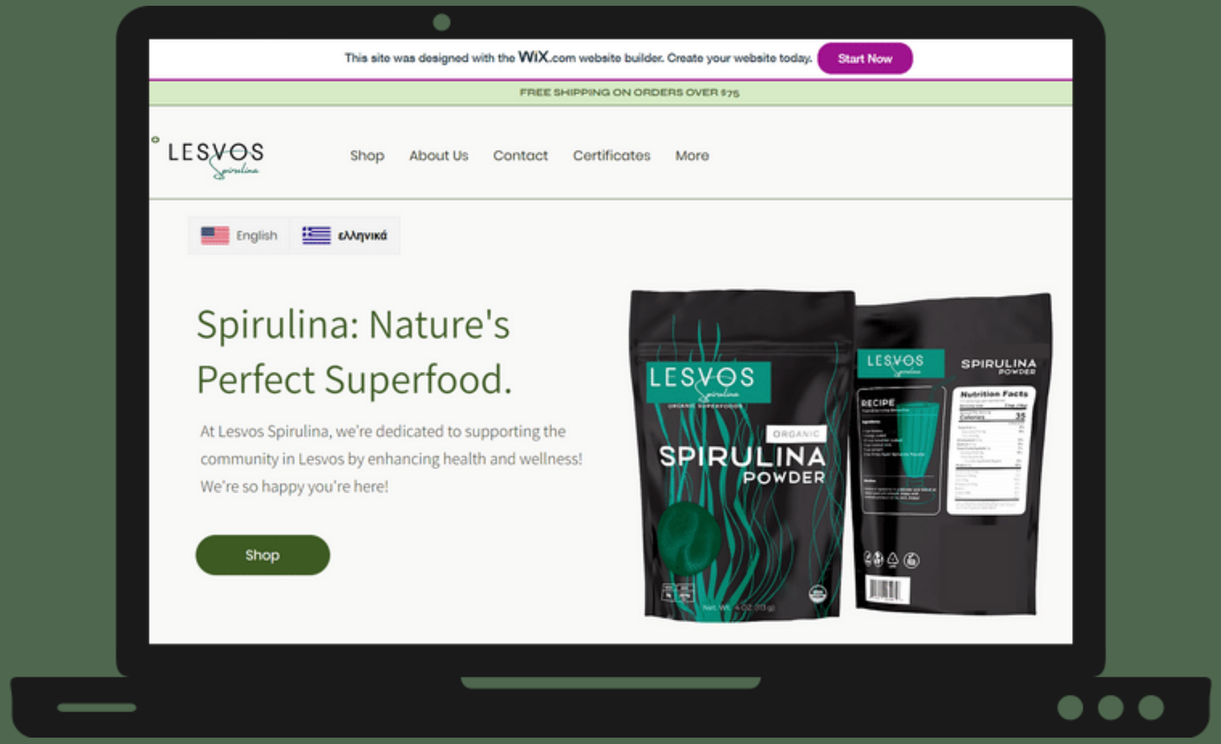



Heat Pump Spirulina Est. Operating Income with Reinvestment at Y5 Nominal; 12 Years
$400,000
$200,000
$0
-$200,000
-$400,000
Cuurency ($)
$74,507
$149,013
-$325,706
-$251,199
Break-Even Point
0
1
2
3
4
5
6
7
8
9
10
11
Time (years)
Nominal Cash Flow (Annually)

Potential Monthly Employment
If Profit + Labor Expense were $14,000

Digital Sales

Website and Digital Engagment Demo



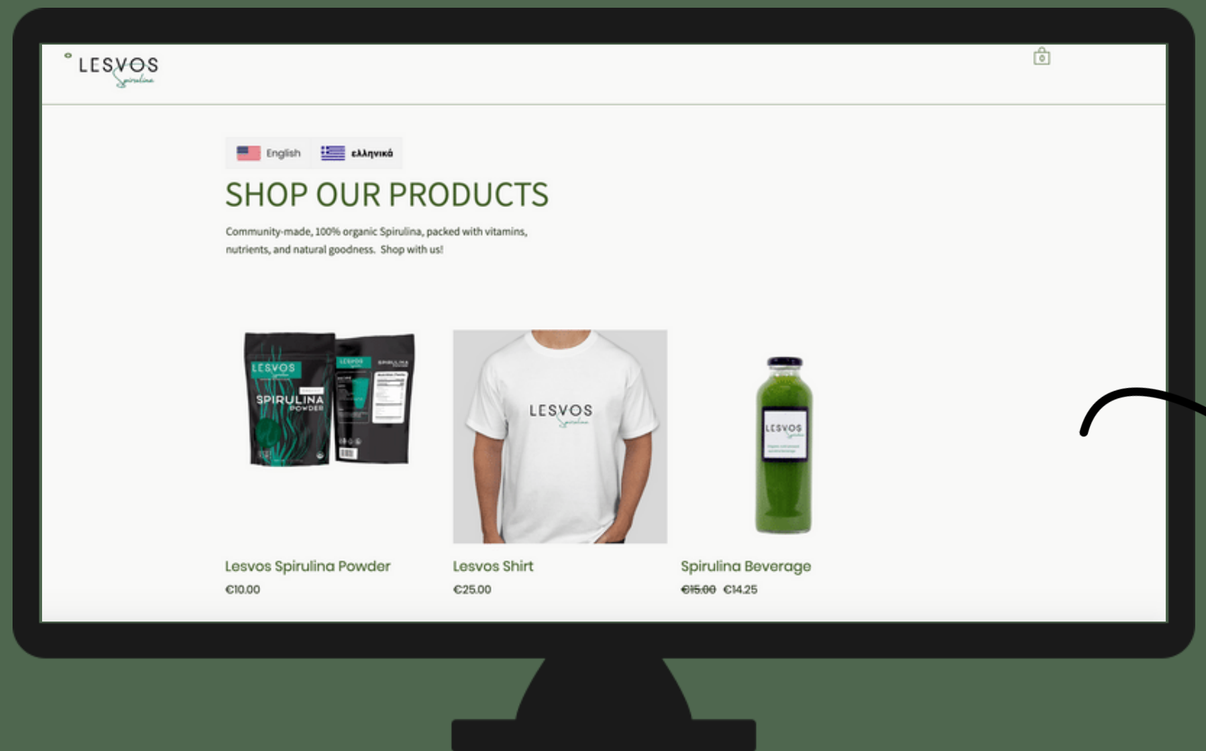
Lesvos Spirulina Demo Website

https://jlim196.wixsite.com/lesvosspirulina/el

Lesvos Project Story → Idea → Opportunities → Feedback

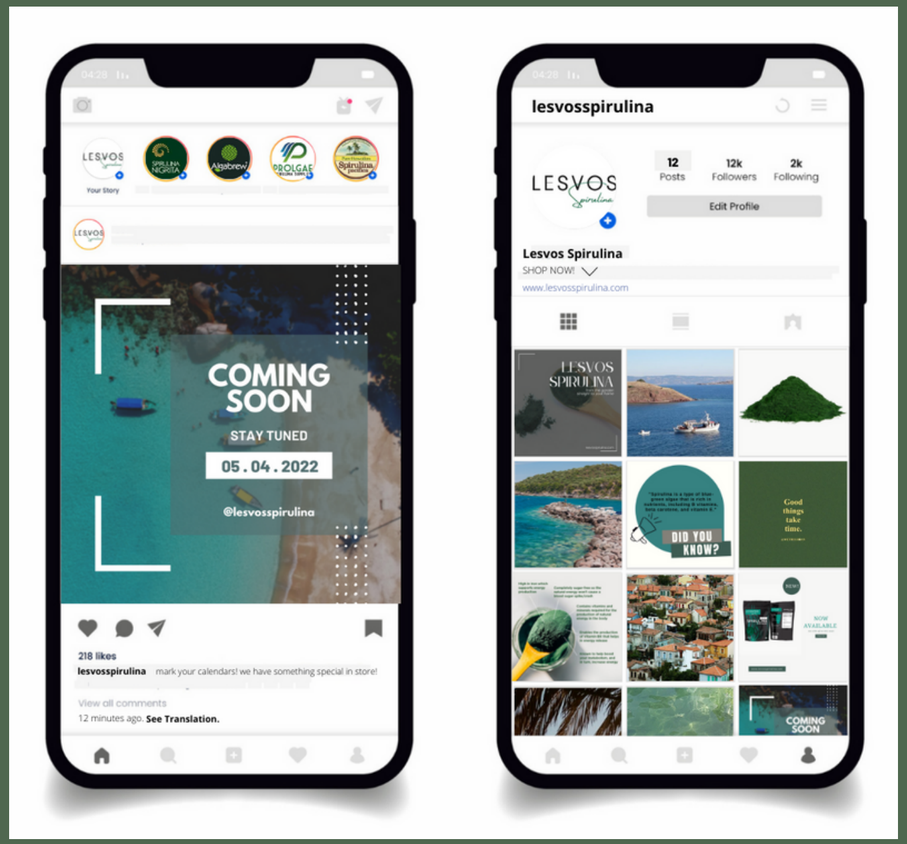
Digital Shop

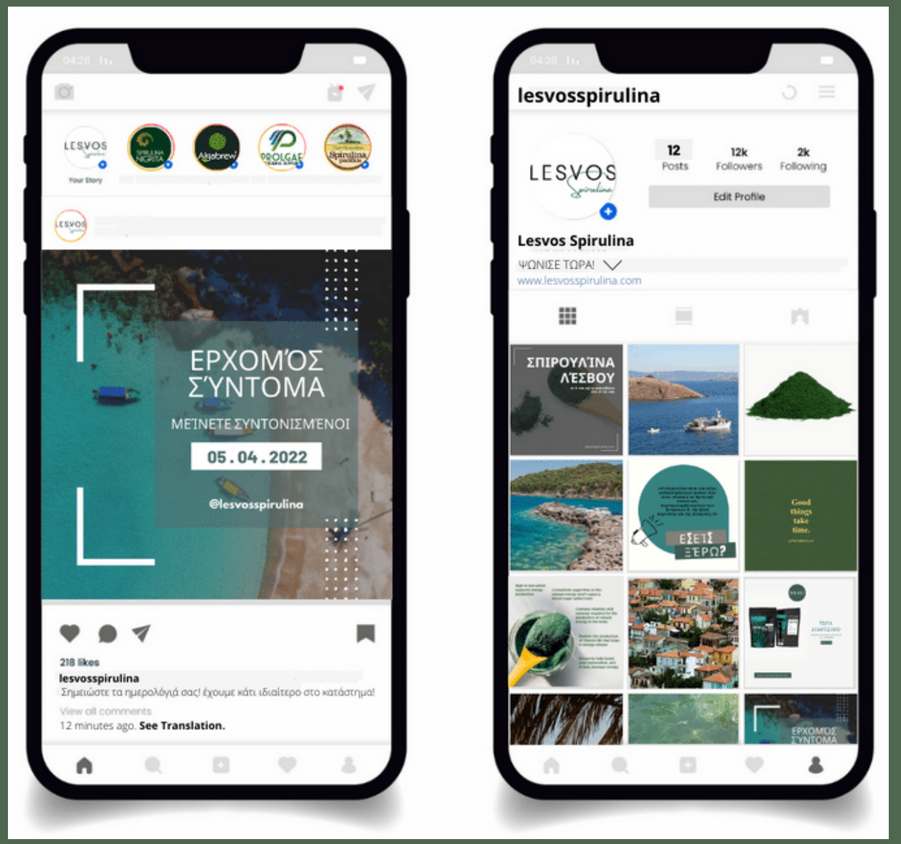
Toggle between English and Greek Language



Digital Marketing

Social Media Demos





Lesvos Project Story → Idea → Business Demos → Feedback

Potential Value Add Partnerships

Lesvos
food fest

LESVOSTRAIL
Fit On Olive Trails | www.lesvostrail.eu

Lesvos Project Story → Idea → Opportunities → Feedback

Thoughts & Feedback

...

Post Pitch Survey

Use these slides to put other information we can have on hand to answer questions people may have about specific things.

Financial Model Index

(More Detailed Explaination of Assumptions and sources

Link to Financial Model Index

~ EXTRA SLIDES ~
[not a part of this presentation]

Preparing a feasibility study for next year

7	Stir Stick	For stirring backup Spirulin	https://www.uline.com/Pro	2	$5.00	$10.00	Nutrient Mixing
8	Nutrient Mix	Food for Spirulina (T20L)	https://www.healthalgae.c	1	$206.17	$206.17	
9	Spirulina Starter Culture	Starting culture for spirulina	https://algaeresearchsupp	2	$330.00	$660.00	Request Health/
10	Hose	25ft hose for filling water	https://www.google.com/a	1	$16.44	$16.44	
11							
12	Secchi Disk	Measure liquid density	https://www.grow-spirulina	1	$19.00	$19.00	Regular Testing
13	pH Strips	Testing Water pH	https://www.amazon.com/	3	$10.99	$32.97	
14	Nutrient Test Strips	Simple testing for accumula	https://www.amazon.com/	1	$20.98	$20.98	
15							
16	Latex gloves	Handling Spirulina and Nut	https://www.amazon.com/	2	$11.97	$23.94	Dechlorination
17	Chlorine Test Strips	For testing if chlorine is pre	https://www.grainger.com/	1	$17.54	$17.54	
18	Beakers	250 mL beaker for dechlori	https://www.webstaurants	4	$3.89	$15.56	
19	100g scale	Measuring quantities	https://www.amazon.com/	1	$10.50	$10.50	
20	Pitri Dishes	30 pack for various needs	https://www.google.com/a	1	$11.39	$11.39	
21	Sodium Metabisulfite	Dechlorinating Tap Water	https://www.amazon.com/	1	$8.15	$8.15	
22	Distilled Water	1 gal for dechlorination	https://www.fredmeyer.cor	1	$1.29	$1.29	
23	Chemical Storage Cont	Storage of Sodium Metabis	https://www.usplastic.com	2	$1.24	$2.48	
24	25 mL Graduated Cylin	Dechlorination System	https://www.homescience	2	$6.35	$12.70	
25	65mm Funnel	Dechlorination System	https://www.homescience	1	$1.60	$1.60	
26	100mm Funnel	Dechlorination System	https://www.homescience	1	$2.70	$2.70	
27	DPD 3 Tablets	Dechlorination Testing	https://www.poolzoom.com	1000	$0.06	$61.26	Min quantity 1000
28	DPD 1 Tablets	Dechlorination Testing	https://www.poolzoom.com	1000	$0.07	$71.03	
29							
30	50 micron nylon filter	Filters the spirulina	https://www.amazon.com/	1	$29.99	$29.99	Harvesting/Filtration
31	25 micron nylon filter	Filters the spirulina	https://www.amazon.com/	1	$36.99	$36.99	
32	20 gallon foodsafe buck	For spirulina water collectio	https://www.webstaurants	2	$28.99	$57.98	
33	5 gallon foodsafe bucke	For transporting spirulina h	https://www.homedepot.co	2	$7.98	$15.96	

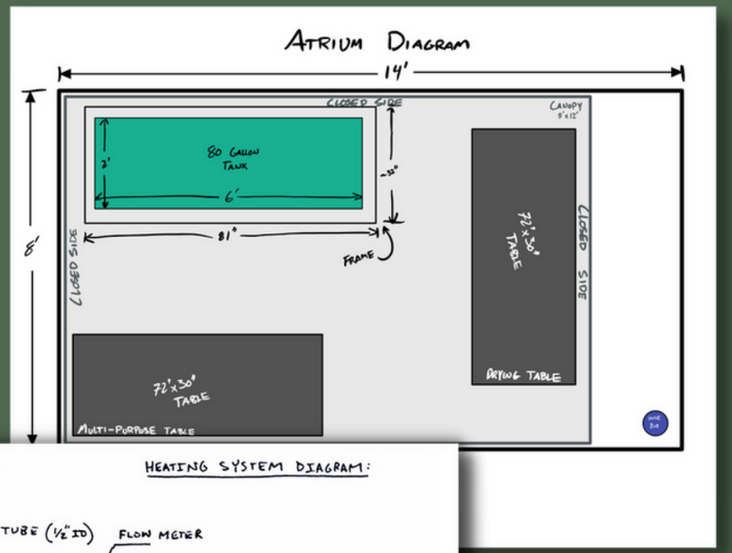
Small-Scale Spirulina Farming Manual

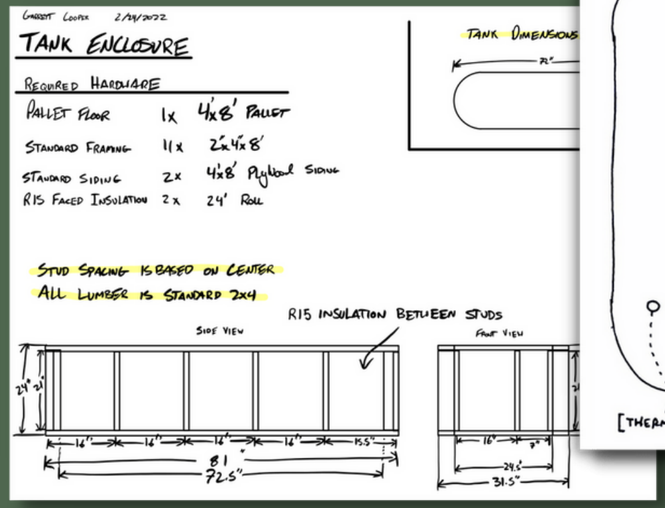
A Comprehensive Guide from Construction to Harvest

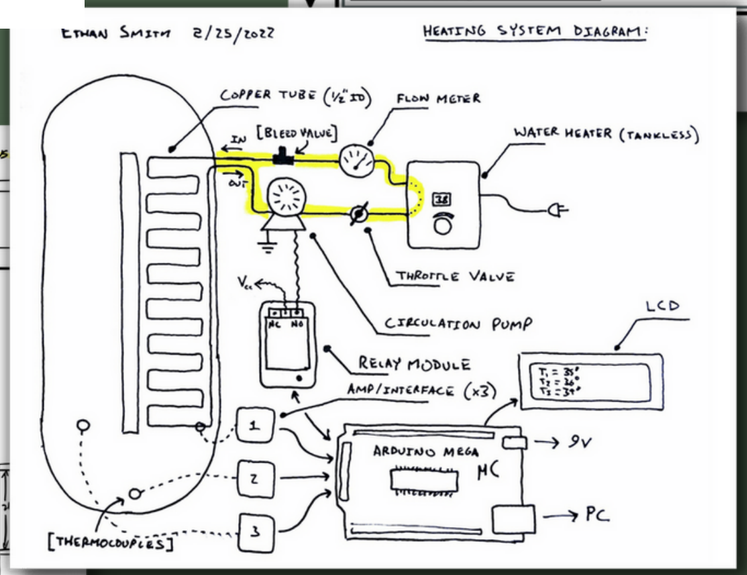
George Fox University College of Engineering


Growing Process
Harvesting Process
Drying Process
Final Product Operations
Sale + Distribution
LESVOS
Spirulina
All efforts contribute to the advancement of the Lesvos Community.
LESVOS
ORGANIC
SPIRULINA
POWDER
LESVOS
SPIRULINA
POWDER
Nutrition Facts
LESVOS
Organic cold pressed spirulina beverage

feasibility study plans








Inputs:
What is Needed
Outputs:
What is Created
Consumer and Stakeholder Insight
Raw Materials:
water, fertilizer, energy.
Effective managers, scientists, and engineers
Financial Resources
Reutilize and Recycle Material
Reinvestment
LESVOS
Spirulina
Products
Shipping and Distribution
Community Impact:
Positive global, educational, and local impact
Economic Development:
Jobs + Tax Revenue
Production Waste and carbon emissions

System Heating

30-35 °C water needed

Is there an existing geothermal well available?

- YES
  - Geothermal likely best
- NO
  - Starting with a large facility
    - Geothermal is most economical long-term
  - Starting small
    - Solar is more scaleable


Growing Process
Harvesting Process
Drying Process
Final Product Operations
Sale + Distribution
LESVOS
Spirulina
All efforts contribute to the advancement of the Lesvos Community.
LESVOS
ORGANIC
SPIRULINA
POWDER
LESVOS
SPIRULINA
POWDER
Nutrition Facts
LESVOS
Organic cold pressed spirulina beverage
Bakery | Artisan

Total Estimated Startup Cost:	$41,205.23

Item:	Description:	Supplier Link:	QTY:	Cost:
Tank Construction				
Plastic Lining	For lining the concrete(?) tanks	https://farmplasticsup	NA	$263.52
Concrete Ends	Volume = 3.1m^3 * 2 sides * $162.5/m^3 =	https://www.concreter	NA	$1,007.50
End Reinforcement	Area = 18.3m^2 * 2 sides * $0.33/m^2	https://www.concreter	NA	$1,559.16
Concrete per meter of straight tank (includes both lane	Volume = 1.16m^3 *$162.5/m^3	https://www.concreter	NA	$22,997.00
Concrete Reinforcement	Area = 6.8m^2 * $0.33/m^2	https://www.concreter	NA	$274.50
More Concrete Costs	~$312 for ends + ~$36/m^2 of straight tank	https://www.concreter	NA	$4,704.00
Total:				$30,805.68
Heating System				
PEX Tubing	1/2" Heat Exchanger Tubing	https://www.vevor.con	NA	$200.00
Heat Pump			NA	$3,660.00
Total:				$3,860.00
Post Processing				
Sieve Shaker	For spirulina filtration (this # is not per square m)	https://m.made-in-chi	NA	$1,500.00
Drying Racks	For spirulina drying	https://grow-organic-s	NA	$41.11
Pump	Pumping spirulina harvest to filter (not per m^2)	https://www.homedep	NA	$279.00
Pulverizing	For pulverizing spirulina to powder (not per m^2)	https://www.alibaba.c	NA	$4,000.00
Total:				$5,820.11
Facility Construction				
See greenhouse cost tab	average of many different green house sizes	[see greenhouse tab]	NA	$307.44
Total:				$307.44
Lighting				
Lights	See Lighting costs tab	[see lighting tab]	NA	$4,717.74
Total:				$4,717.74
Culture				
Starting culture (spirulina)	(this # is not per square m)		NA	$412.00
Total:				$412.00