



Protected Agriculture

Adapting Climate Resilient Technologies to the Caribbean Region

ALQUIMI RENEWABLES

MAY 2018 – GRENADA



alquimi
renewables

Introduction

- Project Development & Investment Company
- US and Caribbean based
- Utility Scale Renewable Energy Conversion
- Solar, WTE, CCHP, & Geothermal Infrastructure

WTE: Caribbean Projects

Geothermal: Nevis (9MW), Montserrat (3+20MW), India (2000MW)

- Off Grid Commercial Greenhouse Projects – Micro Grids

Caribbean, Latam, US, Pacific Islands

The logo for Alquimi Renewables features the word "alquimi" in a black, lowercase, sans-serif font. Above the letter "i" in "alquimi" is a stylized graphic of a leaf or a flame. Below "alquimi" is the word "renewables" in a smaller, green, lowercase, sans-serif font. The entire logo is set against a white background within a white rectangular box.

What is Protected Agriculture?

“modification of the natural environment to achieve optimal growth”

(Jansen and Malter 1995)



Focus on Greenhouse Technology



Greenhouses



Hydroponic Systems



Grow Lighting



Solar Energy

Recent Regional Climate Events Affecting Agriculture

- Hurricanes Irma and Maria - Anguilla (Cuisinart)
- Jamaica – GK Pepper Farm Flooding
- Dominica, Puerto Rico



Case Study – The Power of Technology

The Netherlands is a TINY country....



Hongerwinter
1944-45
22,000 deaths



But it now produces more food than Russia, Canada, or China!

2017* [€]	411,665,633,000	468,241,589,000	56,575,956,000
	AG Imports	AG Exports	Balance

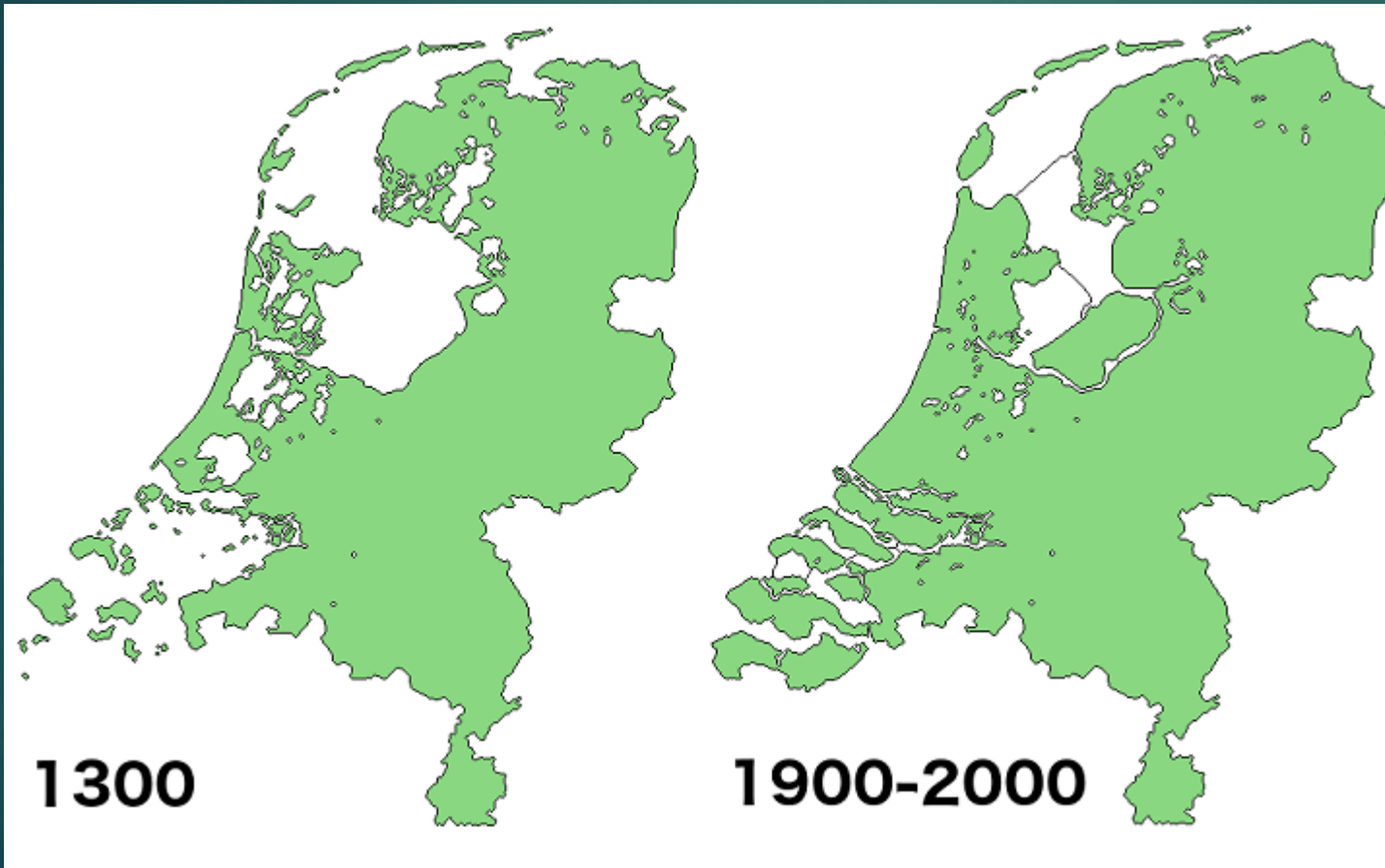
Case Study – The Power of Technology

The Netherlands is a TINY country....



Case Study – The Power of Technology

The Netherlands is a TINY country...but growing.



17% of total land area is reclaimed from the sea;

26% of its area is located below sea level.

21% of its population lives in areas below sea level.

Only **50%** of its area is more than 1 meter above sea level.

Lowest point: Zuidplaspolder -7 m (-23 ft), below sea level.

Global Greenhouse Production



Netherlands

- World leader in protected agriculture;
- 9,000 hectares under glass (1/4 area of Grenada);
- Many powered by geothermal energy;
- 2nd largest agricultural exporter in the world.

Global Greenhouse Production - NL



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USA – The Largest Agricultural Producer

- 1.35 billion square feet of greenhouse production in the US in 2017;
- Equates to over 31,000 acres;
- Produces a market value of almost US\$15 billion annually;
- Estimated to increase dramatically with the advent of urban farms.

	No. of Farms	Square Footage	Market Value
Aquatic Plants	277	1,642,080	\$ 20,756,332
Bulbs	193	1,306,346	\$ 72,766,990
Cuttings, seedlings, liners, and plugs	1,114	35,627,552	\$ 585,066,367
Floriculture	18,724	873,290,590	\$ 5,888,527,346
Flower Seeds	212	368,593	\$ 32,378,251
Greenhouse fruits and berries	673	7,950,774	\$ 28,976,671
Greenhouse Tomatoes	6,323	55,180,582	\$ 400,286,262
Other greenhouse vegetables	5,268	42,816,149	\$ 234,199,741
Sod Harvested			\$ 1,011,490,194
Mushrooms	740	37,416,059	\$ 1,127,007,448
Nursery stock crops	4,883	258,498,855	\$ 5,104,694,108
Tobacco transplants	447	4,487,277	\$ 11,442,846
Vegetable seeds	555	1,801,257	\$ 155,210,334
Vegetable transplants	1,942	21,527,367	\$ 165,845,977
	41,351	1,344,913,481	\$ 14,838,654,867

Source: https://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_1_US/st99_1_041_042.pdf

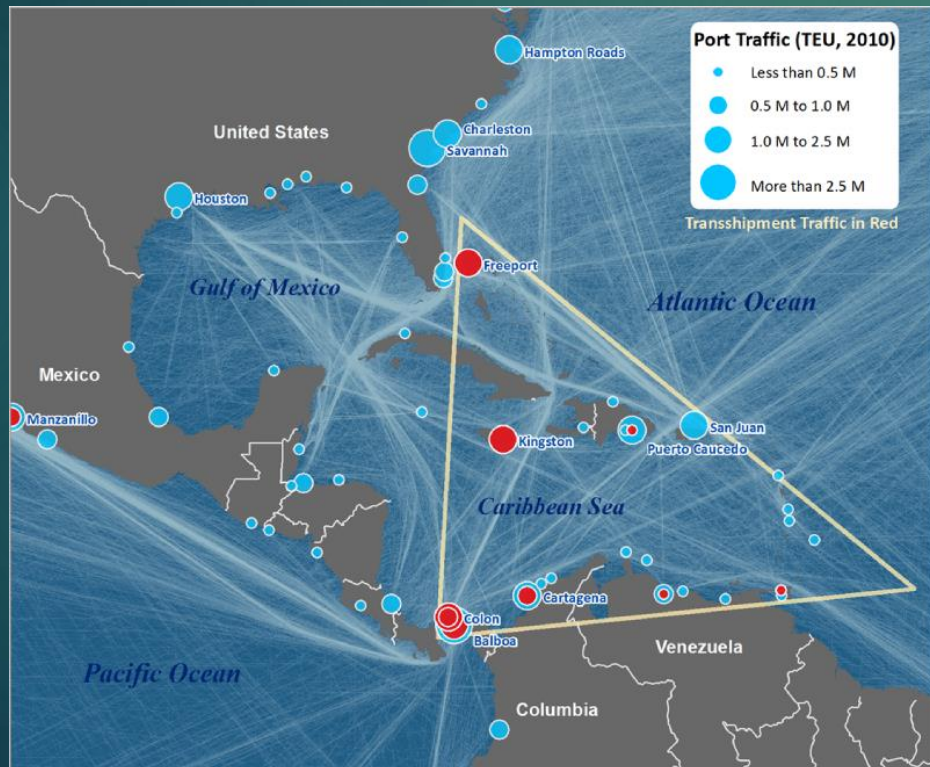


Urban
Rooftop
Greenhouses

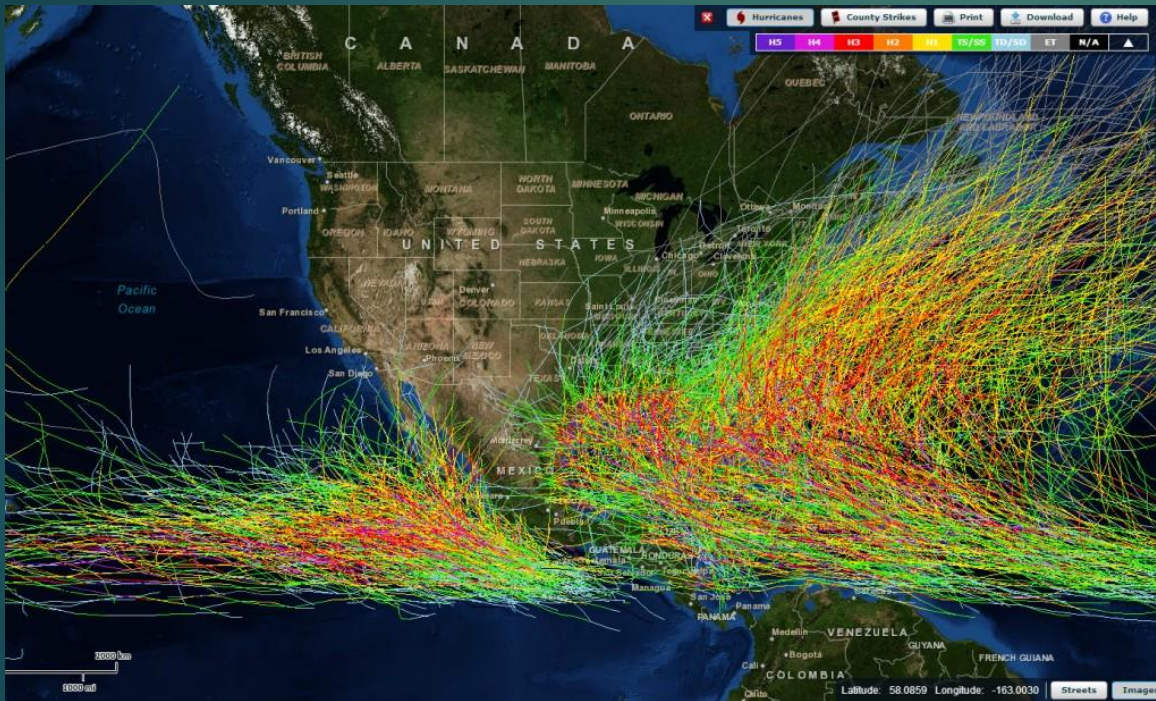
Shipping and Logistics

Reducing the Carbon Footprint

80% of all fresh produce shipments to the Caribbean are from US through Port of Miami.
The region currently imports US\$1.3B of fresh produce and growing.



Climate Threat to Horticulture in the Caribbean



Hurricanes and Typhoons
Drought and Flooding



High Risk Climate Solutions



Greenhouses



Water Recycling

Alternative Energy



Adapting Greenhouses to High Risk Climates - Caribbean

- ▶ Simpler 'Frame & Film' greenhouses are cheaper to build, but are not designed to withstand weather threats like tropical storms or hurricanes;
- ▶ They cannot be fully sealed so are also subject to flooding and pestilence;
- ▶ Difficult to insure, so commercial scale production is high risk to the investor/owner.



Adapting Greenhouses to High Risk Climates - Caribbean

4 acre aluminum frame
and film greenhouse in
Tortola, BVI, destroyed by
Hurricane Irma, Sept.
2017.

Over \$3MM investment
lost, not including
hydroponic system and
crop value.

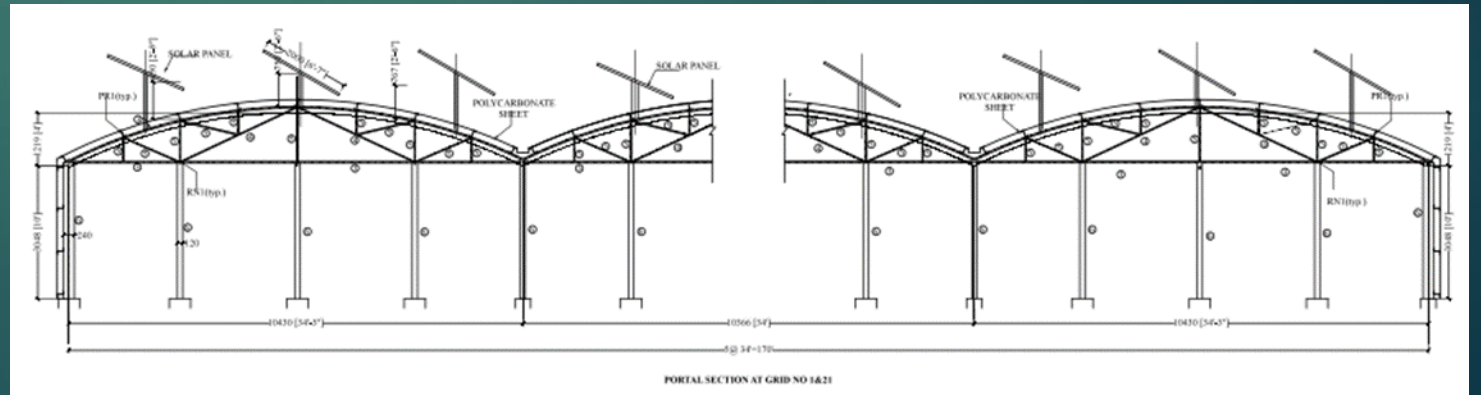


Adapting Greenhouses to High Risk Climates - Caribbean

Alquimi Renewables has engineered and patented the first hurricane resistant commercial greenhouse system.

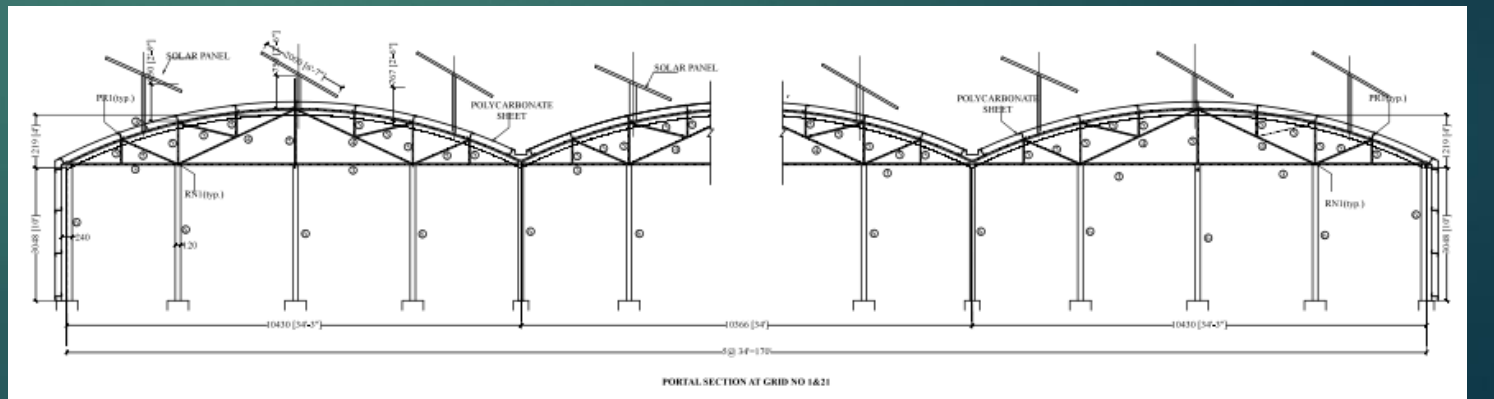
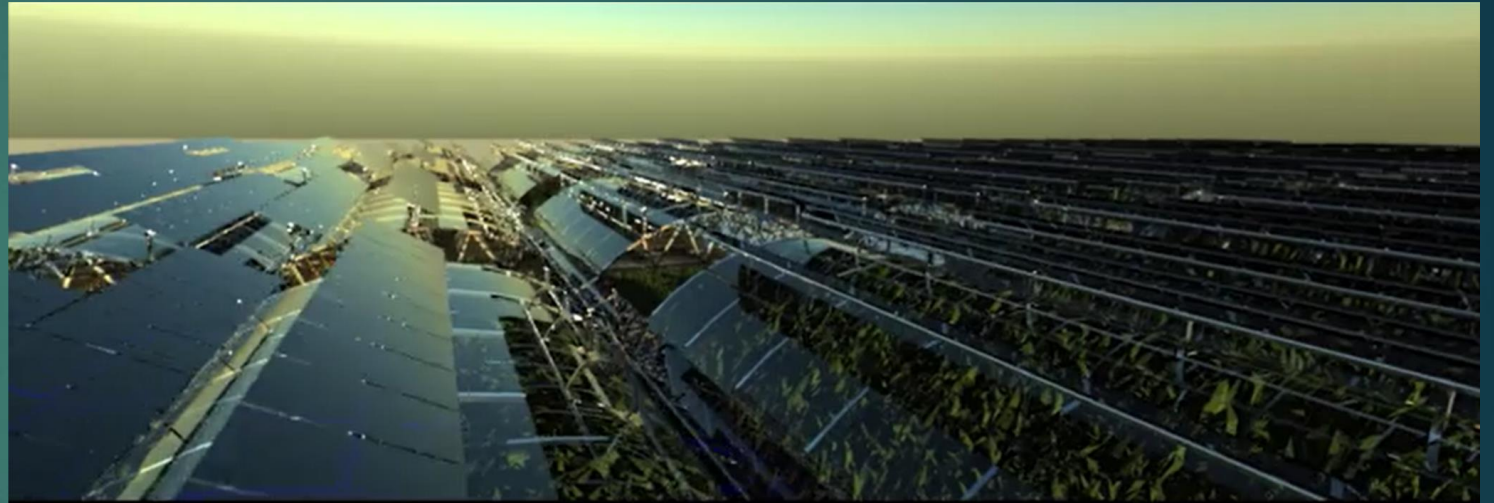
Tested to withstand 150mph sustained winds. (CAT4+)

Constructed from marine coated galvanized steel, polycarbonate panels, and proprietary ground pinning system.



Off-Grid Energy and Water Supply

- Solar energy and battery storage system saves on operating costs;
- Rooftop solar arrays save on valuable land area;
- Water collection, storage, and recycling system (6 in/month = 1000 gl/month)
- Does not require arable land – flat and accessible;
- Each unit 202' x 204' or about 41,000 square feet. Produces over 400,000 pounds of produce annually.



Production – Packaging & Freezer



Sprung Pre-Engineered Structures

- Rapid Deployment;
- Cost Effective;
- Energy Efficient (R25);
- High volume;
- Expandable.

Alquimi Commercial Production Hydroponic Systems

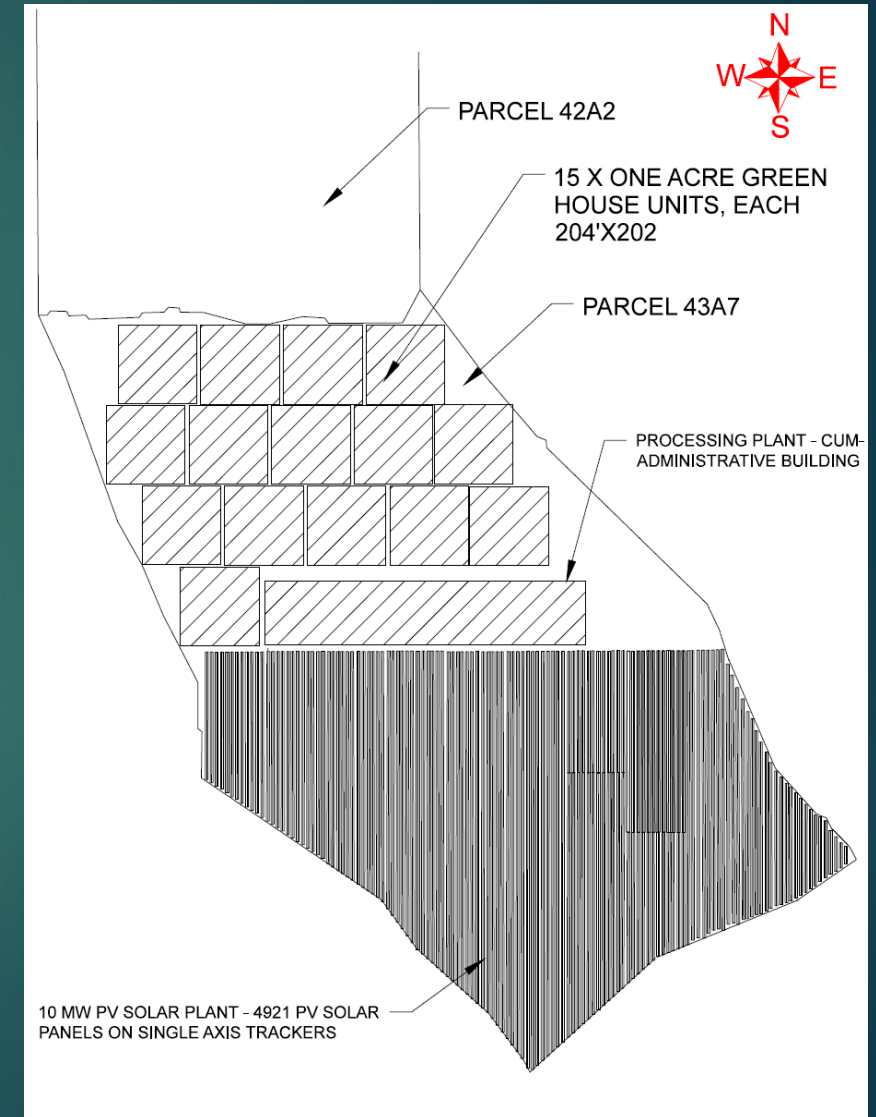


Sub-Tropical NFT and Vine Crop Hydroponic Systems



Alquimi Commercial Production

- Standard project site of 15 greenhouse units;
- Total of 620,000 square feet of greenhouse space;
- Able to produce over **6 million pounds** of fresh produce annually;
- At average wholesale crop price of \$1.80/lb. will generate almost US\$11MM in gross revenue per annum.
- Total project cost approx. US\$35mm



Grenada Market Demand

Grenada fresh produce IMPORTS 2013: 4.34 million pounds

Grenada fresh produce IMPORTS 2017: 8.44 million pounds

5 year increase almost 100%

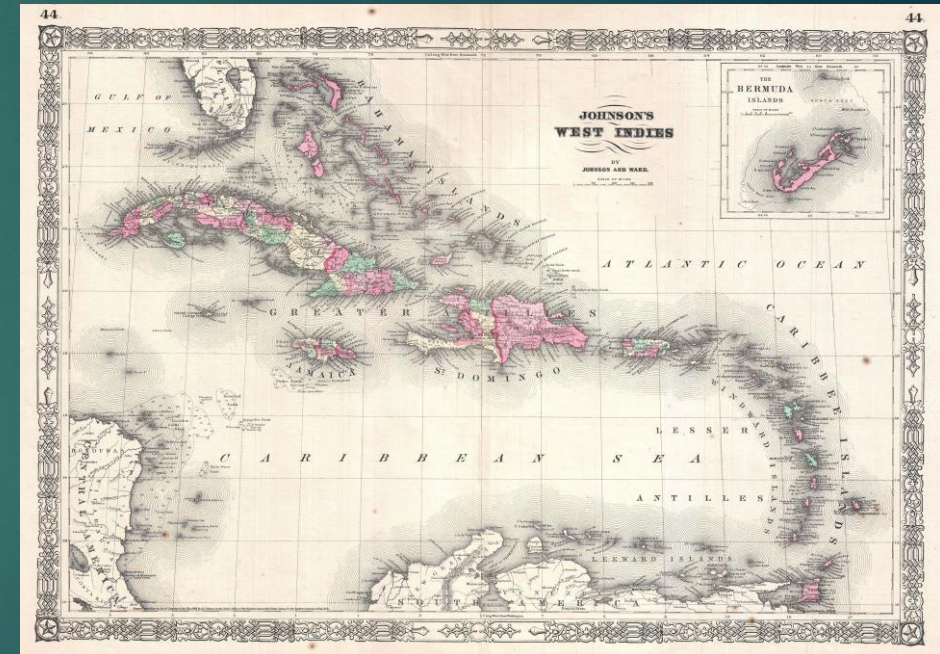
Demand is growing – let's grow local!

(Source: Grenada Statistics Department)



Alquimi Projects in Development Caribbean Region

- Tortola, BVI: 9 acres + 2MW utility off take
- Grand Cayman: 10 acres + 2MW private off take
- St. Croix, USVI: 15 acres + 3MW utility off take
- St. Lucia: 15 acres + 3MW utility off take
- Jamaica: 5 acre private client production
- Jamaica: 1 acre hybrid project
- Barbados: 8 acres (off take TBN)
- Grenada: 8 acres (off take TBN)



Market Demand

Alquimi will supply customized fresh produce needs to the following companies:

Supermarket
Chains:



Resort Chains:



Online Market:



Investor Criteria – Project Delivery

- ✓ NEED? Value Proposition
- ✓ Return on Investment: what's the IRR? Looking for minimum 15% over 25 year term.
- ✓ Risk Mitigation – Real Estate Factors (greenhouse): Proven engineering.
- ✓ Insurance: Project underwriting
- ✓ Market: Customers under contract
- ✓ Tax Implications: Government concessions or MOU?
- ✓ Growth Opportunity: Expansion and downstream opportunities
- ✓ Local support and social mandate.



Financial Pro Forma - AR Solar Greenhouse - BVI Project (Differential PPA Rates)

Inputs

Total Equipment, Construction and development Cost	\$26,807,090.60	
Hardware	\$22,786,027.01	85%
Labor	\$4,021,063.59	15%
Down Payment	0%	
Total Financing	\$26,807,090.60	
Insurance (Approximate)	\$120,000.00	
Operations & Maintenance Including Auto Software	6.0%	
Prime Rate	1.0%	
Spread	3.0%	
Cost of financing	4.0%	
Term (years)	20	

System Details

PV Solar rooftop System Size in Watts	3,029,400
Degradation Allowance	0.50%
Sale Price per KWH to Green House	\$0.20
Annual Escalator on Solar sale price to GH and Grid	3%
Total 9 Acres Green House Foot Print (Sq Ft)	370,872
Cost of Green House including construction	\$32.34
Initial Solar Energy Output / Watt (KWH)	1.756
Solar Installation Cost per Watt	\$2.45
Cost of energy system	\$7,422,030.00
Cost of 25 000 Sq ft of ancillary Buildings (\$49/Sq Ft)	\$1,225,000.00
Fee to Megalo for PV Solar (Per watt)	\$0.10
Cost of Hydroponic system (\$11/Sq Ft)	\$4,079,592.00
Freight and Handling	\$507,000.00
Sale Price per KWH to Grid	\$0.14

The cost includes construction of a 381,915 Sq ft of Concrete flooring slab
Includes 1,000,000Wh Battery storage and a 750KW standby Diesel Generator
Including construction of a concrete flooring slab,

Notes 1.. PV Solar plant capacity of 3029.4 KW DC planned on 370,872 Sq Ft of Green House roofs

Year	0	1	2	3	4	5	6	7	8	9	10
Financing costs	-\$1,972,512.65	-\$1,972,512.65	-\$1,972,512.65	-\$1,972,512.65	-\$1,972,512.65	-\$1,972,512.65	-\$1,972,512.65	-\$1,972,512.65	-\$1,972,512.65	-\$1,972,512.65	-\$1,972,512.65
System Output (KWH)	5,319,626	5,293,028	5,266,563	5,240,230	5,214,029	5,187,959	5,162,019	5,136,209	5,110,528	5,084,975	
<i>Degradation</i>		0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	
Income											
Electricity benefit from sale to Grid (40% of output)	\$297,899.08	\$305,301.87	\$312,888.62	\$320,663.90	\$328,632.40	\$336,798.92	\$345,168.37	\$353,745.80	\$362,536.39	\$371,545.42	
<i>Sell Price /KWH to Grid</i>	\$0.14	\$0.14	\$0.15	\$0.15	\$0.16	\$0.16	\$0.17	\$0.17	\$0.18	\$0.18	
Electricity benefit from sale to Greenhouse (60% of output)	\$638,355.17	\$654,218.29	\$670,475.62	\$687,136.94	\$704,212.29	\$721,711.97	\$739,646.51	\$758,026.72	\$776,863.69	\$796,168.75	
<i>Sell Price/KWH to Greenhouse</i>	\$0.20	\$0.21	\$0.21	\$0.22	\$0.23	\$0.23	\$0.24	\$0.25	\$0.25	\$0.26	
<i>Annual appreciation to Grid as well as to Greenhouse</i>		3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	
Green House rent/Lease Income	\$3,708,720.00	\$3,819,981.60	\$3,934,581.05	\$4,052,618.48	\$4,174,197.03	\$4,299,422.94	\$4,428,405.63	\$4,561,257.80	\$4,698,095.54	\$4,839,038.40	
<i>Green House Rent/Lease (Per Sq Ft)</i>	\$10.00	\$10.30	\$10.61	\$10.93	\$11.26	\$11.59	\$11.94	\$12.30	\$12.67	\$13.05	
<i>Annual escalation for Green House Rent</i>		3%	3%	3%	3%	3%	3%	3%	3%	3%	
Total Income	\$4,644,974.25	\$4,779,501.76	\$4,917,945.29	\$5,060,419.32	\$5,207,041.73	\$5,357,933.83	\$5,513,220.51	\$5,673,030.33	\$5,837,495.61	\$6,006,752.57	
Expenses											
Land Lease-Free	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
Insurance	-\$120,000.00	-\$120,000.00	-\$120,000.00	-\$120,000.00	-\$120,000.00	-\$120,000.00	-\$120,000.00	-\$120,000.00	-\$120,000.00	-\$120,000.00	
O & M Including AI Software	-\$278,698.45	-\$286,770.11	-\$295,076.72	-\$303,625.16	-\$312,422.50	-\$321,476.03	-\$330,793.23	-\$340,381.82	-\$350,249.74	-\$360,405.15	
Interest on Total Project Cost	\$1,072,283.62	\$1,036,274.46	\$998,824.94	\$959,877.43	\$919,372.02	\$877,246.39	\$833,435.74	\$787,872.67	\$740,487.07	\$691,206.04	

Go to Settings to activate Windows.

Grant Funding or Private Investment?

A solid business model and detailed plan can attract private investment;

The Grenada Development Bank was established as an agricultural development bank;

Now only 4% of loans are AG based;

Can be a faster way to grow your business.



Benefit Summary:

Why Growing Locally Matters

- Reduces the US\$1.3B annual fresh food import bill to the Caribbean;
- Improving food quality and nutritional value to local consumers;
- Lowering price of fresh food to local consumers;
- Eliminating dependency of offshore food supply = national food security;
- Improving food quality in restaurants = better tourism product;
- Adding renewable energy to the local grid to reduce energy cost;
- Creating high skilled permanent jobs in every island;
- Foreign Exchange savings;
- Provides access to new skills development and technology transfer (FEP).

For further technical information, due diligence requirements, or investor inquiries, please contact:

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