

A Game Changing CSP Solution for The Livelihood of Islands & Rural Seaside Communities

Development of self-contained renewable energy in ECO autonomous adaption

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Our Story Welcome to Patricia Greenhouse

Patricia lives on a beautiful island. She dreams of building a greenhouse where she can plant her favorite food crops such as lettuce, banana or farm fishes to create a well livelihood and supply nutritious produces to nearby markets.

This greenhouse must generate sufficient consistent renewable energy with zero carbon emission and pollutants to grow her crops and preserve the environment.

Be hold, you are going to see how we help carry out her dream step by step.





Step 1 - Greenhouse with Rooftop dishes

We first build a greenhouse farm which occupies 3500 m² with 76 partitions of 36 m² each.

To collect needed energy, GH's rooftop has 100 dishes of 3.7mΦ tracking the sun during daylight.

These dishes collect and store solar energy equivalent to 17 barrels of 20 kg LNG daily into thermal energy storage.

The energy then be used by Patricia in GH for 24/7 electricity, temperature control & cold storage.





Step 2 - Electricity power 24/7 (CSP thermal)

After complete the greenhouse, 8 sets of 3 kw steam engines are set up to generate 576 kwh per day using 300 ~ 400°C's steam generated by heat in the energy storage to provide Patricia 24/7 non-stop electricity for her greenhouse and essential demands of communities





Step 3 – Chillers For Cold Storage & Air-con

Then we set up a specific designed ammonia chiller. Utilizing 120~250°C's steam coming out of power steam engines to drive the chiller to provide refrigeration so that Patricia can

- Control greenhouse interior temperature for various crops or aquaria.
- Keep a 20' reefer container running for storing harvest.





Step 4 – Seawater Desalination (Fresh Water)

To supply critically needed fresh water in GH, we then set up 3 desalination tanks. Again, utilizing the 50 ~70°C steam out from the exhaust of the chiller to evaporate seawater to provide

- 10 tons of pure water (<100 ppm),
- 25 tons of seawater brine per day

Patricia now can use the fresh pure water for

- Drinking and life essentials.
- Delicate agriculture such as aeroponics box cultivation

She can also extract marine mineral from brine as valuable raw nutrition material.





Step 5. GH photosynthesis (Delicate Agro)

The CSP dishes on rooftop can also reflect 412-times focused sunlight into GH interior (a design based Cassegrain astronomical telescope theory).

And with 6 of skylight focused tubes at center of each room's ceiling, it supplies 1:1 natural radiance into GH's interior.

Patricia can control radiance for photosynthesis of crops in GH to cultivate variety of crops based on demands.

An area of 3500m² GH can be set up with 376,200 aeroponics boxes





Step 6. Additional Power: Indoor & outdoor PV

While there is sunlight in both outside and inside of GH, we install PV panels on the remaining area of rooftops and interior walls to generate additional electricity.

This setup generates 2,772 kwh/day comparing with conventional setup of 1,225 kwh (on similar 3,500 m² land area)

With the extra electricity in daylight, Patricia can electrolyze pure water into O_2 and H_2 , then be used in fuel cells for off-peak utility demands or portable power on transport vehicles.







Features Recap

Patricia now has a greenhouse that is self-contained renewable energy powered. It provides power and water for life; creates sustainable economic value for herself and communities. (often isolated and underserved areas)

This system resolves many critical livelihood issues facing islands/rural seaside area including satisfying daily utility needs and enabling development for the inhabitants; preserving our precious environment



Please visit our web site for more information <u>WWW.AlloGroove.com</u>





A year after completion-Benefit Summary (Est)

| Benefit Summary | | | | | |
|---------------------------------|------|-------------------------------|--|--|--|
| Energy | Q'ty | Note | | | |
| Electricity Power Generated | | | | | |
| (kwh)/day | 3348 | PV and CSP | | | |
| | | 20' frigid container 24 hours | | | |
| Refrigeration Capacity (RT)/day | 178 | operation | | | |
| Deslination (ton) | 10 | Pure/Drinking Water < 100 TDS | | | |
| | 25 | Seawater Brine | | | |

| Greenhouse | | |
|-------------------------------|-----------------|-----------------------------|
| | | |
| Agro Produce Value (Annual) | \$ 1,500,000 | Base on 30 cent per lettuce |

| Mineral Extraction | | |
|-----------------------------------|-----------------|-------------------|
| Marine Mineral Nutrition Material | | |
| (Annual) | \$ 1,460,000 | Base on \$1000/kg |





ALLOGROOVE HEAT EXCHANGER

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THANK YOU

Aerial View of The site Back up data

Project: Game Changer Location: Taiwan Area: ~ 3500 m² Terrain: Flat Coast: 100 m away Community: Farming/Tourism Estimated Cost: US \$5 M



Core Value (Back up data)

