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SUMMARY

Problem

- Need for clean and efficient power generation in wide range of markets

Customers

- Vary from small to large scale (anywhere from boaters to energy utilities)

Solution

- Wave energy converter utilizing gyroscopic principles
- More compact and efficient than competitors
- Less impact on the environment
- Scalable: Not limited to any specific customer segment

THE PROBLEM

Renewable energy resources

Environmentally friendly and efficient ocean wave energy devices



The world currently uses approximately 15 trillion kWh of electricity per annum, representing just 0.02% of the energy contained throughout the world's oceans.

To put this into perspective, the available energy in less than 80 metres of water is almost 5 times the world consumption according to the World Energy Council.

RENEWABLE ELECTRICITY MANDATES

STATE	MANDATE
CALIFORNIA	33% BY 2020
CONNECTICUT	27% BY 2020
HAWAII	40% BY 2030
MASSACHUSETTS	22.1% BY 2020
OREGON	25% BY 2025
WASHINGTON	15% BY 2020

POTENTIAL CUSTOMERS

Customers

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graph TD; A[Customers] --> B[Large Scale]; A --> C[Medium Scale]; A --> D[Small Scale];
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Large
Scale

Medium
Scale

Small
Scale

CUSTOMER INTERVIEWS

Large

SDG&E

Hawaiian
Electric

Medium

Chevron

Upcoming:
Statoil

Small

Boating
Community

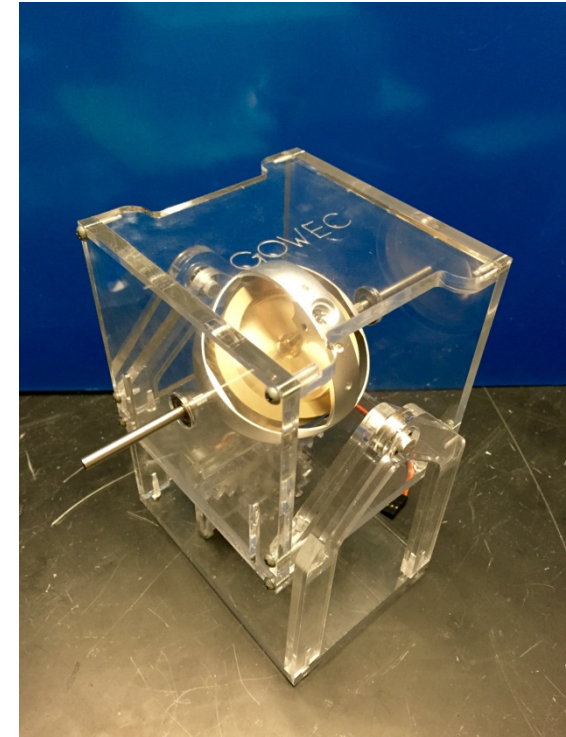
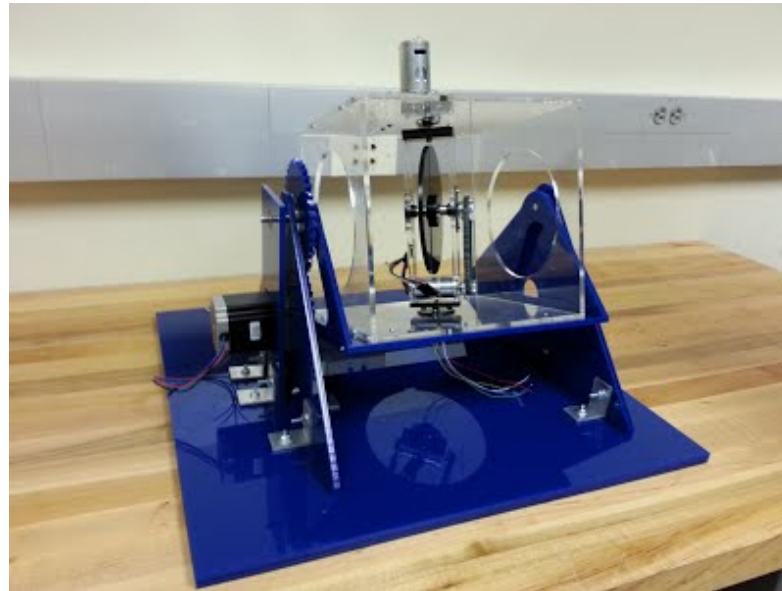
Shipyards

THE SOLUTION

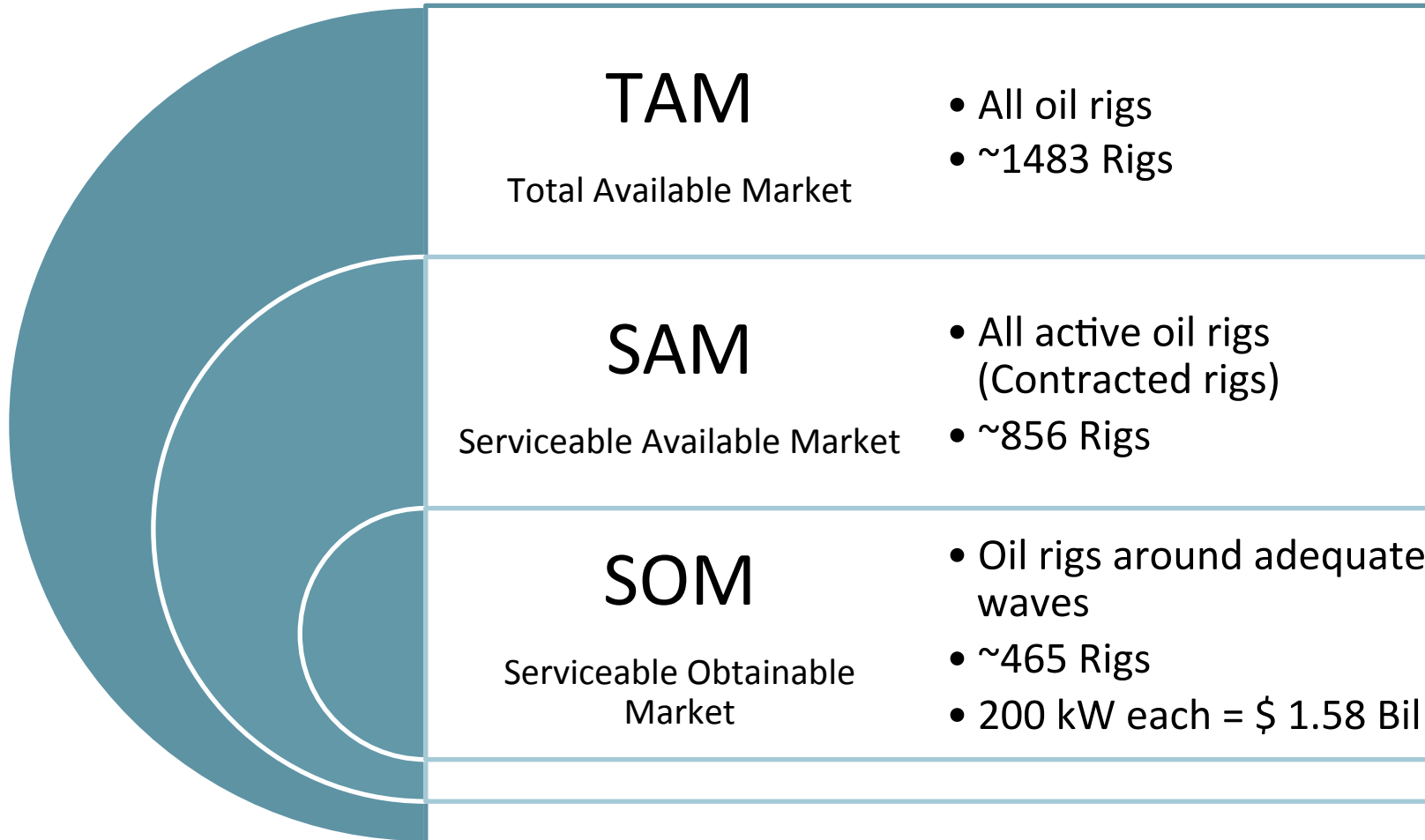
Benefits of Device

- Converts rolling and pitching motion into rotary motion
- Fully enclosed structure
- Space and energy efficient
- Scalable to many applications and regions
- Several design parameters can be controlled to optimize power output

Initial Prototypes



POTENTIAL MARKET SIZE



200 kW System

- Total average energy demand of small rigs

- Lighting, heating, and ventilation system energy demand of largest rigs

Marketability

- Equivalent of reducing 1,209 metric tons of CO2 emissions per year

- Equivalent of reducing emissions from 2,811 barrels of oil every year

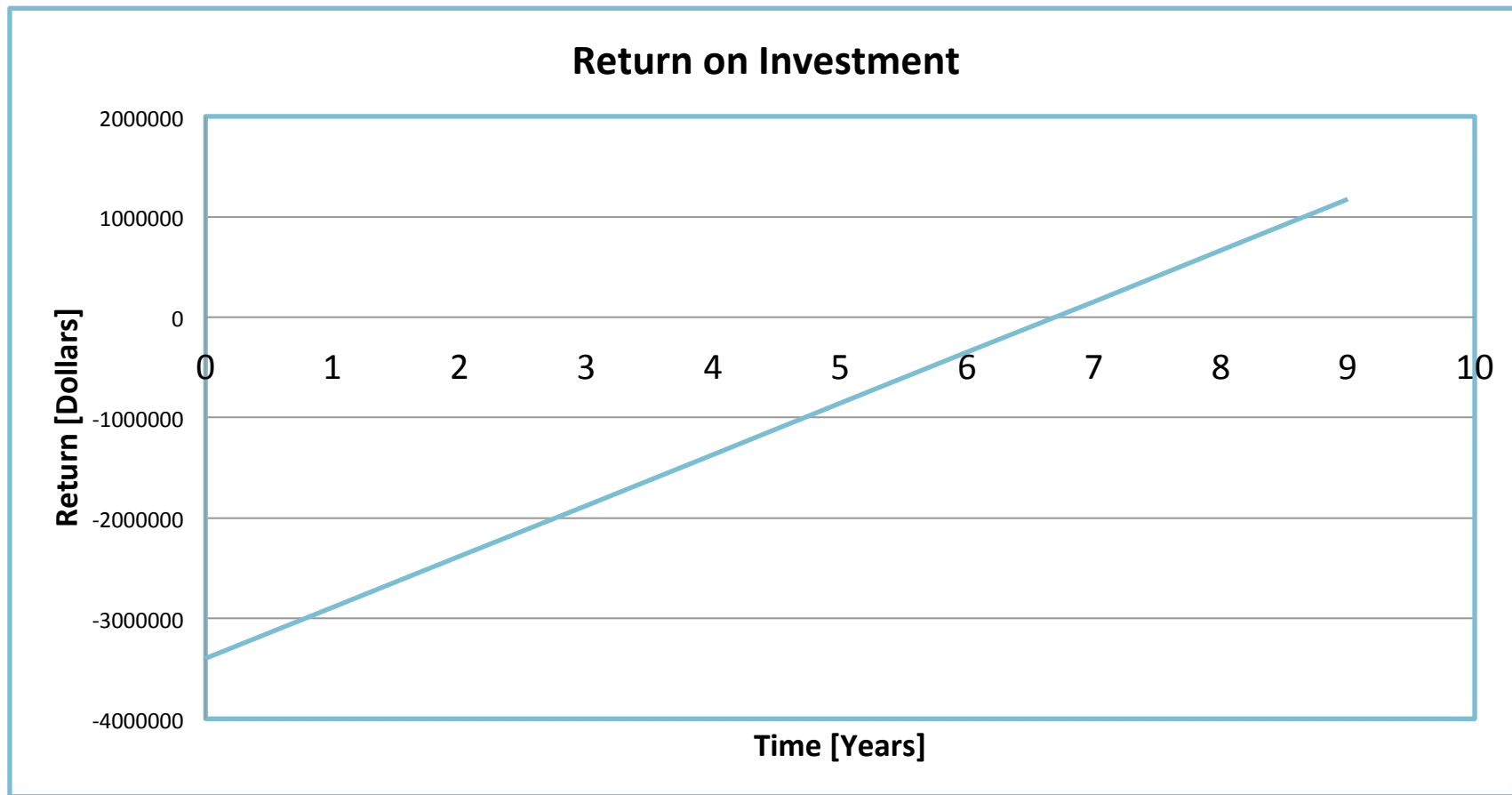
BUSINESS REVENUE MODEL

How Much to Charge

- Cost Structure: (e.g. 200 kW System)
 - Materials..... \$ 646,000
 - Manufacturing \$ 81,600
 - Facilities (storing/building equipment and devices)..... \$ 36,400
 - Cost of Installation..... \$136,000
 - Cabling as necessary
- Total Production Cost\$900,000
- Cost of Purchase..... \$3.4 Million

BUSINESS REVENUE MODEL

ROI Model



COMPETITIVE MATRIX

COMPANY	DEVICE WIDTH (METERS)	TYPE OF DEVICE	Surface Power Density (kW/m ²)	Major Environmental Impact
GOWEC	1	Gyroscopic	3.21	No Major Impact
PowerBuoy	14	Point Absorber	2.11	Marine Life
WaveBob	15	Point Absorber	1.98	No Major Impact
OreCON	32	Oscillating Water Column	1.24	Visual/Noise Pollution
Pelamis Wave Power	4.63	Attenuator	1.08	Marine Life
Aqua Energy (AquaBuoy)	6	Point Absorber	1.06	No Major Impact
Energetech	35	Oscillating Water Column	0.92	Visual Pollution
Wave Dragon	260	Overtopping Device	0.3	Visual Pollution
INRI (SEADOG pumps)	5.4	Point Absorber	0.29	Marine Life

INTELLECTUAL PROPERTY

- Filed provisional in Fall 2013
 - Officer: Wendy Shih
 - Expired Mid-November
 - UCSD Ref. No. SD2014-067-1
- New patent (future)
 - Will be filed after verification of model
 - Including a buoy design structure

NEEDS TO BE DONE

Task	What is Needed	Estimated Date
Ocean Capable Prototype	Time to build / ocean access	July 2015
Data Analysis for Verification	-	August 2015
Re-File Patent	Data verification	August 2015
NSF I-Corps Phase Three	Time commitments	*Summer 2015
Build Full-Scale GOWEC	Verification / more funding	Early 2016
Show Device to Investors / Customers	Connections to interested parties	Early / Mid 2016

LESSONS LEARNED / RECOMMENDATIONS

Technical Milestones

- Sensor installation is complete
- Buoy structure in design phase

Customer Research

- Found many new potential markets
- Narrowed our market down to the most obtainable

Accelerating Project

- Added member to help with constructing prototypes
- Added member for data analysis and programming

THANK YOU

Dr. Rosibel Ochoa

Dr. Jay Gilberg

Mr. John Kohut

All the Mentors for Their Assistance

The Business Model Canvas

Designed for:

VLC-I Corps

Designed by:

Energy Converter Group

Date:

3/4

Version:

4

Key Partners



Who are our key partners?
Who are our key suppliers?
Which key resources are we acquiring from partners?
Which key activities do partners perform?

MOTIVATIONS FOR PARTNERSHIPS
Optimization and economy
Reduction of risk and uncertainty
Acquisition of particular resources and activities

1) Buying Pre-Made Supplies:

-Gyroscope supplier, perhaps in the roll stabilizer business
-Buoy Structure

2) Manufacturing Ourselves

-Make our own Gyroscopes and buoy structures

3) Outsource the Manufacturing:

-Outsource the manufacturing of the structure
-Cabling for delivering power to shore will be outsourced, installation done by us.

Key Activities



What key Activities do our value propositions require?
Our distribution channels?
Customer relationships?
Revenue streams?

CATEGORIES
Production
Problem Solving
Platform/Network

-Installation of device and upkeep/maintenance (checking for ocean water and mechanical problems)
-Customer service line for technical problems of device

Key Resources



What key Resources do our value propositions require?
Our distribution channels?
Customer relationships?
Revenue Streams?

TYPES OF RESOURCES
Physical
Intellectual (brand, patents, copyrights, data)
Human
Financial

If 1) Warehouse for storage and final assembly

If 2) Larger Warehouse for Equipment, Supplies, and for final assembly

If 3) Small or no Warehouse needed

Value Propositions



What value do we deliver to the customer?
Which one of our customer's problems are we helping to solve?
What bundles of products and services are we offering to each Customer Segment?
Which customer needs are we satisfying?

CHARACTERISTICS
Novelty
Performance
Customization
"Getting the Job Done"
Design
Brand/Status
Price
Cost Reduction
Risk Reduction
Accessibility
Convenience/Usability

-Compact design allows customer to decide the size of the farm. Not a "one size fits all" converter. Can put 1, 10, or 30 devices to meet space and electrical needs

-Fully enclosed device allows to easily improve aesthetics

-Full Enclosure greatly limits the effect on marine life

-Simple, Efficient, Scalable

Customer Relationships



What type of relationship does each of our Customer Segments expect us to establish and maintain with them?
Which ones have we established?
How are they integrated with the rest of our business model?
How costly are they?

EXAMPLES
Personal assistance
Dedicated Personal Assistance
Self Service
Automated Services
Communities
Co-creation

-Personal assistance with device installation and upkeep
-Telephone service for easier problems

Channels



Through which channels do our customer Segments want to be reached?
How are we reaching them now?
How are our channels integrated?
Which ones work best?
Which ones are most cost-efficient?
How are we integrating them with customer routines?

CHANNEL PHASES
1. Awareness
How do we raise awareness about our company's products and services?
2. Evaluation
How do we help customers evaluate our organization's Value Proposition?
3. Purchase
How do we allow customers to purchase specific products and services?
4. Delivery
How do we deliver a Value Proposition to customers?
5. After sales
How do we provide post-purchase customer support?

-Direct sales
-Online quotes
-Cleantech Event to connect with Corporations

Customer Segments



For whom are we creating value?
Who are our most important customers?

Market Types
Mass Market
Niche Market
Segmented
Diversified
Multi-sided Platform

-Smaller Scale:

> Larger boats: yachts, cruise ships with considerable power needs
> Marina/ Harbor
> Piers
> Homes in not impacted/tourists ocean sectors
> Offshore oil platforms

-Large Scale:

> Energy Companies
> Islands wanting to be more energy independent

Cost Structure

What are the most important costs inherent in our business model?
Which key resources are most expensive?
Which key activities are most expensive?

IS YOUR BUSINESS MORE?
Cost Driven (lowest cost structure, low price value proposition, maximum automation, extensive outsourcing)
Value Driven (focused on value creation, premium value proposition)

SAMPLE CHARACTERISTICS
Fixed Costs (salaries, rents, utilities)
Variable costs
Economies of scale
Economies of scope

-Manufacturing of device
-Upkeep of device, hiring mechanics to do repairs
-Cabling from the device to the shore



Revenue Streams

For what value are our customers really willing to pay?
For what do they currently pay?
How are they currently paying?
How would they prefer to pay?
How much does each revenue stream contribute to overall revenues?

TYPES
Asset sale
Usage fee
Subscription Fees
Licensing/Renting/Leasing
Licensing
Brokerage fees
Advertising

FIXED PRICING
List Price
Product feature dependent
Customer segment dependent
Volume dependent

DYNAMIC PRICING
Negotiation (bargaining)
Yield Management
Real time Market

-Upfront purchase of device (in smaller scale applications)
-Rental of device with fee
-Price Dependent on Volume

