CALWAVE

APPLICANTS & AFFILIATIONS
Marcus Lehman, CalWave Project Lead, Cyclotron Road

PARTNERS
UC Berkeley

INTELLECTUAL PROPERTY STATUS, PATENT OR TECH TRANSFER NUMBER
US utility filed Oct 2015

TIME TO MARKET - 2-3 years

C2M OBJECTIVES
Customer discovery - while we have some initial ideas, we would be interested in having the C2M team conduct a deeper dive into our potential markets.

TECHNOLOGY
CalWave is developing a novel Wave Energy Converter (WEC) called the Wave Carpet that is simple, modular, and scalable. The Wave Carpet is capable of operating at high efficiency while being semi-submerged in the water column. This unique capability is survivable in storm conditions and results in no visual pollution or collision danger at the surface.

The ability of a muddy seafloor to dampen ocean waves is well documented at various locations around the world. In the Gulf of Mexico, the wave–mud interaction is so strong that large storm waves are damped within a couple of wavelengths. The Wave Carpet WEC mimics this phenomenon to efficiently absorb the energy in passing waves.

POTENTIAL CUSTOMERS
Wave energy is a huge, predictable, and consistent resource that is more energy dense than other renewables. If harnessed, wave energy could provide renewable base load power and desalination to coastal population centers, while also reducing coastal erosion. Wave energy is a very dense, predictable, and reliable form of renewable energy created through friction of wind on ocean surfaces. The Wave Carpet could be an ideal complement to renewables, especially for the growing demand at load centers on coastlines all over the world. Initial target markets potentially include island resorts and utilities.

SCALING - Economies of scale have exponential impact on cost

ADVANTAGES - Submerged, invisible
**BARRIERS**
Permitting, operating hours in water/Technology Readiness Level (TRL); Optimization of design and manufacturing parameters for survivability and lifecycle cost.

**FEEDBACK**
Currently ranked #1 in the US Wave Energy Prize. Marcus was personally awarded Forbes Top 30 Under 30 in Energy for this work. According to the U.S. Department of Energy, wave energy has the potential to power 50 million US homes and PG&E estimates that wave energy could provide 10% of California’s power needs. The Intergovernmental Panel on Climate Change estimates the total theoretical wave power resource to be 29,500 TWh/yr of which 31% is located in North America.

**ACADEMIC/JOB TITLES**
Project Lead, Cyclotron Road (double degree in technology management)
CalWave converts ocean waves to power – submerged, invisible and survivable

1) Inception and Inspiration:
- Prof. Alam inspired by strong mud dampening
- Full IPC patent in filing since 04/2014

2) Technology Status:
- Finalist of the US Wave Energy Prize (Ranked 1)
- Prototype reached over 90% absorption and 60% conversion efficiency
- 30 by 30 feet unit can power 180 homes
- Planned full scale ocean demonstration in San Diego

3) Awards and Recognition:
- $0.5M seed R&D grant from prestigious national program at LBNL, Cyclotron Road
- 1\textsuperscript{st} prize BERC Energy Symposium 2013 and 2014
- MIT and CalTeach Clean Energy Prize semifinal
- Successful crowdfunding campaign
- Large media coverage – Online, TV, Radio, others
R&D and Commercialization Roadmap

Phase
1. Tank Testing and Simulation
2. Field demonstration
3. Demonstration of grid integration
4. Production and Business Scaling

Date
Q2/16
Q4/16
2017
2017-18

Milestone
Design specifications for demonstration
Performance validation in full scale
Grid Pilot
Market Rollout

Need:
Project and strategic partner
Power off-take agreement

MASK model basin (under review)

1/50 Scale Test in Jan/16
Permitted Test Site
Hawaii
CA

WAVE ENERGY PRIZE
U.S. DEPARTMENT OF ENERGY