CAL MARITIME

CALIFORNIA STATE UNIVERSITY MARITIME ACADEMY

www.csum.edu

CAL MARITIME

Our History…

- In 1929, established as California Nautical School.
- In 1930, a training vessel and a school site was established (Tiburon).
- In 1939, California Nautical School became California Maritime Academy (CMA).
- In 1943, CMA moved from Tiburon to Vallejo (present location).
- In 1970, CMA became a four-year institution.
- In 1996, CMA became the 22nd campus of the California State University.
- In 2015, CMA became California State University Maritime Academy.

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Marine Hydrokinetic Energy Pilot Program

A research, development, and operation project of
Cal Maritime's Energy & Sustainability Master Plan

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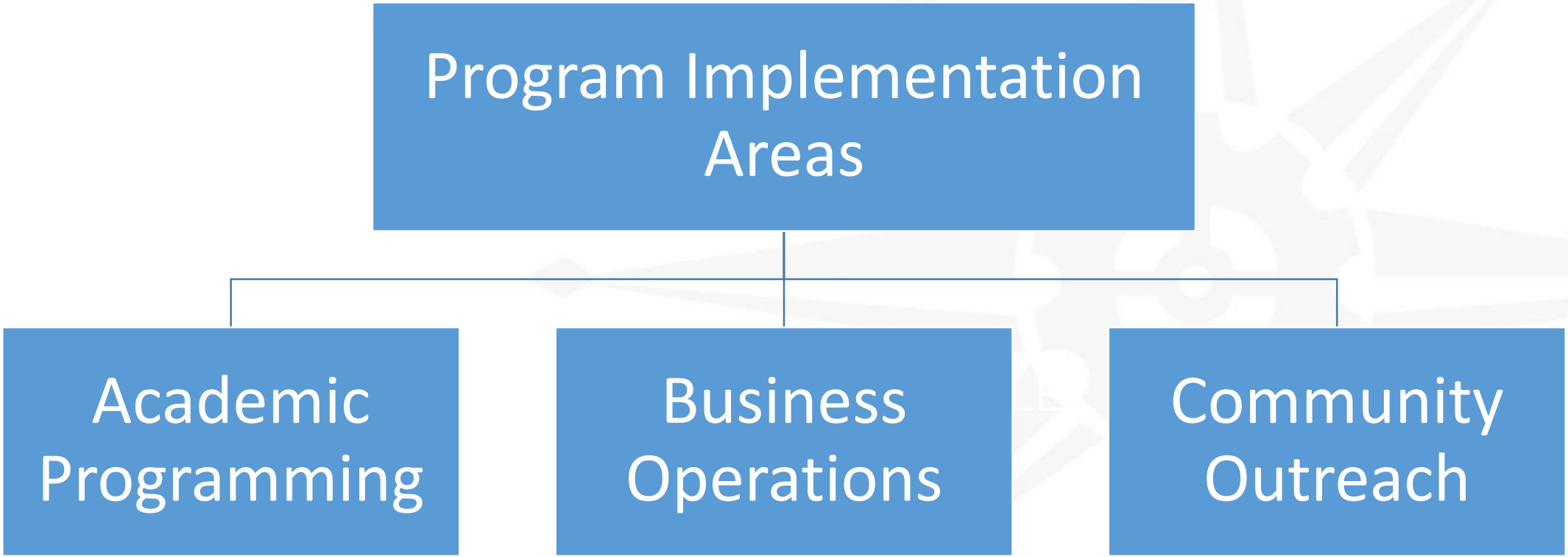
Energy & Sustainability Master Plan


Program Implementation Areas
Academic Programming
Business Operations
Community Outreach

CSU Sustainability Policy:

The CSU Systemwide Sustainability Policy Aims to further reduce the environmental impact of construction and operation of buildings and to integrate sustainability across the curriculum.

CSU Sustainability Goals:

- Integrate sustainability across curriculum
- Reduce GHG emissions
- Procure 33% of energy supply from renewable sources by 2020
- Increase onsite generation from 44 to 80 MW by 2020
- Reduce Water use by 20% by 2020
- Promote use of alternative fuels and transportation programs
- Reduce per capita landfill 50%
- Move towards zero waste. Procure goods that are recycled, recyclable, or reusable.
- Procure 20% local/organic/free trade food by 2020

Implementing Sustainability in Business Operations:

1. Water Management (indoor, irrigation, website)
2. Energy Management (LED, HVAC, controls)
3. Renewable Energy Management (solar, MHK, wind)
4. Transportation Management (EV chargers)
5. Waste Management (e-Waste, composting, signage)
6. Tree Campus (submitted)
7. Carbon Footprint Management
8. Climate Action Plan

Marine Hydrokinetic Energy Pilot Program

GOAL:

Research, develop, construct, and operate a 10 MW marine hydrokinetic power plant at CSU Maritime Academy main campus.

Objectives:

1. Identify, develop, and offer future degree programs in renewable energy technologies and maritime-related program areas.
2. Provide research opportunities, enhance technologies, and serve as a technological and research hub across the globe.
3. Scale, replicate, and deploy technology solutions that support energy and water needs, as well as emergency operations, across the nation and globe.

Work Summary and Next Steps

Work done to date

Initial Research, technology viability; location assessment; academic research potential; renewable energy curriculum offering; regulations, permits, and funding. Global research and business rollout.

Technology

MHK technology; 5 mw power generation scalable to 10 mw; water purification; connectivity; self use and resale of power.

Permitting

FERC, primary permitting partner. (Withdraw NOI, file Preliminary Permit Application)

Minimum permitting coordination with USACE, BCDC, Wildlife & Fishing Department.

Funding and Business Plan

DOD; DOE; Chevron, Debtco; Cal Maritime, In-line Co.

Revenue from 5mw, and then 10 mw all to Cal Maritime.

Rev from Roll out sales:

a) One time sale royalty.

b) PPA model share.

Cal Maritime Onsite MHK Research & Dev.

- Marine & Fish life research
- Weather impact research
- Power generation, connectivity, and delivery research
- Multiple Clean Power Technology Integration
- Renewable Energy Degree Program
- Education & Outreach

Cal Maritime Onsite Power Generation Revenue

On site power generation		
Plant size	5	MW
	5000	KW
Annual Energy Generated	41,610,000	kWhs
PPA Sale price 15c/kWh	6,241,500	Dollars
Profit Margin 100%	6,241,500	Profit
Cal Maritime share (100%)	6,241,500	per year
Water Revenue	1,600,000	per year
Total Revenue	7,841,500	per year

On site power generation		
Plant size	10	MW
	10000	KW
Annual Energy Generated	83,220,000	kWhs
PPA Sale price 15c/kWh	12,483,000	Dollars
Profit Margin 100%	12,483,000	Profit
Cal Maritime share (100%)	12,483,000	per year
Water Revenue	1,600,000	per year
Total Revenue	14,083,000	per year

MHK Project Revenue Model

Marine Hydrokinetic Revenue Models from Global Rollout.

Power Purchase Model:		
Plant size	100	MW
	100000	KW
Annual Energy Generated	832,200,000.00	kWhs
PPA Sale price 15 c/kWh	$ 124,830,000.00	Dollars
Profit Margin 25%	$ 31,207,500.00	Profit
Cal Maritime share (15%)	$ 4,681,125	per year

One Time Sale Model:		
Plant size	100	MW
	100,000	KW
Cost of project @ $3,000/kW	300,000,000	kWhs
Sale Price at $5,000/kW	$ 500,000,000	Dollars
Profit Margin ($2,000/KW)	$ 200,000,000	Profit
Cal Maritime share (10%)	$ 20,000,000	per 100 MW

Physical Configuration and Requirements

Target Location (Cal Maritime)

- Access to Optimum Tide Flows
- Access to PG&E
- Access to Water Filtration
- Minimum Impact on Existing Campus
- Physical Human Access
- Disadvantaged Region
- Federal Opportunity Zone

Marine Hydrokinetic Energy Pilot Program

Physical Configuration

MHK System Components:

- Barge 120’ x 40’ x 14’

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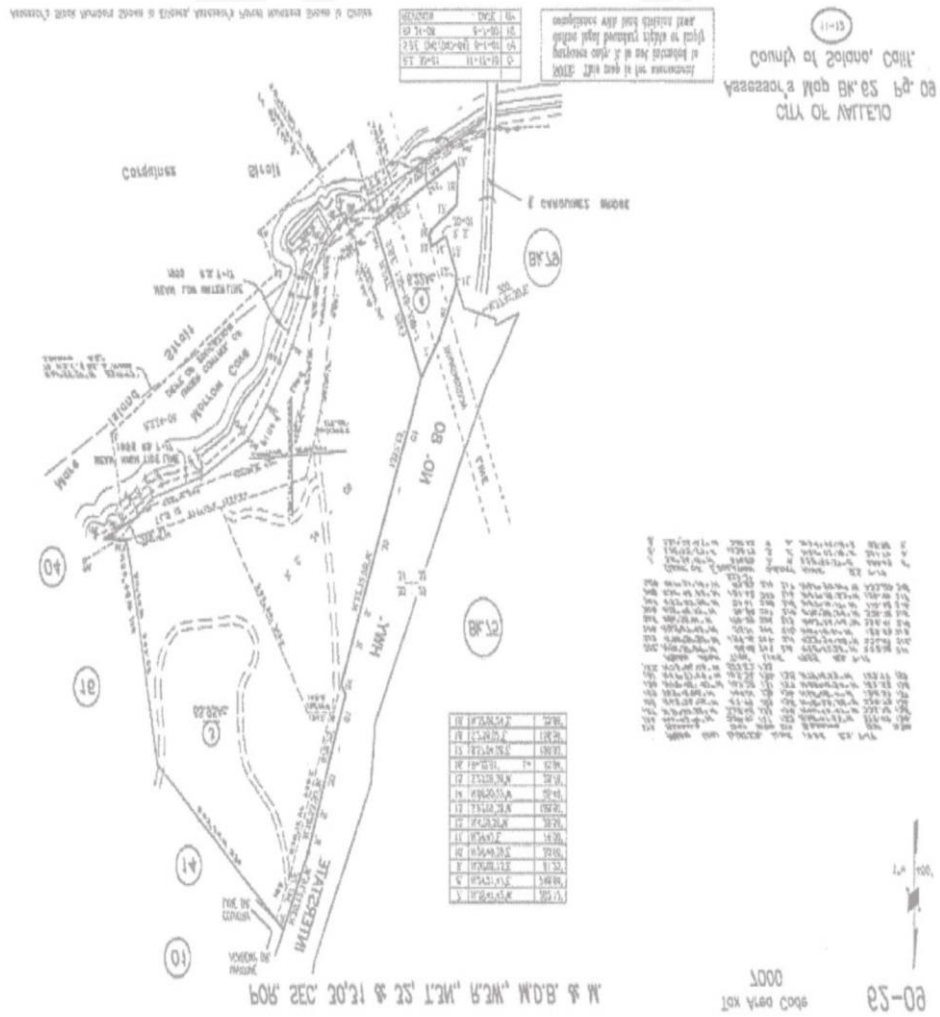
Marine Hydrokinetic Energy Pilot Program

Academic and Research Elements:

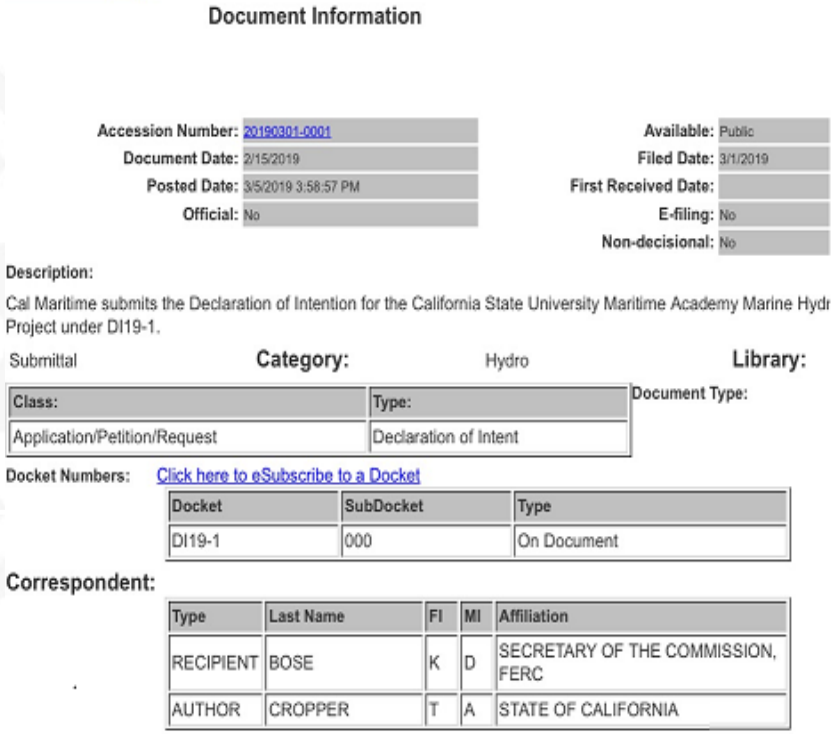
- World Class Test Facility for MHK technology and other renewable energy technologies
- Offer full degree program in Renewable Energy
- Employ student work force
- Use the site as a Living Lab



Work Done To date

Technology Research :

- Initial research and analyses show a MHK power plant of up to 10 MW capacity can be installed on top of a barge.
- Collaborated and shared the concept, theory, and the potential business plan of the project with Cal Maritime faculty and staff.
- A declaration of intent to proceed with the project has been signed and submitted to FERC. (Attached)
- A desktop demonstration model of the MHK power plant scaled to 1: 40 is completed and available for presentation to stake holders.



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Description:

Cal Maritime submits the Declaration of Intention for the California State University Maritime Academy Marine Hydr Project under DI19-1.

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Correspondent:

Type	Last Name	FI	MI	Affiliation
RECIPIENT	BOSE	K	D	SECRETARY OF THE COMMISSION, FERC
AUTHOR	CROPPER	T	A	STATE OF CALIFORNIA

Work Done To date

Regulatory Compliance and Stakeholder Coordination:

- Notice of Intent Document is being prepared to submit to FERC
- A meeting is scheduled with Army Corps and Coast Guard authorities to share project information and plan future collaborative efforts.
- City of Vallejo and Solano County are informed of the MHK Energy Project initiative. Other impacted agencies will be contacted.

Next Steps

- ✓ Present the project plan to US Army Corps of Engineers and seek approval.
- ✓ Complete and submit “Hydrokinetic Pilot Project Criteria and Draft Application Checklist” pursuant to 18 CFR § 5.18 to FERC

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QUESTIONS?