

STATE OF CALIFORNIA

**EPIC TRIENNIAL INVESTMENT PLAN 2015-17****Proposed Energy Research Initiative  
Questionnaire****Title of Proposed Initiative:** Marine and Intermodal Statewide Renewable Energy Technology Initiative**Investment Areas** (Check one or more) – *For definitions, see First Triennial Investment Plan, page 12:*

X\_ Applied Research and Development      X\_ Technology Demonstration and Deployment  
 X\_ Market Facilitation

**Electricity System Value Chain (Check only one):**

\_ Grid operations/market design      \_ Generation  
 \_ Transmission      \_ Distribution  
 X\_ Demand-side management

**Issues and Barriers:**

**Describe the issues and barriers that are impeding full market adoption of the proposed clean energy technology or strategy (such as cost, integration, or lack of information).** California's ports and intermodal gateways (truck/rail hubs) are vital economic components of the State and U.S. goods distribution system. More than 30% of all U.S. cargo is transported through California ports. Increasingly, electrical grid continuity is a determinant in these ports ability to operate. The ports themselves are served by outdated infrastructure, and as landlord ports under State of California charter, each port tenant is separately metered electrically. At the same time, these ports are being required to comply with State requirements to connect incoming ships to the local electrical grid. To remain competitive, they are also required to support the massive new electrical demands and required electrical infrastructure of new multi-billion dollar automated shipping terminals. A third key factor, in general the electricity used by California ports must increasingly be generated by renewable sources. Finally, as the California ports are generally served by some of the State's oldest infrastructure, which was not planned to support massive electrical loads, this infrastructure must also be upgraded with new renewable energy and other grid-related technologies incorporated therein. Frequently, required electrical grid technologies, particularly related to renewable energy, are delayed in review and deployment by lack of information, complexity of the port and intermodal system within which they must be deployed, and budget constraints of the entities considering, purchasing and ultimately installing such systems.

**Initiative Description and Purpose:**

**How will this technology or strategy help address the issue/issues? Describe knowledge to be advanced to overcome critical barriers. Include the recommended funding level (minimum and maximum) for each project under this initiative.** The proposed initiative is a statewide port and intermodal innovation cluster comprising all major California ports, their local universities and industrial communities. This initiative will be led by the California Marine and Intermodal Transportation System Advisory Council (CALMITSAC). CALMITSAC was chartered by the California Legislature in 2002, and includes federal and state agencies, major statewide port and maritime industry associations, the industrial community, organized labor, the California university system, and environmental organizations. The organization and its members have helped to lead all of the port and intermodal technology initiatives introduced into California, a national leader in this regard. Under the proposed program, port and intermodal energy-related renewable energy technologies will be identified and evaluated, and commercialized in association with participating entities, including the California ports, the California state university system and selected federal laboratories, and the industrial and engineering community.

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#### Candidate Regional IOU Participants:

- Port of San Diego, U.C. San Diego, CSU San Diego
- San Pedro Bay Ports (Port of Long Beach), CSU Long Beach, CSU Dominguez Hills
- Port of Hueneme, CSU Channel Islands, U.S. Naval Base Ventura
- San Francisco Bay Ports, CSU Maritime, CSU East Bay, U.C. Berkeley, Lawrence Berkeley
- Port of Humboldt Bay, CSU Humboldt

The anticipated level of funding for this port and intermodal energy innovation cluster is \$5 million per year for the duration of the EPIC program.

#### Stakeholders:

Identify the stakeholders who support the initiative.

- California Marine and Intermodal Transportation System Advisory Council (CALMITSAC) – see attached list of board members - research initiative under review by each board.
- Harbor Association of Industry and Commerce
- Propeller Club of the United States – Los Angeles/Long Beach Chapter
- Burns & McDonnell (#1 U.S. electrical infrastructure firm)
- Electricore (managed \$200+ million of USDOD, USDOE, USDOT, & CEC grant-funded projects)

#### Background and the State-of-the-Art:

**What research development and demonstration has been done or is currently being done to advance this technology or strategy (cite past research as applicable)?** Port and intermodal renewable energy-related technology has been comprehensively evaluated and developed as part of the San Pedro Bay Ports (Long Beach and Los Angeles) Clean Air Action Plan's Technology Advancement Program (TAP). The TAP focused initially on air emission reduction technology, which has since been deployed, and increasingly energy-related technology, such as the Vycon flywheel system, hybrid tugboats and other systems. There has also been considerable review of magnetic levitation rail systems for goods movement. Systems for connection of ships to the electrical grid (cold ironing or alternative maritime power) were also developed primarily for these two ports, and then were deployed statewide. However, there are a great many other renewable energy innovations applicable to California ports and intermodal operations which are available from California public and private research entities. Once tested in California, these systems can be presented to the global maritime community for use.

**Describe any public and/or private successes and failures the technology or strategy has encountered in its path through the energy innovation pipeline: lab-scale testing, pilot-scale testing, pre-commercial demonstration, commercial scale deployment, market research, workforce development.** Through the above-mentioned Clean Air Action Plan, numerous technologies have been funded, developed and tested at the California ports. As one example, a highly promising flywheel technology of Vycon Energy was commercialized with TAP funds and deployed at a Los Angeles port terminal, with very promising results. However, California regulatory uncertainties and port return on investment guidelines led to delays in the use of the technology in California. Instead, it was primarily commercialized and used in China, whose ports immediately saw the application of the Vycon system, and where much of the Vycon workforce is now established. Many other technologies have been tested and deployed at the California ports, some succeeding, others failing, through a very tortuous and fragmented process, which the proposed CALMITSAC Port and Innovation Cluster program would help to alleviate.

**Identify other related programs and initiatives that deal with the proposed technology or strategy, such as state and federal programs or funding initiatives (DOE, ARPA-E, etc.).** The USDOT's Research and Innovative Technology (RITA) Program was active in geospatial technology for optimizing port throughput in association with port stakeholders and university systems. The Department of Homeland Security provides research funding on an

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ongoing basis into the California ports. The U.S. Department of Energy has a marine renewable energy project underway involving California State University San Luis Obispo with port port applications.

#### Justification:

**Describe how this technology or strategy will provide California IOU electric ratepayer benefits and provide any estimates of quantified annual savings/benefits in California, including:**

- **Name of sector and estimated size and energy use.** California's port and intermodal sector, employing 250,000+ residents of the State of California
- **Quantifiable performance improvements for the proposed technology/strategy.** Renewable energy technology systems researched, commercialized and deployed throughout the California port and intermodal sector.
- **Maximum market potential, if successful.** Multi-billion dollar sector growth in renewable energy technology for the port and maritime sector.
- **Number of direct jobs created in California.** 2,000+ (based on 100 new companies x 20 employees each), plus retention of California's present industrial workforce in this sector through availability of renewable energy technologies which allow their sectors to remain competitive relative to other U.S. states.
- **Why this research is appropriate for public funding.** This research is appropriate for public funding because (1) the California port and maritime community has largely developed requirements for renewable energy technology due to state regulatory mandates, (2) the California state university system from which many of these innovations will come is co-located with California's largest ports, and (3) as California's public ports implement these new renewable energy technologies, they set the standards for the world's maritime community with resultant markets for California technologies.

#### Ratepayer Benefits (Check one or more):

X\_ Promote greater reliability

X\_ Potential energy and cost savings

X\_ Increased safety

X\_ Societal benefits

X\_ Environmental benefits – specify

X\_ GHG emissions mitigation

X\_ Low emission vehicles/transportation

X\_ Waste reduction

X\_ Economic development

#### Describe specific benefits (qualitative and quantitative) of the proposed initiative

This initiative will provide best of class California company renewable energy technologies, developed by California universities, tested, commercialized and used at the largest port complexes in the United States, and which will then be applicable to be used, and can be effectively presented as industry standards to, the maritime and intermodal end users throughout the world.

**Public Utilities Code Sections 740.1 and 8360: Please describe how this technology or strategy addresses the principles articulated in California Public Utilities Code Sections 740.1 and 8360.** Section 740.1. The project offer a reasonable probability of providing benefits to ratepayers not unnecessarily duplicate research, support Conservation by efficient resource use or by reducing or shifting system load, development of new resources and processes, particularly renewable resources and processes which further supply technologies, and improve operating efficiency and reliability or otherwise reduce operating costs. Section 8360. The project will help to modernize the state's electrical transmission and distribution system to maintain safe, reliable, efficient, and secure electrical service, with infrastructure that can meet future growth in demand and achieve all of the following, which together characterize a smart grid including I ncreased use of cost-effective digital information and control technology to improve reliability, security, and efficiency of the electric grid, dynamic optimization of grid operations and resources, and deployment and integration of cost-effective distributed resources and generation, including renewable resources.

California Marine and Intermodal Transportation System Advisory Council  
(CALMITSAC)

Leadership Committee

Gary L. Gregory  
Chair, CALMITSAC  
Owner, Gregory Maritime Consulting

Norman Fassler-Katz  
Executive Director, CALMITSAC

Richard Coyle  
Vice President, CALMITSAC  
President, Devine Intermodal

Captain Bruce G. Clark  
Secretary/Treasurer CALMITSAC  
California Maritime Academy

Robert Dockendorff  
Immediate Past Chair, CALMITSAC

James Haussener  
Executive Director, California Marine Affairs and Navigation Conference

William Lyte  
Consultant  
Burns and McDonnell

John McLaurin  
President, Pacific Merchant Shipping Association

Timothy Schott  
Schott & Lites Advocacy  
Representing the California Association of Port Authorities

Gerald Swanson  
Vice President, Pacific Maritime Association