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Title of Proposed Initiative: Renewable Energy Testing Center for pilot scale demonstrations

Investment Areas (Check one or more) – *For definitions, see First Triennial Investment Plan, page 12*:

☐ Applied Research and Development
☒ Technology Demonstration and Deployment
☐ Market Facilitation

Electricity System Value Chain (**Check only one**): *See CPUC Decision 12-05-037, Ordering Paragraph*

☐ Grid operations/market design
☒ Generation
☐ Transmission
☐ Distribution
☐ 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).

Incubators are needed guidance to vet the business plans of start- up companies. But once these companies have done successful lab scale testing – an industrial site for pilot testing might be required. The incubator and testing centers each have their own function to move emerging companies to the next phase of commercialization.

Most startup companies have a difficult time finding a funding and location to test their renewable technologies at pilot scale. A facility that is designed for such activities are rare because the facility needs to be industrial based, knowledgeable of the technology and have in place testing QC and Safety programs. Also permitting of technology; if air emissions result from process, is usually an issue and is costly and may delay projects.

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.

Technikon's Renewable Energy Testing Center (RETC) provides; staff for technical support, permits, facility infrastructure (compressed air, power, natural gas, etc.), air emission and chemical measurement lab equipment, shop equipment and misc. materials that otherwise would be required for each project. These services reduce grant and development costs by eliminating redundant costs that have to be replicated for each standalone project. Much of each grant is spent on pulling together these type of support services – with the RETC they represent a reusable resource for the next company.

A project support request format needs to be developed that would allow CEC and Testing Center team members to review and rank companies that would be eligible for

entering program. The process would have to be streamlined compared to the normal grant process otherwise many companies will not apply.

The RETC has a history of Federal Funding between 2008 and 2012 and requires $3 to $4 million per year to support the team to demonstrate and test 4 to 6 large scale technologies per year.

Stakeholders:

Identify the stakeholders who support the initiative. – *Technikon has support of SMUD, Sac State and myriad of startup companies that have utilized our services.*

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)?

  Eight (8) technologies were installed at the RETC for testing and validation during 4 year period of performance. Sent testing teams to 3 off site locations for review and testing of technologies (LA, Ohio & UK). Type of technologies included – multiple Gasification systems - renewable Liquid Fuel production – Algae bioreactors – Solar concentrator for fuel production – gas cleaning technologies.

  Model of program was that companies had to supply their equipment to the center. Government funding covered installation, operation, testing and public reporting. The program results were used by companies to help obtain over $30 million in additional State, Federal grants and investment monies.

- 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.

  Of 11 tested by RETC – 7 companies have become commercial and have equipment orders. At least 2 more would have been likely successful if funding had not ended. The RETC team's support, credibility and accurate assessments were critical to giving investors' confidence to support these companies.

  The program is actively in discussion with the State of Mississippi to duplicate the testing center at the NASA Stennis Space Center with their Mississippi Eneterprises for Technologies program.

- 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.).

  DOE has a network of testing labs that supply some level of testing; such as EERE, NREL, Southern Research, etc. But their model requires companies to pay for testing services which is prohibitively expensive for most start up companies. The model created by the RETC is a government supporting demonstration site that does testing when the company resolves startup issues. Some companies may have their own site and have constructed a pilot unit that the team can then test when they have it operational.

  Note - in this approach the CEC is not paying the company for their equipment – the center is what CEC is funding and it is available for their use (if approved). This

reduces the cost to CEC and requires the companies applying to bare their internal costs. This changes the paradigm and reduces the applications to the program to the more robust companies that are more likely to be successful.

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. – *Electrical production from Renewable Energy sources that can be used in smart grid systems.*
- Quantifiable performance improvements for the proposed technology/strategy. - *The RETC has had a commercialization success rate of over 60% compared to typical CEC grants of ?*
- Maximum market potential, if successful. – *The State has abundance of cellulosic and other waste that could be used for power and heat plants. Potential market, when considering forest wastes, MSW, tires, C&D, etc. could approach 20% of market needs.*
- Number of direct jobs created in California*. – The RETC program creates 12+ direct jobs. Companies tested by the RETC have created 80+ jobs. A single 40 MW power plant project will create 200+ construction jobs, 60+ fulltime production jobs and feedstock trucking jobs.*
- Why this research is appropriate for public funding. - *Renewable technology demonstration and commercialization is a goal of the PUC, the testing center concept is a low cost and higher success rate approach.*

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

☐ Promote greater reliability

☒ Potential energy and cost savings

☐ Increased safety

☒ Societal benefits

☒ Environmental benefits – specify – lower air emissions

☒ GHG emissions mitigation/adaptation in the electricity sector at the lowest possible cost

☐ Low emission vehicles/transportation

☒ Waste reduction

☒ Economic development – creation of green technologies jobs in State

Describe specific benefits (qualitative and quantitative) of the proposed initiative – *see above*

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. The California Public Utilities Code is available online at www.leginfo.ca.gov/cgi-bin/calawquery?codesection=puc.

The RETC is in direct support of the 740.1 demonstration of technologies goals; a) develop and demonstrate new renewable energy sources, b) validates that a technology will support ultraclean and low emissions goals, c) will supply data to determine if technology will be profitable and reduce cost for ratepayers and d) minimizes expenditures on projects that will not be successful by internal screening and go / no go decision points. Additional the RETC will support 8360c – supply renewable energy sources for distributed energy and smart grids applications.