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Subject: EPIC Second Investment Plan

Docket Number: 12-EPIC-01

Date: February 13, 2014

Workshop: Energy Commission's Proposed 2015-17 Triennial Investment Plan for the Electric Program Investment Charge Program

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Comments on Questions for Panel 2: Beyond RD&D Grants, What Services do Clean Energy Entrepreneurs Need to Bring Products to Market? Innovative Financing, Business Plan Competitions, Consumer Reports for New Technologies, Other?

1. What key services, such as testing centers and independent validation, are needed to help clean energy entrepreneurs successfully commercialize good innovations? At what technology development stage(s) are these key services needed? How should the Energy Commission prioritize the top few technological areas or companies that should receive services?

Answer: The Commission should either ensure that S18.5 covers the types of support that are needed to successfully transition a technology from lab to market, or perhaps create an new category to cover these. Too often, potential solutions remain in the lab because they achieve technical rather than market breakthroughs. Without translating those solutions into terms that the market values, research grants end, people move on, and innovations remain on the shelf without ever reaching downstream incubation such as prototype development, testing and validation, business plan competitions, and seed funding. Early market analysis can be critically important in helping researchers find winnable entry markets. This often needs to occur long before the inventors are ready for testing and validation or even conceive of themselves as "entrepreneurs." When they first invent something in the lab, they often have neither the time, funding, nor training to perform an adequate market analysis. So in addition to the above types of support and those currently articulated in the Triennial plan, it is essential for the Commission to support innovation programs that help researchers with market analysis at a very early stage.

2. What activities, tools, or information are needed by the financial community to help facilitate investments in early-stage clean energy companies? What role can the Energy Commission play in facilitating this through the market facilitation program area of the EPIC program?

Answer: As we discussed at the workshop on market facilitation, investors need to see both winnable entry markets as well as potentially profitable and large growth markets in order to make an investment. If the technology inventor cannot persuasively present their innovation in these terms, investors will not be interested and simply pass them by. This is why scientists and engineers need so much help early on with market analysis. Often, we find they may have a general vision of a long-term market, but no specific understanding of the path they need to take to get there. Or they may be unaware of the range of winnable entry markets that they might be able to use as "stepping stones" toward their ultimate market. The Commission can help by funding programs that (1) assist researchers with these challenges, (2) help identify winnable entry markets, growth markets, and paths between the two, and (3) help them communicate more effectively with business audiences such as potential customers and investors.

3. What can innovative strategies such as design thinking, social gaming, and other creative ideas play in facilitating greater customer adoption of emerging energy technologies and strategies? What technologies or strategies would best be suited to these approaches? Is this a current funding gap not adequately covered by the private sector?

Answer: In the Cleantech to Market program at the Haas School of Business, we have found that design thinking is a critical component of identifying paths to market. There are at least two types of useful design thinking. The first is associated with the inventions such as the Nest thermostat, where former Apple employees used their design skills to translate the household thermostat into a device that now captures consumer interest and helps them save energy by making it aesthetically pleasing, fun to use, and socially exciting. The second type of design thinking is another that we are using to help identify markets for emerging clean energy technologies. This involves (1) carefully evaluating what a technology can potentially do; (2) using "divergent" thinking to identify the many ways that could play out in energy markets; and (3) then using "convergent" thinking to hone in on the most promising market opportunities. Haas has developed an innovation curriculum that promotes this type of thinking, and Cleantech to Market has successfully used it to help a wide variety of clean energy technologies transition out of the lab and into successful entry markets.

4. What technologies or strategies, such as zero-net buildings, could potentially benefit from innovative business models or financing mechanisms the way rooftop PV has benefited from third- party leasing? What funding levels would be needed to pilot these potential business models or strategies?

Answer: In our experience, all clean energy technologies benefit from this type of thinking. We therefore encourage the Commission to fund crosscutting programs such as incubators, accelerators, and other market analysis and assistance programs that serve all of the clean energy technologies that the Commission cares about. In such

programs, it becomes inefficient to work on only one type of technology. For example, in Cleantech to Market, we leverage our 1,000-person energy network, 1.3 FTE of staff, and $275,000 of annual operating costs across multiple types of energy technologies (this diversification is common for market facilitation programs like ours). This approach is important because it is not possible to predict which technology will create a breakthrough at any given time. Rather, as the Commission's technical research has "ripened," we have been able to include it in our program just at the moment when the researchers may need help thinking about their market analysis. If we restricted ourselves to only one sector, we would more likely miss the opportunity to help the right researchers just when they needed it most. We have found this to be true across grid operations, generation, transmission, distribution, and demand-side management technologies.

5. To what extent do existing clean energy business incubators, business plan competitions, and innovation clusters support companies in scaling up to commercial production? What critical need would be addressed if EPIC funds were available to help startup companies gain access to these services? How can the Energy Commission through EPIC address critical needs related to facilitating partnerships to bring innovative clean energy technologies to market?

Answer: Early market research and investor exposure programs are extremely important in helping technologies make the long transition from lab to market. At a recent gathering of clean energy CEOs, they agreed that it is taking an average of 13 years for them to begin to become commercially viable. All along that lengthy and challenging path, they often need help with market analysis, exposure to potential investors, experienced mentors, exposure to one another to share best practices, and more. This is the type of support they receive from market analysis programs, incubators, accelerators, business plan competitions, innovation clusters, etc. As discussed at the workshop, we encourage the Commission (1) to take an inventory of these resources in California, (2) to financially support the existing programs so they can spend their time helping the technologies rather than fundraising, (3) to fund gaps in the existing innovation network, and (4) to fund integrative projects. For example, the Commission could work with existing market support programs on crafting a state-wide mentor network, sharing best practices between the programs, and helping technologies transition from one program to another. In the non-linear path to market, technologies may need all of these programs at one point or another.

In case you need this language under this question, we are repeating our answer to Question #1 here:

Answer: The Commission should either ensure that S18.5 covers the types of support that are needed to successfully transition a technology from lab to market, or perhaps create an new category to cover these. Too often, potential solutions remain in the lab because they achieve technical rather than market breakthroughs. Without translating

those solutions into terms that the market values, research grants end, people move on, and innovations remain on the shelf without ever reaching downstream incubation such as prototype development, testing and validation, business plan competitions, and seed funding. Early market analysis can be critically important in helping researchers find winnable entry markets. This often needs to occur long before the inventors are ready for testing and validation or even conceive of themselves as "entrepreneurs." When they first invent something in the lab, they often have neither the time, funding, nor training to perform an adequate market analysis. So in addition to the above types of support and those currently articulated in the Triennial plan, it is essential for the Commission to support innovation programs that help researchers with market analysis at a very early stage.

Thank you very much for the opportunity to provide input on the important topic of market facilitation.