PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

ITEM # 22 ID #9696

ENERGY DIVISION **RESOLUTION E-4354**

September 2, 2010

R E S O L U T I O N

Resolution E-4354. This Draft Resolution names the winning grant recipients of the California Solar Initiative (CSI) Research, Development, Deployment and Demonstration (RD&D) Program's Solicitation #2, which focuses on improved photovoltaic (PV) production technologies and innovative business practices. Pursuant to Decision (D.) 07-09-042, this Resolution requires Commission approval.

Proposed Outcome: Program Manager will enter into grant agreements with nine selected recipients for a total of up to $14.6 million. These will be paid from the CSI RD&D Program Budget.

Estimated Cost: No additional cost is associated with this Resolution, as funds were authorized by a previous decision.

SUMMARY

This Resolution, made pursuant to D. 07-09-042, formally names the winning grant recipients of the CSI RD&D Program's Solicitation #2, which focuses on improved PV production technologies and innovative business practices. Resolution E-4354 orders the CSI RD&D Program Manager, Itron, Inc., to enter into grant agreements which will provide CSI RD&D grant funding to the winning recipients up to the stated award amounts, and to monitor and report on these recipients' activities pursuant to D. 07-09-042.

BACKGROUND

Senate Bill (SB) 1 (Murray, 2006) authorized the Commission to allocate up to $50 million of the CSI program funds for research, development, demonstration, and deployment of solar technologies. The RD&D portion of the CSI program was adopted in September 2007 via D. 07-09-042. In that decision, the Commission approved the "Adopted CSI RD&D Plan" which identifies the goals and

objectives of the CSI RD&D program, sets forth allocation guidelines, and establishes criteria for solicitation, selection and funding RD&D projects. It also establishes the guidelines for the RD&D program administration and RD&D program evaluation.

To implement the Adopted CSI RD&D Plan, the Energy Division oversaw the competitive selection of Itron, Inc. as the CSI RD&D Program Manager - approved via Resolution E- 4179 in July of 2008. The CSI RD&D Program is overseen by Energy Division staff, in accordance with D. 07-09-042. Operational administration of the CSI RD&D Program is carried out by Itron, Inc. Energy Division staff is responsible for monitoring the Program Manager's expenses and assuring that they act in compliance with D. 07-09-042, as well as participating as members of the Scoring and Selection Committees. The Commission authorizes funding awards via Resolution awards, as recommended by staff and the contract Program Manager. The contract Program Manager is responsible for maintaining program data, developing grant solicitations, evaluating grant requests, entering into grant agreements (after approval by Commission Resolution), monitoring progress on all approved projects, and reporting on approved projects. The CSI RD&D Program Manager maintains a program Web site: www.CalSolarResearch.ca.gov, which is linked from both the Commission's CSI website and the Go Solar California website (www.GoSolarCalifornia.ca.gov), the statewide consumer information site for the State's solar programs.

In March of 2010, the Commission adopted E-4317 for Solicitation #1, which awarded $9,320,472 in funds to 8 projects focused on grid integration.

The CSI RD&D Program has a budget of $50 million, running through 2016 and funded by the electric ratepayers of California's three largest investor-owned utilities, namely Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E).

The Adopted CSI RD&D Plan lays out the seven key principles of the CSI RD&D Program. These principles include:

1. Improve the economics of solar technologies by reducing technology costs and increasing system performance;
2. Focus on issues that directly benefit California, and that may not be funded by others;

3. Fill knowledge gaps to enable successful, wide-scale deployment of solar distributed generation technologies;
4. Overcome significant barriers to technology adoption;
5. Take advantage of California's wealth of data from past, current, and future installations to fulfill the above;
6. Provide bridge funding to help promising solar technologies transition from a pre-commercial state to full commercial viability; and
7. Support efforts to address the integration of distributed solar power into the grid in order to maximize its value to California ratepayers.

The Adopted CSI RD&D Plan establishes the recommended allocation of funding across different types of RD&D. Demonstration projects should receive the largest portion of the RD&D budget, followed by research, development and deployment. The majority of funds will also be awarded to low-risk projects with project results expected within 1-3 years time. These targets were established by the Commission in September 2007 via D.07-09-042 approving the "Adopted CSI RD&D Plan".

The Adopted CSI RD&D Plan also establishes guidelines for match funding. Applicants with projects close to commercialization are expected to bring a higher level of match funding.

Within the CSI RD&D Program, grant funding is further allocated into three target areas:

- Grid integration
- Production technologies
- Business development and deployment

NOTICE

This Resolution is presented on motion of the Energy Division and not in response to an Advice Letter.

PROTESTS

One comment was received on August 19th, 2010 from a recommended applicant: Congenra Solar. Congenra supports the recommendation, but wished

to notify the Commission of their name change. Congenra Solar was previously known as Skywatch Energy.

DISCUSSION

Focus of the Second Grant Solicitation

The second CSI RD&D Program solicitation was released on November 4, 2009 and focuses on improved PV production technologies and innovative business models.[1] The Adopted CSI RD&D Plan suggests that 10-25 percent of CSI RD&D Program funds be allocated to production technologies and 10-20 percent be allocated to business development and deployment projects.

The priority areas of interest for the second solicitation include:

1. Testing and demonstration of new solar technologies with improved performance/reliability or lower costs. Examples of possible production technology projects include, but are not limited to, the following testing and demonstrations:
    a. Economic viability of distributed concentrating PV systems
    b. Building integrated PV (BIPV) products competitive with rooftop PV and which address key technical integration issues
    c. Improved reliability and lifetime of inverters
    d. Improved integration of PV inverters with smart meters
    e. Existing energy storage technologies capable of working with smaller solar systems to help improve the value of the generated energy to the customer and utility
    f. Innovative hybrid solar technologies that enable enhanced energy value and environmental benefits
2. Testing and demonstration of innovative business models that help support expansion of cost-competitive solar technologies by reducing costs or increasing value of the solar system to owners or utilities.

[1] The CSI RD&D Program second grant solicitation document is available here: http://www.calsolarresearch.ca.gov/Current-Solicitations/current-solicitations-status.html

Examples of possible business model testing or demonstration projects include, but are not limited to, the following:

a. Projects where potential roles for utilities in solar PV are identified and vetted
b. Projects involving lower cost, utility grade PV system control, metering and monitoring capability
c. New business practices that help to lower solar system installation or operating and maintenance (O&M) costs
d. Innovative virtual net metering approaches that enable greater use of solar access points while providing verifiable parsing of costs and benefits
e. Testing and development of tariffs that reflect the time dependent value of energy storage to system owners and/or utilities
f. Testing and demonstration of the economic value associated with "unloading" of distribution feeders due to solar systems installed on the feeder

The CSI RD&D Program Manager used various information resources to identify critical areas to target within the second solicitation and refine the priority areas identified above. These information resources include:

- The joint California Energy Commission and California Public Utilities Commission Solar Photovoltaic Research Plan (Roadmap)[2], which highlighted issues important to California, provided RD&D approaches, and set milestones.
- Direct contact with over two dozen entities involved in solar RD&D efforts[3] to ensure that the RD&D program's efforts are not duplicative.

---

[2] Solar Photovoltaic Research Plan, California Energy Commission, CEC-500-2007-038-SD, September 2007.

[3] Contact with other organizations involved in Solar RD&D included: California Energy Commission, U.S. Department of Energy (Solar American Initiative and Solar American Board of Codes and Standards), U.S. Department of Energy national laboratories (NREL, Sandia), NYSERDA, New Jersey's Edison Innovation Commercialization Fund and Clean Energy Manufacturing Fund, Massachusetts Technology Collaborative Congestion Relief Pilots, Oregon Department of Energy, Hawaii Clean Energy Initiative, Sacramento Municipal Utility District's ReGen Program, Los Angeles Department of Water and Power's Sunshares program, a variety of California universities (including California Institute of Technology, Stanford University, UC San Diego, UC Davis, UC Merced, and UC Santa Cruz), a variety of universities in other states (including Arizona State University, Colorado State University), and leading solar industry companies.

Timeline of the Grant Solicitation

The following outlines the timeline and process for the second grant solicitation.

- On September 25, 2009 the second solicitation and CSI RD&D grant agreement was issued in Draft form for public comment by the CSI RD&D Program Manager to the service list of R.08-03-008, as well as to a mailing list maintained by the CSI RD&D Program Manager.
- On October 12, 2009 comments on the second solicitation were received from stakeholders. Comments were considered prior to the release of the final solicitation documents.
- On November 4, 2009 the revised second solicitation was issued, including the Grant Agreement document. The solicitation was issued to the service list of R.08-03-008, as well as to a mailing list maintained by the CSI RD&D Program Manager.
- On November 18, 2009, a bidder's conference webinar was held by the CSI RD&D Program Manager to review the intent and goals of the program, and to allow prospective bidders to ask questions.
- By November 18, 2009, written questions were submitted to the CSI RD&D Program Manager regarding the solicitation.
- On December 7, 2009 (revised January 15, 2010), responses to submitted questions were later posted on the CSI RD&D Program website by the CSI Program Manager.
- On February 16, 2010, proposal responses were due to the CSI RD&D Program Manager. A total of 95 proposals were received. Of these, 31 did not pass the initial screening and were eliminated. The remaining 64 proposals - which requested $105,473,806 in CSI RD&D funds and brought $74,601,590 in match funds - passed the initial screening.
- In late February and early March 2010, the 64 proposals that passed the initial screening performed by the CSI RD&D Program Manager and underwent technical review. This initial technical review assessed the practical feasibility, path to implementation, and funding level requested of the various proposals.
- Two proposal Scoring Committees comprised of Itron personnel, U.S. Department of Energy (DOE), industry experts and representatives of the CPUC evaluated the 64 proposals using the Proposal Evaluation criteria described in Table 1.
- In May 2010, the two proposal Scoring Committees made recommendations to a Selection Committee, comprised of individuals from the CPUC, Itron, National Renewable Energy Laboratory (NREL) and the California Energy Commission. In June 2010, the Selection Committee

made the final determination of the recommended proposals identified in Table 2 (See page 11). The Energy Division prepared this Resolution for Commission consideration.

Proposal Evaluation Criteria for Grant Solicitation

The grant solicitation identified the proposal evaluation criteria. All 64 proposals were scored using the proposal evaluation criteria identified in Table 1. Proposals needed to obtain 75 percent (or 150 points) of the possible 200 points to be considered for funding. Of the 64 proposals that were evaluated by the two Scoring and Selection Committees, nine passed the minimum 75 percent passing score and are recommended for funding.

Table 1: Proposal Evaluation and Scoring Criteria

SCORING CRITERIA	MAX. POINTS POSSIBLE
1. How well does the proposed research address the seven key principles in the CSI RD&D Plan? (See pg 1-2 of this solicitation).	30
2. What is the likelihood that the proposed research will lead to a return on investment/payback, a reduction in the installed price of solar electric systems, an increase in system performance, or in the overall growth of solar capacity in California? Will the proposed project contribute to the CSI goal of 1,940 MW of new electricity generation from solar energy by 2017?	30
3. Is the proposed project located in California? Is the proposed research organization located in California? Does the proposed project address an issue that is important to California?	10
4. Are the amounts and uses of the funding requested appropriate for the work to be performed? Is the funding request reasonable? Is the funding request in-line with the potential benefits that can be realized?	20
5. How well does the proposed project leverage funds from other organizations? How well has the proposal demonstrated the match-funding component of the proposed project? Does the proposed project provide added value by collaborating and coordinating with other RD&D organizations?	20
6. Is the proposed team for the project highly qualified to conduct the working being proposed? Do they have prior experience conducting similar work?	20
7. Does the proposed project include utility participation? Is utility participation significant or needed?	10

SCORING CRITERIA	MAX. POINTS POSSIBLE
8. How likely is it that the proposed project will be successful and overcome a significant barrier to achieving the goals of the CSI Program? Is the proposed project advancing a proven technology or strategy? Is the proposed project sound from a technical, economic, policy, and market perspective?	30
9. How close is the proposed project to commercialization? Are project results expected in the 1-3 year horizon? Is the proposed path to market for the results of this research practical and achievable?	20
10. Does the proposed project have an educational, technical transfer, or informational component? Are the research products valuable? Is there a plan for effective dissemination of information gained from the project?	10
Total Points Possible	**200**
Points Needed to Pass (75 percent of total)	**150**

Proposals Recommended for Funding from Grant Solicitation #2

The proposals recommended for funding are identified in Table 2. Each proposal is identified by the name of its Principal Investigator. Each proposal recommended for funding is described in detail in Appendix A of this Resolution. In the cases where the Principal Investigator is joined by one or more project team members (other organizations), those other organizations are identified in Appendix A. Each Project is identified with a Project ID number, these numbers were assigned for administrative purposes for keeping track of proposals through the review, scoring and selection process.

As shown in Table 2, the proposals recommended for funding total $14,630,058 in grant funding. The selected grants are expected to have matching funds of $13,445,572. Currently, these grants have a total of $11,475,008 in proposed match funding; there are budget discrepancies in four recommended proposals. Recommended CSI RD&D grant recipients will be required to increase the percent of match funding provided to comply with the RD&D Adopted Plan and to best leverage ratepayer funds. To achieve this, they will be required to show increased match funding, either in in-kind services or cash. Alternatively, recommended recipients may reduce the amount of requested RD&D funds so that their original amount of match funding meets the budget match criteria.

The following four proposals are recommended for funding contingent upon a higher percentage of match funding being provided:

1. ID #296, SunPower, proposes $625,000 while this Resolution requests $937,000
2. ID #213, Solaria Co., proposes $635,000 while this Resolution requests $1,217,500
3. ID #249, U.C. Davis, proposes $750,000 while this Resolution requests $1,245,000
4. ID #236, ConSol, proposes $579,633 while this Resolution requests $1,160,697

As described in Appendix A on a project by project basis, the Selection Committee recommends reducing certain project funding levels from the amounts originally requested in order maximize project benefits and meet or exceed the cost share guidance provided in the grant solicitation. The guidance was consistent with the cost share guidance adopted in D.07-09-042. The level of

cost-sharing achieved in the selected grants is sufficient both on an overall and per project basis.

The CSI Program Manager will finalize Grant Agreements with each of the recommended proposers. Awards from this grant solicitation will be contingent on the grantees finalizing this Grant Agreement and entering into contract with the Program Manager within 120 days of the Commission decision. In the case of the four recommended recipients whose level of match funding is currently too low, awards will be contingent upon an adequate level of match funding being provided.

Table 2: Recommended proposals and funding summary

	Project ID	Project Title	Applicant	Requested Funding	Recommended Funding (up to)	Match Funding Provided
Improved Solar Technologies	296	PV and Advanced Energy Storage for Demand Reduction	SunPower Corporation	$1,875,000	$1,875,000	$625,000*
	258	Improved Cost, Reliability, and Grid Integration of High Concentration Photovoltaic Systems	Amonix, Inc.	$2,865,384	$2,139,384	$3,287,000
	213	Solaria: Proving Performance of the Lowest Cost PV System	Solaria Corporation	$1,800,000	$1,217,500	$635,000*
Business Model	270	Innovative Business Models, Rates and Incentives that Promote Integration of High Penetration PV with Real-Time Management of Customer Sited Distributed Energy Resources	Viridity Energy	$2,301,150	$1,660,000	$840,000
	236	Low-Cost, Smart-Grid Ready Solar Re-Roof Product Enables Residential Solar Energy Efficiency	ConSol	$1,581,064	$1,000,000	$579,633*
	249	West Village Energy Initiative: CSI RD&D Project	Regents of the University of California	$2,995,000	$2,500,000	$750,000*
Cross Cutting	247	Advanced Grid-Interactive Distributed PV and Storage	Solar City	$1,774,780	$1,774,780	$1,057,187
	243	Reducing California PV Balance of System Costs by Automating Array Design, Engineering and Component Delivery	SunLink	$996,269	$996,269	$927,031
	219	Improved Manufacturing and Innovative Business Models to Accelerate Commercialization in California of Hybrid Concentrating Photovoltaic/Thermal Tri-Generation (CPV/T-3G) Technology	Cogenra Solar	$1,467,125	$1,467,125	$2,774,157
		Total		**$17,655,772**	**$14,630,058**	**$11,475,008**

*Higher levels of match funding are required for current funding request.

Proposal Summaries for Projects Recommended for Funding

The following discussion provides a short summary of each proposal recommended for funding. In addition, for the two main focus areas as well the cross-cutting area, a brief comparison of the proposals recommended for funding within each of the focus areas is provided.

Focus Area I: Improved PV production technologies

The improved PV production technologies focus includes the following areas are of particular interest:

- Testing and demonstration of new solar technologies with improved performance/reliability or lower costs. Examples of possible production technology projects include, but are not limited to, the following testing and demonstrations:
    - Economic viability of distributed concentrating PV systems
    - Building-integrated PV (BIPV) products that can compete with rooftop PV
    - Inverter technologies with improved reliability and performance
    - Integration of inverters with smart meters
    - Energy storage technologies capable of working with smaller solar systems to help improve the value of the generated energy to the customer and utility
    - Innovative hybrid solar thermal / electric technologies

1. Proposal 296: SunPower Corporation

Proposal 296, from SunPower Corporation, focuses on improved production technologies by demonstrating the integration of advanced energy storage systems in combination with existing PV systems for commercial customers. The SunPower team will work with three energy storage vendors as well as Target Stores to demonstrate better economics with the combination of PV and storage than with each of the technologies separately. The expected range of the test systems are from 80 to 375 kWp with 2 to 6 hours of storage.

Over the two-year research period, the SunPower team will: 1) Determine if the combination of PV and energy storage is of higher value to the customer and utility than either one alone considering time-of-use rates and a demand

response tariff, under actual operating conditions, and 2) Assess the capabilities, reliability and potential degradation of the storage technologies. The ability of the storage technologies to respond to actual or simulated demand response events will also be assessed. This research will provide valuable information regarding the coupling of energy storage with PV in terms of both the economics as well as the reliability of storage technologies.

2. Proposal 258: Amonix, Inc.

Proposal 258, from Amonix, Inc, responds to the improved production technologies area by working to decrease costs and expand the market adoption of high concentration photovoltaic (HCPV) systems. The Amonix team will monitor the performance of nine 53 kW HCPV systems and associated circuits on the University of California, Irvine electric infrastructure. Metered data and associated models will be used to evaluate and compare grid interconnection and energy management strategies. The team will also look at how to correlate measured weather data with accelerated testing in order to predict lifetime and reliability validation that will help to secure financial investments for future HCPV system deployment. The reliability model will help project owners and the financial community with the data on system reliability and lifetime performance, which should accelerate the adoption of HCPV technology on a much wider scale. This project is complimentary to the Renewable Energy Secure Communities (RESCO) project with UC Irvine that has received grant funding from the California Energy Commission, in part, for renewable generation deployment on the campus.

3. Proposal 213: Solaria Corporation

Proposal 213, from Solaria Corporation, seeks to overcome the primary obstacle to wide-scale deployment of their PV technology in that the financial community will only invest in projects that use solar technology with a history of proven performance. To overcome this barrier, the Solaria team proposes to conduct demonstrations at two California fairground sites (Hollister and Stockton). The Stockton demonstration will be a 250 kW 'kit' system that will reduce costs by eliminating customization as much as possible to produce a turnkey tracking PV system. The other three systems, installed in Hollister, will test and compare three types of tracking systems with Solaria modules: single axis, dual axis and polar axis. These tests will allow for further cost and performance comparisons to validate the optimum tracker technology with Solaria modules. The data and results from these demonstrations will reduce the risk for investors to provide

financing to these projects. This will help to accelerate the deployment of solar in the state.

Focus Area II: Innovative business models

In addition to improved PV production technologies, the successful deployment of new business models is required to meet the goals and objectives of the CSI Program. Testing and demonstration of innovative business models will help support expansion of cost-competitive solar technologies by reducing costs or increasing value of the solar system to owners or utilities. Examples of possible business model testing or demonstration projects include, but are not limited to, the following:

- Potential roles for utilities in delivering solar PV
- Development of lower cost, utility-grade PV system control, metering and monitoring capacity
- Demonstrations of improved PV economics using advanced metering, price-responsive tariffs and storage
- Demonstrations of innovative ways to lower installation or operations and maintenance costs
- Testing and demonstrations of virtual net metering approaches
- Testing, demonstrations and assessments of the economic aspects of energy storage
- Assessing the actual risks and benefits of solar systems to the utilities

4. Proposal 270: Viridity Energy, Inc.

Proposal 270, from Viridity Energy, Inc. builds on the high penetration PV research funding from the first CSI RD&D Program solicitation (funding went to UCSD not directly to Viridity) as well as prior SDG&E and UCSD related research. New business models will be identified for integrating up to 1,000 MW of high penetration PV with distributed energy resources (DER) at UCSD. Additionally, new tariffs and incentives will be developed and vetted with SDG&E and the California Independent System Operator (CAISO) and tested on the UCSD Microgrid. Lastly, the team will perform integrated cost-benefit analysis of the business models and management strategies and recommend rates and incentives that balance the costs and benefits from the utility, customer and ratepayer perspectives.

This project is complimentary to another California Energy Commission's Renewable Energy Secure Communities (RESCO) program funded under the Public Interest Energy Research (PIER) program which is to develop and test a smart grid master controller and optimizer/scheduler as well as develop protocols and standards required for the widest possible inter-operability. The development of tariffs and incentives to balance costs/benefits is a critical component to advancing PV generation in the state as well as meeting the goals of the CSI Program. This research will provide valuable information to support both utility operations and the CAISO.

5. Proposal 236: ConSol

Proposal 236, from ConSol, focuses on lowering solar system installation or operating and maintenance (O&M) costs. This project will demonstrate a low cost 'plug and play' roof mounting PV system for the asphalt-shingle re-roofing market. Standard roofers and electrical contractors will be able to install PV along with an asphalt roof with no special tools or roofing penetrations. Demonstrations will be conducted on six homes in the SDG&E territory with the utility contributing to the cost of the energy efficiency upgrades.

The largest U.S. vendor of roofing materials, GAF, with 45 percent market share of the residential roofing market, is a partner in this project. The initial path to market for this research will be through the GAF roofing contractor channel. Other target audiences include homeowners/ratepayers, energy efficiency retrofit providers, utilities and the financial community.

<u>Projects that address both Focus Area I (improved PV production technologies) and Focus Area II: (innovative business models)</u>

6. Proposal 249: Regents of the University of California, Davis

Proposal 249, from the University of California at Davis, addresses both the improved production technologies category as well as the innovative new business models category. The West Village Project at the University of California, Davis, is one of the first large scale communities to be Zero Net Energy entirely through energy efficiency and on-site generation. For the improved production technologies portion of the project, the UC Davis team will test and demonstrate existing and new storage technologies for smaller systems in community-wide applications. The team will also research and demonstrate the integration of AMI with PV and DG as well as test and demonstrate hybrid

solar (PV/Thermal). The West Village Project will be used to test and evaluate several business models for deploying community distributed solar and will document the most promising one. If appropriate, the team will submit an Advice Letter to the CPUC. Lastly, the team will test, demonstrate and assess virtual net metering approaches, energy storage to mitigate the impacts of high penetration PV deployment and the use of solar resource forecasting to optimize storage charging and dispatch.

A portion of this research (Smart Grid Solutions for integration of AMI and solar) builds on the California Energy Commission's Renewable Energy Secure Communities (RESCO) Project being funding by the Public Interest Energy Research (PIER) program and has received support from the DOE. Under this project, UCD will refine the performance metrics being developed under RESCO. Finally, the project is supportive of the CPUC's "Zero Net Energy" policy goals.

7. Proposal 247: SolarCity

Proposal 247, from SolarCity, addresses both improved production technologies and innovative business models. This project builds upon an operational FirmPV installation in San Francisco, which is a combination of Tesla Motors vehicle battery system with SolarCity's SolarGuard dispatch and monitoring platform. The ability to firm intermittent renewable resources will likely result in peak demand reductions and system-wide grid network benefits. The SolarCity team will conduct demonstrations on 12 sites to assess system performance along with assessing the economic, reliability and carbon reduction impacts of large-scale deployment of a firm PV product. Additionally, business model tasks include conducting analysis to determine an optimal tariff product or rate plan that will provide the benefits of FirmPV at the lowest overall cost. Lastly, the SolarCity team will explore a range of financing mechanisms that will best enable FirmPV deployment.

8. Proposal 243: SunLink

Proposal 243, from SunLink, cuts across both the production technologies focus area as well as the new business model focus area. SunLink will build on past work to enable automation of structural and array electrical designs. This will support the industry by enabling cost-effective optimized designs for smaller PV systems as well as expanding the range of contractors who can deliver fully-engineered PV system installations. Additionally, SunLink will automate the documentation process from project approval through system installation.

System installation and balance of system (BOS) components account for 50 percent of the cost of a PV system and any reduction in these costs can have an impact on the installed cost of a PV system. This research is focused on decreasing the time spent on the following: 1) engineering time from system layout to final package, 2) plan checking time and, 3) on-roof array wiring time.

9. Proposal 219: Cogenra Solar

Proposal 219, from Cogenra Solar project is a combination of improved PV production technologies and new business models. Cogenra has developed, prototyped and validated the performance of a concentrating PV (CPV) and thermal co-generation technology. They propose to conduct an 80 kW demonstration of this technology at the Sonoma Wine Company were improved manufacturing and assembly methods will be developed and demonstrated. The field performance of the system will be measured and used to refine economic and financial models. The Cogenra team will also develop an Energy Purchase Agreement business model to facilitate third-party financing for these systems. The solar co-generation system will also be modified to support tri-generation of electricity, heating and cooling. Tri-generation will expand the market for this technology to commercial sites that require cooling and limited hot water. The system will also be modified to provide energy storage for use during peak demand. This research is likely to catch the attention of potential competing vendors of co-generation and tri-generation to enter the market.

Overall Comparison of Focus Area I (Improved Production technologies)

There are three proposals recommended for funding in the improved production technologies focus area along with four others that share this focus with some business model aspects as well (cross cutting focus).

The Amonix and Solaria projects aim to demonstrate the viability of distributed concentrating PV (CPV). By concentrating the available solar radiation on smaller cell material, CPV systems provide for much higher efficiencies compared to traditional flat plate PV. This is both beneficial to reducing system cost through lower cell material requirements as well as more energy production in a given area. However, the current market place lacks data on the reliability and long term performance of such systems to allow for financing and feasibility planning of CPV projects. Providing long term performance data and information to establish the bankability and reliability will enable confidence towards CPV in

the distributed generation market. Both of the CPV projects bring complimentary benefits in that they address different concentration ranges in the product market. The Amonix product is a high concentration HCPV while the Solaria product is the medium to low concentration product.

The Cogenra Solar project demonstrates a concentrating photovoltaic (CPV) / thermal co-generation technology where field performance will be measured. The CPV used in this project is also medium range (8 x concentrations). The Regents of the University of California, West Village project will also be demonstrating hybrid PV and solar thermal systems. However, the Cogenra project has a unique research element which includes modifications to the co-generation system to incorporate tri-generation (heating and cooling).

Energy storage is another aspect that is addressed in a number of the proposed projects. SolarCity and SunPower will be examining various storage options, including off-the-shelf battery technology, lithium ion technology and ice energy technology. Both of these projects will conduct demonstrations to assess the performance, economics and reliability of the various storage systems. The SolarCity project will demonstrate this on residential and small commercial sites, where as the SunPower project is demonstrating this on retail facilities. The project with the Regents of the University of California Davis has an energy storage component, as does Cogenra Solar, another project that cuts across both focus areas. Cogenra Solar will modify the tri-generation system to provide energy storage for use during peak demand. The Viridity project though primarily a business model focus, will be using the PV integrated energy storage to assist in real-time dispatch of distributed energy resources (DER).

Overall comparison of Focus Area II (Innovative Business Models)

There are two proposals recommended for funding that focus only on the innovative business model area along with four others that share this focus with some improved production technologies aspects as well.

The ConSol proposal is focused on lowering the costs of solar with an easier to install mounting system and a new market channel with roofing contractors who will install a solar system at the time of re-roofing. The project from SunLink shares some synergies with the recommended project from ConSol. SunLink's project seeks to enable automation of structural and array electrical designs, while the project from ConSol offers a low cost 'plug and play' roof mounting PV system for the asphalt shingle re-roofing market. Both projects seek to reduce the

installed cost of solar by streamlining processes or expanding the contractor base for installing PV systems. SunLink's automation and document preparation systems will expand the range of contractors that can install fully engineered PV systems. ConSol's approach is to coordinate the installation of PV along with an asphalt shingle re-roofing project as a "plug and play" system that can be installed by standard roofers and electrical contractors. Both of these approaches focus on reducing the cost of a PV system, by reducing balance of system and installation costs; these can account for half of the cost of an installed PV system.

The Viridity proposal will look at different tariffs and incentives to promote the integration of PV with other distributed resources and management practices. Three cross-cutting proposals, Solar City, Cogenra Solar and UC Davis, also have a tariff design element as part of their proposed research. The measured performance from the Cogenra tri-gen project will be used to assess various tariff structures.

Viridity at UC San Diego, along with UC Davis West Village project and Amonix at UC Irvine are all set in a community solar setting and provide for synergistic outcomes that may be beneficial to other community solar projects.

The nine proposals recommended for funding cut across the focus areas of the solicitation as shown in Table 3 below.

Table 3: Comparison of Proposals by Focus Area

Project ID	Project Title	Applicant	Improved Solar Technologies					Innovative Business Models			
			CPV	BIPV	Energy Storage	Hybrid solar technologies	Inverter performance and integration	Utility interface	Installation + O&M costs	Low cost metering and monitoring	Tariff design and TOU
296	PV and Advanced Energy Storage for Demand Reduction	SunPower Corporation			X						X
258	Improved Cost, Reliability, and Grid Integration of High Concentration Photovoltaic Systems	Amonix, Inc.	X						X		
213	Solaria: Proving Performance of the Lowest Cost PV System	Solaria Corporation	X						X		
270	Innovative Business Models, Rates and Incentives that Promote Integration of High Penetration PV with Real-Time Management of Customer Sited Distributed Energy Resources	Viridity Energy			X						X
236	Low-Cost, Smart-Grid Ready Solar Re-Roof Product Enables Residential Solar Energy Efficiency Results	ConSol							X		
249	West Village Energy Initiative: CSI RD&D Project	Regents of the University of California			X	X	X	X			X
247	Advanced Grid-Interactive Distributed PV and Storage	Solar City			X						X
243	Reducing California PV Balance of System Costs by Automating Array Design, Engineering and Component Delivery	SunLink							X		X
219	Improved manufacturing and innovative business models to accelerate commercialization in California of hybrid concentrating photovoltaic/thermal tri-generation (CPV/T-3G) technology	Cogenra Solar			X	X			X		

CSI Program Manager Responsibilities

The CSI RD&D Program Manager will create a grant agreement with each proposer recommended for funding, based upon the submitted scope of work.

The CSI RD&D Program Manager will review the budgets of each proposal prior to finalizing a Grant Agreement with each recipient. During the months since the proposals were submitted, the funding levels may have shifted if, for example, a proposer has since received funding from another source for the same work. Therefore, the CSI RD&D Program Manager will ensure that the funding levels are still accurate in light of any potential changes to project partners, project scope, or matching funds. If projects have received funding from another source (or lost matching funds) since the submittal of the proposal, the budget will be modified to reflect this new information, while remaining within boundaries of matching fund requirements.

Finally, nearly all of the proposals received by the CSI RD&D Program in the second solicitation will likely benefit from collaboration committee meetings. Several California utility representatives and industry stakeholders have offered to participate in an informal collaboration committee to aid the award recipients in the success of the RD&D projects selected under this solicitation. As discussed above, several selected proposals will work in similar areas using different methods and it is logical that the different recommended winners should have an opportunity to share their approaches and work products. The CSI RD&D Program Manager will work to create a collaboration committee process to aid in the success of the CSI RD&D Program grant recipients. This process will ensure that input is provided to the grant recipients early in their projects, as the project progresses, and through a forum to share results and products when the project is complete. The CSI RD&D Program Manager will ensure this activity is included in all grant agreements via the scope of work.

The CSI RD&D Program Manager will reach a final grant agreement with each of the award recipients approved for funding within 120 days of the effective date of this Resolution. The Commission's Energy Division can extend this deadline or cancel an award if an agreement is not signed within 120 days of the Commission decision. The grant agreement will codify the scope identified in the proposal, enhanced or modified in a mutually agreeable manner as specified above and in the best judgment of the CSI RD&D Program Manager under the oversight of the Commission's Energy Division. The grant agreement will specify a CSI RD&D Program funding amount that is consistent with what is in this resolution, and, modified in a mutually agreeable manner as specified above and in the best judgment of the CSI RD&D Program Manager under the oversight of the Commission's Energy Division.

COMMENTS

Public Utilities Code section 311(g) (1) provides that this Resolution must be served on all parties and subject to at least 30 days public review and comment prior to a vote of the Commission. Section 311(g) (2) provides that this 30-day period may be reduced or waived upon the stipulation of all parties in the proceeding.

The 30-day comment period for the draft of this Resolution was reduced to 25 days. Accordingly, this draft resolution was emailed to parties for comments, and will be placed on the Commission's agenda no earlier than 25 days from today.

FINDINGS

1. The CSI RD&D second grant solicitation on improved PV production technologies and innovative business models was carried out in accordance with the Commission direction establish in D. 07-09-042.
2. The CSI RD&D Program Manger had appropriate oversight by Energy Division during the second grant solicitation.
3. The CSI RD&D Program Manager issued the grant solicitation and Sample Grant Agreement on November 4, 2009.
4. The CSI RD&D Program Manager received proposals on or before February 16, 2010.
5. The CSI RD&D Program Manager reviewed the grant proposals in a manner consistent with the plan set forth in D. 07-09-042.
6. The CSI RD&D Program Manger undertook a three part scoring process, including a Technical Review, Scoring Review, and Selection Process, consistent with the direction set forth in D. 07-09-042.
7. The CSI RD&D Program scoring process has resulted in the recommendation of nine proposals that meet the 75 percent scoring threshold and are recommended for funding. These nine grant recipients, described in detail in Appendix A to this Resolution, have submitted proposals which will fulfill the goals of the RD&D Program as described in D. 07-09-042.
    i. Proposal #296 – SunPower Corporation – up to $1,875,000
    ii. Proposal #258 – Amonix, Inc. – up to $2,139,384
    iii. Proposal #213 – Solaria Corporation – up to $1,217,500
    iv. Proposal #270 – Viridity – up to $1,660,000

v. Proposal #236 – ConSol – up to $1,000,000
vi. Proposal #249 – Regents of the University of California, Davis – up to $2,500,000
vii. Proposal #247 – Solar City – up to $1,774,780
viii. Proposal #243 – SunLink – up to $996,269
ix. Proposal #219 – Cogenra Solar – up to $1,467,125

8. Four of the recommended grant recipients (Proposals #296, #213, #249, and #236) are recommended by the Selection Committee for funding contingent upon a the percentage of match funds being provided matches the match funding guidelines.
9. The CSI RD&D Program Manager will ensure that the funding level for each project is accurate, and whether revisions are needed due to potential changes to project partners, project scope, or matching funds.
10. The CSI RD&D Program Manager will work to create a collaboration committee process to aid in the success of the CSI RD&D grant recipients. This process will provide input to the grant recipients early in their projects, provide an opportunity for peer review of projects while in process, and create a forum to share results towards the end of projects when results have been achieved.

THEREFORE IT IS ORDERED THAT:

1. The CSI RD&D Program Manager shall execute Grant Agreements with the following recommended 9 proposers, contingent upon their meeting all requirements detailed in the ordering paragraphs:
   - Proposal #296 – SunPower Corporation – up to $1,875,000
   - Proposal #258 – Amonix, Inc. – up to $2,139,384
   - Proposal #213 – Solaria Corporation – up to $1,217,500
   - Proposal #270 – Viridity – up to $1,660,000
   - Proposal #236 – ConSol – up to $1,000,000
   - Proposal #249 – Regents of the University of California, Davis – up to $2,500,000
   - Proposal #247 – Solar City – up to $1,774,780
   - Proposal #243 – SunLink – up to $996,269
   - Proposal #219 – Cogenra Solar – up to $1,467,125

2. The CSI RD&D Program Manager shall execute grant agreements with the following proposers that include modifications to either the funding amount or the match funding to ensure that the grant will meet the guidelines set forth in the CSI RD&D Adopted Plan.
   - ID #296, SunPower, proposes $625,000 in match, while match guidelines would require $937,000 unless overall funding level changed
   - ID #213, Solaria Co., proposes $635,000 in match, while match guidelines would require $1,217,500 unless overall funding level changed
   - ID #249, U.C. Davis, proposes $750,000 in match, while match guidelines would require $1,245,000 unless overall funding level changed
   - ID #236, ConSol, proposes $579,633 in match, while match guidelines would require $1,160,697 unless overall funding level changed
3. The CSI RD&D Program Manager shall monitor and report on the progress of grant awards to the Commission pursuant to D. 07-09-042.
4. The Energy Division shall continue its ongoing oversight of the CSI RD&D Program by reviewing all Grant Agreements prior to their execution.
5. This agreement will not be subject to negotiation, and each grantee's award is contingent on signing this agreement. Minor modifications to the Grant Agreements with governmental entities will be considered to ensure consistency with state and federal law.
6. Awards from the CSI RD&D second grant solicitation will be contingent on the grantees entering into an agreement with the CSI RD&D Program Manager within 120 days of the effective date of this Resolution. The Commission's Energy Division can extend this deadline or cancel an award if an agreement is not signed within 120 days of the Commission decision.
7. The CSI RD&D Program Manager will finalize Grant Agreements with each of the recommended proposal's Principal Investigator based upon the submitted scope of work and budget. The grant agreement will be for the scope identified in the proposal, enhanced or modified in a mutually agreeable manner as specified above and in the best judgment of the CSI RD&D Program Manager under the oversight of the Commission's Energy Division. For some recommended awards, the scope of the project and the recommended funding levels shall be reduced from what was requested in the proposal.
8. This Resolution is effective today.

I certify that the foregoing Resolution was duly introduced, passed and adopted at a conference of the Public Utilities Commission of the State of California held on September 2nd, 2010 the following Commissioners voting favorably thereon:

_____
Paul Clanon
Executive Director

Appendix A

Project_ID	296
Project Title	PV and Advanced Energy Storage for Demand Reduction
Applicant	SunPower Corporation
Partners	KEMA; Sandia National Laboratories; Target Stores; Xtreme Power; Ice Energy; ZBB Energy
Utility partner	PG&E
Requested Funding	$1,875,000.00
Recommended Funding	$1,875,000.00
Proposed Match Funding	$625,000.00
Recommended Match Funding	$937,000.00
Target Area	Improved Production Technologies
Project Summary	The overall goal of this project is to demonstrate that the integration of PV and energy storage will be of higher value than either technology alone. The project includes tasks to increase demand reduction and verify benefits of solar coupled with storage, and also assess the reliability and performance of 3 different storage technologies. The storage options to be evaluated include an innovative ice energy storage with the other two being traditional batteries. This research will undertake the following: 1) Determine if the combined value of PV and energy storage is of higher value to the commercial customer and utility than either one alone, and, 2) Assess storage capabilities, reliability and potential degradation of the technologies to assess lifetime characteristics. Target stores are a team partner and will provide the demonstration sites for this project.
Deliverables	Project deliverables include: • Report on algorithm design and communication approach related to demand reduction and energy storage • Report on storage performance and testing of 3 different technologies • Final Report
Market Connection/ Audience	The project addresses the issue of coupling energy storage with variability of distributed solar generation which is key to the future of SmartGrid and high penetration of solar. The testing of reliability and performance of the three different storage technologies and assessing the economics of the solar coupled storage will provide the market with valuable data and potentially spur the use of such systems. The Target stores serve as a good test case for this market sector and could encourage the small commercial market towards high solar penetration if proven economically beneficial.
Recommendation	Recommended for funding up to $1,875,000. The Selection Committee recommends that the grantee bring in an additional $300,000 at a minimum in match funding to meet the criteria for demonstration projects. This project will provide valuable information for coupling energy storage with PV, both in terms of economics as well as reliability of the storage technologies in this process. The Selection Committee recommends that a key component of the scope of work include a dissemination plan to ensure that the outcomes of this project are distributed as widely as possible.

Project_ID	258
Project Title	Improved Cost, Reliability, and Grid Integration of High Concentration Photovoltaic Systems
Applicant	Amonix, Inc.
Partners	UC Irvine Advanced Power and Energy Program (APEP); National Renewable Energy Laboratory
Utility partner	
Requested Funding	$2,865,384.00
Recommended Funding	$2,139,384.00
Proposed Match Funding	$3,287,000.00
Recommended Match Funding	$3,157,000.00
Target Area	Improved Production Technologies
Project Summary	This project will monitor the performance of 9 - 53 kW High Concentration Photovoltaic (HCPV) units and associated circuits on the UC Irvine electric infrastructure to evaluate and compare grid interconnection and energy management strategies. This project will also conduct accelerated testing and field data to develop a method to evaluate the reliability and lifetime of HCPV technologies. These advancements are expected to facilitate the evolution of HCPV to become cost competitive with other large scale and distributed solar technologies.
Deliverables	Project deliverables include: • Report on electrical interconnection of the HCPV systems on the UCI grid, along with operation of energy systems on the grid with respect to PV resources • Report on dynamic model of UCI's Central Plant and HCPV systems and preferred deployment and operation of Solar PV with combined heat and power (CHP) and local dispatch systems • Lifetime test protocol for HCPV systems • Thermal fatigue model to predict die-attachment lifetime (developed by NREL) • Final Report
Market Connection/ Audience	This deployment project and lifetime reliability model will help provide project owners and financiers with the data to accelerate adoption of the HCPV technology on a wide scale. The deliverables will be useful for both the utilities and financiers looking for lifetime performance and reliability data in order to fund CPV projects. These results will help solar project owners and manufactures in deploying more CPV product under CSI.
Recommendation	Recommended for funding up to $2,139,384 with elimination of Task 4. The Selection Committee determined that Task 4 (develop next generation product for Amonix) was less beneficial and recommends removing it and reducing the funding accordingly. Some of match funding is not eligible and has been removed from the amount proposed. This will be further addressed during detailed scope and budget development for the project. Also, the Selection Committee recommends that the Amonix team bring in SCE as a utility partner. This will ensure that the project has components that can be extrapolated to the larger grid in order to be valuable to the state. The connection with PG&E is seen as indirect through APEP. The merit of this project is the lifetime test protocol and thermal fatigue model and the integration with the UCI grid.

Project_ID	213
Project Title	Solaria: Proving Performance of the Lowest Cost PV System
Applicant	Solaria Corporation
Partners	California Construction Authority
Utility partner	PG&E
Requested Funding	$1,800,000.00
Recommended Funding	$1,217,500.00
Proposed Match Funding	$635,000.00
Recommended Match Funding	$1,217,500.00
Target Area	Improved Production Technologies
Project Summary	The goal of this project is to conduct demonstrations and collect data on concentrating photovoltaics (CPV) to help convenience investors and the financial community of the viability of this technology. To eliminate customization and reduce costs, a 250 kW demonstration system in Stockton will provide the test for a kit approach for installations in that size and market sector. The system installed in Stockton will be compared with the demonstration systems which will be installed in Hollister. The Hollister demonstrations will include three different tracking systems: single axis, dual axis and polar axis.
Deliverables	Project deliverables include: • Report on energy production, long term reliability, module degradation and soiling studies, which will make a case for bankability and financiability • Data on 4 different tracking types: Single axis horizontal and tilted; Polar axis and dual axis tracking • Report on financial costs and economics for low-x CPV • A total of 350 kW installed on State Fairgrounds in Stockton and Hollister • Final Report
Market Connection/ Audience	The data and reports on the long term reliability and production of CPV will be very useful to demonstrate the bankability of these systems and thereby make it economically viable for their wider scale deployment.
Recommendation	Recommended for funding up to $1,213,501 with a condition that the balance of the project cost comes as match funding to ensure the project meets the required cost sharing guidelines. Additional match funding is required for this demonstration project and a portion of the proposed match is not eligible. Additionally, the information dissemination piece of this project should be further enhanced during scope development to enable sharing of the reliability and performance data on a wider scale. The Selection Committee recommends that the project include the additional services of a third-party evaluator for documenting/disseminating project research. The above issues will be further addressed during detailed scope and budget development. The information gained from this research will fill a gap in the market acceptance and wide-scale deployment of CPV. The soiling and degradation study are also beneficial in the context of the 4 different tracker configurations.

Project_ID	270
Project Title	Innovative Business Models, Rates and Incentives that Promote Integration of High Penetration PV with Real-Time Management of Customer Sited Distributed Energy Resources
Applicant	Viridity Energy
Partners	UC San Diego, Energy & Environmental Economics (E3)
Utility partner	SDG&E
Requested Funding	$2,301,150.00
Recommended Funding	$1,660,000.00
Proposed Match Funding	$840,000.00
Recommended Match Funding	$840,000.00
Target Area	Innovative Business Models
Project Summary	This project builds upon high penetration PV research funded from the first CSI RD&D solicitation and also leverages prior UCSD and SDG&E related work. The Viridity team will identify innovation business models for integration of up to 1,000 MW of high penetration PV with distributed energy resource (DER) management at UCSD. The team will also identify and develop tariffs and incentives that will promote the integrated operation of promising DER technologies and PV integration strategies, vet these tariffs with SDG&E and CAISO, and modify as appropriate. The PV integration and DER management strategies will be tested and demonstrated on the UCSD Microgrid. The team will also perform integrated cost-benefit analysis of these innovative DER business models and management strategies and recommend rates and incentives that balance costs and benefits from the utility, customer and ratepayer perspectives. Results will be disseminated in the form of a final report and an open source spreadsheet tool for use at individual customer sites and with implementing statewide policy. The proposal included an optional task of demonstrating the benefits and revenues from direct participation in the wholesale CAISO energy market using the UCSD microgrid as a pilot. This optional task is not being recommended.
Deliverables	Project deliverables include: • Report on specific strategies for integrating high penetration PV with DER management at UCSD • Report on tariffs and incentives that promote optimal dispatch and real-time management of DER • Report on the installation and integration of Vpower System with DERs at UCSD •Report on baseline performance for UCSD DER operation under current rates and incentives • Report on test of business models, management strategies, tariffs and incentives •Report on the costs and benefits of DER strategies tested • Analysis tool to assist managers and operators in selecting and prioritizing DER and PV integration strategies • Final Report

Project_ID	270
Project Title	Innovative Business Models, Rates and Incentives that Promote Integration of High Penetration PV with Real-Time Management of Customer Sited Distributed Energy Resources
Applicant	Viridity Energy
Market Connection/ Audience	This research will provide valuable information to support both utility operations and CAISO, and both entities have provided strong letters of support for the project. The CAISO commits to collaborate with the UCSD microgrid project and will provide expertise and resources for testing and evaluation. SDG&E states that the project is highly relevant to their smart grid activities, including energy storage, and confirms that they will work in close collaboration with UCSD and Viridity on this project. This research is also quite relevant to end-users with large electric loads and the capability of managing their load profile. These entities include universities, municipalities, government buildings, office buildings and manufacturing facilities.
Recommendation	Recommended for funding up to $1,660,000 (not including $640,600 for Optional CASIO Integration) with the condition that the grantee bring in a minimum of $250,000 in additional match funds to replace the portion of match that was found to be ineligible. This project is complimentary to the California Energy Commission's Renewable Energy Secure Communities (RESCO) project which is focused on deployment of distributed generation and grid security and the optimization and dynamic scheduling of a portion of UCSD distributed resources. The project will focus on development of tariffs and incentives to balance costs and benefits, which is a critical component to advancing PV generation in the state as well as meeting CSI goals.

Project_ID	236
Project Title	Low-Cost, Smart-Grid Ready Solar Re-Roof Product Enables Residential Solar Energy Efficiency Results
Applicant	ConSol
Partners	General Electric; GAF
Utility partner	SDG&E
Requested Funding	$1,581,064.00
Recommended Funding	$1,000,000.00
Proposed Match Funding	$579,633.00
Recommended Match Funding	$1,160,697.00
Target Area	Innovative Business Models
Project Summary	This project will demonstrate a low cost, 'plug and play' roof mounting PV system directed to the asphalt-shingle re-roofing market. The project is designed to coordinate the installation of PV along with asphalt roofing materials by standard roofers and electrical contractors with no special tools. Because the PV installation is done without penetrations in the roof, the 20 year warranty covers both the roof and the PV system. Demonstrations will be conducted on six homes in the San Diego Gas and Electric (SDG&E) territory. SDG&E will support the project by assisting with identifying demonstration homes, modeling zero energy packages and contributing to the cost of the energy efficiency upgrades.
Deliverables	Products and deliverables from this research will include: • Electrical Installation Best Practices •'Plug and Play' installation kit • Report on installed system costs • Marketing materials, target locations and criteria for demonstrations • Report on financing options for PV roof and energy efficiency improvements • Business model development and validation report • Report on performance analysis and installation issues for demonstration homes • Report on energy use impacts of demonstration homes • Final Report
Market Connection/ Audience	GAF, the largest U.S. vendor of roofing materials with 45% of the residential roofing market share, is a partner in this project. The target for this research is the retrofit and new construction residential market with asphalt-shingle roofs. The residential roofing market is nearly 80% asphalt shingles. The initial go-to-market strategy will be through the GAF roofing contractor channel. Other target audiences for this work are homeowners/ratepayers, energy efficiency retrofit providers, utilities and the financial community.
Recommendation	Recommended for funding up to $1,000,000 with modifications and a reduction in the budget. The Selection Committee recommends removing the tasks that relate to the Home Energy Manager (HEM) integration with demand response and AMI as these tasks were not well defined in the proposal. The Committee also recommends that the partners provide more match funding on the project.

Project_ID	249
Project Title	West Village Energy Initiative: CSI RD&D Project
Applicant	Regents of the University of California
Partners	UC Davis Energy Institute; Chevron Energy Solutions
Utility partner	PG&E
Requested Funding	$2,995,000.00
Recommended Funding	$2,500,000.00
Proposed Match Funding	$750,000.00
Recommended Match Funding	$1,245,000.00
Target Area	Improved Production Technologies AND Innovative Business Models
Project Summary	This project focuses on both improving PV technology and demonstrating innovative business models in solar community settings. The UC Davis team will test and demonstrate existing and new energy storage technologies that are able to work with smaller scale systems in community wide installations. The team will research and demonstrate the integration of AMI with PV and distributed energy resources which will lead to a set of standards that can help accelerate the use of advanced metering infrastructure (AMI) with PV. Hybrid solar (PV/Thermal) will be tested and demonstrated in the context of a fully integrated net-zero community energy system. UC Davis will use the West Village Project to 'test case' and evaluate several business models for deploying community distributed solar. Once the optimal business model has been determined, UC Davis will negotiate and document the business transaction, and if appropriate, submit an Advice Letter to the CPUC. Additionally, the team will test, demonstrate and assess virtual net metering approaches, energy storage to mitigate the impacts of high penetration PV deployment and the use of solar resource forecasting to optimize storage charging and dispatch. The University of California is striving to make the West Village Project one of the first large scale communities to be Zero Net Energy entirely through energy efficiency and on-site generation.
Deliverables	Project deliverables: For Improved Production Technologies include: • Report on key findings re: Energy Storage • Best Practices Guidelines for Energy Storage, AMI Integration and Solar Thermal Integration • Site Specific Electricity Supply Design • West Village 'Living Community Energy Laboratory" Final Development Plan • Project deliverables for Innovative Business Models include: • Financial Models of Business Scenarios • Advice Letter to CPUC • Report summarizing legal documents for deploying community scale solar (transferable to other communities) • Report identifying continuing barriers and metrics of program success • Report on tools for integrated use of AMI, energy storage and solar forecasting to mitigate local grid impacts of high penetration solar deployment and virtual net metering • Outreach and communications plan • Final Report

Project_ID	249
Project Title	West Village Energy Initiative: CSI RD&D Project
Applicant	Regents of the University of California
Market Connection/ Audience	There are a variety of audiences for this research. The research on improving production technologies will be of interest to leaders in solar energy, energy storage and Smart Grid. The lessons learned from this project will be of value to other entities pursuing community scale solar including other University and State College campuses. PG&E is one of the primary audiences for the work that focuses on demonstrating the role of IOUs in customer sited solar and centralized electricity storage. The financial community is the audience for the materials that will be developed to attract investors to own and operate renewable energy facilities as part of a community solar project. The project team and PG&E will work to identify and overcome regulatory barriers and will work with PG&E to recommend topics for consideration for an Advice Letter to the CPUC related to tariff improvements.
Recommendation	Recommended for funding up to $2,500,000, with the condition that the grantee bring in an additional $500,000 as match for a total match funding of $1,250,000. The Selection Committee supports the project tasks but would like to see a larger portion of the total project funding as match. This project builds on work funded by DOE and the CEC and is consistent with the CPUC's Big and Bold Efficiency Strategy of getting to net zero for residential new construction by 2020 and net zero for commercial new construction by 2030.

Project_ID	247
Project Title	Advanced Grid-Interactive Distributed PV and Storage
Applicant	Solar City
Partners	Tesla Motors, UC Berkeley Renewable and Appropriate Energy Laboratory; UC Berkeley Energy and Resources Group and Mechanical Engineering;
Utility partner	PG&E
Requested Funding	$1,774,780.00
Recommended Funding	$1,774,780.00
Proposed Match Funding	$1,057,187.00
Recommended Match Funding	$1,057,187.00
Target Area	Improved Production Technologies AND Innovative Business Models
Project Summary	The goal of this project is to create a firm, dispatchable, grid-interactive product that combines PV and storage which can be installed in distributed, small increments in a utility-wide network. The product will combine Tesla Motors vehicle battery system with Solar City's SolarGuard dispatch and monitoring platform. An early step in the project is to deploy 6 combination PV and battery systems using off the shelf battery technology, to establish a cost and performance baseline and to refine communication and control system. Using the test and performance data from these initial installations, the team will then integrate the Tesla lithium-ion high-voltage battery pack with the grid interactive inverter, changer and PV system and conduct a demonstration at 6 additional sites. The team will also assess the performance as well as the economic, reliability and carbon avoidance impacts of a large-scale deployment of firmed PV. Lastly, Solar City will explore a range of financing options that will best enable FirmPV deployment.
Deliverables	Project deliverables include: • Report on the performance of the six FirmPV sites along with installation of monitoring and control system • Report on the performance of the six FirmPV sites using the Tesla Li-ion battery pack • Report on the market research results • Report on the optimal rate designs and ISO services for maximizing the value of combined PV and storage • Report on financing mechanisms for maximizing market adoption of combined PV and storage
Market Connection/ Audience	Solar City has significant experience in the solar market, and will be the primary channel for commercializing the Firm PV product. This research will target the following: 1) electric utilities will benefit from a distributed resource that is incremental, location-independent and firm, 2) CAISO will be provided with robust information in order to create market products for firm PV, 3) Ratepayers will benefit from reduced rates and better power stability from PV/storage, and 4) Technology providers will benefit from new markets that FirmPV will create.

Recommendation	Recommended for funding up to $1,774,780 with a possible budget modification to be made at the time of developing the detailed scope of work and budget for the project. The proposal did not include adequate detail to determine what was included in the match funding and this will need to be clarified, specifically related to the funding for high cost Li-ion batteries. Overall, the Solar City and Tesla team has come up with an innovative approach of combining PV and grid interactive storage which can reduce costs and carbon emissions, enable load shifting, demand reduction and ancillary services. Both companies have demonstrated field and customer experience and a track record for bring products to market. UC Berkeley and PG&E are also partners on the project.

Project_ID	243
Project Title	Reducing California PV Balance of System Costs by Automating Array Design, Engineering and Component Delivery
Applicant	SunLink
Partners	Pacific Earthquake Engineering Research Center; Rutherford and Chekene; Autodesk; Computers and Structures, Inc.
Utility partner	
Requested Funding	$996,269.00
Recommended Funding	$996,269.00
Proposed Match Funding	$927,031.00
Recommended Match Funding	$927,031.00
Target Area	Improved Production Technologies AND Innovative Business Models
Project Summary	SunLink, one of the leading providers of PV mounting and Balance of System (BOS) components, will build on past research to enable automation of structural and array electrical design as well as automated preparation of documentation of project approval and installation. This new automation will help the industry to cost-effectively provide optimized designs for smaller PV systems down to 5 kW. This automation will also expand the range of contractors who can successfully install fully-engineered PV installations, including general and electrical contractors. The four objectives of the research are to 1) reduce the time for PV array design, 2) reduce the time required for project permitting, 3) enable fully optimized designs for smaller commercial roof-top systems, and 4) decrease 'on-roof' time through factory manufacturing of array harnesses and matching combiner boxes.
Deliverables	Project deliverables include: • Seismic Test Results Report • Benchmark Reports on design time, permit delays, small system costs and time to custom wire "on-roof" • Reports on dynamic wind analysis results, automated string wiring software, wiring harness production and permit document requirements • Reports on Test and Analysis, String Wiring Automation and Wiring Harness Fabrication • Trade Journal Publications for building trades and building department professionals • Final Report
Market Connection/ Audience	The target audience for this research includes established solar integrators, contractors (electrical, roofing and general), architects, solar PV component manufacturers and permitting agencies. The mounting system hardware will work with major module manufacturers allowing customers flexibility when designing a solar system.

Recommendation	Recommended for funding up to $996,269. System installation and BOS components represent 50 percent of the cost of a PV system. A reduction in these costs can have a significant impact on the installed cost of a PV system. This project is focused on decreasing system engineering time from system layout to final package, decreasing the time required for plan checking and decrease on-roof array wiring time. Performance will be measured relative to the cost and time reduction objectives. Autodesk is a partner in the project and will bring software expertise and tools to the project. The Selection Committee cautions against using CSI RD&D funding for development of any proprietary tools. The results of the project will be made public to be of benefit to ratepayers.

Project_ID	219
Project Title	Improved manufacturing and innovative business models to accelerate commercialization in California of hybrid concentrating photovoltaic/thermal tri-generation (CPV/T-3G) technology
Applicant	Cogenra Solar
Partners	Sonoma Wine Company; Patch Engineering
Utility partner	PG&E
Requested Funding	$1,467,125.00
Recommended Funding	$1,467,125.00
Proposed Match Funding	$2,774,157.00
Recommended Match Funding	$2,774,157.00
Target Area	Improved Production Technologies AND Innovative Business Models
Project Summary	Cogenra Solar has developed, prototyped and validated the technical performance of an innovative concentrating photovoltaic (CPV)/ thermal co-generation technology and will conduct an 80 kW demonstration at the Sonoma Wine Company. For this project, the field performance of the system will be measured and used to refine economic and financing models and optimization over multiple tariff structures. This project will also look at modifying the co-generation system so that it can support tri-generation of electricity (heating and cooling), expanding the market to include commercial sites that require cooling and lower amounts of hot water. Additionally, Cogenra Solar will modify the system to provide energy storage for use during peak demand and coordination with PG&E on grid integration.
Deliverables	Products and deliverables from this research will include: • Report on the collection and analysis of field performance data from the Sonoma Wine Company demonstration • Report on financial models and tariff structures (including TOU rates) • Report on array design adaptations, system modifications and field data collection • Energy Purchase Agreement model and documentation •Report on demonstration of system compatibility with thermal chillers • Report on demonstration of the interface with grid demand-management system • Final Report
Market Connection/ Audience	The early phase of this project will target ideal market segments and retail energy customers for CPV/thermal, including food processing, chemical processing, pulp and paper, hotels and resorts and government/military bases. The research will provide insights on grid management of these systems that will be useful to utilities and state agencies.
Recommendation	Recommended for funding up to $1,467,125. The Selection Committee supports the work outlined in this proposal, which includes the collection of detailed performance data from the Sonoma Wine Company demonstration to refine economic and financial models. Cogenra Solar will use the models to develop a framework for financing systems based a Power Purchase Agreement (PPA).