CALIFORNIA ENERGY COMMISSION

WORKSHOP ON THE DEVELOPMENT AND SCOPE OF

MARKET FACILITATION INITIATIVES

FOR THE ENERGY COMMISSION'S PROPOSED 2015-2017

TRIENNIAL INVESTMENT PLAN FOR THE

ELECTRIC PROGRAM INVESTMENT CHARGE PROGRAM

TRANSCRIPT OF PROCEEDINGS

1516 9th Street, Hearing Room A

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9:56 a.m.

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I N D E X

I N D E X   C O N T I N U E D

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A P P E A R A N C E S

Panel 1:

Blaine Collison, US Environmental Protection Agency

Ardie Dehghani, University of California Davis

Camron Gorguinpour, US Department of Defense

Winifred Kwofie, University of California San Francisco

Bob Raymer, California Building Industry Association

Christine Vance, Energy Coalition

Randy Walthers, Raley's

Panel 2:

Beverly Alexander, Energy Institute at Haas, UC Berkeley

George Crandell, Technikon

A P P E A R A N C E S   C O N T I N U E D

Jennifer Garson, EERE, US Department of Energy

Josh Gould, ARPA-E, US Department of Energy

Cole Hershkowitez, Chai Energy

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SACRAMENTO, CALIFORNIA, February 7, 2014

9:56 a.m.

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MS. DOUGHMAN: So we're going to get started. Welcome to the Workshop on the Scoping of the Second Proposed EPIC Investment Plan that the Energy Commission will be developing soon. Just to go over the emergency procedures, for those of you not familiar with this building, the closest restrooms are located behind this wall over on this side. There is a snack bar on the second floor under the white awning. Lastly, in the event of an emergency and the building is evacuated, please follow our employees to the appropriate exits. We will reconvene at Roosevelt Park located diagonally across the street from this building. Please proceed calmly and quickly, again, following the employees with whom you are meeting to safely exit the building. And I will just add as well, if it's not an emergency, please exit by the guard, otherwise an alarm will sound. Thank you.

So -- oh, the other thing is there are handouts for today's workshop on the table as you walk in, and there are blue cards. If you are planning to speak, please write your name on the blue cards and the topic you plan to address. Also, for those who are speaking, please be sure to give your business card to the court reporter.

All right. Now, Laurie ten Hope will give some welcoming remarks.

MS. TEN HOPE: Good morning. I just want to welcome everyone to this workshop. I'm Laurie ten Hope. I'm the deputy director for research at the Emergency Commission. I want to thank our panelists. We're very much looking forward to your input and to those of you who have -- who have come today in person. Many of you have been participating in the development of the Electric Program Investment Charge Program, so you're familiar with it. But I think some of you may be -- may be new to this -- to this process. So I just want to provide a short context and then you'll -- we'll hear from our CPUC colleague who will go into a little bit more detail. But the Electric Program Investment Charge is, is a charge that provides funding for clean energy technology development, and so it really provides us an opportunity to develop technologies that will help us fulfill our policy goals. The State of California is embarking on a low carbon energy path that has a lot of renewables, energy efficiency, combining power, electric transportation, some really cutting edge technologies that will provide customers with clean, affordable, safe, and environmentally benign energy sources but that future is -- brings with us some technology challenges of how do we incorporate this in a way that works for customers that is not too complicated on the grid, that's still safe with two-way power flow. That's what this funding is there for, is to bring innovative technologies to bear that will provide these solutions at the, the lowest costs, the lowest costs possible.

In developing this program, for those of you who have been engaged, it's a little, maybe, confusing that we are in a state right now where we're implementing our first investment plan, and we're planning our second investment plan. So just for a little bit of context, we, along with the three investor owned utilities, developed an investment plan for what our research would be for a three-year period, and we're just launching that right now. So there will be program opportunity notices for researchers who are interested in doing research or those of you who want to just follow with what the new technology developments are. The Energy Commission, along with the utilities, will be issuing solicitation soon. We expect in February to start issuing those solicitations. The ones that are planned for the next few months are posted on our -- on our website. So, you know, stay tuned for that.

This workshop is to kick off the planning for the second triennial EPIC Investment Plan, which is the investment plan for 2015, 16, and 17. And so we are -- we have, sort of, a two-prong process to kick off soliciting ideas. One is a questionnaire that you'll hear more about from Pam that's been circulated on our list serve, but if you didn't get it and you have ideas for research initiatives, we really want to hear from you before we develop our draft plan for 15, 16, and 17. But today, what we're focusing on is one element of the investment plan, which we call Market Facilitation, and in that area, we're really interested in experience and ideas for how do you accelerate that path to market. And we developed a -- you know, we have a good technology. We know it's good. Maybe the test site knows that it's -- you know, that it works. But, you know, how do organizations make decisions to widely deploy these technologies. So our first panel is going to provide us some insights about how we might accelerate this path to market. What, what products, tools, experience is needed to help make, you know, make those decisions, and our second panel will help us with some of the challenges of entrepreneurs in that last valley of death. What kind of financial incentives might be helpful or, you know, other kinds of strategies that -- visibility strategies that help really accelerate the path to market. We know we can get a path to market, but can we do it faster and better and get the higher quality technologies deployed. So that's really our purpose. I'm really exited with the panelists that are here, and I'm going turn it over to Pam to introduce our speakers. Thank you

MS. DOUGHMAN: Thank you, Laurie.

The first speaker today is Cem Turhal at the California Public Utilities Commission.

MR. TURHAL: Thank you, Pam. Thank you, Laurie. Hello, everyone. Thank you for joining. My name is Cem Turhal, and I'm an analyst at the CPUC currently responsible for the EPIC program. Before I begin my introduction, I would like to thank the CEC for all their hard work in starting to get the second investment cycles and get the program going.

So with that, let's go to the second slide please. Okay. So Laurie went over most of the slide already, but from the CPUC's perspective, the EPIC program is focused primarily on support of pre-commercial efforts with some additional support for more market facilitation activities, which we'll cover in detail in the next slide. The support for the EPIC program provides -- the support that the EPIC program provides is largely intended to help fill the gaps in funding that exist for technologies where were underfunded traditionally through, like, private capital. After its deliberations, the CPUC determined that EPIC program provided electric rate payers with benefits and promoted greater reliability, lowered costs, and increased safety. This is an important finding, as all projects overseen by the CPUC need to have some sort of ratepayer benefit, and the CEC did a great job in showing us that in their investment plan. The finding for the project will be primarily awarded through competitive solicitations, but that does not preclude the PAs from using noncompetitive awards as well. All of the awards that will be made, will be made public in the PAs annual reports, which they will file the next -- February. Next slide, please.

So the next two slides will cover the initial investment plan funding amounts that are not adjusted for January 1st of 2015 for each of the funding areas. In this slide, again, just for the initial investment plan, and it's not adjusted for the January 1st, 2015 plan, the EPIC funding was around $162 million. I should note that in 2012, however, the program budget was $143 million based on the Commission's state position of the EPIC proceeding with that amount allocated across areas in the same proportions. The CEC will have the lion's share of the budget in the second program as well, and each of the categories, as you can see, it's broken down to applied research, technology demonstration and deployment, and market facilitation, and again, these figures will be adjusted in January 2015 to commensurate with the average chang in consumer price index. And this is per the phase two decision, and the language can be found in that as well. Next slide, please.

Again, this table is also for the 2012-2014 triennial investment plan, but this is a table that's showing the EPIC funding for each program administration, administrator from the November 14th of 2013 EPIC decision approving the program administrators' proposed investment plans. As you can see, the total amount towards the initial investment cycle was a total of $467 million. And there's only a year left -- less than a year now -- to make all these allocations. Given the shortened timeframe of initial investment plan cycle and for the purpose of the initial investment plan cycle, order in paragraph 39 of the latest EPIC decision allows the uncommitted and unencumbered funds that would, under normal circumstances, be returned to rate payers and requires them to be rolled over as if those funds were encumbered and committed. The numbers, obviously, will change again once the CPI adjustment is made in January, but it would be somewhere in the ballpark of this number. Next slide, please.

So as Laurie mentioned earlier, the EPIC program is now live. So it started back in November of 2012 where the program administrators -- submitted their respective proposals for their investment plans, and the CPUC deliberated on and approved on November 14th of 2013 a complete year for proceeding. So now, moving forward, there -- the -- each of the PAs will be holding competitive solicitations and grant awards to specific bidders, and they will file reports on these awards and their amounts and who the award was made to per the November 14th decision language. In the CPUC's ruling, the whole thing will be to, to continue to provide oversight to the EPIC program, and, and the proceeding to, you know, go through second investment plan, and I think November is the time that we, at CPUC, are thinking about, you know, finalizing the deliberations and having a decision on the second investment plan cycle. Next slide, please.

The next steps for the EPIC program. The public administrators will submit their second investment plan applications to the CPUC on May 1 of 2014. This workshop is a -- is a requirement that is a result of the base year decision to have stakeholders come in, and I'm really excited to hear the panelists speak on some of the issues that we're facing. And after receiving the second phase investment plan, the proposed investment plan, the CPUC will begin it's deliberations again, have a decision hopefully out by November of 2014 that will make the second investment plan active by then.

So this is the EPIC program CPUC schedule. This is something that was in the phase two decision of the EPIC program. Again, this is specifically for the CPUC schedule. So these may change depending on how, how we see the stakeholders would like to see changes made or if there are any concerns with something or there are actually delays. These could be shifting around, but this is -- was the base decision outlined and we are going to try to stick to it as much as we can.

So as you can see, in the second investment plan, development of the investment plan will be from January through March, and May 1st of 2014 is when those plans will be submitted to the CPUC. And the CPUC will begin its deliberations in May and hopefully be concluded with them in November to have an actual decision in December.

Next slide, please.

As mentioned earlier, each of the program administrators will file annual reports starting on February 28th. They filed one last year, which did not contain anything since the programming was not launched. And they're going to be filing another one this February 28th, and we're looking forward to that. And in 2016, the CPUC will hire an independent evaluator to see where and how the program is going and see if there's going to be any changes that need to be made to the program. Next slide, please.

So how can you get involved. We tried -- we just recently updated all this. You can visit that link that is before you, and this is the EPIC proceeding number. This is the -- this is the application number for the previous EPIC decision and rulemaking. So if you subscribe to this service list, as soon as the investment plans come in as applications, the CPUC will open up a new docket and everyone that is subscribed to it will be transferred on to the new proceeding. And so -- you know, if you subscribe to this, you will be automatically subscribed to the next service list as well. This is where we're going to send out the emails and any updated information about the next rulemaking that the applications will start.

So you can see in this link, again, you can see all of the previous CPUC information, investment plans that were filed, comments to those investment plans, reply comments, rulings that the ALJ has made, and the decisions that the ALJ has made regarding the EPIC program. Next slide, please.

I believe I -- I wanted to provide everybody with all the EPIC web pages beginning with the CPUC, which has all these -- all these links, hyperlinks, there so you can easily access them through the CPUC's web page. CEC's web page, they have done a great job since early 2012 to -- I mean, 2013 -- to get all of the information they can on their website and they -- the three facilities also have now launched their EPIC web pages and the links are below. Next slide, please.

I, unfortunately, will be leaving the Energy Commission Strategy Team, and so Damon Franz will be the proper contact at this point, and he will assign the new email list to the EPIC program, and I'll hopefully be working with you guys, and I'm looking forward to seeing where the program goes. So thank you, and I'll turn it back to Laurie.

MS. DOUGHMAN: Thank you, Cem. I'm going to give a few points going over the Energy Commission process and schedule for the proposed 2015, 2017 EPIC

Investment Plan.

So this slide provides a rough idea of the estimated start times for each panel and the afternoon staff presentation. The first panel will begin shortly. Each panel will be followed by a public comment period. Also, there will be a public comment period after the staff presentation.

Today's workshop on the Scope of the Market Facilitation Program area of the Energy Commission's Proposed Second Investment Plan is accompanied by a questionnaire on all areas of the second EPIC investment. Written comments and responses to the questionnaire are due February 13th. The Energy Commission is one of four administrators of the EPIC program. Southern California Edison, San Diego Gas and Electric, and Pacific Gas and Electric are the other four -- or other three -- administrators. They plan to hold a scoping webinar on February 21st for their second EPIC investment plans. The Energy Commission plans to post a draft proposed second EPIC investment plan in mid march and hold a workshop on the plan at the Energy Commission on March 17th. The March 17th workshop will be held in coordination with the IOUs. This will be repeated in Southern California on March 21st. The Energy Commission will post a proposed second investment plan in mid to late April. The Energy Commission plans to consider adopting the proposed plan at an Energy Commission business meeting in late April. The Energy Commission plans to submit the proposed plan to the CPUC on May 1st. Investor owned utilities proposed EPIC investment plans are also due on May 1st. As Cem discussed, the CPUC will hold a proceeding to consider the proposed plans from May through November. The current schedule shows a CPUC decision modifying and/or adopting the second EPIC investment plans in December.

This slide --

MAN ON TELEPHONE INTERCOM: Hi, Mike.

MS. DOUGHMAN: Sorry?

This slide summarizes opportunities for stakeholder input on the scope of the Emergency Commission Second EPIC Investment Plan. We encourage written comments addressing -- addressing the questions on the agenda. Also, interested parties are encouraged to complete and submit the questionnaire for all areas of the Energy Commission's EPIC program, including applied research and development, technology demonstration and deployment, and market facilitation. Please submit written comments and the completed questionnaire by email to docket@Energy.CA.GOV and prab.sethi@energy.ca.gov. Please indicate 12-EPIC-01 and EPIC Second Investment Plan in the subject line. You may also submit your comments and questionnaire by mail at the address shown here. Comments and questionnaire are due February 13th. For more information, please go to the Energy Commission's EPIC web page.

Now, let's begin the first panel. Virginia Lew will be the moderator.

MS. LEW: Good morning. Many facilities and procurement managers face a lot of barriers to install clean energy technology into our facilities. Today, we'll hear from our panelists who will tell us about -- to give us their insights and experiences in that area and possibly provide some additional input that we can include in helping to facilitate our process.

So I'm going to ask each of the panel members to give a brief introduction about themselves and about their experiences in this area, and we have about four questions, and we're hoping to open it up for public questions and answers about 12:00 o'clock. So let's hear from Winifred.

MS. KWOFIE: Good morning. My name is Winnie. Kwofie is the last name. I work for UCSF down in San Francisco, and I came with Dave Colsome, our expert on procurement. I work in the facilities department, and one of the things that we have been doing is working with Mike and trying to integrate some of these technologies into our -- down at UCSF. It's been an interesting challenge. We're always -- as on every campus, we face changing old to new, and the integration will always come as a challenge to adapt the old ability to these new systems. We continue to work with the procurement, looking for new ways to make this happen and look forward to my friends, here on the panel, to learn how what they're doing on their side.

MS. LEW: Thank you.

Ardie?

MR. DEHGHANI: Good morning. My name is Ardie Dehghani. I think you can hear me. I'm with the designer and construction management office at UC Davis. I'm the director of the engineering and working on the capital side of the UC Davis facility. We -- our office manages all construction project for capitol project, so we manage design and construction which goes through to a bidding phase. All of our contracts are bid in accordance with public contracting codes.

I thought maybe I'd give you just a rough idea about our campus. Our campus is about a 53 hundred-acre campus in Davis. It's got other facilities outside of Davis, but the one in Davis is 53 hundred. We have

34,000 students, and it's estimated that we would have 5,000 more by 2020. So we are in the growth mode. We have roughly 11 hundred buildings, totalling approximately 12 million square feet facilities. It's interesting that a lot of these facilities were built in 50s, 60s, and 70s, and you all know the challenges with renovation inside these facilities especially with building materials that add cost to the mix.

UC Davis has its own quality treatment plant. We have our own detention basement called "R Freedom" for store management. We have our own underground belts for domestic and landscape water system. We purchase volt electricity and distribute it in our campus by our own 12 KV distribution network. We have massive underground 12 KV. Same as natural gas. We purchase both and distribute to our facility under UC Davis facility's management leadership. We have a heating, cooling central plant. We put in a five million gallon storage tank thanks to CEC and CPUC about a decade ago and really, truly have helped us shape -- our electricity is very low. Our purchased electricity is low. Roughly, it's somewhere between six and half cents and a seven and a half cents a kilowatt an hour. No time of use penalty attached to it, but we are a sustainable campus, and we would like to pursue sustainability to help our campus. Our peak is about 50 megawatts. Our off peak approximately 16. So we are a 24/7 research facility that use a lot of electricity during off hours. We, currently, have one megawatt of solar on our building, and we completed construction of 800 KW digester project, again, with the help of CEC incentive program. That's in partnership with clean world. It takes our garbage and develops energy. We saw a closing of our landfill here pretty soon. We are in process of procuring 14 megawatt solar farm on our campus -- it's going through a procurement process and, hopefully, we'll have that executed within the next month or so. We will complete construction by end of 2014. We have 14 LEED accredited buildings, seven are platinum. These are large facilities, the majority are laboratory. So emerging technologies for energy have played a significant role to make those possible.

UC Davis -- it's interesting, our electricity use in 2012 is about the same as those in '93, although we have added about three million square feet of facility since. One of the main reasons we -- with CPUC leadership and with the partnership at PG&E, we have a state-wide energy partnership program under the same by design. It's 2009 through 2014 program. That program has helped us reduce our electricity, so far, by 45 million kilowatt hour and 2.5 million therms.

So this gives you some idea about where we stand with energy. It's really important to us, and we hope that we will learn more from you all about things that we could implement on our campus. Thank you.

MS. LEW: Thanks. Thank you.

Christine.

MS. VANCE: Good morning. I'm Christine Vance, and I'm a director at the Energy Coalition. And thank you very much for the opportunity today to be a part of this panel.

the Energy Coalition is nonprofit based in California, and we have been a leader in energy efficient policy and education and government programs, energy efficiency programs for the last thirty years. Prior to joining the Energy Coalition, I worked for about -- more than 25 years developing and implementing energy efficiency programs in the public sector, a large part of that in the city and county of San Francisco. And the last about four or five years I was working at San Francisco, we started to use, in particular, definite quantity contracts that we -- that offered all kinds of advantages to adopting, deploying -- not just energy efficiency measures -- but all kinds, especially advanced technology. So I'll be drawing from that experience.

And, more currently, I'm the program director heading up the implementation of a public agency energy services for the Southern Cal regional energy network. And if you haven't -- most people here have probably heard of the Rens but in the -- in the program cycle for 2013, 2014, the CPUC made a decision to have some funding go toward regional energy networks in order to really leverage the collective action of local governments, and, and kind of serve some more innovation and support for the greater scaling of projects. And on behalf of Los Angeles County, there -- the administer of the Southern Cal Ren, the energy solution was hired to develop a program, an innovative program, that provides a set of turnkey services that are trying to address all of the various barriers, not just for advance technologies, but for all technologies.

So we provide a whole suite of cradle-to-grave technical services along with the project financing. And the program is launching September. We have to-date enrolled 27 agencies. We have initiated over a hundred projects, and many of those underway, one already completed in fact. So I think part of the -- part of this regional energy network is trying to bring together the collective, kind of, wisdom on the entire, you know, contracting and engineering community. We have 19 energy engineering firms on board that we draw from and employ. We also have 14 contractors on board saying that they're ready to send out the competitive bid process through the national joint power alliance. And what we have done is adapted this particular contract investment specifically for energy efficiency where we have developed construction price catalogs and basically spent four months with the best in the field with energy solutions on lighting and mechanical and other firms weighing in to bring together in that catalog. We have all of the incentivized measures from -- along with other kinds of advanced technology. So I'll be saying more about that.

In terms of just, just a few high level thoughts that I had, the kinds of -- the kind of barriers when you're -- when you're a -- when you're a public agency, especially, you know, my experience is more public sector, you get a lot of different vendors coming and trying to sell different things, and it becomes difficult to, you know, what to believe. And, you know, so there's a whole host of things that help that situation. You really need some third party objective advice I think. And so the first point is just that the barriers that impact advanced technologies are the same -- some of them -- are the same barriers that impact all energy efficiency, you know, lack of staff, difficulty procuring quality engineering, and quality construction, which are both key, lack funding, financial analysis to help make the, the proposition case for some technologies that may have a higher first costs and so forth. But it's just that advance technology, they have all those same barriers but they have additional barriers, right, or emerging market. And so there's a variety of things to help in that way, and there's, there's different examples like, you know, lighting, LED lighting, and so forth. Am I --

MS. LEW: Yeah, I think we need to move on, and so we can cover your comments in some of the questions later on.

MS. VANCE: Yeah, uh-huh.

MS. LEW: So Bob?

MR. RAYMER: Thank you, Virginia. I'm Bob Raymer. I'm a senior engineer and technical director with the California Building Industry Association. CBIA currently has about three and a half thousand member companies. On an annual basis, we produce about 90 to 95 percent of the new homes built in California each year. By way of comparison, we used to have about 8,000 member companies going back about seven years, but then the housing sector fell through the floor. The good news is we're beginning to finally see a nice spike in construction. And I suspect -- 2013 was the first real uptick that we saw. 2014, we're expecting very similar or better results, and so with that, sort of my job and what I do for building industry, I have had this job for the past 31, 32 years. I have been working with -- and in some cases not necessarily with -- the CEC on a variety of updates of the energy efficiency standards. I have worked on the last ten of these updates. It happens every three years, and part of the challenge from my job is to try and see the mass application of emerging technologies or emerging building systems. One of the more recent is the emerging technology, of course, rooftop solar. It's one thing to have a couple of great examples here or there, but we're trying to get this to where it's not only on ten or twenty buildings; it's on hundreds of thousands of buildings. And so there's challenges because you've got a workforce that needs to understand, needs to be able to incorporate. You need product purchasing that sort of comes up to the challenge, and along with that, we're also very interested in emerging building systems. And that's become more of an issue in the past five to six years, as you can imagine, as the CEC updates the standards every three years, the standards get more stringent. And now that we have had ten very clear, very rigorous updates to those standards, a lot of the low-hanging fruit is gone. In my opinion, pretty much all of it is gone. There's still a lot more that can be done in terms of energy efficiency. It's just getting a lot harder and more expensive. And so we have to, effectively, prepare tens of thousands of workers, designers, subcontractors, contractors, product purchasing agents, sales agents. There's an immense number of individuals that's involved, and the development, the design, the construction, and the selling of these homes, they all need to get on board with this. And so part of what I'll be looking at through the EPIC funding and through a variety of other CPUC and CEC funding opportunities is how to help continue the role that solar is seeing, rooftop solar is seeing right now. I'll get more into that, and also how we can help do pilot projects and a variety of the other things with these emerging building systems, and that will be largely my comments in question number four. So with, that --

MS. LEW: Thank you.

So let's hear from Randy.

MR. WALTHERS: Hello, everybody, and thanks, Virginia. My name is Randy Walthers, and I'm the energy utility manager for Raley's stores in Sacramento here. It's kind of a unique company. We are a privately owned company with 129 stores in northern California and northern Nevada. We are on a management team with Raley's, which our owners are backing, very much in the sustainability and energy efficiencies in our building. When I came on as the energy manager ten years ago, our average buildings were running about a 500 KW peak load and we're down to under -- about 250 now with energy efficiencies. A lot of these were backed with a lot of money through the CPUC and different programs like EPIC. UC Davis is very much in our back pocket here, a lot of times helping us with a lot of different emerging energy efficiencies. In fact, we're doing a couple of projects right now with them that are on the -- more on the waste side with digesters and we're going to convert all of our digestibles in our stores into gas and/or electricity.

But other than that, it's kind of a unique company in that I'm kind of left alone. If I see something that's new and exciting, I try it, and I will try it at one or two stores. We have a store now that is going to be fully controlled, which is part of the CPUC guidelines, of electronic controls with lighting, skylights with movers on the skylights to keep a constant light level in the store, and we're probably going from about a -- oh -- one and half -- or about 125 KW lighting load down to about a 45, which is the new lighting technology with LEDs. So we're kind of unique, and I'm here, basically, as an end user of what happens here. I'd like to see when there's money being broadcast, but I do, like Bob said here, wonder about all the different people out there. You know, I get a hundred calls a day selling solar. "Who are you?" "What are you?" I usually go to end user and work on that. You know, we have 1.5 megawatt solar system on our DC right now that I don't think anybody even here knows. We're kind of quiet that way. If it make sense, we do it. You know, we don't really broadcast a lot out. This is kind of unusual for Raley's to come out and, you know, broadcast what we have done or what we're doing. We are in the middle of another 1.5 megawatt on that same warehouse, and we're doing 25 stores right now on contracts. It's a little bit harder when we don't own the store. We have to work on the, you know, owners' side to get the, the leases, you know, right for them if it's a long-term lease. Usually, you need 25 to 30 years to make solar work. And so we're in negotiations for that. We are looking at fuel cells in our stores, and that will take over the critical side of our energy as far as keeping our frontline going and our computer lines going. I've said the digester, and basically that's about it.

I do utilize, though, and like Bob said, different companies there. Grocery stores have a high, high energy usage, and there's a lot of rebates out there for lighting and that, and to get a hundred different people calling on you, trying to sell you something, or giving you this, I have been utilizing what's called "PECI," it's energy smart grocers. They handled all our PG&E site stores, and they will go in and actually go in and moderate before and after we do a project, and they handled all the paperwork, and they're a God send.

MS. LEW: Okay. Thank you very much.

So we have a few speakers on the phone, and so let's start with Blaine Collison from the US Environmental Protection Agency. Blaine.

MR. COLLISON: Hey, thank you very much. Good morning, everybody. My name is Blaine Collison. I am the director of something that's called the Green Power Partnership here at US EPA. I actually sit in Washington, D.C., and the Green Power Partnership is one of our national voluntary climate change programs. We sit in the same piece of EPA as Energy Star, and our mandate is to work with the demand side of the energy equation, so commercial, industrial energy users and help them source renewable energy, or green power, for some or all of their US needs.

There's a really interesting mix of stakeholders that is engaged in this marketplace. We have 15 hundred and some odd partners from all shapes and sizes and sectors of the US economy. We have several hundred small businesses. We have the Fortune one, which is Wal-Mart, a green power partner. Intel is the single largest user of green power in the nation. We have dozens of partners in California including a number of our green power communities, particularly in Marin.

And I'm here today to talk a little bit about a best practice for onsite solar deployment with commercial and, particularly, institutional audiences that we actually discovered, of course, and I think will surprise no one there, in California. We happened upon a multi-stakeholder PV collaborative procurement in Silicon Valley. We got interested. It seemed like it addressed a number of the barriers that our partners reported all the time, including vender noise, that was just mentioned, is a recurrent issue, technical confusion, bandwidth procurement experience. Long story short, we brought the California model here to the eastern seaboard, and have been deploying it with some stakeholders here and it -- it's striking, the extent to which it seems to be a game changer for, particularly as I say, institutional stakeholders with facility portfolios, particularly large ones. So thinking about cities, school systems, colleges and universities, municipal facilities. Really, really interesting mechanism available to absolutely and utterly transform the scale of what gets pursued, reduce the risk of what gets pursued, add order of magnitude of what moves forward all under simplified procurement processes. It's a -- it's a hard package to beat, and it slots in a compellingly -- in this context, in part, because there's some, some shifting of costs from the back end to the front end, which, as I say, may speak well to some state level of support to facilitate a dramatic expansion of the steadily growing community industry there in California.

So that's why I'm here to chat, and I appreciate being invited and having a chance to share what we have discovered in California.

MS. LEW: Thank you, Blaine.

So let's hear from Camron Gorguinpour from the US Department of Defense.

MR. GORGUINPOUR: Hi, how's it going. This is Camron Gorguinpour, here, it was mentioned, with DOD. I actually run DOD's plug-in electric vehicle programs. My job is to design and execute strategies, sell the option of things, that are nontechnical fleet, but as relates to this conversation, I'll focus, I think, a bit more generally on Federal procurement challenges within the Department of Defense.

I think that, just to start off, DOD operates on some 30 installations in California alone. So we have Marine Corps, Army, Navy, and Air Force assets all right there, and we're, in large, across all of DOD, we're very into green technologies, but you certainly see that play out in California. Of course, the army's got the new energy basis. You have something like 15, 16 megawatts of solar out at China Lake at the new weapons station. As related to my project, Los Angeles Air Force Base is on its way to be the first Federal facility to replace its entire vehicle fleets with electric vehicles. So we certainly have a lot of interest as I have gone around California speaking with station commanders and all service folks who are interested and willing to pursue green technology. Of course, it's also difficult given current budgetary conditions. So I think, generally, what I would -- the general advice I like to give everyone, particularly, I think for small business is get them to use a schedule for products because oftentimes, our facility will pop up and use a schedule but more than that, GSA, itself, operates and reaches out to thousands of Federal facilities. So it's good to be involved with them. Certainly, if there are small businesses working with advanced technologies, get certified as a small business through a small business association. If you can get an AA designation, minority-owned small business, veteran-owned small business, things like that, that certainly helps expedite the procurement process. And folks, again, who work in small businesses should realize that each of the military services is having an entire enterprise around small business procurement. So definitely qualify for that. You could reach out and make sure those folks know who you are and what you're up to.

But beyond that, generally, you know, given the serious budgetary constraints that we have had, you know, at the DOD, we look at our different contracting authority and bring in alternative energy. So power purchase agreements, lease agreements, I think probably are pretty good. I mean, to look at our EPIC, our utility energy saving contracts, certainly, we have energy saving performance contacts, so there are these mechanisms that we have to leverage third party, bring large scale energy efficiency projects onto our facilities, and, of course, we're interested in working with DOD developing, sort of, the baseline knowledge of what the different contracts are, are -- is, is absolutely something that other folks should consider.

And then I guess, probably lastly, this is a new authority, may be relevant at some point, and our lawyers are actually still trying to proffer exactly what this means, but Congress gave us authority last year that DOD can enter into procurement partnerships with State and local governments for installation services. So anything really energy related and efficiency related, we can enter into direct partnerships, either providing services to or receiving services from State and local governments. So, so there's some opportunities there, you know, even though the budget is what it is. There are definitely opportunities and a lot of interest from DOD just to try to figure out to make things happen. We just have to sort through our perfectly reasonable options.

MS. LEW: Okay. Thank you very much, Camron Gorguinpour.

So let's start with our first question. I know many of you have already touched on some of the things that you have done in your facilities, but perhaps, you can elaborate in a little bit more detail on some of the things that you have done to advance clean technologies in your facilities.

And so, Winifred, would you like to start.

MS. KWOFIE: I think what we have done, and my fellow panelists have already talked about it, we have done a lot of lighting technology. We've done lighting, lighting controls. We have done some HVAC controls also in our facility. We continue to look at -- and I want to go back to Randy's point, what makes sense, and that is always a challenge for one institution that is old and medical and patient care.

Some of the strategies that we have looked, in terms of procurement, have been trying to find an investor approach to looking at standards or looking at how to use technologies across the campus. So lighting, of course, is the easiest way to play. We started with, initially, you know, we had all these bulbs, which are no longer mentioned. We went to the T8s, and now the new is the LED, and we're looking at and it's very, very challenging, but we have a great procurement group that is working with us to integrate it in a separate way. Usually, when you have an overall change one time, it's very difficult, because lighting is one of the things that are very sensitive to people, and so we have to be very careful how we integrate that. We have tried a bunch of pilot programs working with the California Technology Center on our parking lot. We tried different controls in office spaces to see how people react, and we take down that information, the feedback we get from the staff. We go back to our procurement group and, you know, we look at that information to see what else we need to do to make it work.

So we continue to struggle along like everybody else. I think, like Bob said, all these -- all those low-hanging fruits are gone. We have gotten to a point where we have to push the boundary a little bit harder and get ready for a challenge that we face as a campus and it's difficult because you cannot get into certain spaces. The work of our station has been on the campus side looking at classrooms, lecture rooms, administrative offices, clinical or medical office spaces and still struggling to find what technology will actually work for the patient care rooms. So that is our challenge right now.

MS. LEW: Thank you.

MR. DEHGHANI: Well, it's -- as it was mentioned, I think as a public entity, there are number of controls that sometimes become problematic with a project. When we do a project, we have to go through a preplanning effort. We have to go through a programming effort. Once we go through that process, we have to go through a budget approval, and that budget, of course, has to be ranked with other priorities on campus. There is a design team selection process. There is, of course, a design phase, public contracting code to be able to get the low bidder going through a bid and award process, construction, itself, and, of course, the final testing and commissioning and verification by a third party. And then taking acceptance. So when we start a project, although the project may be small, the process, at least a two-year, for example, project. Sometimes, we finish the building just in March 2013. The project programming, it's a large facility. It's 80,000 square feet, a three-story lab. From the start to finish, it was seven years, so you, you look at emerging technology at the time, and by the time you are completing construction, the emerging technology have moved 90 steps ahead of you. So you're trying to figure out how you incorporate some of those emerging technologies as you learn through the course of construction, and that, of course, has its own hiccups and challenges with changing and schedule impact and using all of the people on board who want to enter and occupy the facility. So some of those issues that most public entities go through, we have experience as well. However, our campus, we have evaluated a number of different phases for procurement process. We have looked at design bid build and it's traditional. It's -- you know, you hire somebody to go to a better phase. We have looked at CM address, where you contract with the construction management team. They would take the risk. They would be part of the design. They hire contractors with us at the table. There are multi-prime contracting. There are design bid, design build, which seem to be very -- more effective, at least, than -- especially the changes that you go through in the construction phase. But the one that we have, it's been really interesting for us on the energy project, has been design build best value, where we select contractors for constructions based on dollars and quality and then various different versions of design build best value modified, they procure something ahead of time.

But one of the biggest for emerging technology for us to -- has been that we -- if we have the right people at the table, they are expert in areas and know their stuff. It's been much more effective to make sure that we apply the technology that we're not going to be sorry about and apply the technology that would provide what we looking for. We often do cost analysis to identify if it makes sense. California Value Technology Center on our campus has been extremely helpful with our lighting initiative that started in 2010, and we hope to reduce our lighting by 60 percent. That initiative has been successful so far. We still have a while to go, but it's been very effective working with those teams that know their stuff. So that is what we have done.

MS. LEW: Thank you.

MS. VANCE: Hi. Christine Vance. In terms of how -- the strategies both at City and County of San Francisco and more recently on a much bigger scale with regional energy network, there's a couple -- I would say two -- primary, big things that we do, is we bring in the expertise that really has the know-how and they -- and they're -- and they know the -- all the resources that already exist for the third-party verification, performance information, where it exists, and they are able to, as you say, make those compelling arguments at the right time with the right people, and they're third-party neutral knowledgeable. So that's key, and then we're marrying that with something called a "definite commodity construction contract." So think of it as needed construction. It's still competitive bid, full, very robust construction task catalog with unit pricing, which is more of a capped pricing. So you have a very, you know, a lot of control on price, and virtually, any kind of retrofit can be built up from this catalog, and, again, as I was saying earlier, we spent a lot of time looking at every available advanced technology and getting it into that book. And so what they're -- because you're talking about as-needed construction, it solves a lot of these issues. For one, you've, kind of, done the bidding process up front, and these task orders can move very, very quickly. It allows you to do -- very easily -- do mockups before you use a facility company on a much wider scale. The time it takes to complete the project is much more compressed, so it's easier to take advantage of all the incentives and work through that process. It's incredibly flexible even during construction. If a new technology comes on board that is more applicable, you can easily use that without any kind of price gauging during the change over process. So it has a whole host of advantages for utilizing advanced technologies as well as any technology. There's volume discounts included and, and also, you're talking about minimum qualifications to the contractors, so you can really specify the level of experience these contractors will have. So we're talking about contracts and catalogs that are specifically adopted for energy efficiency.

And then I think through a regional energy network setting, then we're making that all available at a mass scale in a collaborative, coordinated fashion with the utilities leveraging all they have to offer and bringing in the financing as well, which is very important because then you're putting the whole package together. So just a few examples of projects right now moving through the regional energy network both at Pomona and Covina, we have identified street lighting projects, lots of wireless technologies, advanced lighting, things that are in compliance with full Title 24 coming on board, and we're doing these smart chillers, very advanced, very efficient chillers in Pomona, and we're bringing all those packages together. We're bringing in the, kind of, "slam dunk," the high return, the low return, into one finance package so that we can take advantage of those advanced controls that are doing deep retrofits so that we can take advantage of all that.

MS. LEW: Thank you

MR. RAYMER: All righty. Bob Raymer with California Building Industry Association. I'll be dealing with building system and advanced techs in question number four, but for right now, I'd like to focus on rooftop solar. For the new residential market, we're bringing in solar rooftop in one of two ways. This is sort of a generalization, but the first way, and certainly growing in popularity, is the use of Power Purchase Agreements, PPAs. This is where a third party entity goes ahead and finances the systems, puts it up on the roof, establishes a contractual relationship with the home owner. All of this, of course, is, obviously, in conjunction with the builder, but the contractual arrangement most commonly is for 20 years. Certainly, there's variations, but it also provides electricity at a rate around 20 percent less of a fee than what the local utility would be charging. That's certainly one of the ways, and that's also the one way that seems to be growing right now. The other way, of course, is the traditional, "here's the solar system on your rooftop." It's purchased just like any portion of the building. The home owner owns it. It's part of the thirty-year mortgage primarily, and both of these are quite popular right now. Procurement for this is usually part of a large volume purchase arrangement and, of course, taking advantage of economies of scales, and so as we used to see solar in 2004, 2005 having a market penetration of less than one percent, we have recently seen where we now have rooftop solar for new residential construction, has a market penetration, depending on the part of the state that ranges from 10 to 15 percent, and I can tell you from being familiar with building systems over the years, that is huge. That is a massive increase in the application of the technology, and while, certainly, the state has a goal of being zero net energy for all new homes by 2020 and certainly 100 percent is a lot bigger number than 10 or 15 percent, there's no discounting the fact that the change that we have seen, the very dynamic, the very fluid change that's happened over the last five years is simply extraordinary. And the basis for that happening, I would have to point to, to the one singular item, and that is actually the CEC's program, the new solar home partnership program, where a relatively healthy incentive is provided for the placement of usually about two to three kilowatts on average on top of the roof. And we have got several of our largest production builders in California that have been taking advantage of that, and so by virtue of doing large scale procurement up front, usually a year to two years in advance of construction, sometimes even further out, but putting the, the incentive money into that sort of Trifecta of financing, we have actually seen sort of a dynamic change where several of our largest builder members are now putting solar on the roof as a standard feature. They have made the switch to simply offering it as a design option, and that's why it was at the one or two percent level of penetration, to where now as a standard feature, for example, KB Home is putting solar on every roof of every southern California project as a standard feature.

And so right now, we, you know, we're very appreciative of the new solar home program. Sort of a concern that we have is that right now, there's a healthy balance in that account. My concern in looking forward is that, at the current burn rate, we will probably deplete that account somewhere in the middle of 2015. My biggest concern, of course, is that large production builders and medium size builders are making plans two and three years out. And so the question here is the new solar home program will be sunsetting in July of 2016. The big question here is, will it have funding between June of 2015 and July of 2016. And at the current burn rate, will we have that funding. The problem here, as I mentioned in my opening comments, is we're experiencing -- in a very nice way -- we're experiencing a huge uptick in residential construction. 2013 was the first year where we saw a significant spike in construction. We, just last week, updated our numbers. Instead of having 60,000 multi-family and single-family units built in 2013, the final number is 83,000. That is a big uptick, and we anticipate seeing a further increase in 2014 and 2015. So consequently, assuming that you're going to have the current burn rate for application of solar is probably not a good assumption. We're going to have an increased burn rate, and so there is a very good chance we're going to run out of that funding. And, of course, these larger companies that are looking to solar as a standard feature are going to be wondering, will that financing, that additional incentive money, be there about two years down the road. If there's not, they've got several choices. Well, can they find something else to fill the gap; can they reduce the size of the system; any number of things. But quite frankly, they're making those decision today. So to the extent that somehow there can be some sort of a certainty of the program being available is one thing.

I realize that, of course, the CEC, in their original EPIC investment plan, has suggested that a $25 million allotment for 2013, 2014 be made. The PUC rejected that and said that the CSI fund would be a more appropriate place for that money to come from and that they will consider that. The problem here is it's a far cry from "consider" to budgeting, and so the question is a real one. Will that money be around down the road, and more importantly, will it be available to the small and medium size builders. And so that's one of the things we're seeking. Maybe EPIC is not the best place to get that from, but we would prefer that we at least have some level of certainty. Right now you've got a huge solar snowball rolling down the mountain. It's picking up steam and it's picking up size. If all of a sudden that program is sort of yanked out a year ahead of schedule, that kind of sends a red flag -- who are procuring product and coming up with design. So we're in this sort of emphases, and we're seeing a staggering increase in the application of solar.

So with that, one of the things that we'll be suggesting to the CEC formally is that as a backdrop that they consider once again putting in a request for funding. We'll certainly be promoting and supporting CSI funding for this, but it might be nice to have EPIC as a backdrop to that.

MS. LEW: So, Randy, do you have anything else to add?

MR. WALTHERS: Well, I just hope Bob's future is true on new homes, because with new homes, we can build new stores. Basically, on the solar issue with new stores, what we are doing is on our existing stores, I agree with Bob. We do a PPA on most of our stores because of the cost involved in it. It's, you know, 25-year contact. What we use on our stores, though, is, on our rate structure for commercial building, we have peak loads and high peak loads. Basically, we can only shave off in the high peak loads in solar. It makes it very economical for commercial accounts at a grocery store because we're 24/7 as far as energy use. And so when we start shaving off that peak load, our energy use, actually our energy cost is almost one-third of what it would have been, and that's where it's very beneficial to us.

We also -- if you know, a grocery store, it's probably not a normal building envelope as energy usage. 55 percent of our energy is in the refrigeration system in the store. You know, an average store, you know, you look at it, it's about $25,000 a month cost, and what we have done through the years, is the energy efficient in refrigeration system, and that's where we have cut most of our costs down, by energy efficiency motors, VFCs. Our condenser on the roof, we went to oversize water condenser. Well, in the last couple of years, we figure that water is going to be a high commodity. We have been switching over to a dual -- we invented a dual condenser, where it takes water and air cooled. The only thing with air cooled, during the summer time in the Valley here, it's very high energy usage. So we have to bring in the water to keep the cost down that way. We are still moving forward with the duel condenser, and then as far as energy efficiency on the lighting, I mean, we're basically state of the art. I hear people still trying to switch over from T12. I mean, we have done that, you know, 15 years ago as most of the industry. You know, we are fully web-based in all our stores. From my phone, I can turn off or on any store when have an alert from the Cal ISO, which we just did last night again. And we can reduce our energy in the stores at any one time, and so that really helps us out as far as getting payback from Cal ISO and demand response programs to help pay for that but also help put in the state of the art controls in our stores.

The other part is our 20 percent. That is the other, and that's basically what runs our front end and all of our computers, and that's the part where we're looking at fuel cells. Right now we have to put generation systems in to do a backup because of the energy power concerns, and these fuel cells will take and run 24/7, all time, on, right now, natural gas. And they're -- the outcome is just water, you know, steam.

And we get a full hundred percent payback on our energy, and it reduces our cost and overhead building of the store or the gem set.

What Ardie said, though, of the other parts of where we're saving money is on our waste and disposal, we are looking at a new disposal system in our store. I have a couple test sites that we're combining all our garbage on site transported to Clean World site over in dispose site. They have, right now, a digester making menthane gas for cogeneration but also to fuel all their trucks. And that's something that we're going to look at in probably about another five years if we have enough storage online that we'll have our own digester system on our DC plants.

So that's all I have, and I'll be waiting for any more questions.

MS. LEW: Thank you.

So, Blaine, or, Ardie -- sorry. Blaine or Camron, do you have anything else you'd like to add?

If not, we can go on to the next question, and the next question was touched by many of the panelists here, where you get contacted by various campuses about new technologies and "Why don't you use our technology in your facility? Try it out." You know, "We have these savings and all these benefits." So how do you go about, kind of, deciding which one of those technologies are the ones that you want to choose? What sort of information or assistance that you might need. I mean, is having technical guides and specification, neutral specifications, helpful? What are some of the things that might be beneficial?

MS. KWOFIE: I'll try and answer and talk a little bit about what we have done. Yes, we have looked at the performance specifications and that's -- you know, we're trying, I think, to move away from the prescriptive specification to more of looking at performance to setting up your energy goals for what you want to achieve. And I think we touched on, in our panel, different things, and I think one part that is always critical for us, and I think Ardie talked about it, in terms of when you have public institutions, is the time that it takes when you are going through the whole process of procurement. And so we have tried to, kind of, leapfrog and talk to our sister companies to find out what is being done. We have used the energy center quite a bit to try to understand applications and test some of them on our campuses that have wasted on all these presentation upon presentation that we can best understand them, not listen to the vendor, get all these flyers, have that time. We starting presentation but I haven't done a real touch, you know, demonstration campus.

The challenge also that we see is most times, you know, you'll bring in an application, and the people who maintain the application also need to be involved in the selection. So you put in an application and it might work on the campus, it might work the whole process of procurement and operations and training to make it work. We might adopt it and might not work for us, and the reason is because we just miss a step in that. So one thing that a procurement team is doing now is looking into more of a vendor relationship time and going with major distributors and, you know, open up a little bit to give us that opportunity not to be only bombarded but give us a more of customized approach to getting these products integrated and, you know, try it out ourselves.

MS. LEW: So I was just wondering if, if another UC Campus had done and installed a particular technology and they were successful, can you use -- continue to use their contract to, kind of, get into their services instead of doing your own independent contracting?

MS. KWOFIE: I think, at the moment, it's always been an independent contracting. Now, there is a move toward a consolidated contracting for products, agreement for products to actually exploit method of that buyer power, and, you know, I think a lot of the panelists have talked about, you know, if you have that volume, then you can influence the prices, you can get value for the product and also you have more people I think. The question is marketing situations, and for the market to actually have that product, a lot of people should have tried it and it should have worked for them and it should be readily available and simple, simple to -- and cost effective to maintain. And so that's, I think, the new thinking about what a campus is trying to do is moving into that situation, and hopefully, we'll see.

MS. LEW: Because it seems like if you could do something like that, you can really reduce the amount of time that it takes to get a project completed and installed. I mean, it wouldn't be the seven-year cycle.

MR. RAYMER: And that's the business plan private sector. A success story, basically, gets the ball rolling, and instead of starting from Point A, you're already, sort of, at the end of the line, "Well, we've got something that works. Let's just go ahead and do it again."

MS. LEW: Kind of like piggyback type of contracts.

MR. RAYMER: Absolutely.

MR. DEHGHANI: It's an interesting dilemma, when we talk about, you know, we have an obligation based on public contract codes to make sure that equally talk about different products, and then you focus on a specific product, although, it may be great, but there are others that come through with a similar product that we should consider. So sometimes, when you focus on technology three years ago, today, we have to make adjustment. As Christine mentioned, we also have something called, job worthy contracts, that we use campus -- UC wide -- that have the unit price that we could -- we have tried to implement more of the energy items in it, but one of the interesting parts for us is no matter how we do our timeline, it becomes more problematic than a typical private job. But knowing this incentive and rebates have some certainty that those are available, as Bob mentioned for solar, I think it truly helps us that if we -- when we did our exterior lighting project, there was a program available under CEC, and if it was not for that program, we would not be able to make the life cycle cost analysis work for us. We implemented exterior lighting project based on external financing that would utilize the energy saving dollars that would pay off the loan, and it was a

15-year loan, and in order to make the interest work and have adequate maintenance to be able to support those, we have to be less than 1-year payback. And no matter how we did, if it was not for EFA, we would not -- we would not be able to implement our project. So some of these incentives, it's really great to see this program, at least, have a three-year life that you can at least plan and be able to tap into it without sweating if things not going to be available. So for us, it's really important if there are more certain than -- so thank you for making this program three years at least so we have.

MS. LEW: Well --

MR. WALTHERS: On the retail side of it, though, what we do is, in putting our resources together, there's a company called Top Source. It's out of the east coast, and it's where all of the independent grocers that do not compete with each other go together, and we just had a big meeting, and we put our resources together on really new technologies, who's doing what, where, and we can talk one-on-one without interfering with our own area of what we're selling, and that helps us out a lot, too. So as you're saying, there's other companies out there like a Top Source for grocers, I'm sure there's other industries that have the same type of support out there. We can talk to HEB in Texas or Big Wide back east and what they're doing. They're very energy efficient grocers, and we can pull our ideas together. That's how we, you know, we put in what's new on the market, because they've either tried it or, you know, failed with it, and then we can move forward with it.

MS. LEW: So innovative technologies get into the Top Source?

MR. WALTHERS: Very much so.

MS. LEW: So you have innovative grocers that try new technologies and it works and then it gets in there and then the world sees.

MR. WALTHERS: The suppliers come in -- like right now, we're -- the biggest energy saving in grocery stores of where we're moving to now is doors on all our open cases, and, you know, the old produce departments where you have your salad and you go and reach in, now, we have doors on it. And it's saving about, you know, 40 percent on our energy right upfront, just putting doors on our cases. Our merchandizers don't like it, because everybody wants to touch everything and they have to open a door now, but people are getting through that, and we're finding that everybody is acceptable to the doors on the cases. Fresh vegetables and meat, they still want to pick up and play with a little bit and stuff like that and the rest of it, and we're using it. And on Top Source, that's where they come in. All the companies would come into us, show us what they're having, what their design is, what the savings is. They would test it, we would all look at it, and then we would all vote together and say, "We like this one." Then we buy it for a year, and that really helps out. So they really bring the top of the line to us, and we have a one-year to two-year contract with whoever we're going to buy with, with what's the energy efficient.

MS. LEW: So does Top Source -- also provides pricing?

MR. WALTHERS: They help us with pricing, yes.

MS. LEW: So you kind of know if you do go out to bid, what the pricing --

MR. WALTHERS: Exactly what it's going to be. And it helps us compete with Wal-Marts and everything else. You know, instead of a Raley's, you know, 200 cases in a year, we're buying 25,000 cases like the Wal-Mart is doing. And so all the companies get together and we're buying cases, and so there's incentive for them to do what we want and move forward with it.

MS. LEW: That's good.

MS. VANCE: Christine Vance. So I actually, kind of, pulled some of the consultants that we have on the program about this. There's a lot here that you can talk about, and what was really interesting is it became very clear that in the area of lighting, there's a whole, a whole variety of things that have occurred, especially in the area of LEDs, and different sources that address a lot of the concerns. There's a lot of needs when you're talking about use of advanced technologies, such as -- like in the case of DOE lighting, LED lighting program, for example, they had a concerted effort of doing field demonstrations, truth in advertising, and whole, whole sets of standards that were adopted at a national level by utilities that become work ethic incentives and standards. And so all, kind of, third party verification, when it came to mechanical, there wasn't as near as much of that the EPIC program to draw on. So -- and a lot of the consultants really end up going on their own experience, where has it been used before, and as much as they can try to find performance data that's third-party verified. But it occurred to me that, that might been an area that the, the, the program could look at in, kind of, filling that gap more on the HVT side of things.

The other -- the other thing is listening to all the panelists is there's kind of an interesting -- there's so many things that have to come together and it needs to be customized, right, but we also talked about simplified procurement, and so how do you blend those things together? There's the gentleman from EPA that talked about the Silicon Valley renewable procurement, cooperative procurement and so I think part of the solution is to really scale up, is some kind of marrying of those two, where you have -- you're using a lot more of these examples of coming together and organizing to do cooperative, kind of, procurement of one kind or another that's standards based and transparent pricing and getting volume discounts, but sometimes, simplified is not very customized, and as we all know, advanced technology is all about the application and it's terribly customized. So you need Expertise to be really customized. So I think solutions that can do both of those things together, I think, is where, where we need to go. And I think the advantage of something like these regional energy networks or any way in which we can just come together and organize at levels that we have never done and before that's in accord with the challenges that we face, right, we have to come together and organize leverage and have synergies at a much greater scale than we have ever had before to really meet our mission reduction goals. And I think that what the regional energy network can do is it really becomes almost a learning community. You know, we have a -- you know, 19 energy consulting firms are all going to be learning from one another, and we're going to be having more and more data basis of technologies that get implemented and utilized and, and then -- and so it's bringing together, you know, really this feedback loop and all of the -- all the, the contractors and the engineers learning together proper application and how to commission, you know, and really properly install of these measures. So all of those things have to come together so that you're helping to drive good decision-making by building owners with good confidence that these measures are going to perform.

MS. LEW: Thank you.

MR. MAYER: Bob Raymer with CBIA. I'll focus on new tech needs first, and then I'll get into third party, and I'm going to fly through this, so I will be submitting written comments.

MS. LEW: Good. Thank you.

MR. RAYMER: In terms of what we're looking for, for new technology, obviously, a long-term certainty, whether it's in a product or a program, long-term certainty is very needed. A case in point on how not to do it, back in the 1990s, there was a very good, successful PG&E energy efficiency program. The utilities, as most of you know, always have programs to provide incentives to go above code. The higher above code you go, the larger the incentive. So they had an excellent program that was implemented. It was supposed to last for about two years. It ran out of money after about eight months. Unfortunately, all of the builders in the area -- particularly in Fresno, Modesto, and Sacramento area -- had made long-term purchase agreements to bring in the products that were going to be partly subsidized by this, and then the program ran out of money. They were left with a couple of issues, either eat the costs or simply revise the design, which is very difficult to do after construction production and housing has commenced. So long-term certainty is the product of the system, clearly, cost-effective, emphasis on "clearly." You have got to be able to market this to the general home buyer, we don't like to tell them that it's going to pay back in 29 to 30 years. Although, that's sort of the calc that's used with the development of the energy rate. The home buying public, as with anybody, wants to know, 'are we going to get our money back.'

System and component warranty, by State law, new homes have a warranty of ten years. There are certain aspects of the home where the warranty is shorter, but at a minimum the product has to be operating very well for a long period of time. Can the new product, the technology, be incorporated into existing design, does it require increased labor, or does it require the imposition of labor having new or very specialized skills, and I'll be getting into that under question number four. Will it impact planning and land use considerations. The layouts of the homes, certainly, productive use of solar, will require some rather extensive layouts, and unfortunately, a lot of projects, at least the footprints of these lots, have been laid out now that they're going to get built four or five years down the road, and that presents sort of a challenge.

Now, moving into the area of third party independent technologies, testing protocols, best in class, and all that, we do feel that there's a clear need for this, but we also need to be cautious how we incorporate this into the existing construction process. New requirements for testing and certification can certainly help improve quality control, but a process that's implemented too quickly via mandates without an appropriate level of education, training, and industry ramp up can create a huge log jam in the field, and we have seen several examples recently of that.

In addition, and whenever possible, emphasis should be placed on enhancing the existing, let's call it, administrative process, as opposed to creating a separate parallel process. Case in point, the State of California right now has 500-plus jurisdictions, cities and counties. Each one of them has either a building department, you know, that does planning land use and, of course, plan check and inspection, or they have their contracting out to this. So to the extent that we can do things that enhance the existing administrative processes out there that can be very productive, it also helps logistics. You're not necessarily looking at one entity to handle fire safety, mechanical plumbing design, and all that and then another entity to look at green building and energy. It would be nice for, at a minimum, to have them, sort of, intertwined. If there are going to be specialties, they need to work in concert with the building department builder, the very established entity, that the state recognized implementing and overseeing the application or state building codes.

Now, one that -- I think for, for, for EPIC that, that we would encourage, particularly, for new technologies and enhanced building system is the development of rather thorough and easy to understand scope of work. As with all contracts with subcontractors and contractors in general, the builder, the company, enters into a contractual relationship with subcontractors, and over the last ten years, we have been working with the CEC, particularly, back in the early 2000s, in the development of scope of works for a variety of -- for example, the HVAC contractor, particularly, on how you check duct systems for leakage, et cetera. And so instead of just signing a contract with a plumber, 'here's ten homes. Put in the plumbing, and you get paid.' Okay. It's becoming a more detailed and more itemized sort of listing of, what needs to happen going above and beyond the minimum specs of the building code, which everybody has to follow. What exactly type of a layout -- where does that water heater -- where is it supposed to go as opposed to where did your grandfather and your father teach you to put it. And so having all of this stuff laid out so that the builder can have access to it to plug it into that scope of work so that the subcontractor has a nice, sort of, itemized listing of the things that have got to on, above and beyond getting the final permit check of the building department, having these sub items in there can be very helpful. And as we getting into the stuff that we'll be discussing under question four, this is going to become absolutely imperative to make some of the new building systems work. So with that --

MR. WALTHERS: I agree with you, Bob. As far as full scope of work, as far as HVAC for residential. In commercial, it's a little bit different because we're under the AB32 guidelines of refrigerant, and so all our technicians have to have, you know, full education and certified to remove or dispose of or add refrigerant to any systems. We just can't go into a store and change a refrigeration system or something like that and walk away. We have to, you know, monitor, identify, and, kind of, repair when it happens right there. So I can see where he has a big problem over the whole industry of residential. There's no guidelines right now or actually education.

As far as the education that I'm looking for when I talk to people that are going to sell me or, you know, are going to try to design something for my builders or -- there's an association of energy engineers out there that has a CEM, and that is the Certified Energy Management license. That gives you a broadcast of everything in the United States, you know, from boiler systems in New York underground to everything else in efficiencies. They also have a different one, which is called the Certified Building Energy, and that's basically for what we would want to use here, is you're a certified energy management of the building and you understand what's in your building before you go out and buy it or procure it, and so you know if it's right or wrong. So there's also a lighting company that's if they don't have a CL license or a CLTC license, I won't talk to the salesman, because all he is someone who took a five-hour course and now he knows it all.

So there's certain things that you can look at, you know, in 30 years with Raley's that I have had everybody and their brother try to sell me something around there and you learn who actually took the time to sell you the right product. You know, LEDs came by -- this was 15 years ago when I started working with the CLTC, with LED case lightings. You know, we had T8s and T12s in our case lightings, and we went to the first LEDs, and it took us two years, the project working with them, to get the right LED light patterns, the heat patterns, and all that. So now we went from a, you know, 40 watt per door down to a 14 watt, which the CEC want us to have right now. So that's a huge energy savings that we're seeing. So just things like that and understanding what you're buying.

And actually, Bob, you have got so many different people out there, it's hard. We're controlled, because we have an inhouse refrigeration system. We're inhouse on all our designs and learning on LEDs through CLTC. You know, well, they build LEDs in a block 30 by 30. Only the 12 by 12 inside part is utilized by the GEs and the major corporations. All the rest of them are sold to whoever, and that's where you find out that you have degradation to your LEDs faster than normal, and they do not hold up. So there's a lot to learn before you just go out there, add money to who's selling it to you where and -- you know, and education out there.

MS. LEW: Okay. Well, thank you.

I think we need to move on to question number three.

Oh. Oh, so, Blaine or Camron, do you have anything else you'd like to add to information that you think -- information that would help get these technologies out there?

MR. COLLISON: I'm all set. Thanks. Go ahead.

MS. LEW: Okay.

MR. GORGUINPOUR: I was just going to

add that -- I'm sorry. Go ahead.

MS. LEW: Was that Camron, or was that Blaine?

MR. GORGUINPOUR: This is Camron right now.

MS. LEW: Okay.

MR. GORGUINPOUR: The only thing I was going to add is just that, again, with a lot of our general budget cuts, it got more difficult for our facility energy managers to go to conferences and things that we had normally held to gather information on new technology to bring back. So I definitely think that there's a need for more information on products to get out in an organized way to our -- to our facility managers. So having independent assessments and things like that, I think it would really help.

MS. LEW: Okay. Good. So let's move on to question number three about innovative procurement strategies that can help reduce the costs of some of these technologies, and we talked about some of them here, and I was going to see whether Blaine or Camron -- because I think your Federal agency talked about GSA, maybe there's something innovative there that can be helpful to others out there.

MR. GORGUINPOUR: Sure. This is Camron again. I'll chime in. So, again, my emphasis is largely on vehicles and not so much on the installation of the building side, but in general, yeah. And I think that these new contracting mechanisms for contracting authorities gives us an opportunity to look at new business models, you know, such as partnering with state, local governments to do joint procurements could help leverage some sort of volume. It could ease the procurement process. Oftentimes, companies have a hard time working directly with the Federal government because they have, again, a set government partner, state or local partner, managing that process. Actually these allow smaller ones to participate. So those are our things that we're definitely looking at. But, you know, there's a classic models also like contracts and so forth, but it would take some time. I actually saw a slide today this morning from the Army that mapped out their process for approving a power purchase agreement. And it is -- it's at least a year long to get through and funded, and then once that happens, probably another year to two years to actually get the project implemented. So there's definitely some focus on figuring out the streamlining process.

MS. LEW: So, Blaine, do you have anything you'd like to add?

MR. COLLISON: Yeah, I think do. This

question is pretty much my wheelhouse today, and so let me say a couple words about the Silicon Valley Project and then the DC area project that we have done here and what the key take aways are there, and I will attempt to be brief about it.

The key thing that happened in both places is that instead of an institutional energy user being in response mode when a solar vendor comes knocking on their door -- and I think everyone in the room here know that that happens a lot -- and it is functionally deafening for an institution energy manager or sustainability manager facilities director to keep being told to respond to that stream of inquiries and solicitations and to manage it and to wrangle it into some kind of order and deterministic basis for making decisions and implementing a strategy. So the thing that the crew out in Silicon Valley did, we hired a Mountain View based solar consultant, who was, in fact, a technical provider in Silicon Valley. We brought them out here. The thing that we did with our stakeholders including the District of Columbia government and the DC public school system and regional governments throughout the area here was to go to them and say, "Hi, why don't you tell us about your portfolio of buildings and facilities. Take this spreadsheet that has 15 fields of potential data that we'd like to see. You guys are the world's greatest experts on your own facilities. Blue sky it for us. Just give as much data as you can, as quickly as you can about any facility, any site within your portfolio that you think might work for solar. Be -- error on the side of inclusion here," right. We will then take that data, and we're going to do a couple different passes of triage on it. We're going to do an initial look, Google Earth and shading concerns. We're looking at age of rooftops. And we're going to take a site that has a stand of old grove forest or a giant parking garage in front of it, and chuck it immediately. And we're going to take the facility that has a two-year-old rooftop on it -- or excuse me -- probably a 17-year-old roof that's going to be replaced in three years, and we're going to chuck that immediately. And we can do that very, very quickly. And then we're going to do some much more detailed site studies, and after a couple of rounds, we're actually going to wind up sending someone out with a camera and a sun meter and a pencil and a clipboard, and we're going to walk around the facilities that really look good. The net result of all this is that when we -- when we got folks through this process, what they had was a package of sites that were, were absolutely, completely ready for projects, right. And so they headed for the RFP process, not with a sense of possibilities that was based on vendors whispering optimistic things in their ears but the result of some top-flight technical analysis. They knew what was possible. There have been some economic studies done. They knew what was sort of the ballpark set of possibilities with some benchmarks there. Vendors are able to come to this set of sites knowing that there's no garbage in there they won't have to price risk into their proposals to account for the possibility that someone has been really, really sloppy, which we see a lot and has thrown in some sites under a broad RFP that are absolutely nonstarters. So folks are able to approach this in a much better posture to offer best price bids. The terms and conditions of the proposal and the bids are standardized, right, so there are apples to apples comparisons. They're available from the get-go.

One of the -- you know, one of the anecdotes that comes out that I love most and is perhaps as good as any at capturing the set of issues here is I sat down with the CFO of a community college in Maryland here a while back. He had 25 years of corporate finance under his belt. He's is in a state with very favorable solar policies. He had a supportive administration. His institution wanted solar. He had a large, uncomplicated, uncompromised, unshaded ground mount opportunity across the road from his office. He had site control, and he said, "you know, look," he showed me the stack. He had a stack of proposals, unsolicited solar proposals from vendors that had to be three, three and a half inches thick. He said, "Look. I'm a finance guy, and I don't quite understand what's in here. They're all in different terms. They're not comparable. It's going to take us a year to go through and, sort of, get a handle on what's in here. We haven't seen contracts like these before, so we've got to figure that part out. By the time we get all that done, all the numbers are going to be stale. So we're going to have to go back to all these guys and have them refresh their bids. Oh, by the way, I have got a ton of other things on my plate to do. So I could tackle this piece, which is looking like, frankly, a giant hairball, or I could let it sit until I get around to it," and, in fact, it was going to sit until he got around to it.

We hear this set of problems over and over again and I -- what was amazing in this collaborative procurement process was to see, see the actual shoulders relax on facility energy managers that have been tasked to go figure out a solar play when we came in and said, "Hi. We're going to help you figure out a solution. We're going to give you non-vendor access to topflight technical and economic insight before you go have to interface with the supply side. We're going to get you -- get you brought up-to-speed here on what's really possible across your facility's portfolio and what you can expect, what you're shooting for. This model has found increased dissemination, a number of geographic pockets across the US, because it is so potentially transformative. It's -- there's some dramatic expansion in a couple of pockets in California. The EPA region 9 office in San Francisco has taken this as a result of a series of conversations that we have had together. They're trying to help some of the Federal facilities in San Francisco access this procurement pathway to get something done there. The place where this interfaces with the broader issue today is that there is, obviously, upfront costs, right. We sent solar engineers both at their desks to do Google Earth analyses and then out to walk around parking garages in Montgomery County, Maryland, right, to take measurements. The costs are generally, ballpark, you know, somewhere in the neighborhood of maybe $2,000 per site. It is absolutely, utterly transformative, and it is money that's incredibly well spent. It's hard for a facility manager to go up their chain and say, "Hi. I need to spend a couple grand per site to find out if we can do anything or what it is that we can do. And you know, I don't know what answers we're going to get back." Right. That's a much tougher internal sales pitch, marketing pitch than, "Oh, yeah. We're going to sign a PPA, and it will be great." But to get to a PPA, in fact, to get more sites to better PPAs faster and open at lower costs for end users and rate payers in California, this approach has almost unbounded promise.

And I can stop there. I'm happy to talk to folks subsequently, but I don't want to monopolize the time here for other panelists.

MS. LEW: That's really good.

And so do any of our panelists have anything else you'd like to add to it?

MS. KWOFIE: I was going to say, thank you, Blaine, for sharing that, because that's some of the issues that Dave and I have been working on at UCSF is, is trying to go a route where it makes sense. So you're talking about a school. In our facility, we have about five million square foot, and we have a lot of researchers very sensitive to research, very sensitive to the air space. And one thing that I was telling Dave right now was a couple of days ago is how do we make procurement manageable for a researcher? There's a lot of risk. There's a lot of risk going there and just touching and realizing the HVAC. And so one approach that we're looking at is trying to actually go and take that burden off them, which is exactly that same process that Blaine talked about, trying to go to them, understand their needs, because if you understand their needs, if you understand why they want certain lights on, why they want certain air flows, the reason for -- you're able to bring your technical group together, to the table, to analyze it because these people are people -- they want data. They want you to draw it on the table to explain to them clearly where you're going to do and how that will not impact their process or it wouldn't impact their research or, you know, those kind of discussions.

And we had a lot of success in that sense where they are now approaching us. We just got a solicitation from a group that say, "We need to do this procurement and how can you help us," and that never used to happen. You know, we needed -- we always were going out to them, became the vendors people didn't like, you know, trying to say, you know, sustainability, and the tools that we have to use and it's important. And they did not like that story, but when we went in and tried to understand, bring the technical people to them, let them do their analysis and to show to them clearly, you know, what is the -- what are the areas, why are they not doing it, and understand it and work with them, you know, they turned it around. And they are now calling us now to help them. So I'm glad that, you know, you get to share this with us, and I'm sure I'm one of the people who will be following up with you to expand this.

MS. LEW: So I think we're going to move on to the next question. And so what are some of the potential activities that can help facilitate the inclusion of emerging technologies into a subdivision, design, or a building design, or part of a retrofit renovation type process. Bob.

MR. RAYMER: Would love to understand that. Bob Raymer, CBIA. You know, in general, there's sort of three areas here of things that can be done, basic research, pilot programs, you know, field application, and, of course, one-on-one design systems. And the one-on-one is not something that's -- it translates very well in production housing and for most projects, you've got five or six model options. You may have a rather infinite number of design options. I can tweak those, but in large part, you usually have got five to six models, and so to the extent that one-on-one design assistance can be provided is great. But as I'm looking into specific areas of need here, having just gone through the latest update of energy efficiency standards, this is the stuff that will take effect in July of this year, and looking forward to the next two updates, the provisions that will take effect in January of 2017 and January of 2020, there's a couple of new construction systems that are going to be promoted heavily by the CEC staff. I know this because they attempted to get it in this series of the mandates, and so we're already well aware that coming down the road, particularly for 2017, they're going to be looking at roof deck insulation, advanced wall system assemblies, further reductions in air infiltration, advanced plumbing system design for, for hot water supply, and so I'd like to, kind of, take those on very quickly in a singular fashion.

Advanced wall system assemblies. Going back to the late 1940s, residential construction is largely 2x4 wood construction with these studs 16 inch on center. Now, to get a more -- a deeper cavity for, for wall insulation, the Energy Commission would like us to move to 2x6, 2x8, or a staggered system where we go 2x6 every other stud or 2x4 so that you can have a rather deep layer of insulation going into that, and quite frankly, this can be done. Engineering wise, this can be done, but once again, getting to my opening comments, we have to take this from the drawing board, we have to take this from the handful of examples that are going on out there and mass produce this in a way so that the subcontractors and the designers, in particular, can get this on to the blueprint so the building officials can understand that this is how the window is going to fit into this new deeper wall cavity; this is how the door is going to fit into this deeper wall cavity. There's a lot that can be done. EPIC can help do basic research. More importantly, EPIC can help with pilot programs and help with one-on-one design.

In terms of roof deck insulation, this is not to be confused with putting ceiling -- or putting insulation, a layer of R30, over your ceiling. This is where the roof deck itself, the sloped part of the roof, has either insulation on the exterior of the plywood or on the immediate interior between your roof deck studs of the joists, and in particular, this has some problems with it. We have to bring the manufacturers up-to-speed, particularly the roof covering manufacturers, so that they don't void their warranties. As we were looking at the last go around of the standards, Energy Commission was proposing putting either, I believe, was R8 on the exterior of the roof deck or R12 on the immediate interior of the roof deck. Putting it on the interior creates some moisture issues. These can be solved, but we have to figure out the best way to do it and then mass apply it. We have had some catastrophic failure on the east coast by trying to do this on the under side, and then putting it on the exterior of the roof deck, you end up having what looks like an ice cream sandwich on the exterior of the roof. It can be done, but we're going to have continual roof penetrations, the vents, the openings for the whole house fan, all of this needs to be understood from a design perspective and from a mass application perspective so that our contractors can get this done. Another challenge that we don't really talk about much here, but is certainly clear out in the field, over half of our framing crews, our carpenters, do not have English as their primary language, and when we were producing fall protection guidebooks, whatever, about ten years ago, we produced 10,000 in English and 10,000 in Spanish. The 10,000 in Spanish went very quickly. I still got some of the English ones if you'd like that. Get them out of my office.

But looking to some of the other things, further reductions in air infiltration. That's a given, but we've got to make sure that we're going to go below where we are right now, which is already a very tight envelope, are we creating an indoor air quality issue. This is something that's a great concern to CBIA. It's something that's a concern to the Air Resources Board, and if we are not careful, we're going to set the stage for mass class action suits down the road. So to the extent that research can focus on that, would be great.

Advanced plumbing system design for water supply. There's a lot of good concepts out there. What we need to do is come up with some, probably, a nice little booklet of the application of this, so that the typical plumber can understand, this is what you're doing now, this is where you would like to go in the future. As opposed to having an energy consultant try to tell the plumber how to do his job. That's not going work in the field. Plumbers, 'my dad taught me to do this. His grandfather taught him how do that,' and the guy with the calculator and the Ipad, that's just not going to cut it with the plumber, and so we got to figure out a tactful way to try to get them to alter how they have been doing it for 40 years. Easier said than done.

A few last things in terms of the clean technology. We, during the last update of the standards, have finally brought compliance credit into the regulations for the application of solar. In seven of our climate zones, you can now get some type of energy efficiency compliant credit for solar. It's a very limited credit, and it doesn't apply across the state. What we're looking for is very robust credit for all sixteen climate zones, and if you put four kilowatts on the roof, you should be getting twice the credit of two kilowatt. Obviously, the benefit varies from climate zone to climate zone, but there's research to get that in, and that's where you're going to make the change in the market for the small and medium size builders who may not be able to take advantage of the economy of scale procurement, but if they can find a very productive way to bring this into compliance with the energy efficiency standards, it's going to sell itself.

And so anyway, like I said, I'll be turning in written comments, but that's my comments for today.

MS. LEW: Okay. Thank you. So we just have a couple more minutes before the open period. So our panelists can make brief --

MS. VANCE: I just wanted to -- this is Chris Vance with the Energy Coalition. I just wanted to, kind of, piggyback on what Blaine was saying. Everything he said, he had some really key points about bringing the right expertise and through and doing the cooperative procurement and just -- but that is so powerful. And I think we need to apply energy efficiency as well and not just to solar and really doing the -- just removing that duplicative process that all agencies or business may have to go through, and just doing it once for everybody, that's very powerful.

And then a little bit back to question three, I just wanted to mention that I think there's also tremendous opportunity at reducing the pricing through the buying power, of course. And we saw that, of course, even at spec with just launching the program. We don't really have the volume yet. We just got started, but when we went back to some of the manufacturers, for example, Kree, they said, "We think this is going to be a big program." They reduced their price on LED lights for student lighting by 48 percent.

So I think there's -- you know, as we move forward I think, you know, I feel like the regional energy networks are really trying to be that living, kind of, laboratory in bringing all those examples from the Silicon Valley solar procurement into the energy efficiency. So that's my --

MS. LEW: Any other quick comments?

MS. KWOFIE: I think one thing that I -- and it may be it goes back to the same thing that Dave said is proactive design guide plan, which is what I would call it simplify, simplify, simplify. Make it easy for training. Make it easy for bringing the people. Just like Bob said, you also need people to understand, because you can't change the way they done it that works for them. So making it simple so that it's not complicated controls with all these designs that they cannot operate would be such a big deal especially for institutions, public institutions.

MS. VANCE: And that portfolio approach as well. Similar to what we're doing is we're providing a whole portfolio market to service providers and they're only responding to one RFP and they're being now, you know, deferred to the market essentially efficiently.

MS. LEW: Okay. Okay. So let's move on to the public portion of our workshop here, and so we're going to open it up first to comments in the room, and did any of you fill out a blue card, or if you'd like to make a comment, you can provide us with your business card and tell us what area that you would like to discuss, and please come up to the podium here, because everything is being recorded.

Okay. You can raise your hand if you'd like a blue card.

Okay. So I have Mr. Walter Horsting from BDI for Terrestrial Energy and Light Systems.

MR. HORSTING: Yes. Couple of quick questions for Blaine at the EPA. Is there any program going on in the country for flare gas recovery versus flare gas being emitted directly into the atmosphere either -- being burned or the methane being released. I was hoping to get some direction on that.

Regarding the US Department of Defense, Camron, I was wondering in you're global based deployment, are you looking at molten salt reactors for base electrical supply in terms of something very compact and mobile.

And for Raley's, I was wondering if your fleet is going into a natural gas mode and whether it could be looking at a source of fuel such as Naphtha to burn.

MR. WALTHERS: As far as Raley's, we had natural gas trucks. Basically, a lot of our trucks go over the mountains, and natural gas is not powerful enough right now, the engines weren't, when we did this five years ago. We are now looking at natural gas with the digester system coming up. I know Atlas Waste Disposal are using all natural gas now, and the new trucks out are powerful enough to haul what they have to haul. That's what we're looking at now.

MR. HORSTING: I might have something to

bring to you.

MR. WALTHERS: Okay.

MR. HORSTING: I'll sit for a response.

MS. LEW: Okay. Blaine or Camron.

MR. GORGUINPOUR: This is Camron. I'm sorry. You know what, when you were asking the question, the sound cut out right when you were talking about asking what specific type of technology. What were you asking about?

MS. LEW: It was molten salt storage.

MR. HORSTING: No, no, no. That was for Blaine. I'm sorry. This is Walter Horsting. The question was on flare gas recovery. There's around 6 trillion units of natural gas that are going into the atmosphere globally yearly, and I was wondering if there's any programs to -- funding for programs to be -- going after capture of that flare gas. I have a process that I'm advocating for that.

MR. CAMRON: Yeah. I'm not aware of anything specifically on that, though, it wouldn't surprise me if, on our R&D front, we have projects. We have funded a lot of different projects to look at just about every way at capturing energy from anything. So it wouldn't surprise me if we did have something, but I'm not, offhand, familiar with anything specifically.

MR. HORSTING: I would --

MR. BLAINE: This is Blaine at EPA. Our natural gas work is a little off my range. We do have a natural gas startup program. We do have a methane recovery program. I would encourage you to have a look there and reach out to those staffers. They may be able to direct you.

MR. HORSTING: Thank you.

MS. LEW: And so the other question had to do with molten salt reactors for the US Department of Defense, that was your other question, correct?

MR. GORGUINPOUR: Oh, okay. Yeah. I'm sorry. This is Camron again. I'm not -- that's one I haven't heard of, but if you want some information, I'd be happy to pass it around to see if anybody knows it.

MS. LEW: Okay. So are there any other questions in the audience?

If not, then we'll go to the phones.

Is there anybody on the phone?

So there's nobody else on the phone.

Any comments?

MR. RAYMER: I didn't want to monopolize the time with the question four, but there were two other issues. Plug load, innovation on plug load strategies. The Energy Commission has been keeping rather good track of our envelope energies related to heating air conditioning and water heating, and they have estimated that about 50, 55 percent of the energy used by the average home right now, the new home, is plug-load related. Either appliances that aren't directly related by the -- or impacted by the energy efficiency standards or all of this stuff that we're plugging in. And to the extent that EPIC could help either do research or have actual application pilot programs on how to get a handle on this in a massive scale and that would be very good, and it would be very helpful as we approach 2020. The whole idea of getting the solar system that goes on your roof that gets us to zero net energy, to keep that cost down, you need it as small as possible obviously for design consideration and economic considerations, and to the extent that we can get a handle on that half of the electricity used in the home, that's going to plug load, that could be enormously helpful.

Lastly, marketable prescriptive packages. As most of you are aware, the various packages that have been developed for the climate zones for the last 30 years are, in large part, rarely used. That's where computer performance analysis is based upon. Cal BO, the Building Officials from the state and CBIA have, sort of, renewed interest now in the development of marketable prescriptive packages, one that includes solar, one that doesn't include. So that particularly small and medium size builders can have access to a compliance approach that doesn't necessarily involve the hiring of an energy consultant. And once, again, the building officials would love that because all of a sudden inspection and plan check becomes a lot easier. So there's two other ideas that we'd like to bring. Thank you.

MS. KWOFIE: And I think one, Bob, that I wanted to -- is I think you had most working on the new homes. I think there needs to be some sort of development on the old homes, too, because that is a concern that I would like to see a lot of research go in trying to help in different ways, helping them also through that.

MR. RAYMER: Yeah, this afternoon, I think the third segment of today's -- on permitting and that -- I'll be coming back for some comments on the retrofit market and some issues we have run into, but perhaps some ways that EPIC could help maybe make things work a lot quicker and easier.

MS. LEW: Okay. That sounds very good.

MR. DEHGHANI: I had just a couple of items.

MS. LEW: Sure. Sure.

MR. DEHGHANI: Me, we love emerging technology. We have many on our campus and -- that he was talking about the heat recovery from fuel gas. We have a large condenser project on our campus that provides heating for 3,000 students for free. This was recently finished in 2012. It would be great if any of you wanted to see. We have a geo-therm solar PV chill beam, underslung heating, cooling, radiant heating, cooling. Multiple energy recovery systems, natural ventilation. We have a group of folks called Energy Efficiency Center on our campus. California Lighting Technology Center, cooling energy, energy conservation office, the student body sustainability office, campus sustainability office. So we would love to hear from you. If you have ideas that you think it would be interesting for us to consider, we appreciate if you give us a ring.

MS. LEW: Thanks.

MS. KWOFIE: May I add something. I think the new president, Janet Nepolitano, said that she's going to change to the institution to actually move research, and she's looking at, looking at research in a different way. Especially energy and in water. So I think that this would be a nice place to start that research and have you all visit so we can change the world.

MS. LEW: Thank you.

So anybody, any other panelists would like to have any other closing remarks?

Okay. Okay. Okay. If -- any last chance for comments from either in the audience or online. Last call.

So I'd like to thank all of our panelists for participating in our workshop today. Really appreciate you coming and sharing your insights with us, and I also want to thank the audience and the participants on the WebEx for also listening in and participating as well. And so if you have any other comments that you think about after this workshop is over, you still have a chance to submit them in writing, Pam had -- and so that information is on the handout and the PowerPoint that Pam provided earlier.

And so if there's nothing else, I'd like to conclude this workshop -- this panel -- the first panel portion of this workshop. And we're going to be taking a lunch break, and it's about 12:04 right now. We'll probably start around --

MS. DOUGHMAN: We'll be back around 1:15.

MS. LEW: Thank you very much.

(Break taken.)

MS. DOUGHMAN: Okay. We'd like to get started with our second panel. Eric Stokes will be the moderator.

MR. STOKES: Okay. Thanks, Pam.

My name is Eric Stokes. I'll be the moderator for the second half of the day's workshop, which will focus on ways the Energy Commission through the EPIC program can help facilitate the commercial success of good energy technologies and the companies and entrepreneurs developing them.

We have a great panel today. We're going to share some of their insights, ideas, experience around what they see is really needed to help accelerate the path to market for clean energy technologies for clean energy technologies.

Unfortunately, today, one of our panelists wasn't able to make it. She had something come up last minute, but it will be great to hear from the rest of the panel. The format for this panel will be the same as this morning. Each panelist will have up to five minutes to make some opening comments, and then we'll dive into the questions on the agenda, which will then be followed by public comments and questions.

And so with that, we'll go ahead and get started. First up is Beverly Alexander with the Energy Institute at HAAS at UC Berkeley.

MS. ALEXANDER: Thank you. Good morning -- or good afternoon. In the quick to market program, we work with innovations coming out of the Department of Energy labs, the California Energy Commission funding, as well as a variety of different labs across UC Berkeley and startups outside of Berkeley. And the biggest gap that we have been focusing on is what we call the lab to license gap, where you have some really some interesting technologies, some interesting results in the lab, but the researchers don't have the time, the funding, or even the inclination or the background to do a really solid market deep dive on the technology. So if you -- for those of you who happen to have the slides, you'll look, most people talk about the valley of death, where you don't have enough revenue to cover your costs when you're already started, but we're seeing a pretty significant valley of death long before that in terms of even getting someone to license the technology coming out of labs.

We see a second problem, which is a lot of people working in clean tech are mission driven rather than business driven, and so they want to participate in a mission around an end state, you know, smart grid or biofuel or something, and so they're thinking way down the line often into these heavily occupied commodity markets where people have been playing for a hundred years. And so there isn't a sense of how you half find your way into commercial success through those markets, and it's almost never jumping straight to the ultimate commodity market. You almost always have to take a stepping stone path along the way. And so we find that -- if we can -- if there's a predictable set of mistakes that we can correct to our analysis and it means being relentless about competitive value, realistic about a product development cycle, and highly selective in terms of your finding a winnable first target market.

So the way that we assess this gap and these tendencies to make these mistakes is that we have leveraged the HAAS innovation curriculum. We're entering our sixth year, so we have a five-year track record that HAAS has put a stake in the ground around innovation, and then we bring together teams of graduate students from 20 different programs across UC Berkeley and we apply that curriculum to a 42-factor, business factor, check list, where we just go very wide and then very deep on what may be the most promising commercially winnable target markets and then -- and then articulate a path towards the ultimate market with a very rigorous product to market fit analysis, and we have done this across the entire carbon chain.

I think we're on to the next -- the following -- the next slide.

We've done this across the entire carbon cycle. Lawrence Berkeley Lab has put an issues in place called Carbon Cycle Two that would not only change -- look at what -- where all the different things we can do. It would be low carbon on the demand side, the supply side, high tech, low tech, and clean tech market to all of these and apply this approach to all of these, and we actually had about a 20 percent success rate, year over year, regardless of domain and sector, using this kind of approach around business rigger combined with creativity and design thinking. So we think it's a pretty useful approach.

And so we have -- if you can go to the next slide -- we have had, what people are calling, a steady stream of success with 20 percent incorporation, 15 million in investments, grants, awards, and revenue. 47 percent continuing RD&D but this time, in a more commercially viable direction, and with that, we have had about 20 million in funding, 12 percent licensing, 9 percent are still part of the Department of Energy research hub, and 12 have actually redirected their research finding that we found that there were fatal flaws in that something was just simply never going to become commercially viable in that direction that they were able to tweak it, and now they have got a much better direction that I can tell war stories on that.

Also, job creation. We've created 60 brand new jobs and placed people in about a hundred existing jobs that are focused and dedicated on energy technology.

So we're excited about both understanding these gaps better and are finding really concrete ways to address them.

MR. STOKES: Thanks, Beverley.

Our next panelist is George Crandall with Technicon.

MR. CRANDALL: Thank you, Eric.

Technicon is a nonprofit company located in the Sacramento area that has focused on renewable energy over the last five years. We've created something called the renewable energy testing center, and its goal is to support emerging technologies on a little larger scale than what Beverly's program is about. What we really do is we have a program that allows people to put pilot technologies of a fairly large scale at an industrial location where they can have their equipment demonstrated -- first, maybe developed -- then demonstrated then tested and validated for performance. This program has been funded by the US Army under a program to transfer technologies to army bases. Due to congressional issue in the last year that kind of fell apart, we still have two technologies, two gas fire companies, located at the McClellan site, which is close to here, and we have had to relocate ourselves to a smaller facility for testing. But we have -- we're basically -- retained all the assets that allows us to continue a program along like this. The, the really core areas that we work on have been waste energy, waste to fuel, biomass to fuels, algae production, gas cleaning technologies. We have not got into -- or geothermal. There's some things that each testing center needs to have a focus on. We see ourselves as a commercialization accelerator for these companies. We have had a pretty good success rate -- and next slide, Pam.

We've actually tested five gas -- five gasifiers at -- three of them at our facility to offsite. We made liquid fuel, diesel fuel in our site and tested other technologies offsite. During that five years, we've operated -- we managed to help companies get $35 million in grants, mostly federal, some state. Of the 11 companies using our services, some of them right now are selling equipment. Wouldn't call it completely commercial but they're attempting to sell equipment. Some of them have -- most of them have sold equipment, though. Examples of those, Pacific Renewable Fuels got a grant under REII from the Federal Government, built a $19 million facility in Toledo, Ohio based on the results from the testing that we did on our shop on their pilot system. They have now split up and formed two companies, one with the Toledo base for biomass to power, and the second one they're calling Gray Rock, and that's focused on natural gas and diesel fuel. So they're off and running. They have got big players, like Exxo, investing in them right now. So that has been a big success. Sierra Energy is a small gas fire company out in Davis. They have got an Army contract that they got through ours. Waste at about 20 tons per day to power. We have to Cha Corporation still at our facility. They're doing gas cleaning technologies, and they have contracts with Boeing and the Air Force. Advanced Plasma Power, interesting company located in UK. Actually got to take a whole crew over for a week. That was tough duty. They're selling units for a 300 ton per day for MSW power. Peat International is focusing on medical waste. They're successfully selling units, and we have a couple pyrolysis that are selling units presently, mostly at the 40 ton per day rate.

So the program really is about bringing people through the valley of death and out of the fog in Beverly's curve there, they have got the business plan together, they have got the people. They need -- they just are looking for a site to demonstrate the equipment. The process that we go through will take some refinement under the EPIC program if we get that far, but essentially, we make the companies supply their own equipment at their own expense. The testing facility, the people, the development are all covered by the program. It gets them to the point that investors can come in, kick the tires, see what's going on, and it's really a unique steppingstone that all these companies in this space really need.

So that's my comments. Thank you.

MR. STOKES: Thanks, George.

Our next panelist is Jen Garson with the US Department of Energy.

MS. GARSON: Hi, thank you for having me today. So my name is Jennifer Garson. I work from -- at the Office of Energy Efficiency and Renewable Energy, text market within the US Department of Energy. Over the last two years, a lot of our focus has been on early stage commercialization, and we have launched several programs focusing on this areas. Our first largest one, with the $5 million program we launched called the Innovation Ecosystems Initiative. This was really focused on creating regional partnership to incentivize service to commercialize their technology. We funded five different regions across the county, including one in California through the University of California San Diego, and we have seen some really great returns on that initial program. A lot of their programs were focused on tech demonstration and validation and supporting entrepreneurs and creating mentorship networks. Our organizations have worked with about 60 different startups with a followup on funding that's $110 million over the last three years so creating about a twenty to one return on investment for us.

Additionally, I manage our National Clean Energy Business Plan Competition. This was a program we set up through the Obama Administration startup America initiative focusing on creating opportunities for student entrepreneurs to commercialize clean energy technology. We have had about 600 teams apply over the last two years. We're heading into our third year. This has been an opportunity really for students to have an opportunity to bring their technology concepts and apply business acumen to really come up with a business proposition and that can, kind of -- several levels of judging. And out of that, we have also seen some great successes about startups and with about a $25 million in follow on funding.

Additionally, I worked within business networks on the on state screen challenge program. This was an initiative launch with the US Department of Commerce, the US Environmental Protection Agency, and the US Department of Energy, among others, and this is really looking at proof of concept centers. So developing testing centers across the country where we could focus on commercial clean energy technology. And most recently, we actually put out a request for information this past fall where we really looked at trying to address the gap that actually, I suggest a little bit earlier, where we're having some off take research technology and create a business from it. So this is pre-deployment innovation stage, and a lot of what we heard from was the need for technical assistance and technical demonstration, mentorship and support incubators. So we just recently announced an incubator initiative for upward funding where we're going to fund three to five individual incubators across the country.

It's a national organization to help support the coordination of clean energy incubators across the country. So a lot of our work really focuses on how do we take all of the really great technology ideas and IT that's been developed at both our national labs and universities and help facilitate it's entry into the market. So I'm looking forward to today's conversation and for any questions that you might have.

MR. STOKES: Okay. Thanks, Jen.

Our next panelist is Josh Gould with ARPA-E at the US Department of Energy.

MR. GOULD: Great. Thanks, Eric. Thanks for you and the whole California Energy Commission for having us here today.

So ARPA-E is the early stage applied research arm of the Department of Energy. We fund high impact energy technologies that are too early for private sector investment. So more specifically, we fund applied research across the energy, the spectrum as long as it can have a transformational impact in one of three areas, so that's reducing energy related emissions, improving energy security, or improving energy efficiency. So in addition to our mission, ARPA-E is a little bit unique in that it actually has a congressional mandate to prepare technologies for an eventual transfer from the lab to the market. It's actually with Congress has asked us to it in setting up our agency. So we spend a lot of time and dedicate a lot of resources to assist ARPA-E or these, what we call, reformers, here, in doing that transition from lab to the market. One of those resources that we provide is, what we call, a technology to market team here at ARPA-E of which I'm a part. And so, you know, because we have such a diversity of technologies and teams who come from -- everywhere from national labs to universities to even R&D groups of large companies. We also realize that every project team that we work with has its own vision for how to reach commercialization. So whether that means spinning out a company, raising venture money and licensing technology, you know, working within the context of a large company, we're entirely okay with that. We're agnostic as to the approach to how folks commercialize. We don't endorse a single strategy, and so what we try to do is help teams in constructing and carrying out their plans. In particular, try to provide them the knowledge and skills to carry out their objectives, you know, which also helps our agency carry out our own congressional mandates to make sure that these things get commercialized.

Just a fitting topic for ARPA-E, because that's what I spent every day thinking about, sometimes on the weekends too and thinking about what helps energy entrepreneurs to bring these products to market. Also want to mention that we have a memorandum of understanding with the CEC, our agency does. So that's also intended to help both of our organizations achieve our shared objective of bringing over funding to market. So look forward to the conversation this afternoon.

MR. STOKES: Okay. Thanks, Josh.

Our last panelist today is Cole Hershkowitz with Chai Energy.

MR. HERSHKOWITEZ: Can you guys hear me all right?

MR. STOKES: Yeah, we can hear you fine.

MR. HERSHKOWITEZ: Yeah. Awesome. All right. Cool. I wasn't sure. No, but yeah, so I'm Cole Hershkowitez. Thank you guys, and thank you, Eric and Pamela, for putting this on. I run a small startup company down here in southern California called Chai Energy. We're a pre-revenue company, and what we do is we take smart meter data from the 40 billion smart meters across the country, and we kind of crunch those numbers and figure out exactly where homeowners can save on their utility bill and what's going on in their home.

So my perspective is very much through the lens of a low capital, direct-to-consumer, low sales force; it's more of a marketing play. And we have, kind of -- through our inception -- about a year and a half ago, we have gotten a lot of support through programs that things like EPIC would support in particular the western region called flow of the DOE clean energy business plan competition, which Jennifer mentioned and also the Los Angeles -- so I'm not going to talk about pre-valley of death and what gets people and students and graduate students excited about and interested in starting companies in the clean energy states. So I think we have already talked about how you coddle and help, and once they get into that space, how do you get more smart people to want to start companies? And I think it really comes down to three or four things.

So the first of the three things is motivation. You need to motivate people. You need to show them that there's something to do here. The second is inspiration. Inspiring people with stories of successful clean energy ventures is a great way to get entrepreneurs excited about what they're doing. I think it's one of the three or four core things you need in someone's job is passion and inspiration. And the last is community, which provides you a number of things but including, kind of, advice, mentorship, guidance, and knowledge around starting companies.

So -- let's see. So I think -- I talked about community first. You need to really create communities within schools and outside of schools, because founders need to meet each other. Founders need to meet adviser and mentors to provide them, kind of, the knowledge and insight they need and the connections they need to succeed the connections to things like the Energy Commission and other organizations in California.

Motivation. People aren't going to do things unless they really have a reason to do it. So how do you motivate people. Well, through our own devices. If you don't ever see successful stories or stories of successful clean tech energy companies, I think we would all just work at big companies. So showing people what a startup can become is very important and that kind of goes to communication as well.

And lastly is inspiration. People need ideas. There needs to be a cross pollination between disciplines of ideas so you can borrow things from the financing industry to start something like the solar or borrow ideas from battery technology in order to start something else.

And then the fourth thing, which isn't part of the first three, but it's the next part of the puzzle of getting entrepreneurs excited, is creating a knowledge base around startups. I think, in particular, the tech industry, which I followed for a while has done a really good job of doing this; the clean energy lacks has not. Particularly, there are websites online with tons of knowledge and information about starting technology companies. So there are millions of, like, clean energy -- that, kind of, core knowledge base that's publicly available online.

And then we're going to talk a little bit about how we got that in our growth in the past. So we participated in the clean energy business plan competition out west here called Flow, and that really inspired students through speakers and events, just telling their stories. It provided motivation for people. So $100,000 first prize motivated, I think, well over 50 student teams to apply. It created an ongoing community of relationships through various events they would hold, and lastly, through advisors, they provided knowledge to the students who didn't really know anything about startups. And the second thing is the incubator they were part of, the Los Angels clean tech incubator, which provides an even more tight knit community of advisors that are willing to help you through and give you advice from their experience at whim and that, kind of, leads to the knowledge as well. So yeah, that's what I had to say on it.

MR. STOKES: Okay. Thanks, Cole.

I think we'll start with the questions, and the first question is at what key services such as testing centers, independent validation are needed to help clean energy entrepreneurs successfully commercialize good innovations. The second piece of this question is what technology development stages are these key services needed and how should the Energy Commission -- how should the Energy Commission prioritize the top two -- top few technical areas that companies should receive services. And I think we'll start with the panelists in the room and then go to the those participating remotely.

MS. ALEXANDER: Yeah, and I know that a couple of people have more knowledge than I do about this but I have had -- we have had about 40 projects go through our program, and from watching them, what's really struck me, it's very hard to predict what kind of testing equipment they will need. So for example, one of our first startups was a printable battery, and they needed the best printing equipment ever. We never would have predicted that, starting that program, equipment would be so critical to their success. So the philosophy that I've come to believe is that the CEC can do to promote a really wide range of user agreements for a huge range of technologies -- you'll never be able to design a tech space that has all the equipment. By definition, innovation is about breaking new ground, so you're never going to be able to forecast exactly what testing equipment they'll need but if a wide variety of equipment is made available on -- whether it's nights or weekends or something, private, public, any of the public equipment -- I think that would be really helpful for the space. So that's just from observing what our people have needed. They have needed wildly different kinds of equipment and you can't -- you really can't predict when there's an advance. So --

MR. CRANDALL: Well, what we found is that -- this is George Crandall -- was that people would come to us nationwide looking for support on putting a technology at some location that was really heavily industrial. They could get them a permit in California, and that's one of our standard models is we permit every technology we bring in before they actually run so that the ability to have a testing site that, like Beverly said, has a variety of equipment that they would otherwise have to purchase if they built their own facility was a major attraction. I mean, a complete laboratory with GCs, mass specs, synthesis gas emission measurement technology, for exhaust gases. All that equipment, all those services at one location really brings these companies a relief in the amount of money they have to spend. It gets them a kick start having a whole, complete machine shop, air compressors, power, all these things that you would otherwise have to put together for you own individual test site. Being in one location reduces the cost hopefully for the Government as well as for the developer, entrepreneurs. So that's one thing we see on the key services area.

I'll pass on that.

MR. STOKES: Okay. Jen or Josh, do you guys have anything to add to this question?

MR. GOULD: Yeah, this is Josh from ARPA-E. You know, I think one thing we can see from the responses is that, you know, one, the type and stage and funding amount necessary for testing and validation is going to vary depending on the industry that the technology is target to but, two, into almost every case, particularly if you're doing, you know, really innovative, early stage, technical work, you are, at some point, going to need to address testing and validation and have the resources available to do that if you're serious about getting whatever you're working on in the market. And so one of the ways that we try to address this at ARPA-E is we ask folks to write up a technology department plan, which is essentially what is your approach for getting this technology to market and as one of the components of that plan, we ask them to think about exactly what they're going to need for testing and validation and, you know, think about what roughly it's going to cost, and related to that, how, how you're going to be able to obtain those resources. So we ask -- and that's something we ask for as they begin a project with us, and we've found it's helpful to start thinking about that at the beginning because of the difficulty in obtaining the resources necessary to do that. And so, you know, we think it's -- I -- you know, the appropriate strategy is for folks to think about it early and often but I think, you know, as an agency, we're aware of being overly prescriptive as whatever the resources needed for testing the validation are going to be highly industry and technology dependent. And so, you know, one way to look at or think about tradeoffs between industries is to ask folks, you know, to think about what the testing facility would typically cost and how much choice there is in testing and validation providers, you know, who are trusted by the industry because that's another important component, and in doing that, you know, it doesn't mandate that a federal or a state agency necessarily be the expert on all things testing the validation but rather to have teams who are innovating in this space begin to gain the knowledge and skills and resources necessary to understand exactly what's necessary to get technology to market in terms of testing and validation. So I think -- I think it's good that we're talking about this and thinking about this, but I think it's going to be highly industry dependent, and I think having teams who are working with the CEC or working with other agencies that bear some of the burden and at least think about it not necessarily having the resources but at least thinking about it early, that's been beneficial for us.

MR. STOKES: Thanks, Josh.

MS. GARSON: This is Jennifer Garson. I agree with Josh. I mean, you know, one of the things I wanted to say here is that testing and demonstration is obviously a really important component for the risk technologies before they can be potentially investment ready. So, you know, we've worked with contract labs and with our national labs on doing some prototyping testing. For example, we've worked with the Fraunhofer

Institute in Massachusetts, and they've worked with startups on doing testing and valuation to provide, sort of, a third-party validation that the technology proposition that they have -- they proposed really is confirmable and outside of the labs but one of the important things that you need to couple with this testing and validation is marked validation. You know, if we just contain it to validate, the technical capabilities of the technology, sometimes, some of these entrepreneurs may lose track of who their end customer is. So when setting up testing and demonstration sites, there really needs to be buy in as well from industry players saying, you know, 'this is something that we would actually like to purchase at the end.' So -- and it's really important for entrepreneurs to begin engaging with customers at the beginning point as well, making sure that what they're trying to validate is actually going to be picked by an industry.

MR. STOKES: Okay. Cole, do you have anything else to add to this question?

Okay. We'll move on to the next question. Second question, what activities, tools, or information are needed by the financial community to help facilitate investments in the early stage of clean energy technology. What role can the Energy Commission play in facilitating this through the market facilitation program.

MS. ALEXANDER: So one of the reasons we structure our analysis the way we do is that the investors we talk to absolutely need to see a winnable first market. They have got to see that you can get revenue coming in as soon as possible, that you're going to beat the competition, and that you can actually get revenue coming in over costs at some point. But that's not enough. They have got to see growth markets, and so that sense of a winnable first, a growth market where you're going to get the revenue and the customers in very, very large numbers, and then some path between those. So they can't be disconnected. They don't have to be identical. They can be different as long as there's a logical next step and a logical path, and so that's why we structure our analysis the way we do and why we talk so much about paths to market. And, and like I said, with these commodity markets, you're -- often we're working with -- just to give you an example an electric chromic window. Beautiful technology and they were discouraged because the price point wasn't even close to a commercial building, but that was their ultimate market. And then we helped them find interim markets such as satellites and greenhouses and other things where they could still develop the same technology but they would be using -- producing smaller volumes at higher price points to actually just get a beach head somewhere. And so we have also noted that oftentimes that can be in the military. We had one year where virtually every project we had was -- the first market was looking like a military application. So we joked that we were clean tech to military that year. But I think that, you know, we have seen that a lot of these small volume, high price markets do often end up being military markets. So I just think investors have to see that, and I know you may be thinking of other kinds of tools from their own end, but I wanted to lay that out as a first perspective.

MR. CRANDALL: I think the groups that we're dealing with are always at risk because the data the investment world is looking for, the readiness levels six, seven, eight, and most of those are in the middle were they do not know if this technology will scale. They really do not know the total environmental impact, and so what Beverly's program does, we really don't try to do, but we see the problem. A lot of them come in with no real economic sense of where they're at. They know their technology will do this to that, and it's the greatest technology in the world, and that's where they get hung up. So testing and validation and incubation is important to work through those issues before state and Federal money is expended on a great scientific experiment and not really a reality of being an investment grade technology.

What the Energy Commission can do is try to figure out a method of sorting through these technologies that they wish to invest in and putting them through programs like we're talking about in an orderly manner to promote success. We're not, at the stage we were at, capable of doing complete market analysis of these technologies. Truthfully, we were getting Federal money. We were looking at the end market being the military. We knew what they wanted. We really didn't care if it would be an investment that the utility companies would be interested or fuel companies would be interested. The military's economics are different, but to move into the commercial stage, we need a priority system developed.

MR. STOKES: Okay. And anyone online like to weigh in on this question?

MR. GOULD: Josh, ARPA-E. You know, I think we can probably broadly generalize investors, kind of, look at three things when you're investing in a company or a technology is broadly grouped into team market and product. And I think the Commission can have a positive impact in each of them. You know, as it relates to team, we at ARPA-E, do our best to try to provide performers, many of whom often tend to be really technical, with some basic coaching and knowledge on how business folks and investors view the world. So, you know, it's -- a lot of it, frankly, is just asking questions, which would -- you know, to give you a couple of examples, be things like, why is talking to potential customers important, why is that important in the beginning of a technical effort versus towards the end, you know, how can you quantify or create a cost performance model that describes your valued proposition. Do you understand what the competition is in the market and how you're doing any different -- what you're doing is any different or better than what's out there. And then based on the answers to all those questions, you know, how might you try to help a team fill in any gaps in their knowledge or experience. And, you know, and I think those, those gaps reveal themselves when we ask questions like that.

You know, as it relates to the market, I think the Commission has a very relevant mission in terms of trying to solve big problems and trying to do -- trying to take on issues and challenges, which could be transformational and, you know, oftentimes, not always but certainly that can lead to transformational returns for an investor if you're talking about a big, difficult sticky market. So there's, there's, there's some work that can be done there but, you know, it also helps to do when we -- at least at ARPA-E, when we pitch a program or pitch an area, and I think the commission does this to some extent as well, that itself requires some deep market insight and some, some market research. So sharing that with our performers after we have done it really can give folks a head start on understanding a market.

And then, you know, the idea that Beverly mentioned around product market fit, I think is always really relevant and a lot of that is, frankly, just going out and talking to the customers. We see with early stage technologies that oftentimes there are a variety of different first markets, like Beverly mentioned, and it's really understanding, Okay. What components of your products do you really need to optimize for that need to be ground-breaking or best in class, and which other ones might just be what, in poker terminology, you could call table stakes or good enough, and that is a really ambiguous, difficult process that you really only get by going out and trying to talk to customers.

And so I think in wrapping all this together, we have a summit or a get together in late February where we showcase all our technologies, and so an event like this that we're all talking about right now, you know, the discussion that we're having right now, I think it's a good start, and it might be worth the Commission thinking about, you know, how they can convene a group of like minded folks and investors together to look at technologies, that's the plan of our summit and trying to equip our performers with the skills and experiences necessary that once they actually get to that event, you know, that they can make something of it. So, you know, in addition to those resources and in addition to thinking about how, how we help performers address those three categories I think also just the -- one of the advantages of government is the power of convening, and I think having the Commission think about how it might use the power of convening folks to the advantage of its performers is a worthwhile exercise as well.

MS. GARSON: This is Jennifer. I understand what he's saying but there are -- there are a lot of different mechanisms that we have seen that help de-risk companies before talking to investors, and one of them is going through customer identification such as the

National Science Foundation, I-Corps model or of the launchpad model or going through business competitions where they have actually -- the teams, themselves, have been vetted and have a better understanding of their market and it's -- it, sort of -- it de-risks this for the companies to customers in a more informal setting before they actually have to go out and do their races. It allows them to have a better understanding of what their market is.

Additionally, like what our ARPA-E said at their summit, one of the things that I have heard a lot from utilities and energy companies is that they feel there aren't as many opportunities for them to really have an opportunity to engage with startups at summit or at, you know, competitions, and they really wish there were more formalized settings where they can actually meet companies that potentially could fit their technology needs, and one of the ways that you could even craft those kinds of meetings is to create a consortium of energy companies, utilities and other customers to talk about what are their areas of need and serve as matchmaking between, say, startups that are working in incubators and accelerators across the state and help to, kind of, play that, facilitating matchmaking role.

Additionally, in terms in financial incentives, another thing that we heard a lot recently is the whole first mover incentive. So how do you create an incentive for energy companies and utilities to adopt early stage technology. A lot of them are very risk-averse. They want to make sure that they're in compliance with all of the regulations and not that you break but what kind of an incentive could you set up to make these large customers, like utilities, really want to adopt at this early stage technology once they have been through some tech demonstration and validation. You know, a lot of states have talked about this, but there really hasn't been a good model of that out there, and I think that it can really be a good opportunity for this commission.

MR. STOKES: Okay. Any followup?

MR. HERSHKOWITEZ: This is Cole here. I wanted to really agree with what Josh was saying about giving startups the information, knowledge they need. There's, kind of, low tech solution there, which is making available free online but this also connecting to startups and mentors who can answer more specific questions.

And in building on that -- actually, not building on that, completely separate, helping startups pilot their technology and programs but not in a subsidized way. So helping startups by, perhaps, paying for the research that goes around a pilot that then helps the startup show numbers and metrics and, kind of, product market fit that they need to show investors. Because if you show investors that the government just paid for a pilot or did a pilot program for them, it doesn't bode well unless they actually have a customer while they're into that who's willing, excited, and happy about paying for it, paying for the product because of that.

MR. STOKES: Okay. So I think with that, we'll go on to the third question. What role can innovative strategies such as design gaming, social gaming, and other in reference to adoption and emerging energy technology and strategies, what technology or strategies would be best suited for these approaches. Is there a current funding gap not adequately covered by the private sector.

Beverly.

MS. ALEXANDER: I'd like to talk about one version. I know there are many kinds of design thinking, so one is the Apple where you make it so cool that people want to buy it, but there's another kind of design thinking that is taught at Haas, which is that you stand back and take all your blinders off and get very clear and very factual about what actually it exactly is that you have in your hand, and then get creative in thinking about what the uses of that might be. And so we have used that a lot in finding these first markets, creative first markets. And so for example, fuel cells, Lawrence Berkeley Labs has spent 15 years developing a very rugged variety of fuel cells, and the company was formed to try to use this in cook stove applications, charge cellphones and developing nations. So it's a very cool market. Very cool idea. They were funded by very reputable investors, some of the best in Silicon Valley, and it turns out, that market was turning out to be a hard market to get revenues over cost very quickly, and so they came to us to ask us to apply this, kind of, design thinking to what might it be developed in a developed world market market. And so that team, they stood back. They looked very, very objectively at every feature of this thing, and they spent months and about six weeks of just wracking their brains about what might work for this, and the very features that made it useful for cook stoves made it potentially applicable in national gas fracking sites that are way off grid and can't use the electric schematics to track emissions, and so this was something that wasn't even remotely on the radar screen for the company, and they found out that it had the potential to be a double bottom line investment where you could provide additional process and significantly either reduce or eliminate fugitive emission from fracking sites. So that kind of design thinking is just really taking the blinders off and going very, very wide and very, very creative, but we have found that thought process, because the teams struggle with it for a while and the companies struggle with it, because it's working way outside their preconceptions, but it has helped us in, I would say, 60 percent of our projects find really interesting target markets that nobody had thought of or come up with before, but again, I know there's a lot more, so I just wanted to take comments on it.

MR. CRANDALL: This is George. When we see our people, they really have a fixed idea of what their market is. It may be wrong -- I just talked about but the one -- the one thing that's problematic with a lot of these technologies really is customer adoption like this talks about because there's not enough support either environmentally or public relations wise about those kind of technologies, and this also gets not in my backyard area where we need to engage the public more in the advantages of these technologies and why they should adopt them in their neighborhoods, areas, et cetera. So that's my comment.

MR. STOKES: Okay. Anyone on line want to weigh in?

MR. GOULD: This is Josh. Just one quick tidbit that we raised is we engaged some crowd sourcing, you know, some professional kind of crowd sourcing entities, and we found that to be effective but only effective in certain use cases specifically where you've got a challenge that's really well defined, you know, "I need an electrolyte like this," "I need an energy density of X," even more narrowly defined than that. And, you know, we have worked with groups that have done a very good job of sending out a technical, a very specific technical challenge to their networks, and have been pleasantly surprised at the results. So I'm not sure to what extent that's relevant to the commission. It may be more relevant to the funding that utilities distribute, but we have found crowd sourcing mechanisms to be very effective when what you're sourcing is very well defined.

MR. STOKES: Thanks, Josh. Anyone else want to follow up with that?

MS. GARSON: This is Jennifer. We received a lot of this integration of design thinking in social gaming primarily in the software platform for engaging consumers and it's how you -- you not only, you know, make consumers use technology but make them want to. So it goes along with what was said earlier, the Apple thing. The reason why, say, you know net has been so successful for some consumers is that they want something that looks pretty, but, you know, secondarily, there's been a trend toward bringing in social scientists when trying to do promote strategy plans that you have more of a customer adoption side of technology plan not just technological milestones but understanding what makes people want to adopt technologies, you know, how the Clean Energy Commission could utilize that, and maybe it means bringing on more social sciences in looking at all of these matters and -- but it's a complicated space. But, you know, it's -- we have definitely seen this emergence of trying to make platforms that consumers engage with more user friendly and something that makes them want to engage, which is why a lot of the gamers have been brought on recently with software platform designers.

MR. HERSHKOWITEZ: Cole here. I was just quickly going to say that, you know, in Chai Energy, we deeply believe in an idea of social gaming and design thinking and building products for customers, but I think Jennifer's right in that a lot of these ideas come into play in software programs or software technologies, which means there's not really a funding gap as you proposed but rather perhaps the knowledge, understanding an age gap, because the people that we try to sell to, at least in part, are utility companies, who are, kind of, used to deploying new infrastructure, new product, new energy sources on a forty-plus cost to year time cycle, and they just don't understand the fundamental idea of the AT&T U-Verse is constantly being referenced to customers feedback, and there's a big disconnect in the utility companies really being an infrastructure company that builds forty-plus year infrastructure and their customers wanting things something new every year, like a new Iphone, you know, your new computer, and this mismatch and kind of time crisis that I think is the real problem not a funding problem.

MR. STOKES: Beverly, go ahead.

MS. ALEXANDER: I just wanted to really agree wholeheartedly with what Jennifer said about the social science move into energy or more energy people are bringing in social sciences because if you think of the traditional grid, it was largely all behind the scenes. You know, all you had to do was flip the switch and turn the knob, and whatever, energy just showed up magically, and it was all wholesale, behind the scenes. So as we move to a more distributed model of energy where it is more of a retail encounter, you're actually planning where that solar cell goes or you're thinking about your energy efficiency project that we have to -- energy people need to bring in all the tools that retailers have always brought in. I mean, it's nothing new. In the retail market, bringing in all these social science people. It's just new in energy, right, because it used to be a wholesale thing. So I just think that that's a hugely positive move, and I think that the more promote that in areas that are going to become distributed in areas that are going to be centralized.

MR. STOKES: Any followup for this question?

Okay. So we'll move to the fourth question. What technologies besides photovoltaic or strategies, such as zero net buildings, could potentially benefit from innovative business models or finance mechanisms the way rooftop PB has been benefited from third party leasing. What funding levels would be needed to pilot these potential business models or strategies.

MS. ALEXANDER: I would strongly encourage you to stay open that all different areas are going to be benefit from innovative business models. We've seen that across the board. I think you're going to have to probably design funding around a case-by-case basis. I don't know that you can generally answer that question, but as I have mention before, we have worked across the entire market innovative business models, have come up in every single one of them, so I'd hate to rule anything out.

MR. STOKES: George.

MR. CRANDALL: This is George. I think making long-term building upgrades is part of an investment in the facility and not part of home ownership, loans, individual loans, and I know there's a program in the state going on trying to do that. I think that's a big benefit to bringing other technologies to the market.

In Europe, there's a big effort, of five countries come together for solid oxide fuel cell adaption at the home level for natural gas to electricity and also heat and hot water. They're financing 1,000 units at about -- from five or six companies in various countries, each of them picking target markets usually trying to support some company in their own country, but a program like that is financed by the state, in this case, would make sense to advance these kind of technologies.

MR. STOKES: Thanks, George.

Anyone on line want to address this question?

MR. GOULD: Um, you know, the -- I think --

I think it's a question best addressed maybe by a policy expert but I do think there are certain signs that, that one can see that, that indication a public or indicate of some kind that's relevant, so, you know, for instance, an energy efficiency, of course, we all know that the investments in energy efficient technologies tend to be very strong, but the paybacks can oftentimes, from most advance technologies at least, be relatively long. And so where there's that kind of market failure, where the public, as a whole, you know, would benefit from a given investment but, you know, a particular individual may not have that incentive because he or she may not stay in that residence for long enough, may not own or use that piece of equipment for long enough, you know, those, those are definitely telltale signs that there's a public interest in stepping in to address that market failure or that mixed alignment of incentives and where that action could benefit the public of as a whole, that's where it seems to make market sense, but I think the particular mechanisms and the funding the level are going to differ depending on the circumstances.

MS. GARSON: This is Jennifer. I mean, I think, again, all the print ups of that whole idea is, of course, for incentives, a lot of market adoption of energy technology is driven primarily by policy levers particularly at the deployment level. We have seen, through federal incentives, whether it's been through federal tax policy or through the Recovery Act Policy, that when the policy signals are there, the market will oftentimes move on. So, so, you know, whether it's through energy efficiency tax credit for building owners, whether it's, you know, incentives for energy producers. I mean, I know that the State of California already does a lot of these policy including incentives for and mandates for energy storage among others, but, you know, looking into other -- kind of, carrots through the policy is always a good idea if you're trying to incentivize for the deployment. I think there's also, you know, obviously, room to talk with utilities about their own rate design and how you can create better incentives for -- and to adopt more efficient technologies. Obviously, there have been certain utilities that have moved on this across the country including looking at the whole fit fuel idea. I think there's a lot of -- there's a lot of thinking right now, though, new business models whether it's utilization of craft funding through equity states like mosaics or just craft funding for philanthropic reasons. I will -- actually, Beverly said it, that you don't want to cycle anything of these things either, because I think there are a lot of great ideas out there for business model redesign in the energy sector.

MR. STOKES: Thanks, Jennifer.

Anyone else want to add anything?

Okay. So we'll go on to the last question. To what extent do existing clean energy business incubators, business plan competitions, 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 innovator clean energy technologies to market?

MS. ALEXANDER: I think we all reinforced the notion that you can have a great technology but if there's not business vision or not business skills or business partners, you're never going to get there. Technology alone just isn't going to walk in the market, and so the more you can do the -- I mean -- doing a great job of working in the space, the more you can partner in that space. I think -- at the state level, I think that would be fantastic. I would just encourage you, from what we have seen, there's definitely some of these programs that seem to start at the business plan and go forward, and we have seen there's this rich, fertile soil pre-business plan, where teams aren't even because they're not getting that business thinking driven back far enough. And so I would encourage you to look at the whole space even including pre-business plan, but that I think state involvement there can be very positive. There's a lot of different models of success. So -- probably too numerous to talk about here but things where -- that we have heard already, the inspiration, the matching of business and technical people, the mixers between startups and large corporate strategics, the use of these user agreements to use state equipment so that they can have -- they don't have to spend the capital to get involved. There's many, many different ways you can support this phase. So it's constantly looking at best practices and gaps and then putting the money there and having some kind of a partnership hopefully with the feds.

MR. CRANDALL: This is George. One thing I've noted is there is a lot of these incubator programs that are State funded sometimes, university funded sometimes. Some of them are independent companies that fund these with investor organizations behind them. There's no really central program to tie these all together that, you know -- so what happens down in San Diego is not reflected in what happens in the Bay Area. And so something that would let everybody know about these programs and have some sense of an overarching organization to publicize them would be helpful.

MR. GOULD: You know, broadly, when we're talking about resources, one of the things that we do at ARPA-E is all performers, when they're awarded funding, they dedicate five percent of it. Sometimes, it can be more. They need a waiver to have less, but they dedicate at least, typically, five percent to technology to market activities. And so we allow performers to -- with our input and monitoring and judgement -- we allow those performers to spend those funds as they best see fit, and so that could be one way. You know, they sometimes use that to enter a business plan competitions. You know, Beverly talked about partnership with the feds. You know, in her business plan competition, we have had a couple ARPA-E awardees. So I think there's lots of room for collaboration and partnership. I don't necessarily think duplicating existing activities is the best use. And we have taken the approach of they provide people the resources and coaching and let them make good, informed adult decisions about how to use that. And, you know, we have seen that work pretty well as it relates to the incubators. I think where the public sector makes sense is for -- at least in our case -- that early stage technical development, because while I think all of us are very supportive of the business knowledge and business expertise that these incubators can give and it's critical, you know, there also needs to be, typically, a public sector actor to do that really early stage technical development where it's such high risk that it, frankly, make sense for the private sector to get involved. So I just want to make sure that piece isn't lost, and I think it also, you know, doesn't makes sense to not think about duplicating but still providing folks the resources, making sure that they're aware of and working with, where it's relevant, incubators. I think that would be a useful approach for the Commission.

MS. GARSON: This is Jennifer. I want to go back to something that Cole said earlier, too and that's access of information. I mean, one of the things that we see a lot of with entrepreneurs that we work with is that there's not a whole lot of information about which pathways they should be taking in terms of their go-to market strategy. So -- may have a technology but they don't even know what accelerators or incubators may be in their region unless they happen to be connected up with them. So a real concerted effort to map out the different resources within the State of California, the existing capabilities, the different accelerators and incubator and universities may have, you know, where entrepreneurs should be looking for partnerships and mentors, just a really strong mentor network is critically important for early stage companies as they try to figure out how they commercialize their product. And I think that, you know, the Energy Commission can certainly address a lot of this. So I hope they, again, would be the convening power for all these different organizations to really map out what the different resources are within the State of California. And then also, I mean, you know, providing support for these different, you know, incubators or work competitions. You know, we have seen that through research. I think it's 85 percent of incubators receive some sort of public support, whether it's at the state, local, or federal level. At lot of these incubators are nonprofit. They don't take equity stakes, but they serve a really important role for helping transition technology to market. So, you know, there's always direct support, but then also looking at best practices. So what have been the supported services that have worked best for California since startup. You know, what are the services that should be expanded upon. You know, I think there's a lot of opportunity to do good research and analysis on what the type of the services for the different markets in the clean energy sector could really be a big step in the right direction.

MR. GOULD: Just one quick thing to tack onto what Jennifer said in terms of just giving folks information, I think that's actually a really, to use a colloquial terms, I think that's potentially a quick win for the Commission. You know, there are a lot of resources online. We have a section of our website that we call a resource map where it's just a Google map, and there's little flags all over the country where there's resources, and you can imagine creating, consolidating something like that, obviously, probably more California focused for the commission, and that's not a ton of effort. You know, it's, essentially, linking people to publically available sources of, you know, LA clean tech incubator, you know, the Berkeley clean tech to market program, things like that that doesn't necessarily have to be a huge effort or costly but is a good way to give performers the information that they need.

MR. HERSHKOWITEZ: I wanted to agree with what Beverly and George said earlier about knowledge and information being very important. I think you can't really -- to provide that to be useful you really need to motivate and inspire people to want to get that information, to want to use it, because if you don't have people out there that are excited about starting companies and going out becoming entrepreneurs and building new things, it's just going to sit there and sit there and sit there. And I think the way -- one way you can use business plan competitions and incubators to do this is we applied to both years of the Flow business plan competition, and the first year we applied, we didn't do so well. We didn't fail at the beginning, but we didn't get to the end. And just being there, and seeing that, talking to the other startups. They're talking to the startups that won, you could really see that they aren't much different from you as students. And it shows people a clear path from step one, being a student to step five or ten, which is actually owning a company and being on your own. And I think illuminating that path for people and showing people that there are steps and having people meet other startups and entrepreneurs who are anywhere between step zero and ten, makes it very obvious and very clear, there's doable, tangible real thing, and I think, kind of, building that community in these areas and showing people that there is a step zero to step ten is equally as important as knowledge because that's what motivates people to pursue the knowledge and find the knowledge on their own.

MR. STOKES: Beverly.

MS. ALEXANDER: Yeah, just building on some of these comments, we wondered if there -- we might be able to create a California wide energy mentorship network, because Clean Tech Open has a great network. We have got about a thousand person mentorship network, so some, some possibility of -- I like this idea of linking these mentorship networks and maybe cataloging by subject and sector or whatever and also linking the library resources. So one of the advantages is that we have is our students have access to all of the Berkeley libraries, and so things that would cost people four or $5,000, to get it outside the university, they can get access to inside. And I'm wondering if the State can play a role with access to library resources or help with subscriptions services. There's some amazing market resources out there, but they're too expensive for a startup, especially young and really cash strapped. So all of those linking and labeling and reminding people of and making available all those kinds of resources would be great.

MR. STOKES: Any followup on line?

Okay. With that, I think we'll move to the public comment questions. We'll start with those in the room. If you have a question or comment, come up to the podium and, for the court reporter, please state your name and organization.

MR. HORSTING: Walter Horsting, Business Development International representing a national gas to liquid fuels breakthrough technology and also a Canadian firm building molten salt reactors that I wanted to address.

For Josh, I was wondering if there was any research of funds out there for mitigating flare gas emissions. There's roughly six trillion units yearly being emitted into the atmosphere, and I'm representing a process that could be very helpful on orphan well site, well head sites for that.

The second issue I wanted to bring up is that green energy requires a massive amount of rare earth elements. Lithium for batteries Magnesium for magnets, and various rare earth elements for solar panels. There's a vast wasteland of, of a toxic leftover including thorium being left behind in this mining. The unique aspect and the DOD -- I mean, DOE has actually allowed China to be working on the thorium molten salt reactor using Oak Ridge National Labs information -- is that we can take the thorium that's being literally tossed into tailing ponds and have hundreds of years of absolutely clean emission free energy, and I would like to suggest that we look at a thorium and rare earth federally charted development bank to allow the private sector to develop useful, useful local stream of rare earth elements not have a monopoly forcing all advanced green energy to China for manufacture for sourcing of the rare earth elements, which is currently the case, to bring industry back to the United States and California.

I'm, right now, being asked to look at fifty-year franchises for nuclear power desalinization plans. I'm going to have to go to Canada for supply and to the Middle East for partners to make that happen when that could be being done in the Port of Oakland or Port of Long Beach and ship globally and also help with our current drought situation.

So I would just like to advocate thinking about thorium rare earth development bank to get the environmental impact off of the mining. We don't have to mine for any more energy, because it's just sitting in tailing ponds. Literally, thorium is everywhere, and we might as well use it cleanly. Thank you.

MR. STOKES: Any more questions?

Okay. So Tom Jensen from Enterprise Futures Network.

MR. JENSEN: Hi. Enterprise Futures Network is a nonprofit that was founded in 2003, and it's a mentor based network that works with universities throughout the country including NYU and Duke and Michigan Rice and others, and so what we do is we draw on volunteer experiments in terms of a business community who volunteer largely in entrepreneurial classes and business plan competitions, and I'd like to echo what people have been saying about the role that the CEC can play in terms of them pulling together a process and framework and resources and in one place. It's not just PDFs or links but actually kind of a -- you know, it's about commercialization or about, you know, getting funding or whatever. Again, there's a process associated with that, so I think you can do a good job, kind of, laying out something maybe in an interactive website that can do that.

And then, you know, entrepreneurs or inventors even pre-company, they can learn a lot from mentors, and they can also learn a lot from themselves. You know, I think one of the most valuable things in these business planning competitions or other forums in terms of -- is if you can get them together and sectors, different sectors, for two, three days where they can all, you know, learn from each other and particularly over the web, you might be able to find a cofounder or someone who wants to collaborate with you. So I think there's a lot of things you can do.

MR. STOKES: Thanks, Tom.

Any more public comments or questions in the room?

Oh, we have one more.

MS. TEN HOPE: This is Laurie ten Hope from the Energy Commission, and I'm just interested in your thoughts on how you prioritize the companies that you help. Not all ideas or teams are equal, and if we get attached to all of them -- if we're working with them -- but any thoughts you have on really focusing on the cream of the crop.

MS. ALEXANDER: So even -- we run two selections communities when we're picking our projects. We run, sort of, on an internal one and an external one. The internal one is folks who have worked in tech transfer across Department of Energy labs and universities and inside people who have experience commercializing universities and Department of Energy and other types of technical fields really fundamental research work. So that's our first screen is a more technical screen, and then our outside screen is more investment oriented where we bring in all different kinds of investors whether they're large corporations or venture capitalists or family funds, which are becoming increasingly important right now for patient capital. And so we do an investment screening and we -- out of that, we pick our winners. And we try to be -- we think that a smaller program that has a higher yield is probably better than some huge program that's more buckshot, but that's just our philosophy, so there are different ways. But we do think the screening is important but -- and we screen on a lot of different factors on how breakthrough is the science engineering what -- how -- what are these markets looking like, what is the impact on carbon, so there's, kind of, a social benefit screen, lots of different screening functions, but those are probably our main ones. And then how accessible are the inventors and are they really going to work with the team that's actually going to commercialize this.

MR. CRANDALL: This is George.

MR. STOKES: Laurie -- oh, go ahead. Sorry. Go ahead.

MR. CRANDALL: With the RETC what we really had, as Beverly said, is we had internal screening process, and we would sort those down. Since we were dealing with pretty large equipment type companies and technologies weren't usually breakthrough technologies, refined technologies, so the data that we work with was pretty understandable. We would then pass it on to funding source -- which, in our case, was the Army; sometimes it was grant sources -- and get their approval on the process and have an application for their uses. But it is complicated when you're talking about state money to fund another gasifier or another Fischer-Tropsch process, and it's going to have to develop into a clearer definition or matrix that makes this technology worthy.

MR. STOKES: Okay. Josh, I think you were going to weigh in on that.

MR. GOULD: Yeah. So I think Laurie has a good point. All of us, whether public or private, have limited resources, so I think how to spend one's time and resources is a really relevant question. For us, we try to focus on a team specific's needs, which sounds really generic, but let me just give you a few examples. So for teams that already have the skills and experience and, and, you know, sort of, fully based competency to do a startup or get a technology to market by their own assessment and ours -- oftentimes, our role is more strictly focused on the convening authority, thinking of it as almost, you know, helping folks with their business development, making introduction where it's necessary but, you know, probably a little bit less direct engagement, a little bit less time because, you know, I think a lot of those people have the folks that have the network and competence to be able to accomplish it, and I think a larger category of teams are those that are willing and able to want to learn more, may not have the skills as it is today or the set of experiences or the team as it is today, to be able to execute on their objectives, and that's where we feel like we get a very good return on the time that we spend with that group of teams. You know, folks who may not be -- may not have it all figured out today, but at least are open and honest about it and willing to improve and learn and, you know, that's where we really have a high touch and can dig in and, you know, help to inspire those people but also help to coach and teach those folks. I think one advantage that, that we have -- it may not be as relevant to the commission -- it's where and when we find a project that is not performing or a team is not going to have the impact that they intended either because they gave their best efforts and it particularly isn't going to work out because they're doing something difficult or, you know, maybe they have made some mistakes of their own volition, we can -- we can eliminate them. And so we try not to use that stick, so to speak, where it isn't relevant but it is helpful in terms of making sure that we're spending our time where we have an impact. So, again, just adopting that approach based on what a specific team's needs are. I think being flexible has been really helpful to us.

And then just to that first -- that gentleman's first question, just two quick responses. First, you know, flaring is definitely a large problem. We, in general, can't talk about potential future programs, because it would give someone a benefit, so I can't really speak to whether we will or will not run a program around that, but it is an emissions problem and then as it relates to rare earth, we actually have an entire program 35 to $40 million of investments around finding rare earth replacements for materials where is needed. You know, there's applications in consumer electronics, of course, magnetics, motors, et cetera. So we're running a program around that problem to address it, but again, as it relates to Laurie's comment, I think being flexible and trying to spend time, you know, eliminating teams that, that -- who -- whose participation is not going to benefit them or the commission and then being able to work with teams where they may not be, sort of, fully baked but at least they're open and willing to learn and inspire to learn, that's where we find that highest return on our own time and effort.

MR STOKES: Any more comments?

MS. GARSON: Yeah. This is Jennifer Garson. I just wanted to, kind of, give my perspective because a lot of the programs that we run, we fund other organizations basically to find good teams and good companies, and a lot of what we rely on from, from our organizations is really making sure that the teams that they work with are actually committed to really developing their technology, and lot of times it's based on personal relationships. And so a real commitment from teams over a couple of months if they really want to be involved in the process. But, you know, we also -- we rely on network to basically help do the vetting for us. If I try vetting every single technology that went through the business plan competition I wouldn't have, you know, any time to execute anything else. So we rely on our really good partners that we wanted to help carry out these activities, but in terms of characteristics that we have seen in companies that have been done well either through the innovations ecosystems initiative or through the business plan competition, a lot of it really does come down to the team itself. Some of the people we have seen that, you know, won national prizes or have, you know, done good phases are people who are okay with not getting ranked the first time. In fact, you know, our national, one of our competitors this year has gone through competitions the previous year hasn't done anything, came back and really were committed to developing this technology, which I think is indicative of a good entrepreneur regardless of whether or not they win competitions. So really making sure that the team is very committed to carrying through their technology and being committed even when there may be, you know, a potential failure is really important.

MR. STOKES: Okay. Any other comments?

I'm guessing with that, we'll go to those online that wish to have comments or questions.

Okay. So Kevin Wolf.

There, Kevin? No.

Okay. I think that is it.

Any closing remarks from the panelist that they'd like to make?

MS. ALEXANDER: I think this has been a very --

MR. GOULD: I'd just like to say I think that the commission is engaging in this process. I think listening to one's constituents is always good. It's something we try to do at ARPA-E, and I want to say, thanks, for hosting this, and I think you're absolutely doing the right thing in terms of how to best spend your time and effort in funding going forward, so well done.

MS. ALEXANDER: Just echo, we're very excited to see you getting engaged in this space. I think it will be very positive.

MR. CRANDALL: And I hope that the success rate of projects will increase through these programs. I think that's something that has not been a terrible success rate at the agency, and I think these methodologies will improve the use of the money for these programs.

I want to thank CEC for having us today.

MS. GARSON: Yeah, I'd also like to thank the commission for convening everybody to talk about these issues and for -- from the energy standpoint, I mean, the issue of trying to address the gap of bringing tech to market particularly in this early stage of commercialization is a really important area, and I'm thrilled to see that you guys are really taking an initiative on trying to tackle some really tough issues, but the great thing is that you have a lot of great actors and great players within your state that are really trying to focus in on that area. So the more that you tap into the current knowledge that you have within your stakeholder, I think the better, but I really want to thank you for inviting us to participate.

MR. HERSHKOWITEZ: Thank you guys for hosting this. Thank you guys for reaching out to the community, and I think there's a lot to learn about what everyone said here, and I look forward to continuing to learn from everyone in the clean energy community in California.

MR. STOKES: Great. Well, I just want to thank all our panelists for participating today.

It's 2:45. We'll take a 15-minutes break, and we'll start the last topic of the day at 3:00 o'clock, which will be a staff presentation followed by public comments.

(Break taken.)

MS. DOUGHMAN: We're going to get started again, so if everyone can take their seats.

MS. NEIDICH: Thanks, Pam. My name is

Sherrill Neidich and I work in the Energy Research and Development position and I also -- well, I work in the energy deployment and market facilitation office. I'll be providing an update on the local regulatory and permitting challenges. I'll be providing an overview of the local regulatory and permitting initiatives in the first EPIC investment plan that was the 2002 -- or 2012 to 2014, other clean energy regulatory and permitting efforts I did for the second EPIC investment plan and, then I'll have some planning and permitting questions.

These are the initiatives that were outlined in our investment plan under the objective 16. These are the permitting and planning initiatives for the 2012 to 2014. 16-1 was to conduct pilot demonstrations of localized energy resource markets in each IOU territory, and these pilot programs will illustrate best practices for coordinated planning and will help achieve high penetrations of local energy resources. 16-2 is to provide planning grants to cities and counties to incorporate clean energy technology planning and permitting progresses into local government land use planning, and the grants will provide funding to cities and counties in the IOU territory, the upgrade their comprehensive plans, regulations and codes to promote deployment of clean energy technologies and balance development impacts. And 16-3 was to conduct a local government needs assessment study that identified regulatory gaps within local planning and zoning processes, and this will be a review and will be consisting of existing planning and zoning documents in assessing needs or gaps. And four, 16-4, was collaborate with local jurisdictions and industry stakeholders to create model ordinances for emerging clean energy technologies and this will assist the local governments with establishing appropriate ordinances in advance of new technologies -- of advance of new technologies becoming fully deployable in markets. And 16-5 is to provide funding to assist in the implementation of the general plan guidelines and through a competitive bid process, a contractor will be selected to work with OPR, Office of Planning and Research to ensure local governments have the tools to implement clean energy aspects of the guidelines in the IOU territory. And six, 16-6, is develop consensus based educational materials for local officials interested in facilitating clean energy market growth, and we will develop and disseminate clean energy planning and permitting information for local governments in IOU service territories.

There's also some other clean energy regulatory and permitting efforts going on right now. The Governor's office of planning and research general plan guidelines will be out shortly -- will be released this year. And after they're released, there will be a voluntary sixty-day public review period. The general plan guidelines provide cities and counties information that they will use to prepare and update their plans. The web page link noted on this slide will take you to the general plan guidelines web page where you can find additional information and sign up for the general plan guidelines elist.

And then there's information for the Desert Renewable Energy Conservation Plan. You can go to that web page to find information about the DRECP, Renewable Energy Conservation Planning Grants Assembly Bill X1-13 added public resources code section 25619 -- excuse me. And directed the Energy Commission to provide up to $7 million in grants to 15 qualified counties for the development of revision of roles and policies. And there have been -- the one solicitation went out. It was released in 2013, and the first solicitation, five counties received awards totally approximately $3.3 million and for those counties -- excuse me -- that receive the funds were Imperial, Los Angeles, San Bernardino, and San Luis Obispo. A second solicitation was released on January 18th, 2014 with a deadline to submit applications on March 24th, 2014, and that solicitation will provide up to $2.5 million in grants for the development or revision of rules and policies and there was ten qualifying counties for that solicitation and for those counties, I mean, those ten qualifying counties were Fresno, Kern, Kings, Madera, Riverside, San Diego, San Joaquin, Stanislaus, and Tulare. And a third solicitation will be posted soon. You can find out more information to promote the development of this on the web page link noted on this slide where you can sign up for the renewable listserv and the commission grant manager for this solicitation is Pablo Gutierrez, who works here at the Energy Commission in the Renewable Energy division.

And then we have also Assembly Bill 327, which is distribution resources plans. Assembly 327 requires each IOU to prepare a distribution resources plan to identify optimal locations for distributed renewable generation resources, energy efficiency, energy storage, electric vehicles, and demand response technologies consistent with the goal of yielding net benefits to rate payers. The plans are due to the CPUC no later than July 1st, 2015, and you can read the entire bill at the web page link noted on the slide.

And staff is seeking ideas for the second EPIC investment plan. That's the second one for the 2015, 2017. We have had some preliminary areas for planning and permitting. And these are listed here. The programmatic environmental impact report, the biomass, the environmental impacts report should focus on streamlining the environmental review process for Senate Bill 1122 type projects. There's also clean energy technologies and infrastructure to improve local energy reliability during anticipated and emergency conditions like, fire, drought, flood, heat waves, et cetera. We're also looking at exploring process innovations to better coordinate IOU planning and local government permitting for the next generation of clean energy deployment, also, regional planning about clean facilities such as mitigation banking and other conservation strategies and, of course, any other ideas.

And then here's some questions we'd like to pose, and these, once again, will be for the 2015, 2017 investment plan. One, should EPIC provide funding -- we're already programmatic -- environmental impact report for biomass? How should this be structured to best capture benefits for IOU electric rate payers? And also, how can EPIC address, planning/permitting barriers to fast track deployment of technologies that can improve local reliability? Three, how can EPIC funds build on work underway to identify preferred areas for distributed generations. What critical needs for planning and permitting on this topic remain unaddressed? Four, what types of tools would be most useful to regional, local planners to facilitate planning, permitting, and, and implementation of clean energy facilities and technology. And five, what are the next generation of permitting and regulatory challenges that the state may face to achieve goals for energy storage, micro grids, and other clean energy policy objectives?

And next steps, we would encourage everybody to complete the questionnaire that was sent out with the notice, and the link on this page is for that questionnaire. So if you haven't seen it already, please check it out. We also have a notice for instructions to submit comments. This is the link for that notice, so you find the location where to send any comments, and we encourage everybody to sign up -- if you haven't done so already -- for the Energy Commission's EPIC list server, and that link there is for the web page for EPIC. And once again, our written comments and the questionnaire are due February 13th, 2014, and I guess we're going to open up for questions, and, of course, if anyone has any more information about the EPIC program administered by the Energy Commission, you can contact the staff noted on this slide.

So I guess first, we'll see if there's any questions out in the audience. Bob.

MR. RAYMER: Thank, you Sherrill. This is Bob Raymer, senior engineer and technical director with the California Building Industry Association, and my comments today on this would follow under other ideas, sort of, micro permitting if you will. The first problem that's popped up -- and both of these relate significantly to the existing housing stock and existing commercial stock, the first one for existing housing stock. For about the past six to eight years, the Energy Commission has required duct testing if you're going to put in a new air-conditioner or heater. And what we have found is, of course -- that, of course, makes a lot of sense. We were very supportive of that during the development of the regulations. For those of you that are unfamiliar, before you can put an air conditioner on to an old house put a new air conditioner on to an old house, you have got to check the duct system to make sure that duct system isn't leaking, and if it's an old house, it is leaking and it's usually leaking very badly, in the range of the about 30 to 60 percent leakage rate. That being the case, it takes all the sense to require that not only to do testing but if you find a leakage rate over a certain level, I believe it's nine percent, you have got to fix it.

Unfortunately, this had the inadvertent, sort of, effect of significantly increasing the cost of fixing the air conditioner. Case in point, it's not uncommon to find HVAC change out jobs that if you fix the duct system or look at, it cost about five grand. If you do fix the duct system and do the testing, it will cost ten grand. So what's happened here, I'll use LA as an example, over 90 percent of the HVAC change outs in the county of LA are currently being done underground. Whether or not this is by a licensed contractor or an non-licensed contractor, number one, they're not pulling the permits. They're -- of course, they're not checking the duct system. They're not fixing the duct system. The home buyer, may or may not be aware of this. I would suspect in most cases, they're not aware of the state requirement, so consequently they may have an excellent 14 SEER or 15 year air conditioner of which they're only maybe getting half of the cool air into the rooms.

So with that being said, there -- for the last couple of years, there's been a desire to try to fix this at the local permitting stage and at higher levels. And in looking at a number of initiatives that have, sort of, been bounced around, number one, of course, CSLB has a sting operations, and they have been working off and on with the Energy Commission to help provide technical background support. But to the extent that a more elaborate, and I would say state level and localized level, of education to the public in general, to get this word out could be very helpful. There should also be some type of interaction between the CEC and CSLB with regards to the contractor license board's testing. In essence, HVAC contractors, there should be serious requirements as you take your test, as you do your training, or whatever, that you have got to show an understanding of the state's regulations, because these things evolve before somebody actually goes into the business and pulling permits or whatever, they should fully understand that you can't just simply slap a new air conditioner onto a very leaky duct system. But more importantly, I would say there needs to be some type of, I would say, pilot program done where we investigate the ability to provide a paper trail from the manufacturer to the retailer to the installer to the home. So in essence, we can actually find why, out of the 10,000 air conditioners sold, only 400 had permits pulled, that we have only got a slight idea of where those 400 went. The others, they went somewhere in LA, we just don't know. So with that, that would be one area where it's certainly the peak load of some of these major metropolitan areas could be helped. If there was some focused attention to that. We may have to have statute to go along with some type of the paper trail. I know that labor CBIA and a few other groups are very supportive of that, but it's going to take a lot of work on the part of the Energy Commission to the extent that EPIC would be used to help underwrite some of those initiatives. It would be very useful.

The last item I wanted to bring to your attention was something that we have, sort of, being working on with staff for about the last six months, and it's just starting to, kind of, gear up here, and that is, of course, California has its home energy rating service, sort of a way to compare apples to apples among existing housing stock and new housing stock and even newer housing stock, but you should be aware that the national HERS and the California HERS are very different, and I would say in California, I would say probably the top 10 to top 15 production builders are doing business outside the State of California along with their California market, and so with that, they're finding great difficulty. To use an example, KB Home has a number of the projects in the southern part of Nevada and then right across the border into southern California, and they can find that the home in California gets a much worse score on the national home energy rating service because a lot of the things that we do in California, that are clearly energy efficient, do not get credit at the national score, and so there has to be some kind of a crosswalk from California to the national program. We have been working with Commissioner McAllister. He's very aware of this issues, and unfortunately, we -- it's a lot worse than what we originally anticipated. We thought that, you know, it's not a huge scale. You effectively got a hundred, couple hundred points or whatever to work within. The same house done -- a minimum client's house in California is actually getting a 22-point difference from other homes built in Nevada when they should be effectively the same. There's a negative 22 points for the home in Nevada or California gets. That's not good, and so to the extent that we can somehow create a consistent system where, not only at the national level, you can compare apples to apples but somehow so California can effectively get the credit that it's due.

So I realize that may be sort of a little advanced from what EPIC would normally be doing, but it could be immensely helpful, particularly, as we move further into the existing housing stock. And for a number crunching, we have got 13 and a half million units that are out there, apartments and condominiums, and single-family homes. Two-thirds of them were built before the first set of energy regs took effect, and so there's a huge market of what you might call energy hogs out there, and we'd like to help work on it. Thank you.

MS. DOUGHMAN: Any other comments in the room?

Any comment online?

Okay. So that ends our discussion for planning and permitting, and I would like to remind everyone to provide written comments on the questions we discussed today by February 13th. Also, please submit a completed questionnaire on ideas for the second EPIC investment plan by February 13th. The email address to submit both items is posted here. Please indicate 12 EPIC 01 and EPIC Second Investment Plan in the subject line. And with that, we'll adjourn. Thank you, everyone.

(Whereupon the proceedings ended at 3:18 p.m.)

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I, Brittany Flores, a Certified Shorthand Reporter of the State of California, duly authorized to administer oaths, do hereby certify:

That the foregoing proceedings were taken before me at the time and place herein set forth; that any witnesses in the foregoing proceedings, prior to testifying, were duly swore; that a record of the proceedings was made by me using machine shorthand which was thereafter transcribed under my direction; that the foregoing transcript is a true record of the testimony given.

Further, that if the foregoing pertains to the original transcript of a deposition in a Federal Case, before completion of the proceedings, review of the transcript ( ) was ( ) was not requested.

I further certify I am neither financially interested in the action nor a relative or employee of any attorney of party to this action.

IN WITNESS WHEREOF, I have this date subscribed my name.

Dated:

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Brittany Flores CSR 13460