

BEFORE THE
CALIFORNIA ENERGY COMMISSION

In the Matter of:) Docket No. 12-EPIC-01
)
Implementation of the) Workshop
Investment Plans for the) RE: Second Triennial
Electric Program Investment) Investment Plan
Charge Program)

Joint Workshops on the Proposed
2015 -2017 Triennial Investment Plans
for the Electric Program Investment Charge Program

CALIFORNIA ENERGY COMMISSION
HEARING ROOM A, 1516 NINTH STREET
SACRAMENTO, CALIFORNIA

MONDAY, MARCH 17, 2014
10:00 A.M.

Reported by:
Kent Odell

APPEARANCES

Commissioners Present (*Via telephone)

*Robert Weisenmiller, Chair

Presenters

Laurie ten Hope, Energy Commission
*Damon Franz, Energy Division, CPUC
John Minnicucci, Southern California Edison Company
Percy Haralson, Southern California Edison Company
Suna Taymaz, Pacific Gas and Electric Company
Frank Goodman, San Diego Gas & Electric Company

CEC Staff Present

Pam Doughman
David Hungerford
Rizaldo Aldas
Jamie Patterson
Erik Stokes
Lorraine Gonzalez

PG&E Staff Present

Amanda Moore, Regulatory Case Manager, Pacific Gas
and Electric Company

Also Present

Frank Ramirez, National Director for Governmental
Affairs, National American Indian Veterans
Nehemiah Stone, Benningfield Group, Board member of
California Energy Efficiency Industry Council
William Toman, with Cal Poly San Luis Obispo
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Walter Silva (ph), Philips Lumileds
Scott Elrod, Palo Alto Research Center
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Art Rosenfeld, Lawrence Berkeley Laboratory
Mark Berman, Davis Energy Group
*Fred Bauman, Center for the Built Environment,
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Merwin Brown, Electric Grid Research
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I N D E X

	Page
Energy Commission - Opening Remarks	
Chair Robert Weisenmiller, Energy Commission	4
Overview of the Energy Commission's 2015-2017 EPIC Investment Plan	
Laurie ten Hope and staff, Energy Commission	9, 20
Damon Franz, Energy Division, CPUC	14
Public Comment on the Energy Commission's 2015-2017 EPIC Investment Plan	68
Next Steps	86
Investor-Owned Utilities - Investor-Owned Utility EPIC Investment Framework	87
John Minnicucci, Southern California Edison Company	88
Overview of Southern California Edison Company's 2015-2017 EPIC Investment Plan	
Percy Haralson, Southern California Edison Company	95
Overview of Pacific Gas and Electric Company's 2015-2017 EPIC Investment Plan	
Suna Taymaz, Pacific Gas and Electric Company	106
Overview of San Diego Gas & Electric Company's 2015-2017 EPIC Investment Plan	
Frank Goodman, San Diego Gas & Electric Company	117
Brief Discussion on EPIC Intellectual Property Issues	
John Minnicucci, Southern California Edison Company	128
Public Comment	138
Adjournment	143
Reporter's Certificate	144
Transcriber's Certificate	145

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2
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4
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8
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P R O C E E D I N G S

MARCH 17, 2014 10:03 a.m.

MS. DOUGHMAN: Just a few housekeeping items before we begin. I need to inform you that this workshop is being recorded and the recording will be posted on the Energy Commission's webpage, as well as the transcript.

For those of you not familiar with this building, the closest restrooms are located off to the left behind the hearing room. 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 now Chair Weisenmiller will welcome us to the workshop.

CHAIR WEISENMILLER: Welcome to this Joint Workshop on the second EPIC Investment Plans. This workshop provides another

1 opportunity for stakeholders and the public to
2 provide input for the development of the second
3 set of EPIC Investment Plans. This workshop
4 follows upon the February 7th Scoping Workshop
5 for the Energy Commission plan and the February
6 21st Webinar for the EPIC funds administered by
7 Edison, PG&E, and San Diego. In addition, we're
8 having another workshop in Southern California on
9 March 21st.

10 The Energy Commission's proposed
11 initiatives are designed to improve reliability,
12 safety and affordability by supporting
13 incremental and breakthrough advancements in
14 clean energy. These advancements will help
15 achieve California's clean energy goals and
16 follow the loading order for electricity. The
17 plan includes initiatives for energy efficiency
18 and demand response, renewable energy, and
19 distributed generation and storage, and the
20 infrastructure needed for Smart Grid and Electric
21 Vehicle charging.

22 This draft proposed initiatives for
23 market facilitation will build on discussions at
24 the February 7th workshop indicating a need for
25 EPIC funds to expand commercialization assistance

1 for emerging clean energy technologies.

2 The staff draft EPIC Investment Plan
3 proposes the option of using EPIC to help fund
4 New Solar Homes Program if other funding sources
5 are not available.

6 Thanks for your participation today and
7 we look forward to your feedback.

8 MS. DOUGHMAN: Thank you, Chair
9 Weisenmiller. So today we are having a joint
10 workshop with the Energy Commission, Pacific Gas
11 and Electric, San Diego Gas and Electric, and
12 Southern California Edison. And this is to
13 discuss the proposed 2015-2017 Triennial
14 Investment Plans, the initiatives for those plans
15 for the Electric Program Investment Charge.

16 So our next speaker is Damon Franz.
17 Damon, are you on the phone?

18 MS. TEN HOPE: While we wait for him to
19 connect, Pam, why don't you run through the
20 agenda?

21 MS. DOUGMAN: Okay, so the agenda for
22 today, we'll have an introduction from the
23 California Public Utilities Commission, followed
24 by the Energy Commission. We'll have Laurie ten
25 Hope and staff discussing our proposed

1 initiatives for the 2015-2017 EPIC Investment
2 Plan.

3 Then we will have public comment on the
4 Energy Commission's proposed initiatives. We
5 plan to break for lunch around that time, and
6 after lunch we plan to have the Investor-Owned
7 Utilities discuss their proposed initiatives. To
8 begin that discussion, we'll have John Minnicucci
9 from Southern California Edison discuss the EPIC
10 Investment Framework for the Investor-Owned
11 Utilities, then each of the utilities will walk
12 through their proposed initiatives, giving some
13 examples, and then there will be a brief
14 discussion of intellectual property issues from
15 the perspective of the Investor-Owned Utilities.

16 Then we will have public comment on the
17 Investor-Owned Utilities' presentation, and after
18 that we will have a continuation of public
19 comment on the Energy Commission's proposed
20 initiatives if additional time is needed.

21 So we're about to unmute all callers to
22 see if our speaker from the CPUC is on the phone.
23 If you are not from the CPUC, please mute your
24 phone. Damon, are you on the phone? Okay, well,
25 I think - Damon? I think we'll go ahead and get

1 started with the Energy Commission's
2 presentation. Following the Energy Commission's
3 presentation, we will hear from the CPUC.

4 MS. TEN HOPE: Good morning. I'm Laurie
5 ten Hope, I'm the Deputy Director for Research
6 here at the California Energy Commission, and
7 with the absence of Damon from the CPUC, just a
8 little bit of context for those of you who may be
9 new to this process.

10 The CPUC established a proceeding and
11 developed the Electric Program Investment Charge,
12 and we are in the midst of implementing the first
13 Investment Plan with the four Administrators that
14 both the Chair and Pam identified, so the Energy
15 Commission and the three Investor-Owned Utilities
16 are administering Investment Period 1 and we're
17 here today to talk about Investment Period 2.

18 So you will be seeing solicitations
19 rolling out from the utilities and the Energy
20 Commission for that first time period, and we're
21 planning for the second. So that overlap, I just
22 want you to keep that overlap in mind, and the
23 second plan is to build on what we anticipate
24 accomplishing in the first investment period.

25 I understand that Damon is on now, so

1 he'll be able to walk us through.

2 MS. DOUGHMAN: Damon, are you on the
3 phone? Please go ahead, Laurie.

4 MS. TEN HOPE: Okay. So I'm going to
5 start with the Energy Commission's presentation
6 and just provide a little bit of context. This
7 will be kind of rolling through at a pretty high
8 level, and I'm sure the utilities will feel the
9 same way, kind of rolling through what we
10 anticipate our second investment plan will cover.

11 And as I was saying, this is going to be
12 for the time period of 2015, 2016, and 2017. I
13 am going to provide a little bit of context for
14 what we anticipate will be in our plan, and then
15 the staff members will walk through each of the
16 initiatives. This will be pretty high level and
17 we expect to have a draft plan out by the 21st
18 and that will allow you to take a little bit more
19 look at the context of what we're envisioning for
20 each of these initiatives. So for the next
21 slide, please.

22 Our initiatives in the 2015-2017
23 Investment Plan are based on, first of all, SB96
24 which was a statute passed in 2013, it provided
25 some priorities for the Energy Commission's

1 portion of the EPIC Investment Plan, with an
2 interest that, at a minimum, the investment plan
3 include storage, renewable energy, energy
4 efficiency, forecasting of renewables, electric
5 vehicle grid integration, and renewable energy
6 grid integration. So the scope is not limited to
7 those areas, but those are established as
8 priorities with an expectation we would identify
9 the barriers and gaps to research in those
10 particular areas.

11 We have received over 100 sets of
12 comments and want to thank you for those; those
13 have been reviewed and are reflected in the
14 initiatives. We have done an assessment of the
15 current state of R&D at this point, and what we
16 see is some of the R&D gaps based on the first
17 Investment Plan activities by the Department of
18 Energy, the utilities, and other private sector
19 actors, and looking at what the key factors
20 driving clean energy development are.

21 It probably goes without saying that the
22 initiatives incorporate the CPUC's final
23 decision, their defined program areas, their
24 emphasis that we follow certain guiding
25 principles, and what was termed "electricity

1 value chain," tie the research back to the
2 electricity system and identify the areas that
3 have the greatest potential value proposition for
4 ratepayers. Next slide.

5 So I'm not going to go through all the
6 differences between Investment 1 and 2, but just
7 to give a high level of an example in energy
8 efficiency -- let me just say the Investment Plan
9 itself will give a reflection in all the topic
10 areas of what is covered in Investment Period 1
11 and what will be covered in the second one.

12 In the first plan in energy efficiency,
13 we established a foundation for large-scale
14 demonstration deployments and feel that now with
15 the foundation that we'll be ready for some
16 large-scale demonstration projects that you'll
17 hear about in the Technology Demonstration &
18 Deployment area.

19 But in the Applied Research, there's
20 still a need for ongoing technology work, both at
21 the technology level and the integration level,
22 in order to meet ZNE goals and really up the
23 energy efficiency of existing buildings. But one
24 of the things that we've added in the second plan
25 is a "golden carrot" type project for super-

1 efficient consumer electronic devices. And so
2 we'll be interested in feedback in this new area.

3 In the Industrial, Ag and Water Area,
4 we've focused both in pre-EPIC and the EPIC first
5 plan on technology demonstrations for the
6 Industrial Ag and Water area. And so this time
7 we're going to step back and look for what are
8 some of the enabling technology opportunities.
9 We've done four rounds of demonstration projects,
10 so looking for more of the breakthrough type
11 technologies. And we're also going to focus on
12 end use water efficiency; it wasn't the major
13 focus in the first plan, and the drought kind of
14 brings that to fore.

15 The next topic area is Technology
16 Demonstration & Deployment. As I basically
17 mentioned, the first plan focused on IAW
18 Demonstrations, so this time we're going to focus
19 on the building sector demonstrations. And in
20 the second plan, we're really looking for ways
21 it's going to accelerate the ZNE or near-ZNE
22 buildings and communities, so we expect that
23 through the first plan we'll be doing individual
24 sites and we're looking at either procurement
25 strategies or incentive strategies, ways that

1 this will be deployed more on a subdivision, full
2 development power park-type basis. So we have
3 some ideas in that area, but we're also looking
4 for stakeholder input.

5 And lastly, market facilitation. In our
6 first Investment Plan, we initiated some pilot
7 programs in workforce development and permit
8 assistance for local governments, and in the
9 second plan we've really taken a step back based
10 on workshops we had in the development of the
11 first plan and our February 7th workshop, and
12 we're really proposing to diversify the market
13 facilitation area quite a bit and look for
14 strategies that will accelerate deployment
15 through institutional procurement, product
16 validation, partnerships with incubators,
17 linkages with the investment community. And so,
18 again, we're going to put forward some new
19 initiatives in this area and, you know, tell us
20 if you think these are good ideas, or if you have
21 some others you'd like to put on the table.

22 And lastly, the Chair mentioned we are
23 incorporating NSHP as a potential option in the
24 second Investment Plan. There is a shortfall in
25 the New Solar Home Partnership Program and we're

1 looking at all funding options to fund market
2 support in NSHP, and keeping the door opened at
3 this point in the second Investment Plan.

4 All right, so we're going to take a
5 little detour back to Damon Franz with the CPUC,
6 and then we'll roll through the initiatives.

7 MR. FRANZ: Hello?

8 MS. DOUGHMAN: Go ahead, Damon. We'll
9 switch over to your presentation now.

10 MR. FRANZ: Thanks. Sorry I'm a little
11 bit late, I had a little trouble dialing in. My
12 name is Damon Franz, I'm the Supervisor of the
13 Emerging Procurement Strategy Section at the PUC
14 and we are responsible for EPIC implementation.

15 I want to thank the CEC for holding these
16 workshops. When we were developing sort of the
17 policy around EPIC, we recognized the importance
18 of having a lot of stakeholder input into the
19 plans. This is really a program that is meant to
20 be for the public, to address public benefits,
21 and so public participation and public input is
22 really important to the process, so I just want
23 to encourage participation and sort of robust
24 comments. Next slide, please.

25 So just to give you a little bit of

1 background on the EPIC program, the EPIC Program
2 kind of picks up where the PIER program left off,
3 and the PUC sort of took over a formation of
4 policy around this program in 2011. And it's
5 really kind of meant to fill this gap in
6 technology development from the stage where
7 somebody has a good idea, or somebody has either
8 demonstrated a workable technology that can
9 improve electric system functioning to get them
10 to the point where they can get that product to
11 market and to where it can sort of deliver value
12 to California's electric ratepayers.

13 So we're really trying to assist in the
14 development of new technologies that need a
15 little boost to get developed and to come to
16 market.

17 So where we are in the process right now,
18 as you heard the first Triennial Investment Plans
19 were proposed just a little bit over a year ago,
20 and when that happens, so just like these plans
21 that happen as a result of a public process,
22 stakeholders provided input to the CEC and the
23 three IOUs, they brought their plans to the CPUC
24 and at that point parties have more opportunity
25 to comment on the plans and just sort of shape

1 their final outputs. So those were filed in
2 December of 2012, went through a Proposed
3 Decision, went through some public vetting, and
4 were approved in October.

5 And now we're at the point in the first
6 set of Investment Plans where the CEC and the
7 IOUs will be holding solicitations to award
8 projects on a competitive basis. So that will be
9 happening simultaneously with the development of
10 the second round of Investment Plans. So if you
11 look at the first round of solicitations and you
12 find that there's a gap, or there's something
13 missing, some area where we need funding that
14 isn't being provided, you know, the second
15 Investment Plan period is sort of where to try to
16 shape that process and to get that input into the
17 plan.

18 So just to reiterate, everything is
19 awarded competitively and the Administrators have
20 to report on any non-competitive awards in their
21 Annual Reports to the Commission. Next slide.

22 Just a quick look at the funding. As you
23 can see, the CEC, industry and the three
24 Investor-Owned Utilities, PG&E, Edison, and San
25 Diego, administer the program. The CEC

1 administers the program across all funding areas,
2 so you can see down on the left from Applied
3 Research, that's very early stage development
4 when there's an idea and it needs to be assigned
5 and reassigned, and it's gotten to the point
6 where it sort of is a product that can be
7 marketed. Technology Demonstration and
8 Deployment, that's demonstrating that the product
9 provides value testing it out, gathering data.
10 Market Facilitation is a little bit further along
11 where there's a product that has a value
12 proposition, but just hasn't been proved out
13 enough to get the funding to get it to market.
14 So those are sort of three areas down the value
15 chain. The Utilities only fund the second one,
16 so when you're formulating your comments and your
17 feedback, sort of think about where the
18 appropriate place for the funding should go. And
19 this is an annual funding over three years. Next
20 slide.

21 So as I just mentioned, the program is
22 now live, it's very exciting. We are just
23 getting going with projects in the first
24 Investment Plan period. So in case you're
25 confused about how the overlapping investment

1 periods work, the first Investment Plan -- there
2 are three Investment Plans, the first one is
3 2012-2014, the second is 2015-2017, and the last
4 one is 2018-2020. Because we were delayed in
5 getting the first investment plan launched, we
6 were held up by some legislation and a few other
7 things, unspent funds from the first investment
8 period can roll over into the second and funds
9 are essentially considered committed as soon as
10 they're kind of dedicated to a project. So the
11 Program Administrators have until the end of 2014
12 essentially to kind of refine the product, the
13 projects and get the solicitations out. And at
14 that point, those 2012-2014 funds will be
15 considered committed to those projects. And we
16 as the CPUC will not only help shape the
17 Investment Plans for the next triennial period,
18 but we'll oversee the implementation of the first
19 one, so we'll be overseeing the solicitations for
20 projects and the Annual Reports on how the
21 solicitations went and what those projects are.
22 Next slide.

23 As I mentioned, we have continuous
24 oversight of the program. Annual Reports are
25 filed February 28th of each year. We've received

1 the Annual Reports from the first year, but
2 because the decision authorizing the first set of
3 Investment Plans just passed, there wasn't too
4 much to report on, we expect a much more robust
5 report next year. And at the end of 2016, we'll
6 hire an independent evaluator to sort of look
7 back and just see how the program went, and make
8 sure that we're meeting our goals of funding
9 projects that provide value to ratepayers. Next
10 slide, please.

11 So if you have any questions on EPIC, we
12 try to keep all the documents regarding the
13 current Investment Plan cycle and the development
14 of the future Investment Plans on our webpages.
15 You can look at our website, the CEC's, and the
16 three IOUs, and those are the places to go if you
17 are a company and you're interested in
18 participating in the solicitations for projects.
19 Next slide.

20 So this is just my contact information.
21 Anyone who has any questions on the program, on
22 the process for soliciting comments, any concerns
23 about the way the program is being implemented,
24 don't hesitate to contact me at the email or the
25 phone below. Email is probably best, but feel

1 free to give me a call, as well.

2 So that concludes my presentation.

3 Again, I'd like to thank the CEC and the PAs for
4 having these webinars and I encourage robust
5 participation. Thanks.

6 MS. DOUGHMAN: Thank you, Damon. Now
7 we'll go back to the Energy Commission.

8 MS. TEN HOPE: Slide 6. So this is
9 Laurie. Thanks, Damon, for your presentation and
10 your guidance on the program.

11 So we're going to walk through the
12 initiative and the first one up are going to be
13 the Applied Research and Development area. We
14 don't have funding yet internally, but envisioned
15 at about \$55 million a year in the Applied
16 Research area. There are 11 strategies here,
17 Energy Efficiency and Demand Response, both in
18 buildings and in process energy, clean
19 generation, looking for innovations both at the
20 distributed level and at the utility-scale
21 renewables, as well as reducing the environmental
22 and public health input of energy. There are
23 four Strategic Objectives in the Smart Grid area
24 from Smart Inverters, Distribution Modeling
25 Tools, communication between customer devices and

1 utility devices, and the integration of Plug-in
2 Electric Vehicles to the electricity system. And
3 finally, two crosscutting areas around advancing
4 breakthrough energy concepts and providing
5 federal cost share for Applied Research awards.

6 So this first area is earlier in the
7 innovation pipeline, it's not basic research, but
8 it's in the lab scale testing and pilot scale
9 testing, and I'm going to turn it over to my
10 colleague in one second, but I wanted to let you
11 know that we'll be going through these
12 presentations for about an hour, and then we'll
13 have 45 minutes for public comment, and then
14 we'll break and move to the utility
15 presentations. If we still have additional folks
16 that would like to comment, we'll loop back to
17 additional public comment at the end of the day.

18 So the things that we're particularly
19 looking for, and I'd like you to think about with
20 the presentations, are we missing some critical
21 areas, that you know, some breakthrough
22 opportunities or deployment strategies that you
23 think would really make a difference.

24 On the other hand, do you see some stuff
25 here that's like, yeah, I mean, there's a little

1 bit more that could be done, some incremental
2 improvements, but it's an area that's pretty well
3 covered by other research, because we want to
4 hone in on the areas where we can really bring
5 value to ratepayers. So if you think some areas
6 could be dropped, that's as useful. I mentioned
7 that we're looking at a golden carrot, so we are
8 looking for some larger funding opportunities in
9 particular areas, you know, where a flagship-type
10 program might really be warranted. So we'd look
11 for your comments there, as well.

12 So with that introduction, I'm going to
13 turn it to David Hungerford, who will walk
14 through the Applied Research Energy Efficiency
15 Initiatives.

16 MR. HUNGERFORD: Good morning. I'm David
17 Hungerford. I'm a Senior Scientist in the Energy
18 Efficiency Research Office of the R&D Division.
19 For the first Strategic Objective, our purpose
20 here is to build on our past investments in
21 energy efficient technologies and identify
22 promising new technologies with the potential to
23 reduce energy consumption. The first initiative
24 under this is to continue investing in advanced
25 devices and systems to improve building

1 performance, reduce costs, facilitate consumer
2 adoption, and inform future codes and standards
3 efforts. Under that, we have five general
4 research efforts and they're divided sort of
5 according to technology.

6 The first is Lighting Systems and
7 Controls, especially; the second is Heating
8 Ventilation and Air-Conditioning Systems,
9 especially advanced systems; the third is
10 exploring new ways to use building envelope to
11 reduce leakage and improve efficiency, the fourth
12 is to address the growing proliferation of small
13 plug-in devices throughout the home, what we call
14 "plug-loads," and we're hoping to spend some
15 effort on plug-load devices; we're also looking
16 at retrofit strategies for existing buildings in
17 support of AB 758.

18 The second initiative, the problem we
19 were facing is getting to the level of efficiency
20 necessary to achieve the Zero Net Energy goals,
21 will require an integrated approach to building
22 design and need to meet three critical criteria,
23 builder support and cooperation, consumer
24 acceptance, and costs that are comparable to
25 current construction practices.

1 We have two research areas we want to
2 focus on there. The first is to develop and test
3 standardized prescriptive design packages for
4 Zero Net Energy Residential Multi-Family and
5 Commercial Buildings; the second is to create a
6 design optimization competition, one of the
7 golden carrots that Laurie referred to, for Zero
8 Net Energy Residential, Commercial, Multi-Family
9 and Low Income Buildings in our communities.

10 The third initiative is to look more at
11 applying well established in other fields, social
12 science research methods to the problem of
13 adoption and use of energy efficient technologies
14 to improve energy efficient technology
15 development by applying established social
16 science research methods to empirically determine
17 how people respond to and engage with new
18 buildings and designs and systems, how people
19 adapt their lifestyles to new technology
20 opportunities associated with ZNE buildings, and
21 how people will best respond to opportunities to
22 retrofit existing building, again, in support of
23 AB 758.

24 The three main research areas will be to
25 look at best practices for contractors and

1 comparative analysis of emerging contractor
2 business models with the fundamental goal of
3 being able to diagnose building inefficiency in
4 providing customers with reasonable options for
5 fixing those problems. The second is consumer
6 acceptance, address the fundamental issue of
7 consumer acceptance and adoption of emerging
8 technology by exploring ways in which the
9 technology research and development process could
10 include social science research components that
11 anticipate end user needs, expectations,
12 understandings and their capabilities.

13 The third is to look at new ZNE buildings
14 and to develop empirically-based understanding
15 about the development process and the real world
16 operation of ZNE Buildings so that we can make
17 them work in practice, as well as in theory.

18 The fourth initiative is to deal with
19 indoor air quality. As buildings become tighter,
20 previously minor sources of indoor pollution are
21 of increasing concern. We have two research
22 areas to approach here, one is developing and
23 demonstrating metrics for tracking and comparing
24 indoor air quality in buildings. The second is
25 to develop approaches to improving indoor air

1 quality by considering both technological
2 solutions and occupant behavior.

3 The fifth initiative, the purpose is to
4 develop, validate, and document energy saving
5 technologies that are in the research and early
6 development stages in industrial, agricultural,
7 water and wastewater plant settings. There's a
8 substantial amount of research that's going to be
9 done under this initiative and it's divided into
10 four general areas, the first under industrial
11 and agricultural is to look at process
12 improvements for energy intensive industries, the
13 development of technologies that substitute or
14 materially change the underlying process.

15 The second major area is in the water and
16 wastewater sectors, and there are four
17 subcategories here, the first is to look at
18 advanced membrane filtration technologies for
19 water treatment, both for water supply and for
20 wastewater; the second is to collect data from
21 new and existing facilities to develop reliable
22 estimates of savings potential and cost
23 alternatives of water disinfection systems.

24 The third is to evaluate existing
25 installations of water re-use technologies of

1 both centralized regional facilities and of
2 individual industrial sites to better understand
3 the potential of water reuse to save water and
4 energy in California.

5 And the fourth is to identify potential
6 efficiencies in the process of moving water
7 around within the wastewater facilities and the
8 water treatment facilities to identify
9 efficiencies there.

10 The third major area under this
11 initiative is to develop a clearinghouse for
12 advanced energy efficient technologies for use by
13 the Industrial Ag and Water sectors so that
14 there's sort of a one-stop shop, a place where
15 the ability to identify the cutting edge
16 technologies is available to those sectors.

17 And the fourth is to identify new
18 research priorities by engaging experts and
19 others through workshops and technical advisory
20 meetings.

21 The sixth initiative is to promote water
22 and energy efficiency in residential and
23 commercial buildings. We have three research
24 areas under that. The first is to increase the
25 efficiency of end-use devices; the second is to

1 increase substitution of gray and stormwater for
2 landscaping and other purposes; the third is to
3 identify leakage and waste to distribute use of
4 better water metering and control technology.

5 Now I'm going to move on to the next
6 Strategic Objective, to develop new technologies
7 and applications that enable demand response
8 technologies to assess performance, increase
9 reliability, and improve forecasting techniques.
10 While the basic technologies for demand response
11 have been proven, there remain substantial need
12 for building operational experience and empirical
13 evidence that supports the case for adapting
14 energy markets and designing programs that
15 displace traditional generation resources with
16 DR.

17 The second investment plan will focus on
18 developing and testing and demonstrating demand
19 response technology and operational capabilities
20 in the following areas: first, constructing
21 performance datasets needed for DR to compete
22 with generation as a resource; the second, to
23 provide technical and operational data to support
24 new programs and market products that take
25 advantage of DR characteristics; and the third,

1 to improve the capability of forecasting DR
2 performance.

3 The first initiative, Strategic
4 Initiative 1 under this, will focus on increasing
5 the potential for Demand Response to displace
6 fossil generation, while maintaining grid
7 reliability and integrating intermittent and
8 highly variable renewable resources.

9 Three research areas will be our focus.
10 The first is to develop and test advanced demand
11 response technologies, building on previous
12 efforts in that direction; the second is to
13 develop and evaluate, control and monitoring
14 hardware and software systems to provide enhanced
15 highly reliable demand response and storage
16 performance forecasting, and allowing increased
17 utilization of DR as a reliable substitute for
18 generation resources. The third is to assemble
19 and evaluate performance data to be able to make
20 reliable estimates of performance from different
21 end uses and customer types, under different
22 conditions, which is a necessary condition for DR
23 to be able to substitute for generation as a
24 resource.

25 I think we're moving on to the next

1 initiative for the next Strategic Objective.

2 MR. ALDAS: Okay, good morning everyone.
3 My name is Rizaldo Aldas. I'm the Lead for
4 Renewable Energy and Advanced Generation. The
5 next two Strategic Objectives were prepared under
6 Renewable Energy and Advanced Generation Program
7 with the help from staff and I would like to
8 acknowledge them.

9 The Strategic Objective three is to
10 develop innovative solutions to increase the
11 market penetration of distributed, renewable and
12 advanced generation. We all know that
13 distributed renewable energy advanced generation
14 is a key goal for us. It is specifically
15 mentioned in Governor Brown's Clean Energy Jobs
16 Plan, as well as the Renewable Portfolio
17 Standard. There are several forms of
18 distributed, renewable and advanced generation
19 technologies and there are common barriers such
20 as high overall cost, depending on technology and
21 resource, intermittency and reliability. So DG
22 was addressed in the first Investment Plan, and
23 in the second Investment Plan we would like to
24 further support that, but addressing some areas
25 that were not addressed in the first Investment

1 Plan and we intend to further advance that
2 technology.

3 We have five initiatives proposed under
4 this Strategic Objective 3. The first three are
5 supporting the core renewable energy resources,
6 while the last two, Initiatives 4 and 5, are
7 addressing the needs for emerging and advanced
8 generation, the technologies.

9 For the first initiative under Objective
10 3, the intent here is to lower cost, efficient
11 and sustainable bioenergy, and have innovations
12 to improve that Biomass-to-Energy systems in the
13 state. The intent is to help realize the full
14 benefits of biomass and help support some of our
15 upcoming policy goals, for instance, the
16 recommendations under the current Integrated
17 Energy Policy Report, the upcoming SB 1122, for
18 example, so prepare the technologies to help
19 address those. The intent here is to develop and
20 demonstrate early stage innovative technologies,
21 techniques, and deployment strategies for biomass
22 waste stream to electricity and provide co-
23 benefits. In the first Investment Plan, we
24 supported a wide range of research from the
25 biomass energy and in the second Investment Plan,

1 we'd like to focus on a few resource areas,
2 resource technologies.

3 Okay, some of the potential projects here
4 may involve developing technologies, addressing
5 the high temperature conversion, for example, on
6 forest biomass, or those that are addressing the
7 advanced biomass conversion technologies and
8 application of biomass or sustainable and biomass
9 harvesting, processing, and handling systems.

10 In the second initiative under Objective
11 3, this is to develop integrated and hybrid
12 photovoltaic technologies and strategies to
13 reduce costs and advance Zero Net Energy
14 buildings. The intent here is to develop next
15 generation distributed PV technologies and
16 strategies with the intent of increasing overall
17 conversion efficiencies, possibly the adoption of
18 building integrated PV and having PV thermal
19 systems.

20 Distributed Solar PV was addressed in the
21 applied section of the first EPIC Investment Plan
22 and we are intending to use the early conclusions
23 and recommendations that will come out of that
24 and use it for these applications and primarily
25 focus on these other areas, for example, in the

1 first Investment Plan we were looking at smart
2 inverters in this area, but for the second
3 Investment Plan, we were looking at more on the
4 technology development side and some specific
5 focus on hybrid PV and thermal technologies, as I
6 mentioned.

7 The third initiative under Objective 3 is
8 focused on an area that was not included in the
9 first Investment Plan, and this will be on the
10 In-Conduit Hydrokinetic Power. There were
11 assessments, for example, at the Energy
12 Commission that shows the potential of the
13 Hydrokinetic Power, for instance, a recent study
14 showed 250 megawatts of available and existing
15 open channel drops of nine feet or more, and
16 there is significant greater generation
17 opportunities that exist, for example, by
18 replacing the pressure valves in pressurized
19 water, or wastewater conveyance pipelines. So
20 for this particular initiative, we will develop
21 the tools, strategies and technologies to advance
22 the pre-commercial development and demonstration
23 of In-Conduit Hydropower turbines and generators.
24 We will also try to address the need for
25 developing the testing protocols or procedures

1 for evaluating these new technologies.

2 Under the fourth initiative, as I
3 mentioned a while ago, this will be focused on
4 the new emerging technology and advanced
5 generation technology. This will help develop
6 early stage innovative electricity generation
7 technologies and novel applications with
8 breakthrough potential in the commercial market.
9 Some target technology that will have the
10 potential for dramatically increasing conversion
11 efficiency, reducing system costs, and expanding
12 the use of renewable and advanced generation
13 technologies. These are just some of the
14 potential projects that may be supported under a
15 wide range of possible projects under the
16 breakthrough initiative examples may include
17 novel technological solutions to enable increased
18 deployment of clean and advanced distributed
19 power generation - designs, materials, control
20 systems that have the potential to significantly
21 reduce the cost, or improve the durability and
22 increase the reliability, system designs for
23 example, for turbines or fuel cells, enabling
24 control systems to better integrate renewable
25 distributed generation with the grid and

1 addressing user requirements.

2 The fifth initiative on piezoelectric-
3 based materials, this is coming out of the recent
4 Energy Commission study on the assessment of
5 piezoelectric materials for roadway and energy
6 harvesting. Some of you may not be familiar with
7 the piezoelectric materials, these are materials
8 that generate electricity with the application of
9 stress and so with that, there is a wide
10 opportunity for harvesting that energy whenever
11 stress or vibration are available. So this will
12 take advantage of the developments in
13 piezoelectric materials, availability of existing
14 waste and mechanical energy to expand the
15 generation of energy from these untapped
16 resources, for example, we can use the
17 piezoelectric devices to harvest power from, say,
18 existing roadway surfaces, for train tracks,
19 building materials for other under-utilized
20 applications. Next slide, please.

21 The Strategic Objective number 4, the
22 intent here is to improve the power plant
23 performance, reduce costs, and accelerate market
24 acceptance of existing and emerging utility scale
25 renewable energy generation. The utility-scale

1 clean energy generation is defined as a
2 standalone generation facility, that is, they are
3 directly connected to the grid. There are
4 several sizes for capacity, we heard in different
5 studies. We have used 20 megawatts as a
6 benchmark for utility-scale, and this objective
7 is in support of some of the State goals such as
8 Governor Brown's Clean Energy Jobs Plan, as well
9 as the RPS, and the intent here is to address the
10 need to improve the cost and performance of
11 existing systems, possibly by developing new
12 cost-effective enabling technology and
13 strategies.

14 So we have four proposed initiatives
15 under Objective four that are addressing the
16 needs for solar energy, forecasting, geothermal,
17 and wind energy. For the first initiative, which
18 is on boosting concentrated solar power by
19 reducing system costs and increasing performance.
20 CSP or Concentrated Solar Power is one area that
21 was included in the first Investment Plan. In
22 the first plan, the focus was on components such
23 as heat transfer fluids, thermal storage, and in
24 the second Investment Plan, we would like to look
25 at the other more critical components of CSP such

1 as reflectors and receivers. CSP technologies
2 have different system configurations that they
3 all use different designs of mirrors or
4 reflectors and receivers or observers to
5 concentrate sunlight to heat fluid to produce
6 steam that drives a turbine to produce
7 electricity.

8 So this initiative will support research
9 to encourage the performance of those reflectors
10 and mirrors for system applications, reduce
11 manufacturing operation, and the maintenance
12 costs. Some of the potential research projects
13 here may include improving the solar
14 transmissivity of the mirrors, developing lighter
15 weight reflective surfaces, or developing
16 reflector coating to reduce maintenance costs or
17 improving the reflectivity assessments to improve
18 maintenance and again reduce costs.

19 The second initiative under objective 4
20 is to develop the tools and strategies to
21 increase the predictability and reliability of
22 wind and solar energy generation. This
23 initiative is to support research solutions, to
24 improve intermittent renewable energy integration
25 into the State's electric grid. And research

1 under this initiative will develop, evaluate and
2 improve forecasting techniques and tools, inform
3 grid operators of expected wind and solar power
4 plant performance on, say, minutes ahead, hours
5 ahead, or days ahead timescales.

6 In the first Investment Plan we supported
7 the area of forecasting and so we would like to
8 leverage any technical advancements that will be
9 made in the first Investment Plan to further
10 increase the accuracy of solar and wind
11 generation forecasts and the value that they can
12 provide to California IOUs and the California
13 Independent System Operator.

14 In the third initiative under Objective
15 4, this is to develop advanced technologies and
16 strategies to improve the cost-effectiveness of
17 geothermal energy production. This initiative
18 will support further research in geothermal
19 energy with emphasis on existing facilities. In
20 the first EPIC Investment Plan, we are
21 researching on the wide scope of geothermal
22 development from reservoir exploration and
23 characterization through the power plants. For
24 the second Investment Plan, the focus is on
25 improving the performance of existing plants,

1 address topics from improved reservoir management
2 and plant operation, assessing the value to the
3 grid from geothermal generation, including
4 ancillary services.

5 Now, for the fourth or last initiative
6 under Objective 4, this is focused on upgrading
7 California's aging wind turbines, looking at the
8 design, cost and development improvements that
9 are needed. This initiative will support an area
10 that we did not include in the first EPIC
11 Investment Plan, we will address technology
12 issues associated with the current state of most
13 of California's wind facilities. Much of
14 California's best wind resource acreages are
15 occupied by an aging fleet. Wind turbines are
16 past their design of 20 years and are made of
17 relatively inefficient turbines, and they are now
18 candidates for repowering. So this initiative
19 under Objective 4 will address the technologies
20 and strategies that are needed to address the
21 challenges to that repowering target. The
22 overall intent is to improve the system
23 performance while taking into consideration
24 possible regulatory or social or other barriers
25 to repowering. And we know the kind of

1 background is that we know that modern turbines
2 are now more efficient at converting wind energy
3 into electricity, and they now feature
4 sophisticated control technologies, enhancing
5 their contribution to the grid. So we would like
6 to bring this to test and demonstrate in our wind
7 resource area. Next slide, please.

8 The next strategic objective is Strategic
9 Objective 5 that was developed for under the
10 energy-related environmental research program led
11 by Guido Franco and his team in the EA Program.
12 Objective 5 is to reduce the environmental and
13 public health impacts of electricity generation
14 and make the electricity system less vulnerable
15 to climate impacts, which is to support
16 developing science and innovation which is also
17 the overall primary focus of the program. There
18 are other key drivers for coming up with this
19 objective, for instance, the current insufficient
20 range of comprehensive assessments of impacts of
21 clean energy technology based on best available
22 science, or on the recent research results
23 confirming that the existing electricity system
24 will become highly vulnerable to climate change
25 and extreme events. And we know that rapid

1 evolvment of the electricity system offers the
2 opportunity to reduce that vulnerability.

3 Under this Objective 5, there will be
4 five initiatives. The first initiative is on
5 implementing a roadmap to address the public
6 health effects from energy technologies. Under
7 EPIC 1, we are developing a detailed roadmap of
8 research on the potential public health
9 implications of new energy technologies. It is
10 envisioned that the second investment period will
11 implement a research on key topics identified in
12 that roadmap. Some unresolved issues explored in
13 prior studies and under the first EPIC investment
14 period will be analyzed; an example is the
15 atmospheric transformation and fate of extremely
16 small particles that are emitted from power
17 plants.

18 In the second initiative under Objective
19 5, this is developing environmental tools and
20 information for future renewable energy
21 conservation plans. The Draft Air Resources
22 Board Scoping Plan calls for a future
23 determination of post-2020 greenhouse gas
24 targets, so the generation of electricity from
25 renewable sources of energy with zero, or close

1 to zero, greenhouse gas emissions are needed for
2 both the 2020 and potential post-2020 greenhouse
3 gas targets. Under this initiative, we plan to
4 develop some of the environmental tools and
5 information that will be needed for future
6 renewable and conservation plan such as the
7 Desert Renewal and Conservation Plan.

8 Initiative 3 under Objective 5 is to
9 improve science for water management in power
10 generation such as hydropower forecasting and
11 hybrid cooling towers. This initiative will
12 assist with improvements in the way that we
13 manage water for electricity generation; for
14 example, a hydrologic forecast can be off by up
15 to 40 percent because little is known about the
16 actual amount of water contained in the snowpack
17 in high elevations in the Sierra Nevada. But
18 there are now tools that can be used to measure
19 the snowpack in these remote areas, which can
20 substantially improve the forecast, allowing the
21 electric utilities to increase revenue from their
22 hydropower units. So with increased temperature
23 due to climate change, for example, the amount
24 for water for cooling will increase and the
25 performance of the cooling units will decrease.

1 So this research proposes to investigate the use
2 of hybrid units to address these issues.

3 In the fourth initiative under Objective
4 5, this will provide tools and information for
5 regional climate change adaptation measures for
6 the electricity sector. The initiative will
7 leverage several climate change scenarios and a
8 statewide adaptation recommendation with the main
9 focus on the local or regional level to provide
10 the tools and information that are needed to
11 implement adaptation measures for the electricity
12 sector. It will examine the potential effects of
13 a changing climate and wind and solar
14 availability and other parameters to determine
15 the potential impacts on renewable sources of
16 electricity.

17 And lastly, Initiative 5 under Objective
18 5, the intent is to provide small grants to
19 solicit innovative energy-related environmental
20 research. We would like to implement a wide open
21 solicitation to provide seed funding for
22 innovative energy-related environmental research
23 concepts, and we find that programs designed this
24 way are excellent opportunities to discover
25 unconventional ideas that can revolutionize a

1 given area of work. And so thank you.

2 MS. TEN HOPE: The next presenter is
3 Jamie Patterson for the Smart Grid Initiatives, I
4 believe the next three slides.

5 MR. PATTERSON: Good morning. I'm Jamie
6 Patterson. I'm a Senior Electrical Engineer in
7 the Research and Development Division, and we're
8 on slide 13, looking at Strategic Objective 6.
9 Our objective here, is to advance the use of
10 smart inverters for grid support in California,
11 and our Initiative 6.1 to achieve that is to
12 develop smart inverter capability to improve
13 Grid operations. Advanced smart inverters offer
14 solutions to the challenges of high penetrations
15 of renewables, can increase the penetration of
16 photovoltaics, and provide other Grid effects.
17 This initiative will move inverter capability
18 beyond California Rule 21 and IEEE1547A
19 requirements to those of 1547.8 to provide
20 benefit for long feeder lines with voltage and
21 reactive power problems, as well as helping
22 neighborhoods with high penetrations of solar
23 where features that allow inverters to ride
24 through voltage sags and surges, while also going
25 offline for anti-islanding purposes, will be most

1 beneficial. Research under this initiative will
2 also expand smart inverter communication
3 capabilities and they're included within the
4 research areas under this initiative.

5 Can we go to Slide 14, please? Thank
6 you. This is Strategic Objective 7. Our
7 objective here is to develop advanced
8 distribution modeling tools for the future Smart
9 Grid. Our Initiative 7.1, to achieve that, is to
10 develop open-source electricity system modeling
11 tools to visualize California's modern
12 distribution systems. The purpose of this
13 initiative is to develop modules for existing
14 open-source modeling tools for use by the
15 utilities and the CAISO. These modules are
16 needed to visualize the dynamic operation of the
17 distribution system. Current tools provide only
18 a simple snapshot of the grid, while new tools
19 will allow utilities and the CAISO to analyze the
20 interactions of Smart Grid equipment in a dynamic
21 and changing manner. These tools will include
22 Smart Grid elements and be capable of simulating
23 the operation of California's future smart
24 distribution system.

25 Can we go to Slide 15, please? Our

1 objective here, Objective 8, is to advance
2 customer systems to coordinate with utility
3 communications. Our initiative to achieve that
4 objective is to develop customer systems to
5 manage Demand Response, renewables, and Electric
6 Vehicles, and integrate these tools with the
7 Grid. On the customer side of the meter, the
8 networks of customer equipment for Demand
9 Response, Electric Vehicles, and Smart Inverters,
10 and renewable generation equipment lacks a
11 central energy management system. This makes
12 them unable to coordinate with each other to
13 provide a single customer premise response to the
14 utility and to maximize the combined benefits for
15 their customers. This initiative will develop
16 customer energy management systems to coordinate
17 the various energy devices in a customer premised
18 network, and communicate a system response to the
19 utility grid side to help with distribution
20 operations. These management systems will also
21 enable coordination of the generation and load to
22 maximize their benefit for the consumer, and will
23 enable their participation in energy markets.

24 Thank you.

25 MR. ALDAS: Good morning. This is

1 Rizaldo again. We are in Slide 16, Objective 9.
2 This is for efficient integration of plug-in
3 electric vehicles to the electricity system.
4 This is an objective developed under the
5 transportation research area with Rey Gonzales
6 and his team. Its focus is on Plug-In Electric
7 Vehicles and its efficient integration into the
8 electricity system. Plug-In Electric Vehicles
9 and companion electric transportation
10 technologies offer a promising and potentially
11 revolutionary alternative for meeting the state's
12 transportation needs. PEVs or Plug-In Electric
13 Vehicles can provide a number of benefits to the
14 electricity grid when integrated with smart
15 charging technologies and other strategies. So
16 better research is needed to determine how these
17 can effectively be integrated into the
18 electricity grid and how to minimize, for
19 instance, the carbon footprint or which
20 technologies continue to advance the
21 capabilities. Objective 9 supports the
22 strategies identified in the 2013 Zero Emission
23 Vehicles, or ZEV Action Plan. ZEV was released
24 as a result of the Governor's Executive Order in
25 2012 establishing expectations for agencies to

1 expedite the rapid commercialization of Zero
2 Emission Vehicles with a goal of 1.5 million Zero
3 Emission Vehicles by 2025.

4 Objective 9 also supports the Vehicle-
5 Grid Integration Roadmap. This roadmap maps the
6 way to develop solutions that enable electric
7 vehicles to provide Grid services while still
8 meeting consumer driving needs, and that vehicle
9 integration roadmap also supports the ZEV Action
10 Plan.

11 So there are three initiatives proposed
12 under Objective 9, the topics are on PEV,
13 Vehicle-Grid integration, and Battery Recycle.
14 With the exception of Battery Recycle, the other
15 two initiatives were not included in the first
16 EPIC Investment Plan, but we had projects in this
17 area under the previous funding program. The
18 second EPIC Investment Plan will leverage the
19 findings and results from this ongoing and past
20 efforts.

21 The first initiative under Objective 9 is
22 to advance electric vehicle charging and grid
23 services to maximize the renewable resources and
24 improve grid flexibility. The initiative will
25 develop advanced methods of smart and efficient

1 charging for Plug-In Electric Vehicles that help
2 mitigate intermittency issues associated with
3 renewable generation so that will allow for a
4 higher mix of renewable resources such as wind
5 and solar into the grid. The initiative will
6 look for opportunities to utilize the distributed
7 battery capacity of an electric vehicle fleet as
8 to Grid storage, and create opportunities for
9 rapid response and operational flexibility to
10 provide regulation and load following
11 capabilities.

12 The second initiative is focused on the
13 vehicle-grid integration and the intent is to
14 advance the development of VGI, or Vehicle Grid
15 Integration technologies, and methods into
16 residential and private or public fleet
17 applications. The initiative builds on previous
18 VGI projects, that is, developing the
19 communication and protocols to enable
20 bidirectional power flow to perform vehicle to
21 grid and vehicle to building strategies. And the
22 research will further advance the development of
23 VGI technologies and methods by expanding beyond
24 military bases and government fleets and into
25 residential and private or public fleet

1 applications. The research will leverage
2 findings from ongoing Department of Defense
3 military installations VGI projects, including
4 continuing to determine cost benefits of VGI
5 through Demand Response or load shifting, and to
6 determine impacts VGI may have on PEV batteries.
7 Some of the examples of projects that may be
8 included here include understanding vehicle use
9 profiles, plug-in electric vehicle cost benefits,
10 and battery life challenges with VGI and under
11 residential, and private or public fleet
12 applications, assessing VGI grid impacts for
13 different VGI applications and technologies, and
14 developing VGI business models for residential
15 and private or public fleet applications.

16 The third initiative under Objective 9 is
17 to further develop and evaluate advanced
18 technologies and methods for safe and efficient
19 recycling of PEV batteries. As the number of
20 electric vehicles in California's transportation
21 grows, it is essential that efficient, safe,
22 environmentally sound, and cost-effective
23 recycling systems be developed for recycling
24 large format lithium ion batteries. The
25 initiative will further develop existing battery

1 recycling strategies and pursue projects that can
2 fill research gaps, as well as advance existing
3 methods for battery production and recycling.
4 The initiative will research battery disposal
5 impacts, advance tools and methods necessary for
6 large-scale battery pack recycling, and recycling
7 efficiency. Thank you.

8 MR. STOKES: Okay, so this is Erik
9 Stokes. I will be presenting the crosscutting
10 elements for the Applied Research and Development
11 Area.

12 Okay, so one of the takeaways from a lot
13 of our policy reports is that we need really both
14 a mix of incremental improvements to existing
15 technologies, also some breakthrough ideas, and
16 this Strategic Objective is meant to address the
17 latter of those two.

18 We have two funding initiatives under
19 this objective, the first of which will provide
20 seed level funding for potentially disruptive
21 technologies. And this initiative really aims to
22 address that funding gap early in the technology
23 development process, and aims to really help
24 researchers prove out and determine the
25 feasibility of some of their early concepts.

1 The second initiative under this
2 objective will conduct incentivized prize
3 competitions for targeted challenges in the
4 electricity sector, especially in areas where
5 there hasn't been much advancements made in the
6 market. And most people's familiarity with these
7 types of competitions has been X Prize, but even
8 organizations such as DARPA are starting to
9 utilize these competitions as a way to kind of
10 foster a broader set of innovators to compete and
11 collaborate, and really bring some new ideas in
12 thinking to some of these industry-specific
13 challenges. Next slide.

14 Also under the last plan we had an
15 initiative for Federal cost share, and in this
16 plan we're also proposing a similar initiative.
17 And the aim of this initiative is really to use
18 EPIC funds to leverage federal funding by
19 providing cost share to entities that apply for
20 and ultimately receive an award from a federal
21 opportunity announcement, either from the
22 Department of Energy, Department of Defense, or
23 even other entities like the U.S. EPA.

24 MS. TEN HOPE: Okay, so we're going to
25 leave the Applied Research area and move into

1 Technology Demonstrations, so in this area we're
2 looking for pre-commercial demonstrations and
3 commercial-scale deployment. So these are the
4 projects that have already proved themselves in
5 the lab and are ready for the demonstration
6 phase.

7 Here, we have six objectives, again, we
8 sort of follow the loading order kicking off with
9 the demonstrations in the energy efficiency area,
10 and then renewables, and smart infrastructure.
11 In the middle, taking microgrids to the next
12 level which is sort of an integrative strategy of
13 energy efficiency, renewables, and Smart Grid, so
14 it kind of pulls all of them together.

15 We'll start again with Dave Hungerford
16 for the Energy Efficiency Demonstration Projects.

17 MR. HUNGERFORD: All right, for the first
18 Strategic Objective under this, or for our first
19 initiative under this Strategic Objective, in
20 this Investment Plan we want to focus primarily
21 on the demonstrations in the building sector with
22 an emphasis on the technologies investigated in
23 the first Investment Plan. The objective here is
24 to produce independent technical and economic
25 performance data on promising efficiency and

1 Demand Response technologies to document savings
2 and performance. This will build on previous
3 work in the state partnership for energy
4 efficiency demonstrations, the SPEED Program,
5 which focused on technology demonstrations and
6 deployments in the University of California and
7 other government buildings. In this initiative,
8 we're going to expand that work to additional
9 sectors.

10 The second initiative, we'll focus on
11 demonstrations in large-scale deployment of
12 emerging integrated demand-side management and
13 other smart technologies to maximize efficiency
14 or achieve Zero Net Energy building goals. Under
15 this, we have four research areas we're looking
16 at, the first will be to demonstrate and deploy
17 an integrated suite of emerging demand-side
18 management technologies, including efficiency,
19 demand response, and other smart technologies
20 such as energy management systems. The second is
21 to demonstrate and deploy integrated Zero Net
22 Energy turnkey package designs in multiple
23 residential multi-family and commercial
24 developments, the idea being to come up with
25 straightforward design groups that allow builders

1 and developers to not have to develop everything
2 from scratch, but to be able to move from
3 something that's already on paper on how to do
4 this correctly, and the third area is to create
5 an information exchange for facility owners,
6 design professionals and trades, to share demand-
7 side management and ZNE information based on
8 demonstrations and deployment results.

9 The fourth is to integrate social science
10 behavioral research into the development and
11 implementation phases of the demonstrations to
12 make sure that the demonstration designs also
13 consider the fact that people have to live in and
14 operate these buildings.

15 MR. ALDAS: Good morning. We are in
16 slide 21 for Objective 13. The focus of this
17 Strategic Objective is on field demonstration and
18 evaluation of Biomass-to-Energy conversion
19 systems and tools and strategies that can enable
20 or help the demonstration and deployment of that
21 system. The intent here is to kind of help
22 realize full benefit from our abundant biomass
23 and organic waste resources in California and we
24 are also timing the objective 13 with some of the
25 state policy goals, for instance, the SB 1122, we

1 expect that to be operational soon and that
2 particular bill requires an incremental 250
3 megawatts of renewable feed-in tariff procurement
4 from small-scale bioenergy projects. This is
5 also supportive of the other policy goals like
6 the recent IEPR and the Bioenergy Action Plan.

7 Objective 13 is designed to leverage the
8 efforts and results from the first EPIC
9 Investment Plan, for instance, under the Applied
10 R&D we are supporting development of Biomass-to-
11 Energy and enabling technology. Examples of
12 these are methods and strategies to convert
13 biomass in the forest and/or by interface or the
14 development of Digester and emission control
15 strategies, those that are under Applied R&D in
16 the first Investment Plan. And we expect that
17 some results or early conclusions, or some of the
18 recommendations from those efforts can be
19 incorporated once we implement the Technology
20 Demonstration and Deployment Solicitations for
21 Bioenergy under the second Investment Plan.

22 We are proposing two initiatives for
23 Objective 13, these initiatives are aligned with
24 the two practical routes for converting biomass
25 to electricity, these are the high temperature or

1 fast rate process and the biological conversion
2 process, primarily by anaerobic digestion.
3 Assuming that these two pathways, have a distinct
4 set of deployment matters and challenges, they're
5 in different stages of pre-commercial and
6 commercial readiness and they warrant a unique
7 set of solutions.

8 For the first initiative under Objective
9 13, this focuses on demonstrating and evaluating
10 the technical and economic performance of
11 emerging systems. The focus is on woody biomass
12 and other low moisture biomass such as order
13 pruning and other agricultural crops. The focus
14 is on field demonstration or early stage
15 deployment of thermal chemical Biomass-to-Energy
16 conversion technologies, systems, and market
17 strategies that have been successfully
18 demonstrated at the pilot scale, so that's a
19 requirement that they have to be demonstrated or
20 approved in smaller scale. The intent is to
21 improve the technical and economic feasibility of
22 these systems, for instance, improve the
23 conversion efficiency, reduce the waste products
24 coming out of that, including emissions while
25 reducing the capital and operating and

1 maintenance costs, and essentially prepare the
2 technology for more accelerated commercial
3 deployment. There are several projects that may
4 be supported here, examples may include
5 demonstration and deployment of pilot-scale
6 proven technologies and strategies to expand
7 efficient and sustainable use of biomass to
8 align, for example, with fire prevention
9 activities, demonstrating an integrated thermal
10 chemical conversion systems, along with advanced
11 pollution controls to meet local land safety and
12 air quality standards, or demonstrate advanced
13 biomass fuel management, including handling
14 delivery systems and possibly densification
15 systems to reduce transportation costs and expand
16 fuel markets.

17 The second initiative under Objective 13
18 is focused on accelerating the demonstration and
19 deployment of emerging biodigester and integrated
20 clean generation technology. The intent is to
21 cater to the agricultural, primarily for example
22 the dairy waste, or dairy manure, and other
23 animal facilities, municipal and other food
24 processing organic waste, mainly COH or
25 wastewater, for example, from municipal food

1 processing facilities. And the focus of this
2 initiative is on field demonstration, again, and
3 early stage deployment of anaerobic digestion,
4 innovative technology systems, and market
5 strategies that have been successfully
6 demonstrated at the pilot scale, with the intent
7 of improving the overall performance of these
8 systems, for instance, in terms of both
9 conversion and efficiency, air emissions, provide
10 data to support integration and permitting
11 requirements, improve costs, and other economic
12 parameters, again, with the intent of supporting
13 the data needed for larger scale commercial
14 deployment of these technologies.

15 There are several projects that may be
16 supported, examples can include biogas from
17 wastewater treatment, municipal organic waste,
18 diversion, food processing, and co-digestion,
19 which is directly called in the SB 1122 target of
20 110 megawatts from these facilities.

21 Another example is a project from dairy
22 and agriculture bioenergy, again, which is in
23 support of 19 megawatts target called for under
24 SB 1122. Thank you.

1 MR. PATTERSON: We're on Slide 22. And
2 it's Strategic Objective 14. Our objective here
3 is to take microgrids to the next level,
4 maximizing their value to customers, and our
5 initiative to achieve that objective is using
6 microgrids to evaluate a combination of emerging
7 technologies to determine the best integrated
8 performance and least cost configurations to meet
9 the customers' energy needs. This initiative
10 will use microgrids as a demonstration tool for
11 evaluating systems of integrated energy
12 technologies and the benefit they can provide to
13 customers and the grid. These microgrids will
14 demonstrate the technical and the economic
15 feasibility of operating high penetrations of
16 renewable energy sources with Demand Response,
17 CHP using biomass, energy storage, and energy
18 efficiency measures. These demonstrations will
19 also evaluate a full range of state-of-the-art
20 clean energy technologies that include advanced
21 vehicle charging, demand-side management
22 strategies, and advanced Microgrid controls.

23 In our first Investment Plan, we
24 demonstrated how these integrated energy systems
25 in a Microgrid can enhance reliability. The goal

1 for this plan is to demonstrate a variety of
2 applications and produce technical and economic
3 performance data such as cost and benefits to
4 identify the best configurations at the lowest
5 cost for these integrated Microgrid systems.

6 Okay, slide 23, please. Strategic
7 Objective 15. Our objective here is
8 demonstrating advanced energy storage systems to
9 lower cost and improve grid reliability. Our
10 initiative to achieving that objective is
11 demonstrations of advanced energy storage
12 technologies and transmission distribution and
13 customer-side applications to transition to the
14 commercial market. The California ISO identified
15 energy storage as an important resource to enable
16 integration of renewable energy at increasing
17 penetration levels.

18 Under Assembly Bill 2514, the California
19 Public Utility Commission has set energy storage
20 procurement target decisions that require 1,325
21 megawatts by 2020, starting in 2014 and made
22 fully operational by 2024. This initiative will
23 build upon the 12 ARRA, that's American Recovery
24 and Reinvestment Act funded storage projects in
25 California, that prove the feasibility of energy

1 storage to provide grid benefits. Information
2 from these demonstrations will help develop an
3 evaluation protocol for the CPUC for benchmarking
4 and reporting purposes. Meeting California's
5 energy storage targets will require demonstration
6 to advance the use of energy storage from
7 emerging technologies to commercially available,
8 viable, and cost-effective technologies that can
9 compete in the AB 2514 procurement market.

10 Slide 24, please. Strategic Objective
11 16, our objective here is to expand smart
12 charging and Vehicle-to-Grid power transfer for
13 Electric Vehicles. Our initiative to achieving
14 that objective is to demonstrate the ability of
15 distributed Electric Vehicles to provide grid
16 services.

17 Through an Executive Order in 2012,
18 Governor Jerry Brown set a target of 1.5 million
19 Zero Emission Vehicles on California roads by
20 2025. Many of these vehicles will be owned by
21 individuals across California. While the first
22 Investment Plan focused on demonstration with
23 vehicle fleet owners, the second plan will expand
24 the market participation to geographically
25 distributed individual vehicle owners, vehicles

1 owners that are basically not located in one
2 place. The goal is to enable individual
3 participation of plug-in electric vehicles in the
4 market by having them aggregated by either
5 utilities or third parties and to resources that
6 are large enough to participate in utility or
7 independent system operator markets. Thank you.

8 MR. STOKES: Okay, so just like in the
9 Applied R&D Initiative, we also have a federal
10 cost share for the technology demonstration and
11 deployment initiative, same process using EPIC
12 funds to better leverage federal investments.

13 MS. TEN HOPE: And our last area is
14 Market Facilitation. I know it's hard to listen
15 for this long, but we have a few more initiatives
16 in the Market Facilitation area, four Strategic
17 Objectives. And as I mentioned earlier, some of
18 these are new to the second Investment Plan. And
19 Pam Doughman will present these initiative
20 topics.

21 MS. DOUGHMAN: Initiatives for Strategic
22 Objective 18 will address challenges facing clean
23 energy entrepreneurs and startup companies,
24 including a need for greater business expertise,
25 market assessment, and access to testing

1 equipment. Overcoming these challenges can help
2 entrepreneurs develop a viable path to
3 commercialization and attract capital to scale-up
4 production.

5 There is an initiative to provide
6 mentoring, tools and services to help clean
7 energy entrepreneurs. A second initiative will
8 facilitate feedback for entrepreneurs on specific
9 market opportunities and customer needs. A third
10 initiative will provide support for third-party
11 testing and validation of new technologies.

12 Initiatives for Strategic Objective 19,
13 address challenges emerging clean energy
14 technologies encounter when seeking to ramp up
15 deployment and build economies of scale. Large
16 procurers of energy technologies such as military
17 bases, government facilities, ports and
18 intermodal transportation gateways, hospitals,
19 and building developers, can help create early
20 market pull for clean energy. However, before
21 investing in large quantities of energy-related
22 equipment, these groups need greater certainty.
23 They need greater certainty that the product is
24 clearly cost-effective from a lifecycle
25 perspective, that takes into account

1 independently verified costs and benefits. They
2 also need greater certainty that the product can
3 be incorporated into existing systems and
4 construction processes. Greater certainty is
5 also needed that there are no impacts on the
6 training and availability of skilled labor to
7 install and maintain equipment, as well as the
8 extent to which the new product or system affects
9 land use or environmental permitting
10 requirements.

11 Another challenge is the long lead time
12 for large-scale procurement and construction
13 which tends to slow the pace of adoption of clean
14 energy innovations.

15 To help overcome these challenges,
16 initiatives for Strategic Objective 19 includes
17 support for strategies to streamline purchasing
18 decisions, reduce purchasing costs, and test
19 drive clean energy equipment before embarking on
20 large-scale enterprise-wide procurement.

21 Initiatives for Strategic Objective 20
22 focus on challenges posed by uncertainty, costs,
23 and delays related to regional and local planning
24 and permitting. Improved planning at the
25 regional and local levels can help accelerate the

1 deployment of new clean energy technologies and
2 strategies, to increase energy, environmental,
3 and societal benefits for ratepayers and local
4 communities. However, many local governments
5 currently lack advanced tools, information, and
6 process innovations to deploy these technologies,
7 leading to delays in assessing and mitigating
8 environmental impacts and addressing other
9 permitting concerns. Initiatives in this
10 Strategic Objective provide assistance to better
11 integrate utility and local government planning
12 for clean energy and improve energy reliability
13 during emergency situations.

14 There is also an initiative to reduce
15 costs and reduce delay for bioenergy through
16 development of a programmatic Environmental
17 Impact Report and an initiative to streamline
18 permitting of Zero Net Energy home developments.

19 Strategic Objective 21 includes an
20 initiative to identify clean energy options and
21 business models that provide win-win outcomes
22 under a range of scenarios. Other initiatives
23 will develop a clearinghouse for clean energy
24 project results, conduct gap analysis to update
25 research roadmaps, and perform measurements,

1 evaluation and verification of EPIC projects.
2 These initiatives address the need to assist the
3 clean energy market to develop products and
4 strategies that are robust under a wide range of
5 plausible potential futures, taking into account
6 the impact of climate change on energy
7 infrastructure and other factors that introduce
8 uncertainty. These initiatives also address the
9 need to track program progress and benefits.

10 Staff plans to include a chapter
11 discussing the possible use of EPIC funding for
12 the New Solar Homes Partnership. The New Solar
13 Homes Partnership provides an upfront incentive
14 to help transform the use of rooftop solar in the
15 new housing market and make solar energy systems
16 affordable for more investor-owned utility
17 ratepayers. Staff plans to propose the option of
18 using EPIC to help fund the New Solar Homes
19 Partnership if other funding sources are not
20 available.

21 At this time, staff is interested in
22 keeping all options for New Solar Home
23 Partnership funding open, including combining
24 different funding sources provided that total
25 funding does not exceed the \$400 million cap for

1 the New Solar Home Partnership established under
2 Senate Bill 1 in 2006.

3 So now we'll be opening it up for public
4 comments. We have questions for stakeholders.
5 The first question is: Are critical research
6 initiatives missing? If so, provide examples and
7 explain why. The second question: Can some
8 initiatives be dropped because of progress made
9 to address this issue? The third question:
10 What issues are deserving of significant funding
11 due to their high potential for ratepayer
12 returns? And the last question: Are there
13 initiatives that should be combined? Please
14 explain why. So we will begin with questions
15 from people attending in person, if you could
16 fill out a blue card, there are blue cards around
17 the corner as you came in. And then after you
18 speak, please provide a business card to the
19 Court Reporter with the headphones there. And
20 then after we take questions from the room, we
21 will ask people participating through the WebEx
22 to use the raised hand function and then we will
23 unmute your phone so you can speak and ask your
24 questions.

1 Okay, people in the room who would like
2 to make a comment, if you could give your card to
3 Erik Stokes -- if you can raise your hand, Erik?

4 MS. TEN HOPE: Or Lillian, who is walking
5 around with blue cards. Just have them come up
6 right here.

7 MS. DOUGHMAN: If you could come up to
8 the microphone at the end table there?

9 MS. TEN HOPE: Give them to Erik, and
10 Erik will call people up, and then please help
11 yourself to the chair. These microphones, when
12 you sit down you need to click the microphone on
13 and then just announce your name.

14 MR. STOKES: If I could just remind
15 everyone, when you come up please say your name
16 and the organization you're affiliated with. So
17 first is Frank Ramirez.

18 MR. RAMIREZ: I see a green light there.
19 Ah, good, it's a good day. Thank you very much.
20 Frank Ramirez, National Director for Governmental
21 Affairs for the National American Indian
22 Veterans. Impressive, all the activities of
23 trying to save energy, water, etc. I wanted to
24 put into the mix, and I've been talking with the
25 State Water Control Board and some of the private

1 groups, about the new technology for evaporation
2 suppression. Evaporation and seepage is kind of
3 interesting; in California we lose about half of
4 the water source due to evaporation and seepage.
5 Tomorrow, the Western Water District is going to
6 adopt 100 percent drip system because of
7 evaporation, that's how significant it is, it's
8 major. I met a group out of Canada that's doing
9 some work, they have a two-year pilot project in
10 Southern Nevada with the Southern Nevada Water
11 Authority, and they've reduced in two bodies of
12 water 31 percent reduction in the evaporation.
13 It does two things, it saves water, it also
14 increases the capacity for hydroelectricity, and
15 it reduces the cost of pumping. Los Vaqueros
16 down in the Contra Costa Water District, the
17 water at Los Vaqueros Reservoir comes from
18 pumping from the valley at a very high cost, and
19 so if you're able to reduce the evaporation in
20 those types of bodies of water, it saves water,
21 environmentally safe, reduces energy control, and
22 this technology has been approved by U.S. EPA,
23 U.S. Fish & Wildlife, NSF, so it's good
24 technology, fairly new, the current issue of the
25 AWWA Journal, a water journal, has just put it --

1 I call it the centerfold article -- on this
2 technology. I think it's very important. I
3 brought a package that I can leave here, but I
4 would definitely like to see evaporation put on
5 the front burner. This could be installed in 20
6 minutes without a major cost for infrastructure,
7 it's very low cost, and the impacts are
8 impressive. Thank you.

9 MS. TEN HOPE: Thank you. Just to get a
10 sense of how many people want to speak, would you
11 please raise your hand if you would like to speak
12 in the room so we have just a sense? Okay, not a
13 lot of public speakers. So go ahead, Erik, and
14 call up one at a time.

15 MR. STOKES: Okay, so the next, and I'm
16 probably going to mispronounce this wrong, but
17 Nehemiah Stone?

18 MR. STONE: Nehemiah Stone with
19 Benningfield Group and I'm also a Board member of
20 the California Energy Efficiency Industry
21 Council. And I have comments mostly representing
22 the Council. So we submitted a letter, comments,
23 and I'd like to reiterate some of the major
24 points of that because I think what we research,
25 I think, is no more important than how we do it.

1 And we're seeing a trend that we're not that
2 comfortable with in the research, and that is a
3 trend towards all the research projects going to
4 universities, national labs, you know, trade
5 associations, or companies that are looking for
6 help in developing a product that they can then
7 sell. Most of our members don't fit that. Most
8 of the research that we have done that has
9 benefitted California has led towards an
10 improvement in Codes and Standards, and in
11 measures to help control energy use that none of
12 our members are making a profit off of. It's
13 advanced, it's truly public interest energy
14 research that would not be done otherwise.

15 I think one of the best ways of taking a
16 look at what we see as the eventual outcome of
17 the direction that things are going is this last
18 NOPA; none of the successful proposers were from
19 the category that I'm talking about, they were
20 all national labs, universities, or manufacturers
21 or trade associations, manufacturers looking to
22 make a profit on what they were developing. All
23 of those are good, but they are not the whole
24 world and the Energy Commission is going to be
25 missing out on a lot of very important research

1 if firms like ours are kept out of the mix. And
2 there is nothing in the rules that says we can't
3 play, but if you look at the fact that grants
4 mean that there's no profit to be made, and
5 you're asking for-profit companies to put
6 proposals together when there is no way for us to
7 make, to sell a widget afterwards, you are
8 essentially eliminating us. And we have some
9 other concerns about the way contracts are
10 handled and we would like to help the Commission
11 figure out how to meet the goals that you have,
12 including protecting the public interest and the
13 dollars spent in a way that does not exclude our
14 firms. I have a lot more to say, but you have
15 other people to talk, so I will keep it short
16 unless there's any questions. Okay, thank you.

17 MR. STOKES: Okay, next is William Toman
18 with Cal Poly SLO.

19 MR. TOMAN: Good morning. My name is
20 Bill Toman, I'm working with Cal Poly San Luis
21 Obispo on some cutting edge studies we're doing
22 for the Department of Energy regarding wave
23 energy utilization in the state.

24 We're very happy to report that recently
25 Cal Poly was awarded a \$750,000 grant from the

1 U.S. Department of Energy to facilitate siting
2 and costing studies for potentially siting a
3 national wave energy test center offshore of
4 California somewhere. We're working in
5 conjunction with Humboldt State University and
6 the Scripps Institute of Oceanography at U.C. San
7 Diego, along with Cal Poly San Luis Obispo.

8 I want to talk about the issue of cost
9 share, federal cost share. Just as an example,
10 this most recent grant had a requirement of a 25
11 percent applicant cost share. My readings
12 through some of the EPIC material, I see numbers
13 of caps around 10 percent. So in this case, for
14 the one that we just recently won, which was done
15 mostly with cost share provided by the California
16 universities that would not have been as helpful
17 as a larger amount. The Department of Energy
18 tells us that after they evaluate the year-long
19 study that we are embarking on, in competition by
20 the way with facilities in Oregon, that they will
21 at some point issue a grant solicitation for
22 actually building this test facility, which could
23 cost as much as \$60 million. It would center the
24 wave energy industry here in California, the
25 tremendous benefit for Ratepayers long term in

1 meeting greenhouse gas emission reduction targets
2 and costs. DOE most likely will ask for a 50
3 percent cost share with the Build Funding
4 Opportunity Announcement, as they call them. And
5 in my meetings with the Department of Energy in
6 Washington, there's a constant theme of where is
7 the State of California in supporting wave
8 energy? Where is the State funding to evidence
9 their commitment to furthering this promising
10 technology? I'd like to look to the Energy
11 Commission through the EPIC program to help
12 provide an answer to those questions from the
13 Federal Department of Energy. I think this is
14 something that would be a tremendous return on
15 your investment. Thank you very much.

16 MR. STOKES: Okay, next is Ken Broome.

17 MR. BROOME: Ken Broome. I've submitted
18 a response to your questionnaire regarding a
19 commercial demonstration of small-scale low head
20 hydropower, and in order to prepare a proposal it
21 will take a lot of work on my part to assemble
22 the site, the fabricator, the engineer, and so
23 forth. So I'd like to know when we're likely to
24 be given a request for a proposal and how long
25 we'll be allowed for the response.

1 MR. STOKES: Yeah. So as far as the
2 response, it varies from solicitation to
3 solicitation. RFIs or PONs for the first
4 Investment Plan will be coming out over the next
5 couple months, still to be determined when PONs
6 for the second Investment Plan will be coming
7 out.

8 MR. BROOME: But this will be at what
9 month of the year?

10 MS. TEN HOPE: We've posted on our
11 website for the first Investment Plan the
12 solicitations that we anticipate doing,
13 initiating through June of 2014, and then the
14 solicitations that will follow in the last six
15 months of the year. And as we get more precise,
16 we'll post individual quarters. This plan right
17 here that we're talking about for 2015-2017,
18 these are staff proposals at this point, they
19 need to go through an internal review at the
20 Energy Commission, and then be submitted to the
21 Public Utilities Commission. And so the plans
22 won't be finalized until the end of 2014, I
23 believe, is when the CPUC is intending to make a
24 decision. And so we would not anticipate

1 solicitations on this plan until spring of 2015
2 at the earliest.

3 MR. BROOME: Thank you.

4 MR. STOKES: Okay, so Dave Watson from
5 Slice Energy.

6 MR. WATSON: Hi. I'm Dave Watson with
7 Slice Energy. I was really glad to hear the
8 increased interest in integrated demand side
9 management technologies, which traditionally mean
10 integration of efficiency and traditional Demand
11 Response. My comment is that I'd like to see
12 additional integration or emphasis on fast Demand
13 Response, which can be used for grid balancing
14 purposes. It is a fraction of the cost of peaker
15 plants and grid-scale storage, and can be used in
16 conjunction with those resources and assets in an
17 effective way to help integrate renewables onto
18 the grid. So just the word Demand Response, I
19 think, needs to either be split into different
20 categories, or somehow an emphasis on this newly
21 emerging Demand Response technologies that allow
22 for both regulation up and regulation down,
23 similar to a generator. So I'll just put a pitch
24 in that I think that's a really important topic
25 that maybe alluded to in the integrated demand

1 side resources, but I just want to amplify that
2 point.

3 MS. TEN HOPE: We're not going to respond
4 to each person, just to make sure that you have
5 plenty of time to get your comments on the
6 record, so I would just keep bringing folks up.

7 MR. STOKES: MR. STOKES: Walter Saur
8 (ph).

9 MR. SILLEVIS-SMITT: Good morning. My
10 name is Willem Sillevis-Smitt with Philips
11 Lumileds. I saw a lot of research initiatives in
12 the area of building technologies, which I think
13 is very encouraging and a very important topic.
14 One suggestion I'd like to make is to identify
15 lighting as a separate technology within the
16 group of technologies that encompass building
17 technologies. Lighting accounts for about 20
18 percent of total electricity consumption and so
19 any gains in the efficacy of lighting and market
20 adoption, consumer adoption of lighting that can
21 be made and can be accelerated, I think will
22 greatly help energy savings. So I'd like to
23 refer also to the way the Department of Energy
24 handles solid state lighting specifically as a
25 form of energy efficient lighting, there are

1 separate programs set up for the acceleration of
2 development and market adoption of solid state
3 lighting as a separate area within the overall
4 building technology program there, and I think
5 that would be a very good example. I would also
6 like to suggest that to the Commission to
7 consider this as a separate research initiative.
8 That's my comment. Thank you.

9 MR. STOKES: Okay, next is Scott Elrod
10 with the Palo Alto Research Center.

11 MR. ELROD: Thank you. Scott Elrod. I
12 work for the Palo Alto Research Center. First, I
13 want to say it's a very impressive set of
14 initiatives and what strikes me is how
15 comprehensive it is. So my comments aren't about
16 the comprehensiveness, they're more about
17 affordability and some ideas around how to maybe
18 organize this.

19 We are performers on several ARPA-E
20 grants at PARC and so we're familiar with the
21 solicitations, and each solicitation has in it
22 \$20 to \$30 million, and those solicitations, some
23 of them map fairly directly onto things that
24 you're trying to address through the EPIC
25 Program. So the concern I would have is that,

1 for the \$160 million, how can you address all
2 those things at once? It's a very ambitious
3 agenda. So just one idea would be to try to
4 organize the solicitations around what is
5 actually the vision for the future, and I suspect
6 that these visions were and are prominent in your
7 thinking, but I'm wondering if the solicitations
8 themselves could be organized in this way. So a
9 grouping of solicitations that are oriented
10 toward, say, the homeowner of the future, the
11 energy user in the home of the future; or a group
12 of solicitations around the corporation of the
13 future and its interaction with the energy
14 system. So maybe there could be 10, 15
15 solicitations which are addressing the different
16 pieces of the value chain, the communications
17 required, the energy storage required, the
18 renewable generation that could be sited in those
19 places, and that would be a way, I think, to
20 further focus the effort and ensure that there's
21 enough money to deliver on what those visions
22 are. I also think there's great value in
23 bringing together the performers on different
24 aspects or different projects, and so this could
25 also provide a means to bring together the

1 principal investigators, the performing
2 organizations together around that theme, the
3 theme being this specific vision for, say, the
4 2030 homeowner and his or her interaction with
5 energy. Thank you.

6 MS. TEN HOPE: And I think we're ready
7 for -- well, let me do a call first, anyone else
8 that would like to speak in the room? So we'll
9 go online. Yes, we -- Fred Bauman, please go
10 ahead. Fred, would you mind chatting your
11 comment? The sound doesn't seem to be working
12 very well. And we'll read it here in the room.
13 Fred, could you type your question into the chat
14 function on the WebEx, and we'll read it in the
15 room? Is there anyone else in the room who would
16 like to make a comment at this time? Is there
17 anyone else on the WebEx? Okay, yes, we will
18 read a question that has been texted through.
19 Just a moment.

20 This is a question from Elissa Brown:
21 "In some state solicitations, there is a match
22 waiver for projects benefitting low income
23 communities. Some of the technology
24 demonstration projects such as Forest Bioenergy
25 do not have access to much match funding. Could

1 you consider match waivers for these programs?"

2 This is from Elissa Brown with the Sierra Nevada
3 Conservancy.

4 Art Rosenfeld, please go ahead.

5 MR. ROSENFELD: Can you hear me, Laurie?

6 MS. TEN HOPE: Yes, we can.

7 MR. ROSENFELD: I'd like to make two
8 comments, one is a simple question. The
9 Investment Plan 2 funding notices, funding
10 opportunities, seem to be delayed until the end
11 of the year, but on your website you have
12 Industry, Ag and Water showing as coming in
13 before June. Why am I confused? Are there two
14 different deadlines in Industry, Ag and Water?

15 MS. TEN HOPE: The lists that are on the
16 website are for the current Investment Plan,
17 Investment Plan 1, and the ones we're talking
18 about today are for the second Investment Plan
19 that will roll out in 2015.

20 MR. ROSENFELD: Oh, thank you very much.
21 And while I'm on, I would like to make one
22 comment. I would like to emphasize Frank
23 Ramirez's comment on evaporation. I've been
24 working with Russell Sykes at Harvard and we have
25 an evaporation control with brightening water

1 with underwater clouds, bubbles, and our estimate
2 is we can save one foot of evaporation per year
3 at moderate costs, and there are nearly half a
4 million acre feet available. So I do think
5 that's a hot topic and maybe we can combine our
6 efforts. Frank Ramirez, if you could email me at
7 ArtRosenfeld@gmail.com, I would be very
8 interested in talking to you. Thank you very
9 much.

10 MS. TEN HOPE: Art, did you want to state
11 an affiliation?

12 MR. ROSENFELD: Oh, I'm sorry, Lawrence
13 Berkeley Lab. Thank you, Laurie. And a former
14 Commissioner.

15 MS. TEN HOPE: It's a pleasure to have
16 you online. Thanks, Art.

17 MR. STOKES: Okay, so we have another
18 commenter from the room. Mark -- I can't read
19 the last -- from the Davis Energy Group. Is it
20 Berman?

21 MR. BERMAN: Thank you. I'm Mark Berman,
22 President of Davis Energy Group. And we've done
23 work over the years for the California Energy
24 Commission. And I have a number of thoughts.
25 One is I'd like to reiterate something the

1 gentleman from Palo Alto Research Center said,
2 although \$60 million sounds like a lot of money,
3 it's not as much as it used to be, and I'm
4 concerned that it's getting spread too thin, too
5 many initiatives at the same time. And I'm
6 wondering if some prioritization is needed, or,
7 as was suggested looking toward a theme. And one
8 of the themes that I would suggest is the roots
9 of the California Energy Commission, and that is
10 efficiency within buildings and energy in and on
11 buildings, and that includes new and existing.
12 We've done some work in existing housing and
13 retrofitting it and it's a real challenge.
14 There's a lot more that needs to be done there to
15 figure out how to motivate homeowners to do what
16 seemingly obviously is in their interest, and
17 there are many other areas within buildings where
18 energy can be saved, demonstrations are needed,
19 products are available, but uptake is low to the
20 Valley of Death.

21 And finally, I would like to reiterate
22 what Nehemiah Stone mentioned. We are seeing a
23 trend more and more of awards going to larger and
24 larger institutions, which certainly large
25 institutions have a place to play; but so do

1 small adept entrepreneurial organizations such as
2 the one I represent, a couple of dozen people
3 that can do some really good and effective work,
4 and have over the years, in areas that have no
5 hope of generating a profit in the future. And
6 so the concept of match funding makes no sense
7 for a modest sized company to do work in an area
8 that's not going to yield revenue in the future.
9 And the concept of spending \$20,000 to put in a
10 well-thought-through, hopefully, proposal in
11 response to a solicitation that you may or may
12 not get, and no possibility of profit on the
13 other end, with accounting oftentimes
14 micromanaged, the value proposition is declining,
15 and that's not good for the Commission, it's
16 certainly not good for the health of our
17 companies, and it really just doesn't make sense
18 for so many grants to be out there that disallow
19 profit, when profit in fact in most instances is
20 used for training, reinvestment, and creating
21 more proposals. So that does need to be re-
22 thought. Please pay careful attention to the
23 comments of the California Energy Efficiency
24 Industry Council, they come with good intention
25 and lots of experience. Thank you.

1 MS. DOUGHMAN: So we have a comment
2 online, I'll be reading it in a moment. So this
3 comment is from Fred Bauman. He is with the
4 Center for the Built Environment at U.C.
5 Berkeley. His comment is related to the first
6 Strategic Objective. Fred writes: "I think it
7 is important to specify strategies that will
8 improve and promote indoor environmental quality
9 in relation to all of the energy efficiency and
10 demand response research efforts. The presented
11 list includes such human factors as social
12 science research methods and indoor air quality,
13 but the list does not talk about thermal comfort
14 and overall indoor environmental quality, which
15 is obviously important for the success and
16 adoption of any of these technologies. It may be
17 implied that the demonstration projects will
18 require comfort and indoor environmental quality
19 issues to be included, but I encourage you to
20 explicitly include these in your plan. Proposers
21 may respond by including these topics in their
22 research methods and by also including these
23 topics in their clean technology developments."

1 We'll check one more time, if you are
2 online and you would like to make a comment,
3 please use the raised hand function.

4 MS. TEN HOPE: Could we move to our Next
5 Steps slide?

6 MS. DOUGHMAN: Yes, so the Next Steps,
7 please submit written comments by the close of
8 business on March 28th. Please send your
9 comments by email to Docket@energy.ca.gov.
10 Please include the docket number 12-EPIC-01 in
11 the subject line. And please send an electric
12 copy to LorraineGonzalez@energy.ca.gov. You may
13 also send a paper copy to the California Energy
14 Commission, Dockets Office, Mail Stop 4,
15 regarding Docket No. 12-EPIC-01, 1516 Ninth
16 Street, Sacramento, California 95814-5512. And
17 with that, we will break for lunch. We'll return
18 at 1:00 to hear from Investor-Owned Utilities.

19 MS. TEN HOPE: Shall we go to 1:15?

20 MS. DOUGHMAN: Oh, 1:15, yeah.

21 MS. TEN HOPE: Thank you, everyone.

22 (Break at 12:01 p.m.)

23 (Reconvene at 1:17 p.m.)

24 MS. MOORE: Welcome to the second-half of
25 our Joint Workshop for the Electric program

1 Investment Charge program. The purpose of today's
2 workshop is to solicit stakeholder and public
3 input on draft funding initiatives for the 2015-
4 2017 EPIC Triennial Investment Plans.

5 This morning's segment focused on the
6 CEC's Draft Initiatives, and this afternoon's
7 segment will focus on the Investor-Owned
8 Utilities, or IOU, Draft Initiatives. The IOU
9 Administrators of the EPIC Program are Pacific
10 Gas and Electric Company, Southern California
11 Edison Company, and San Diego Gas & Electric
12 Company.

13 My name is Amanda Moore, Regulatory Case
14 Manager for Pacific Gas and Electric Company, and
15 on behalf of all the EPIC IOU Administrators, I
16 would like to thank you for participating in
17 today's workshop. Please note that this meeting
18 is being recorded.

19 A recording and transcript will be posted
20 on the Energy Commission's web page.

21 This afternoon's discussion will begin
22 with John Minnicucci of Southern California
23 Edison Company, who will provide EPIC Investment
24 Framework from the Perspective of the IOUs.
25 Next, we will have a segment where we discuss

1 each of the IOU's EPIC Investment Plans for the
2 2015-2017 cycle. That will be followed by an
3 EPIC Intellectual Property Discussion given by
4 John Minnicucci. Finally, we will have a talk
5 about EPIC Research, Development and Deployment
6 Journey. And at the end of today's presentation
7 we will have the opportunity for stakeholders to
8 Make comments and ask questions.

9 With that, I would like to get today's
10 presentation started with John Minnicucci of
11 Southern California Edison.

12 MR. MINNICUCCI: Thank you, Amanda. Next
13 slide, please. One more. There we go. So I'm
14 not going to spend a lot of time on these next
15 slides, we presented these slides at our Webinar
16 in February, but we feel it's important to
17 provide a little bit of context to kind of
18 demonstrate what the utilities are faced with in
19 California, so just a real brief survey of some
20 of the energy goals: once-through cooling,
21 coastal power plants in California will no longer
22 be able to run water through a cooling cycle at a
23 single pass. That means they either have to shut
24 down or retrofit. That could cause impacts to
25 the transmission system that needs inertia in its

1 current form, the way we operate, to continue to
2 run.

3 AB 32, everybody is familiar with the AB
4 32 Standards. That has a very very large impact
5 on a variety of things, including utility
6 operations, again not being able to rely on your
7 more standard forms of generation and looking
8 toward different types of generation.

9 Renewable Portfolio Standard, 33 percent
10 renewables by 2020, a very aggressive target,
11 good for the State of California, but it is
12 something that we have to manage as a utility.
13 Again, operations are not similar to how they had
14 been.

15 The Governor also has a 12,000 megawatt
16 localized energy resource goal. While this is
17 not a mandate, it does show the direction in
18 policy for California, and localized energy
19 resources will definitely change how we manage
20 our distribution systems. And most recently, the
21 State Energy Storage Procurement Requirement,
22 which requires the utilities procure 1,325
23 megawatts of energy storage by 2020. These goals
24 are aggressive and advantageous for the state,
25 but they also present a lot of challenges, which

1 is why we're here and why we're very interested
2 in pursuing these types of programs that you'll
3 hear about in a little bit. Next slide, please.

4 So just roughly, on the left side what
5 you're seeing, gridlock reliability through
6 rotational inertia, remember the power plants
7 that we were talking about, big moving mass is
8 what keeps the system reliable and stable today;
9 in the future, we see that reduced stability
10 because of the change in the generation mix: the
11 wind blows when the wind blows, the sun shines
12 when the sun shines, and without big rotational
13 mass you're going to have to work other solutions
14 to keep the grid stable.

15 Dispatchable Generation -- today, well,
16 not necessarily today, but in the past you could
17 pick up the phone and have a generator come on
18 line and in a matter of hours and things are not
19 quite as dispatchable these days. And in the
20 future, it's going to be even more different with
21 stochastic generation, again, you know, clouds
22 pass over a photovoltaic and what happens on a
23 distribution system. Rather than seeing these
24 things as blocks of power for planning purposes,
25 you're going to be looking at blocks of power at

1 a distribution circuit level, and trying to
2 manage at that level which is not something that
3 we had historically done.

4 Passive/Predictable Loads -- the future
5 might have transactive loads. With Demand
6 Response and energy efficiency programs and the
7 potential to have those programs play a role in
8 reliability, it's no longer just managing how
9 people turn lights on and off, and businesses
10 operate, it really becomes much more dynamic and
11 much more unpredictable.

12 Human-in-the-Loop Grid Management -- you
13 know, you have operators that sit in substations
14 and work the system; in the future, with all of
15 the change to the distribution system, we think
16 that we're going to have to focus some of the
17 intelligence in a distributed manner as opposed
18 to everything being centralized. The human-in-
19 the-loop is just not fast enough to deal with
20 what we think is coming at us.

21 And then lastly is the Rigid and
22 Centralized System Control. We're going to have
23 to build flexible and resilient distributed
24 systems in order to manage the grid of the
25 future. Next slide, please.

1 Let's talk a little bit about EPIC.
2 Damon from the CPUC had gone through what the
3 EPIC Program is in a broader sense this morning,
4 this is what the EPIC Program means to the
5 Utilities. The CEC will administer about 80
6 percent of the authorized budget and the
7 Utilities will administer about 20 percent. The
8 CEC's program is broad-based, they'll be doing
9 the applied research, technology demonstration
10 and deployment, and market facilitations. The
11 Utilities, on the other hand, will only be doing
12 the technology demonstration and deployments.
13 Some of the reasoning behind that is the
14 utilities have grids with which to do these
15 demonstrations and deployments.

16 A difficulty with having said grid is
17 that, that grid must be safe and reliable when
18 you're doing these demonstrations, so we have to
19 be very sure that this stuff is going to work
20 before we do a demonstration, which means it will
21 be lab tested and challenged through a variety of
22 processes before we actually get it out onto the
23 grid. And then with respect to the electric
24 system value chain, the utilities are typically
25 going to focus on grid operations, market design,

1 distribution and transmission, which is kind of
2 our forte and what we do in the market,
3 generation demand-side management, and other
4 activities will be focused mainly on the CEC.

5 The Utilities may do programs or projects
6 that touch on generation or demand side
7 management, but it's not a demand side management
8 or generation program in and of itself, it's how
9 you incorporate either data or operations into
10 utility systems to ensure a safe, affordable and
11 reliable grid. Next slide, please.

12 This I'm hoping people are familiar with.
13 This will be probably the sixth time we've
14 presented this, but this is the Investor-Owned
15 Utility EPIC Framework. And the reason we do
16 this at every meeting is the Utilities are very
17 much working together on EPIC. It doesn't make a
18 whole lot of sense for Utilities to unnecessarily
19 duplicate, or pursue research that we can better
20 work on together. That's not to say that there
21 shouldn't be projects that each utility is doing.
22 An example is the behind-the-meter work on
23 Electric Vehicles that the Commission has ordered
24 us to do. All three Utilities are doing work in
25 that area by order, but also it makes sense

1 because all three Utilities have different
2 systems and billing systems and whatnot.

3 But to quickly cover the topic areas,
4 Renewables and Distributed Energy Resource
5 Integration, clearly something that's very
6 important in California; Grid Modernization and
7 Optimization -- we can't get to our targets and
8 goals without having a more modernized and
9 optimized grid; Customer Focused Products and
10 Services Enablement -- again, this is not
11 directed toward doing energy efficiency or Demand
12 Response programs, it's making those programs or
13 helping those programs interact more effectively
14 with the grid. And then the last target area is
15 crosscutting and foundational. This is where,
16 you know, cyber security communications, all the
17 things that are going to stitch this new and
18 modern grid together, that's where those projects
19 would be done. And if you look to the far right,
20 and I apologize for those on the phone that can't
21 see this, we have a list of some of the key
22 drivers. California has got a lot of ambitious
23 objectives and we want to help California get
24 there, and we think by doing the projects that
25 you're going to hear about, that will help move

1 us into the right direction. So without further
2 ado, I'm going to hand the microphone over to Mr.
3 Percy Haralson, who is going to talk about SCE's
4 projects.

5 MR. HARALSON: Thank you. Good
6 afternoon. Okay, the slide that you see right
7 now, this is showing that we have really a
8 consistent framework from EPIC 1 to EPIC 2. You
9 see the same basic categories, same four
10 categories that you saw in EPIC 1. We see EPIC 2
11 as the continuation of that.

12 What I'm going to be talking about today
13 is I'm going to talk about the proposed projects
14 that Southern California Edison has, that fall
15 into these categories. Out of the four
16 categories, we have about 21 proposed projects
17 and I'm going to go ahead and discuss five of
18 those today. So next slide, please.

19 Okay, the first one is really focused on
20 storage and you heard John talk about kind of the
21 exciting and kind of aggressive proposals that we
22 have on the board for California. One of those
23 for Southern California Edison is to install and
24 make available about 580 megawatts worth of
25 storage onto the grid. That's going to be a

1 challenge. And it's a challenge because we're
2 talking about relatively new technologies. When
3 you talk to different manufacturers, each
4 manufacturer kind of has their own view of how
5 that device would interface to the grid, and how
6 it would be controlled, all the way from what
7 type of communications to what communications
8 protocol is used, and then also how that device
9 acts automatically, too, on its own.

10 The goal of the first project, it's
11 called Optimized Control of Multiple Storage
12 Systems, and it is exactly that. We want to be
13 able to go ahead and show how multiple vendors
14 can interoperate with each other and can also
15 interface with existing utility control systems,
16 too, behind the scenes. Now, it's interesting
17 because in my experience, you know, years and
18 years ago I remember doing the same kind of thing
19 with capacitor banks, a much simpler technology,
20 but I can remember back in the '90s having each
21 vendor meet, at the time it was the DNP3
22 Standard, and each different vendor kind of had
23 their own way of interpreting the standard, and
24 when you went ahead and you put these systems
25 together, or the controls together, you found out

1 that they wouldn't interoperate with one another.
2 So it won't be surprising to see the same type of
3 outcome with this, then, too.

4 The other thing that's going to be a
5 challenge in here too is to be able to go ahead
6 and see how these technologies support a lot of
7 different functions because storage isn't as
8 simple as capacitor banks. It really comes down
9 to what particular use case are you using the
10 device for, and how do they interoperate with one
11 another for each use case, too. So this will be
12 much much more challenging than it has been in
13 the past.

14 We're going to be also demonstrating how
15 these devices can operate in their own standalone
16 mode, and how they can go ahead and work together
17 as a team, both to mitigate localized problems
18 and also work as a team to go ahead and mitigate
19 system level problems. Next slide, please.

20 The next project is the Versatile Plug-In
21 Auxiliary Power System, we call it VAPS. The
22 whole idea of this really is you look at when our
23 people are out in the field working at a site,
24 they typically have their truck running, it's
25 sitting their idling and they're using the power

1 from the truck to go ahead and power their power
2 tools and all of the other ancillary devices that
3 they need, including radio communications, safety
4 gear, you know, all of the essential pieces of
5 equipment. And the whole concept of this is to
6 come up with a device, or to have a device and
7 show how it can be used where instead of it being
8 like a portable generator, or the truck itself
9 that would be running on gasoline or diesel, this
10 would be an energy storage device that could be
11 charged up, it could be brought out to the field,
12 it can be set up, and then all of the equipment
13 when the crew is using it would be running off of
14 that energy storage device.

15 Now the advantage of that, you know, you
16 think about it, for people that are kind of used
17 to, say, like hybrid cars now days, it's not an
18 alien concept anymore to come to a stop or to be
19 sitting in front of a facility waiting for
20 someone to come out and you're sitting there with
21 the air-conditioner on and the engine is not
22 running, and that's because the car really is
23 using the energy that is stored in the battery to
24 go ahead and run those services, in that case
25 air-conditioning, so that you're not sitting

1 their idling all the time.

2 Now, the other thing that this project
3 will be doing and showing will be the use of
4 battery technology that really is consistent with
5 what's being used in automobiles, too. So this
6 is the *Chevy Volt*, or the *Ford Focus EV*. And when
7 I say that, what I mean is that internally the
8 device will be made up of the same basic modules
9 that are used in the cars. The advantage of
10 that, there's obviously an advantage of scale
11 that we see for it, and we think that's going to
12 really help the device be much more cost-
13 effective. The other thing that this does,
14 though, too is that it allows us to take a look
15 at using energy storage battery modules that are
16 coming from vehicles as a secondary use, so we
17 see this as also a possibility of taking vehicle
18 batteries that are no longer used in the
19 vehicles, but could be used as a secondary use
20 case, then, in the VPAPS or the VAPS system.
21 What that does, then, is it also gives us the
22 ability to get more use out of the batteries
23 before they're recycled and increases the value,
24 really, of those assets then, too, and reduces
25 the amount of batteries that are then having to

1 be disassembled and lost then. Next slide,
2 please.

3 The next project is the Cyber Auto-
4 Response and Policy Management System. Now, when
5 you think of cyber security on the grid, cyber
6 security comes in a lot of different flavors.
7 Normally, with every system that you purchase,
8 every control system, you get a different flavor
9 of security from that particular manufacturer.
10 And one of the things that Southern California
11 Edison has done as part of their previous
12 projects was to go ahead and come up with what we
13 call the Common Cyber Security Services. And the
14 whole concept to that is to have a set of
15 security services that are standardized, that can
16 be used or leveraged onto any system that the
17 utility uses, then, or brings into the company.
18 The advantage of those is multifaceted: one is,
19 obviously if you have a lot of different systems
20 with each one having their own cyber security
21 system, or their own flavor of that, you end up
22 having people to support that specific flavor of
23 cyber security. The other piece that is
24 important about having a common cyber security
25 service is that it makes the monitoring of those

1 systems and the integration of those systems into
2 the security organization much more consistent
3 also.

4 When you think of cyber security, you
5 also think of not only the ability to be able to
6 recognize when, or to 1) make the system secure,
7 it's like the locks and the keys, but you also
8 want to be able to recognize when there's a
9 break-in, you know, just like you have for a
10 home, if you have a break-in, it's detected and
11 then at that point, though, it turns over to a
12 human, then, that has to make a response. All
13 right, somebody comes and checks on it, that kind
14 of thing, well, that takes time and it takes
15 individuals to make those decisions. So in this
16 project, what we'll be doing is leveraging that
17 common cyber security services platform that we
18 had developed previously, and we would be now
19 showing it with the abilities of being able to
20 automatically recognize when there is a break-in,
21 or a potential break-in, and instead of just
22 passing that on to a set of humans that would
23 then go ahead and decide what they're going to do
24 about it, the system would have automatic
25 mitigation schemes built into it, then, that

1 would then go ahead and basically -- you know,
2 picture in your mind somebody breaks into your
3 house, right, well, what you'd really like to do
4 is you'd really like to be able pick that person
5 up, throw him outside, and re-key the lock,
6 right? I mean, that's really what you'd like to
7 do, and that's really what this is trying to do.
8 It would have the ability to go ahead and
9 recognize it, terminate the session that the
10 cyber attacker is coming in on, and then be able
11 to re-key basically those end devices in the
12 field so that, then, you're basically restarting
13 the whole thing all over again if somebody is
14 trying to break in.

15 As part of this, we would be deploying
16 this and showing it with these automatic
17 policies, which is changes on the system and the
18 keying, basically, to end point devices. These
19 would be things like field radios, digital fault
20 recorders, it could be smart inverters in the
21 future, and then also our relay equipment. So
22 this is the protective equipment in our
23 substations and our distribution system. Next.

24 The next project is the California ISO
25 Operations and Utility Grid Coordination Project.

1 And this is a crosscutting and foundational
2 strategy and technology project. If you look at
3 the California ISO today, they are the balancing
4 authority for the state and are tasked with being
5 able to control what generation is available for
6 the amount of load that is out on the system.
7 Now, it's one thing to be able to do that when
8 you have a lot of wholesale power that's being
9 generated on the transmission side, they're well-
10 positioned to be able to do that and to have the
11 information for it and the control capabilities
12 to handle that. But as we get into a change into
13 a market where a lot of the generation will be on
14 the distribution side, things change a little bit
15 because the California ISO doesn't really have
16 the ability to see that deeply into the
17 distribution system. So you have instead the
18 utility that is managing the distribution system,
19 and you have less and less ability for the
20 California ISO to be able to control those
21 devices on the distribution side.

22 So one of the things that this project
23 would be focused on is what technology does it
24 take and what type of communications does it take
25 to be able to have meaningful grid need

1 notification that can then be pushed down through
2 the distribution system and to the premise and be
3 able to go ahead and have a response that you
4 expect from the devices on the other side of the
5 meter. This is not a Demand Response type
6 program, this is really more of a control program
7 for generation and load, combined. And in
8 particular, as we're focusing on this, is we're
9 really focusing on the communications technology
10 of what it would take to make that work. Again,
11 California ISO is really focused on using
12 wholesale pricing information and, to a retail
13 customer wholesale pricing just doesn't have any
14 meaning to them at all, so our focus on this
15 would be how you go ahead and turn that into
16 really grid need type signals instead, and those
17 grid need signals can then be interpreted by
18 equipment, then, at the customer premise. Okay,
19 next please.

20 The next project is our Microgrid for
21 Enhanced Grid Reliability & Security. You know,
22 one of the things that you look at California is
23 we are definitely blessed with wonderful weather.
24 You know, when you look at what's been going on
25 on the East Coast over the last few years with

1 Super Storm Sandy and you see the type of
2 devastation that it can have on the
3 infrastructure, on the grid infrastructure, and
4 how long it can take to go ahead and actually
5 restore power to those customers, on the West
6 Coast, though, we're not immune to it, you know,
7 we have a little bit different scenarios, we
8 still have natural disasters, we have
9 earthquakes, we have wind storms, we do have
10 fires, we have vandalism, all these kind of
11 things challenge the grid. And we believe that
12 there are learning experiences that we can glean
13 from the East Coast. Part of that is the whole
14 strategy of Microgrids, and one of the things
15 that we're focused on in this project is how do
16 you go ahead and have a system of Microgrids, how
17 do you control the resources on the Microgrid
18 side and have them be able to easily interconnect
19 and disconnect as needed to the grid. What type
20 of services can be made available to the utility
21 with that Microgrid and that Microgrid control
22 system?

23 One of the items also in this project
24 that is important to notice or to note is that we
25 want to be able to go ahead and leverage the EPIC

1 funding with other money from other sources, so
2 in the case of this one we would be looking to
3 potentially leverage that money with the
4 Department of Energy, DOE, also and be able to
5 get literally more bang for your buck out of it,
6 then, for that project. And I think that's my
7 last one. Yes.

8 MS. MOORE: Thank you, Percy, for
9 providing that overview of SCE's draft
10 initiatives for the second Investment Plan.

11 Up next we have Suna Taymaz of Pacific
12 Gas and Electric Company. She will provide an
13 overview of PG&E's second Investment Plan.

14 MS. TAYMAZ: Thanks. So next slide,
15 Amanda. Similar to SoCal Edison, we followed the
16 cross common IOU Framework, and I'll spend a
17 couple of minutes describing the various projects
18 here. This is the beginning of our R&D
19 portfolio, it's still evolving.

20 Similar to my other IOU colleagues, we
21 probably started around the same time, January,
22 so about two and a half months to begin the
23 ideation and planning process for the 2015-2017
24 EPIC portfolio, or what we're calling EPIC 2.

25 And part of this process was to meet with

1 various folks within our own electric group, so
2 be it system engineers, planners, operators, our
3 customer programs, our IT folks, our enterprise
4 architecture departments, and the reason I bring
5 this up is because the projects aren't really -
6 you know, they're not in an abstract bubble, they
7 came from based on real things that our planners,
8 our engineers, our operators are seeing on the
9 grid, or they believe they're going to start
10 seeing on the grid in a more impactful manner.

11 As part of this process, we also engaged
12 research institutions, members of the academic
13 community, various industry associations, and
14 across IOU benchmarking. So I think it's all
15 important to give the context of where these
16 proposed demonstrations come from.

17 So with that context, let me just spend a
18 little bit, a couple of seconds, on each of these
19 boxes. Renewables and Distributed Energy
20 Resources Integration: so this is really all
21 about demonstrating the technologies available to
22 integrate DER, give us visibility of DD on the
23 system, as well as storage, be that the customer
24 side, or the utility side, and help us integrate
25 all these new parameters into our processes. And

1 so that could be planning for capacity and
2 reliability, using an integrated approach that
3 considers DER and DG and Storage, it could also
4 be real time control and coordination of such
5 systems for the utility needs, as well as market
6 needs.

7 John had mentioned earlier the storage
8 procurement target, and so this is obviously high
9 on the minds of all the utilities. Right now,
10 not counting our pumped hydro storage, PG&E has
11 about -- I want to say six megawatts of storage,
12 and so by 2021, we're looking at for all of the
13 utilities, 1325 megawatts. So we've got a ways
14 to go to make sure we can integrate the storage
15 properly, cost-effectively, procure it, and make
16 sure we can deploy it and operationalize it in a
17 way that's cost-effective for our customers.

18 Some of the things to think about is are
19 there better or worse placements, the types of
20 storage, the control and coordination of the
21 storage resources and how to do that all in a
22 safe and reliable manner.

23 Moving on to Grid Modernization and
24 Optimization, I've characterized the projects in
25 this section as exploring various new sensor or

1 smart technologies that have really come up over
2 the past couple of years, piloting these various
3 different applications really give us better
4 information about our assets. We can't get
5 around the fact that our infrastructure is built
6 over the last 100 years, and so with an average
7 age, that is 40 to 50 years. PG&E has 18,500
8 miles of transmission lines, we have a 70,000
9 square mile service territory, and 884
10 substations, so anything we can do to make the
11 patrol of those assets more efficient, extend the
12 life of assets safely, or be alert to real-time
13 conditions is going to be a cost-effective
14 measure we can pass on to our customers.

15 I'll also mention quickly the bottom of
16 Grid Modernization and Optimization, so a lot has
17 happened obviously in the mobile space over the
18 past couple of years, we have field crews that
19 have gone from 100 years ago paper and pen to
20 ruggedized laptops, and we'd like to explore the
21 next generation of technologies to help them do
22 the work in the field and kind of the catch
23 phrases closer to the trouble.

24 A third area, Customer Focused Products
25 and Services, this is really about putting the

1 customer as integrated into the various parts of
2 the value chains, so, you know, gone are the days
3 from generation on one end to customer on the
4 other end. It's really about having the customer
5 in the middle, part of the utility processes,
6 part of the market processes, and so that entails
7 integration with customer-side devices, home
8 networks, integrating those demand side
9 strategies into utility and market operations.

10 And then finally, I'll go to the cross-
11 cutting section, and so I would characterize the
12 projects here around the necessary coordination,
13 interoperability, integration, automation, and
14 the standards, so all of the things that will
15 help the grid work in the modern Smart Grid way
16 to make sure that we have the support to provide
17 the safe, reliable, and affordable services.

18 You will notice a significant focus on
19 the AMI Network, so the Advance Metering
20 Infrastructure Network. This is a big priority
21 to provide a path for our customers and vendors
22 to connect and communicate their various devices
23 and applications in a seamless manner. Next
24 slide, please.

25 MS. MOORE: So I'll focus on three

1 specific projects. The first one, so I had
2 mentioned storage, I said we have an energy
3 procurement target, and so all the utilities are
4 looking at how do we -- what is the best practice
5 for deploying storage? What is the methodology,
6 the processes? They aren't there yet and we want
7 to move beyond obviously the studies and the
8 research to actual field deployment,
9 demonstrating the benefits of that storage. We
10 know there are likely better and worse places to
11 put storage from a safety, reliability, and cost-
12 effectiveness point of view, and so this
13 demonstration would seek to develop out that
14 methodology that we could use, you know, in a
15 repeatable and consistent manner to demonstrate
16 not just the operational aspects, but also the
17 benefits, the risks and the costs.

18 Conceptually, you can think of a tool or
19 data that fields a tool that helps you score
20 storage and understand what are the best
21 locations, what are the optimal types, how do we
22 use it in the grid operations, as well as how do
23 we use it in the markets. For primary benefits
24 around this project, I've mentioned the policy
25 attainment, so meeting our policy goals. What we

1 are also trying to do is assess storage as a
2 method to maintain reliability, as well, with our
3 growing amounts of renewable DER on the Grid, as
4 well. Next slide, please.

5 So on this slide, I'll highlight the
6 Emergency Preparedness Activities, and so in this
7 case Emergency Preparedness Modeling and
8 Emergency Management Mobile Apps. So Percy had
9 also mentioned the amount of storms that you
10 might be seeing, or even if you look across the
11 U.S., as well as worldwide, you know, various
12 incidents that have happened and they can be
13 disruptful and harmful to the public, as well as
14 to our system safety. Folks are caught off guard
15 on restoration activities perhaps in that case,
16 or we have not expected the level of severity or
17 duration of these types of events. And so,
18 without understanding what those natural hazards
19 are and modeling them in a holistic way, you
20 can't really have a good scenario planning in
21 place. And so what we're really seeking to do is
22 improve our scenario planning ability.

23 The demonstration would seek to pilot a
24 holistic natural hazard damage model, and there
25 are some various options out there, and the proof

1 of concept would integrate the models with
2 utility assets to estimate the impacts of a
3 natural hazard on our utility facilities. The
4 proof of concept could then model the impact on
5 the transmission line, the distribution system,
6 actually the impact to customers, and quantify
7 potential outages. This really helps with our
8 estimations to restoration activities, how much
9 research we need, where and when, and for what
10 amount of time to bring the grid back up in a
11 sufficient time.

12 PG&E has developed basic models for
13 outage and restoration, and so this would build
14 on that in a broader manner, leveraging newer
15 technology around virtualization, risk ranking,
16 impact analysis, to calculate these potential
17 losses, and prepare proactively for restoring
18 power.

19 Also, this would look at pairing this
20 with improve mobile technology for field
21 response, so that be it the customers, our first
22 responders, other first responders, the public
23 could actually have the real time information to
24 guide them out of the path of the hazard, alert
25 them to situations, coordinate over a wide area.

1 I'll give you a pretty simple example. So, in
2 our world today, a customer calls and there's a
3 wire down, and we roll the truck to go
4 investigate. Let's say a certain percentage of
5 those calls are for telephone lines down. And so
6 if the customer could take a picture, send that
7 to our call center and realize it's a telephone
8 wire down, we can avert a truck roll, keep our
9 emergency responders for the emergency, and
10 perhaps route that to the telephone service
11 providers. So there are real savings as far as
12 truck rolls, operational efficiency, reduced
13 greenhouse gases from that truck not going, lots
14 of potential applications. Next slide, please.

15 So this slide describes our Real-Time
16 Energy Usage Feedback for Customers, and this is
17 under the Customer Focused Products and Services
18 area. We have very strong energy efficiency and
19 demand response programs, and John had mentioned
20 that, as well. So our focus isn't so much on
21 those programs, but really the grid integration,
22 how do we make those programs effective so they
23 can actually contribute to our internal planning
24 processes on the distribution system, help meet
25 our capacity and reliability needs, really

1 integrate and leverage those programs in a
2 significant manner. And so, as I mentioned
3 before, the customer has moved to the center of
4 utility and market operations, and to really get
5 there we have to incent our customers to really
6 play a part in the utility model. And so one
7 such demonstration takes the use and availability
8 of real time data, grid data, market data, real
9 time usage data, and using that to engage the
10 customer and encourage or incent demand-side
11 participation.

12 One concept here is gamification, so if
13 anyone has played video games, it's a significant
14 trend in recent years, to use it in a non-gaming
15 context, and so this is potentially a powerful
16 tool to change behaviors, how we interact with
17 customers, and also how even employees can drive
18 innovation. Traditional games, if you're
19 familiar with video games, use points, reward
20 badges, status broadcasts over social media, and
21 so if we combine these types of gamification
22 strategies with real-time data, we have the
23 opportunity to really advance some of our
24 customer facing programs in a more significant
25 way so we can actually meet policy goals, achieve

1 grid integration, really enhance the
2 collaborative strategies between the customer and
3 the utility. Next slide, please.

4 So the last slide is an example from our
5 Cross-Cutting and Foundational category, and this
6 is really about demonstrating our AMI Network
7 License Spectrum Demonstration. There has been
8 lots of discussions, research, there is a lot of
9 activity around licensed versus unlicensed
10 spectrum, the various opportunities and
11 challenges on both sides. Our network is an
12 unlicensed spectrum, and we would seek to
13 demonstrate on a small scale the various benefits
14 or advantages or challenges of licensed spectrum,
15 as well. So there are various vendors out there,
16 again, various kind of opportunities on both
17 sides, but this would seek to evaluate whether
18 there is any benefit to moving to a new type of
19 network, whether it's a potential supplemental
20 source of bandwidth over the coming years,
21 essentially not to lock us into one solution,
22 knowing that the road ahead for Smart Grid
23 communications, distribution automation, customer
24 devices, isn't yet quite known, so allowing us
25 the path to see the various different future

1 scenarios that could play out. And I think
2 that's my last slide.

3 MR. MOORE: Thank you, Suna, for
4 providing an overview of PG&E's second EPIC
5 Investment Plan. Up next we have Frank Goodman
6 of San Diego Gas and Electric Company. He will
7 provide an overview of their second plan.

8 MR. GOODMAN: Thanks, Amanda. The
9 approach here is similar to what you saw from my
10 colleagues from the other Investor-Owned
11 Utilities and following the same framework that
12 we've used in the past triennial cycle, this is
13 the landscape view for San Diego Gas and Electric
14 in the second triennial plan.

15 We have six projects up there and that is
16 the current list, it's not yet final. We've been
17 working it internally with a tiger team of people
18 and vetting by -- what do we call it -- our R&D
19 Governance Team, which is mainly Director level
20 people. And that list you see there is our
21 current list, we had a much longer list when we
22 started, but we wanted to brainstorm all the
23 possibilities and we ended up picking what we
24 thought were the most urgent needs to the extent
25 we can look through our crystal ball at the time

1 this program gets approved, what we think they
2 will be. But we've left enough flexibility in
3 them that staying within the confines of those
4 six activities we could pretty much adjust as
5 needed to whatever happened in the industry
6 between now and when the plan is approved. So
7 I'm going to go through the five up above, five
8 of our six, following Percy's lead, picking five,
9 and it's the ones in blue that I'll walk through.
10 And I'll say this, that we do have in this case
11 populated more of the different elements of the
12 framework, the initiatives, that is, than we did
13 in the first triennial cycle. We had only
14 activity in two of the four initiatives, this
15 time we've got activity in all four. So the next
16 slide, please.

17 Okay, now in that first initiative, which
18 is the column on the far left, we have this
19 project, Modernization of Distribution System
20 Integration and Integration of DGDS. One of the
21 things that we did in populating that initiative
22 framework was we took a look at what would map
23 from work already underway, and we have R&D
24 programs going on that are funded out of our rate
25 case R&D Program which runs through the end of

1 next year, and through the triennial 1 plan which
2 is ramping up right now.

3 So we first asked the question, is there
4 anything there that will need a logical follow-
5 through in Tri-2, the next phase, if you will.
6 And then we also said, what aren't we doing at
7 all that might need to be done? This one is more
8 in the category of logical follow-through to
9 things we're doing on smart circuits and on
10 renewables and DER integration, but it kind of
11 starts to narrow it down into a smaller number of
12 projects. And this will be our follow-through
13 for what was multiple areas in the past. But it
14 will likely be the largest of the projects, and
15 some of the things we'll be doing in there,
16 examples, and the actual final list of
17 activities, it's determined in the actual project
18 planning phase which is Phase 1 of the program,
19 all of our projects work that way.

20 We might pilot a Robust Distribution
21 Circuit Design with Adaptive Protection and
22 Regulation Capabilities that can accommodate a
23 wide variety of new device types at different
24 penetration levels. New device types not just
25 meaning DER, which is what everybody gravitates

1 to right away, Distributed Generation and
2 Storage, but also could include things like SVCs,
3 Static VAR Compensators, and other controllable
4 power electronic devices that are emerging from
5 the vendor community. And our issue is how do
6 you make them interoperate together and rather
7 than work against each other.

8 And then we will also continue to look at
9 is it better, for example, to use your inverters
10 on the DER in the power factor control mode in
11 order to regulate voltage? Or through volt VAR
12 control? So different operating approaches, what
13 is better, what's worse, and in specific
14 situations, what works in one case may be just
15 the other way around in the other case.

16 And then we're going to look at different
17 storage issues like how could you stack different
18 storage functionalities where you put a storage
19 system in at considerable cost, especially if
20 it's batteries, and then you have some primary
21 intended function and you ask, well, it's going
22 to be sitting there, is there anything else it
23 could be doing when it's not shaving your peak at
24 4:00 in the afternoon, or however you normally
25 would use it? And start to look at how can you

1 layer in a number of different uses of that
2 device and get more value out of it than just its
3 primary use. So that's the first one. And you
4 pretty much see there we have mapped it to these
5 primary and secondary principles as the other
6 IOUs, I don't need to read the list. Next slide,
7 please.

8 The Data Analytics and Support of
9 Advanced Planning and System Operations is our
10 second one. This moves now into the middle
11 initiative area of Grid Modernization, and it's
12 true that a lot of these projects I'm describing
13 actually have a primary and a secondary mapping
14 in the initiative list, and the way I'm labeling
15 them today is according to primary mapping. But
16 that one I just presented, for example, it not
17 only is DER integration oriented, but it is a
18 part of your modernization process, as well.
19 Excuse me, I brought a throat full of San Diego
20 pollen with me.

21 The second one here is on Data Analytics
22 and we have the concern that we're getting a lot
23 of these data producing devices. Any
24 controllable device generates information and
25 data if it's an inverter sitting out at a

1 customer residence, you could extract information
2 on system operations. Any power electronic
3 device that requires to monitor, system and
4 voltage from the utility system in order to
5 operate itself, well, if you had the
6 communication infrastructure in place, you could
7 use that device as a monitoring node in addition
8 to its primary function. So we want to look at
9 those aspects, but then the bigger aspect that
10 emerges is a data tsunami, a different tsunami
11 than what Suna was talking about, different type,
12 that is. And you've probably heard the phrase,
13 there's this large volume of data that's going to
14 emerge as we add more and more controllable
15 electronic devices and they generate information
16 that could be useful, or it could just snow your
17 whole operating process and take it down, so we
18 really need to get our arms around this one and
19 ask what sort of filtering needs to be done, and
20 at what level in the control system, and what
21 data is not sent further upstream, but either
22 discarded or used down at a lower level, and so
23 on up the line. So that's what this project is
24 about, is getting at the management of all this
25 data that is already -- well, we're getting more

1 than we can handle right now and we're going back
2 and looking at old data and finding all kinds of
3 useful things about how well our volt VAR
4 management systems are working, or not working,
5 just by mining the information that is already
6 archived in data. So you not only want to do
7 that, though, you want to be able to handle this
8 data stream in real time and make use of it to
9 customer benefit to deliver a higher level of
10 sophistication in your operations to customer
11 advantage. Next slide, please.

12 So the next one here is the Monitoring
13 Communication and Control for Power System
14 Modernization. And here I move away just from
15 data to the whole picture of the monitoring, and
16 then using the information to do something
17 useful, the control aspect, once you manage the
18 data and have your arms around that, doing
19 something useful with it and getting it to the
20 place you're going to do something useful which
21 is the communication part. And we want to get
22 into the issues around communication architecture
23 and standards, and sometimes I hesitate to even
24 raise it, but IEC61850, and I commend SCE because
25 they are doing the first 61850 conforming

1 substation, I believe in North America, and the
2 North American utilities have a big investment in
3 the legacy architecture called DNP3; however, in
4 the long run, like 10-15 or more years down the
5 road, there's enough advantages in the 61850
6 architecture that the North American utilities
7 may want to migrate to it. So that's an area
8 that we plan to explore more around the
9 distributed energy resource area since SCE has
10 moved ahead on the substation, now we're very
11 anxious to learn from what they're doing, and
12 then we want to start to try out what are called
13 61857-420 object models, which are the ones that
14 are for DER. That's the piece of 61850 that is
15 for DER, and begin to look at how the system
16 would be architected here and what standards you
17 would use in different places in the architecture
18 and pilot them and get smarter, and answer some
19 key questions: 1) Do we really want to migrate
20 to 61850 or to some other new standard? Believe
21 me, right now, 61850 is the most sophisticated,
22 so do we want to migrate to something else other
23 than our current platforms, or not? And if so,
24 what will the migration process be? And the only
25 way you can really figure that out is to start

1 piloting and getting familiar with some of these
2 standards. So that's that one. Could we move to
3 the next?

4 All right, this next one is around system
5 operations development in advancement, and here
6 we're saying, well, gosh, we are moving as
7 aggressively as we can within the resources we
8 have to modernize the power system, and we're
9 putting in new hardware, new software, adopting
10 new standards where it makes sense, and then what
11 about the control aspects, meaning the staffing,
12 the training, the skill sets, the workforce
13 readiness, and then again that overall system
14 integration issue as you're bringing the new
15 technology software and so forth on line, are
16 they properly integrated? And then how do you
17 have your workforce readiness positioned to
18 really operate it properly, to deliver the
19 maximum value to the ratepayers? Because the
20 value to the ratepayers will come not only from
21 moving to more advanced infrastructure, but
22 making darn sure you're smart about using it and
23 you're using it right. So this one gets more
24 into the human element and also tries to position
25 us where we're not only ready, but we have a

1 process since this is an ongoing thing and we're
2 not going to roll out the new infrastructure and
3 be done with it, there will always be new
4 technologies coming, and so we want to have a
5 process in place that you can easily adapt
6 incrementally to the changes, and not alarm your
7 operating people, or really disrupt your
8 operating processes with a lot of things all at
9 once, so to be able to do it quickly and
10 incrementally. Next slide, please.

11 This is my final slide and it deals with
12 the integration of customer systems into electric
13 utility infrastructure. I'm now in that right-
14 most column of the initiative slide. And here,
15 we're not trying to go behind the customer meter,
16 there seems to be an awful lot of work going on
17 there, whether assisted by federal, state, local,
18 or even some of the IOU programs, and then
19 there's major incentive programs outside of the
20 R&D arena, major incentive programs already in
21 place. So rather than go behind the meter, we're
22 trying to look at that interoperability between
23 the utility system and the customer, and we have
24 some work already underway. And Sally Muir, my
25 colleague here from San Diego Gas & Electric,

1 raise your hand, Sally, she's managing that new
2 project area. We're laying some groundwork, but
3 we will need to follow through, try to. And it's
4 basically taking a look at everything you have
5 between your advanced distribution management
6 system at the top level to operate your power
7 system, down through some what we call
8 subsystems, you're working toward a system of
9 systems, with things like DRMS, Distributed
10 Energy Resource Management Systems, DRMS without
11 the "E", Demand Response Management System. And
12 other intermediates below the top level
13 Distribution Management System, and you get down
14 to that need for that gateway between DRMS, if
15 you will, or whatever is the last level before
16 you go to the customer, you need the gateway
17 between that level and the customer, and that is
18 what this work is about, the work Sally has
19 underway, and we will want to follow through on
20 it and arrive at a standardized interoperability
21 system that allows a customer to come and hook up
22 and plug and play with the utility distribution
23 management system seamlessly, which means all of
24 that information is coming out through a set of
25 standardized protocols. And what protocols? All

1 of that needs to be decided. And whether or not
2 it should include partially using the AMI because
3 ultimately what you want to do is going to be
4 beyond the capability of AMI, but whether you
5 want to use the AMI as a part of it, or just have
6 a complete separate gateway, all those kinds of
7 questions will be answered as a consequence of
8 this work. So that's it. I don't think I have
9 any more slides. And with that, I'm going to
10 turn it back over to Suna, I believe.

11 MS. MOORE: Yes. Thank you very much,
12 Frank, for providing an overview of SDG&E's EPIC
13 2 Investment Plan. Up next we have John
14 Minnicucci who will lead a discussion of
15 intellectual property issues from SCE's
16 perspective.

17 MR. MINNICUCCI: Thank you, Amanda. So
18 one of the things that I wanted to bring to
19 everybody's attention is that there may be some
20 intellectual property issues as we move forward
21 with EPIC. SCE issued a Request for Information
22 to a number of suppliers for engineering and
23 technical services, and we've received some
24 responses, and I wanted to make those a little
25 more publicly available than we would typically

1 do, just in the interest of helping to further
2 the program and hopefully get robust comments in
3 the subject areas.

4 So with respect to the RFI, there were 16
5 business respondents and five university
6 respondents. The concerns generally fell within
7 three topic areas, the first was the treatment of
8 preexisting intellectual property. If you're a
9 business that has done much work to develop a
10 product or a tool, and you bring that into an
11 EPIC program, you know, what happens to your
12 initial intellectual property? We believe that
13 it would be you would maintain that and that
14 would be the sensible thing, but the decision
15 wasn't exactly clear on how to treat the
16 preexisting intellectual property, as the vendors
17 had identified.

18 The next one was the retaining and
19 ability to use developed IP, so as part of this
20 program a vendor would be working with the
21 utility and potentially there could be a
22 development in IP. If the vendor was to take
23 that and then build a better product, then the
24 utilities could use and deploy and meet our
25 system needs, that would be of benefit to the

1 utility and our customers because we now have
2 something that is usable and deployable, and has
3 passed all of our tests. So we think that that
4 might be something worth thinking about.

5 And then one that almost all of the
6 respondents keyed in on was indemnity for the
7 State of California. That is a tall order for a
8 business to indemnify. Now, some of the
9 comments, "Is this an indemnification for just
10 the research results? Is it an indemnification
11 for some of the data that comes about? Or is it
12 an indemnification on somebody's use or misuse of
13 the data?" There were questions and those are
14 things that they would like us to address or at
15 least resolve.

16 And then the next issues, SCE is very
17 aggressively pursuing DOE funding. We believe
18 it's very important for the state that we can
19 leverage as much as we can of these limited
20 dollars. Someone had pointed out in the CEC
21 presentation that, you know, \$120 million to \$160
22 million really isn't a whole lot of money and you
23 cannot do everything with that pot of money; the
24 utilities' portion is a little smaller, and if
25 you're going to be doing demonstrations,

1 demonstrations are typically expensive, so we
2 want to leverage that. But there are issues with
3 IP with respect to the Department of Energy, so
4 one of the first issues that was noted was the
5 DOE would receive copies of all the reports,
6 deliverables, etc. etc., and they would have full
7 rights to disseminate them. This is a California
8 program, but if it's matched with federal funds,
9 I think the leverage would warrant the ability to
10 do that. The DOE also typically has unlimited
11 rights in the data generated under the project,
12 that's something that right now I think the CPUC
13 is focused on those rights, and that's something
14 we would have to resolve if we're going to
15 leverage.

16 And then patent rights. The DOE has some
17 fairly aggressive patent right restrictions. On
18 our big projects that we received ARRA funding
19 for, there was a patent waiver which allowed us
20 to move more quickly -- I wouldn't say we moved
21 quickly, there were a lot of challenges to
22 getting those projects done, but the patent
23 waiver allowed us to negotiate more effectively
24 and to move more quickly. On the issue of patent
25 rights, I think there will be a direct conflict

1 between that which the DOE wants and that which
2 is currently in the decision.

3 And then the final item that was noted
4 was equipment. If the DOE is cost matching for
5 equipment, they would have an ownership right in
6 that equipment, that's a standard term for any of
7 the DOE arrangements.

8 So I guess what I'm asking for, at least
9 from Southern California Edison's perspective, is
10 if any of those in the audience, vendors or
11 universities or others that are interested in
12 participating, have any insight or have any
13 comments to intellectual property that you please
14 forward them to the websites which you'll see at
15 the end. We'd like to discuss them and hopefully
16 resolve any potential issues so that we can move
17 forward effectively. Thank you.

18 MS. MOORE: Thank you very much, John.
19 Up next, we have a joint IOU discussion regarding
20 the EPIC Research, Development and Deployment
21 Journey, and that will be led by Suna Taymaz of
22 Pacific Gas & Electric Company.

23 MS. TAYMAZ: Thanks, Amanda. Next slide,
24 please. So I'll kick it off, but colleagues,
25 please feel free to jump in. We just thought

1 we'd share a little bit along what we
2 traditionally call the RDD&D Journey, so
3 Research, Development, Demonstration, and
4 Deployment if we look at the CEC Portfolio, as
5 well, it's the entire R&D spectrum. And so it
6 really has been a journey for those that have
7 been following and it's been four months since
8 the decision was approved. We had three public
9 forums, we've got another one at the end of this
10 week, and so we've had discussions with academia,
11 research institutions, etc., so we're moving.
12 Many vendors have asked us, you know, where are
13 the solicitations, and so we're moving them as
14 fast as we can.

15 The feedback tells us that we're focused
16 in the right areas, so far, and we look forward
17 to hearing your comments, as well. There are a
18 lot of various areas to pursue in the Energy
19 space, but the feedback that we've heard is that
20 we're focused on the right things to meet policy
21 goals, grid challenges, emergent challenges.

22 A couple things just to highlight, you
23 know, on our journey there's a quote there from
24 Thomas Edison, "I've not failed, I've just found
25 10,000 ways that won't work." And so we really

1 are looking towards these demonstrations to
2 provide us the learnings are important, in fact,
3 invaluable, and in some cases knowing that
4 something is not grid deployable, or does not
5 meet cost benefits, that is also a success. A
6 gentleman this morning mentioned it's not about
7 an end product, it's about in many cases the
8 codes and standards to support that technology,
9 or that strategy, or that goal. So those are all
10 very important as we start down this journey.

11 Also, you may sense that there are
12 similar things that we're focused on, be it the
13 three utilities, or the CEC, or other research
14 institutions, and that's also by design.
15 Innovation and R&D by nature, it's a community
16 event, we don't innovate by having one person
17 work on one thing and then someone else works on
18 another in a bubble, it's all about bringing
19 those ideas together and building upon each idea
20 and moving it forward, and so we're not looking
21 to sort of -- collaboration is a more important
22 word than duplication in that case.

23 I'll also mention, so we're building our
24 capabilities now since the Decision on November
25 14th, and so we're building the processes,

1 understanding what are some of those bottlenecks
2 or roadblocks, and what our role is as the R&D
3 groups within the various utilities. And so a
4 couple of things, you know, we need strong
5 governance, we also need portfolio flexibility,
6 and so those things, and we're also in utility
7 environments, and so innovation doesn't fit
8 easily into that space, and so a couple of things
9 we've come along with is there's some flexibility
10 in our portfolio, it has to be managed as a
11 portfolio, you've rebalanced your projects based
12 on risk and return, and so that is something that
13 we're actively adopting.

14 We found a key need to facilitate certain
15 processes or almost like the internal expediter,
16 so John mentioned IP issues, the things where we
17 find we are, let's say, stepping in to help
18 expedite our contract negotiations, ramping up
19 projects, facilitating the external and internal
20 exchange of information, and hence we've set up
21 our various websites to help get that information
22 flowing.

23 And then finally, the last bullet there,
24 EPIC is really the beginning of the journey, and
25 so demonstrating something in even a small-scale

1 pilot or lab, actually the beginning of the
2 journey; there's a road after that, and that's
3 what we're also focused on, and that road to
4 deploy at grid scale in a safe, reliable, cost
5 affordable manner also includes the change
6 management, the customer adoption, the industry
7 adoption, the regulation that goes along with it,
8 and so those are all things that we're thinking
9 of as we look towards grid challenges and meeting
10 them.

11 MR. MINNICUCCI: Thank you, Suna. Those
12 were great points. One of the things that it
13 wasn't as evident in this presentation because we
14 wanted to spend time talking about what our
15 potential projects might look like, and to get
16 some feedback on those, but there's been a
17 tremendous amount of collaboration between the
18 three utilities. It's not very often you see all
19 three utilities with their logos on anything, and
20 this is one area where we meet weekly, even in
21 the down times, we're meeting every other week to
22 coordinate, collaborate, discuss, and move this
23 forward, so Suna brings up an excellent point, it
24 really is about the collaboration and
25 coordination of things, rather than just picking

1 one thing or another.

2 And, you know, if you look at the
3 projects, there are flavors of each of the
4 utility's projects that kind of touch on the
5 other projects, and that's entirely intentional
6 because we don't have all the answers at SCE -- I
7 know that's shocking to those of you in the room,
8 but we rely on a lot of other very very
9 intelligent and bright people to pull this off.
10 And when you think about, you know, how much
11 money there really is, Edison's operating budget
12 is right around \$14 million per year. If you put
13 that in a broader context, our Tehachapi Storage
14 project is a \$50 million project. Our Irvine
15 Smart Grid demo is an \$80 million project. Those
16 are single projects. So, I'm just putting that
17 into context. This is not a program that is
18 going to solve everything, it's a program that
19 through collaboration and coordination we're
20 going to identify things, there are going to be
21 some failures, but those are important learnings,
22 as well.

23 MS. MOORE: Thank you very much for that
24 discussion. Next we have the opportunity for
25 stakeholders and public comment and questions, so

1 we will start here in the room. We ask that you
2 fill out this blue card and include your name and
3 affiliation on the card, and please bring a
4 business card to me, as well, if you have any
5 comments.

6 So the first comment we have is from
7 Merwin Brown of Electric Grid Research. Please
8 hit the --

9 MR. BROWN: -- with CIEE. A number of
10 you are working on data collection and data
11 analysis techniques. Another piece of all of
12 this is that, with a deployment of the rooftop
13 photovoltaic-type technologies and energy storage
14 in a distributed fashion, the ability to model
15 the load has become more and more difficult
16 because it's hidden, if you will, behind sources,
17 building sources. It sounded like, but no one
18 actually said in any of your projects that you
19 were looking at using data taken from customer
20 behaviors to be able to either better model and
21 predict what the load behavior is going to be
22 under transient conditions, or, and even longer
23 term projections, or actually measure it. So I
24 was just curious if that is a problem that you're
25 addressing in some of this research.

1 MR. GOODMAN: Thanks for raising that,
2 Merwin. The short answer is yes and indeed one
3 of the things that has come to light in
4 discussions back in our shop is conservation
5 voltage reduction practices were established way
6 way back, and the nature of load has changed, and
7 it's become more inductive, less resistive. But
8 we don't really know what it is. So, yes, we
9 plan to look not only at customer data as far as
10 better understanding our loads, but also some of
11 the measurements right in the circuits.

12 MR. JAWED: This is Farhaan Jawed with
13 PG&E, and I would say the same is true for our
14 company, as well. And if you think back to some
15 of the slides that Suna went through, one of the
16 areas we highlighted in blue, the first one under
17 the Renewables and DR Integration, that referred
18 to this exact phenomena, so you have increased
19 DG, increased potential for storage, and what are
20 the implications for load forecasting,
21 particularly on the distribution side. So it is
22 very much on our radar and part of the plan, if
23 you will.

24 MR. HARALSON: Yeah, and from our
25 perspective, too, it's not only on the plan, but

1 it's kind of right up front, as a matter of fact.
2 And I apologize, you know, as we go through these
3 example projects we've talked about, it's
4 literally just examples, you know, you pick up
5 five out of 21 projects, that kind of thing, and
6 in reality there's a lot of modeling and things
7 like that in these other projects, too, that
8 address some of that. But it's a huge problem
9 for the utilities. You know, it's kind of funny
10 when you talk to the operations groups, you know,
11 they're kind of used to the way things operate
12 today, and when you tell them that, hey, you've
13 got a lot of distributed generation out there,
14 the first response is, "Well, that's not that big
15 a deal." You go, "Well, no, you've got
16 distributed generation that is hiding load that
17 is out there, that you're not going to know about
18 and it's not going to show up until you have a
19 fault on the circuit." And then all of a sudden
20 all the generation jumps ship, all the load shows
21 up, and this is a whole lot more than you counted
22 on before. So they're getting the idea, too, and
23 realizing it, so it's absolutely an important
24 piece.

25 MS. MOORE: Thank you. The next comment

1 is from Nehemiah Stone of Benningfield Group.

2 MR. STONE: Since you just introduced me,
3 I won't introduce myself again. One of the ways
4 of energy storage that we've had for the longest
5 time has been our reservoirs, and there's a lot
6 obviously, a lot of demand on water outside of
7 just electricity. And if you covered it, I
8 apologize, but I didn't see within what you were
9 looking at how any research focused on balancing
10 what the needs are - the other needs for water
11 versus what we need to keep the grid functioning
12 right. Is that part of the research that you're
13 going to be doing, too? I'll take that for a no.
14 You know, it came up to me when you were talking
15 about how well you guys are all working together
16 and that's great, but there's other utilities out
17 there that are not generating electricity, but
18 that are using the exact same resources as you
19 are, and the constraints that like you were
20 talking about the grid planners that were
21 thinking about the past, I mean, there will be
22 other constraints in the future on the use of
23 water for generation that we've just barely seen
24 the tip of the iceberg on.

25 MR. JAWED: Just a comment. The utility

1 portion of the EPIC program tends not to focus on
2 the generation piece of it, so that might be part
3 of the reason why we're not as focused. That
4 said, water is obviously a significant problem
5 for California, so as a theme it's certainly
6 something to be aware of.

7 MS. MOORE: Thank you. Are there anymore
8 comments or questions here in the room? Okay, at
9 this time we would like to give people on the
10 phone an opportunity to make a comment or ask a
11 question. We ask that you use the raised hand
12 function to ask your question.

13 MS. GONZALEZ: There's a question from
14 Alvin White, who is a member of the public. The
15 question is: "A question for all you utilities:
16 if it were anticipated that the construction of
17 new nuclear power plants in California was to be
18 permitted in the future, would the utilities
19 consider R&D in the area of nuclear power?"

20 MS. TAYMAZ: This is Suna from PG&E. So
21 I guess I won't answer that question broadly, but
22 I will say specifically the workshop today and
23 our focus is on the EPIC Program, it's
24 transmission, distribution, the integration of
25 demand side management, so generation, be it

1 nuclear, hydro, traditional forms of generation
2 isn't in the scope for our program.

3 MR. MINNICUCCI: Yeah, this is John
4 Minnicucci, specifically we're not allowed to do
5 generation research as part of the EPIC Programs.

6 MS. MOORE: Are there any more questions
7 or comments online? Any more questions or
8 comments in the room? Last call? Okay, great.

9 Written comments are due March 28th and
10 the last slide provides the contact information
11 for each of the utilities. Please submit your
12 comments to the websites, the email addresses
13 listed there on the page. Thank you all for
14 participating in today's workshop. Have a good
15 day.

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17 (Whereupon, at 2:31 p.m., the workshop was
18 adjourned.)

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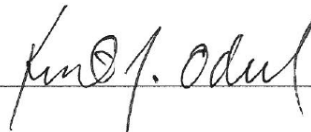
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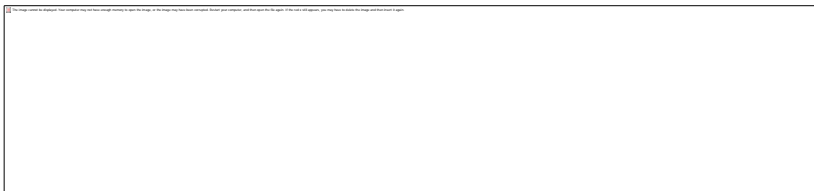
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