California Energy Efficiency Strategic Plan

Research and Technology Action Plan

Stakeholder Workshop

Date	**July 11, 2011**
Time	**9:00 am – 4:30 pm**
Location	**California Energy Commission, Sacramento**

Purpose of the Workshop

The purpose of this workshop is to facilitate information exchange and launch the development of the action plan for the Research and Technology (R&T) Chapter of the CEESP[1]. The R&T Action Plan will be designed to help California achieve the Zero Net Energy (ZNE) and hot-dry climate HVAC technologies goals described in the California Energy Efficiency Strategic Plan (CEESP):

1. *Research and Development to achieve incremental improvement in existing demand side management (DSM) technologies and breakthrough in advancing new and/or emerging integrated DSM technologies*
2. *Commercialization including demonstration, deployment and consumer acceptance to advance the market adoption of integrated DSM technologies*

[1] CPUC, *The California Efficiency Strategic Plan* (January 2011 Update):

http://www.cpuc.ca.gov/NR/rdonlyres/A54B59C2-D571-440D-9477-3363726F573A/0/CAEnergyEfficiencyStrategicPlan_Jan2011.pdf

Meeting Objectives and Expected Outcomes

Meeting Objectives
Discuss current and future opportunities and key actions needed to set the research agenda for the integrated demand side management (IDSM)[2] Research, Development, Demonstration and Deployment (RDD&D) to achieve both incremental (for existing and/or near-term technologies) and game-changing (for new and/or emerging technologies), technology innovations and functionality in the following research areas: ▪ ZNE (Residential & Commercial) ▪ Hot/dry Climate HVAC ▪ Plug Loads ▪ Integrated Building Design including Whole Building Integrated Solutions and New Building Materials and Designs ▪ Building Management Systems, Diagnostics and Controls ▪ Lighting ▪ Demand Response ▪ Renewable and Storage
Expected Outcomes
▪ **Identify progress to date on the IDSM RDD&D activities i.e. status** ▪ **Determine key actions and timelines to achieve the milestones for incremental and game-changing technology innovations and deployment** ▪ **Identify potential champions (individuals and/or organizations) to lead the implementation of the key actions**

[2] Demand Side Management includes energy efficiency, demand response and renewable energy.

WS AGENDA	
Topic	Time
Morning Session (9:00 am - 12:30 pm)	
Introductions & Overview 1. Meeting Purpose 2. Overview of R&T AP Process	9:00 am - 9:30 am
Overview of Workshop Agenda	9:30 am - 10:00 am
Roundtable/Panel Discussion 1. Planning, Process and Funding 2. Research and Development (Existing and New/Emerging Technologies) 3. Commercialization (Demonstration, Deployment and Consumer Acceptance)	10:00 am - 12:30 pm
Lunch Break (12:30 pm - 1:30 pm)	
Afternoon Session (1:30 pm – 4:30 pm)	
Breakout Sessions 1. Planning, Process & Funding 2. R&D in Existing & Emerging/New Technologies 3. Demonstration & Incubators 4. Large-scale Deployment 5. Consumer Acceptance & Information Dissemination, and Knowledge Management Systems & Technical Market Research	1:30 pm – 3:00 pm
Coffee Break (3:00 pm – 3:30 pm)	
Report Back from Breakout Sessions	3:30 pm - 4:15 pm
Wrap-up	4:15 pm - 4:30 pm

Panel Discussion

First Panel: Planning, Process & Funding

Panel Members: **Laurie ten Hope (CEC), Gregg Ander (SCE) and Susan Preston (Clean Energy Angel Fund)**

First Panel Discussion Topics

1. **What is the best strategy for communicating and coordinating the integration of Demand Side Management and Research, Development, Demonstration and Deployment (IDSM RDD&D) activities (or programs) to achieve the ZNE building and hot/dry HVAC California Energy Efficiency Strategic Plan goals?**
2. **What should be the IDSM RDD&D investment/funding priorities?**

Second Panel: Research and Development

Panel Members: **Mary Ann Piette (Lawrence Berkeley National Lab), Pete Horton (Watt Stopper) and Mark Modera (UC Davis)**

Second Panel Discussion Topics

1. What should the research priorities be in your area for the **integration** DSM and the R&D Agenda in California?
2. Identify key barriers and strategies to address the gaps in R&D to improve the performance of existing technologies and develop game changing technologies.

Third Panel: Commercialization (Demonstration, Deployment and Consumer Acceptance)

Panel Members: **Bernie Kotlier (Green Energy Solution) and Nicole Biggart (UC Davis)**

Third Panel Discussion Topics

1. Discuss key barriers and strategies for demonstration, deployment and market adoption of emerging technologies needed to advance the CEESP goal
2. Discuss key strategies to enhance market intelligence, information dissemination and consumer acceptance required to advance ZNE market demand.

Break-Out Sessions

Expected Outcomes

- Identify timelines and key actions to achieve milestones
- Develop inventory of progress to date
- Develop implementation recommendations, and success factors
- Identify potential champions

Guiding Strategies:

1. Engage the full-range of participants: private entities, national labs, clean energy and environmental groups, green venture capital firms, Federal, State, and local government, utilities and consumers.
2. Employ systems approach to establishing research priorities
3. Identify new technologies and enhance existing technologies to make them better and improve their uptake and use

   Breakthrough in advanced new technologies and incremental technology performance improvements for existing technologies

   Holistic approach of building design, delivery and operations

   Directed research and technology investment
4. Facilitate paths-to-market for technologies and enabling/supporting practices through directed research and technology investment, market push/pull techniques, and targeted product distribution methods
5. Apply social and behavioral science theory to encourage the adoption and best use of resources and energy efficient technology

SESSION 1: PLANNING, PROCESS & FUNDING

SESSION 2: R&D IN EXISTING TECHNOLOGIES AND NEW/EMERGING TECHNOLOGIES

SESSION3: DEMONSTRATIONS

SESSION 4: LARGE-SCALE DEPLOYMENT

Session 5: CONSUMER ACCEPTANCE & INFORMATION DISSEMINATION, AND KNOWLEDGE MANAGEMENT SYSTEM & MARKET RESEARCH

BREAKOUT SESSIONS

SESSION 1: PLANNING, PROCESS & FUNDING

Objectives	Strategies	Key Actions	Champions	Timeline
Align Research Agenda of Collaborating Parties	1-1 (1): Collaborate with regional and national labs, manufactures, universities to ***develop and enhance*** technologies that can meet the SW strategic EE/DR goals			
	1-1 (2): Form Utility advisory group to ***formally provide input*** into PIER & coordinate with ETCC			
	1-1 (4): Refine ET & PIER process for ***rapid evaluation*** of ET			
	2-1 (1): Convene collaboration among researchers and their funders to ensure ***alignment of activities*** with BBEES			
Leverage Private industry & Federally funded Technology research and investment	1-2 (1): Expand ***Federal R&D*** support for integration with California's efforts			
	1-2 (2): Create and ***investor-ET network*** to share market information, technology assessment results and expedited access to incentive programs			
	1-2 (4) **Expand upstream relationships and channels to effectively target and generate support for energy-related technology**			

SESSION 2: R&D IN EXISTING TEHNOLOGIES & NEW/EMERGING TECHNOLOGIES

Objectives	Strategies	Key Actions	Champions	Timeline
Target Improvement in Performance for Existing Technology	1-1 (3): Target ***promising opportunities*** to improve ***plug loads***, ***lighting*** and ***IDSM information*** and ***control systems***			
	2-2 (1): Target ***improvement*** in EE for existing technologies (building shell, HVAC, lighting, and supporting areas such as real-time energy performance monitoring and automated building commissioning technologies)			
	2-2 (2): Collaborate with ***industries*** to improve performance of existing technologies			
	2-2 (3): Develop ***specification*** to guide improvements in EE for existing technologies			
Achieve Breakthrough in Advanced New Technologies, Whole building & Integrated Solutions	2-4 (1): Initiate ***upstream technology program*** activities including whole building integrated solutions			

SESSION 3: DEMONSTRATIONES

Objectives	Strategies	Key Actions	Champions	Timeline
Deploy Incubators, Pilots and Demonstrations	1-2 (3): ***Pilot incubator*** program to fast track ET deployment			
	1-2 (4): Expand ***upstream relationships*** and channels to effectively target and generate support for EE technologies			
	2-4 (2): Embark on plan to ***demonstrate BBEES measures*** in customer sites & seed the market			
	2-4 (3): Conduct ***pilot programs*** of new technologies seeding and market uptake through subsidies and incentives			

SESSION 4: LARGE-SCALE DEPLOYMENT

Objectives	Strategies	Key Actions	Champions	Timeline
Target product distribution and large-scale Market Transformation strategies	2-2 (4): Explore long-term strategies to ***increase saturation*** of new BBEES technologies			
	2-3 (2): Collaborate with PIER to develop ***formal process*** to roll PIER developed technologies into EE			
	2-4 (4): Collaborate with manufactures to pilot new technologies and ***full scale demonstration programs*** to mature innovative system technologies			

SESSION 5: CONSUMER ACCEPTANCE & INFORMATION DISSEMINATION AND KNOWLEDGE MANAGEMENT SYSTEM & MARKET RESEARCH

Objectives	Strategies	Key Actions	Champions	Timeline
Perform Behavioral Research to encourage ET adoption	1-3 (1): Develop ***road map*** to identify and prioritize consumer needs, behavioral drivers and decision processes			
	1-3 (2): Develop and launch ***behavioral market research agenda***			
	1-3 (3): Integrate ***consumer influences*** in ET project screening			
	1-4 (2): Explore ***customer/manufacturer targeted strategies*** for creating pull			
	2-3 (1): Provide ***Stakeholder input*** to ensure alignment of PIER with BBEES			
Enhance Market Intelligences and Knowledge	1-3 (4): Assess technology specific ***market potential*** using secondary market research to obtain technical and economic potential on new and ET and market segments			
	1-4 (1): Plan and launch ***Knowledge Management Systems & Lessons Learned***			

Background on the Research & Technology Chapter of the CEESP

Vision

"Technology advancement related to energy use and demand will match—or even eclipse— the consumer electronics industry ***in innovation, time to market, and consumer acceptance****."*
(CEESP, page 79)

The CEESP embraces four specific programmatic goals, known as the "Big Bold Energy Efficiency Strategies" (BBEES)[3]:

1. **All new residential construction in California will be Zero Net Energy by 2020;**
2. **All new commercial construction in California will be Zero Net Energy by 2030;**
3. **Heating, Ventilation, and Air Conditioning (HVAC) will be transformed to ensure that its energy performance is optimal for California climate; and**
4. All eligible low-income customers will be given the opportunity to participate in the low energy efficiency program by 2020.

Note: the R&T Action Plan will address the three first BBEES.

Guiding Strategies:

1. Engage the full-range of participants: private entities, national labs, clean energy and environmental groups, green venture capital firms, Federal, State, and local government, utilities and consumers.
2. Employ systems approach to establishing research priorities
3. Identify new technologies and enhance existing technologies to make them better and improve their uptake and use
   - *Breakthrough in advanced new technologies and incremental technology performance improvements for existing technologies*
   - *Holistic approach of building design, delivery and operations*
   - *Directed research and technology investment*
4. Facilitate paths-to-market for technologies and enabling/supporting practices through directed research and technology investment, market push/pull techniques, and targeted product distribution methods
5. Apply social and behavioral science theory to encourage the adoption and best use of resources and energy efficient technology

[3] BBEES are established by the CPUC in Decision 07-10-032 and Decision 07-12-051.

The Research and Technology chapter of the CEESP (Chapter 11) includes two main goals:

Goal 1

Refocus utility and Energy Commission energy efficiency research and technology support to *create demand pull* and *set the research agenda* for both incremental and game-changing energy efficiency technology innovations.

Goal 1 Results:

Ratepayer-funded R&D programs will explicitly support widely applicable whole-building improvement, lighting, and plug load solutions envisioned in this Plan and will be used to leverage other private and public funds for the deployment of new technologies.

Quote for Goal 1:

"*California will benefit greatly from deliberate efforts to secure better integration and leverage across these activities.*

While new buildings and industrial facilities offer good opportunities to adopt new advanced technologies, this construction replaces only 1-2 percent of the existing stock each year. To make rapid progress with energy efficiency will also require making incremental technology improvements that can be inserted into California's existing buildings and industrial facilities. It will be important that research on advanced technologies pursue paths that target breakthrough as well as incremental technologies and their performance gains." (CEESP, page 80)

Goal 2

Conduct *targeted emerging technologies R&D* to support the Big, Bold Energy Efficiency Strategies and integrated energy solutions goals.

Goal Results

Profound improvement in equipment efficiency as well as new building materials and designs aimed at achieving more efficiency from new buildings than technically feasible today, and necessary to achieve Zero Net Energy and hot/dry climate HVAC outcomes.

Quote for Goal 2:

"*To stimulate major breakthroughs in support of BBEES there must be an intensive focus on the technologies, products, and practices driving the majority of building energy use, as well as integrated building design approaches and dynamic diagnostic and energy management control systems that take a holistic view of building design, delivery and operations.*" (CEESP, page 83)