

CA | Energy Efficiency Strategic Plan

Research and Technology Action Plan

**Joint Initiatives by
California Energy Commission & California Public Utilities Commission**

**December 8th , 2011
California Commissioning Collaborative
San Diego, CA**

Big Bold Energy Efficiency Strategies



(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) industry will be transformed to ensure that its energy performance is optimal for California's climate



(4) All eligible low-income customers will be given the opportunity to participate in the low energy efficiency program by 2020

- Chapter 11 of CEESP: One of 13 Chapters in CEESP
- **Cross-cutting** chapter targeting Research and Development (R&D), Demonstration and Deployment (D&D), Customer Acceptance and Market Intelligence.

Background on R&T Chapter Goals

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.

- The R&T Action Plan will be designed to help California achieve the Zero Net Energy (ZNE) and hot-dry climate HVAC technologies goals (BBEES) described in the California Long-term Energy Efficiency Strategic Plan (CEESP).
- The R&T Action Plan will prioritize the key actions required to achieve the near-term (2010-2012) milestones of the R&T Chapter.

Background on R&T Chapter Goals Cont..

- *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.

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)

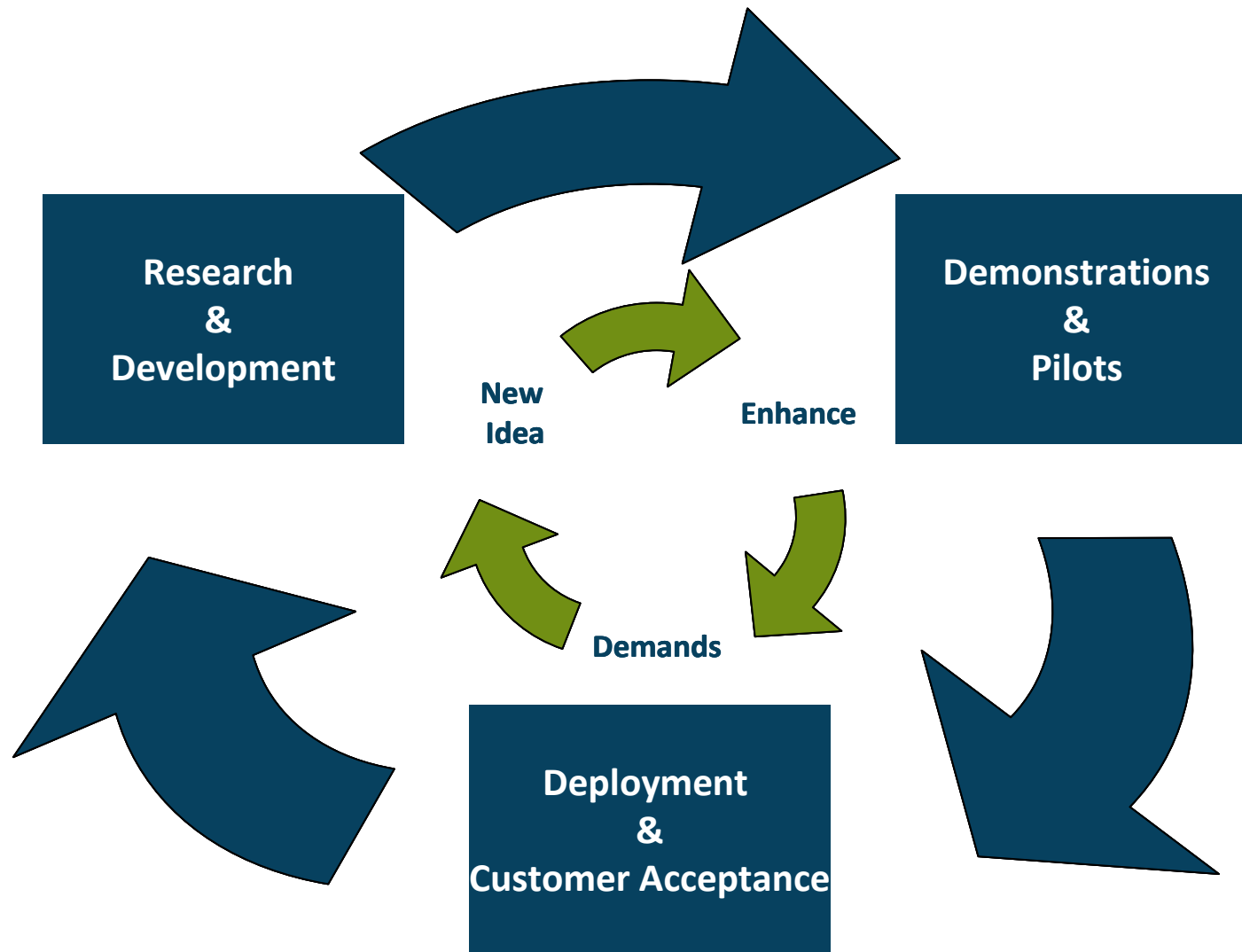
Set the Research Agenda

- 1. Develop RDD&D Community**
- 2. Technology Roadmaps**
 - Roadmap vision
 - RDD&D goals
 - Milestones and actions
- 3. Market Intelligence**
 - Consumer needs and behavioral drivers
 - Knowledge management systems

Key Areas

- 1. Integrated Building Design**
(including Whole Building Integrated Solutions and New Building Materials and Designs) & Renewable and Storage
- 2. Plug Loads** *(including Controls, Building Management Systems and Diagnostics and Demand Response)*
- 3. Hot/dry Climate HVAC**

Innovation: Advance Technology Continuum towards ZNE



Background on R&T Chapter Strategies

Goal 1: Create **Demand Pull** for New Technologies

1. Apply Systems approaches to establishing research priorities
2. Leverage private industry and federally funded technology research and investment
3. Enhance market intelligence and behavioral research activities related to EE technologies
4. Expand activities to create market pull for energy-efficient technologies

Background on R&T Chapter Strategies (cont..)

- Goal 2: Targeted R&D
 1. Develop general R&D community support for support of Big Bold Initiatives
 2. Promote cost-effective near term performance enhancements of existing technologies
 3. Develop initiatives aimed at PIER to support larger gains in support of Big Bold Initiatives
 4. Develop initiatives aimed at ET to support Big Bold Initiatives

Closing & Next Steps

Activity	Timeline
Draft Action Plan	Early February 2012
Public Comments on Draft	Mid February 2012
Final R&T Action Plan	End of March 2012

Contacts for Followup Questions/Comments

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Background Slides on Research and Technology

- In 2005, CPUC and CEC Energy Action Plan II, declared:

“[The] goal is for California’s energy to be adequate, affordable, technologically advanced, and environmentally-sound...Cost effective energy efficiency is the resource of first choice for meeting California’s energy needs. Energy efficiency is the least cost, most reliable, and most environmentally sensitive resource, and minimizes our contribution to climate change.”

- **In 2006, California Global Warming Solutions Act (AB 32) states:**

“while —California has a long history of success in implementing regulations and programs to encourage energy efficiency... [it] will need to greatly expand those efforts to meet our greenhouse gas emission reduction goals.”

The Draft Scoping Plan, establishes a statewide energy efficiency target of at least 32,000 gigawatt hours and 800 million therms by 2020. If achieved, emission reductions from these efficiency savings would result in over 25 million metric tons of GHG emissions reductions, making them the second largest component in the state's overall emissions reduction program.”

- In 2007 Integrated Energy Policy Report (IEPR), the CEC notes that *“Energy efficiency, which helped to flatten the state’s per capita electricity use, will continue to be the keystone of California’s energy strategy. California’s building and appliance standards have saved consumers more than \$56 billion in electricity and natural gas costs since 1978 and averted building 15 large power plants. It is estimated the current standards will save an additional \$23 billion by 2013.”*

California Long Term Energy Efficiency Strategic Plan (CEESP) (cont..)

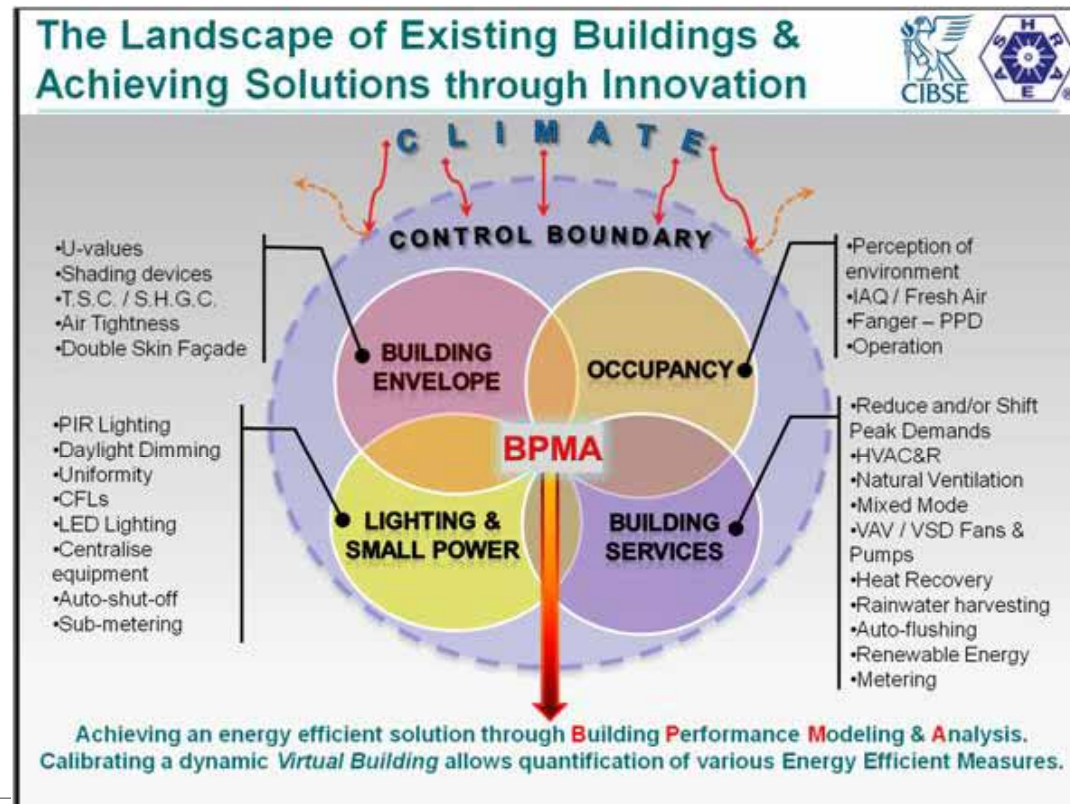
- **Some of the key objectives of the CEESP are:**
 - **Employ market transformation (MT) as its unifying objective**
 - **Recognize that the process of MT cannot and should not be driven by ratepayer-funded utility programs alone; e.g. Research and Technology chapter of the CEESP represents a cross-cutting area where *non-utility actors* may well be better positioned to drive the “push” of new technologies to market, or the “pull” for customers and business to adopt available efficiency technologies or practices**
- **In order to guide MT in a number of key sectors, the CEESP embraces four specific programmatic goals, known as the “Big Bold Energy Efficiency Strategies” (BBEES)**

- **Quotes for the R&T Chapter**

“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)

Research and Technology Chapter (cont..)

“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)



- Goal 1 (Strategy 1-2): Leverage private industry and federally funded technology research and investment
- Pilot incubator program to fast track ET deployment
 - Expand upstream relationships and channels to effectively target and generate support for energy-related technologies

- Goal 2 (Strategy 2-2): Develop cost-effective near-term performance enhancement of existing technologies
 - Target building shell, HVAC etc.
 - Collaborate with manufacturers to improve performance of existing technologies
 - Develop specifications to drive/guide improvement activities
 - Explore long term strategies to increase saturation of new big bold measures and technologies

- Goal 2 (Strategy 2-4): Develop initiatives aimed at ET to support Big Bold Initiatives
 - Initiative upstream technology program activities including integrated solutions
 - Embark on plan to demonstrate big bold measures in customers sites and seed the market
 - Conduct pilot programs of new technology seeding and market uptake through subsidies and incentives
 - Collaborate with manufactures in new ambitious pilot programs, including full-scale demonstrations programs to mature innovative system technologies

*CEC/PIER & CPUC/ED **joint** initiatives to develop the R&T Action Plan*

Purpose

- Facilitate information exchange and continue the development of the Research and Technology Action Plan to advance the implementation of the California Energy Efficiency Strategic Plan CEESP.^[1]

Objectives

- Develop key actions required to achieve both incremental and game-changing technology innovations and functionality for zero net energy (ZNE) building related RDD&D.

Examples include hot/dry HVAC, energy efficient plug loads devices and controls, integrated building design, building management systems, diagnostics and controls etc.

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

http://www.cpuc.ca.gov/NR/rdonlyres/A54B59C2-D571-440D-94773363726F573A/0/CAEnergyEfficiencyStrategicPlan_Jan2011.pdf

Expected Outcomes

- 1. Review the Key Actions identified during the July 2011 WS**
- 2. Identify new key actions to R&T goals and strategies**
- 3. Set timelines to implement key actions**
- 4. Identify potential champions (individuals and/or organizations) to lead the implementation of the key actions**

- Essentially, the action plan is project management applied to a policy document.
- **Tasks (“key actions”)** are developed in coordination with stakeholders and industry experts to achieve milestones, and are the **heart of the action plan**.
- R&T Chapter includes two main goals:
 1. Create demand pull and set the research agenda to pursue both incremental and game-changing EE technology innovations, and
 2. Conduct targeted emerging technologies R&D to support the BBEES/programmatic initiatives and integrated energy solutions goals.
- Each goal includes four different strategies
- There are total of 25 near-term milestones aligned with the various strategies

Research and Technology Action Plan Strategies, Milestones & Actions

- There could be multiple of key actions and champions for each milestone
- Stakeholders can identify new key actions and/or key actions that have started (on-going) and/or completed during 2010-2012
- Stakeholders can nominate themselves as champions and/or nominate other individuals and/or organization, industry leads etc. as champions



Strategic Plan	
Goal	
Strategies	Near-Term "Milestones"
1-1 Apply systems approaches to establishing research priorities	1-1 (1) Collaborate with regional and national labs, manufacturers, universities to...

Action Plan			
Strategy			
Milestones	Champion	Key Actions	Time-line
1-1 (1) Collaborate with regional and national labs, ...	Champ 1 Champ 2	Action 1 Action 2	Q4 2011 Q1 2012