

**EPIC Investment Plan Workshop Questions**  
September 27, 2012

**1) Program Scope**

- a. Are there proposed initiatives in the staff draft Investment Plan that should be dropped from the plan? Indicate the initiative(s) and explain why.
- b. Are critical initiatives missing that are consistent with the EPIC mission? If so, please describe the initiative using the template in the Investment Plan (and outlined below).
- c. Are there proposed initiatives that are too narrow in scope? By contrast, are there proposed initiatives that are too broad in scope? Please indicate which initiative(s) and explain.
- d. Do the initiatives identified in the investment plan put the right emphasis on technologies that would significantly benefit from new innovations (e.g., in the applied research category) versus those that would significantly benefit from scale-up (e.g., in the technology demonstration & deployment category)? Please explain.

**2) Funding Priorities**

- a. Where should the greatest amount of funding be allocated among the initiatives to maximize the deployment of clean energy technologies?

**3) Project Match Funding**

- a. Are the minimum match funding requirements appropriate for applied R&D and technology demonstration & deployment categories? What level of match funding from local government is appropriate for the proposed market facilitation grant award?

**4) Funding Priorities**

- a. What is the minimum and maximum amount of EPIC funds that should be set aside as match funding for federal awards? Please explain.

**5) Intellectual Property**

- a. Are the IP rights in the Plan an appropriate balance to encourage innovation while returning applicable benefits to the ratepayers?

**6) Advisory Structure**

- a. Should there be an advisory structure, and if so, what elements are most important?
- b. What coordination with the IOUs proposed Investment Plans will be most helpful to you?

**7) Other Comments**

Please articulate additional comments that would strengthen the Energy Commission's proposed EPIC Investment Plan.

## California Energy Commission Staff Draft EPIC Initiative Template

*Proposed Funding Initiative: [Insert Descriptive Title here].*

Technology Pipeline Stage				Electricity System Value Chain			
Applied R&D and Pilot-scale Testing	Full-scale Demo	Early Deployment	Market Facilitation	Grid Operations/ Market Design	Generation	Transmission/ Distribution	Demand –side Management

[Place an X in each cell of this table that applies to the initiative]

**Issues:** [Provide a few paragraphs describing the issues/challenges to be addressed by this initiative]

**Purpose:** [Provide a few paragraphs explaining the actions and results to be produced by this initiative. How will this technology or strategy help address the issue(s)? Which objective of the draft investment plan does this initiative address? Please include a summary of relevant stakeholder support for the strategy or technology (if any). Also, describe how this technology or strategy will provide ratepayer benefits as described in the CPUC EPIC Phase 2 Decision.]

**Background:**

[Provide a few paragraphs discussing the context for this initiative. What has been done or is currently being done on this technology or strategy? Where in the innovation pipeline is the technology or strategy?

- Applied Research and Development: pre-commercial technologies and approaches that are designed to solve specific problems (lab scale demonstration, pilot scale demonstration)
- Technology Demonstration and Deployment: installation and operation of pre commercial technologies or strategies at a scale sufficiently large and in conditions sufficiently reflective of anticipated actual operating environments to enable appraisal of the operational and performance characteristics and the financial risks (pre-commercial demonstration or deployment).
- Market Facilitation: program tracking, market research, education and outreach, regulatory assistance and streamlining, and workforce development to support clean energy technology and strategy deployment (regulatory assistance, workforce development, education and outreach, program tracking, market research)

Describe any public and/or private successes and failures the technology or strategy has encountered in its path through the pipeline. Summarize other related programs and initiatives in California, such as DOE funding initiatives.]

## Example

### *S3.1 Proposed Funding Initiative: Develop Innovative Technologies and Approaches to Improve the Performance of Combined Heat and Power Systems.*

Technology Pipeline Stage				Electricity System Value Chain			
Applied R&D and Pilot-scale Testing	Full-scale Demo	Early Deployment	Market Facilitation	Grid Operations/ Market Design	Generation	Transmission/ Distribution	Demand –side Management
<b>X</b>					<b>X</b>		<b>X</b>

**Issues:** Upfront costs of installing CHP systems are a major barrier for many potential customers. Another major deterrent, particularly for reciprocating internal combustion engine systems, is the poor air emissions performance and inconsistent ability to cost-effectively achieve and sustain compliance with air emission standards. Advanced generation technologies such as microturbines and fuel cells emit less air pollutants but have other cost and operation-related barriers, some of which are discussed below.

CHP systems are also limited by the fact that they are sized for their thermal load, which sometimes results in excess electricity generation that does not provide additional value to the customer. The ability to match thermal load with potential end-use applications and customer-specific controls remains among the major technical issues. Other issues include the maintainability and durability of CHP systems, interconnection complexities (including telemetry requirements), and the flexibility to use alternative fuels and varying operational profiles. Compounding these issues is the perceived risk and uncertainty by potential customers about owning such a system, as well as a lack of technical expertise to conduct operation and maintenance activities.

**Purpose:** This initiative will support applied research and development to advance the technical, economic and environmental performance of CHP systems – including combined cooling, heating, and power (CCHP) – that operate on renewable fuels, fossil fuels, or both. The goal of research in this area is to reduce technology costs and improve system components through the following actions:

- Evaluate novel emission controls and strategies to meet air quality standards.
- Develop methods and strategies to improve prime mover performance and efficiency.
- Develop strategies and approaches to increase CHP market acceptance in industrial, commercial, and multi-family residential settings.

To promote wide acceptance of CHP and realize its full benefits to ratepayers, this initiative will investigate technological improvements and cost-effective and environmentally sound strategies for key CHP systems and prime movers. Potential focus areas will include, but not be limited to:

- Commercial CHP and CCHP systems that will provide cost-competitive and effective wide application of heat (such as thermally driven chillers for CCHP systems).

- Industrial cogeneration systems that are capable of using alternative fuels and integrating with energy storage.
- Advanced gas turbine cycles that will facilitate hybrid systems and the use of renewable fuels.
- CHP-enabling strategies that will address a range of fuel flexibility and technical and economic improvement for heat recovery technologies.

**Background:** CHP is an important energy generation technology that caters to all three priority actions under California's loading order. It is a proven technology for improving energy efficiency and when viewed as such, qualifies as first in the loading order. CHP represents about 12 percent of the online power generation capacity in California. A majority of this CHP capacity is powered by fossil fuels, with limited capacity from renewable resources. The many benefits provided by CHP systems include reduced energy costs, more efficient fuel use, fewer environmental impacts, improved reliability and power quality, locations near load centers, and support of utility transmission and distribution systems.

ICF International released a report that evaluates several scenarios for CHP deployment in California over 20 years. The analysis indicated that a 10 percent capital cost reduction is needed by 2030 to achieve the penetration modeled in the high-case scenario. Previous research examined the development of lower-cost, high-performance CHP systems. Current research projects will address the technical and operational requirements for integrating multiple DG and CHP technologies and enabling technologies and for DG/CHP systems with multiple fuel capabilities. Some specific areas targeted by current research include emerging approaches for reducing criteria pollutant emissions, expanding applications for use of exhaust heat for process heating and cooling support, application of other exhaust components such as carbon dioxide from internal combustion engines, and strategies for co-fueling of natural gas and biogas. Additional research efforts will build on these emerging, emission-reduction and technology integration strategies, expanded potential applications, and other key project results to further reduce costs and enable further deployment of CHP and CCHP systems in California.