

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

ENERGY DIVISION

RESOLUTION G-3519

September 29, 2016

R E S O L U T I O N

Resolution G-3519. The California Energy Commission requests approval of its 2016-2017 natural gas research budget.

PROPOSED OUTCOME:

- Approve the CEC's *Natural Gas Research and Development Program, Proposed Program Plan and Funding Request for Fiscal Year 2016-2017* with a budget of \$24 million, pursuant to California Public Utilities Commission Decision (D.) 04-08-010.

SAFETY CONSIDERATIONS:

- This Resolution approves and prioritizes the implementation of the CEC's proposed budget of \$4 million to advance infrastructure safety and integrity. Successful research in this area will support continued safe infrastructure operation.

ESTIMATED COST:

- Approves \$24 million for Fiscal Year 2016-2017, as previously authorized by D.04-08-010.
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SUMMARY

This Resolution approves the California Energy Commission (CEC) *Natural Gas Research and Development Program Proposed Program Plan and Funding Request for Fiscal Year 2016-2017*. The Program was established pursuant to D.04-08-010. The California Public Utilities Commission approves the CEC's proposed \$24 million budget, and provides additional implementation guidance.

BACKGROUND

D.04-08-010 (Decision) implemented Assembly Bill (AB) 1002, establishing a natural gas surcharge to fund gas public purpose programs, including public interest research and development (R&D).

In 2002, the Commission instituted Rulemaking (R.) 02-10-001 to implement AB 1002. In that proceeding the Commission addressed various issues related to the design and implementation of a surcharge to fund gas public purpose programs, resulting in D.04-08-010.

D.04-08-010 established certain criteria for gas R&D projects to be approved under this program.

The Decision defines public interest gas R&D activities as those which “are directed towards developing science or technology, 1) the benefits of which accrue to California citizens and 2) are not adequately addressed by competitive or regulated entities.”¹

The Commission established the following criteria for public interest gas R&D projects:

- 1) Focus on energy efficiency, renewable technologies, conservation and environmental issues,
- 2) Support State energy policy,
- 3) Offer a reasonable probability of providing benefits to the general public, and
- 4) Consider opportunities for collaboration and co-funding opportunities with other entities.

¹ D.04-08-010 at 25.

D.04-08-010 designated the CEC as administrator of the R&D program.

The CEC administers various public interest research programs and is publicly accountable, being subject to the Bagley-Keene Open Meeting Act and the Public Records Act.² CEC selects funding areas, which the Commission then reviews and approves.

D.04-08-010 reserved ultimate oversight for the Commission.

The Commission is responsible for adopting the R&D program, and for setting the surcharge to fund the R&D program. The Decision made it clear that the Commission has final responsibility to “approve and resolve administration, funding, project approval, or other matters, and make a final decision.”³ The Decision further designated the Commission’s Energy Division to serve as this Commission’s advisor.

The Commission has approved the CEC’s R&D program plans and budgets from 2005 to FY 2015-2016.

D.04-08-010 established a zero-based budget for the Gas R&D program, starting at \$12 million for 2005, with maximum annual increases of up to \$3 million per year, subject to Commission approval, up to \$24 million per year.⁴ Historically, each year the CEC has requested, and the Commission has approved, the maximum budget increase over the previous year. Thus, the budget ceiling reached \$24 million in FY 2009-2010. The Commission has approved a \$24 million budget since FY 2010-2011. In 2016, the Commission directed the CEC to file a supplementary Climate, Drought, and Safety Natural Gas Budget Plan for the re-investment of \$3.6 million in previously-encumbered unspent funds, but no increase was made to the \$24 million annual budget.

² D.04-08-010 at 31.

³ D.04-08-010 at 32.

⁴ D.04-08-010 at 38.

The CEC has submitted its Proposed Program Plan and Funding Request for Fiscal Year 2016-2017.

In addition to providing its research plan and budget for FY 2016-2017, the CEC also provided information on prior program activities and expenditures.

DISCUSSION

D.04-08-010 provides that the Commission “will assess the reasonableness of the funding level, and the overall R&D program” after four years.

D.04-08-010 provided for Commission review of the “reasonableness of the funding level, and the overall R&D program” after four years, i.e., sometime after FY 2009-2010. The Commission has not yet developed a firm timeline for such a review but is in the process of gathering information leading up to such a review.

Pending an assessment of the reasonableness of the overall R&D program, it is reasonable to keep the maximum limit for program funding at \$24 million.

In the interim, we elect to maintain the same administrator (the CEC) and maximum funding level at \$24 million per year. We approve the CEC’s proposed budget of \$24 million for FY 2016-2017. This funding level has no precedential value regarding the overall program review or funding levels beyond FY 2016-2017, as the CEC is required to propose a zero-based budget for each fiscal year.

Consistent with D.04-08-010, the CEC’s Public Interest Energy Research Program for Natural Gas focuses on research and development directed towards maximizing energy efficiency and renewable technologies, mitigating environmental effects of gas consumption, improving natural gas vehicle performance, and enhancing natural gas pipeline safety.

Consistent with the state’s Energy Action Plan loading order, the CEC’s proposed budget for FY 2016-2017 allocates the \$24 million budget to the following research areas: Energy Efficiency (\$7.1 million), Renewable Energy and

Advanced Generation (\$4.4 million), Energy Infrastructure (\$6.6 million), and Natural Gas Transportation (\$3.5 million). The CEC also allocates \$2.4 million to program administration, including technical support. The CEC's proposed budget allocations are delineated in Appendix A of this Resolution.

The following is a breakdown of specific areas within the four major categories:

1. Energy Efficiency (\$7.1 million)

- a. Industrial, Agriculture, and Water Efficiency: Natural Gas Efficiency Research and Demonstration for:
 - i. Food Processing, Glass, and Chemical Manufacturing Industries: Including innovations for heat recovery processes; water-reduction strategies; advancements in processes like pasteurization or drying; glass melting, recycling, and refining; and improvements to chemical control, distillation, and integration processes.
 - ii. Heat Recovery and Improved Combustion Processes for the Oil and Gas Extraction and Refining Industry and the Cement Industry: Foci including cement combustion technologies, process improvements, and carbon capture/particulate control technologies.
 - iii. Industrial, Agriculture, and Water Research Roadmap Update: identifying research needs in this area, as well as links to policy goals for affected industries.

2. Renewable Energy and Advanced Generation (\$4.4 million)

- a. Cost-Effective Waste Heat to Power Systems for California Industries: proposes R&D to support technological advances to adopt waste heat to power in key industries statewide.
- b. Hurdling the Distributed Generation Barriers through Cost Effective Emissions Control and Other Novel Systems and Strategies: addressing technical and economic barriers to deploying Distributed Generation, CHP, and combined cooling, heat and power (CCHP) in small commercial, light industrial, or multifamily residential applications in the small- to micro-scale range.

3. Energy Infrastructure (\$6.6 million)

- a. Natural Gas Infrastructure Safety and Integrity: Enhanced Methods, Tools, and Assessments for Natural Gas Infrastructure Safety and Integrity Management (\$4 million): developing new approaches that use advanced methods, technologies and high-speed, high-power computers for real-time infrastructure damage and flaw detection, risk assessment, hot spot identification, system leaks, and corrective action planning and implementation.
- b. Energy-Related Environmental Research (\$2.6 million):
 - i. Exploratory Study of Innovative Methods to Assess Structural Integrity of Levees Protecting Natural Gas Infrastructure in the Sacramento-San Joaquin Delta.
 - ii. Improved Characterization of the Climate Implications of Natural Gas Consumption in California: Detecting and quantifying emissions from “super-emitters,” testing early-identification methods for methane leaks, improving biomethane assessment models, and complementing ongoing and planned methane studies.
 - iii. Chemical and Isotopic Fingerprints of Natural Gas Basins to Support Full Fuel Cycle Accounting.

4. Natural Gas Transportation (\$3.5 million)

- a. Improving the Economics of Onboard Compressed Natural Gas Storage Research and Development: improve the economics of lightweight gas storage by developing more cost-effective, fuel-efficient, and adaptable CNG storage options for medium- and heavy-duty natural gas vehicles.
- b. Improving Heavy-Duty Natural Gas Engine Operating Efficiency Research: new research will build on previous transportation research in advanced technologies such as cylinder deactivation, advanced ignition, and combustion methods.

The CEC also provides a detailed accounting of stakeholder input on the proposed plan, including specific changes or responses made based on that input.

CEC's continued efficient use of program R&D and administrative funds is appropriate.

The CEC's request for administrative expenses (\$2.4 million, or 10 percent of the total proposed budget) is appropriate and in line with historical program administration costs. We adopt this limit and require the CEC to adhere to it, and encourage the CEC to continue to keep such expenses at 10 percent or less for future budget proposals.

In the interest of transparency, Resolution G-3495 directed the CEC's proposed budgets to include an account, by research area, of then-current unspent funds in the program, including encumbrances and expiration dates.

The CEC has two years to encumber PIER Natural Gas R&D funds with projects, and an additional four years before such funds expire. After those six years, remaining funds must be approved for re-investment by the Commission. Beginning with the Fiscal Year 2014-2015 proposed budget, the CEC has included in its proposed budget an account of then-current, unspent funds in the PIER Natural Gas R&D program, including encumbrances and expiration dates. The intent of this requirement is to show that the CEC has spent its cumulative authorized budgets in the areas in which the money was authorized and to provide an accounting of the status of cumulative unspent funds. This requirement shall remain in place for each fiscal year's proposed budget, until otherwise directed by the Commission.

The CEC's plan identifies \$5.9 million in current unspent funds, and requests guidance on how to address them.

In its FY 2016-2017 proposal, the CEC identifies \$5.9 million in previously-collected, unspent program funds. These funds result from the fact that, as the CEC states, "it is normal for these agreements to complete their activities with some amount of funds being unspent in the six-year cycle." We provide guidance for the reinvestment of these funds below.

The CEC's proposed budget appropriately continues to prioritize key areas as directed in G-3507, and we provide continuing guidance here.

In 2015, we directed the CEC to re-prioritize its program plan based on several relevant policy directives and priority areas. First, on April 1, 2015, the Governor issued Executive Order B-29-15, which set new goals and strategies for responding to California's historic drought.⁵ Second, on April 29, 2015 Governor Brown issued Executive Order B-30-15 expanding the state's carbon emission reduction and climate change adaptation goals.⁶ With an overall goal of reducing greenhouse gas emissions to 40 percent below 1990 levels by 2030, the order specifically addresses the electricity, efficiency, and transportation sectors, among others.

In light of those orders, we directed the CEC to implement these measures first, provide a supplemental plan to invest last year's unspent funds in those areas, and to provide a 2016-2017 plan that increases funding for pipeline safety. This increase was reflected, and is justified, particularly due to the needs for system improvement illustrated by the gas leak at California's Aliso Canyon storage field that occurred in 2015 and 2016.

We further provide additional coordination direction, including specific coordination with legislatively-directed research studies stemming from the Aliso Canyon leak.

In its plan, the CEC proposes to allocate \$7.1 million to energy efficiency research in the industrial, agriculture, and water area. It identifies specific industry target areas: food processing, glass industry, chemical manufacturing, oil and gas extraction and refining, and the cement industry. This funding is dedicated to R&D to improve the efficiency of the natural gas use in these industries. Further, we seek to enhance coordination of the program's investments in this area with other current State efforts to target and support these industries' efforts to meet carbon reduction goals.

⁵ Available online at <http://gov.ca.gov/news.php?id=18913>

⁶ Available online at <http://gov.ca.gov/news.php?id=18938>

In its implementation of its efficiency projects, and in the industry-focused aspects of its renewable generation projects, the CEC shall therefore plan to leverage existing research to target industries and facilities that could benefit from the research advancements. This includes reviewing the list of covered entities under the Air Resources Board (ARB)'s Cap-and-Trade program, as well as ARB's past and ongoing leakage studies which identify industries that are both emissions-intensive and trade exposed (EITE). Our intention here is for the CEC to actively target specific industries and/or EITE facilities that may have specific research needs or be facing specific challenges in reducing their carbon emissions. We particularly require this focus because some of the research initiatives approved herein –such as those focusing on the cement industry– target particularly high-emission industries and are the first such focused initiatives this program has funded. We seek to ensure that the research meets the industries' needs and challenges under California's climate policies.

We additionally want to ensure that the research approved herein is fully coordinated with planned research conducted by the California Council on Science and Technology at the direction of the Legislature. Specific research is specified within Senate Bill 826 (the Budget Act of 2016) in Provision 3 of Appropriation Item Number 8660-001-0462 (the item number containing the Commission's budget), which tasked the Commission with overseeing research related to natural gas storage facilities. It reads:

Of the amount appropriated in Schedule (3) of this item, \$2,500,000 shall be allocated for a contract with the California Council on Science and Technology to conduct an independent study. The Public Utilities Commission, in consultation with the [CEC], the [ARB], and the Division of Oil, Gas, and Geothermal Resources within the Department of Conservation, shall request the California Council on Science and Technology to undertake a study in accordance with Provision 14 of the Governor's Proclamation of a State Emergency issued on January 6, 2016. The study shall be conducted in a manner following well-established standard protocols of the scientific profession, including, but not limited to, the use of recognized experts, peer review, and publication, and *assess the long-term viability of natural gas storage facilities in California. Specifically, the study shall address operational safety and potential health risks, methane*

emissions, supply reliability for gas and electricity demand in the state, and the role of storage facilities and natural gas infrastructure in the state's long-term greenhouse gas reduction strategies. The study shall be completed by December 31, 2017. (Emphasis added)

This specific research direction clearly shares broad goals and foci with the plan approved herein, and with the NG Research program overall. Consistent with existing program requirements regarding coordination of research, we therefore require the CEC to ensure, in its implementation of the 2016-2017 plan and future plans, that its efforts are coordinated with natural gas research that is conducted by CCST in concert with the Commission. Especially because the CEC is already active in the above named study, we consider this activity well within its existing administrative responsibilities.

Given the urgency of recent climate change directives and safety needs, and the stakeholder feedback calling for increased funding, we find it appropriate for the CEC to submit an additional plan for investing unspent funding in these areas.

As previously mentioned, the CEC identified \$5.9 million in previously-collected, unspent program funds. In its plan, the CEC proposes that the CEC could invest these funds in the following potential areas:

“areas identified by the CPUC in Resolution G-3507 of pipeline safety, responding to the Governor’s Executive Orders on Climate and the Drought, assessing the long term strategic view of the use of natural gas in a carbon-constrained, water-efficient environment, and augmenting priority research areas such as bioenergy and NOx reductions. The Energy Commission would like to include research into the Aliso Canyon natural gas leak and completing research to address the issues encountered on this site to develop long term recommendations to avoid future potential challenges of the same nature.”

We find these areas reasonable, and in line with program requirements, our guidance in G-3507 and G-3503, and stakeholder input. We also include the recent legislative guidance requiring additional studies with CCST. Overall,

research in these areas fall into two categories justifying increased funding: long term infrastructure reliability, and the long term role and impact of natural gas in a carbon-constrained context. The CEC in its role as administrator should determine and propose a method for allocating funds in these two areas to its other research efforts (or as distinct projects).

Therefore, we find it appropriate for these funds to be treated as follows: The CEC shall prepare, and submit within 120 days of the effective date of this Resolution, a Supplementary Reliability and Climate Focused Natural Gas Budget Plan identifying specific areas where its \$5.9 million in unspent funds would be used to address R&D areas supporting long term infrastructure reliability and the long term role and impact of natural gas in a carbon-constrained context. This plan shall contain the same level of detail and information as contained in the CEC's proposed R&D plan and budget for Fiscal Year 2016-2017. The plan is subject to the other applicable requirements, and will be subject to the same review process at the Commission, as the CEC's other annual program plans. We find this treatment of unspent funds to be the most prudent use of funds to benefit ratepayers (at no additional cost to ratepayers), and it does not represent a precedential increase or change to the CEC's annual \$24 million program budget. Future program budget plans shall continue to report upon accumulation of unspent funds as previously directed by this Commission.

The CEC suggests the Commission consider adjusting annual funding levels for the program, including the \$24 million program budget.

In its 2016-2017 plan, the CEC states:

Natural gas critical issues needing research have increased significantly over the last five years. With natural gas pipeline explosions, uncertainty on the amount methane leaking from the natural gas system, impacts such as subsidence and overall infrastructure deterioration from climate change and the recent natural gas leak from the Aliso Canyon storage facility the need for additional natural gas system research continues to grow. Historically, the funding for the program increased by 100% from 2005 until 2009 and has remained at the same level for the last seven years.

Given the interest from stakeholders and the increase in the need for natural gas system research, the Energy Commission requests the CPUC consider evaluating the ability to increase the annual funding for natural gas research program in the near future to a level commensurate with the issues that need to be addressed.

As provided in D.04-08-010 and stated above, the Commission will assess the overall reasonableness of the program, including funding. This assessment has not yet occurred, but we take seriously the CEC's suggestion that more funding may be necessary. We also note the several recent legislatively-directed natural gas research studies on issues of current concern. However, the information and justification provided in the CEC's plan is not sufficient for our review. We therefore request that the CEC provide a more detailed accounting to inform Commission review of the overall funding levels of the program. This detailed accounting shall include, at minimum:

- An overview of the impact of current funding levels;
- An assessment of the results and outcomes from current and prior funding levels (differentiating, for example, those resulting from the current \$24 million levels, and those resulting when the program was at lower levels);
- An assessment of current research needs, priorities, and stakeholder input that may justify increased funding. Include data used to support these recommendations, and the metrics/indicators used to assess them; and
- An assessment of different funding ranges that may support different levels of results/research advancements, aligned to the identified research needs.

We shall set no timeline for submission of this information, other than to stipulate that it should be provided as part of an annual proposed program plan and funding request. Our request for this information, and the CEC's provision of it, does not pre-determine any potential future Commission decisions or processes related to an assessment of program funding.

The CEC's Proposed Program Plan and Funding Request for Fiscal Year 2016-2017 is approved.

In accordance with D.04-08-010, the CEC provided the annual proposed R&D program for FY 2016-2017 to the Energy Division. The CEC has solicited R&D project proposal abstracts and incorporated them into the development of its plan. The Energy Division has reviewed the CEC report and found it to be submitted properly in compliance with D.04-08-010. The basic program areas meet the criteria for public interest gas R&D projects laid out in the Decision, the CEC reasonably selected gas R&D program areas, and the CEC reasonably allocated the program's budget to the different program areas. We authorize the CEC's proposed \$24 million budget as described in its *Natural Gas Research, Development, and Demonstration Program, Proposed Program Plan and Funding Request for Fiscal Year 2016-2017*.

COMMENTS

Public Utilities Code section 311(g)(1) provides that this Resolution must be served on all parties and subject to at least 30 days public review and comment prior to a vote of the Commission. Section 311(g)(2) provides that this 30-day period may be reduced or waived upon the stipulation of all parties in the proceeding.

The 30-day comment period for the draft of this Resolution was neither waived nor reduced. Accordingly, this draft Resolution was mailed to parties for comments on August 25, 2016. No comments were received.

FINDINGS

1. The CEC filed its Fiscal Year 2016-2017 public interest gas R&D budget and program plan, per D.04-08-010.
2. The CEC's proposed R&D project areas meet the criteria set forth in D.04-08-010.
3. The CEC reasonably selected gas R&D project areas, and reasonably allocated the Fiscal Year 2016-2017 R&D budget to the different project areas.

4. Recent state policy directives should be reflected in this plan, and this Resolution guides the plan's priorities and the CEC's treatment of unspent funds accordingly.
5. The CEC's request for administrative expenses (\$2.4 million, or 10 percent of the total proposed budget) is appropriate and in line with historical program administration costs.
6. The CEC's proposed R&D plan and budget in its *Natural Gas Research, Development, and Demonstration Program, Proposed Program Plan and Funding Request for Fiscal Year 2016-2017* should be adopted for a maximum budget of \$24 million.
7. The CEC identified surplus funds for reinvestment in accordance with past Commission direction, and ratepayers would benefit from their redirection to priority research areas.
8. Prior guidance on research priorities, stakeholder input, and current research gaps justify the reinvestment of surplus funds to priority areas of improved long term natural gas reliability and assessment of climate impacts.
9. The CEC should submit a Supplementary Reliability and Climate Focused Natural Gas Budget Plan for the use of previous-cycle unspent funds in the amount of \$5.9 million within 120 days of the effective date of this Resolution.
10. The Commission has not yet determined the reasonableness of the overall PIER Natural Gas R&D Program or of the funding level beyond FY 2016-2017.
11. The CEC should submit additional information in a future annual budget plan to inform Commission review of the overall funding levels of the program.

THEREFORE IT IS ORDERED THAT:

1. The CEC remains the program administrator for the PIER Natural Gas R&D program for FY 2016-2017.

Natural Gas Public Interest Research Program Fiscal Year 2016-2017/MS9

2. The PIER Natural Gas R&D program funding level for FY 2016-2017 is \$24 million. The CEC's administrative budget is 10% of these funds, or \$2.4 million.
3. The CEC shall include in its Fiscal Year 2017-2018 proposed budget an account of then-current unspent funds in the PIER Natural Gas R&D program, including encumbrances and expiration dates.
4. The CEC shall submit a Supplementary Reliability and Climate Focused Natural Gas Budget Plan for the investment of the cumulative previous-cycle unspent amount of \$5.9 million no later than 120 days after the effective date of this Resolution. This plan shall propose to invest these funds as directed in the body of this Resolution.
5. The CEC's *Natural Gas Research, Development, and Demonstration Program, Proposed Program Plan and Funding Request for Fiscal Year 2016-2017* is approved for a budget of \$24 million.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed and adopted at a conference of the Public Utilities Commission of the State of California held on September 29, 2016; the following Commissioners voting favorably thereon:

/s/TIMOTHY J. SULLIVAN

TIMOTHY J. SULLIVAN

Executive Director

MICHAEL PICKER

President

MICHEL PETER FLORIO

CATHERINE J.K. SANDOVAL

LIANE M. RANDOLPH

Commissioners

Commissioner Carla J. Peterman, being necessarily absent, did not participate.

Appendix A**Table 1: CEC's FY 2016-2017 Natural Gas Research Budget**

PROGRAM AREAS	Proposed Budget
Energy Efficiency	\$7,100,000
Buildings End-Use Energy Efficiency	\$0
Industrial, Agriculture, and Water Efficiency (1)	\$7,100,000
Renewable Energy and Advanced Generation	\$4,400,000
Energy Infrastructure	\$6,600,000
Natural Gas Infrastructure Safety and Integrity	\$4,000,000
Energy-Related Environmental Research	\$2,600,000
Natural Gas-Related Transportation	\$3,500,000
Program Administration	\$2,400,000
TOTAL	\$24,000,000

Source: California Energy Commission *Proposed Program Plan and Funding Request for Fiscal Year 2016-2017*

(1) Energy Efficiency Program areas will alternate funding each year between building efficiency and industrial efficiency research. For FY 2016-17, the focus will be on the industrial, agriculture, and water efficiency sector. In FY 2017-18, the natural gas research will focus on buildings end-use efficiency. This approach will allow the funding of multiple projects in each research area.