Date of Issuance: March 19, 2021

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

ENERGY DIVISION

RESOLUTION G-3573
March 18, 2021

R E S O L U T I O N

Resolution G-3573. The Southern California Gas Company requests approval to record Research, Development, and Demonstration (RD&D) expenses to the Research, Development, and Demonstration Expense Account.

PROPOSED OUTCOME:

- Approves the Southern California Gas Company (SoCalGas) to record up to $16.18 million in Research, Development, and Demonstration expenses as outlined in its 2021 Research, Development, and Demonstration Program Research Plan to its Research, Development, and Demonstration Expense Account, pursuant to Decision (D.) 19-09-051.

SAFETY CONSIDERATIONS:

- This resolution approves and prioritizes $652,311 for Environmental & Safety research as a Gas Operations sub-program, representing 18.5 percent of total spending on Gas Operations Research and Development in the 2021 plan. This sub-program includes system emissions, environmental projects, and safety projects as key research areas.
- Safety is a central criterion in 12 of 18 sub-programs, including the Environmental & Safety research sub-program, representing 47.5 percent of total investment in 2021. Successful safety-related research will support pipeline maintenance and repair, corrosion detection, and system monitoring technologies.

ESTIMATED COST:

- Approves SoCalGas to record up to $16.18 million to its Research, Development, and Demonstration Expense Account as authorized in D.19-09-051.

By Advice Letter 5652-G, filed on June 25, 2020.

SUMMARY

This Resolution approves the Southern California Gas Company (SoCalGas) to record RD&D expenses as detailed in its 2021 Research, Development, and Demonstration Program Research Plan to its Research, Development, and Demonstration Expense Account. The California Public Utilities Commission (CPUC) approves the SoCalGas budget of $16.18 million (in 2021 dollars) for research, development, and demonstration (RD&D) in the General Rate Case (GRC) Decision (D.) 19-09-051. This Resolution does not approve SoCalGas to spend ratepayer funds on research into Near-Zero Emission CNG Engine Development. This Resolution further restricts SoCalGas to spending ratepayer funds on research into zero-emission vehicle demonstrations, zero emission technology for rail, and zero emission Tier 4 engine research for new construction equipment.

BACKGROUND

The California Public Utilities Code Section 740.1 provides for the CPUC to authorize utility RD&D activities that benefit ratepayers through improved reliability, safety, environmental benefits, or operational efficiencies provided that achieving those benefits is reasonably probable and the focus is not unnecessarily duplicative of efforts by other research organizations. Section 740.1 additionally requires that each project support at least one objective related to environmental improvement; public and employee safety; conservation through efficient resource use; conservation through reducing or shifting system load; development of new resources and processes, particularly renewable resources and processes, that further supply technologies; improvement of operating efficiency or reliability; or the reduction of operating costs.

In 2016, D.16-06-054 approved SoCalGas's RD&D Program for an average annual funding level of $12.282 million.

In 2017, SoCalGas submitted its GRC Application (A.) 17-10-008 and requested to continue its RD&D program for the 2019 GRC cycle. SoCalGas forecasted an average annual funding level of $14.329 million and proposed to continue to record RD&D expenses in a one-way balancing account. D.19-09-051 authorized a three-year GRC cycle of funding for SoCalGas, including the 2021 RD&D program budget. In addition, the decision ordered SoCalGas to take additional steps beginning in 2020 to improve program administration and transparency, including hosting a public workshop under the supervision of Energy Division. The decision also directed SoCalGas to file a Tier 3 Advice Letter with their Research Plan for the following year, including: (1) Detailed budgets broken down by research sub-program areas; (2) Explanation of how the projects improve reliability, safety, environmental benefits, or operational efficiencies;

and (3) Discussion of how SoCalGas incorporated feedback from workshop stakeholders and CPUC Staff.

In June 2020, SoCalGas submitted its 2021 Research, Development, and Demonstration Program Research Plan proposing 18 research sub-programs in the general fields of low carbon resources, gas operations, clean transportation, clean generation, and customer end-use appliances. In its Advice Letter submitting the Plan, SoCalGas escalated the total value of the RD&D budget approved in its GRC decision to 2021 dollars, from $14.329 million to $16.181 million. SoCalGas calculates the 2021 rate impact of the proposed RD&D budget's revenue requirement to be $0.00179/therm; they also note that 2020 RD&D expenses of $15.80 million are currently in rates, so the change in rates for the 2021 RD&D expenses is minimal.[1] Those costs have already been approved by the GRC. Details about the research areas and budget can be found in the Appendix to this Resolution.

NOTICE

Notice of AL 5652-G was made by publication in the Commission's Daily Calendar. SoCalGas states that a copy of the Advice Letter was mailed and distributed in accordance with Section 4 of General Order 96-B.

PROTESTS

Advice Letter 5652-G was not protested.

DISCUSSION

The CPUC has reviewed and evaluated SoCalGas's 2021 Research, Development, and Demonstration Program Research Plan based on the following:

- Consistency with D.19-09-051 Annual Workshop and Report Requirements
- Consistency with D.19-09-051 Advice Letter Requirements
- Consideration of equity and disadvantaged communities
- Alignment of SoCalGas RD&D plan with California decarbonization goals

Consistency with D.19-09-051 Annual Workshop and Report Requirements

Ordering Paragraph 30 of D.19-09-051 found that SoCalGas should host an annual workshop during the second quarter of 2020 under the supervision of the Commission's

[1] SoCalGas October 26, 2020 Response to Energy Division Data Request.

Energy Division. During the workshop, SoCalGas should present the results of the previous year's program and obtain input regarding its intended spending during 2021. The decision also found that SoCalGas should submit a report to Energy Division describing: the previous year's RD&D program, including a summary of ongoing and completed projects; program funds expended; funding recipients; leveraged funding; an explanation of processes used for selecting RD&D project areas; and the structure of the RD&D portfolio. Finally, the decision stated that SoCalGas should engage stakeholders and provide Energy Division with workshop materials and documentation of stakeholders consulted.

On January 31, 2020, SoCalGas met with Energy Division staff to discuss their plan for the workshop and annual report and receive feedback from staff.

On April 24, 2020, SoCalGas hosted a public workshop attended by 148 people from at least 56 organizations to discuss the company's 2021 Research Plan. As required by D.19-09-051, SoCalGas presented the results of the previous year's program during the day-long workshop and proposed initiatives and funding allocations for 2021. SoCalGas also obtained input on intended spending for the following calendar year. SoCalGas provided materials before the workshop, including the workshop agenda, draft presentation, and a draft of the 2019 Annual Report. SoCalGas noticed the meeting on March 24, 2020 to Energy Division staff, the service list for A.17-10-008, and other stakeholders.

Consistent with D.19-09-051, SoCalGas followed up by including documentation of stakeholder engagement in its 2021 Research Plan. The Plan lists the organizations represented at the workshop, the workshop agenda, and the consulting group that hosted the workshop.[2]

On April 17, 2020, SoCalGas submitted its 2019 Report to CPUC Energy Division Staff documenting program results from the previous year. The 2019 report includes summaries of ongoing and completed projects, funds expended and funding recipients in the "2019 Summary of Ongoing and Completed Projects" section. The 2019 report also lists co-funders and total co-funding dollars. The 2019 report's brief "Project Area Selection Process" section states that a combination of regulatory and policy drivers, as well as corporate and policy goals, were considered. A brief subsection on "Program Structure" names each broad area of funding and explains the structure of the RD&D portfolio.

[2] Recorded in the Appendices of the 2021 Research Plan. Appendix B: Workshop Questions, Comments, and Answers, and Appendix C: Post-Workshop Feedback.

SoCalGas appropriately consulted with and followed input from Energy Division staff in conducting its workshop and developing its 2019 annual report, and meets the workshop and reporting requirements of D.19-09-051.

Consistency with D.19-09-051 Advice Letter Requirements

D.19-09-051 states that after considering stakeholder comments during the workshop, SoCalGas shall file a Tier 3 Advice Letter with its research plan for the following calendar year. The research plan should (1) Detail budgets broken down by research sub-program area, (2) Explain how the projects help improve reliability, safety, environmental benefits, or operational efficiencies and (3) Discuss how SoCalGas incorporated feedback from workshop stakeholders and Commission staff. The decision states that SoCalGas shall not record any RD&D project expenses in the one-way balancing account until the advice letter is approved.[3]

Detailed budgets broken down by research sub-program area

The SoCalGas 2021 Research Plan includes detailed budgets and a breakdown of research by 19 sub-program areas for six programs (including Program Administration). Section 1.5 of the Plan renames and consolidates their sub-programs to better delineate research and includes an appendix of sub-program title changes in comparison to prior years' research. SoCalGas states that these changes reflect better alignment with industry categorization best practices and shifts in research priorities in response to emerging trends and technologies.

The Program Administration budget is broken down into budget items in Section 1.6. All other programs are broken down by sub-program total budgets in Section 1.6. Each sub-program budget is further broken down into committed funds for 2021 and funds for projects under development for 2021. The budget allocation for each program is more detailed in the 2021 Research Plan than in SoCalGas's 2019 Research, Development, and Demonstration Program Annual Report (2019 Report).

Appendix A to this Resolution provides a breakdown of the budget by program and sub-program and a breakdown of the program administration budget.

We find that SoCalGas provides a sufficiently detailed budget by sub-program area to justify its 2021 investments. However, we find there are some areas that can be enhanced in SoCalGas's workshop and planning process next year. For example, while

[3] At 379.

the project selection process description is more detailed than in the 2019 Report, it is still not clear what process SoCalGas used to make its funding decisions or select RD&D projects other than that it used the general criteria listed in the Plan. In the future, SoCalGas could better address these questions by explaining the justifications for its criteria selection, the weights of different criteria, and the processes by which the use of criteria in assessments determined funding for research programs and sub-programs.

Energy Division Staff and other stakeholders also asked about the SoCalGas consortia dues included in the proposal. It is likely that consortia are helpful for certain types of projects, such as early-stage research, because they leverage the funding and expertise of multiple utilities. The April 24, 2020 workshop identified 2019 funds expended on consortia dues as well as 2020 and 2021 funding forecasts. The workshop materials also include projects listed by name, associated costs, and associated consortia. In the future, SoCalGas could increase transparency in this area by including a chart showing SoCalGas's dues to each consortium and their allocation to various research projects. SoCalGas provided this information as a response to a CPUC data request in 2020 but could offer the same level of detail in its 2022 Research Plan.

SoCalGas's request for administrative expenses ($1.52 million, or 10 percent of the total proposed budget) is a reasonable use of ratepayer funds. The CPUC similarly has allowed the California Energy Commission to use 10 percent of the budget for the CPUC's statewide Natural Gas R&D Program for administration. We approve the use of $1.52 million, or 10 percent of the total funding amount of $16.18 million, for program administration of the projects approved in this Plan.

Explanation of how the projects improve reliability, safety, environmental benefits, or operational efficiencies

Each sub-program throughout the Plan includes a breakdown of sub-program benefits for reliability, safety, environmental benefits, and/or operational efficiencies. The sub-program breakdown for each benefit both names the benefit category and explains in general terms how the sub-program addresses the goal, for example by replacing fossil fuel-sourced energy and reducing greenhouse gas emissions in the environmental benefits category. The descriptions do not include quantitative estimates of potential benefits, numeric targets, or a specified numeric range of potential benefits. Without such specifics, it is difficult to determine what constitutes success in the sub-program except at a general level and how much of an improvement in reliability or safety or any other benefit would meet the sub-program's objective.

As such, SoCalGas sufficiently describes in its 2021 Research Plan the general intention of each sub-program and how the research could improve reliability, safety, environmental benefits, or operational efficiencies. Where possible, future plans should

quantitatively specify the intended benefits or a range of potential benefits that could be created by the sub-programs. SoCalGas could also increase transparency by better explaining how it will assess progress made toward the listed benefits for each sub-program area.

Discussion of how SoCalGas incorporated feedback from workshop stakeholders and CPUC Staff

SoCalGas's April 24, 2020 stakeholder workshop was attended by 148 people from at least 56 government agencies, universities, community groups, and private companies. SoCalGas also conducted interviews with 25 people from unspecified organizations before the workshop and received written comments after the workshop from nine people representing public agencies and laboratories, gas industry associations, and private companies.

SoCalGas reports that in pre-workshop interviews as well as in comments received by staff during and after the workshop that the company was asked to provide 1) A more detailed description of each program's budget allocation, 2) A more detailed description of the project selection process, 3) The addition of equity engagement as one of the Regulatory and Policy Drivers, 4) Modifications to sub-program names, and 5) Research on value-added chemicals. SoCalGas reported that it responded and incorporated feedback in each of those areas in the 2021 Research Plan. As noted previously, the 2021 Research Plan provides more detail about the project selection process than in SoCalGas's 2019 Plan but could provide more detail about the expected measurable benefits to be provided by programs and sub-programs.

In addition to the comments summarized by SoCalGas, written stakeholder and CPUC feedback included in the Appendix of SoCalGas's Advice Letter expressed a range of additional concerns including the need to reduce reliance on methane as well as issues with hydrogen methanation and methane leaks from pipelines. These concerns are not reflected in the 2021 Research Plan.

Based on workshop participation and comments received before and after the workshop, SoCalGas has adequately sought stakeholder input and incorporated feedback in its 2021 Research Plan. However, future plans could better incorporate the full range of stakeholder input received.

Consideration of equity and disadvantaged communities

Given the CPUC's increasing focus on equity, this Research Plan has also been reviewed for its consideration of impacts on disadvantaged and low-income communities. SoCalGas added Equity as a Regulatory and Policy Driver in the 2021 Research Plan

and included Section 1.3.6 addressing equity considerations. The Plan identifies the CPUC's ESJ Action Plan as a key consideration for project selection.

The Equity section of SoCalGas's Plan states that "equity issues have been a consideration when the RD&D Program staff select projects to co-fund." Earlier in the Plan, under criteria for project selection, SoCalGas states that RD&D program staff are instructed to evaluate proposals based in part on whether a proposed technology directly addresses the specific needs of a disadvantaged or low-income community and whether the project is sited within or near a disadvantaged or low-income community. Program staff are also instructed to ask whether the project includes engagement by a community-based organization.

The Equity section highlights five past RD&D projects co-funded by SoCalGas in low-income or disadvantaged communities. The Plan states that "these projects have been focused on reducing GHG emissions, improving air quality, increasing the affordability of energy, and improving service reliability." All the projects may have included benefits for local air quality and public health. However, the Plan does not state which projects produced those benefits, increased investment in clean energy, or benefited ESJ communities. Similarly, the Plan does not quantify how many jobs were created by several of the highlighted projects and how community members were engaged or hired.

The Equity section says that based on feedback received during the 2020 Workshop and other community outreach efforts, SoCalGas RD&D program staff plan to pursue six equity-related practices in 2020-2021: building long-term relationships with key representatives of low-income and disadvantaged communities; sharing RD&D educational materials with disadvantaged and low-income communities; working with SoCalGas's Public Affairs team to identify and connect with contacts in those communities and seek input on potential research needs; connecting with regional California universities and identifying researchers working with low-income and disadvantaged communities; leveraging existing relationships with state agencies to identify community contacts; and establishing metrics and goals to measure progress in working with communities.

In its list of stakeholder groups participating in the 2020 Workshop, the Plan names five organizations specifically dedicated to community building: DIY girls, Hispañas Organized for Political Equality, Imperial Valley Economic Development Corporation, Inland Empire Economic Center, and The Protect Our Communities Foundation. The Plan does not state if SoCalGas engaged these organizations or other ESJ groups outside of the Workshop.

SoCalGas's 2021 Research Plan appropriately incorporates equity in its criteria and research descriptions. SoCalGas has also included ESJ groups in its stakeholder work. However, more quantitative detail is needed in future plans to measure the impact of RD&D projects on disadvantaged and low-income communities in terms of job creation and other economic development. SoCalGas should engage with diverse academic populations at universities, California Community Colleges, California State Universities and University of California local campuses including organizations such as the Center for Diverse Leadership in Science at UCLA in order to foster new researchers. More detail is also needed in the 2022 Research Plan about SoCalGas's engagement efforts with community-based organizations and the overall progress of its equity practices plan for 2020-2021. Finally, in implementing its 2021 portfolio and in developing future Research Plans, SoCalGas should consider offering small grants, participation stipends, or technical assistance to disadvantaged community stakeholders to encourage meaningful participation in the research development process.

Alignment of SoCalGas RD&D plan with California decarbonization goals

As noted in D.19-09-051, the CPUC has set clear guidance about the importance of meeting the state's goals for decarbonizing its energy and transportation systems through building decarbonization and transportation electrification measures. Several stakeholder comments submitted after the workshop also remarked on the value of reducing reliance on methane as an energy source as well as the problem of methane leaks from pipeline infrastructure.

The 2021 Research Plan includes two proposed areas that need careful consideration to determine whether they are aligned with the state's longer term decarbonization goals.

Low Carbon Hydrogen Production

The first of the two proposed areas needing careful consideration to determine whether it is aligned with California's decarbonization goals is SoCalGas's proposal to research the production of low carbon hydrogen using various methane feedstocks (Low Carbon Hydrogen Production Sub-Program outlined in Section 2.3 of the plan). The CPUC's biogas proceeding (R.13-02-008) is considering in part whether and how to inject renewable hydrogen (produced via electrolysis) into natural gas pipelines to offset the use of fossil gas. In 2020, Energy Division launched work by UC Riverside researchers into the viability of injecting renewable hydrogen into the state's gas pipeline system. While the CPUC has not yet issued a decision on standards or interconnection protocols for the injection of renewable hydrogen, consideration is underway, and the CPUC remains interested in supporting the development of renewable hydrogen.

In 13 filed comments, SoCalGas, STARS, the California Hydrogen Business Council, the Green Hydrogen Coalition, C4-MCP, Roger Aines of Lawrence Livermore National Laboratory, Peter Johnson of Monolith Materials and Azimuth Capital Management, C-Zero, Imperative Science Ventures, Palo Alto Research Center, QuickCycle Consulting, joint comments from the American Biogas Council, the Bioenergy Association of California, and the California Association of Sanitation Agencies, and joint comments from Ravi Prasher of Lawrence Berkeley National Laboratory and Arun Majumdar of Stanford University, all opposed prohibiting SoCalGas from funding research into producing hydrogen with methane in its 2021 RD&D Research Plan.

Several comments state that SoCalGas research into hydrogen production using methane should be allowed because that will help grow the hydrogen market and reduce carbon emissions. SoCalGas states that a variety of approaches are needed to help California meet its climate and air quality goals, and that both the Low Carbon Hydrogen Production Sub-Program and Clean Transportation Program are consistent with those climate goals and existing law. SoCalGas further states that achieving cost parity with incumbent fuels will be instrumental to hydrogen becoming an essential component of California's future energy economy. SoCalGas further states that hydrogen will be integral to achieving energy decarbonization at scale in order to provide emissions-free energy for fuel cell electric vehicles, industrial and building heat, and other processes. SoCalGas writes that its Low Carbon Hydrogen Production Sub-Program focuses on reducing the emissions of greenhouse gases and criteria air pollutants from hydrogen production via methane pyrolysis and advanced steam methane reformation (SMR), and that such a focus will reduce the emissions profile of hydrogen production compared to current SMR technologies. The California Hydrogen Business Council states that hydrogen produced through biomethane reformation will be a transitional pathway while electrochemical and thermochemical technologies advance. The Green Hydrogen Coalition states that funding research for methane-derived hydrogen will expand the hydrogen market and reduce costs, as well as produce data that can be used in state energy analysis and modeling.

Several comments state that hydrogen produced from renewable methane is already allowed by other state programs and policies. SoCalGas writes that no existing record suggests that research into the production of low carbon hydrogen using various feedstocks is contrary to state law or policy. Instead, SoCalGas cites existing state policies that support the broad use of alternative fuels such as hydrogen. Cited state policies include the California Air Resources Board's Low Carbon Fuel Standard (LCFS), which defines renewable hydrogen as including hydrogen produced from biomethane, or the "catalytic cracking or steam methane reforming of biomethane."[4]

[4] 17 CCR Section 95481(a)(131)

Identical comments filed separately by C-Zero, Imperative Science Ventures, Palo Alto Research Center, and QuickCycle Consulting also note that the CPUC approved the California Energy Commission's 2020-21 Natural Gas R&D Program in November 2020, and that the program included the DECARB 1 project demonstrating methods for producing hydrogen from renewable methane such as from methane cracking into hydrogen with potential carbon capture.[5]

Several comments state that producing hydrogen through methane pyrolysis using renewable natural gas can result in negative carbon emissions. Identical comments filed by C-Zero, Imperative Science Ventures, Palo Alto Research Center, and QuickCycle Consulting state that methane pyrolysis, which produces hydrogen from methane and turns the carbon into cement additives, carbon nanotubes, and other products, is a path to negative carbon emissions if biogas is used and if the heat for the high-temperature reactor involved in the process is produced from renewable or carbon neutral energy. Joint comments from Ravi Prasher, Associate Lab Director at Lawrence Berkeley National Laboratory, and Arun Majumdar, Professor of Mechanical Engineering and of Photon Science at Stanford University, repeated verbatim language filed in the joint comments about methane pyrolysis providing a pathway to negative carbon emissions. Roger Aines, Chief Scientist of the Energy Program at Lawrence Livermore National Laboratory, also highlighted that methane pyrolysis using biogas and carbon capture was a pathway to negative emissions.

Several comments state that electrolysis-based hydrogen currently is expensive to produce. Identical comments filed by C-Zero, Imperative Science Ventures, Palo Alto Research Center, and QuickCycle Consulting highlight that electrolysis-based hydrogen production currently costs as much as four times the cost of producing hydrogen through SMR. Comments from the company STARS, which produces hydrogen through solar electricity- or thermal-powered SMR, also notes the current high cost of electrolysis-based hydrogen. STARS is a contractor for SoCalGas in the Low Carbon Hydrogen Production Sub-Program.

Joint comments from the American Biogas Council, the Bioenergy Association of California, and the California Association of Sanitation Agencies state that producing hydrogen from organic waste is an efficient method to reduce short-lived climate pollutants (SLCP) and produce negative carbon emissions. The joint comments also point out that existing state legislation already requires an increase in renewable gas production to reduce SLCP emissions and that production of renewable hydrogen using biogas would fulfill this directive.

[5] Available at: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M350/K789/350789679.PDF

Comments from the company C4-MCP, which creates hydrogen production technology that generates solid carbon by-product, state that water electrolysis will be hard to scale with intermittent wind and solar resources. The comments also state that water electrolysis-based hydrogen production will not be able to provide reliable energy for scalable hydrogen production.

Comments from Peter Johnson, of Azimuth Capital Management and co-founder of Monolith Materials, a methane pyrolysis company, state that electrolytic hydrogen can unfairly burden low-income households because the high cost of producing the hydrogen may raise energy rates. Johnson writes that the CPUC should not pre-select technologies for hydrogen production.

We have weighed the comments received and will allow SoCalGas to use the proposed $2.9 million for the three areas listed in the Low Carbon Hydrogen Production Sub-Program. SoCalGas, however, should support the use of renewable natural gas (*i.e.*, biomethane) in the sub-program. If SoCalGas chooses to, it may instead spend some or all of the $2.9 million it had allocated to this sub-program to fund Area 1 of the Renewable Gas Production Sub-Program: Renewable Hydrogen Production via Direct Water-Splitting.

Clean Transportation

SoCalGas's Research Plan proposes a Clean Transportation program geared towards medium- and heavy-duty vehicles (and supporting fueling infrastructure) for vehicles fueled by natural gas, renewable natural gas, and hydrogen (Section 4 of the Plan). In September 2020, Governor Gavin Newsom issued Executive Order N-79-20 requiring California to sell only zero-emission passenger cars and trucks and off-road vehicles by 2035 and only zero-emission medium- and heavy-duty vehicles by 2045 where feasible.[6]

Identical comments submitted by C-Zero, Imperative Science Ventures, Palo Alto Research Center, and QuickCycle Consulting note that Senate Bill 32 (Pavley, 2016) require California "to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions" and "to ensure that statewide greenhouse gas emissions are reduced to at least 40 percent below the statewide greenhouse gas emissions limit no later than December 31, 2030." In its comments, SoCalGas writes that it agrees that "RD&D activities should be authorized if they have a reasonable probability of benefitting ratepayers, and each project supports environmental improvement, public and employee safety, improved operating efficiency and reliability or otherwise reduce operating costs."

[6] Available at: https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-text.pdf.

In order to achieve California's ambitious emissions targets, the state must implement Executive Order N-79-20 by transitioning quickly to zero-emission vehicles in a way that fulfills the objectives described by SoCalGas. Ratepayers should not fund research into transportation technology that is neither scalable nor carbon free. Therefore, we find that SoCalGas's proposal to spend ratepayer funds on Area 1 of Sub-Program 4.2 (Near-Zero Emission CNG Engine Development) does not meet these criteria and is not allowed. In Area 3 of Sub-Program 4.3 (Zero and Near-Zero Emission Vehicle Demonstrations), we limit SoCalGas to spending ratepayer funds on research into demonstrations of zero-emission technology, and not near-zero emission vehicles. For Area 1 of Sub-Program 4.3 (Zero and Near-Zero Emission Technology for Rail), SoCalGas is only permitted to spend ratepayer funds for research into zero-emission emission technologies, and not near-zero emission technologies. Also, in Area 1 of Sub-Program 4.3, SoCalGas is allowed to use ratepayer funds for research into using hydrogen as fuel for locomotives as well as in a fuel cell. In Area 3 of Sub-Program 4.3 (Zero and Near-Zero Emission Technology for Construction Equipment), SoCalGas may spend ratepayer funds on research into Tier 4 retrofit packages for near-zero emission engine technology for existing engines if they are made more efficient. But for research into new engines, SoCalGas may only spend ratepayer funds on zero emission engine technology, and not near-zero emission engine technology. Nothing shall prohibit SoCalGas from reallocate funding denied for a particular Area to another Area within the same sub-program.

Finally, SoCalGas should limit hydrogen-related RD&D funding in the Clean Transportation Program exclusively to projects utilizing renewable hydrogen (*e.g.,* hydrogen produced via electrolysis). We approve funding for the Clean Transportation Program with the implementation guidance described here. As Executive Order N-79-20 was issued after SoCalGas submitted its current plan, we additionally direct SoCalGas to closely consider the Executive Order in developing its next RD&D plan.

Summary of Assessment of 2021 Research Plan

The CPUC approves SoCalGas to record $16.18 million (2021 dollars) in the Research Development and Demonstration Expense Account according to its budget breakdown for RD&D expenses, as described in its 2021 Research, Development, and Demonstration Program Research Plan. Any adjustments to the Program budget necessitated for the prior year (over or under) shall be carried over to the following year, with any unspent RD&D funds remaining at the end of the GRC cycle returned In rates to customers as part of the next SoCalGas GRC.

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. Please note that comments are due 20 days from the mailing date of this resolution. Section 311(g)(2) provides that this 30-day review period and 20-day comment period may be reduced or waived upon the stipulation of all parties in the proceeding.

The 30-day review and 20-day comment period for the draft of this resolution was neither waived nor reduced. Accordingly, this draft resolution was mailed to parties for comments, and will be placed on the Commission's March 18, 2021 meeting agenda.

Thirteen comments were received. The comments have been explained and addressed in the appropriate Discussion section.

FINDINGS

1. The Southern California Gas Company (SoCalGas) filed its 2021 Research Development and Demonstration Program Research Plan, pursuant to Decision (D.) 19-09-051.
2. SoCalGas organized an annual workshop for stakeholders, provided materials ahead of the workshop, and documented stakeholder engagement, consistent with D.19-09-051.
3. SoCalGas's 2021 Research Plan meets the Advice Letter requirements of D.19-09-051 by providing: 1) Detailed budgets broken down by research sub-program area; 2) An explanation of how the projects improve reliability, safety, environmental benefits, or operational efficiencies; and 3) Discussion of how SoCalGas incorporated feedback from workshop stakeholders and CPUC Staff, consistent with D.19-09-051.
4. SoCalGas's 2021 Research Plan appropriately incorporates equity in its criteria and research descriptions.
5. SoCalGas's 2021 Research Plan includes two research areas that needed careful consideration to determine whether they are aligned with the state's longer term decarbonization goals.
6. The proposed Low Carbon Hydrogen Production Sub-Program should support research into methane-based hydrogen production using renewable natural gas.
7. The proposed Clean Transportation program is limited to research into zero-emission transportation.
8. SoCalGas's request for $1.52 million in administrative expenses, 10 percent of the total budget, is reasonable.

THEREFORE IT IS ORDERED THAT:

1. The Southern California Gas Company's (SoCalGas's) administrative budget of $1.52 million is approved.
2. SoCalGas shall make the following modifications to its 2021 Research, Development, and Demonstration Program Research Plan and implementation of its plan:
    - Direct all budgeted funding of research in the Low Carbon Hydrogen Production Sub-Program to support projects utilizing renewable natural gas. If SoCalGas chooses to, SoCalGas may use some or all of the $2.9 million it had allocated to this sub-program to instead fund research of Renewable Hydrogen Production via Direct Water-Splitting (Section 2.2.3 Area 1).
    - SoCalGas is not permitted to use ratepayer funding on Area 1 of Sub-Program 4.2 (Near-Zero Emission CNG Engine Development).
    - SoCal Gas is allowed only to spend ratepayer funds on demonstrations of zero-emission technology, and not near-zero emission vehicles, in Area 3 of Sub-Program 4.3 (Zero and Near-Zero Emission Vehicle Demonstrations).
    - SoCalGas is only permitted to spend ratepayer funds for research into zero emission technologies, and not near-zero emission technologies in Area 1 of Sub-Program 4.3 (Zero and Near-Zero Emission Technology for Rail). SoCal Gas is allowed to use ratepayer funds for research into using hydrogen as fuel for locomotives as well as in fuel cells in Area 1 of Sub-Program 4.3.
    - In Area 3 of Sub-Program 4.3 (Zero and Near-Zero Emission Technology for Construction Equipment), SoCalGas may spend ratepayer funds on research into Tier 4 retrofit packages for near-zero emission engine technology for existing engines if they are made more efficient. But for research into new engines, SoCalGas may only spend ratepayer funds on zero emission engine technology, and not near-zero emission engine technology.
    - Direct all permitted funding of research in the Clean Transportation Program to focus on support for projects involving vehicles fueled either by renewable hydrogen or renewable natural gas.
3. In developing the subsequent Research Plans, SoCalGas shall:
    - Continue to increase transparency in project area selection processes and criteria, program benefit assessment processes and criteria, stakeholder outreach efforts, and justification of consortia dues.

- Additionally, to increase transparency and facilitate Commission and stakeholder assessment of the benefits of SoCalGas's R&D portfolio, future annual reports and proposed R&D plans should include an explanation of how SoCalGas has used (or intends to use) the results of the RD&D projects.
- Continue to increase its focus on equity by including detail on how it will measure impacts to communities and providing additional detail on engagement with community-based organizations.
- Detail how future RD&D proposals align with the State's transportation and building decarbonization goals.

4. SoCalGas is approved to record up to $16.18 million to the Research, Development, and Demonstration Expense Account as outlined in Appendix A to this Resolution.

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 March 18, 2021; the following Commissioners voting favorably thereon:

/s/ Rachel Peterson
RACHEL PETERSON
Executive Director

MARYBEL BATJER
President
MARTHA GUZMAN ACEVES
CLIFFORD RECHTSCHAFFEN
GENEVIEVE SHIROMA
DARCIE HOUCK
Commissioners

Appendix A: Approved Budget Breakdown by Program and Administrative Budget Breakdown[7]

Program	Total Budget (2021 dollars)	Sub-program	Sub-program budget (2021 dollars)
Low Carbon Resources	5,424,200	Renewable Gas Production	1,500,000 (may spend up to 4,424,200 if 2,924,200 is moved from the Low Carbon Hydrogen Production)
		Low Carbon Hydrogen Production	2,924,200
		Low GHG Chemical Processes	1,000,000
Gas Operations	3,518,400	Environmental & Safety	652,311
		Operations Technology	285,553
		System Design and Materials	1,743,227
		System Inspection & Monitoring	837,309
Clean Transportation	2,052,400	On-Road	935,424
		Off-Road	809,600
		Refueling Stations	134,582
		Onboard Storage	172,794
Clean Generation	1,612,600	Integration & Controls	806,300

[7] Composite of AL-5652 "Table A: 2021 RD&D Program Budget" (numbered page 5) and AL-5652 *2021 SoCalGas RD&D Research Plan* "Program Administration Budget Items" (numbered page 21) with modifications ordered in this resolution shown in underline and strikethrough: elimination of funding from the Low Carbon Hydrogen Production Sub-Program, and the potential for SoCalGas to instead add this funding to the Renewable Gas Production Sub-Program.

Program	Total Budget (2021 dollars)	Sub-program	Sub-program budget (2021 dollars)
		Distributed Generation	806,300
Customer End-Use Applications	2,052,400	Commercial Food Service	157,600
		Residential Appliances	900,600
		Commercial Applications	235,715
		Industrial Process Heat	620,570
		Advanced Innovation	137,915
Program Administration	1,520,000	Management Labor	674,282
		Administrative Labor	260,718
		Compliance & Reporting	125,000
		Program Planning & Workshop	200,000
		Education and Outreach Activities	10,000
		Equity Engagement Program	100,000
		Database & Website Improvements	150,000
Total	16,180,000		16,180,000