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**NRDC RMI Comments on the June 3 2022 Workshop Launching
Gas Decarbonization**

Additional submitted attachment is included below.

Comments of the Natural Resources Defense Council (NRDC) and RMI on the Lead Commissioner Workshop to Launch Gas Decarbonization Proceeding

Docket Number 22-OII-02

Submitted: June 17, 2022

Submitted by: Kiki Velez, Merrian Borgeson, Sherri Billimoria, and Abigail Alter

On behalf of the Natural Resources Defense Council (NRDC) and RMI we respectfully submit the following comments on the Lead Commissioner Workshop to Launch Gas Decarbonization Proceeding held on June 3, 2022.

I. Summary

NRDC and RMI support the California Energy Commission's ("Commission") initiative to open an informational docket on the gas system transition. To achieve an equitable and least-cost energy transition, it is imperative that the state conduct comprehensive, long-term gas planning to 1) halt gas system expansion, 2) safely and equitably contract the existing gas system, and 3) prepare specific locations to depart the gas system through equitable, community-centered electrification and market transformation. This gas planning must be integrated with comprehensive electric system planning to manage the grid costs of electrification and maintain a safe, reliable, and affordable energy system.

The Commission can play a vital role in this planning, utilizing their technical and engineering expertise to support ongoing and future gas planning efforts, including the California Public Utilities Commission's ("CPUC") Gas System Planning Proceeding (R. 20-01-007). In particular, the Commission can contribute their expertise in the following areas:

1. The Commission can contribute to gas pruning efforts through:
 - a. The development of technical criteria for retiring or derating gas pipelines
 - b. The development of a plan to improve the consumer economics of electrification through market development incentives and other levers to enable cost-effective targeted electrification in the future
2. The Commission can provide electrification demand forecasts to support integrated gas and electric system planning that minimizes electric grid costs while maintaining a safe and reliable energy system.

3. The Commission can conduct PATHWAYS modeling to determine how to meet the future infrastructure needs of “hard-to-electrify” customers in the least-cost manner.

II. Introduction

Imagine that the year is 2035, and California’s energy system is undergoing dramatic changes as the state nears its goal of carbon neutrality. Entire neighborhoods, especially those with large low-income populations and disadvantaged communities, are heating and cooling their homes with affordable and clean electricity. The old gas distribution pipes that used to serve them lie on the ground sealed and unused, and many more will be capped soon, rather than repaired or replaced, as more neighborhoods make the shift to clean appliances. Those who haven’t yet had the opportunity to transition are still able to afford their heating and hot water bills due to careful planning that has managed system costs and kept gas rates affordable. The electricity system hums along reliably, heating and cooling homes across California. It is safer, more affordable, and—critically—cleaner, emitting fewer GHG emissions and enabling children to breathe clean air, no matter what neighborhood they grow up in. The goal of economy-wide carbon neutrality is well within reach, and all communities are sharing in the benefits of electrification.

From where we stand now, getting to this point may seem like an insurmountable challenge. This future is possible, but only if we engage in comprehensive, long-term gas system planning starting today. While the state agencies have considered important gas planning issues across various proceedings, **there is currently no enforceable and comprehensive planning process underway** to enable a least-cost gas transition. Through this Proceeding, the Commission can help lead and initiate the required planning process.

1. Building decarbonization requires electrification of gas end uses.

State policy and a growing number of programs across California’s agencies clearly outline the state’s energy future—California is on the path to eliminating greenhouse gas (GHG) emissions from its building sector via a transition to clean, highly-efficient electric appliances powered by the state’s increasingly renewable electric grid. Electrification programs under the CPUC’s purview alone will allocate approximately \$475 million to this transition over the next

four years¹—and much more is needed to meet California’s urgent climate, equity, and air quality objectives. As CPUC staff observed in the Building Decarbonization proceeding, “California must accelerate its efforts to reduce gas usage in homes and offices if it is to succeed in meeting its ambitious climate goals...The CPUC should use its broad regulatory authority to act decisively in support of building decarbonization.”²

The reason for this is clear: electrification is the most cost-effective path to eliminating greenhouse gas (GHG) emissions from California’s building sector. As modeled for the Commission in its report, *The Challenge of Retail Gas in California’s Low-Carbon Future*, a “High Building Electrification scenario is lower cost than the No Building Electrification scenario in 2050 by \$5 billion to \$20 billion per year (in 2018 dollars).”³ This is due in part to the fact that all of today’s pipeline gas cannot be “decarbonized” in a cost-effective manner. As only one example of the limitations of “decarbonized” gas, hydrogen can only replace up to about 15 percent of pipeline gas by volume before requiring significant and costly gas system upgrades to accommodate the fuel.⁴ Moreover, biomethane feedstocks that might replace remaining gas on the system are limited in quantity, and producing and consuming biomethane may result in considerable air quality and other environmental impacts, depending on the feedstock.

With the transition to electrification in mind, California must conduct long-term gas planning to halt the expansion of the gas system, which will become increasingly obsolete as the state

¹ “Fact Sheet: Heat Pump Water Heater Incentive Programs,” California Public Utilities Commission (May 1, 2020) (*finding a total of \$435 Million in program funding, which we update to include the additional \$40 million allocated to the Self Generation Incentive Program’s HPWH Sub-Program in December 2021*)

² R.19-01-011, Assigned Commissioner’s Amended Scoping Memo and Ruling, Appendix A: R.19-01-011 Phase III Staff Proposal, at 46 (Nov. 16, 2021) (*emphasis added*) <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M423/K516/423516230.PDF>.

³ Aas, Dan et al., Final Report: *The Challenge of Retail Gas in California’s Low-Carbon Future*, Energy and Environmental Economics, Inc., California Energy Commission (Apr. 2020) at 4.

⁴ M. W. Melaina et al., National Renewable Energy Laboratory, *Blending Hydrogen into Natural Gas Pipeline Networks: A Review of Key Issues* at v (Mar. 2013) (“If implemented with relatively low concentrations, less than 5%–15% hydrogen by volume, this strategy of storing and delivering renewable energy to markets appears to be viable without significantly increasing risks associated with utilization of the gas blend...However, the appropriate blend concentration may vary significantly between pipeline network systems and natural gas compositions and must therefore be assessed on a case-by-case basis”), <https://www.nrel.gov/docs/fy13osti/51995.pdf>.

nears its 2045 goals, and begin to cost-effectively and equitably contract the existing gas system, especially as existing infrastructure comes in need of costly repairs or replacement.

2. California needs a managed transition.

Given the infeasibility of widespread “decarbonization” of pipeline gas, decarbonization will result in **a significant decline in gas system throughput by 2045**. The Commission projects that in the least-cost building decarbonization pathway, gas demand in buildings could decrease by 90 percent between 2020 and 2050.⁵ Gas utilities forecast a similar transition to electrification and decline in gas throughput: SoCalGas’s *The Role of Clean Fuels* report models least-cost pathways that require 50-100 percent electrification of gas appliance sales by 2035,⁶ SDG&E’s *Path to Net Zero* report projects a 65 percent reduction in gas throughput by 2045,⁷ and PG&E’s *Climate Strategy Report* pledges to pursue electrification as an alternative to planned gas projects where feasible and seeks to zonally electrify communities.⁸ Energy investments made today should reflect the fact of declining gas throughput and the need to contract the gas system. California needs to engage in comprehensive gas planning because the state—and particularly its most vulnerable residents—cannot afford an unmanaged transition. The Commission can play a vital role in this effort.

The differences between a managed and unmanaged gas transition are well-documented. The CEC-commissioned report from E3 finds that a managed gas transition will reduce gas system costs by \$4 billion annually in 2050 (and \$25 billion cumulatively in net-present value terms),⁹ while the Environmental Defense Fund estimates up to a 500 percent cost difference

⁵ Aas, Dan et al., Final Report: *The Challenge of Retail Gas in California’s Low-Carbon Future*, Energy and Environmental Economics, Inc., California Energy Commission (Apr. 2020) at iii.

⁶ SoCalGas, *The Role of Clean Fuels and Gas Infrastructure in Achieving California’s Net Zero Climate Goal – Full Report* at 24 and 31 (Oct. 2021) (*See Exhibit 2.2 Key assumption differences between scenarios and Exhibit 3.1. Assessment of scenarios along selected key criteria*), https://www.socalgas.com/sites/default/files/2021-10/Roles_Clean_Fuels_Full_Report.pdf.

⁷ SDG&E, *The Path to Net Zero: A Decarbonization Pathway for California* at 15 (Apr. 2022), <https://www.sdge.com/sites/default/files/documents/netzero2.pdf>.

⁸ PG&E, *Climate Strategy Report* at 22 (June 2022), https://www.pge.com/pge_global/common/pdfs/about-pge/environment/what-we-are-doing/pge-climate-goals/PGE-Climate-Strategy-Report.pdf.

⁹ Aas, Dan et al., Final Report: *The Challenge of Retail Gas in California’s Low-Carbon Future*, Energy and Environmental Economics, Inc., California Energy Commission at 67 (Apr. 2020) (“*The example gas transition strategy reduces the cost of the gas system by \$4 billion annually*”).

between a managed and an unmanaged gas transition.¹⁰ Gas planning will provide the greatest benefit to low-income Californians and disadvantaged communities. Not only do these households already experience the highest levels of energy burden in the state,¹¹ but they are also least likely to be able to transition to electric appliances without financial assistance and most likely to be stranded on the gas system as throughput decreases without intentional planning. Thus, low-income and disadvantaged communities are most likely to absorb the costs of any new, underutilized capital investments in the gas system—investments which can be avoided through comprehensive gas planning.

Additionally, a managed transition will establish certainty for the gas workforce and enable labor unions to develop a workforce transition plan.¹² Regulators must work with labor unions to develop a plan for supporting the over 10,000 gas distribution workers in California through the energy transition.¹³ These individuals have worked hard in family-supporting jobs to maintain the energy system, sometimes for decades. Many have accrued pension, seniority, and other benefits in their positions. While the state has an obligation to take meaningful climate action, it must also support the workers impacted by gas transition policies.

From a gas utility perspective, there is also a need to sustain a right-sized gas workforce through 2045 to maintain the system safely as it contracts. This might involve retraining junior employees to manage the decommissioning process while providing incentives for senior

in 2050 and \$25 billion cumulatively in net-present value terms”),
<https://www.energy.ca.gov/sites/default/files/2021-06/CEC-500-2019-055-F.pdf>.

¹⁰ Environmental Defense Fund, *Aligning Gas Regulation and Climate Goals: A Road Map for State Regulators* at 26 (Jan. 2021) (“*In California, one estimate projects an approximate 5x cost difference between a managed and an unmanaged Transition*”), <https://blogs.edf.org/energyexchange/files/2021/01/Aligning-Gas-Regulation-and-Climate-Goals.pdf>.

¹¹ Evergreen Economics, *Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs* at 7 (Dec. 2016) (“one third of low-income households indicated that they struggle with energy bills either often or constantly, and more than half of all low-income households said that they could not lower their energy bills by heating or cooling their homes any less”) available at http://www.calmac.org/publications/2016_LINA_Final_Report_-_Volume_1_of_2.pdf.

¹² See Velez, Kiki, California Building Decarbonization Coalition, *California’s Building Transition: Recommendations for Gas Transition Regulatory Proceedings at the California Public Utilities Commission* at 20-22 (Jan. 2021), https://www.buildingdecarb.org/uploads/3/0/7/3/30734489/recommendations_for_gas_transition_regulatory_proceedings_at_the_cpuc.pdf.

¹³ U.S. Economic Census, 2012.

employees to retire at the right time. Labor unions and gas utilities should work to develop a career bridge for the gas workforce, with the Diablo Canyon workforce transition serving as a potential model. As with Diablo Canyon, clear infrastructure decommissioning dates are necessary to enable unions to plan and provide greater certainty to the gas workforce during this time of transition.¹⁴

State agencies must equitably advance California’s climate goals through gas planning, and this work must start today. Every new, unnecessary gas investment approved for ratepayer recovery is an additional burden on California utility customers—and especially on those who can least afford it. California must develop an iterative gas planning process that 1) adopts policies to halt the expansion of the gas system; 2) makes plans to contract strategic regions of the gas system in order to meet interim system cost reduction goals en route to 2045; and 3) prepares geographic locations to depart the gas system through equitable, community-centered electrification, market transformation, and gas workforce planning. The Commission can contribute their analytical and engineering expertise and collaborate with other state agencies to kickstart this planning.

III. Recommendations

The Commission can contribute their technical expertise to support ongoing and future gas planning efforts, including the Gas Planning Proceeding underway at the CPUC. While the Commission should coordinate with the other state agencies to identify areas where the Commission’s support is most needed, we submit the following recommendations for potential contributions.

- 1. The Commission can contribute to gas pruning efforts through the development of a) technical criteria for retiring or derating gas pipelines and b) a plan to improve the consumer-economics of electrification through market development incentives and other levers to enable cost-effective targeted electrification in the future.**

¹⁴ See Tom Dalzell, UC Berkeley Labor Center, “Diablo Canyon: A Just Transition for Workers and the Environment” (Nov. 2018)

Iterative, long-term planning will be critical to contracting the existing gas system in a cost-effective way. State agencies must engage in comprehensive planning today to ensure that electrification and gas planning efforts complement each other and result in an affordable, equitable, reliable, and safe energy system throughout the transition. These efforts might proceed as follows:

State agencies should work with utilities to identify pipelines that will need to be repaired or replaced within the next 10 years, with a special focus on distribution pipes that serve low-income customers or disadvantaged communities, that serve uses that can be electrified within the remaining useful life of the gas pipe, and/or that are served by the same transmission pipeline. With stakeholder and community input to define specific criteria, the state agencies should select pipes and regions that are ideal targets for geographic electrification.

Next, agencies must work with community-based organizations and other stakeholders to facilitate electrification of the selected regions. This may include incentive or pilot programs that enable low-income customers to transition. To prepare for this point, ongoing and future market transformation and rate reform efforts are needed to help bring the cost of electrification closer to parity with gas appliances. State agencies and the Legislature should also implement bill and tenant protections to ensure that low-income customers who electrify experience cost-savings on their energy bills and avoid displacement associated with building upgrades. The Commission and other agencies should work with stakeholders to develop a plan to enable targeted electrification through a strategic, cost-effective combination of market development and equity incentives (such as TECH and BUILD incentives), rate reform, and targeted electrification funding.

Addressing the utilities' obligation to serve customers will be important to make progress. The CPUC should clarify, or work with the Legislature to clarify, the utilities' obligation associated with gas service. After addressing the obligation to serve, a gas utility should be able to retire—rather than repair or replace—the targeted distribution pipeline at the end of its useful life, reducing costs for remaining gas customers by avoiding unnecessary infrastructure costs. This process of targeted electrification should take place iteratively across the gas system, and throughput should eventually decrease enough to derate, and even retire,

local and backbone transmission pipelines. The Commission can contribute to this process in various ways.

a. The Commission can develop technical criteria for retiring or derating gas pipelines

First, Commission engineers can develop technical criteria to determine when it is possible to retire a gas distribution pipeline or to retire/derate a gas transmission asset, including a compressor driving the gas flow on a particular transmission segment, without sacrificing gas system safety and reliability. These engineering criteria, alongside policy criteria adopted in a public gas planning process, can help avoid costly gas infrastructure repair and replacement costs while ensuring a safe and reliable energy system throughout the transition.

b. The Commission can develop a plan to improve the consumer-economics of electrification through market development incentives and other levers to enable cost-effective targeted electrification in the future.

Targeted gas system retirements must be accompanied by targeted electrification efforts to equitably transition communities served by a particular gas distribution line. The Commission and other state agencies must develop a strategy to enable targeted electrification by first transforming the market for electric appliances and then phasing in additional assistance to electrify “targeted” households where necessary. This strategy should entail continued market development incentives (such as TECH, BUILD, CalEHP, and additional equity-focused building electrification incentives), rate reform to support building electrification, management of grid costs, an all-electric building code and appliance standards, and targeted electrification funding as needed. Strategically investing in market development and pursuing other measures to improve the customer economics of electric appliances early on will help facilitate electrifying whole communities down the line, as gas appliances will be more likely to be replaced on burnout with electric appliances. This can bring down the total cost of geographically targeted electrification. The Commission should work with other state agencies and stakeholders to develop an electrification strategy in this proceeding to enable the cost-effective pruning of gas infrastructure.

2. The Commission can provide electrification demand forecasts to support integrated gas and electric system planning that minimizes electric grid costs while maintaining a safe and reliable energy system.

As the state agencies pursue market development and geographically targeted gas retirements to minimize gas transition costs, they must also conduct electric system planning to ensure there is sufficient electric grid capacity to reliably serve customers that move off the gas system. The Commission can play a key role by identifying (and exploring opportunities to manage) the increase in electric load brought on by zonal electrification. This demand forecasting will enable the CPUC and electric utilities to build out the electric infrastructure that will be needed to meet electrification demand in a least-cost manner.

Because the gas and electric systems are intricately interdependent, the state agencies must strategically coordinate the decrease in gas throughput with an accompanying increase in electric system load. For example, as customers transition to electrification, gas distribution throughput will decrease—but the gas demand for electric generation may increase, along with a subsequent need for gas storage to supply gas to electric generators that supplement renewables on the grid during times of peak demand. The concurrent transition to electric vehicles will only compound the reliability and affordability challenges of this transition. But comprehensive electric system planning can help minimize the grid costs of electrification load through strategic investments, such as demand-flexible heat pumps. Planning for a least-cost gas system contraction **alongside** a least-cost electric system expansion is critical to building an affordable, reliable, and decarbonized energy system.

The Commission has played an important role in Senate Bill (SB) 100 electric grid planning, and they can play an important role in integrating gas and electric system planning. Specifically, the Commission can contribute their expertise in developing electric demand forecasts to 1) quantify the increase in electric demand that will be brought on by electrification, driven by a) market development programs; b) LMI deployment activities; and c) zonal electrification projects, and 2) explore opportunities to minimize electrification demand increases, such as through investments in demand-flexible appliances.

The Commission currently conducts a statewide demand forecast and then allocates that forecast at a distribution level. This forecast quantifies expected load growth, which doesn't

account for the amount of electrification actually required to meet our economywide decarbonization goals. Through this Proceeding, the Commission should conduct two statewide electrification policy compliant forecasts—an unmanaged scenario and a managed scenario—and then apply these to develop electrification policy compliant forecasts at the distribution level.

In the unmanaged scenario, customers would electrify their current gas end uses without policy interventions to minimize and shift the new electric demand to off-peak times. In the managed scenario, the state would implement policies to minimize peak load increases from electrification. A managed scenario might include a high penetration of high-efficiency, demand-flexible heat pumps and efforts to minimize electric panel upgrade requirements, such as by increasing adoption of low-amp charging and appliances. The Commission should work with stakeholders to determine the appropriate load management strategies to model. The managed scenario will help identify load management investments that can minimize the total energy system costs of targeted electrification.

Once specific gas distribution lines (and neighborhoods) are identified for gas decommissioning, then the CPUC and electric utilities can use the Commission’s electrification policy compliant distribution level forecasts to determine what electric grid upgrades are required to electrify the region in both the managed and unmanaged electrification scenarios. This process will help quantify the energy system savings that would result from “managed” electrification investments and will enable the state agencies to identify a least-cost energy transition strategy. This kind of integrated gas and electric system planning is critical to maintaining an affordable energy system throughout the transition.

The Commission should collaborate with the California Independent System Operator (CAISO), the CPUC, and stakeholders to identify further forecasting and analysis needs that can support a least-cost transition from gas to electric load.

3. The Commission can conduct PATHWAYS modeling to determine how to meet the future infrastructure needs of “hard-to-electrify” customers in the least-cost manner.

Some distribution pipelines and transmission pipelines may need to remain on the system to serve “hard-to-electrify” customers through and beyond 2045. These might include electric generators (including fuel cells) and some industrial and commercial customers, such as concrete

and steel manufacturers and high-temperature process industries. Identifying the future infrastructure needs of these customers is critical to long-term gas and electric system planning. Some pipelines serving noncore customers may be feasibly retired in the mid-term, while pipes that serve “hard-to-electrify” customers may need to be maintained over a longer time horizon. Alternatively, these customers may eventually be served by new, dedicated hydrogen pipelines. More information and PATHWAYS modeling are required to understand the most societally-cost-effective way to decarbonize “hard-to-electrify” customers, and the Commission can fill this gap by conducting an economy-wide analysis with stakeholder input to determine an optimal decarbonization strategy.

Any analysis must recognize the limited availability, high cost, lifecycle emissions, and criteria pollutants associated with “alternative fuels” such as biomethane and hydrogen. Because other sectors, such as the airlines and maritime shipping, may also require these fuels to decarbonize, the analysis must be economy-wide and consider the impacts of potential emissions leakage. This planning also needs to be iterative to incorporate the impact of technological developments, including the potential rise of commercially available products to electrify industrial uses, such as industrial heat pumps, or to meet the capacity filled by electric generators, such as demand flexibility and battery storage. Understanding the optimal decarbonization pathway for “hard-to-electrify” customers is critical to targeting gas pipelines to retire in the next decade.

An updated economy-wide analysis to determine the most cost-effective and feasible pathway to decarbonize heavy industry will assist with long-term energy planning, helping the state agencies and stakeholders weigh the benefits of industrial electrification technologies against hydrogen or biomethane. And the Commission is uniquely positioned to contribute this analysis, having enhanced modeling capabilities and a budget for gas decarbonization research. The Commission should conduct this modeling as part of this Proceeding, which will help to kickstart the comprehensive, interactive gas planning process that the moment requires.

IV. Conclusion

Thank you for the opportunity to comment. We appreciate the Commission’s decision to launch a Gas Decarbonization Proceeding, and we look forward to working with the Commission

and stakeholders to advance an equitable and managed gas transition. As stated throughout these comments, the state—and especially its most vulnerable residents—cannot afford to wait any longer for a comprehensive gas transition plan.

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