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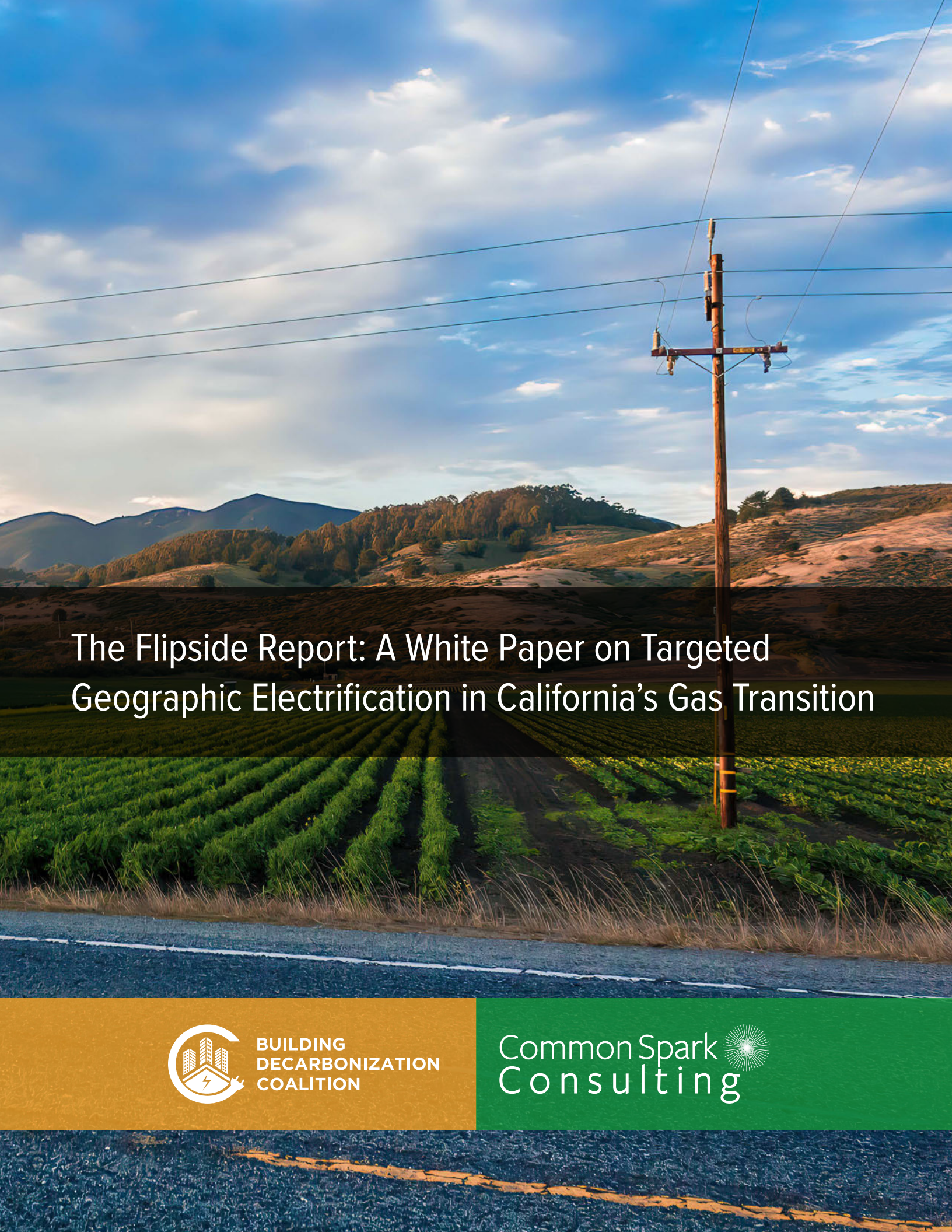

The Flipside Report: A White Paper on Targeted Geographic Electrification in California's Gas Transition

BUILDING DECARBONIZATION COALITION

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The Flipside Report: Electrification Strategies for an Equitable Gas Transition

Executive Summary

California is decarbonizing its future, and natural gas demand is on the decline. To date, this is driven by several key policies and programs—including the passage of Senate Bill 32 in 2016, Senate Bill 100 in 2018, and a statewide cap and trade program, aggressive building codes, transportation electrification targets, and more. Advocates and the state recognize that building electrification is the lowest cost path to building decarbonization—a scenario estimated to be $20 billion less expensive per year by 2050 than a scenario without building electrification.[1] Simultaneously, electrification provides a critical platform for climate and environmental justice advocates to achieve a cost-effective and equitable path to healthy and safe buildings; it is poised as the primary solution to replace current gas end uses and cost-effectively achieve state climate goals.

As gas demand declines, the costs and risks associated with remaining gas system infrastructure begin to rapidly increase. While gas utilities must continue to invest in the safety and reliability of the system, including mitigating risks of leaks or disastrous explosions, the cost of doing so will continue to increase in relation to customer demand. As the cost per unit of gas rises, more ratepayers will leave the system and seek alternatives, placing these increased costs on fewer homes and businesses.

The solution is a managed approach to reducing gas infrastructure, to relieve ratepayers of escalating costs of stranded assets.[2] This means halting new investments in future stranded gas assets and decommissioning the gas system sections at a time, removing entire sections of pipeline and disconnecting the buildings and sections of communities currently reliant on them—also known as trimming.

However, to support a cost-effective and equitable gas transition, electrification must happen in a geographically targeted and whole-house approach. Piecemeal electrification, such as appliance-by-appliance retrofits, will make it challenging to decommission sections of pipeline. A single gas use will necessitate the maintenance of costly infrastructure on a shrinking ratepayer base, creating enormous risk for ratepayers. Whole-house electrification aligned to support a managed gas transition can relieve ratepayers of those costs, deliver ratepayer savings, support energy affordability, and improve system efficiency, safety, and resiliency.

1 Energy and Environmental Economics, Inc., California Energy Commission. (2020). The Challenge of Retail Gas in California's Low-Carbon Future.

2 Environmental Defense Fund. (2019). Managing the Transition: Proactive Solutions for Stranded Gas Asset Risk in California.

TARGETED ELECTRIFICATION, THE FLIPSIDE TO THE GAS TRANSITION

Successfully delivering targeted electrification to enable strategic trimming of the gas system will require diverse funding and implementation approaches. This paper organizes its recommendations for targeted electrification under three strategies, each addressing unique policy, economic, social, and technical challenges, and opportunities to provide electrification as a solution to achieve an equitable and cost-effective gas transition.

Prioritize Investments in Vulnerable Communities

Vulnerable communities carry the highest risk of being left on the system longest with the least ability to absorb the likely costs. They have disproportionately suffered from the state's reliance on fossil fuels, the resultant poor air quality, and unequal access to clean energy and energy efficiency benefits, including healthy and affordable housing. As a result, they stand to benefit the most from electrification. Recommendations under this strategy ensure these communities are equipped to move out of harm's way and receive the benefits of the transition first and foremost.

Accelerate Investments in Non-Pipeline Solutions

Through a thorough and public planning process, such as that proposed by Gridworks, sections of pipeline could be identified for maintenance, repair, and replacement over their lifetime. For some sections of pipeline, it should be possible to project lifetime costs to maintain the infrastructure, which would help quantify the avoided cost if that pipeline were instead to be decommissioned. Recommendations under this strategy seek to capture avoided costs that can instead be used to invest in a non-pipeline alternative, both supporting and accelerating the decommissioning of portions of the gas system.

Reform the Regulatory Environment

The California Public Utilities Commission's Long-Term Gas Proceeding (R.20-01-007) Phase 2 is scoped to assess rate dynamics that incentivize the transition, encourage investments in electrification market transformation, and establish key policies and drivers that dictate an accelerated move away from gas to electrification. This is the Commission's opportunity to signal and support a managed transition from the gas system, provide guidance around timelines, limit new gas infrastructure investments, and consider cost recovery models for remaining gas assets. Recommendations under this strategy seek to create a new regulated environment that prompts localized electrification efforts and transitions away from the gas system.

Despite significant uncertainty, California is embarking on a journey away from gas. This transition will only be truly cost-effective and equitable if it is led by strategic trimming of the gas system and enabled by targeted whole-house neighborhood electrification.

The Flipside Report lays out the policy and regulatory challenges and opportunities to ensure cost-effective, rapid, and equitable transition off the gas system through geographically targeted electrification. The report is a declaration that all California communities can and should be supported in their transition to electrification. It is a call to action for the state to prioritize investment in, and leadership by, the state's most vulnerable and historically marginalized communities, and to establish regulatory tools and structures to ensure that electrification is both the most cost-effective and equitable solution to a decarbonized future.

Introduction: Gas on the Decline

U.S. natural gas use is on the decline. Production and demand are set to drop for the second consecutive year.[3] In California, such a trend is welcomed, as the state's energy supply becomes cleaner and more efficient, and the opportunities to dramatically reduce greenhouse gases through building electrification come within reach. However, simply decreasing gas use in buildings will not deliver an equitable climate solution. The flipside, or how the state replaces gas use with electrification in homes and businesses, will determine if our decarbonized future improves public health, supports local economies, and enhances affordability for all Californians.

California is decarbonizing its future. It is moving away from the use of gas[4] in homes and businesses, and is promoting electrification of space and water heating, cooking, and laundry. Decarbonization by building electrification is needed to meet state climate objectives including those laid out in the 2018 Executive Order, to achieve carbon neutrality no later than 2045, and in Senate Bill (SB) 32, requiring a reduction in greenhouse gas (GHG) emissions to 40 percent below the 1990 levels by 2030.[5,6] State agencies, from the California Energy Commission (CEC) to the California Public Utilities Commission (CPUC) have launched proceedings, research, and demonstrations around responsibly managing the changing future of state gas infrastructure.[7]

Significant local and regional momentum across the state around building electrification, including over 40 cities passing all-electric and electric-ready building reach codes and bans on new gas lines, are already impacting residential and commercial new construction.[8] Regional and local incentives for new efficient electric appliances and technology are growing in tandem. Advocates and the state recognize that building electrification is the lowest cost path to building decarbonization—a scenario estimated to be $20 billion

3 U.S. Energy Information Administration. (2021). 2021 Short Term Energy Outlook.

4 This paper hereon refers to "fossil gas," also known as "natural gas," as "gas".

5 State of California – California Gov. Edmund G. Brown Jr. (2018). Executive Order B-55-18 to Achieve Carbon Neutrality.

6 State of California. (2006). California Senate Bill 32 SB-32, the California Global Warming Solutions Act of 2006.

7 California Public Utilities Commission. (2020). California Public Utilities Commission (CPUC) Long-Term Gas Planning Proceeding (R.20-01-007).

8 California Energy Codes and Standards. (2021).

less expensive per year by 2050 than a scenario without building electrification.[9] Simultaneously, electrification provides a critical platform for climate and environmental justice advocates to achieve a cost-effective and equitable path to healthy and safe buildings; it is poised as the primary solution to replace current gas end uses and cost-effectively achieve state climate goals.

The CPUC Long-Term Gas Planning Proceeding, launched in early 2020, is a momentous juncture in California's pursuit of a decarbonized future, inviting the visioning and planning work necessary to identify, manage, and outline the state's reduction of gas infrastructure. It provides a forum to begin to address questions about responsibly managing the decline in gas demand, brought on by market forces (i.e., energy efficiency and performance of new electric technologies) and by policy direction (i.e., new air quality regulations, local building codes, and state climate goals). The Proceeding is spurring dialogue about setting retirement dates for gas infrastructure and structuring the financial recovery of gas assets to "to ensure that gas transmission costs are allocated fairly and that stranded costs are mitigated."[10]

As a practical matter, the gas system will need to shrink by decommissioning sections at a time, trimming, or removing entire sections of pipeline and disconnecting the buildings and sections of communities currently reliant on them. Electrification cannot support this type of decommissioning by happening in a piecemeal manner, appliance-by-appliance in households across the states. Rather, it will require communities, agencies, and advocates to use a whole-house geographically targeted approach to electrify energy services impacted by gas system trimming. A piecemeal approach to electrification would reduce overall gas demand and use but necessitates the existence and ongoing maintenance of the current gas infrastructure delivery system. Such an approach will result in skyrocketing costs to maintain expansive existing infrastructure across a declining customer base. How California approaches building electrification must be driven by the need to strategically decommission entire sections of gas infrastructure in a geographically targeted manner. **That is the 'flipside' of the issue.**

Building electrification must respond to the challenge of a gas system being decommissioned section-by-section. Whole-house targeted geographic electrification is necessary, not only to replace energy services for those sections being decommissioned, but such an approach plays a broader role in supporting a managed gas transition and delivering the broad benefits of decarbonization, such as health, safety, resiliency, and economic development, to all California communities. This paper outlines how electrification can support the successful wind-down of the gas system.

Section 1 of this paper will describe the interplay between the state's gas transition planning and considerations for near-term building electrification. This includes how the two efforts must be designed in tandem to ensure near- and long-term affordability for consumers and the state. Different regulatory structures, rules, and technical limitations need to be addressed to ensure that the move to electrification is done in a smart, cost-effective, and equitable manner.

Section 2 discusses the role and value of whole-house geographically targeted electrification, and how such an approach is required to support a managed gas system transition. Such an approach to electrification, by nature, will depend upon community leadership and local workforce development to be successful and deliver the full benefits of electrification and the gas transition to California communities.

Section 3 proposes three strategies for the state's near-term, geographically targeted whole-house electrification. These three strategies highlight the different partnerships, programs, and funding and financing needed to pursue system-wide electrification and resulting reduction of the gas system:

1) Prioritize Investment in Vulnerable Communities

2) Accelerate Investments in Non-Pipeline Alternatives

3) Reform the Regulatory Environment

Recommendations are organized under each of the three strategies. Together, the three strategies comprise a comprehensive approach to deliver electrification as a solution for an equitable and cost-effective gas transition.

This report is a call for policymakers, state agencies, program administrators, and advocates to consider the opportunities, imperatives, and barriers to the electrification 'flipside' of California's Long-Term Gas Planning Proceeding. Its recommendations ask for new policies and rules, innovative infrastructure financing tools, prioritized funding, and creative program deployment models that put communities in the driver seat of their own energy future. This report is a call for every stakeholder involved to recognize that electrification can be a broadly beneficial climate solution; a solution that requires a shift from a statewide to localized focus, from market-driven to market-supported community-led initiatives, from piecemeal system-wide approaches to targeted deep interventions. If done in a concerted deliberate way, the benefits of electrification can be the flipside to the long-term gas transition.

9 Energy and Environmental Economics, Inc., California Energy Commission. (2020). The Challenge of Retail Gas in California's Low-Carbon Future.

10 California Public Utilities Commission. (2020). Rulemaking 20-01-007, Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and Perform Long-Term Gas System Planning.

Section 1: Reducing Gas Demand Isn't Enough

All ratepayers are vulnerable to the rising cost of gas infrastructure. As gas demand drops, gas infrastructure must be right-sized to avoid putting Californians at risk. Strategic trimming, or localized decommissioning, of gas infrastructure is the clearest path to managing costs. California's communities, climate, economy, and health depend on it.

As gas demand declines, the costs and risks connected to gas system infrastructure begin to rapidly increase. Gas and dual-fuel utilities must maintain the safety and reliability of an already risky system to continually mitigate risks of leaks or disastrous explosions. However, the cost of maintaining the system (e.g., monitoring, repairing, and replacing pipelines), will increase in relation to how much the utility is delivering to customers. This means the cost of each gas unit delivered will increase, and potentially very rapidly. As the cost per unit of gas increases, more and more ratepayers will leave the system and seek alternatives, placing these increased costs on fewer homes and businesses. Without support, populations who are already financially vulnerable and energy-burdened will be left to carry the costs of a system in decline.[11]

This section summarizes: 1) the cost, environmental, health, and equity benefits of geographically targeting gas infrastructure trimming; 2) the driving factors that might determine where to trim gas infrastructure; and 3) the current regulatory barriers to trimming the gas system.

THE CASE FOR STRATEGIC TRIMMING OF THE GAS SYSTEM

Reducing gas demand, electrifying new buildings, and incentivizing communities to pursue electrification retrofits are core to the broader building decarbonization strategy in California. However, strategic trimming of the existing gas system will be an equally critical component to delivering a cost-effective transition that also delivers equity, health, safety, and environmental benefits to all Californians. Historically, the objectives of clean energy and energy efficiency programs have been achieved in a system-wide, piecemeal manner—with success measured by the number of participating households or the total energy saved across a region or statewide. The gas transition, in comparison, will necessitate targeted, strategic trimming and localized decommissioning of gas infrastructure.

11 The Greenlining Institute. (2019). Equitable Building Electrification: A Framework for Powering Resilient Communities.

Strategic trimming will be essential in ensuring customer affordability and reducing ratepayer burden. With geographically targeted electrification, a section or entire neighborhood could be transitioned off the gas system, consequently saving costs by reducing the number of gas distribution pipelines that must be maintained throughout the transition (see Figure 1). Thus, this paper focuses on the value of targeted geographic electrification to trim sections of the distribution system.

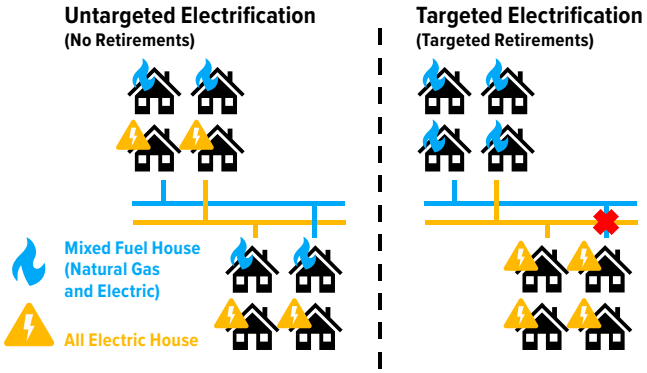


Figure 1: "Two Gas System Futures With and Without Targeted Electrification". The Challenge of Retail Gas in California's Low-Carbon Future, Energy and Environmental Economics, Inc., California Energy Commission, April 2020. This paper refers to "untargeted electrification" as "piecemeal" in nature.

Ratepayer Costs

Investments into the gas distribution system are not always prudent investments moving forward. In many cases, investments in replacing or repairing gas pipes will be simply creating additional stranded assets. A new gas pipeline might have an engineering life of up to 80 years, but California has committed to achieving economy-wide carbon neutrality in 30 years.[12] Therefore, new gas assets—and many existing ones—will likely cease to be "used and useful" before the end of their engineering life and before their cost is recovered from ratepayers.[13] So, as portions of the gas system come to require repairs or upgrades, utilities should aim to shut down those portions rather than continue investing in what will become an obsolete gas system.

The monetary benefits of such a managed gas transition are well established; for example, the Environmental Defense Fund estimates up to a 500 percent cost difference between a managed and an unmanaged gas transition.[14,15] Gridworks has identified a suite of policy, investment, and planning needs to manage cost risk of the gas transition.[16] Energy and Environmental Economics, on behalf of the California Energy Commission, has estimated that a managed and targeted approach to gas system retirements will reduce gas system costs by $4 billion in 2050.[17]

Trimming achieves ratepayer savings by reducing gas utilities' operations and maintenance and capital investment costs. Every year, gas utilities in California spend almost $3.5 billion in operations and maintenance (O&M) costs plus capital reinvestments to ensure safe and reliable gas service.[18] Reducing these costs would lessen the rate impacts on remaining gas customers.

In addition, whole-house electrification of neighborhoods, providing households with a suite of energy efficiency, renewable energy, demand response, and storage, can provide a cost-effective non-pipeline alternative.[19] Solutions to address harder-to-electrify industrial end uses should be pursued in parallel, so that the little remaining gas infrastructure in California's future can be prioritized for these sectors until cost-effective alternatives are available.[20] Especially where non-pipeline alternatives exist, the state and utilities should partner to trim gas infrastructure in a cost-effective way and invest in electric infrastructure, which will deliver long-term benefits and cost-savings to communities.

12 Payne, Healther. (2020). The Natural Gas Paradox: Shutting Down a System Designed to Operate Forever. Maryland Law Review, 80.

13 Environmental Defense Fund. (2021). Aligning Gas Regulation and Climate Goals: A Road Map for State Regulators.

14 Energy and Environmental Economics, Inc., California Energy Commission. (2020). The Challenge of Retail Gas in California's Low-Carbon Future.

15 Environmental Defense Fund. (2021). Aligning Gas Regulation and Climate Goals: A Road Map for State Regulators.

16 Gridworks. (2020). California's Gas System in Transition: Equitable, Affordable and Decarbonized.

17 Energy and Environmental Economics, Inc. (2020). The Challenge of Retail Gas in California's Low-Carbon Future.

18 Ibid.

19 Definition: Non-pipeline alternatives, or NPAs, "are the gas equivalent of non-wires alternatives in the electric utility context... NPAs fall into two categories: those which address peak-day constraints, such as demand response programs, CNG or LNG and those which address total annual customer demand, such as energy efficiency programs and fuel switching programs like targeted electrification". Aligning Gas Regulation and Climate Goals: A Road Map for State Regulators, Environmental Defense Fund, p. 20. The California Low-Income Weatherization Program has shown, particularly in multifamily situations, a suite of solutions can provide beneficial bill impacts while electrifying.

20 Environmental Defense Fund. (2021). Aligning Gas Regulation and Climate Goals: A Road Map for State Regulators.

California Gas Ratepayers: Core and Non-Core

California's gas system distinguishes between two main customer groups: 1) core customers, which refers to residential and small commercial customers; and 2) non-core customers, which tend to be industrial and large commercial customers, including electric generation plants using gas.[21] Core customers depend on their utility for the procurement of fuel and its delivery and transmission to the end use of their business or home. Though greatly outnumbering non-core customers, core customers only consume about 35 percent of the gas delivered by California's gas utilities.[22] Non-core customers procure fuel independently but use the utility infrastructure for delivery.[23] Non-core customers consume about 65 percent of the gas delivered by utilities.

It may be difficult to move non-core customers away from their pipeline. Customers that include hard-to-electrify industries, or electric generation, may depend on pipelines longer, which might impact the cost-effectiveness of trimming connected distribution systems. Further, the rate structures and economics for these two customer classes differ greatly, impacting how quickly certain ratepayers may be financially incentivized to move off the pipeline.

Vulnerable Communities

Strategic trimming can also help reduce the risk to communities from the volatile costs expected throughout the gas transition. Whole swaths of customers are already at risk of utility service disconnection, an estimated 800,000 per year according to The Utility Reform Network, and cannot absorb additional anticipated costs from the gas transition.[24]

Low-income residential customers spend over three times more of their income on energy than non-low-income households and have limited or no disposable income or property ownership position to make the investment of switching from gas to electric.[25] Furthermore, moving off gas often requires more than an appliance switch out. It may require panel and electrical upgrades or other home infrastructure and safety updates. Mitigating costs in the transition of low-income residential customers off the gas system will be critical.

In addition to low-income residents, residents of environmental and social justice communities (ESJ) and disadvantaged communities (DAC) face both economic and financial challenges. These populations carry the added cost and burden of disproportionately higher health and safety impacts from the state's pollution. For these customers, collectively referred to as vulnerable communities in this report, the benefits of gas infrastructure trimming are even more salient, and can be expanded and maximized by geographically targeting electrification. These communities are poised to capture the greatest health, economic, quality of life, and resiliency benefits of departing an energy system set to experience variable and increased costs.

Due to historical disinvestment and social, racial, environmental, and financial discrimination, vulnerable communities will need substantial financial support in this transition. This is critical for addressing long-standing inequity and preventing future harm to these residents and communities, and for achieving state climate goals. One-third of investor-owned utility (IOU) residential customers are enrolled in the California Alternate Rates for Energy (CARE) program, which provides a low-income qualified rate. Given the level of energy burden statewide and the likely cost of the gas transition, more low- and moderate-income residents could experience financial insecurity and should have access to CARE or similar rate assistance. In 2014, CalEnviroScreen reported over 9.3 million Californians lived in communities that were identified as "disadvantaged." If facilitated through early education, investment, and strong partnerships with community-based organizations (CBOs), electrification efforts in these communities can uplift and empower low-income and historically disadvantaged customers to realize the full health and environmental benefits of climate action.

21 Ibid.

22 California Public Utilities Commission. (2020). Natural Gas and California.

23 Gridworks. (2020). Gas Infrastructure Planning Report.

24 The Utility Reform Network. (2021). Keep the Lights ON! Request to Fund Utility Customer Debt Relief.

25 Energy Institute at U.C. Berkeley's Haas School of Business, Next 10. (2021). Designing Electricity Rates for An Equitable Energy Transition.

Vulnerable Communities: Many Communities, Many Definitions

This report uses the term "vulnerable communities" to encompass the intersecting ways in which communities and their members are disproportionately experiencing negative impacts by climate change, economic, social, and energy systems.[26,27] In using "vulnerable communities," this report recognizes designations formally used and recognized in existing programs, such as low-income criteria,[28] Disadvantaged Communities as identified by the California Environmental Protection Agency pursuant to Section 39711 of the Health and Safety Code,[29] and Environmental and Social Justice Communities,[30] and "vulnerable community" as identified pursuant to section 71340(d) of the Public Resources Code. As defined by the state, Disadvantaged Communities DACs suffer from a combination of economic, health, and environmental burdens including poverty, high unemployment, air and water pollution, presence of hazardous wastes, and high incidence of asthma and heart disease. Environment and Social Justice (ESJ) communities cover a broader definition, covering most DACs as well as low income, tribal, and environmental justice metrics. This report uses the term, "vulnerable communities", to recognize those communities and their members that experience the same injustices but may not be recognized by these or any other formal designation.

Environmental, Health and Safety Benefits

Trimming gas infrastructure will deliver critical environmental, climate, health, and safety benefits to all Californians more quickly than reducing overall gas throughput alone.

In terms of environmental impact, trimming gas infrastructure will hasten the reduction in greenhouse gas emissions from California buildings. Recent studies have shown that methane is a greenhouse gas that is both damaging to the environment, as a contributor to climate change, and for communities, in terms of air quality and public safety.[31] It is expected that the health and air quality impacts of methane leakage can often be even worse than a coal generation plant, and that transitioning California residential and commercial buildings off the gas distribution system will reduce roughly 10 percent of state greenhouse gas (GHG) emissions.[32,33]

Additional safety concerns related to deteriorating gas infrastructure also include earthquake-related threats and the detrimental health impacts of gas appliances (cooking ranges and space and water heating units), which have been shown to lead to in-home pollutant concentrations that exceed federal and state outdoor air quality standards.[34] Retiring gas pipelines and storage areas that might leak gas will advance state climate goals while making communities safer and more resilient.

FACTORS IN PRIORITIZING TRIMMING OF GAS INFRASTRUCTURE

Determinations of where and when to trim gas infrastructure are complex, and additional research and analytics are needed—in coordination with gas, electric, and dual-fuel utilities—to understand where the prime opportunities are for gas infrastructure decommissioning. Several factors can help determine where and how to trim gas infrastructure, including the level of pipe, age and maintenance schedule, customer end uses, and value to existing core customers. Identifying the overlap of feasible decommissioning sites with state vulnerable communities will also be critical.

Level of Pipe: Transmission and Distribution

A primary factor determining the necessity of certain gas infrastructure is whether a pipeline is part of the high-pressure gas transmission system or the lower-pressure gas distribution system. Gas transmission pipelines make up the backbone pipelines that transport gas across the state of California to distribution pipes. Distribution pipelines serve broad swaths of customers on the gas system, run directly to serve large-volume, non-core customers, such as for industrial purposes.

Age and Maintenance Costs

When determining where to begin trimming gas infrastructure, the CPUC and utilities must consider when and where gas transmission and distribution pipes are due for repair or replacement. This information should be publicly disclosed and readily available, to ensure investments are prudent and cost-effective and in line with targeted electrification and gas decommissioning goals. Section 3 discusses these opportunities in more detail, as an important funding pool for the gas transition and electrification could come from the avoided costs of gas infrastructure maintenance and replacement.

26 California Public Utilities Code. PUC § 71340.

27 State of California Governor's Office of Planning and Research, Integrated Climate Adaptation and Resiliency Program. (2018). Defining Vulnerable Communities in the Context of Climate Adaptation.

28 California Department of Housing and Community Development. Income Limits.

29 California Public Utilities Commission. Disadvantaged Communities.

30 State of California Government Code. GOV § 65040.12.e.

31 Union of Concerned Scientists. (2020). The Gas Index Report.
Further, natural gas is proving to be a less manageable emission than coal due to methane leakage.

32 Union of Concerned Scientists. (2014). Environmental Impacts of Natural Gas.

33 California Air Resources Board. (2020). 2020 Edition: California Greenhouse Gas Emissions for 2000 to 2018.

34 Rocky Mountain Institute, Mothers Out Front, Physicians for Social Responsibility, Sierra Club. (2020). Health Effects from Gas Stove Pollution.

Customer End-Uses

Gas is piped in and delivered for a myriad of uses in the California economy. Homes use gas for space and water heating, cooking, and clothes drying. Businesses use it for kitchens, laundry units, and space and water heating. Larger enterprises and industries may also pipe in gas for their own on-site power generation. Lastly, large electric power generators use gas to deliver electricity to millions of Californians every day.

In general, it will be much easier to retire sections of gas distribution pipelines serving residential and small commercial customers than for larger enterprises and industrial users, as the latter may not have as many available or cost-effective alternatives to gas. Further, it should be noted that communities, in particular ESJ and DAC communities, impacted by industrial air pollution, may often share a distribution line with or rely on a transmission line that also serves harder-to-electrify commercial or industrial customers.[35] This dynamic issue both complicates and necessitates providing a solution that targets and relieves the disproportionate risk that vulnerable communities bear.

Societal and Equity Impacts

Utilities and the CPUC should consider carefully how the long-term planning and management of the gas system is likely to exacerbate historical and ongoing inequities and injustices across California, many caused and upheld by the current energy system.[36] The transition of the gas system will have broad and enduring effects. It should be viewed as an opportunity to begin to reverse past injustices and historical divestment of certain communities and build a stronger and more resilient energy system for all California communities. Unmanaged, this transition will do further harm to already struggling communities. Alternatively, ensuring a responsible wind-down of the gas system in conjunction with electrification can provide material health, safety, economic, and resiliency benefits.

EXISTING BARRIERS TO TRIMMING GAS INFRASTRUCTURE

Obligation to Serve

In efforts to motivate utilities to invest in decommissioning lines and replacing energy services with electrification, uncertainty continues to prevail around the gas utilities' "obligation to serve."[37] The concept of "obligation to serve," referred to in the Public Utilities Code, requires utilities to serve all customers, and at just and reasonable rates.[38] Existing law does not specify that a service must be replaced by the same fuel, and it can be argued that the CPUC and utilities already have the authority to substitute electric service for gas service. However, precedent and practice has not yet proven this pathway.[39]

Early Replacement Cost-Effectiveness

Utilities should consider the remaining book value of gas pipelines when determining where to trim infrastructure. In general, pipes that have already been fully depreciated in cost, such that utility customers were able to fully benefit from the investment, can be retired earlier. Decommissioning gas pipelines that have a high remaining value presents a funding and financing challenge, as the dwindling remaining gas customer base would have to cover the cost of early decommissioning. To overcome this barrier, the CPUC should work with utilities to identify pipes nearing retirement that can be decommissioned without a loss to the utility and ratepayers. Additional non-ratepayer funding streams will inevitably need to be identified to subsidize some early decommissioning of gas assets.

Access to Gas Planning Information

Currently, utilities provide mapping data of transmission pipelines, but do not provide the granular data on the location, condition, or status of distribution pipes. It is critical that the CPUC work with utilities to collect more granular gas infrastructure data and share it publicly with stakeholders to provide for a transparent and robust planning process. This includes identifying: the location of local transmission and distribution pipes; the condition of pipes; the timelines by which existing gas assets will be depreciated; where gas pipes are due for repairs or replacements (and at what scale); and which gas pipes serve vulnerable communities.[40] This information is critical to identify and prioritize gas infrastructure trimming in a cost-effective, efficient, and equitable way.

35 Environmental Justice communities are often burdened by, among other potential variables, poor air quality and pollution levels due to proximity to polluting industrial zones and transportation hubs. We expect that ESJ communities will likely, in many cases, share distribution or transmission line delivery with hard-to-electrify industrial customers as a result. For more information on Environmental Justice and industrial pollution, see: California Environmental Justice Alliance. (2018). CalEnviroScreen: A Critical Tool for Achieving Environmental Justice in California; The Tishman Environment and Design Center at The New School. (2019). Local Policies for Environmental Justice: A National Scan; CALmatters. (2020). 'Trying to breathe'—as CA toasts environmental win, pollution still plagues.

36 For more information, see: Tufts University, ScienceDaily. (2019). Racial inequality in the deployment of rooftop solar energy in the United States, study finds; Fournier, E.D., et al. (2020). On Energy Sufficiency and the Need for New Policies to Combat Growing Inequities in the Residential Energy Sector (including report summary); California Center for Sustainable Communities at UCLA. (2020) Clean energy revolution may leave disadvantaged communities behind;) GreenTechMedia. (2020). What Is the Clean Energy Industry Doing to Confront Racism?

37 Resolution of "obligation to serve" may provide a unique opportunity for dual-fuel utilities to shift investments within the corporation; it would not naturally resolve the disincentive to electrify still experienced by gas-only utility business models.

38 California Public Utilities Code. PUC § 451.

39 Wallace, N., Zerbe, A., Wara, M. & Sivas, D.A., Stanford Law School, Mills Legal Clinic, Environmental Law Clinic. (2020). Removing Legal Barriers to Building Electrification.

40 Gridworks. (2020). Gas Infrastructure Planning Report.

Section 2: Electrification as the Flipside to the Gas Transition

Just as it is costly to simply reduce gas demand and not decommission a pipeline, electrification must be approached as a whole-house endeavor across communities that are good opportunities for strategic gas trimming. The transition must be grounded in community, address local priorities, empower local leadership, and build demand for high-quality jobs. Only then will electrification be a cost-effective and equitable decarbonization solution.

Electrification can provide efficiency, safety, resiliency, and increased level of energy services. To be the most cost-effective and equitable solution in the gas transition, electrification must be: 1) targeted and whole-house, 2) community-led, and 3) supported by local high-road workforce development.

Meeting these criteria and supporting local community organizations will require additional funds and resources. These funds should be justified as community investments that help address historical disinvestment, and that provide the stimulus needed to catalyze the transition. Local workforce development means investing in outreach, training, and providing family-supporting wages. However, a model of electrification that fully incorporates local experience, priorities, and needs will leverage trusted networks and ensure relevance to community members. Such an approach can lead to higher quality installations, strong program coordination, faster roll-out, and ultimately a stronger economy and healthier community.[41] Electrification can either represent an investment that improves whole communities and solves for the challenges of the gas transition, or a solution that fixes only one problem, in isolation of others.

TARGETED WHOLE-HOUSE ELECTRIFICATION

Electrification as the alternative to gas end uses must happen in a geographically targeted whole-house approach. A single remaining gas use, necessitating the use of a section of pipeline, will incur enormous costs on the remaining customer(s). To allow for the decommissioning of a section of pipeline, and removal of the long-term costs associated with maintaining that pipeline, electrification must reach every gas end

41 The Greenlining Institute. (2019). Equitable Building Electrification.

use in every home and building on that section of the system. In other words, no end use on a given section of pipeline gets left "behind." As such, targeted whole-house electrification challenges the way the clean energy and decarbonization programs are predominantly implemented.

The electrification movement is grounded in the same policies that have formed the foundation of the well-established and successful energy efficiency, conservation, and renewable energy programs. Historically, the objectives of these clean energy and energy efficiency programs are achieved on a system-wide basis, generally valuing a kWh or therm saved or offset, no matter where the location. These programs provide a forceful precedent in the development of electrification efforts, with many similar market transformation tools such as rebates or incentives, workforce development, and education and marketing. These approaches will remain valuable in building the markets that support electrification broadly. However, if electrification is to be the primary alternative to gas end uses, the deployment of electrification must mirror and support the strategic trimming of the gas system.

Implementation models will need to be much more localized and comprehensive in nature, knitting together programs, trades, and practices from across the building industry: heating, cooling, and ventilation practices; weatherization and energy efficiency; electrical and panel upgrades; plumbing modifications; electric distribution grid readiness; and renewable energy. Utility coordination will also be necessary to ensure grid readiness. As gas planning identifies opportunities for trimming, electric utilities can also plan for new electric loads. Few program models and policies support the level of coordination and integration that programs require for achieving whole-house retrofits at scale. Such integration is required for building electrification to meet the localized needs of a managed gas transition.

Impactful Pilots that Deliver Benefits and Data

Pilots are a common approach to testing out and learning new ways of doing things. Pilots present a crucial opportunity to demonstrate immediate value for all stakeholders involved. Pilots should strive to serve three main objectives: (1) directly and immediately benefit participants, (2) provide real-world implementation data, and (3) boost market transformation efforts. The San Joaquin Valley Affordable Energy Pilots are a positive starting point for electrification in disadvantaged communities and will be critical to informing future generations of pilots.

Pilots should immediately benefit participants. If supported properly to cover upfront costs and absorb unforeseen costs, participating households and their residents will unlock the benefits of electrification immediately, without the risk or cost of "going first." Pilots can subsidize training and hands-on experience for workforce development, additional support to permitting offices, and customer service to resolve any concerns or questions about the installation, operation, or performance of new equipment.

Secondly, pilots can provide real-world implementation data to inform policymakers and other communities in their electrification efforts. Valuable data can include the scopes of work required to achieve whole-house electrification, the hard and soft retrofit costs associated with workforce and labor learning curves, permitting processes and costs, timelines, program and technical issues, and customer experience, including bill impacts, technology performance, and quality of energy services provided by electric equipment. Pilots, ideally, should be conducted on a community-wide scale as an example of electrification that can support trimmings of sections of the gas system, and therefore include a diversity of end uses, from single-family and multifamily housing to small business and commercial entities.

Lastly, pilots help boost market transformation efforts. Pilots in single family and especially in multifamily housing will support sales of residential heat pump space and water heating technology, electric laundry appliances, and electric (in particular, induction) cooktops. Pilots can grow consumer confidence in induction cooking and heat pump technology, develop contractor and installer confidence in emerging technologies, and address other known market transformation challenges. Scaling up pilots quickly and robustly will be critical to meeting state GHG emissions reduction goals by 2045.

For more information on the San Joaquin Valley Pilots, see the CPUC website on the San Joaquin Valley Proceeding.

COMMUNITY-LED

A targeted approach to electrification is inherently a local deployment effort. Following a stakeholder engagement framework and supporting the leadership of vulnerable communities (not just elected officials, but community leadership in the form of trusted community-based organizations) will ensure that community members are welcomed and empowered to guide the process.[42]

The coordination, resourcing, and implementation of community-wide whole-house electrification will require the support of local stakeholders. A thoughtful and robust community engagement process will allow the community to determine if, how, and when electrification and transitioning off gas can be done in a way that supports local priorities and needs. The Greenlining Institute's Equitable Building Electrification Framework provides a proven set of principles and processes to ensure community priorities and needs are met and recognized through any electrification efforts.[43] The San Joaquin Valley Affordable Energy Proceeding and resulting pilots exemplify that putting communities in the driver's seat will result in important trust-building and locally relevant, climate-resilient outcomes.[44] Through a stakeholder engagement process that partnered with local community-based organizations and brought CPUC Commissioners to the involved communities, eleven of the thirteen communities elected electrification solutions to replace their wood and propane uses.

Finally, resourced community-based organizations and local governments are best positioned to develop and deploy tailored solutions in their communities. Local groups and agencies bring the perspective of being the first line of defense providing support services related to health and safety, rent and displacement, and economic and financial insecurity. They are already trusted in the community, and therefore are the most effective program implementers. Their involvement and leadership will be required to help community members navigate the complex work of whole-house electrification and related health and safety needs likely to be uncovered in the process.

LOCAL HIGH-ROAD WORKFORCE DEVELOPMENT

Finally, targeted electrification provides an opportunity for local economic development and building family-supporting jobs. The electrification work described above will require a workforce made up of many trades, from electricians to plumbers, installers, and energy system consultants. It will require updated training on new technologies, safe handling of refrigerants, and coordination to ensure energy systems work together to deliver a safe and healthy home. Further, it will require a sufficient workforce across California to meet the needs of the gas transition, wherever pipes are set to be replaced by targeted electrification.[45]

The above labor needs present an opportunity for high-road workforce development. This approach means 1) ensuring the local workforce has the updated technical and project skills to meet new market needs; 2) expanding access to job opportunities to local residents and populations underrepresented in the trades; and 3) meaningfully partnering with labor unions and community-based organizations to bolster local benefits to the workforce and its community.[46] The development of high-road jobs promotes building demand in a way that supports and provides for a highly valued workforce, resulting in higher family-supporting wages, a stronger cycle of local economic growth, and high-quality installations and successful deployment of electrification.

High-Road Workforce Development

A recent report by Inclusive Economics, "High-Road Workforce Guide for City Climate Action," provides an accessible and actionable guide to high-road workforce development. It states:

"High-road workforce development (HRWD) has two objectives: 1) improve the quality of jobs so that they are better able to support worker economic self-sufficiency, upward mobility, and overall welfare; and 2) increase access to jobs for people who need them most and who have been historically excluded from career-track, family-sustaining employment. The goal of HRWD is to pursue progress on both objectives simultaneously."

"Workforce development can transform local economies by delivering several interrelated benefits: more competitive businesses, greater economic mobility for residents, and increased regional economic growth. In the context of climate action, workforce development can contribute to GHG emissions reductions, while simultaneously improving economic opportunities for residents. HRWD is a uniquely powerful tool that can play three critical functions: successful implementation of climate plans, enhanced economic inclusion and equity, and broader community support for climate action."

Excerpt from: "High-Road Workforce Guide for City Climate Action." Inclusive Economics, as prepared for the American Cities Climate Challenge. April 2021.

42 Ibid.

43 Ibid.

44 California Public Utilities Commission. (2019). San Joaquin Valley Affordable Energy Proceeding.

45 Inclusive Economics and the UCLA Luskin Center for Innovation. (2019). California Building Decarbonization Workforce Needs and Recommendations.

46 Inclusive Economics, as prepared for the American Cities Climate Challenge. (2021). High-Road Workforce Guide for City Climate Action.

Section 3: The Flipside—Strategies to Achieve Targeted Electrification

Successfully delivering targeted electrification to enable strategic trimming of the gas system requires diverse funding and implementation approaches. Different scenarios, based on community needs and gas infrastructure factors, afford unique financing and funding opportunities.

As Section 1 highlighted the gas system infrastructure is diverse—from type of pipeline, age and maintenance, customer end uses, to social and environmental justice objectives. These factors define the value, timeline, and cost-effectiveness of trimming certain sections of the gas system and providing electrification in its place. Such diversity requires multiple approaches. This paper organizes its recommendations under three strategies, each addressing unique policy, economic, social, and technical challenges, and opportunities to provide electrification as a solution to achieve an equitable and cost-effective gas transition.[47]

4) Prioritize Investments in Vulnerable Communities

5) Accelerate Investments in Non-Pipeline Solutions

6) Reform the Regulatory Environment

PRIORITIZE INVESTMENT IN VULNERABLE COMMUNITIES

Vulnerable communities carry the highest risk of being left on the system longest with the least ability to absorb the likely costs. They have disproportionately suffered from the state's reliance on fossil fuels, the resultant poor air quality, and unequal access to clean energy and energy efficiency benefits, including healthy and affordable housing.[48] As a result, they stand to benefit the most from electrification.[49] This strategy is to ensure these communities are equipped avoid the risks and costs of the gas transition and receive the benefits of electrification first and foremost.

47 These three strategies do not connote a sequencing but rather a differentiation of core opportunities (and challenges). The three strategies do not seek to address known and urgent safety threats, which must be addressed on their own timeline.

48 The Greenlining Institute. (2019). Equitable Building Electrification.

49 For more, see: The Greenlining Institute. (2019). Equitable Building Electrification. California Environmental Justice Alliance. (2018). CalEnviroScreen: A Critical Tool for Achieving Environmental Justice in California.

Decision-makers must ensure that vulnerable communities are moved off the gas system first in a way that addresses community needs and priorities and defends these communities from the anticipated increased cost of gas throughout the transition. This not only begins to repair historical inequities and damages incurred by these communities but represents a critical and long-overdue investment in quality of life, public health, infrastructure, economic development, and environmental quality in these communities. Prioritizing these communities is also directly in line with a growing set of state policy goals, including SB 535 related to Disadvantaged Communities, passed in 2017, which creates tools for identifying and tracking metrics for vulnerable communities to inform proactive and directed policy and program support.

Vulnerable communities will need the most support, technically and financially, to overcome the costs and hurdles associated with targeted whole-house electrification. Resources such as technical assistance, outreach and training for residents and businesses, funding for trusted community-based organizations, strong incentive programs, and direct install programs can support community-led efforts to electrify. A full suite of protections should be tailored to address localized vulnerabilities, including rent and displacement protections. Local agencies and community organizations will need to be resourced for outreach and education tailored to community members' needs, in particular immigrant, non-English speaking, or Black and Indigenous communities. Lastly, it will be crucial to address the 65 percent of low-income Californians that are renters and have not reaped the benefits of clean energy and energy efficiency measures because of landlord-tenant split incentive challenges. Solutions must fit the needs of each locality and provide the most relevant and impactful financial and technical assistance.

Recommendations

Addressing targeted whole-house electrification and supporting the transition of vulnerable communities off the gas system will require financial, programmatic, legal, and regulatory action. The following recommendations constitute a first step for California state agencies, utilities, and program implementers to provide the level of support vulnerable communities will likely need to successfully transition off the gas system.

Provide resources and investment in trusted community-based organizations to lead and support a community-driven transition to electrification. Existing clean energy programs often provide funding for material equipment, technical assistance, and labor and installation, along with a broad education and marketing initiative. This approach ignores localized community priorities and needs within program planning and implementation. Resourcing trusted groups and local leadership makes it possible for communities to represent themselves in the planning and implementation processes of electrification work in their own neighborhoods.

Leverage successful direct install, integrated programs and approaches that provide subsidized comprehensive energy upgrades. For vulnerable communities, the state should be prepared to deliver substantial direct install incentives to cover the costs and navigational challenges of electrifying homes. Direct install efforts should be focused and prioritized to community members with the highest barriers to electrification, including multifamily, very-low income, and other vulnerable community members. To a great extent, these communities may not be able to take advantage of rebate-type incentives that require upfront payments for equipment, nor might they be able to afford appliances at a rebated price. Households will often

need simultaneous safety and health upgrades and panel and electric improvements. To provide bill savings in these instances, electrification will need to be integrated with efficiency, weatherization, and clean energy. Deeper home retrofits will likely be costly but investing in these historically underserved communities is needed to address long-standing inequities. Avoiding or delaying upfront investment will only result in greater public health, safety, and ratepayer costs down the line. The California Low-Income Weatherization Program is an established model for integrating program and funding sources into a comprehensive intervention that is resulting in household bill savings and improved quality of life for household members.

California's Low-Income Weatherization Program: A model for comprehensive programming

The Low-Income Weatherization Program (LIWP) is a successful model resulting in real energy cost savings for participants, providing electrification of low-income households combined with solar photovoltaic, weatherization, and efficiency retrofits. Funded by state greenhouse gas cap and trade funds, the program exclusively serves single family and multifamily low-income households and priority populations, such as disadvantaged communities. To overcome split incentive challenges, the program provides incentives based on greenhouse gas reductions with tenant-impacting improvements and investments garnering a higher level of incentive. The program currently has funding through June 2022, which is enabling investment into their Farmworker Housing Single-Family and Multi-Family program, but additional cap and trade funding has not been allocated since 2019.[50] Beyond LIWP, few programs have been successful in delivering electrification benefits to low-income and vulnerable communities in a whole-house fashion. Stable funding, such as long-term committed cap and trade funds, are needed to scale this effective approach.[51]

Partner with affordable housing and housing rights advocates to establish standard tenant protection and anti-displacement measures that state or local agencies can adopt to limit rent increases and restrict evictions. Making substantial efficiency or electrification investments in properties will inherently increase the property value but may add costs to tenants through rent increases. Especially in the case of whole-house electrification in vulnerable communities, tenant protections and anti-displacement measures must be in place to ensure that such investments do not trigger evictions or rent increases that result in displacement.[52] Programs and funding to vulnerable communities for electrification should come with these protections—determined by and agreed to in partnership with local tenant and renters' rights advocates. Program criteria could include a statewide standard baseline tenant protection agreement that limits rent increases for a portion of the lifetime of the investment, and language that prohibits evictions for reasons related to the electrification investment.[53] While local governments often already have stricter rent controls and protections in place, a standard statewide tenant protection policy tied to all public funding and supported programs can provide more foundational protection. The San Joaquin Valley Pilots include some bill protection funds, and the Commission ordered the pilots to seek assurances from property owners to not increase rents or evict because of the home improvements; a workshop was ordered to further flesh out protections.[54] Incentive structures and tenant-landlord agreements should support property owner costs such to ensure those costs are not passed on to tenants.

Propose rate reforms that better align baseline energy needs and affordability for low-income and multifamily renter households. The California Alternate Rates for Energy (CARE) provides discounted rates for qualified low-income households. However, CARE rates or standard all-electric rate options may not offer the same relief to an all-electric low-income or smaller multifamily household with lower energy demand than a standard household.[55] CARE discounts, in combination with other bill protection (i.e., a temporary limit on

50 California Department of Community Services & Development. (2021). Low-Income Weatherization Program Fact Sheet.

51 California Housing Partnership. (2021). Prioritizing California's Affordable Housing in the Transition Towards Equitable Building Decarbonization.

52 GRID Alternatives. (2019). Presentation: San Joaquin Valley Pilots Tenant Protection Principles & SOMAH Case Study.

53 California Public Utilities Commission. (2018). Opening Comments of The Greenlining Institute on The Proposed Decision Approving San Joaquin Valley Disadvantaged Communities Pilot Projects.

54 California Public Utilities Commission. (2018). Decision 18-12-015. Rulemaking 15-03-010. Order 12e. Decision Approving San Joaquin Valley Disadvantaged Communities Pilot Projects.

55 The new E-ELEC rate in California supports most ratepayers making the switch to all-electric. Analysis shows that this benefit may not materialize for ratepayers on CARE rates or those living in multifamily environments: Sierra Club. (2021). Efficient Electric Appliances Can Lower Your Energy Bills Today.

bill amounts), could also be calibrated to support fully electrified households by increasing the discount on electric rates over time. The CPUC should assess CARE rate discounts based on projected electric and gas bill trajectories, to ensure that any CARE customers who are not electrified upfront are also not burdened by rising gas bills. For any vulnerable customers who are unable to electrify early, the CPUC could increase gas CARE rates from their current 20 percent discount to 30–35 percent (the current electric CARE rate) until those customers are able to transition off gas.[56] A much more thorough analysis is needed of rate structures overall, and how gas and electric rates can and should interact to ensure rapid electrification as well as affordability.

ACCELERATE INVESTMENTS IN NON-PIPELINES ALTERNATIVES

Through a thorough and public planning process, such as that proposed by Gridworks, sections of pipeline could be identified for maintenance, repair, and replacement over their lifetime.[57] For some sections of pipeline it should be possible to project lifetime costs to maintain the infrastructure, which would help quantify the avoided cost if that pipeline were instead to be decommissioned. This strategy seeks to capture avoided costs that can instead be used to invest in a non-pipeline alternative, both supporting and accelerating the decommissioning of portions of the gas system.

With some runway, there is an opportunity to plan and provide neighborhood electrification as a non-pipeline alternative, by a certain date, to facilitate a planned decommissioning process. Certainty of date and investment (and investment savings) will provide both gas utilities and communities the opportunity to work toward the common outcome: strategic trimming of the gas system and targeted electrification (and the associated grid and circuit preparation). Assuming these timelines would be ample, as most planning processes look several years out, this can provide a runway to gather community, technical, and workforce resources for the transition.

Near-term regulatory support for a robust planning process that calculates the extent of the avoided cost, decommission costs, and electrification costs will be crucial. Further, utilities, particularly gas-only utilities, will need to be compensated and likely incentivized to support such a process. Whether finding a way to provide anticipated return on investment, providing greater return on alternative investments, or providing an incentive to offset the loss of long-term returns from infrastructure investments, gas utilities will require support for their cooperation in pursuing the state's decarbonization goals.

Recommendations

Supporting and encouraging frameworks for utilizing avoided costs to invest in non-pipeline alternatives will require clear and robust regulatory action. It will involve changing the way gas assets and targeted electrification are identified, quantified, and proposed by the CPUC, and providing a clear incentive path to de-risk and properly mobilize utilities.

Non-Pipeline Alternative Proposal in ConEd

ConEd, a dual-fuel utility in New York, is thinking boldly about shifting its assets from gas to electric infrastructure. In a recent non-pipeline alternative (NPA) proposal, ConEd proposes that 100-percent of rate-based gas investments moving forward, including new safety and maintenance investments, must be evaluated against NPAs, including electrification. ConEd's framework proposes to recover costs associated with NPA deployment over a 20-year amortization period, treating these investments as regulatory assets. The 20-year period generally aligns with the lifetime of key alternative measures and allows customers to contribute to these costs through the electric rate base as the benefits of the investments are realized. ConEd proposes a very detailed plan for identifying gas infrastructure projects that can be deferred or replaced by alternatives. Examples of easy projects to be deferred would include those proposed just for load relief (which can be alleviated through electrification, demand response, and efficiency measures), regulator station upgrades (if evaluated against predicted declines in demand), and pipelines that are already targets for replacement due to leakage or other major maintenance. Additional grid and societal benefits can be assessed as part of valuing the NPA itself, as ConEd proposes, including coincidence with peak load, workforce impacts, coincidence with environmental or social justice communities, and more.[58]

56 Velez, K., The Building Decarbonization Coalition. (2021). California's Building Transition - Recommendations for Gas Transition Regulatory Proceedings at the California Public Utilities Commission.

57 Gridworks. (2021). Gas Infrastructure Planning Report.

58 State of New York Public Service Commission. Case 19-G-0066, Proposal for Use of a Framework to use Non-Pipeline Alternatives to Defer or Eliminate Capital Investment in Certain Traditional Natural Gas Distribution Infrastructure, Consolidated Edison.

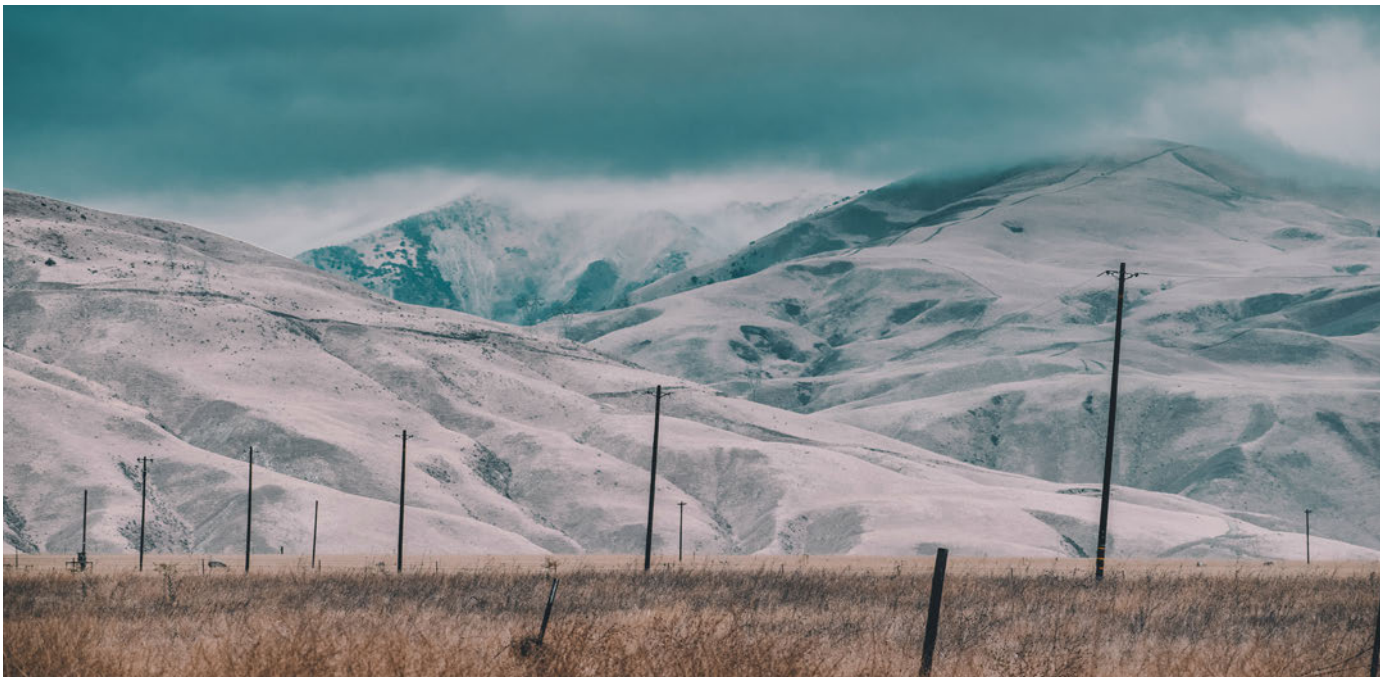
Initiate an interagency planning process to identify the long-term cost of maintaining, operating, and replacing sections of pipeline, and evaluate the total avoided cost that could be allocated toward non-pipeline alternatives. Avoided safety and maintenance investments should be tracked and repurposed as funding to cover the electrification retrofits in the neighborhood served by the decommissioned infrastructure.[59] Harnessing these avoided costs will require rethinking the way in which gas utilities recover costs for remaining assets and system costs. If deferred investments into gas infrastructure and proactive electrification are considered as a non-pipeline alternative (NPA), the state could allow utilities to earn a rate of return on other investments—such as their operational management of industrial efficiency or electrification measures—added to their rate base. Drawing from new research and early examples in other states such as New York, California could and should take a holistic approach to evaluating avoided costs of gas investment and use that deferred capital cost as a budget to fund electrification.[60]

Revise utility inventive models to motivate gas utilities to support non-pipeline alternatives, invest responsibly in the transition, and to compensate them for their role in a successful transition. There are few, if any, successful working models that translate avoided infrastructure operation and maintenance costs into behind-the-meter investments. The California Integrated Distributed Energy Resources (IDER) proceeding sought to develop an incentive framework (Distribution Investment Deferral Framework) for electric utilities to defer grid investments in lieu of energy efficiency, renewable energy, storage, and demand response investments. The results have been mixed at best, but the lessons learned should be evaluated to support NPA frameworks.[61]

Any new incentive and investment structure will need to result in substantial early earnings opportunities for utilities, to overcome perceived risk and organizational change costs and to reward the continual effort to achieve the desired outcome (which could take years). Kicker or bonus incentives for achieving milestones—such as meeting or beating deadlines, providing additional community engagement and resources, or making substantial workforce development investments—may also smooth the transition. On the other end, penalties for missing multiple deadlines, or time limits on return of investment of infrastructure to be decommissioned, may also be required to ensure the transition happens promptly. More broadly, reform of the utility business model toward performance-based returns could help de-emphasize the dependence on infrastructure investment. Whatever the approach, a compelling incentive (and/or penalty) should be provided if the utilities are to see a benefit in even trying out the NPA strategy.[62]

REFORM THE REGULATORY ENVIRONMENT

The California Public Utilities Commission's Long-Term Gas Proceeding (R.20-01-007) Phase 2 is scoped to assess rate dynamics that incentivize the transition, encourage investments in electrification market transformation, and establish key policies and drivers that dictate an accelerated move away from gas to electrification. This is the Commission's opportunity to signal and support a managed transition from the gas system, provide guidance around timelines, limit new gas infrastructure investments, and consider cost recovery models for remaining gas assets. This strategy seeks to create a new



59 Environmental Defense Fund. (2021). Aligning Gas Regulation and Climate Goals: A Road Map for State Regulators.

60 Ibid.

61 Greentech Media. (2020). California Struggles to Find Path for Solar and Batteries to Take Place of Traditional Grid Investments.

62 The incentive structure may be differentiated between dual-fuel and gas-only utilities, and that thoughtful solutions will be required to properly allocate costs and benefits between gas-only and electric utilities gaining new load.

regulated environment that prompts localized electrification efforts and transitions away from the gas system by aligning regulation and policy signals to support market evolutions and community-wide movement away from the gas system in line with state climate goals.

RECOMMENDATIONS

The following recommendations call on regulators and legislators to provide the clear guidance and direction for a long-term managed transition from the gas system to clean electricity.

Establish clear limits on gas infrastructure expansion and investments. The Environmental Defense Fund and Gridworks provide clear regulatory suggestions around drawing a "bright line" or a deadline after which no new unnecessary gas investments can be included in the rate base, and defining the criteria for investments to maintain a safe and reliable energy system.[63,64] Regulatory guidance on such limitations sends a strong signal about the value of gas infrastructure, including informing how the CPUC evaluates 'used and useful' determinations after the "bright line" date. Such a policy would necessitate an end to all ratepayer-funded incentives that support installation of gas end-uses, such as gas efficiency measures, and be supported by any mandates ending the purchase of fossil fuel appliances.

Adopt accelerated gas infrastructure depreciation schedules. Recalibrating depreciation and cost-recovery schedules to better align with the remainder of a pipeline's actual useful life (rather than an engineering estimate) will indicate when and if the operation and maintenance costs will exceed the investment in a non-pipeline alternative. Establishing decommissioning dates for existing assets will give both utilities and ratepayers certainty in their investments. Clarifying an end-date for the use and value of sections of the gas system will define the cost of maintaining the gas asset through the rest of its "adjusted" useful life, and therefore also the value of a non-pipeline alternative such as electrification investments.

Clarify obligation to serve policy coupled with a clear statement toward service that supports state policy objectives. Obligation to serve reform at the Legislature can be helpful to assuage some ofthe legal ambiguity. The Legislature could clarify utilities' obligation to serve by granting the CPUC broad authority to 1) manage the transition, 2) reduce gas service territories, and/or 3) approve substitution of electric service for gas service, and 4) establish a process to identify and implement gas trimming opportunities. Alternatively, they could clarify that utilities' obligation to serve refers to end-use services, regardless of the type of energy that supplies them. Addressing CPUC and utility concerns around "obligation to serve" and clear authorization and funding for more proactive, policy-driven electrification are needed to encourage and support utilities in managing the gas transition.

Establish pathways for creative finance, such as state-backed securitization. Securitization is an especially important tool for communities that might be ready to transition off gas before a scheduled decommissioning. Securitization would provide an opportunity to convert a utility's remaining debt into much lower-interest ratepayer-backed bonds issued by the state. This provides utilities with guaranteed capital recovery, lowers costs for ratepayers, and minimizes shareholder exposure (low interest rates to bondholders, as opposed to high utility rate of return on the full asset value). Legislation would be needed to authorize utilities to charge ratepayers a fee to recover costs associated with the stranded assets.[65]

Continue funding support for successful whole-house electrification models[66] as well as existing upstream, midstream, and downstream programs that provide market transformation value and workforce development. Resources and funding should shift to prioritize electrification efforts that fully electrify homes, particularly in communities set to be impacted by gas system decommissioning. Traditional programs, such as appliance- or technology-specific incentives, while piecemeal, are still valuable to drive market transformation and expand consumer adoption. Such programs can contribute to lowering the cost of eventual whole-house and neighborhood-wide electrification.

63 Environmental Defense Fund. (2021). Aligning Gas Regulation and Climate Goals: A Road Map for State Regulators.

64 Gridworks. (2021). Gas Infrastructure Planning Report.

65 Environmental Defense Fund. (2019). Managing the Transition: Proactive Solutions for Stranded Gas Asset Risk in California.

66 California Department of Community Services & Development. (2021). Low-Income Weatherization Program Fact Sheet.

Conclusion

Despite significant uncertainty, California is embarking on a journey away from gas. It is even clearer that the transition will only be truly cost-effective and equitable if it is led by strategic trimming of the gas system, enabled by targeted whole-house neighborhood electrification. This paper is an invitation to advocates, policymakers, and stakeholders advancing electrification efforts to align their efforts to support an equitable and managed transition away from the gas system.

All California communities can and should be supported in their transition to electrification. To achieve this, the state must prioritize funding resources for vulnerable communities and establishing regulatory tools and structures to pave the way for electrification investments to replace pipelines. This paper calls on the California Public Utilities Commission, the California Energy Commission, the Air Resources Board, and the Governor's Office to provide the regulatory reforms, financial resources, and leadership to ensure that electrification is both the most cost-effective and equitable solution to a decarbonized future.

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