2025 Risk Assessment Mitigation Phase

Appendix 4

Environmental Social Justice

Pilot Study Plan

May 15, 2025

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Introduction

In February 2019 and updated in April 2022, the California Public Utilities Commission (Commission) adopted its Environmental Social Justice (ESJ) Action Plan as a comprehensive strategy and framework for furthering principles of ESJ in Commission policy-setting and decision-making processes. The April 7, 2022 update to the ESJ Action Plan, Version 2.0 represents a continuation of efforts to systematize considerations of ESJ principles across Commission activities and reinforces its focus on equity, defined as "increasing access to power, redistributing and providing additional resources, and eliminating barriers to opportunity, to empower low-income communities of color to thrive and reach full potential."[1] The Phase 2 Decision (D.) 22-12-027[2] of the Risk-Based Decision-Making Framework (RDF) Order Instituting Rulemaking (OIR) (Rulemaking 20-07-013) directs the Investor Owned Utilities (IOUs) to undertake Environmental and Social Justice Pilots as part of each IOU's next Risk Assessment and Mitigation Phase (RAMP) filing and requires the IOUs to consider seven Action Items in the pilots. Southern California Gas Company (SoCalGas) has addressed these requirements in this ESJ pilot study plan (SoCalGas ESJ Pilot Study Plan or Pilot Study).

Purpose and Objective

As the nation's largest natural gas distribution utility, delivering energy to over 21 million customers, SoCalGas's risk-based decision-making is guided by an unwavering commitment to delivering safe, reliable, and affordable energy to customers. SoCalGas invests in mitigations to proactively reduce risk and enhance safety in the communities it serves. In this Pilot Study, SoCalGas analyzed the impacts of several of these mitigation investments to evaluate equity among Disadvantaged and Vulnerable Communities (DVCs) and non-DVCs. The SoCalGas ESJ Pilot Study Plan seeks to incorporate social justice into the risk assessment and mitigation process by exploring equity issues and the needs of the most vulnerable, including actions

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1 California Public Utilities Commission (CPUC), *Environmental & Social Justice Action Plan Version 2.0* (April 7, 2022) at 8, *available at:* https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/news-and-outreach/documents/news-office/key-issues/esj/esj-action-plan-v2jw.pdf.

2 D. 22-12-027 at 65-67 (Ordering Paragraph (OP) 5).

targeting improved air quality and climate resilience. In compliance with D.22-12-027,[3] the following action items are evaluated in this Pilot Study:[4]

- Action Item No. 1: Consider equity in the evaluation of Consequences and risk mitigation within the RDF, using the most current version of CalEnviroScreen to better understand how risks may disproportionately impact some communities more than others;

- Action Item No. 2: Consider investments in clean energy resources in the RDF, as possible means to improve safety and reliability and mitigate risks in DVCs;

- Action Item No. 3: Consider Mitigations that improve local air quality and public health in the RDF, including supporting data collection efforts associated with AB 617 regarding community air protection program;

- Action Item No. 4: Evaluate how the selection of proposed mitigations in the RDF may impact climate resiliency in DVCs;

- Action Item No. 5: Evaluate if estimated impacts of wildfire smoke included in the RDF disproportionately impact DVCs;

- Action Item No. 6: Estimate the extent to which risk mitigation investments included in the RDF impact and benefit DVCs independently and in relation to non-DVCs in the IOU service territory; and

- Action Item No. 7: Enhance outreach and public participation opportunities for DVCs to meaningfully participate in risk mitigation and climate adaptation activities consistent with D.20-08-046.

Workshops

In accordance with D.22-12-027 Ordering Paragraph 5, SoCalGas held the following workshops jointly with San Diego Gas & Electric Company (SDG&E):

1. Community-based Organization Working Group (CBOWG) Workshop – July 12, 2024
2. Disadvantaged Communities Advisory Group (DACAG) Workshop – July 19, 2024
3. Public Workshop – August 12, 2024

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[3] *Id.*

[4] Action item No. 5 from D.22-12-027 does not apply to SoCalGas, as a natural gas utility.

SoCalGas was appreciative of the stakeholder feedback provided in these workshops which is summarized below. Stakeholder feedback topics included risk analysis and mitigation impacts. These topics were addressed in multiple workshops, including whether SoCalGas intends to modify mitigations based on the analysis in this Pilot Study, and what next steps would be if the analysis revealed an inequity to DVCs. Presenters and attendees also discussed specific mitigations and action items, such as how hydrogen microgrids and hydrogen blending can help disadvantaged communities, and whether the utilities would study indoor air quality as part of this study. In addition, there was meaningful dialogue about DVC screening tools, and how the definition of a DVC would be applied to the action items in the Pilot Study. For example, the public workshop on August 12, 2024 included a discussion regarding consideration of defining DVCs by where DVC community members work, as opposed to only analyzing where DVC community members reside as reflected in census tracts. Further, SoCalGas and SDG&E received suggestions for multiple screening tools to consider for ESJ analysis, including the Healthy Places Index,[5] the Climate and Economic Justice Screening Tool from the White House Council on Environmental Quality Climate,[6] and the Living Infrastructure Field Kit from Accelerate Resilience Los Angeles.[7] Stakeholders also expressed interest in how to actively participate in risk mitigation planning activities including how best to address meaningful risks facing their communities and ensuring DVCs receive the benefits flowing to their communities. This included asking the utilities to consider impacts to DVC small businesses and coordination with Assembly Bill (AB) 617[8] communities[9] as part of their risk mitigation planning activities.

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[5] Public Health Alliance of California, *California Healthy Places Index*, *available at:* https://www.healthyplacesindex.org/.

[6] Public access to the CEJST tool was removed on January 22, 2025, but previous versions of the tool remain available. *See* CEJST, *Explore the map*, *available at:* https://edgi-govdata-archiving.github.io/j40-cejst-2/en/#3/33.47/-97.5.

[7] Accelerate Resilience L. A. (ARLA), *Living Infrastructure Field Kit, available at:* https://livinginfrastructure.org/.

[8] AB 617 (Garcia, 2017), *available at:* https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB617. AB 617 provides funding to support early actions to address localized air pollution through targeted incentive funding to deploy cleaner technologies in these communities in addition to other requirements.

[9] CARB, *Community Air Protection Program Communities – Community Hub 2.0*, *available at:* https://ww2.arb.ca.gov/capp/cst/ch2/community-air-protection-program-communities.

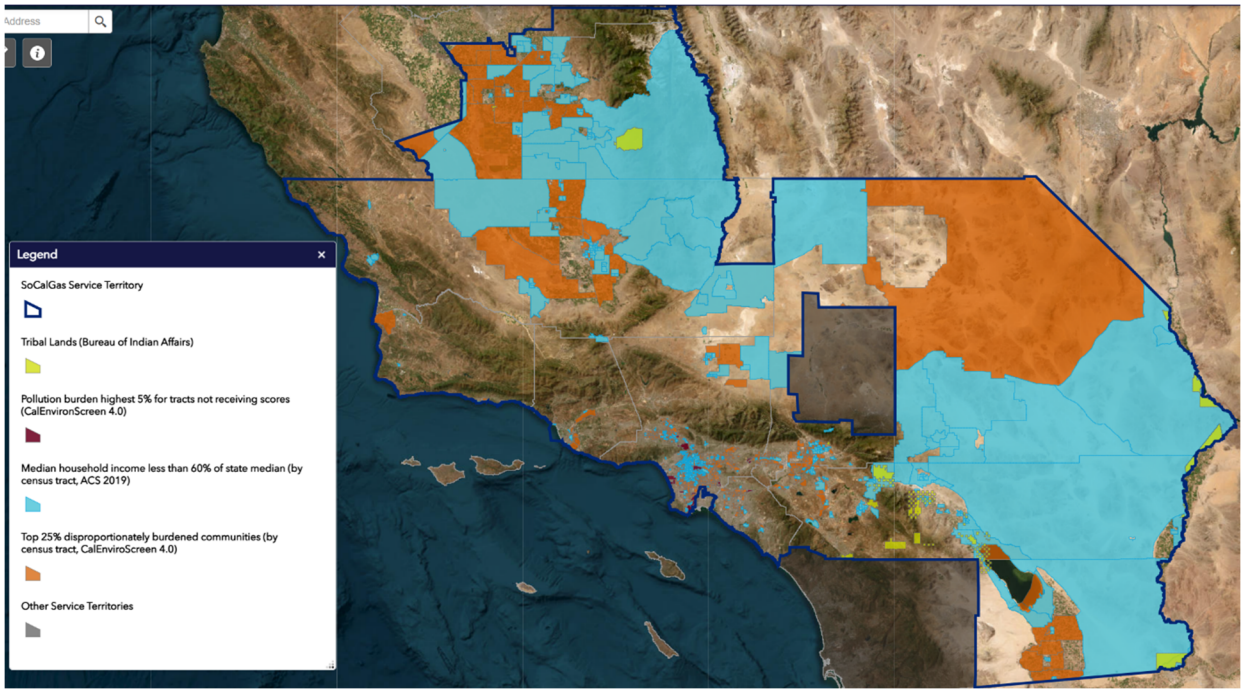
Disadvantaged and Vulnerable Communities

SoCalGas followed the DVC definition provided in D.22-12-027 which adopts the definition from D.22-08-046:

- the 25 percent highest scoring census tracts according to the most current version of CalEnviroScreen;
- all California tribal lands;
- census tracts that score in the highest five percent of Pollution Burden within CalEnviroScreen, but do not receive an overall CalEnviroScreen score due to unreliable public health and socioeconomic data; and,
- census tracts with median household incomes less than 60 percent of state median income.[10]

Figure 1 illustrates DVCs within SoCalGas's service territory, following the aforementioned DVC definition and data sources.

Figure 1: DVCs in SoCalGas Territory



[10] D. 22-12-027 at 48.

Approach and Methodology

For Action Items 1, 4, and 6 of this Pilot Study, SoCalGas evaluated two enterprise risks and their associated mitigation impacts to DVCs:

1. **Medium Pressure Gas System Risk:** Medium pressure gas system risk is defined as the risk of failure of a medium pressure pipeline (including appurtenances to and at the meter) which results in serious injuries, fatalities, and/or damages to the infrastructure.[11]
    a. The analysis for this Pilot Study focused primarily on pipeline replacement of medium pressure mains, however, the medium pressure gas system risk is addressed by a number of additional programs which mitigate risk that were not included in this analysis. Those include, but are not limited to, cathodic protection activities, leak survey, leak repair, pipeline monitoring, regulator station replacement and enhancement activities, several maintenance and inspection programs, as well as multiple infrastructure protection programs. Additional details on these activities and programs can be found in the Medium Pressure Gas System RAMP Chapter SCG-Risk-3.
2. **Excavation Damage Risk:** Excavation damage risk is defined as risk to both high and medium pressure infrastructure associated with third-party digging activities that may damage SoCalGas's natural gas system and possibly lead to asset failure resulting in catastrophic consequences.
    a. The analysis for this Pilot Study primarily focused on Locate and Mark, the process of identifying and displaying underground pipelines at street level (*e.g.*, spray paint or flags). Mitigations that were not analyzed as part of this Pilot Study include public awareness campaigns such as media advertising of 811 DigAlert[12] announcements, damage prevention strategies, and damage prevention mapping. Additional details on these

[11] *See* Chapter SCG-Risk-3: Risk Quantification Framework.

[12] DigAlert, *About DigAlert, available at:* https://www.digalert.org/about.

activities and programs can be found in the Excavation Damage RAMP Chapter SCG-Risk-4.

For Action Item 2 of the Pilot Study, SoCalGas evaluated its efforts and mitigations to improve safety and reliability through decarbonized energy solutions. SoCalGas selected the Honor Rancho Compressor Modernization project (HRCM) for evaluation for this action item. For Action Item 3, SoCalGas evaluated air quality enhancements through SoCalGas's alternative fuel fleet vehicles (AFVs) program as part of SoCalGas's efforts to achieve its goal to have a zero emissions fleet by 2035. For Action Item 7, SoCalGas evaluated opportunities to leverage community collaborations to bring further awareness to climate resilience and adaptation in DVCs through broader community engagement.

Data Methodology - Medium Pressure Gas System Risk

SoCalGas's risk analysis in this Pilot Study of the medium pressure gas system used inputs from the 2023 Quantitative Risk Assessment (QRA) which is a data-driven risk model that analyzes threats and factors, including pipe-specific data such as age and material, or community-level factors such as population density and consists of data as of year-end 2022, to determine the probabilities of failures for each pipe segment. All results were calculated based on average risk at the census-tract level utilizing the CalEnviroScreen census tract data merged with geospatial medium pressure pipeline segment location data across SoCalGas's service territory. The segment location data was extracted from Geographic Information System (GIS) software, and pipe segment risk value data was extracted from Copperleaf, an enterprise-wide risk-informed investment decision support system.[13] Using inputs from the QRA, Copperleaf calculated monetized values of risk associated with each pipe segment, which was used to plan 2024 mitigation activities. Geospatial analysis was used to examine safety, reliability, and climate risk at the pipeline segment level across DVCs and non-DVCs within the SoCalGas service territory. The impact of SoCalGas's 2024 mitigation investments was integrated with current risk data to evaluate differences in risk reductions and climate resilience enhancements between DVC and non-DVC communities.

[13] *See* Chapter SCG/SDG&E RAMP-2: Enterprise Risk Management Framework at Section IV.

Data Methodology – Excavation Damage Risk

To evaluate baseline Excavation Damage risk in DVCs and non-DVCs, SoCalGas mapped the geospatial location of excavation damage dig-ins dating back to 2019. The dig-in locations were then mapped between DVC and non-DVC areas as defined by CalEnviroScreen 4.0.[14]

Executive Summary

Action Item 1: On average, this evaluation indicated that pipelines in DVCs face a 54% higher baseline safety risk per foot and a 74% higher baseline reliability risk per foot than those in non-DVCs across the entire SoCalGas service territory.

Action Item 2: The Honor Rancho Compressor Modernization (HRCM) project includes replacing 25% of its horsepower (hp) with zero-emissions electric engines. This upgrade is expected to reduce expected peak daily emissions of nitrogen oxides (NOx) during normal operation (i.e., not including startup emissions) by up to 95%, and also lowering levels of carbon monoxide (CO), volatile organic compounds (VOC), respirable particulate matter (PM10[15]), and sulfur oxides (SOx). These reductions do not reflect the preferential use of electric engines.

Action Item 3: SoCalGas's AFV fleet conversion program has achieved significant air emissions reductions, with approximately 15,000 metric tons of CO2 reduction per year. Moreover, approximately 96% of the AFV fleet serve a DVC, AB 617 Community Air Protection Program (CAPP) community, or Consistently Nominated Communities (CNC) community. These AFV vehicles are stationed at 92% of SoCalGas's facilities with 76% of those facilities located in a DVC, CAPP community, or CNC community.

Action Item 4: Wildfire, storm surge, and flood risk are 9-12% higher in non-DVCs, as DVCs are primarily in non-coastal, dense urban areas. Mitigation efforts occur in both DVCs and non-DVCs, and these efforts improve regional climate resilience in both types of communities.

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[14] State of California – Office of Environmental Health Hazard Assessment (OEHHA), *CalEnviroScreen 4.0*, *available at:* https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40.

[15] Fine particulate matter (PM2.5) is a subset of respirable particulate matter (PM10). PM2.5 is assumed to be equal to PM10 emissions for combustion of natural gas.

Action Item 6: Pipeline replacements reduced average safety risk per foot by 40% in both DVCs and non-DVCs where mitigation occurred. Pipeline replacements successfully reduced average reliability risk per foot by approximately 50% in DVCs where mitigations occurred and by approximately 44% in non-DVCs where pipeline replacement mitigation occurred.

Action Item 7: SoCalGas leveraged previously established Regional Advisory Boards from its Climate Adaptation Vulnerability Assessment (CAVA) program. Organized into four regions, SoCalGas was able to tap into knowledgeable and engaged representatives of DVC communities that had been providing input on climate risks over the past year. These groups were also introduced to the RAMP process along with the ESJ Pilot Study Plan and were asked for input on risks to medium pressure pipelines and third-party excavation damages. This Pilot Study effort was able to expand the conversation on broader risks facing DVCs in order to help prioritize investments to mitigate these impacts.

Action Item No. 1

Consider equity in the evaluation of consequences and risk mitigation within the Risk-Based Decision-Making Framework (RDF), using the most current version of CalEnviroScreen to better understand how risks may disproportionately impact some communities more than others.

Medium Pressure Gas System Risk

For purposes of this Pilot Study, the medium pressure gas system safety risk is derived from the likelihood and expected safety consequences of a serious incident based on RAMP safety risk parameters. Similarly, the medium pressure gas system reliability risk is derived from the likelihood and expected reliability consequences of a serious incident or hazardous leak based on RAMP safety risk parameters. These inputs and results are based on calculations by SoCalGas's Quantitative Risk Assessment (QRA).

Figure 2 shows the mean safety risk per foot across the medium pressure gas system. The blue gradient symbology on the map reflects relative safety risk with higher risk shown with the darker blue shading. Areas with no coloring indicate no medium pressure pipes in this region. Generally, safety risk is concentrated in dense urban areas such as downtown Los Angeles, or pockets in smaller areas such as East Los Angeles and Burbank.

Figure 2: Mean Safety Risk per Foot Across the Medium Pressure Gas System

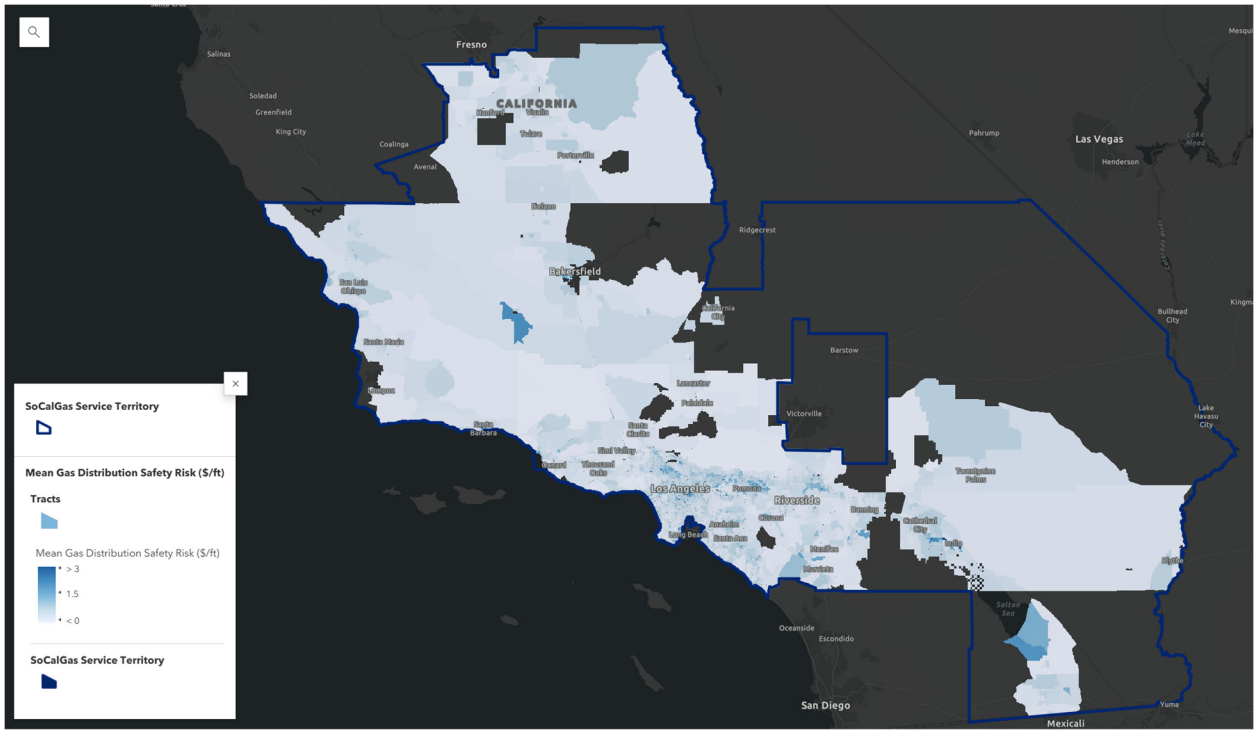


Figure 3a and 3b shows DVCs (blue cross-hatching) overlayed with census tract-level average baseline safety risk per foot (blue shading). On average across the SoCalGas service territory, safety risk per foot is 54% higher in DVCs compared to non-DVCs. Several factors account for this difference, including pipe factors, such as pipe age and material, along with community-level factors such as higher population density in urban areas where DVCs are often located.

Figure 3a: Mean Medium Pressure Gas System Safety Risk in DVCs and non-DVCs across SoCalGas Service Territory

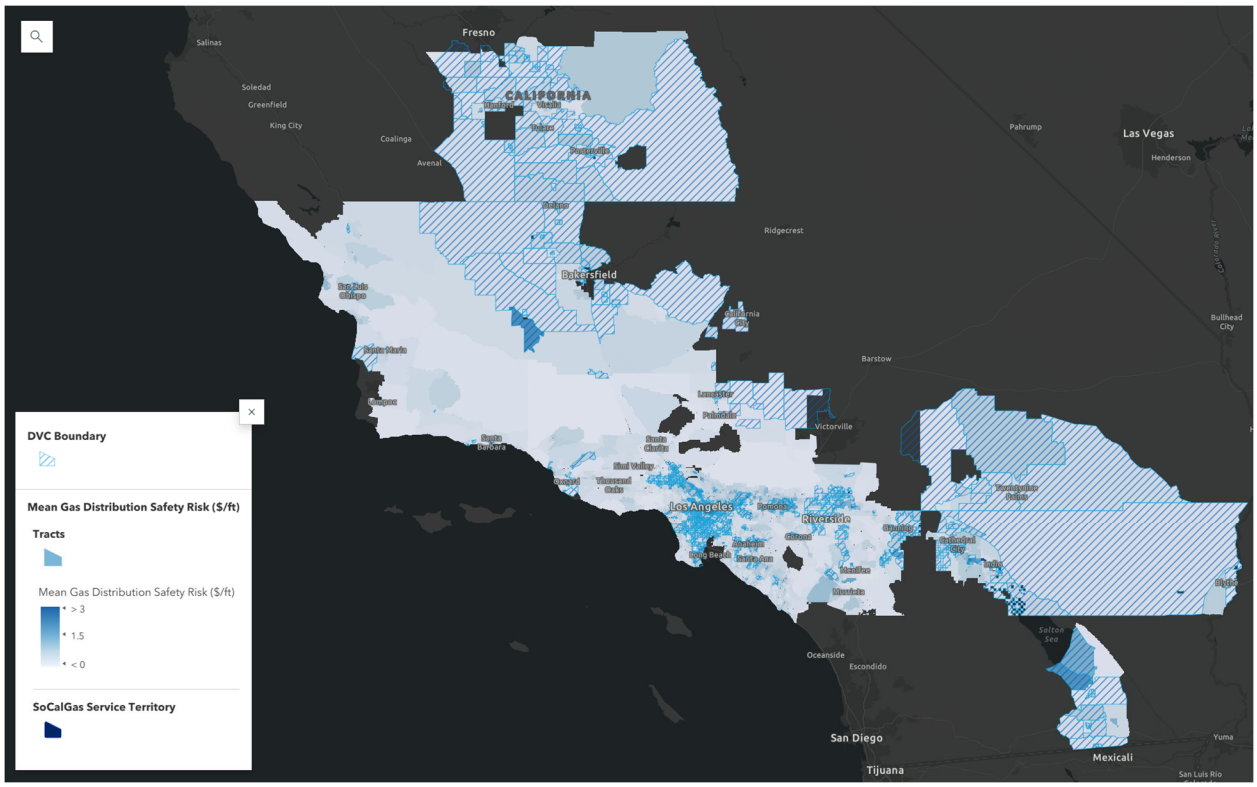


Figure 3b: Mean Medium Pressure Gas System Safety Risk in DVCs and non-DVCs in Los Angeles Basin Area

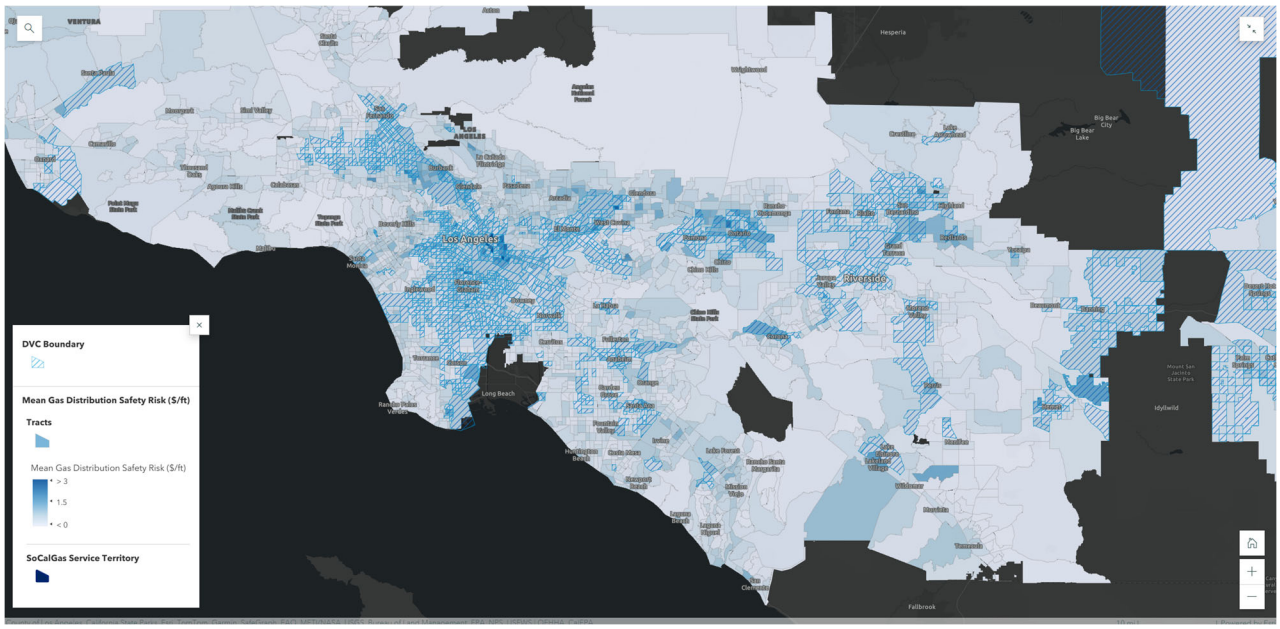


Figure 4 shows the mean medium pressure gas system reliability risk per foot across medium pressure pipes in SoCalGas's service territory. As reflected in the legend, the blue gradient on the map reflects relative reliability risk with higher risk shown with the darker blue shading. Areas with no coloring indicate no medium pressure pipelines in this region. As with safety risk, medium pressure pipe segments with higher reliability risk are generally concentrated in urban areas such as the Los Angeles Basin and surrounding communities, with other areas of elevated reliability risk in rural counties such as Tulare, Kern, Kings, and San Bernardino.

Figure 4: Mean Medium Pressure Gas System Reliability Risk in SoCalGas Service Territory

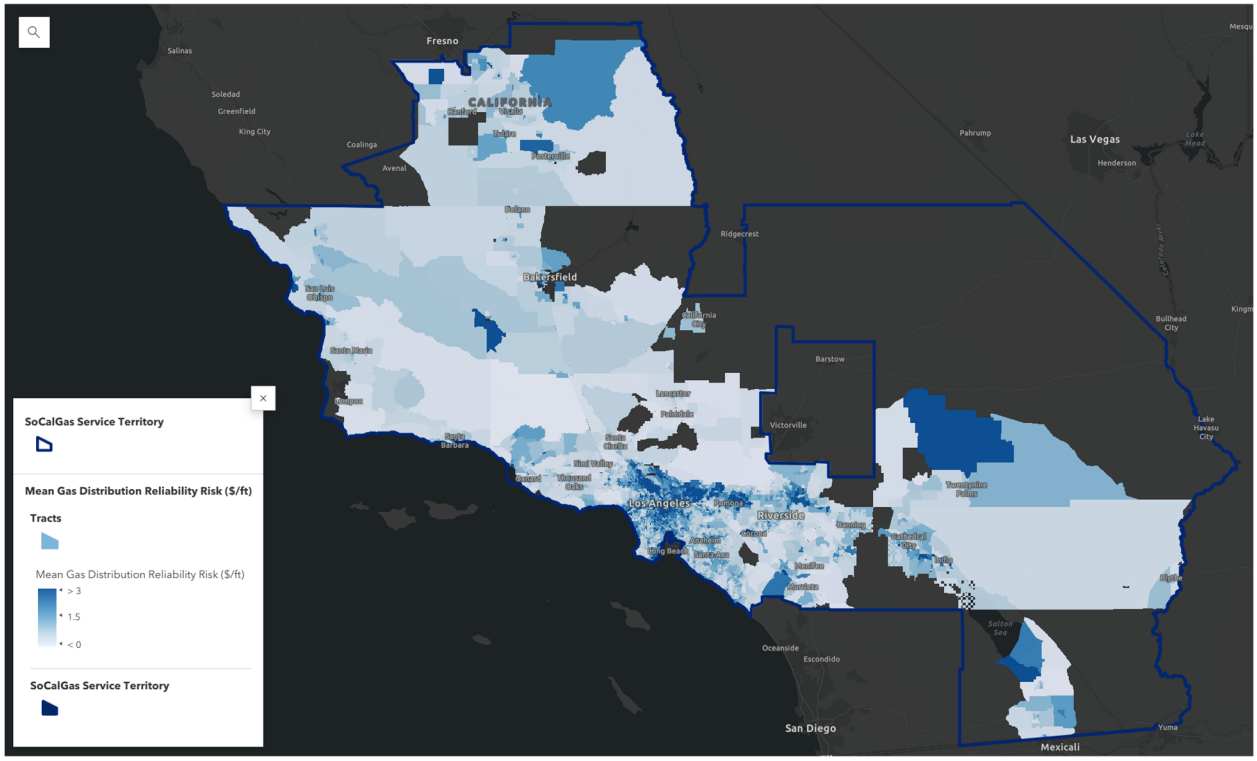


Figure 5a and 5b shows DVCs (blue cross-hatching) overlayed with census tract-level average baseline reliability risk per foot (blue shading). On average across the SoCalGas service territory, this analysis indicates that reliability risk per foot is 74% higher in DVCs compared to non-DVCs. Similar to safety risk, several factors account for this difference, including pipe factors, such as pipe age and material, along with community-level factors such as higher population density in urban areas where DVCs are often located.

Figure 5a: Mean Medium Pressure Gas System Reliability Risk in DVCs and non-DVCs across SoCalGas Service Territory

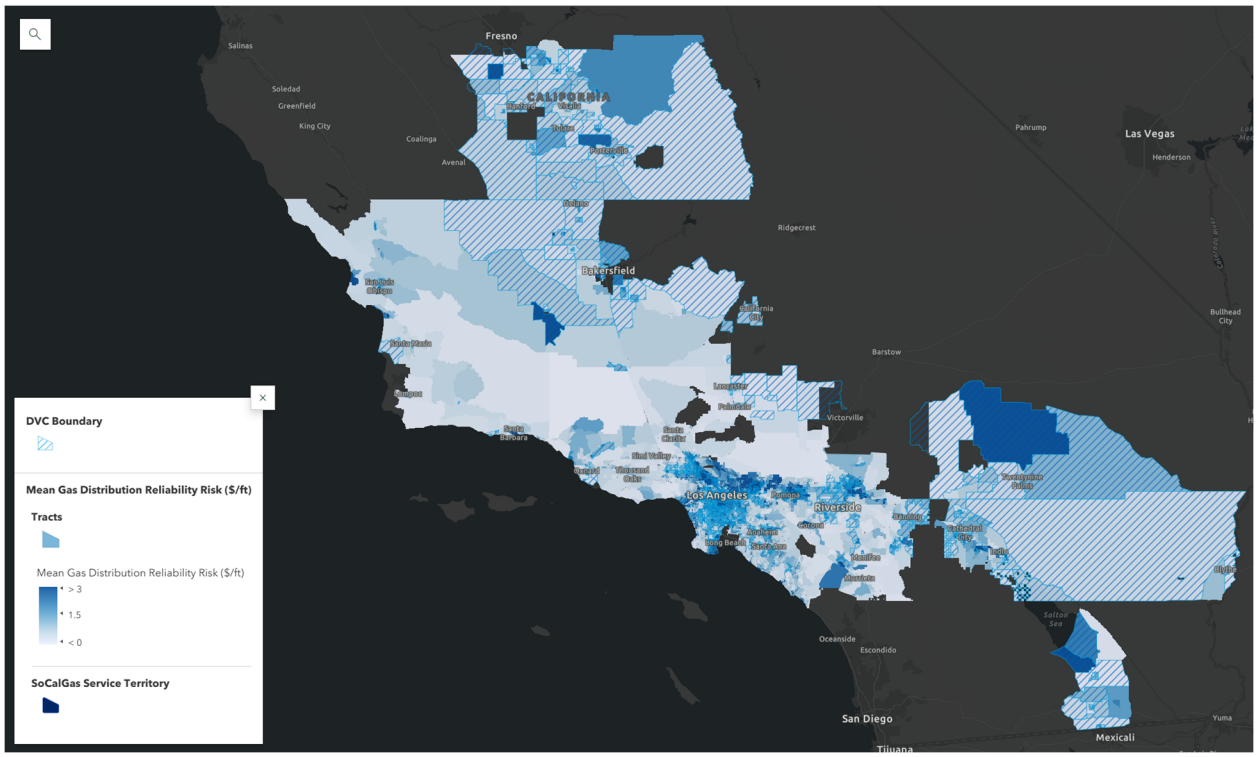
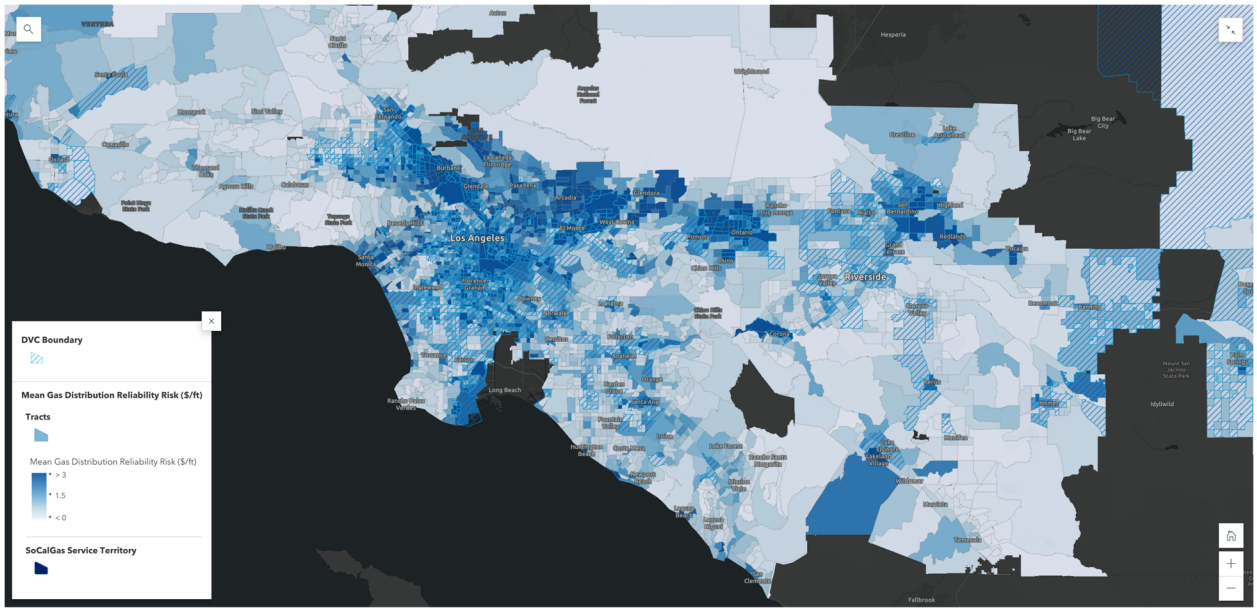


Figure 5b: Mean Medium Pressure Gas System Reliability Risk in DVCs and non-DVCs in Los Angeles Basin Area



Excavation Damage Risk

Figure 6a and 6b shows DVCs (purple shading) overlayed with clustered locations of excavation damages (red-yellow-green dots) on SoCalGas pipelines from 2019 – 2024. This analysis includes excavation damages on both medium pressure and high pressure pipelines across the SoCalGas service territory. Because excavation damages are primarily caused by outside factors such as third-parties accidentally hitting pipelines, locations of damages appear in a relatively unpredictable pattern.

Figure 6a: Map of Clustered Excavation Damages in DVCs and non-DVCs in the SoCalGas Service Territory

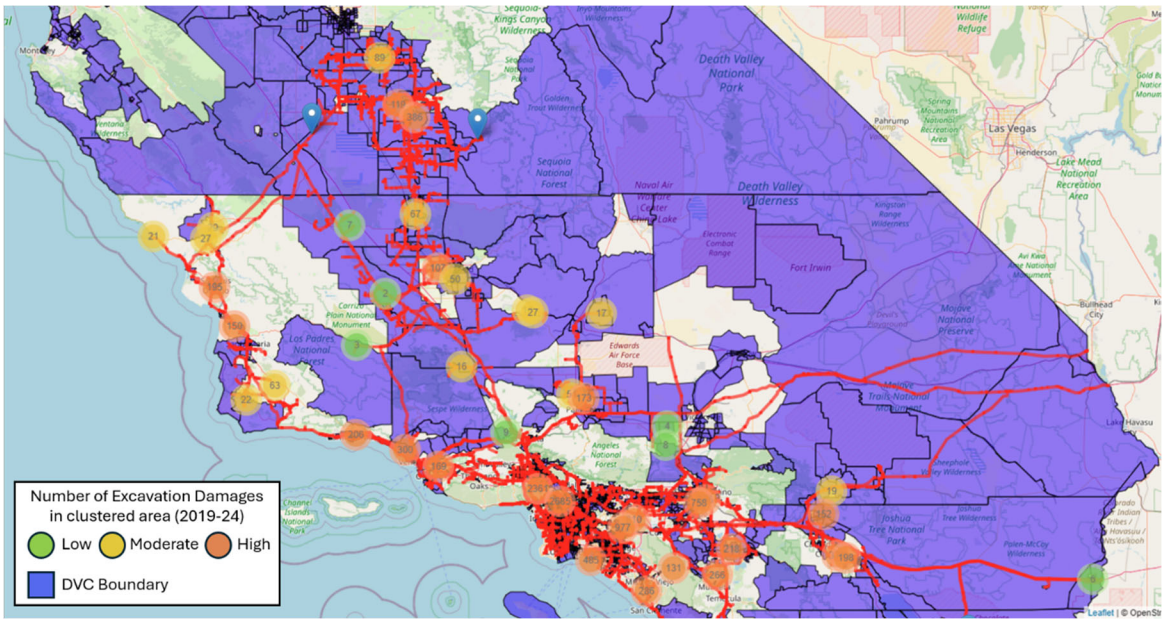


Figure 6b: Map of Clustered Excavation Damages in DVCs and non-DVCs in Los Angeles Basin Area

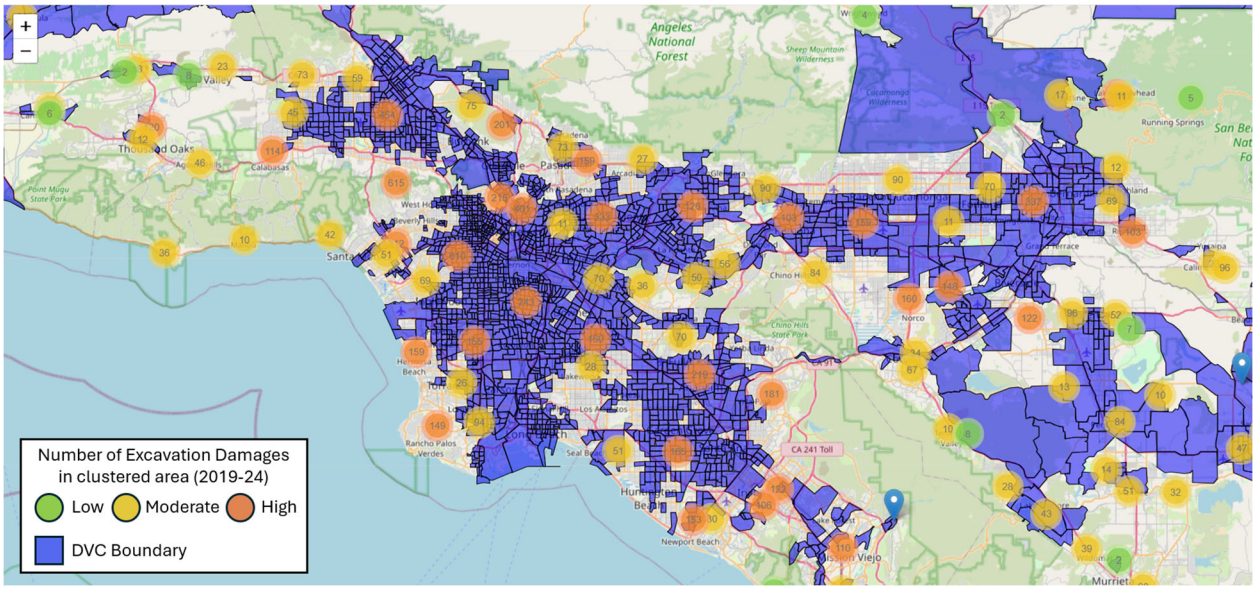
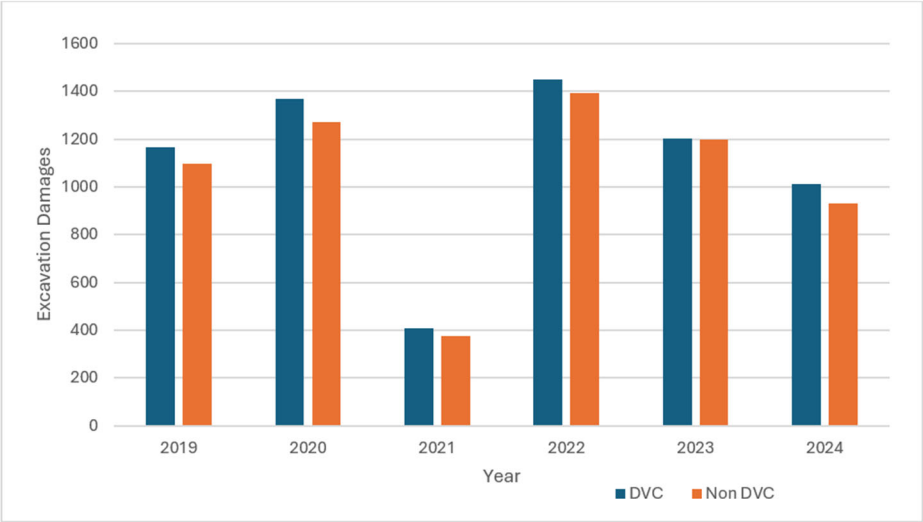


Figure 7 shows a year-by-year comparison of excavation damages across SoCalGas's service territory, categorized between DVC and non-DVC locations. This analysis indicates that the number of excavation damages in DVCs and the number of excavation damages in non-DVCs is relatively even each year. The total volume of excavation damages decreased by 70% in 2021, with the percentage of excavation damages in DVCs and non-DVCs comparable to other years. Based on the unpredictable trend of excavation damage locations mentioned above, SoCalGas did not find a direct relationship between excavation damage locations and DVC or non-DVC neighborhoods in its analysis.

Figure 7: Year-on-Year Comparison of Excavation Damages in DVCs and non-DVCs



Action Item No. 2

Consider investments in clean energy resources in the RDF, as possible means to improve safety and reliability and mitigate risks in DVCs.

Honor Rancho Compressor Modernization Project[16]

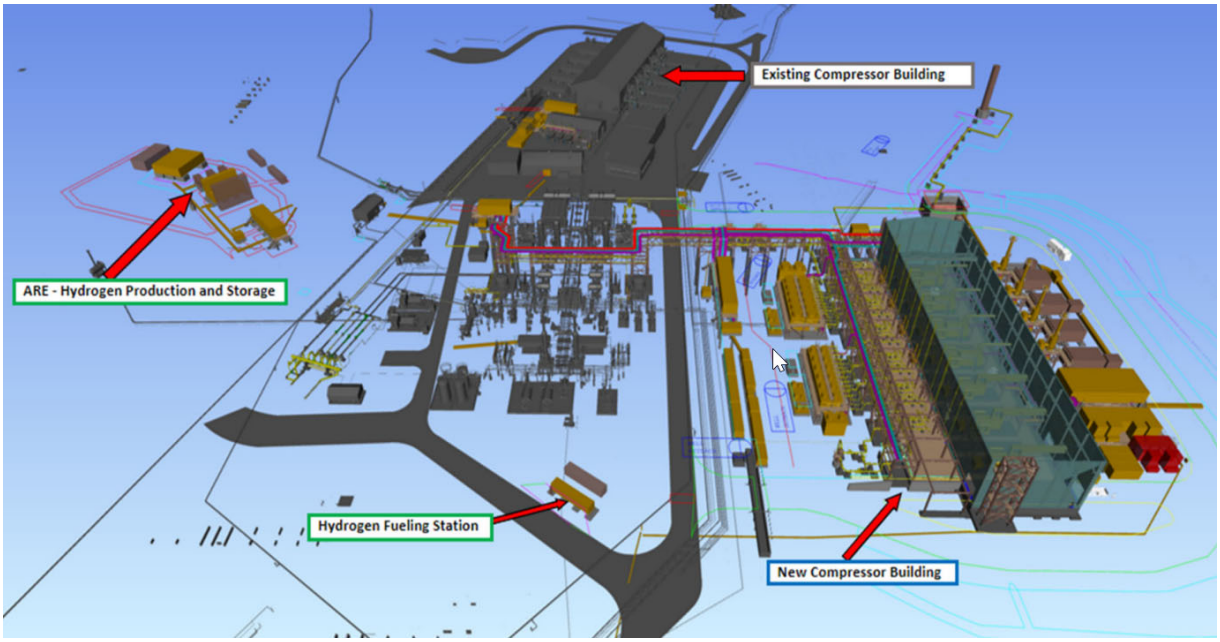
The Honor Rancho Storage Field (Honor Rancho) is located approximately 40 miles north of downtown Los Angeles in the city of Santa Clarita. Honor Rancho has been operating safely since 1975, with 35 active wells with a working capacity of 27 billion standard cubic feet (BCF) designed for a maximum withdrawal capability of 1.0 BCF per day. Approximately 25% of SoCalGas's total firm injection capacity is currently provided by Honor Rancho, making this facility a critical part of SoCalGas's natural gas system including its role in providing electric generation resiliency for the greater Los Angeles area.

Figure 8: Honor Rancho Storage Field

[16] The Honor Rancho Compressor Modernization Project (HRCM) was introduced in the 2019 GRC. In the 2024 GRC Decision (D. 24-12-074), the Commission recognized the importance of the project and the role of compressor stations in maintaining operational reliability and safety of the gas system.

To meet air quality compliance requirements of the South Coast Air Quality Management District (South Coast AQMD) and enhance reliability, the HRCM project will modernize the compressor station through the installation of a combination natural gas-fueled lean burn engines and zero-emission electric motor driven compressors. Specifically, five aging natural gas-fueled lean-burn engines driving five compressors will be replaced by a combination of four new natural gas-fired lean-burn engines equipped with selective catalytic reduction (SCR) and oxidation catalysts and two electric motors driving a total of six new compression units. Upon commissioning of the new compressor assets, SoCalGas will decommission the five existing engines and five compressors.

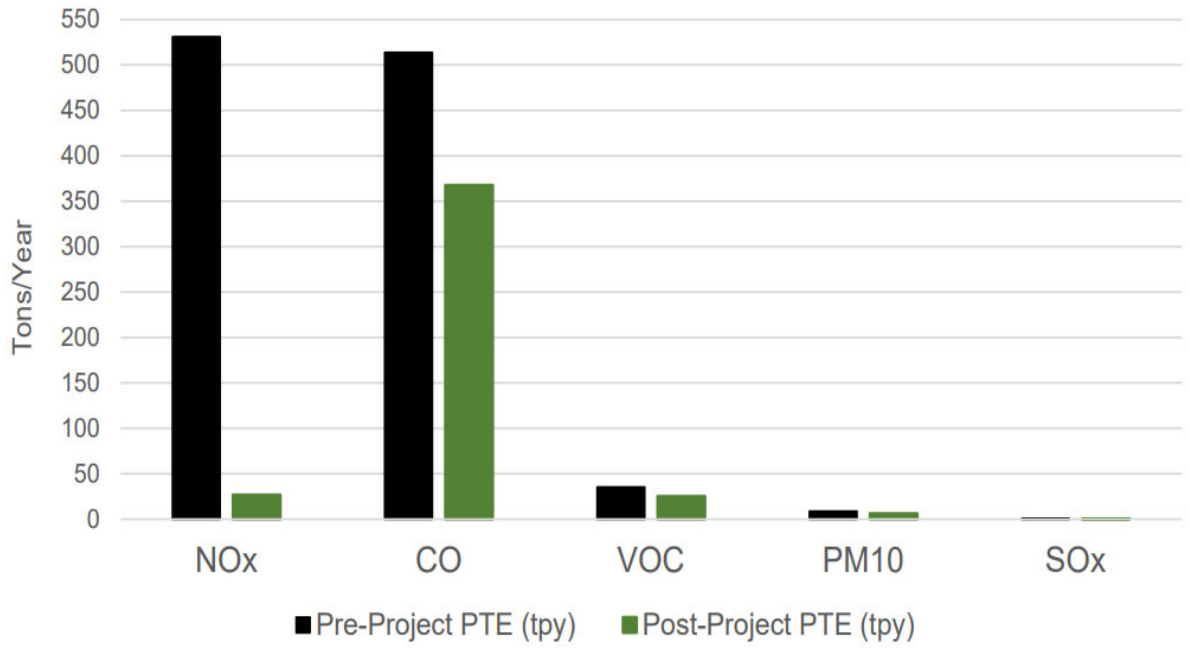
Figure 9: Honor Rancho Compressor Modernization Project Layout



The HRCM project estimates significant reductions in criteria air pollutants from the replacement of the compressor engines. The two new electric motors have zero combustion emissions, while the new lean-burn engines with SCR emissions control equipment are expected to achieve significant and measurable reductions in NOx emissions. Expected peak daily emissions of NOx during normal operations (i.e., not including startup emissions) are projected to decrease by approximately 95% from the existing actual levels, while CO, VOC, PM10, and SOx emissions are expected to decrease by approximately 30%. Projected emissions do not reflect further reductions in emissions from the preferential operation of the two new electric motors, with zero combustion emissions. The permitted NOx emissions (e.g. potential to emit

(PTE)) from the compressor engines at the facility is expected to decrease by up to 95% and the total horsepower (hp) of lean-burn engines is expected decrease from 27,500 hp to 20,000 hp, over 25%.[17]

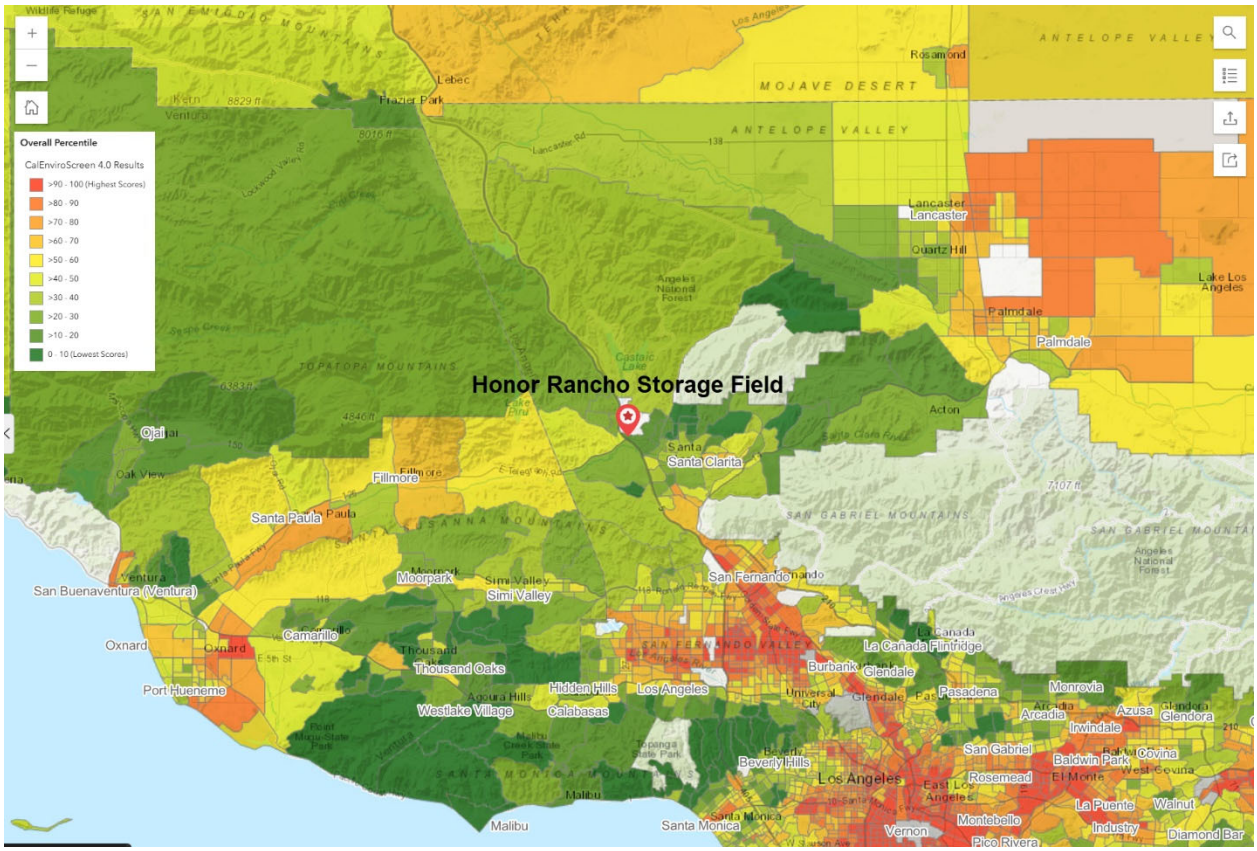
Figure 10: Pre and Post Project PTE for HRCM



The HRCM Project is expected to significantly improve regional air quality for surrounding communities and reduce emissions of criteria air pollutants including DVCs and non-DVCs by modernizing the facility with cleaner compressor engine technologies.

[17] 2024 GRC, Direct Testimony of SoCalGas Witnesses Larry T. Bittleston and Steve Hruby (Ex. SCG-10-R), Appendix E (Honor Rancho Compressor Modernization Supplemental Project Description) at Section II.

Figure 11: Honor Rancho Relative to DVCs



Action Item No. 3

Consider Mitigations that improve local air quality and public health in the RDF, including supporting data collection efforts associated with AB 617 regarding community air protection program.

Alternative Fuel Fleet Vehicles (AFVs) Program

SoCalGas's alternative fuel fleet vehicles (AFVs) program to convert existing natural gas-powered fleet vehicles to alternative fuels and the addition of more AFVs is described herein. Many of these vehicles are used in areas near SoCalGas facilities that are designated by the United States Environmental Protect Agency (EPA) as nonattainment areas for one or more National Ambient Air Quality Standards under the federal Clean Air Act.[18] SoCalGas adopted

[18] EPA, *Current Nonattainment Counties for All Criteria Pollutants*, *available at:* https://www3.epa.gov/airquality/greenbook/ancl.html.

the use of AFVs beginning in the 1980's with Compressed Natural Gas (CNG) vehicles and has continued to expand its AFV fleet with the adoption of additional alternative fuel vehicle technologies. AFVs facilitate SoCalGas's mission to deliver safe, reliable and affordable energy today and to be ready for the future by reducing vehicle emissions in the communities SoCalGas serves. SoCalGas's analysis evaluated AFV fleet data with an in-service date of 2004 to present day, focusing on their emissions data and location based on (1) AB 617 designated communities, (2) Consistently Nominated Communities as identified by the California Air Resources Board, and (3) DVCs identified by the Office of Environmental Health Hazard Assessment pursuant to Senate Bill 535[19].

SoCalGas AFVs include the following fuel types: renewable natural gas (RNG), non-plug-in hybrid, fuel cell electric, and battery electric. As of 2024, AFVs make up 43% of SoCalGas's total fleet with the majority being RNG vehicles.

Table 1: SoCalGas Alternative Fuel Fleet Vehicle Types

AFV Type	Total
RNG	1583
NON-PLUG-IN HYBRID	149
FUEL CELL ELECTRIC	50
BATTERY ELECTRIC	101
Grand Total	**1883**

SoCalGas's analysis shows that an estimated 96% of its AFV fleet operates within a DVC, AB 617, or Consistently Nominated Community. These vehicles are stationed at 92% of SoCalGas's facilities, with an estimated 76% of those facilities being in a DVC, AB 617 designated community, or Consistently Nominated Community.

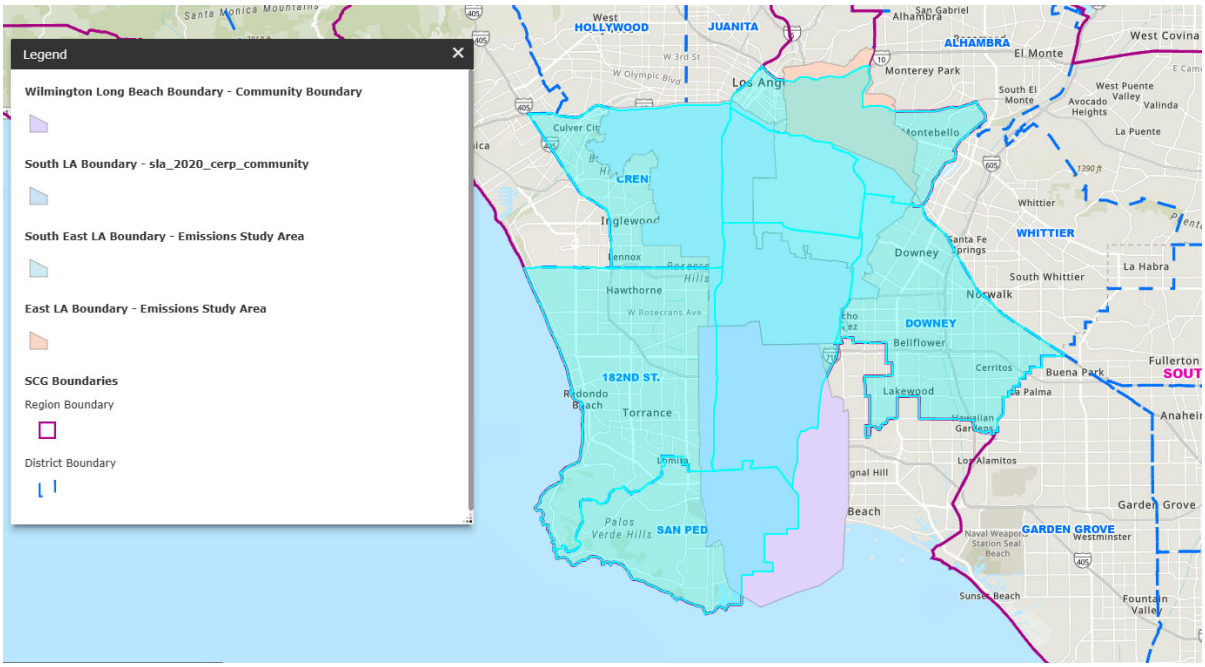
Table 2: AFV Fleet Data

Total AFV Count	Total SCG Fleet Count	% of AFV in SCG Fleet
1883	4415	43%
Total AFV that serves DVC, AB 617, or CNC	**Total AFV Count**	**% of AFV that serve DVC, AB 617 or CNC**
1806	1883	96%
Facilities that contain AFV	**Total SCG Facilities**	**% of Facilities that contain AFV**
65	71	92%
Facilities with AFV & serve DVC, AB 617, or CNC	**Total SCG Facilities**	**% of Facilities that contain AFV & serve DVC, AB 617, or CNC**
54	71	76%

[19] OEHHA, *Disadvantaged Community Map*, *available at:* https://oehha.ca.gov/calenviroscreen/sb535.

SoCalGas's AFVs on average drive 54 miles per day. To provide an illustrative perspective Figure 13 shows a sample of SoCalGas facilities and their respective district boundaries within the Los Angeles area with AFVs (teal blue outline) and the AB 617 designated communities (solid-colored polygons) they serve.

Figure 12: LA Basin of AB 617 Designated Communities and SCG Facilities Boundaries[20]



SoCalGas's RNG vehicles make up most of the AFV fleet and translate to an estimated 15,000 metric tons of CO2 reduction per year which is equivalent to an estimated 13,000 passenger vehicles per year.[21] Additionally, EPA and the California Renewable Transportation Alliance (CRTA) have both identified the air quality benefits of RNG vehicles in addition to the associated reduction of CO2 emissions.[22] CRTA highlights the benefits of RNG vehicles not only as vehicles using a fuel with the lowest carbon intensity score of California fuels, but also

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20 District boundaries refer to SoCalGas operating facilities and are divided by SoCalGas regions.

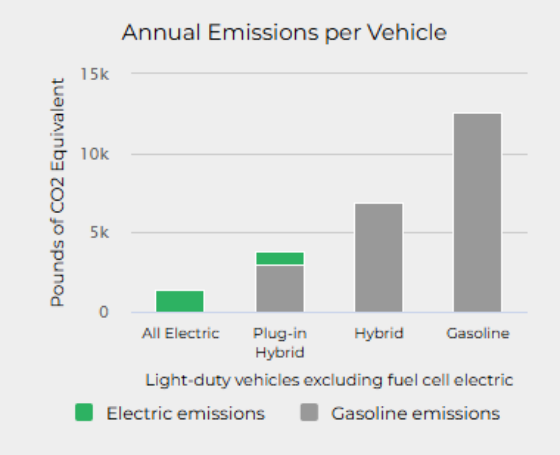
21 The calculation is based on every RNG service truck equates to 10 metric tons of reduced CO2 emissions. *See* SoCalGas, *SoCalGas to Convert 200 New Service Trucks to Run on RNG* (April 22, 2021), *available at:* https://www.socalgas.com/newsroom/stories/socalgas-to-convert-200-new-service-trucks-to-run-on-rng.

22 Refer local air quality improvement benefits of RNG discussed by the EPA, *see* EPA, *Renewable Natural Gas – Benefits, available at:* https://www.epa.gov/lmop/renewable-natural-gas#benefits; *see also* CTRA, *RNG = lower GHGs, cleaner air, healthier Californ*ia, *available at:* https://ca-rta.org/renewable-transportation-fuels/renewable-fuel/.

their multiple air quality and climate goal benefits, the ease of use and benefits in the commercial waste use industry, and the available extensive fueling infrastructure for RNG vehicles.[23]

Non-plug-in hybrid, fuel cell electric, and battery electric AFVs further advance SoCalGas's efforts in supporting decarbonized energy and improved air quality. The chart below, cited from the United States Department of Energy (DOE), shows the estimated emissions per vehicle for electric, plug-in hybrid, non-plug-in hybrid, and gasoline. This chart illustrates the air quality benefits of AFVs compared to gasoline, specifically for non-plug-in hybrid and electric vehicles utilized by SoCalGas in its fleet.

Table 3: DOE State Averages[24]



Fuel cell electric AFVs powered by hydrogen (FCEVs) are also part of SoCalGas's AFV fleet and have been shown to have positive effects on reduced CO2 emissions as zero emissions vehicles and further expands technologies available for AFVs. The DOE and the EPA also recognize the substantial air quality benefits of FCEVs as zero emission vehicles.[25]

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[23] CTRA, *RNG = lower GHGs, cleaner air, healthier California*, *available at:* https://ca-rta.org/renewable-transportation-fuels/renewable-fuel/.

[24] DOE, *Alternative Fuels Data Center - Emissions from Electric Vehicles, available at:* https://afdc.energy.gov/vehicles/electric-emissions.

[25] DOE, *Alternative Fuels Data Center – Fuel Cell Electric Vehicle Emissions*, *available at:* https://afdc.energy.gov/vehicles/emissions-hydrogen.

Action Item No. 4

Evaluate how the selection of proposed mitigations in the RDF may impact climate resiliency in DVCs.

Medium Pressure Gas System Risk

Medium pressure pipeline risk exposure to wildfire, storm surge, and flood events was evaluated at part of this Action Item. As part of this evaluation, this risk was integrated with the SoCalGas service territory and DVC boundaries to understand the intersection of risk across communities and identify communities where mitigation efforts may increase climate resilience. Through this Pilot Study, SoCalGas's analysis indicated that wildfire, storm surge, and flood risk are higher in non-DVCs, as most DVCs are primarily located in non-coastal, dense urban areas, whereas non-DVCs are located more prevalently in mountainous regions of Southern California, with a higher wildfire risk, and along the coastline, which is highly impacted by storm surges and flooding. Since mitigation efforts occur in both DVCs and non-DVCs, SoCalGas's analysis indicated that pipeline replacements improve regional climate resilience. Impacts to climate resilience in DVCs are discussed below.

Figure 13: Wildfire Risk Exposure Baseline to 2050

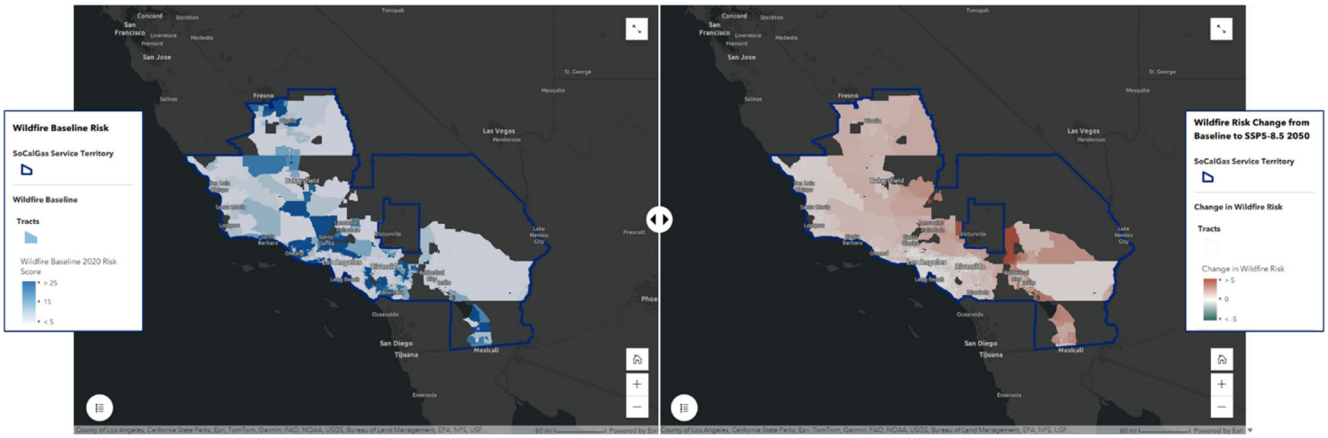

Figure 13 shows the baseline 2025 wildfire risk (left) and the future projected change in this risk in 2050 (right) under the IPCC's SSP5-8.5 high emissions scenario .[26] As reflected in the legends, areas with projected high baseline wildfire risk are shown with the blue gradient while

[26] Refer to IPCC's SSP5-8.5 climate scenarios, *see* ICCP, *IPCC Sixth Assessment Report - Chapter 8: Water Cycle Changes* (2021), *available at:* https://www.ipcc.ch/report/ar6/wg1/chapter/chapter-8/.

areas where risk is expected to increase are shown with red gradient. Currently wildfire risk exposure in the SoCalGas service territory is predominantly concentrated in mountainous regions around Los Angeles. Wildfire risk is expected to increase in these mountainous regions more than the urban regions of the area.[27] For example, in San Bernardino County, projections indicate a 10% increase in the number of days with extreme wildfire conditions by 2050. Projections of increased wildfire exposure poses direct threats to pipeline infrastructure, potentially leading to weakened or melted infrastructure above ground, and soil instability underground.[28] An increase in projected future wildfire events can result in increased risk of leaks and service interruptions due to pressure and flow disruptions.[29]

The analysis of this Pilot Study indicated that non-DVCs are more prevalent in the mountainous regions of Southern California, contributing to a higher wildfire risk exposure for non-DVCs than DVCs, which are largely located in urban areas where wildfire risk is lower. This analysis also concluded that overall, wildfire risk exposure in non-DVCs is 11% higher than DVCs in 2050 under a high emissions scenario. Furthermore, in the mountainous San Bernardino County, 2050 wildfire risk is 33% higher in non-DVCs compared to DVCs under a high emissions scenario.

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[27] World Weather Attribution, *Climate change increased the likelihood of wildfire disaster in highly exposed Los Angeles area* (January 28, 2025), *available at:* https://www.worldweatherattribution.org/wp-content/uploads/WWA-scientific-report-LA-wildfires.pdf.

[28] IOPscience, Increasing exposure of energy infrastructure to compound hazards: cascading wildfires and extreme rainfall (October 19, 2019), *available at:* https://iopscience.iop.org/article/10.1088/1748-9326/ab41a6; *see also,* Advancing Earth and Space Sciences (AGU), *Interdependencies Between Wildfire-Induced Alterations in Soil Properties, Near-Surface Processes, and Geohazards* (January 3, 2024), *available at:* https://agupubs.onlinelibrary.wiley.com/doi/pdfdirect/10.1029/2023EA003498.

[29] ScienceDirect, *How vulnerable are US natural gas pipelines to electric outages?* (March-April 2023), *available at:* https://www.sciencedirect.com/science/article/pii/S1040619023000180?via%3Dihub.

Figure 14: Mitigation activities may improve wildfire resilience in affected tracts

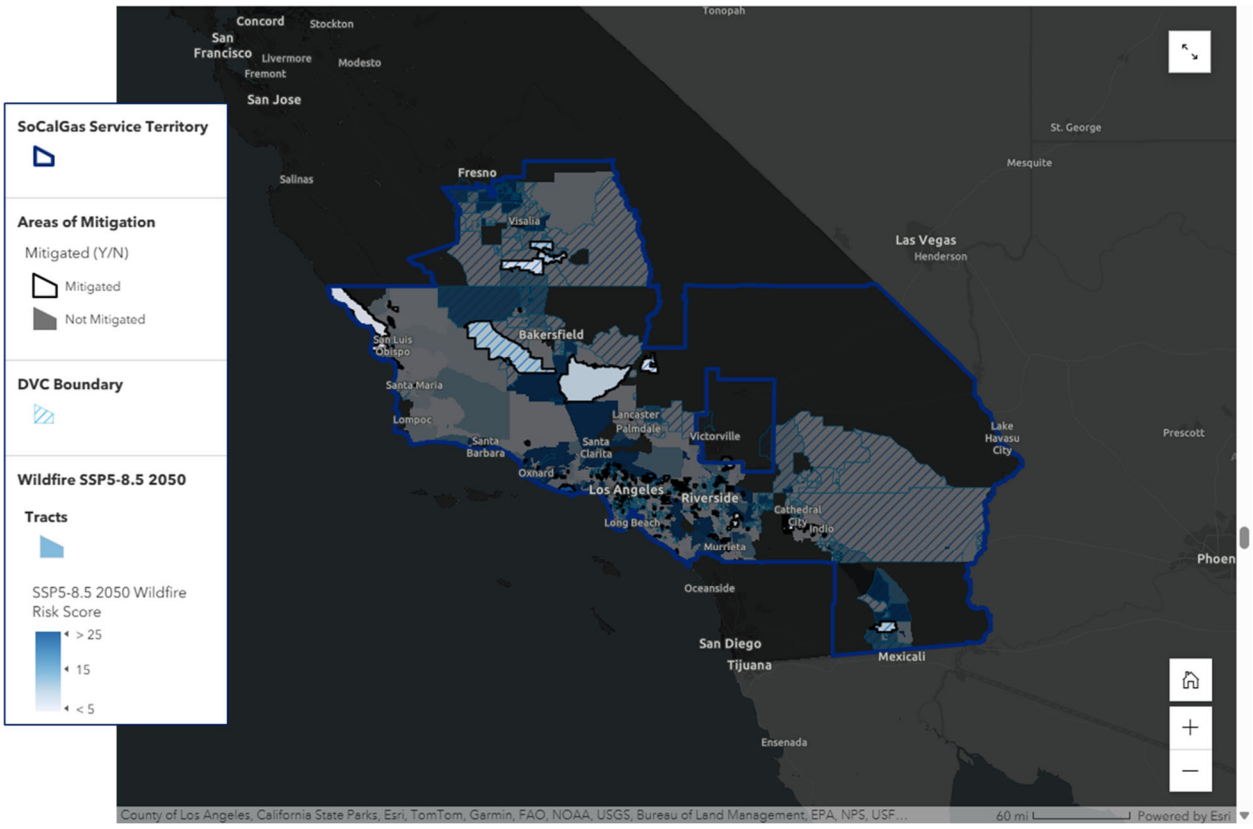


Figure 14 shows projected 2050 wildfire risk (blue shading) along with DVC boundaries (blue cross-hatching) and highlights tracts where mitigation efforts occurred (black outline). Both DVC and non-DVC tracts with projected higher wildfire risk exposure experienced pipe replacements, pipeline replacements may improve local infrastructure's resilience to post-wildfire soil instability.[30]

[30] AGU, *Interdependencies Between Wildfire-Induced Alterations in Soil Properties, Near-Surface Processes, and Geohazards* (January 3, 2024), *available at:* https://agupubs.onlinelibrary.wiley.com/doi/pdfdirect/10.1029/2023EA003498.

Figure 15: Storm Surge Risk Exposure Baseline to 2050

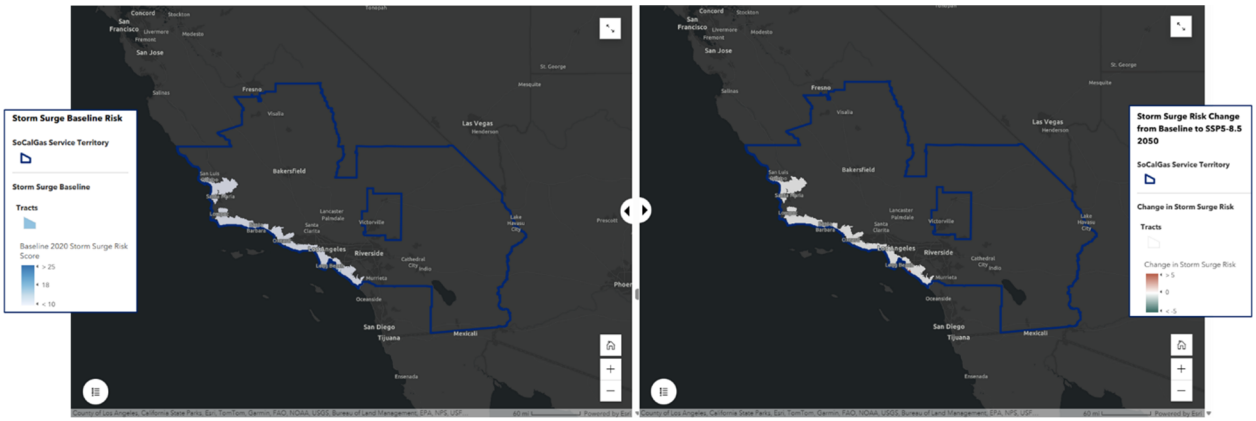


Figure 15 shows baseline 2025 storm surge risk (left) and the future projected change in 2050 (right) under the IPCC's SSP5-8.5 scenario. Areas with high baseline storm surge risk are shown with the blue gradient while areas where risk is expected to increase are shown with red gradient. Currently, projected storm surge risk is concentrated in coastal regions like Santa Barbara and Huntington Beach. Anticipated higher risk exposure in 2050 could be attributed to projected sea level rise and potential changes in the frequency and severity of tropical cyclones. For example, by 2050 the surge depths from a Category 1 or 2 Tropical Cyclone in Huntington Beach may increase by as much as six inches deeper under a high emissions scenario. As a result, increased flooding is also expected in this area. Storm surge events can lead to coastal incursion, exposing pipelines and making them more vulnerable to physical damage. Additionally, saturated ground can cause shifting or settling, potentially leading to cracks or gas leaks. Finally, exposure to salt water can contribute to corrosion, with older pipes being particularly susceptible to damage.[31] These impacts can result in malfunctions or short circuits in above ground infrastructure, causing service disruptions and safety concerns for local communities. Overall, storm surge risk exposure in non-DVCs is 12% higher than DVCs in 2050 under a high emissions scenario.

[31] NJP Clean Water, Analysis and ranking of corrosion causes for water pipelines: a critical review (September 15, 2023), *available at:* https://www.nature.com/articles/s41545-023-00275-5.

Figure 16: Mitigation activities do not target coastal communities with higher storm surge risk

Figure 16 shows 2050 storm surge risk (blue shading) along with DVC boundaries (blue cross-hatching) and highlights tracts where mitigation efforts occurred (black outline). Across SoCalGas's service territory, this analysis indicates that mitigation activities appear to have minimal overlap with high storm surge risk regions. Among other mitigation efforts not evaluated in this Pilot study such as pipeline coating, wrapping cathodic protection, burial depth and backfill material targeting coastal regions, pipeline replacements in conjunction with these mitigations potentially improve climate resilience which could improve corrosion resistance.

Figure 17: Flood Risk Exposure Baseline to 2050

Figure 17 shows baseline 2025 flood risk (left) and the future projected change in 2050 (right) under the IPCC's SSP5-8.5 scenario. Areas with high baseline flood risk are shown with a blue gradient, while areas where risk is expected to increase are shown with a red gradient. Flood risk is currently distributed throughout larger census tracts north of Los Angeles, in addition to concentrated pockets within inlet regions like Long Beach. This analysis indicates that across the service territory flood risk is expected to increase northwest of Los Angeles and decrease east of Los Angeles by 2050. Flooding can lead to soil erosion and displacement, which may undermine the structural integrity of pipelines, resulting in potential leaks or ruptures. After an event, standing water can exacerbate corrosion processes, particularly in older or inadequately protected pipeline segments. Flood risk exposure varies by neighborhood, however, overall flood risk exposure in non-DVCs is estimated to be 9% higher than DVCs in 2050 under a high emissions scenario.

Figure 18: Mitigation activities may improve flood resilience in affected tracts

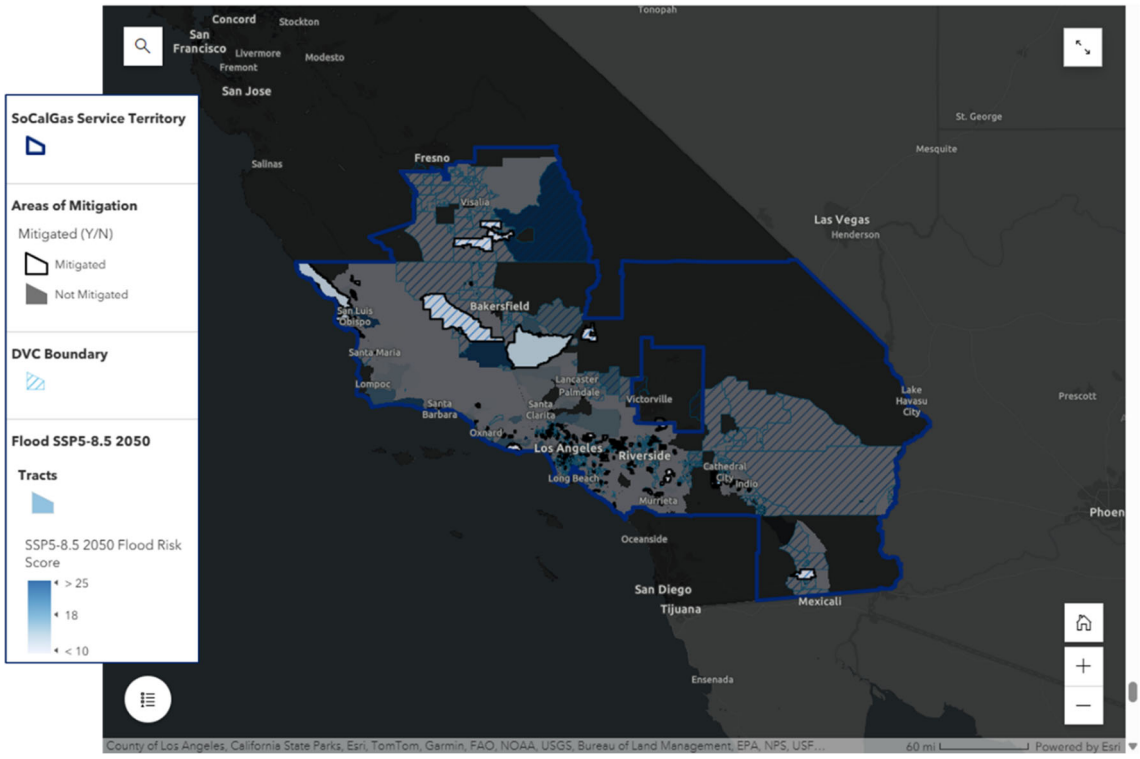


Figure 18 shows 2050 flood risk (blue shading) along with DVC boundaries (blue cross-hatching) and highlights tracts where mitigation efforts occurred (black outline). Both DVC and non-DVC tracts with relatively higher flood risk exposure are projected to experience pipe replacement, improving local infrastructure resilience to corrosion.

Excavation Damage Risk

Excavation Damage risk is primarily caused by third-parties failing to follow proper procedures such as calling 811 DigAlert prior to digging, or due to incorrect/unsafe excavation practices. As a result, there is no expected climate resilience impact from excavation damage mitigation activities. Perils such as wildfire, storm surge, and flooding would likewise not be expected to cause a significant impact on excavation damage risk to DVCs or non-DVCs in the future.

Examples of Other SoCalGas Mitigation Activities Not Evaluated for this Action Item

In addition to the mitigations evaluated in this Action Item, SoCalGas established the Climate Advisory group in 2020. As part of the Climate Advisory Group activities, SoCalGas regularly engages in partnerships with academic and research institutions to leverage innovative

technologies and expertise to further advance climate resilience initiatives.[32] Highlighted in Volume 1, Chapter RAMP-5, is the Climate Change Adaptation Table, Controls and Mitigations that Align with Increasing Resilience to Climate Hazards. This table highlights the list of mitigations SoCalGas is undertaking which address climate hazards.

Action Item No. 5

Evaluate if estimated impacts of wildfire smoke included in the RDF disproportionately impact DVCs.

This Action Item does not apply to SoCalGas.

Action Item No. 6

Estimate the extent to which risk mitigation investments included in the RDF impact and benefit DVCs independently and in relation to non-DVCs in the IOU service territory.

Medium Pressure Gas System Risk

Figure 20 highlights the census tracts where at least one or more medium pressure pipe main replacements occurred across the SoCalGas service territory in 2024. Overall, an estimated 7% of census tracts experienced at least one medium pressure pipe main replacement in 2024, with approximately 114 miles of pipe replaced. Pipeline main replacement mitigation efforts[33] were primarily concentrated in urban areas and surrounding communities such as Los Angeles and Ontario.

Of the estimated 114 total miles of pipe replaced, 34 miles were replaced in DVCs and 80 miles were replaced in non-DVCs. Based on the total mileage of pipe in DVCs and non-DVCs, 0.25% of DVC pipeline was replaced compared to 0.23% of non-DVC pipeline. This represents an 8.7% higher rate of replacement in DVCs than non-DVCs on a per mile basis. There is a nominal

[32] *See* Chapter SCG RAMP-5: Climate Change Adaptation at Section II.

[33] Other mitigations which impact the Medium Pressure Gas System risk were not evaluated as part of this study, as described in the Approach and Methodology section.

difference of <1% which indicates almost an equal rate of safety risk reduction in DVCs and non-DVCs based on 2024 medium pressure pipe replacements.

Figure 19: Census Tracts with Medium Pressure Pipe Main Replacements in 2024

Figure 20a and 20b show changes in average safety risk per foot across medium pressure pipes where 2024 pipe main replacement efforts occurred in the SoCalGas service territory. Blue shaded areas on the map reflect improvements to relative safety risk. Pipe replacements across the SoCalGas service territory are projected to have reduced average safety risk per foot by 40% in the pipes where pipeline replacement mitigation efforts occurred.

Figure 20a: Change in Safety Risk by Medium Pressure Pipe Main Replacements

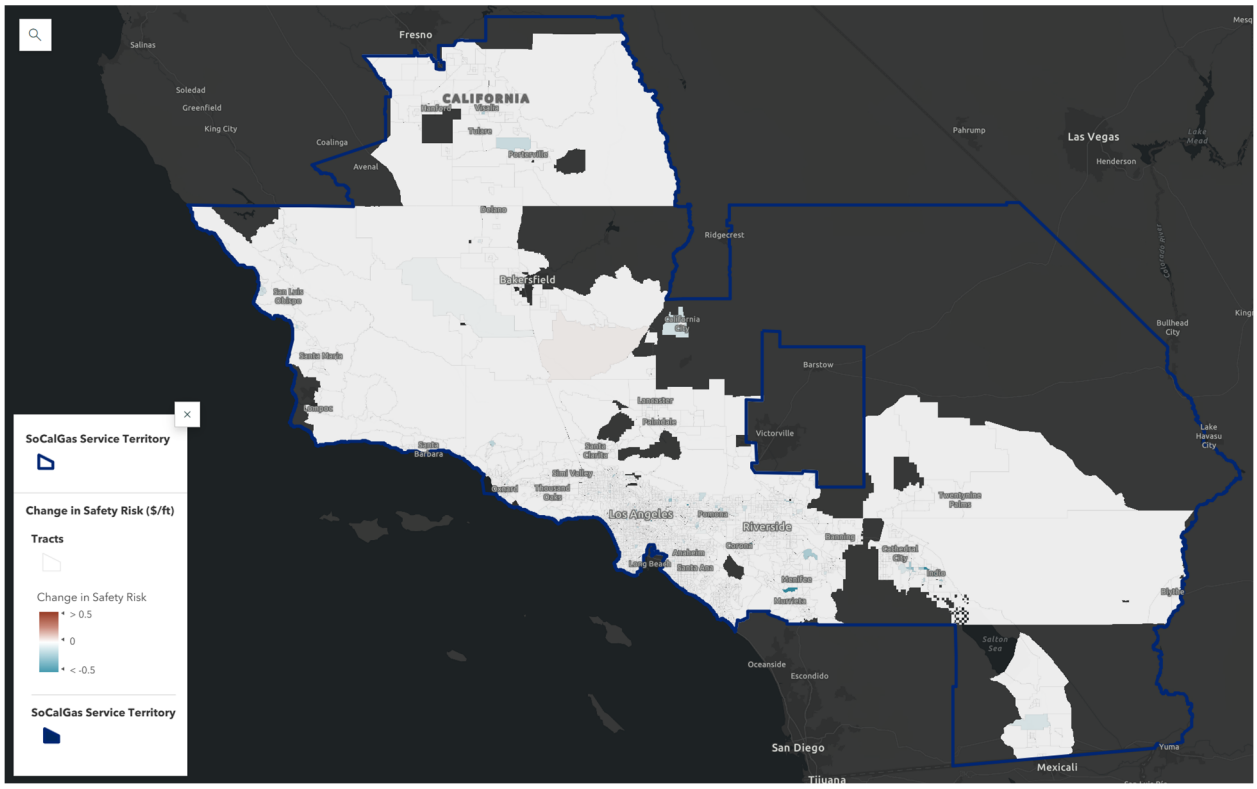


Figure 20b: Change in Safety Risk by Medium Pressure Pipe Main Replacements in Los Angeles Basin

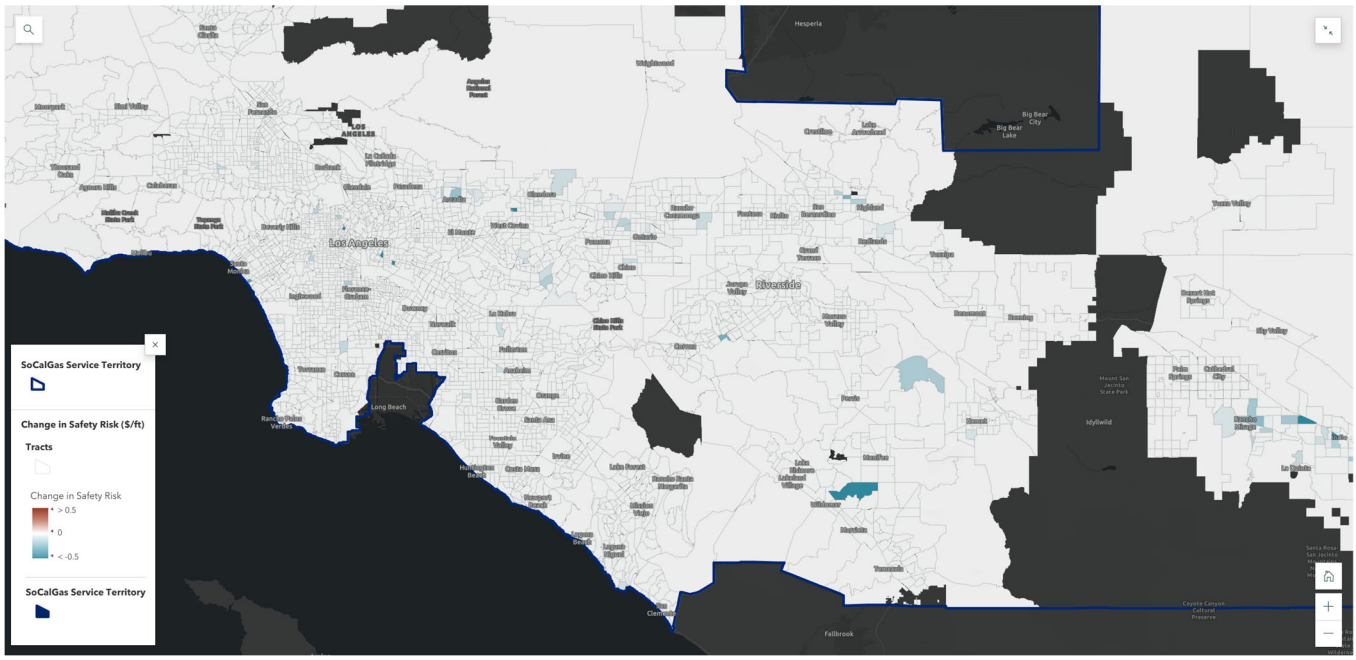


Figure 21a and 21b show where census tract-level average safety risk per foot has changed, overlayed with DVC boundaries (blue cross-hatching). Pipe replacements located in DVCs are projected to have reduced average safety risk per foot by an estimated 40.0% in the pipes where mitigation efforts occurred, while pipe replacements located in non-DVCs reduced average safety risk per foot by an estimated 40.3%. This difference of <1% indicates a near equal rate of safety risk reduction in DVCs and non-DVCs based on 2024 medium pressure pipe replacements.

Figure 21a: Change in Safety Risk by Medium Pressure Pipe Main Replacements with DVC Overlay

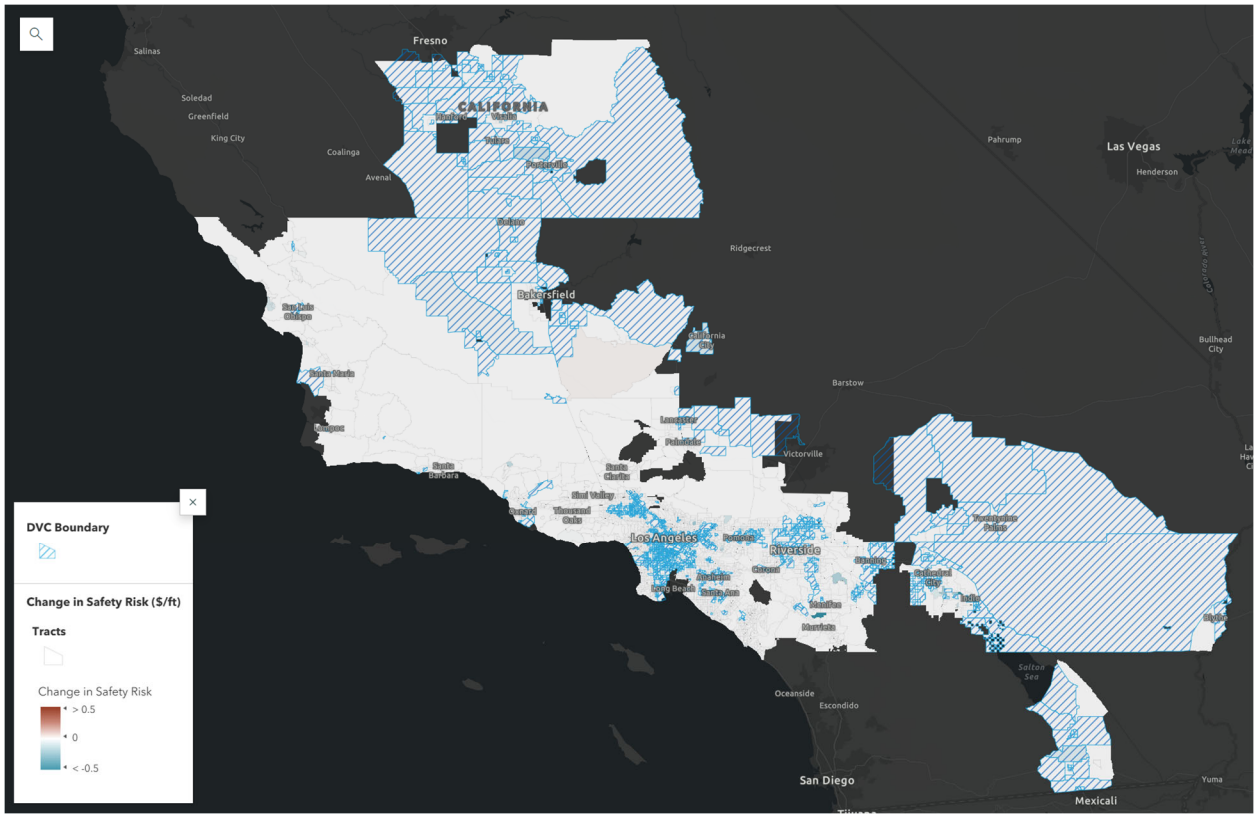


Figure 21b: Change in Safety Risk by Medium Pressure Pipe Main Replacements in LA Basin with DVC Overlay

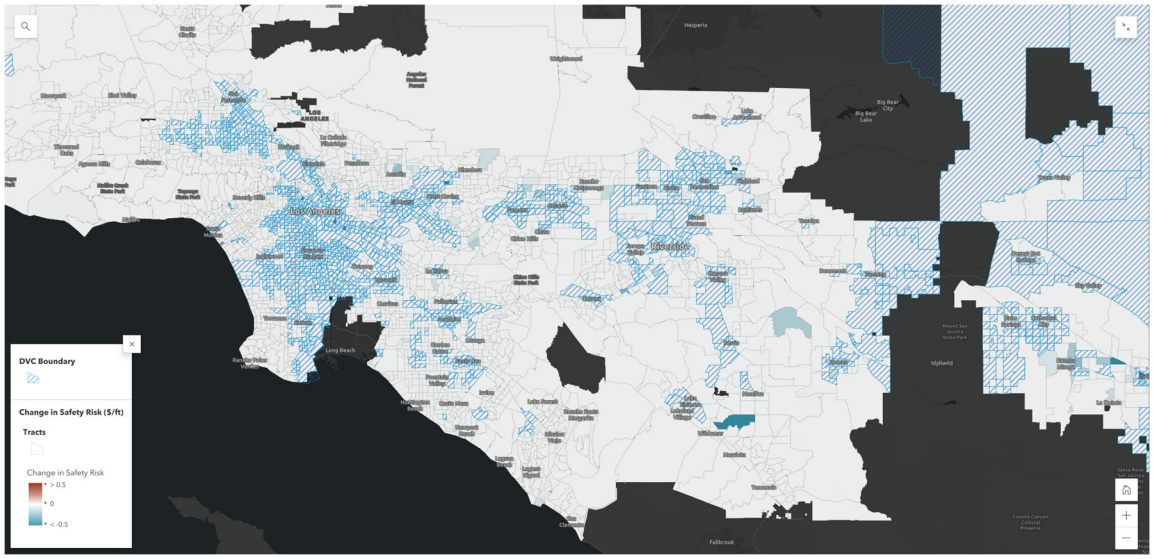


Figure 22 visualizes change in average reliability risk per foot across medium pressure pipes in SoCalGas's service territory. Blue shaded areas on the map reflect improvements to relative reliability risk. Pipe replacements across the SoCalGas service territory are projected to have reduced average reliability risk per foot by 47% in pipes where mitigation efforts occurred.

Figure 22: Change in Reliability Risk by Medium Pressure Pipe Main Replacements

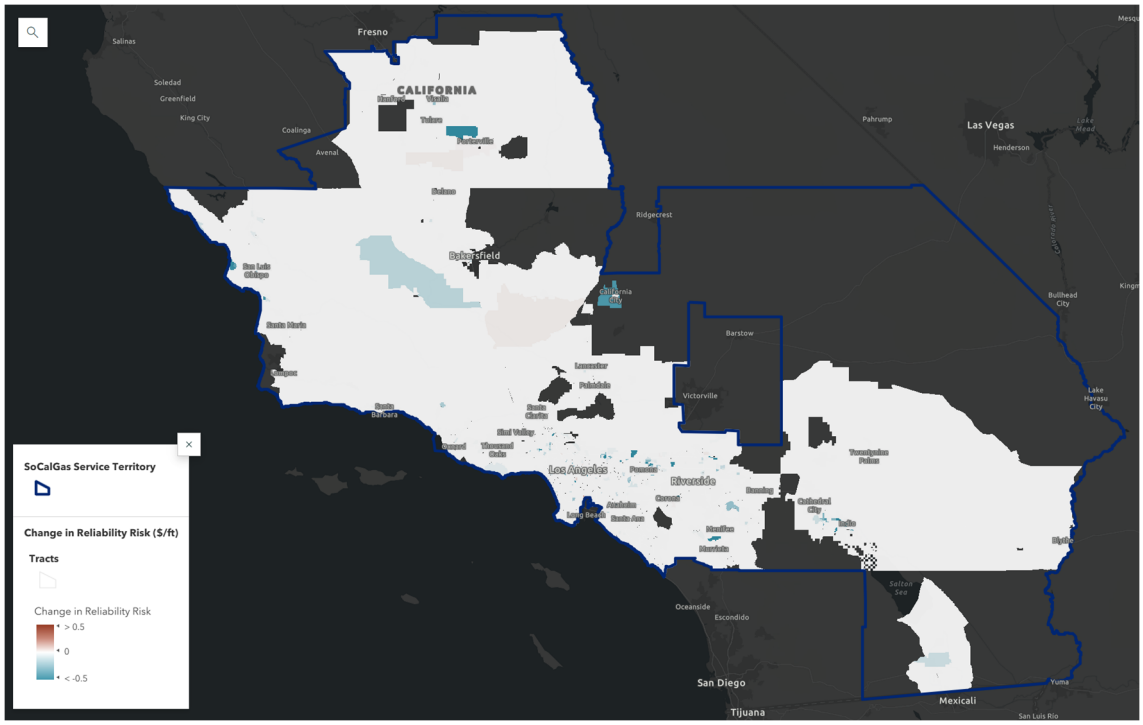


Figure 23a and 23b show where census tract-level average reliability risk per foot has changed, overlayed with DVC boundaries (blue cross-hatching). Pipe replacements located in DVCs reduced average reliability risk per foot by 50% in the pipes where mitigation efforts occurred, while pipe replacements located in non-DVCs reduced average reliability risk per foot by 44%. This indicates a reliability risk reduction in DVCs at a 1.13x rate compared to non-DVCs based on 2024 medium pressure pipe replacements.

Figure 23a: Change in Reliability Risk by Medium Pressure Pipe Main Replacements with DVC Overlay

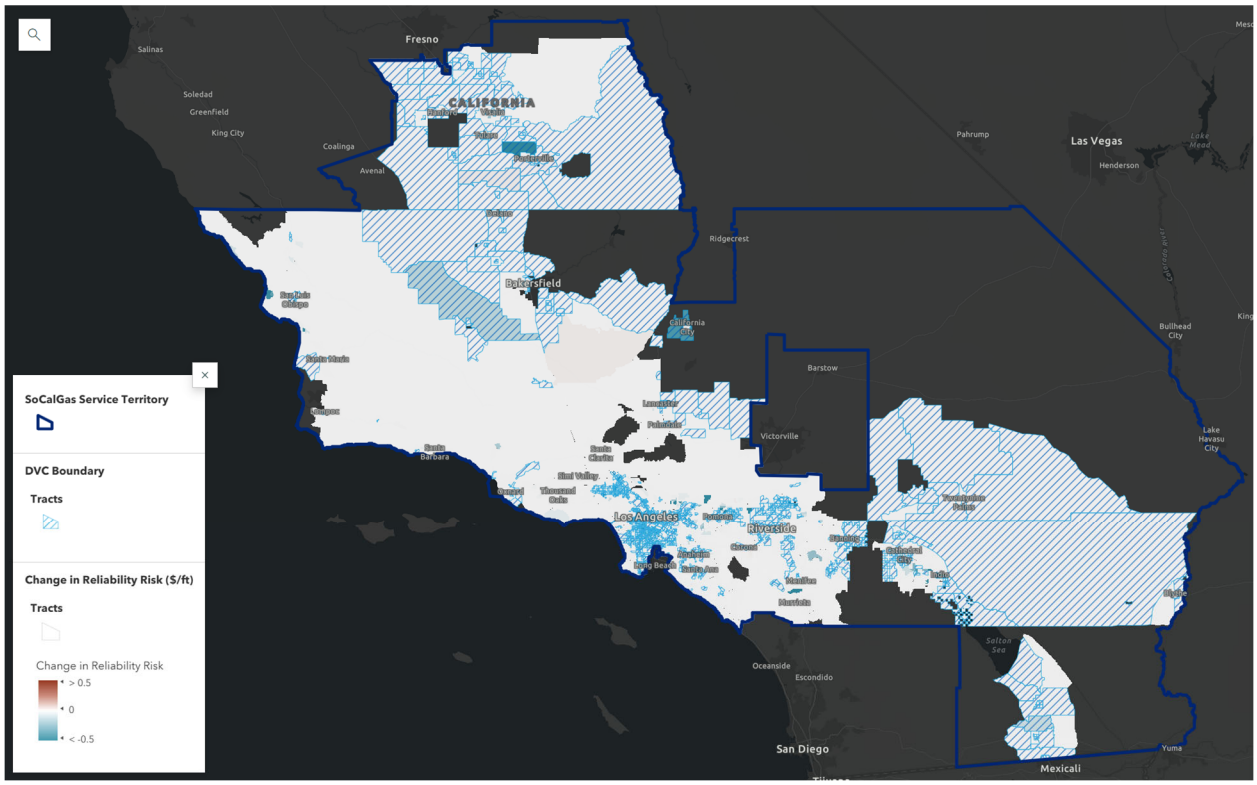
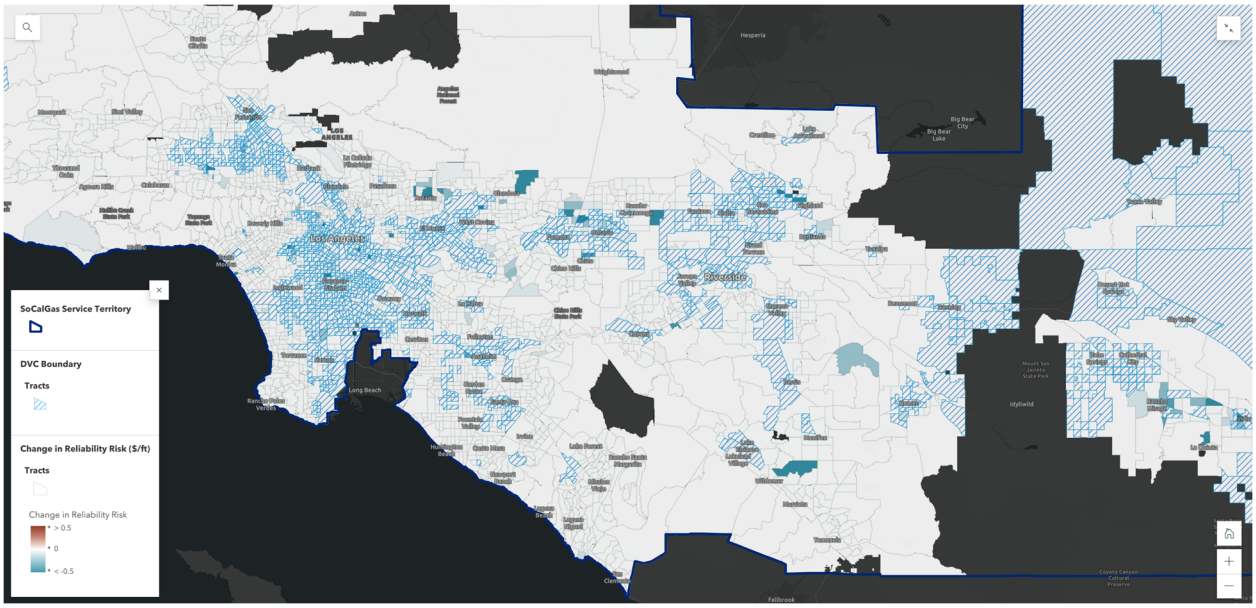


Figure 23b: Change in Reliability Risk by Medium Pressure Pipe Main Replacements in Los Angeles Basin with DVC Overlay



Excavation Damage Risk

One of SoCalGas's primary risk mitigation activities for Excavation Damage is Damage Prevention Activities, which includes Locate and Mark, the company's activities responding to 811 DigAlert ticket requests to mark subsurface facilities or confirming that no conflict exists in the proposed excavation area. Damage Prevention Activities are largely reactive in nature, as SoCalGas's ability to mitigate excavation damage is dependent upon third-parties making 811 DigAlert ticket requests, regardless of the location of the request. Due to the nature of how those orders are placed, the location data of 811 DigAlert ticket requests would not provide a full picture of mitigation impact between DVC and non-DVC areas. To quantify mitigation impact, further assessment of damage prevention quality and effectiveness between DVC and non-DVC areas would need to be analyzed, requiring incorporation of excavation damage data into a larger data system for better visibility. This integration will provide a broader view of high-pressure and medium-pressure asset information, including pipeline locations, recent damages, and other critical data, to continue advancing the mitigation of this risk. Those lessons learned and next steps will be documented in SoCalGas's ESJ White Paper.

Examples of Other SoCalGas Mitigation Activities Not Evaluated for this Action Item

Medium Pressure Gas System Risk

Other mitigation activities for the Medium Gas Pressure System risk include cathodic protection activities, leak survey, leak repair, pipeline monitoring, regulator station replacement and enhancement activities, several maintenance and inspection programs, as well as multiple infrastructure protection programs. While this Pilot Study focused on pipeline replacement and its significant contribution to risk mitigation in specific areas, the entire portfolio of medium pressure mitigation activities plays an important role in addressing this risk across the SoCalGas service territory.

Excavation Damage Risk

Other mitigation activities not evaluated as part of this Pilot Study include Damage Prevention Public Awareness which includes media advertising of 811 DigAlert announcements, as well as Damage Prevention Strategies advancing safe excavation practices in compliance with California State Excavation Law 4216, and Damage Prevention Mapping to enhance and continuously improve the quality of SoCalGas's subsurface facility mapping. These activities are proactive efforts by SoCalGas to advance damage prevention with employees, third-parties, and the public. As noted herein, no representative location data associated with these activities is available at this time, as this outreach work is applied across the SoCalGas service territory.

Action Item No. 7

Enhance outreach and public participation opportunities for DVCs to meaningfully participate in risk mitigation and climate adaptation activities consistent with D.20-08-046.

As part of this Pilot Study, SoCalGas enhanced participation opportunities for DVCs by expanding its existing outreach and engagement programs as detailed herein. For example, SoCalGas previously established four Regional Advisory Boards for its Climate Adaptation Vulnerability Assessment (CAVA) program, one in the Central Valley/Central Coast region, one in the Los Angeles region, one in the Orange County/Coastal region, and one in the south inland region. These groups were created to help assess the impacts of climate change on DVCs and prioritize investments to mitigate these impacts. These Regional Advisory Boards are made up

of community-based organization leaders who provide direct services to DVCs. Additionally, leaders from labor groups, agricultural organizations, women's groups, youth groups, senior citizen groups, Americans with Disabilities Act (ADA), assisted living groups, housing organizations, environmental groups, homeless services, food banks, ethnic and cultural organizations, etc. were engaged to provide their perspectives on climate change risk and climate adaptation options.

To enhance this existing outreach and public participation program, the ESJ Pilot Study Plan team and the CAVA team worked closely together to integrate the Pilot Study and RAMP materials into SoCalGas's Climate Adaptation program. SoCalGas hosted four workshops with its Regional Advisory Boards in October through November 2024. In addition to discussing climate risks, each workshop included a segment to introduce RAMP and the ESJ Pilot Study Plan. This included an evaluation of the highest enterprise risks and the impact on DVCs.

Feedback from these workshops included a discussion around agricultural communities and the risk of third-party excavation damage. Advisory Board members expressed the desire to have continued outreach and engagement, in all appropriate languages and translations, to better disseminate 811 DigAlert announcements. Advisory Board members also stressed the importance of post-excavation damage. For instance, Advisory Board members highlighted communications with surrounding neighbors and areas about the third-party dig-in, describing what happened and how it can be avoided in the future. Finally, community members also asked about mapping availability and if anything could be downloaded or understood prior to calling 811.

SoCalGas enhanced opportunities for engagement as part of this Pilot Study by expanding its climate risk discussions to include SoCalGas's highest enterprise risks. This was a new opportunity for the Regional Advisory Boards to weigh in on third-party dig-in risks, especially in DVCs. It also served as an introduction to the RAMP process for many of SoCalGas's community stakeholders, further expanding their knowledge and opportunities to provide input on SoCalGas's risk mitigation activities.

The ESJ Pilot Study team continues to work with other internal stakeholders to increase outreach opportunities for DVCs through existing programs. These include Customer Programs, Public Affairs, Community Relations, Research & Development, and Sustainability. SoCalGas also

developed training for various departments within SoCalGas that is specifically focused on engagement in DVCs, climate equity, available tools, and best practices.

Conclusion

The goal of the ESJ Pilot Study Plan was to evaluate the impact of selected risks and mitigation activities on Disadvantaged and Vulnerable Communities (DVCs) and how that compares to non-DVC areas. The analysis primarily focused on pipeline replacement for the Medium Pressure Gas System risk and Locate and Mark activities for the Excavation Damage risk. Initial findings highlighted pipe replacements had a difference of <1% (near equal rate) of safety risk reduction in DVCs and non-DVCs. Similarly, pipe replacements located in DVCs successfully reduced average reliability risk per foot by 50% in the pipes where mitigation efforts occurred, while pipe replacements located in non-DVCs reduced average reliability risk per foot by 44%. Further, SoCalGas evaluated projects where air quality benefits could be realized for the various communities across the service territory along with leveraging existing community outreach and engagement efforts. SoCalGas's ESJ White Paper, to be filed no later than July 15, 2025, will provide an opportunity to discuss in greater detail what challenges were faced in the execution of this Pilot Study along with possible improvements to target mitigations and their impact on DVCs.