

# **Aliso Canyon Methane Leak Climate Impacts Mitigation Program**

**Draft**

**Air Resources Board  
1001 I Street  
Sacramento, California 95812**

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## I. Executive Summary

This document sets forth the California Air Resources Board's (ARB or Board) recommended approach to achieve full mitigation of the climate impacts of the Aliso Canyon natural gas leak. This leak at a Southern California Gas (SoCalGas) natural gas storage facility in Los Angeles County emitted almost 100,000 tons<sup>1</sup> of methane, a potent greenhouse gas, into the atmosphere from October 2015 to February 2016. ARB estimates that the leak added approximately 20 percent to statewide methane emissions over its duration.

The methane emissions from Aliso Canyon will contribute to global warming and its many detrimental effects on the environment, problems that the State has recognized and rallied to address. A decade ago, the State enacted the California Global Warming Solutions Act of 2006 (AB 32), which targeted a return to 1990 statewide greenhouse gas emission levels by 2020. The emission-reduction strategies ARB has adopted and implemented under the authority of AB 32, together with valuable contributions by other State agencies and local authorities, have resulted in significant progress toward this goal. By contrast, the methane emissions from the Aliso Canyon leak, equivalent to millions of tons of carbon dioxide, exacerbate rather than mitigate climate change.

This mitigation program arises out of a shared appreciation of the Aliso Canyon methane leak's substantial negative environmental consequences. By letter sent to Governor Brown in December 2015, SoCalGas pledged to mitigate the environmental impacts of the leak. Governor Brown subsequently issued a proclamation<sup>2</sup> (Proclamation) that directed ARB to prepare a program, to be funded by SoCalGas, that would "fully mitigate the methane emissions from the leak" and prioritize reductions of short-lived climate pollutants (SLCP). This program, with its focus on the leak's climate impacts, represents one facet of a comprehensive response by State and local agencies to the leak and its short- and long-term effects upon the environment and public health and safety.

This draft represents ARB's preliminary response to the Governor's Proclamation. It prescribes a principle-driven approach to mitigation that will accomplish the

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<sup>1</sup> ARB has issued a preliminary estimate that the natural gas leak emitted approximately 94,500 tons of methane, the primary component of natural gas, into the atmosphere. ARB, Aliso Canyon Natural Gas Leak, Preliminary Estimate of Greenhouse Gas Emissions (As of February 21, 2016), [http://www.arb.ca.gov/research/aliso\\_canyon/aliso\\_canyon\\_natural\\_gas\\_leak\\_updates-sa\\_flights\\_thru\\_feb\\_21\\_2016\\_updated.pdf](http://www.arb.ca.gov/research/aliso_canyon/aliso_canyon_natural_gas_leak_updates-sa_flights_thru_feb_21_2016_updated.pdf). Additional data will contribute to a final emission estimate to be produced by Summer 2016.

<sup>2</sup> Governor's Proclamation of a State of Emergency (Jan. 6, 2016), <https://www.gov.ca.gov/news.php?id=19263>.

Proclamation's objectives. ARB projects that with a sufficient financial commitment by SoCalGas, the program related in this document would generate reductions in greenhouse gas emissions in this State that are at least equivalent to the emissions from the leak, and set the stage for substantial additional emission reductions.

Many mechanisms exist for reducing emissions of methane and other greenhouse gases, not all of which are well-situated for inclusion within a mitigation program with a definite target and a focus on SLCPs. ARB has considered numerous mitigation opportunities for potential inclusion within its program. Following this review, ARB proposes that the Aliso Canyon mitigation program incorporate a portfolio of emission-reduction projects that would:

- Generate significant and quantifiable reductions in methane emissions within the agriculture and waste sectors;
- Promote a more sustainable energy infrastructure by promoting energy efficiency and decreasing reliance on fossil fuels; and
- Address emissions from methane "hot spots" not presently targeted under federal, State, or local laws.

ARB recommends that the mitigation program focus primarily on reducing methane emissions from the agriculture (including dairy) and waste (landfill and wastewater) sectors for several reasons: methane is the State's most prevalent SLCP, these sectors generate a substantial majority of the State's methane emissions, and ARB has identified significant mitigation opportunities within these spheres. Furthermore, properly targeted investments within the agriculture and waste sectors, proportionate to what a mitigation program could realistically provide, would be expected to generate emission reductions commensurate with the emissions from Aliso Canyon, catalyze additional emission reductions, and generate significant economic and environmental co-benefits. Meanwhile, the two secondary areas of program emphasis recommended by ARB would serve valuable complementary roles by producing near-term emission reductions, yielding co-benefits of their own, including in communities most directly affected by the Aliso Canyon leak, and ensuring the realization of other programmatic objectives, as described below.

This draft elaborates on the program's background, its framing principles and objectives, ARB's recommended areas of programmatic emphasis, and a process for implementing the program. ARB welcomes comments on this draft. Comments can be posted and viewed through the Aliso Canyon page on ARB's website ([http://www.arb.ca.gov/research/aliso\\_canyon\\_natural\\_gas\\_leak.htm](http://www.arb.ca.gov/research/aliso_canyon_natural_gas_leak.htm)) through 5:00 p.m. (PST) on March 24, 2016. ARB will review these comments prior to its production of a final version of its mitigation program on or before March 31, 2016.

## **II. Background**

In October 2015, SoCalGas reported a natural gas leak at well SS-25 at its Aliso Canyon natural gas storage facility in Los Angeles County. Over the next four months, emissions from this leak would drive thousands of local residents from their homes, impair public health, and add almost 100,000 metric tons of methane, a powerful greenhouse gas, into the atmosphere.

SoCalGas stopped the leak and sealed well SS-25 in February 2016. Even though the leak has stopped, State, regional, and local agencies continue the work they began while the leak was ongoing to identify and address the leak's many impacts on public health and the environment. Among these efforts, throughout the duration of the leak ARB teamed with partners including the South Coast Air Quality Management District to monitor and track leaked emissions. These efforts continue, with a final estimate of the leak's methane emissions expected by Summer 2016. Investigations also are underway to pinpoint the reasons for the leak, and rulemakings have been launched to prevent similar calamities from occurring in the future.

This climate impacts mitigation program represents one facet of the comprehensive multi-agency response to the Aliso Canyon leak. While ARB's proposed mitigation program addresses only the global warming consequences of the leak, ARB understands that the leak has had other significant harmful impacts that require careful review and full redress. State, regional, and local authorities have already taken and will continue to take significant steps to moderate and respond to these impacts and the leak's other effects on the environment and public health and safety. The mitigation program that ARB recommends will complement the actions of these entities by achieving full mitigation of the leak's climate impacts.

The mitigation program draws from ARB's experience in measuring greenhouse gas emissions and devising and executing strategies to reduce these emissions. Since the enactment of AB 32 in 2006, ARB has designed and implemented a suite of emission-reduction programs to achieve the statute's target of returning to 1990 statewide greenhouse gas emission levels by 2020, as well as continuing further reductions thereafter. ARB also is developing a complementary plan pursuant to SB 605 (Lara, Chapter 523, Statutes 2014) to reduce the State's emissions of SLCPs, including methane. SLCPs represent a class of climate pollutants that also includes black carbon and fluorinated gases. SLCPs do not persist in the atmosphere for as long as carbon dioxide—the most common climate pollutant—but on a ton-for-ton basis, SLCPs have a more significant climate impact than carbon dioxide. Overall, it is estimated that SLCPs are responsible for approximately 40 percent of current net climate forcing, a fact that

highlights the need for prompt action to address these pollutants. ARB released its draft SLCP reduction strategy in September 2015, and a final plan is forthcoming.

The mitigation program also reflects a common understanding of the Aliso Canyon methane leak's profound climate impacts. On December 18, 2015, with the leak still ongoing, SoCalGas CEO Dennis Arriola wrote Governor Brown a letter promising that SoCalGas would "mitigate the environmental impact of the actual natural gas released from the leak" and "[w]ork[] with you and your staff to develop a framework that will help us achieve this goal." Consistent with SoCalGas's pledge, Governor Brown charged ARB with developing a program to mitigate the climate impacts of the methane released from the leak. In a Proclamation issued on January 6, 2016, Governor Brown directed ARB to prepare a mitigation program, to be funded by SoCalGas, that would fully mitigate the leak's emissions of methane. The Proclamation also directed that this program be developed in consultation with appropriate State agencies, be limited to projects in this State, and prioritize projects that reduce short-lived climate pollutants. Finally, the Proclamation directed ARB to develop the program by March 31, 2016.

This draft relates a mitigation program that meets the Governor's goal of realizing full mitigation through a portfolio of in-State projects that prioritizes reductions of SLCPs. The draft represents a step in an ongoing process of program development that has included outreach to appropriate State agencies, a presentation by ARB staff to the Board at its February 2016 meeting, and ARB staff's review of stakeholder input received at that meeting and through channels including ARB's website.

ARB welcomes input on this draft. Simultaneously with the release of this draft, ARB is opening a portal on its website (through its Aliso Canyon page at [http://www.arb.ca.gov/research/aliso\\_canyon\\_natural\\_gas\\_leak.htm](http://www.arb.ca.gov/research/aliso_canyon_natural_gas_leak.htm)) for the public to post and view comments regarding the document. Comments may be submitted until March 24, 2016, at 5:00 p.m. (PST). ARB will consider these comments and make any appropriate revisions to this draft to produce a final program document by March 31, 2016.

### **III. Quantifying Full Mitigation**

The directive to fully mitigate the Aliso Canyon leak's emissions of methane requires, at the outset, that ARB define "full mitigation" of climate impacts in this context.

Since November 2015, ARB has measured emissions from the Aliso Canyon leak using several different methods. These measurements allow for the estimation of the leak's cumulative emission totals. ARB presently estimates that, in all, the leak released approximately 100,000 metric tons of methane into the atmosphere. This is a

preliminary estimate. Additional data will inform a final emission estimate, expected by Summer 2016.

ARB believes a mitigation program that will achieve “full mitigation” of climate impacts must generate reductions in emissions of SLCPs and other greenhouse gases at least equivalent to the total quantity of Aliso Canyon methane emissions ultimately estimated. The preliminary nature of the current estimate means that the mitigation program that ARB proposes in this draft is, by necessity, scalable and designed to account for possible adjustments in the overall emission total at a later date.

ARB envisions that methane reduction projects will be the primary focus of the mitigation program for the simple reason that methane is not well controlled today.<sup>3</sup> By capturing approximately 100,000 tons of this gas, the program would redirect the State’s overall climate footprint toward where it had been before the Aliso Canyon leak, while at the same time addressing emission sources that are not now covered by the State’s climate action program and promising additional emission reductions outside of the program’s immediate scope. Overall, this focus on methane would yield a transformative and cost-effective greenhouse gas reduction program. The text below discusses the drawing of comparisons across greenhouse gases, however, in the event that some other gases may be targeted either directly or as an ancillary effect of programs designed to achieve methane reductions.

The concept of a global warming potential (GWP) recognizes the fact that some climate pollutants have a more powerful influence upon the climate on a per-ton basis than others. A climate pollutant’s GWP represents a measure of its climate impact integrated over a period of time from the emission of a unit mass relative to carbon dioxide, which has the baseline GWP of 1. The fact that different climate pollutants have different GWPs means that the emission reductions needed to fully mitigate approximately 100,000 tons of methane will depend on the specific climate pollutant involved in the mitigation. ARB envisions that most of the necessary reductions will occur through projects that address methane emissions, thereby minimizing conversion issues. However, should projects target other SLCPs or carbon dioxide, some conversion will have to occur to account for the fact that, on a ton-for-ton basis, methane is a far more potent climate pollutant than carbon dioxide, and less potent than fluorinated gases or black carbon.

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<sup>3</sup> Methane is neither a criteria pollutant subject to air quality standards under the Clean Air Act, 42 U.S.C. section 7208 et seq. and State law (e.g., California Health and Safety Code sections 39602.5, 39606(a)(2), 39608(a); California Code of Regulations title 17, section 70100 et seq.) nor a toxic air contaminant subject to control under California Health and Safety Code section 39650 et seq. and California Code of Regulations title 17, section 93000 et seq.

A GWP can be characterized in 20-year and 100-year terms. This distinction accommodates the fact that some gases, such as methane, have an especially potent effect over a short time horizon, which then decays as the gas undergoes chemical reactions that transform it into gases that are not climate pollutants. The GWPs assigned to different greenhouse gases have evolved with advances in climate-change research. Current science, as related by the Fifth Assessment Report of the United Nations Intergovernmental Panel on Climate Change (AR 5), assigns to methane a 20-year GWP of 84 and a 100-year GWP of 28.<sup>4</sup> In other words, one ton of methane has the global warming potential of 84 tons of carbon dioxide over a 20-year timeframe, and the potential of 28 tons of carbon dioxide over a 100-year span. These reconciliations often are expressed in terms of methane's carbon dioxide equivalent, or CO<sub>2</sub>e.

In connection with the mitigation program, ARB recommends using the 20-year GWP for methane assigned by AR 5. This figure properly incorporates current scientific knowledge, underscores the influence of SLCPs as immediate climate-forcing agents, and emphasizes the need for immediate action on climate change.<sup>5</sup> The anticipated consequences of climate change by 2050 and 2100 are sufficiently dramatic and irreversible to make it inappropriate to tether mitigation here to methane's impacts over an even longer time horizon. Using the AR 5 20-year GWP of 84, the approximately 100,000 tons of methane emitted in the Aliso Canyon leak amount to about 8,000,000 metric tons of carbon dioxide equivalent (8 MMTCO<sub>2</sub>e).

The full mitigation contemplated by this proposal does not involve the purchase and surrender of compliance instruments (allowances and offset credits) associated with the State's Cap-and-Trade Program for greenhouse gas emissions. Use of these instruments for mitigation would be inappropriate for several reasons. Among them, the Cap-and-Trade Program, with its carefully calibrated annual emission caps, was not designed to capture fugitive emissions from sources such as Aliso Canyon. SoCalGas's purchase of compliance instruments commensurate with Aliso Canyon emissions, therefore, could tighten the markets for Cap-and-Trade allowances and offsets and potentially impact the cost and ability of regulated entities to comply with the

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<sup>4</sup> IPCC (2013), Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis, Final Draft Underlying Scientific-Technical Assessment, [https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/drafts/fgd/WGIAR5\\_WGI-12Doc2b\\_FinalDraft\\_Chapter08.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/drafts/fgd/WGIAR5_WGI-12Doc2b_FinalDraft_Chapter08.pdf).

<sup>5</sup> "The use of [global warming potentials] with a time horizon of 20 years better captures the importance of the [short-lived climate pollutants] and gives a better perspective on the speed at which [short-lived climate pollutant] emission controls will impact the atmosphere relative to CO<sub>2</sub> emission controls." ARB (2015), Draft Short-Lived Climate Pollutant Reduction Strategy, <http://www.arb.ca.gov/cc/shortlived/2015draft.pdf>.

Cap-and-Trade Program. Surrender of compliance instruments to mitigate Aliso Canyon emissions thus could hinder rather than facilitate the State's progress toward meeting its 2020 target for greenhouse gas emissions and may not represent emission reductions in addition to those that would otherwise be achieved by the Cap-and-Trade Program.

Lastly, ARB recommends that the emission reductions associated with this mitigation program occur within a defined time frame, ideally five and not more than 10 years from the beginning of the Aliso Canyon leak. This window for achieving the necessary emission reductions recognizes that, as discussed later in this draft, some mitigation projects that may be included within the program may take a few years to start generating substantial emission reductions due to coordination, planning, permitting, and construction prerequisites. At the same time, a time limit will ensure prompt action is taken to implement the mitigation program, facilitate the monitoring of program progress, lessen the administrative costs associated with program implementation, and avoid the contingencies that may complicate or frustrate distant emission reductions.

#### **IV. Mitigation Objectives and Principles**

There exist many possible routes toward full mitigation of the climate impacts of the methane emissions from the Aliso Canyon leak. ARB has identified a series of core principles and objectives that provide necessary direction for mitigation efforts.

##### **A. Program Objectives**

Consistent with the language of the Governor's Proclamation, the mitigation program envisioned by ARB involves a complementary suite of emission-reduction projects. ARB has identified the following as the key objectives for the overall mitigation program:

- Achieving reductions in emissions of SLCPs and other greenhouse gases with an aggregate CO<sub>2</sub>e (20-year GWP) at least equal to the CO<sub>2</sub>e of the methane emitted from the leak;
- Catalyzing substantial additional reductions in emissions of SLCPs and other greenhouse gases over the near- and longer terms;
- Generating significant environmental and economic co-benefits, including benefits to public health and reduced reliance on fossil fuels;
- Conferring co-benefits upon disadvantaged California communities and communities directly impacted by the leak, and incorporating avenues for engagement by these communities in the program development and implementation process;



- Facilitating participation by other stakeholders, with the public being given the opportunity to provide meaningful input toward the program’s composition, and receiving timely updates regarding the program’s ongoing progress; and
- Allowing for ongoing monitoring and verification of program implementation and progress.

The first of these objectives follows from the definition of “full mitigation” related in Section III of this draft, and represents the paramount goal of this mitigation program. The next three objectives recognize that some mitigation projects that could serve to achieve this goal also may provide momentum for additional emission reductions, involve co-benefits such as reductions in criteria pollutants, and provide benefits to disadvantaged communities and areas most affected by the Aliso Canyon methane leak; their inclusion as objectives underscores that these beneficial attributes also should inform project selection and program composition. The final two objectives pertain to process, with an inclusive program-development process being followed by a well-supervised and transparent implementation phase.

## **B. Project Criteria**

Additionally, to carry out the directives in the Governor’s Proclamation ARB has defined several core principles that individual projects must satisfy to be eligible for inclusion within the mitigation program. At a minimum, each project within the program must:

- Occur within the State of California;
- Complement the existing and anticipated efforts of federal, State, and local agencies to combat global warming, reduce air pollution, and protect public health, safety, and the environment;
- Address the global warming impacts of the Aliso Canyon methane leak;
- Involve specific actions (whether in the nature of funding or otherwise) to be taken by SoCalGas, and allow for ready verification of these actions;
- Yield real, verifiable, and permanent greenhouse gas emission reductions that are additional to those that would be achieved under a conservative “business as usual” scenario, including actions that SoCalGas already is taking, will otherwise be legally obligated to undertake, or voluntarily agreed to prior to the natural gas leak at Aliso Canyon.

ARB has considered and rejected the position that projects that could have any economic value to SoCalGas should be excluded from the mitigation program on that basis. As described above, eligible projects must be additional to those that SoCalGas already is taking, will be legally obligated to undertake, or voluntarily agreed to prior to the Aliso Canyon leak. These criteria will be carefully applied to projects under review

for inclusion within the mitigation program, and will avoid the prospect of a windfall in lieu of true mitigation. To ensure this outcome, SoCalGas may be required to forfeit some benefits associated with mitigation projects, or contribute these benefits toward additional mitigation efforts, until such time as full mitigation is achieved.

In addition to the necessary criteria related above, ARB recommends that other considerations also inform the selection of specific projects for the program. Specifically, the program should prioritize or otherwise encourage emission-reduction projects that:

- Involve substantial direct and indirect reductions in emissions of SLCPs, especially methane;
- Enhance the sustainability of the State's energy infrastructure, by decreasing reliance on fossil fuels or otherwise;
- Address the interests of disadvantaged California communities and communities directly impacted by the leak; or
- Provide other significant and demonstrable environmental, economic, and public health co-benefits.

These additional factors reflect priorities, rather than essential elements. Not every project would have to fulfill each of these additional criteria to be eligible for inclusion within the Aliso Canyon mitigation program. That said, projects that satisfy one or more of these criteria would represent especially attractive candidates for inclusion within the program.

As part of its public process for developing a mitigation program, ARB has received stakeholder comment urging that the mitigation program concentrate wholly, or to the maximum extent feasible, on projects located within the area immediately affected by the Aliso Canyon methane leak, or in Southern California. ARB agrees that an emission-reduction project's capacity to provide co-benefits to areas directly affected by the leak represents a factor relevant to the project's potential for inclusion within the mitigation program, and that projects that could provide these benefits should receive particularly close consideration in the project-approval process. As will be discussed below, affected communities may represent optimal settings for pilot programs or other investments that will contribute toward a more sustainable energy infrastructure, one of ARB's recommended areas of emphasis. Other projects located in Southern California also could meet the necessary project criteria, and will be given close consideration as well in the composition of the overall mitigation program.

At the same time, ARB believes that its mitigation program must consider and, as appropriate, incorporate emission-reduction opportunities as may exist across the

State. Limiting the mitigation program in advance to local emission-reduction projects, or to projects in any particular region of the State, could result in a program that would not result in full mitigation of climate impacts, do so only at excessive cost, or fail to achieve transformative results or other important program objectives. These concerns loom especially large insofar as the program must produce substantial reductions in emissions of SLCPs, especially methane, within a manageable time frame.

## V. Mitigation Projects

The objectives and principles described above inform ARB's recommendations regarding the mitigation program's areas of emphasis. These recommendations also draw from insights generated through ARB's ongoing preparation of a Short-Lived Climate Pollutant Reduction Strategy,<sup>6</sup> stakeholder input regarding project selection,<sup>7</sup> and the substantial efforts of other authorities at the federal, State, local, and international levels to reduce emissions of SLCPs and other greenhouse gases.

### A. Areas of Concentration

In identifying the recommended areas of program emphasis, ARB has considered the extent to which potential project categories, both viewed independently and in tandem with other project types, would fulfill the principles and objectives discussed earlier in this draft. ARB also has taken into account additional factors such as the State's pronounced interest in reducing methane emissions; the cost-effectiveness of various emission-reduction measures; the quantity of emission reductions anticipated to result from different mitigation projects; and the need for both immediate and longer-term reductions in emissions of SLCPs and other greenhouse gases. From this assessment, ARB recommends that the Aliso Canyon mitigation program emphasize the following:

- **Reducing Methane Emissions from the Agriculture and Waste Sectors:** ARB recommends that, as its primary emphasis, the mitigation program support projects that would reduce methane emissions in the agriculture (including dairies) and waste (landfill and wastewater) sectors. Combined, these sectors produce approximately three-quarters of statewide methane emissions, making improvement central to the achievement of the State's climate goals. ARB anticipates that with sufficient funding, the mitigation program could generate

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<sup>6</sup> ARB (2015), Draft Short-Lived Climate Pollutant Reduction Strategy, <http://www.arb.ca.gov/cc/shortlived/2015draft.pdf>.

<sup>7</sup> Comments on the mitigation proposal received at the February 18 Board meeting or through ARB's web portal appear on ARB's website at <http://www.arb.ca.gov/lispub/comm2/bccommlog.php?listname=aliso-canyon-mp-ws>.

reductions in methane emissions from these spheres at least commensurate with the emissions from the Aliso Canyon leak, although it may take several years to realize this mitigation. One example of a mitigation strategy that would promote ongoing emission reductions in these sectors would involve SoCalGas's sponsorship of projects that would promote the diffusion of anaerobic digesters within the State and the infrastructure needed to convert methane captured by these digesters into biogas that could be directed toward several beneficial uses, including renewable hydrogen production.

- **Promoting Sustainable Energy Infrastructure:** As a secondary area of emphasis, ARB recommends that the mitigation program reduce emissions of SLCPs and other greenhouse gases through projects that would enhance the State's sustainable energy infrastructure, decrease reliance on fossil fuels, and promote energy efficiency and renewable energy resources. Examples of projects within this category include:
  - New or enhanced incentives or subsidies to replace appliances that consume fossil fuels (e.g., gas water heaters and furnaces) with devices or systems that rely on renewable energy;
  - Subsidization of purchases of low-emission or zero-emission vehicles to replace existing vehicle fleets, including diesel fleets (such as bus fleets) and fleets of light-duty vehicles;
  - Build-outs of infrastructure necessary to support sustainable transportation technologies; and
  - Sponsorship of other residential and commercial energy-efficiency programs additional to SoCalGas's existing and anticipated efforts.

Within this area of emphasis, as discussed above, ARB recommends that particular consideration be given to emission-reduction projects that would benefit communities most directly affected by the leak, as well as disadvantaged communities within the area historically served by the Aliso Canyon storage facility. This recommendation recognizes, among other equitable and practical considerations, that properly targeted emission-reduction projects could help avert potential electric and grid reliability issues in areas that have relied on gas stored in Aliso Canyon.

- **Addressing "Orphan" and Newly Identified Methane Emission Sources:** Finally, ARB recommends that the mitigation program build upon ongoing efforts to identify and control previously unrecognized or unresolved sources of methane emissions through additional projects that would reduce emissions of greenhouse gases, especially methane, that no person or entity presently has a

legal responsibility to mitigate, or which lack a financially solvent responsible party. Projects here could include sponsorship of efforts to abate leaks at high-emission methane “hot spots” in the State, such as abandoned oil and gas wells.<sup>8</sup>

A robust mitigation program comprised of projects within these three categories would represent a significant boon to the State’s efforts to reduce SLCP emissions. Such a program would address SLCP emissions on multiple dimensions by simultaneously targeting the predominant known sources of methane emissions in the State; assisting with the identification and abatement of additional methane emission sources; and advancing the State toward a future in which an evolved energy infrastructure will make SLCP emissions, from facilities such as Aliso Canyon or otherwise, less likely to occur. A further explanation of ARB’s recommendations follows.

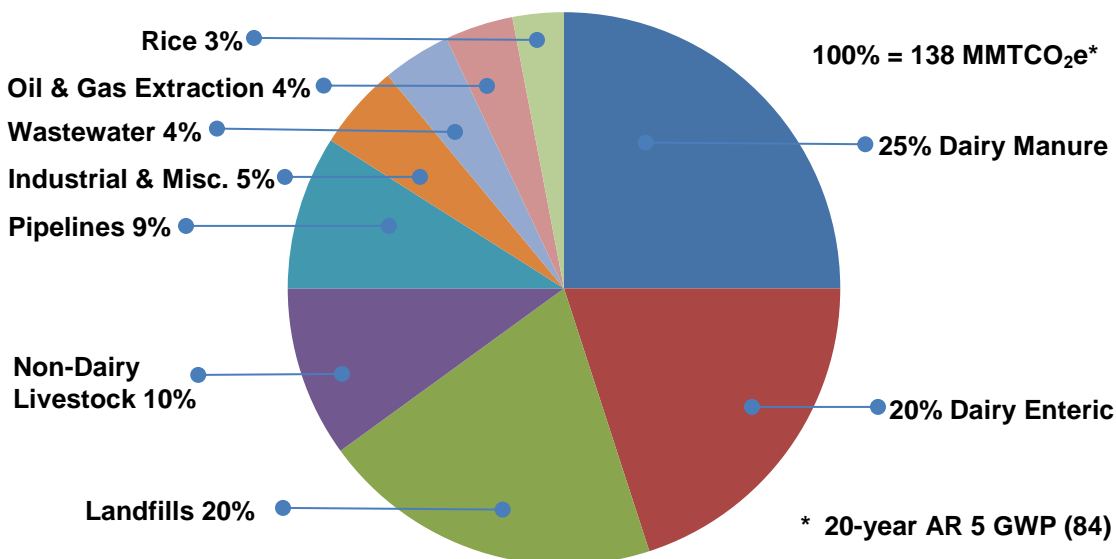
### **B. Program Concentration #1: Reducing Emissions in the Agriculture and Waste Sectors**

ARB anticipates that within the mitigation program, projects within the agriculture and waste sectors will produce most of the emission reductions required for full mitigation of climate impacts. As ARB’s SLCP inventory demonstrates, approximately three-quarters of the State’s emissions of methane come from these sectors:

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<sup>8</sup> ARB has been charged under AB 1496 (Thurmond, chapter 604, Statutes 2015) with monitoring and measuring methane “hot spots” within the State. California Health & Safety Code section 39731(a). The mitigation projects envisioned within this category would build on, and be additional to, research efforts undertaken by ARB and others to identify and monitor emissions from these sites.

**Figure 1: California 2013 Methane Emission Sources**



Methane emissions from agriculture are primarily associated with enteric fermentation and emissions from dairy manure lagoons. Emissions from landfills derive principally from the decay of organic waste deposited in these sites.

Since these sectors are responsible for the majority of the State's methane emissions, they represent logical starting points for prospective mitigation opportunities responsive to the Aliso Canyon methane leak. The State must seize these opportunities in order to achieve the Governor's goals of a 40 percent reduction in statewide emissions of greenhouse gases by 2030 and an 80 percent reduction in these emissions by 2050. ARB's Draft Short-Lived Climate Pollutant Reduction Strategy has identified reduced greenhouse emissions from manure management practices at dairies, in particular, as the source of almost half the reductions needed to achieve the State's 2030 emissions target for methane.

Past, present, and anticipated rulemakings, incentive programs, credits, and grants will put the State in a position to achieve these emission-reduction targets, but more must be done.<sup>9</sup> The Aliso Canyon mitigation program provides a unique and opportune

<sup>9</sup> As observed in ARB's First Update to the Climate Change Scoping Plan, the voluntary installation of anaerobic digesters at California dairies has not increased as expected, due to factors including a lack of adequate financial incentives and insufficient utility contracts. The production of renewable biogas offers a way to make dairy, landfill, and wastewater-treatment digesters more economically attractive, but only if the necessary infrastructure exists to connect sources of biogas with pipelines and, eventually,

vehicle to stimulate substantial emission reductions through projects that will divert or capture methane from agricultural, landfill, and wastewater treatment sites. SoCalGas could, for instance, leverage its existing capabilities and provide funding to facilitate the production of marketable biogas from methane emissions that could be captured at anaerobic digesters situated at dairies, landfills, and wastewater treatment facilities. SoCalGas's contributions could involve, without limitation, subsidizing these digesters; sponsoring diversion projects that would channel organic waste away from landfills and toward existing digester capacity at wastewater treatment plants; sponsoring infrastructure such as pipeline interconnections and the upgrade and injection facilities necessary to make captured methane marketable under standards set by the California Public Utilities Commission; and underwriting demand-side measures that would facilitate digester construction and operation by securing a steady revenue stream for the biogas these digesters produce.

While ARB anticipates that projects within the agriculture and waste sectors ultimately will provide the majority of the methane emission reductions associated with the mitigation program, some of these efforts also may require significant planning, permitting, and coordination, and for this reason may not generate substantial emission reductions immediately. Timing, as well as the importance of generating a diversified project portfolio and achieving the full array of program objectives, counsel in favor of incorporating into the overall mitigation program additional measures that are capable of realizing prompt emission reductions.

As described above, ARB recommends that these additional areas of emphasis advance either or both of two goals: enhancing the sustainability of the State's energy infrastructure, and addressing sources of methane emissions that fall outside of the State's legal framework for greenhouse gas reductions, or which lack a financially responsible party. The timing, areas of impact, and co-benefits associated with projects within these categories would make them beneficial complements to mitigation efforts targeted at emissions in the agriculture and waste sectors. Furthermore, to the extent that investments by SoCalGas to fund or support projects that target emission reductions in the agriculture and waste sectors may result in only partial allocation of the emission reductions ultimately generated by these projects, emission reductions from other sources will serve to ensure that the program as a whole realizes full mitigation of the Aliso Canyon leak.

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consumers. ARB (2014), First Update to the Climate Change Scoping Plan, [http://www.arb.ca.gov/cc/scopingplan/2013\\_update/first\\_update\\_climate\\_change\\_scoping\\_plan.pdf](http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf).

### **C. Program Concentration #2: Promoting Sustainable Energy Infrastructure**

The first of these complementary project categories would emphasize projects that would achieve emission reductions while advancing the long-term sustainability of the State's energy infrastructure. Projects in this sphere would sponsor or otherwise promote enhanced energy-efficiency measures and the targeted replacement of fossil fuels with renewable energy resources, especially in the transportation, commercial, and residential sectors. These projects could include incentive programs, sponsored infrastructure installations, equipment purchases, and other efforts to promote the adoption and utilization of less energy-intensive systems and devices, including those powered by renewable energy resources. Projects within this category could have several co-benefits, among them, reducing reliance on gas storage by reducing peak gas and electric demand in communities that have historically relied on the Aliso Canyon storage facility.

While ARB does not anticipate that these efforts will result in emission reductions equivalent to those projected to come from projects in the agriculture and waste sectors, it believes that these projects nevertheless would serve several useful complementary purposes. Consistent with the overall objectives of ARB's proposed mitigation program, projects in this sphere could serve disadvantaged communities and communities directly impacted by the Aliso Canyon leak. These projects also could produce transformative benefits either by auditioning new technologies and processes, or by placing emission-reducing innovations on more secure footing. In addition, while mitigation projects in the agriculture and waste sectors may take time to start generating emission reductions, projects designed to enhance energy efficiency could yield returns more quickly, thereby ensuring continuing momentum for the mitigation program. Combined, these factors provide a compelling case for the inclusion of these projects within the overall program portfolio, subject to the limitation that the mitigation program, as a whole, must prioritize SLCP reductions.



### **D. Program Concentration #3: Identifying and Addressing Additional Methane “Hot Spots”**

The last of ARB’s recommended areas of programmatic focus would build upon ongoing efforts to identify and address high-emission methane “hot spots” across the State. It is now believed that previously unrecognized or underappreciated emission sources may contribute substantially to overall methane emission levels. In a measure passed last year, the Legislature recognized that there was “an urgent need to improve the monitoring and measurement of methane emissions from the major sources in California,”<sup>10</sup> and directed ARB to “[u]ndertake, in consultation with districts that monitor methane, monitoring and measurements of high-emission methane hot spots in the state using the best available and cost-effective scientific and technical methods.”<sup>11</sup>

Some of the methane-emission sources detected by surveys undertaken by ARB and others may be difficult to abate without additional contributions such as those that the mitigation program could provide. There may be no existing legal obligation to mitigate some high-emission “hot spots,” such as natural sources of methane emissions. Other detected sources of methane emissions (such as abandoned oil and gas wells) may lack a financially solvent responsible party, leading to “orphan” emissions that would go unaddressed unless outside action is taken.<sup>12</sup> ARB therefore recommends that the mitigation program, as a point of secondary emphasis, capitalize upon ongoing and upcoming monitoring and measurement efforts by directing mitigation efforts toward the abatement of emissions from sources such as these that would otherwise lack remedial attention.

### **E. Additional Considerations**

Finally, ARB has considered whether to incorporate a minimum supplemental financial commitment within the mitigation program. Such a commitment from SoCalGas could serve to ensure full mitigation in the event that the initial slate of projects funded by the company does not realize full mitigation, making further mitigation efforts necessary. Such a backstop may ultimately represent an important component of the mitigation program. But the need for and design of such a failsafe will depend on the slate of projects that are initially chosen for the program and SoCalGas’s initial funding commitment. ARB therefore takes the position that the existence and extent of a

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<sup>10</sup> AB 1496, ch. 604, section 1(c).

<sup>11</sup> California Health & Safety Code section 39731(a).

<sup>12</sup> Such efforts would build upon the earlier work of the Department of Conservation’s Division of Oil, Gas, and Geothermal Resources (DOGGR), which from 1977 to 2010 plugged 1,307 orphan wells. DOGGR, Oil, Gas, and Geothermal – Idle Well Program, [http://www.conservation.ca.gov/dog/idle\\_well](http://www.conservation.ca.gov/dog/idle_well).

backstop represent matters properly reserved for future discussions with SoCalGas in connection with program implementation.

## **VI. Going Forward: Project Selection and Program Development**

Implementation of the mitigation program described in this draft will require the specification and completion of tasks that include:

- Soliciting or otherwise identifying eligible projects;
- Screening responses to requests for project proposals to evaluate the submitted projects' consistency with specified project criteria;
- Composing a portfolio of suitable projects that will realize full mitigation and other program objectives;
- Presenting the approved portfolio of projects to all necessary parties for their review and approval;
- Supervising and managing disbursements from any funding account established for program implementation;
- Overseeing project implementation, including receipt and review of periodic progress reports (including the evaluation of reported emission reduction totals) and undertaking project audits as appropriate;
- Issuing periodic reports to the public regarding the program's progress toward its mitigation goals; and
- Certifying project and program completion.

ARB recommends that at a minimum, ongoing oversight of program implementation be assigned in the first instance to a third-party administrator, to be selected at a later date. Otherwise, however, ARB does not make a detailed recommendation at this juncture regarding which among the above responsibilities are properly assigned to a third-party administrator, or best reserved to ARB or another party. The optimal allocation of these responsibilities may depend on decisions relating to program design that will be finalized only in the future. For this reason, ARB defers suggesting any precise assignment of responsibilities associated with program composition and implementation.

Regardless of how responsibilities are assigned, project proposals would be carefully vetted and reviewed prior to their inclusion within the mitigation program. The project selection process would begin with a public solicitation for project proposals consistent with the specified requirements for inclusion within the mitigation program. These proposals would have to be received by a deadline agreed upon in advance by ARB and SoCalGas to be eligible for the program. Each project proposal would incorporate a discussion of project details, including, at a minimum:

- A description of the project, including its location, timeframe, interested parties, the manner in which it will achieve emission reductions and other beneficial impacts, its benefits to affected or disadvantaged communities, and other pertinent information;
- The extent of SoCalGas's financial investment or other commitment(s) that would be required for the project;
- The anticipated annual and cumulative emission reductions associated with the project, relative to a conservative business-as-usual baseline;
- The methodology used to quantify emission reductions associated with the project, along with an explanation of how these reductions are real, permanent, additional, and verifiable;
- An explanation of how emission reductions associated with the project are to be assigned or allocated to SoCalGas;
- The identity of a qualified and independent verification authority that will certify any emission reductions associated with the project; and
- The project operator's agreement to comply with all obligations associated with inclusion within the program, including but not limited to the provision of periodic compliance reports to a mitigation program administrator.

Each project proposal would undergo an initial review to determine whether the project description is accurate and complete, and that the project comports with the criteria required for inclusion within the mitigation program. In the event that the project description is incomplete or insufficient for the reviewer to make a compliance determination, the person or entity submitting the project description would be required to provide the necessary additional information. Project descriptions that contain misleading or inaccurate material information would be subject to rejection on that basis alone.

If a proposed project passes this initial review, the reviewer would assess whether the project, together with other ongoing and anticipated projects within the mitigation program as a whole, will realize the program's overarching objectives. Once the reviewer has compiled a portfolio of projects that, in its opinion, would produce full mitigation and satisfy all other program objectives, it would endorse the portfolio of projects as a viable mitigation program and submit the program, as a whole, to any other necessary parties for their confirmation. In the event that ARB would not be responsible for initial project review, its approval of the project portfolio would be required at this stage. ARB and any other necessary parties would conduct their own reviews of the portfolio to ascertain whether the projects therein comply with required criteria, and whether the program as a whole meets the mitigation program's objectives. Upon this review, the program would either be approved for implementation, or rejected.

In the event of rejection, a different array of projects could be compiled and circulated for approval. ARB anticipates that this review and approval process would be completed in a relatively brief interval, with all necessary funding commitments by SoCalGas put in place shortly thereafter.

As discussed above, ARB recommends that an administrator that it approves be appointed to supervise the implementation of the mitigation program. The administrator's duties would include oversight of any funds that SoCalGas would deposit in an escrow account to fund the program, project oversight and (if and as necessary) auditing, and the preparation of periodic progress reports. With regard to the last of these tasks, at specified intervals during program implementation the administrator would submit compliance reports to ARB that would describe the program's progress toward meeting SoCalGas's mitigation commitments. These reports would include discussions of the progress, including emission reductions, made by specific projects undertaken to date. These progress reports would be made available to the public through their posting on ARB's website. The third-party administrator also would certify to ARB and, as appropriate, other entities responsible for additional oversight when SoCalGas has completely fulfilled its responsibilities under the mitigation program. This certification would be subject to confirmation by ARB and any other necessary parties.

## **VII. *People v. Southern California Gas Company***

The preceding discussion assumes a mitigation commitment that has been voluntarily assumed by SoCalGas, consistent with the firm's December 18, 2015 letter to Governor Brown. Since that time, ARB has joined *People v. Southern California Gas Company*, a civil lawsuit brought in Los Angeles Superior Court against SoCalGas in connection with the Aliso Canyon methane leak. This lawsuit was filed in December 2015 by the Los Angeles City Attorney, and the Attorney General and the County of Los Angeles also appear with ARB as plaintiffs. The lawsuit includes claims alleging that the methane emissions from the leak have amounted to a nuisance and have impaired and polluted the environment, and seeks relief that includes mitigation of the leak's climate impacts.

The relationship between this lawsuit and the mitigation program described in this draft remains to be fully determined. If, for example, the pertinent claims in *People v. Southern California Gas Company* are resolved in the plaintiffs' favor and the court orders mitigation by SoCalGas, or should the case result in a settlement agreement between the plaintiffs and SoCalGas that is then entered as a consent decree by the court, these resolutions could provide an avenue for enforcing the provisions of any agreed-upon or compelled mitigation program.

## **VIII. Conclusion**

ARB welcomes feedback on this draft. Comments can be posted and viewed on ARB's website (through its Aliso Canyon page at [http://www.arb.ca.gov/research/aliso\\_canyon\\_natural\\_gas\\_leak.htm](http://www.arb.ca.gov/research/aliso_canyon_natural_gas_leak.htm)) through 5:00 p.m. (PST) on March 24, 2016. ARB will review these comments prior to ARB's production of a final version of its mitigation program on or before March 31, 2016.