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Submitted electronically: ict2018

Re: Innovative Clean Transit Regulation

To Whom It May Concern:

SoCalGas appreciates the opportunity to provide comments on the proposed Innovative Clean Transit (ICT) Regulation. SoCalGas has been participating in ICT activities as natural gas transit buses are critical to achieving criteria pollutant and greenhouse gas emission reductions in a timely and cost-effective manner. We look forward to continuing to collaborate with the Air Resource Board (ARB) on the development and implementation of the regulation.

SoCalGas would like to submit previous letters (attached) provided throughout the workshop process into the official rulemaking docket as well as the following overall comments on the ICT.

The technology is not yet proven
Zero emission buses are not yet proven to work in transit applications. While there are several current demonstrations and the technology may appear promising, it is not proven to be commercially or economically feasible. In several cases, most notably with LA Metro, battery electric buses have had a "record of poor performance and mechanical problems" (LA Times article 5/20/18). Similar issues have been reported with a number of other zero emission bus operations including Albuquerque, New Mexico (Albuquerque Business Journal, 5/17/18). Transit agencies that are using zero emission transit operators like Foothill Transit and the Orange County Transportation Authority have also raised concerns about CARB's proposed ICT rule (Foothill letter to ARB dated 7/5/18; OCTA letters dated 5/14/18 and 1/22/18).

Transit agencies and ridership could suffer unintended consequences
Transit agencies, which are not for profit organizations and rely heavily on subsidies to provide services, will be asked to take on the financial burdens of zero emission technologies. If they are unable to get zero emission buses and their associated infrastructure fully subsidized, they will have no choice but to pass the burden on to their ridership in the form of increased fares or reduced service. If the technology struggles continue, not only transit agencies will be impacted, but those that rely on the essential services transit agencies provide will be impacted as well. This is significant because most riders who rely on public transit are low-income individuals.

Rollout plan submittals should be delayed until technologies are proven
The regulation start date and schedule is far too aggressive for technologies that are not yet proven. The proposed regulation requires a transit agency to develop a rollout plan in 2020. Transit agencies would have approximately one year from the adoption of the regulation to decide how they will meet

the requirements of the regulation before technologies are proven to be economically and operationally feasible. This would force transit agencies to choose the technology they will be using for multiple decades based on limited prototype information. While battery electric buses are further developed than hydrogen, hydrogen has several advantages over battery electric buses. Hydrogen buses do not have range limitations of battery electric buses. The range of a battery electric bus is limited by the size of the battery, while hydrogen tanks take up minimal space. Also, battery electric buses require significant time to charge the batteries. Hydrogen, on the other hand, can be fueled in a matter of minutes. Transitioning to a mobile, conventionally fueled technology such as hydrogen would present less operational concerns. Hydrogen could ultimately be a better zero emission technology for transit and other mobile applications. Transit agencies should be able to wait for the technologies to further develop before committing significant resources to a specific technology.

Efforts to reduce emissions should be on high polluters

The ICT Initial Statement of Reasons (ISOR) states that 39 percent of the state's greenhouse gas (GHG) emissions come from the transportation sector. However, the ISOR neglects to mention that in 2015, transit emissions account for less than one half of one percent (0.462%) of the state's GHG emissions. Per the ICT cost analysis, battery electric buses cost $770,000 per bus, which is $330,000 more than a conventional bus. Turning over the statewide fleet of 14,000 buses would cost over $10 billion, with the total incremental cost exceeding $4 billion. This cost is solely for the buses and does not include infrastructure, which will significantly increase the overall cost. LA Metro quoted that the costs for their battery charging systems represented 20% of the total zero emission program cost. This is a high price tag for what will amount to minimal emission reductions. Emission reduction efforts and investments should focus on high polluting sectors. This is particularly important as the Los Angeles Times recently reported (July 23, 2018) that transportation greenhouse gas emissions have increased since 2013. This is an alarming trend as the state has invested approximately $1.7 billion in Low Carbon Transportation Incentives, specifically to reduce transportation emissions. To effectively reduce transportation emissions, efforts and incentives should focus on high polluters.

Cost effective solutions should be prioritized

As stated above the cost to replace the statewide bus fleet would be over $10 billion, plus infrastructure. Transit agencies have thoroughly studied the use of zero and near-zero emission natural gas buses running on renewable gas and have found using the latter provides significant emissions benefits at a much lower cost. LA Metro conducted a cost and emissions analysis on zero and near-zero emission buses and found that "…the use of Renewable Natural Gas (RNG) and transition to low NOx buses, will be more effective at reducing in-basin PM, total CO2, total GHGs, and total NOx from the LAMTA fleet over the next 40 years than transition to either electric or fuel cell buses…This approach will also be less expensive than transition to either electric or fuel cell buses."[1] With billions of dollars going into reducing transportation emissions, while emissions are increasing, now is the time to be prudent with programs and incentives to reduce emissions cost effectively.

The state cannot fund compliance

There are currently unprecedented amounts of incentive funding in the state. Greenhouse Gas Reduction Funds (GGRF) are expected to be able to fund a portion of the near-term turnover to zero

[1] "Zero Emissions Bus Options: Analysis of 2015-2055 Fleet Costs and Emissions," Ramboll Environ (Feb. 5, 2016) (prepared for LA Metro), *available at*:
https://media.metro.net/board/Items/2016/09_september/20160914atvcitem4.pdf.

emission buses. Many of the transit agencies that have committed to zero emission buses have already used funding for early action. However, if ICT is approved and purchasing zero emission buses becomes a compliance obligation, transit agencies will no longer be eligible for incentives. Early actors that have already committed to zero emissions, such as large transit agencies, will be able to access the funds. Transit agencies that are not ready to move to zero emissions will not be able to use state incentives and their ability to access federal funds may also be at risk.

Waiting for technologies to develop leaves emission reductions on the table

To impact climate change, it is important to achieve as much emission reductions as quickly as possible. Waiting for developing technologies means emissions reductions are not being achieved during the waiting period. Low NOx engines with RNG, which are available, can achieve emission reductions today.

Comparing the emission reductions, the LA Metro study found that the deployment of buses using Low NOx engines with RNG over a 40-year period would reduce GHG emissions by 72 percent compared to its existing fleet. Meanwhile, deployment of electric buses would reduce GHG emissions by 52 to 53 percent over the same timeframe. This is because RNG significantly reduces GHG emissions, there are GHG emissions associated with the electric grid, and largely because there is a delay in the ability to begin deploying zero emission buses in mass. Reducing emissions early ultimately leads to more emission reductions.

Reasonable alternatives were not considered

ARB is required to examine alternatives to a proposed regulation. Government Code Section 11346.5(D)(13) reads as follows:

"A statement that the adopting agency must determine that no reasonable alternative considered by the agency or that has otherwise been identified and brought to the attention of the agency would be more effective in carrying out the purpose for which the action is proposed, would be as effective and less burdensome to affected private persons than the proposed action, or would be more cost effective to affected private persons and equally effective in implementing the statutory policy or other provision of law." (emphasis added)

CARB staff's conclusion that a performance-based regulation alternative is "not feasible" is incorrect, because it is inconsistent with the fact that the current "Fleet Rule for Transit Agencies" has an existing performance-based standard for fleet NOX emissions and has proven successful. Such a standard could easily be extended to other parameters, such as GHG emissions, petroleum reduction, and diesel PM emissions. Unfortunately, this obvious performance-based approach was not considered or evaluated by CARB staff. Thus, it appears that CARB staff has failed to meet its burden under Government Code §11346.5(a)(13) of showing that "no reasonable alternative was considered … more effective …, less burdensome … more cost effective…."

In addition, and as stated above, LA Metro conducted a study to compare the zero and near-zero emission alternatives. The study, commissioned by a transit agency, found that near-zero technologies with RNG would be more effective at reducing emissions and less expensive, or in other words, less burdensome. However, the ISOR states ""…no alternative proposed was found to be less burdensome and equally effective in achieving the purposes of the regulation in a manner that ensures full compliance with the authorizing law." Therefore, as LA Metro has concluded that there is an alternative that would more effective and less burdensome, ARB did not fully examine reasonable alternatives and

therefore did not fulfill this requirement. SoCalGas recommends that ARB first conduct a thorough analysis of feasible alternatives, including a true performance-based standard, before proceeding with this regulation. We urge ARB to assess a true performance standard or alternative compliance method in lieu of the proposed regulation. A true performance based standard can potentially achieve comparable emission reductions at a fraction of the cost and should be assessed per Government Code Section 11346.5(D)(13).

Thank you again for the opportunity to comment on the ICT. SoCalGas supports reducing emissions from the transit sector; however, there are significant flaws in how the proposed regulation intends to achieve that goal. An unfunded mandate for unproven technologies would have drastic impacts on transit agencies and users throughout the state and we urge ARB to reconsider the proposal.

If you have any questions, please feel free to contact me.

Sincerely,

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July 23, 2018

Jack Kitowski
Division Chief, Mobile Source Control Division
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RE: SoCalGas Comments to the Draft Proposed Innovative Clean Transit Regulation and its Regulation Summary

Mr. Kitowski:

Thank you for the opportunity to comment on the Draft Proposed Innovative Clean Transit Regulation and its Regulation Summary released June 11, 2018.

As a member of the California Natural Gas Vehicle Coalition (CNGVC), we support the comments made by CNGVC and would like to add the following additional insights to their comments.

Regulation start date and schedule
The regulation start date and schedule is far too aggressive for technologies that are not yet proven. While there have been purchases and deliveries of zero emission transit buses, there have yet to be any documented successes for large scale fleet conversions that would warrant such an aggressive schedule. Given your proposed timetable that requires a zero-emission bus (ZEB) rollout plan in 2020 for large transit agencies and 2023 for small transit agencies, large transit agencies would essentially have one year to decide on what type of ZEB pathway to take based on data that shows sub-par performance, uncertain capital costs (buses and infrastructure), and unstable electrical costs. It would not be prudent to force a technology on transit agencies without better results in the field and while competing ZEB technologies are being developed. In addition, the infrastructure issues attendant to Battery-Electric buses (e.g. charging equipment) have also proven to be less-than-ready. The ICT regulation should take this uncertainty into account and allow transit agencies more timeline flexibility.

Sunset on old diesel buses still in service
Under the proposed regulation, existing diesel users would only be required to upgrade their existing buses to 2010 diesel engines until they purchase ZEBs per their rollout schedule. This is not equitable and grossly counterproductive to the goals of the program. The most significant and fastest emission reductions available can be achieved by converting buses to "near zero" technologies as soon as possible. At a minimum, any buses being turned over should be treated similarly. Under the proposed regulation, natural gas users are required to upgrade to an engine certified to near-zero emissions. Additionally, all new fuel contracts must be for renewable fuel only. For a limited time, this should be applied to all buses being turned over by transit agencies, until they are able to move to ZEBs. This same standard should be applied to transit agencies that have diesel engine vehicles. They should upgrade to

buses with engine that are certified to the same CARB optional low NOX standard. The emissions savings would be significant and there would be no loss of reliability in terms of performance.

Create an off-ramp or deferral process for agencies that will have difficulty transitioning to zero-emission vehicles.

Not all transit agencies have the same operational needs. Transit agencies operate varying routes and duty cycles and there is not a one size fits all approach. Zero emission buses may work well for some transit agencies, but not for others depending on the routes, operations, and economic considerations. Even within transit agencies where electric buses have been deployed, performance varies based on the types of routes being driven as well as many other factors. Further, if range and other performance issues affect the ability to keep buses on the road reliably, a transit agency will either have to curtail service OR purchase more buses resulting in significant financial implications (increased costs). Off-ramps should be provided for transit agencies that will have difficulty using all ZEBs. Flexibility of integrating technologies should be afforded to transit agencies based on their specific needs.

Technology feasibility studies are needed

In order to help mitigate the issues mentioned above, CARB should collect more data from those agencies that ARE piloting ZEB technology. Technology feasibility studies should be conducted that realistically assess and document the performance capabilities of ZEBs. Then, based on the ongoing findings and undoubtedly improving performance, transit agencies could calibrate their purchase and integration of ZEB technology in a manner that is best for them. Feasibility studies that prove that the technology is viable should be required prior to enacting any requirements of the regulation.

In addition to the comments above, SoCalGas would also like to reiterate comments made in previous comments letters.

Emission reductions should be the focus of the regulation

The average carbon intensity of renewable natural gas (RNG) is 60-80 percent lower than diesel and can have a carbon intensity (CI) up to 400 percent lower than diesel - carbon negative values far below any other fuel/technology. This is possible because RNG mitigates emissions that would have escaped to atmosphere if not captured. ARB awarded AMP Americas, a renewable energy company, a CI score of -254.94 grams of carbon dioxide per megajoule (g CO_2e/MJ), which is the lowest ever issued by ARB. In comparison, the California electric grid has an energy efficiency ratio corrected CI value of approximately 20 g CO_2e/MJ.

Last year, Cummins Westport Inc. certified a 12-liter engine to the Optional Low Nitrogen Oxide (NOx) standard. A study commissioned by ARB and completed by Southwest Research Institute (SWRI) was recently released that showed that in some transit duty cycles, the natural gas 12 liter near zero engine showed 0.000 grams of NOx per brake horsepower/hour (g/bhp-hr). [1] The SWRI report concluded that 2010-compliant natural gas engines could be developed, using existing technology, that reduced NOx tailpipe emissions to undetectable levels. These technologies are available today and can cost-effectively achieve more emission reductions while also maintaining an expected level of service for the transit agencies purchasing the technology. Continued deployment of existing, proven, clean bus

[1] "Evaluating Technologies and Methods to Lower Nitrogen Oxide Emissions from Heavy-Duty Vehicles", Southwest Research Institute, April 2017

engines would achieve immediate emission reductions that would benefit the public and help to achieve the state's climate goals.

Additionally, LA Metro's recent study found that "…the use of RNG and transition to low NOx buses, will be more effective at reducing in-basin PM, total CO2, total GHGs, and total NOx from the LAMTA fleet over the next 40 years than transition to either electric or fuel cell buses…This approach will also be less expensive than transition to either electric or fuel cell buses." Existing natural gas technologies combined with the use of renewable natural gas achieve more emission reductions at a faster rate and at a lower cost than ZEBs. A long-term technology mandate for ZEBs leaves significant emission reductions on the table, while the technology is still being developed. ARB should focus on emission reductions rather than a technology mandate of ZEBs. This can be done by providing alternative compliance based on emission reductions.

Flexibility for transit agencies

As the technology is still being developed, transit agencies need flexibility in achieving emission reductions, particularly in the early years. The proposed regulation should be performance based to provide maximum flexibility to transit agencies. If CARB proceeds with a technology mandate, it should not be so aggressive until the technology is developed, particularly when Low NOx engines operating on RNG is available.

ICT can help to meet Short Lived Climate Pollutant (SLCP) goals

SLCPs, such as methane and black carbon, have a much higher global warming potential than other greenhouse gases. Reductions of these emissions are critical for curbing climate change. ARB's SLCP Strategy states, "While reducing CO2 emissions limits climate change over the long term, reducing emissions of SLCPs will effectively slow the rate of climate change in the near-term. Therefore, the best path forward is to emphasize parallel strategies for reducing SLCP and CO2 emissions."

In its SLCP Strategy, ARB has a goal to reduce methane emissions by 40 percent. The SLCP Strategy proposes the capture of biogas to be used as a transportation fuel, injected into natural gas pipelines, and used to generate on-site renewable electricity and heat. Increasing the use of renewable gas as a transportation fuel would not only reduce methane emissions from organic waste streams, but also reduce black carbon by displacing diesel in older, conventionally fueled heavy-duty vehicles. Renewable natural gas in transit buses, which in many cases already have natural gas infrastructure in place, is an effective way to quickly achieve methane reduction to meet the state's goal.

Thank you again for the opportunity to comment on the proposal. We look forward to working with you and your staff on the upcoming formal regulatory proceeding.

Respectfully submitted,

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January 12, 2018

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Transmitted to: shirin.barfjani@arb.ca.gov

Re: Innovative Clean Transit Regulation Discussion Document

Dear Ms. Barfjani:

SoCalGas appreciates the opportunity to provide comments on the Innovative Clean Transit (ICT) Regulation Discussion Document ("Discussion Document"). SoCalGas has been participating in ICT activities as natural gas transit buses are critical to achieving criteria pollutant and greenhouse gas emission reductions in a timely and cost-effective manner. We look forward to continuing to collaborate with the Air Resource Board (ARB) on the implementation of the measure. To that end, SoCalGas respectfully submits the following comments on ICT.

ARB should pursue performance standards rather than a technology mandate.

As stated in previous comment letters, SoCalGas strongly recommends a flexible approach based on performance standards to allow transit fleets to deploy advanced, clean technologies that address state environmental needs while providing transit agencies operational flexibility and choice. ARB previously stated that "ARB would develop and propose a variety of approaches and mechanisms to support the transition to a suite of innovative clean transit options."[1] The measure then goes on to explain that the proposal may require a "binding" commitment from transit providers for transitioning to zero-emission buses and *other technologies*" (emphasis added).[2] However, the proposed regulation, as currently drafted, is a strict technology mandate with no flexibility. Setting a "one size fits all" mandate for a technology that is not fully tested or suitable for all transit duty cycles, will force transit agencies to either purchase buses that don't serve their needs or wait for the technology to be developed. This would result in the state forgoing emission reductions that can be achieved today, with existing, advanced technologies.

[1] "Revised Proposed State SIP Strategy," ARB, pp. 69-70 (March 7, 2017).

[2] *Id.*

The Discussion Document states "California has made significant progress and is on track to meet the Assembly Bill 32 goals of reducing greenhouse gas (GHG) emissions to the 1990 level by 2020. However, we need to continue making progress beyond 2020 to meet the following goals:

- Federal health-based ambient air quality standards (key milestones in 2023 and 2031).
- 40 percent reduction in GHG emissions from 1990 levels by 2030.
- 80 percent reduction in GHG emissions from 1990 levels by 2050.
- 50 percent petroleum reduction target by 2030.
- Continued reductions in criteria pollutants and toxic air contaminants to protect public health."

Each of these goals can easily be translated into fleet-wide average performance standards for transit agencies, similar to what has already been done under the CARB "Fleet Rule for Transit Agencies" that sets fleet-wide average NOx and diesel PM emission standards.[3] Further, transit agencies operating "near zero" natural gas buses and using renewable natural gas (RNG) are already meeting a 90% reduction in NOx, a 100% reduction in petroleum use, a 100% reduction in diesel PM, and up to a 400% reduction in GHG depending on the RNG source. Thus, transit agencies operating on natural gas can, under a properly designed performance based regulation, meet and exceed the goals established in the Discussion Document and in a shorter timeframe than a technology mandate.

The Performance Based Option conclusion is flawed

The Discussion document addresses a performance based regulation option but claims a "fleet-wide performance standard" is problematic and dismisses that approach for several reasons, none of which are defendable:

1. **Inability to access funding programs**. ARB staff states "funding programs would not allow funding to be used to purchase ZEB or low NOx engines until the transit agency could show compliance with the next compliance requirement." ARB has had a performance based "Fleet Rule for Transit Agencies" regulation in effect for many years that set fleet-wide average NOx and diesel PM emission performance standards and has enabled transit fleets to access funding where they showed the emission reductions went above and beyond the prevailing standard. ARB staff does not explain why this would not be the case under a technology mandate mechanism. Transit agencies will still be able to access funding programs under a performance based regulation, so this objection is misplaced.
2. **Inability to establish an "equitable" performance based mechanism**. ARB staff states "For example, a uniform NOx reduction goal may be easy to meet for a CNG bus fleet because low NOx engines are already available but may be impractical for a diesel bus fleet that could be forced to retire buses and aggressively ramp up ZEB purchases to achieve the same reductions." It is not clear why ARB staff believes it is inequitable to force diesel bus fleets to aggressively ramp up ZEB purchases but

[3] The ARB "Fleet Rule for Transit Agencies" is codified at 13 CCR § 2023.1

believe it is equitable to force all bus fleets to aggressively ramp up ZEB purchases. A properly designed performance based mechanism would provide diesel bus fleets various options to meet the performance based requirements which may or may not include ZEB purchases. Transit fleet operators should be given fuel and technology choices that allow them to cost-effectively meet performance based emission standards while retaining operational flexibility.

3. **Inability to separate a performance based regulation from other parallel ARB regulations**. ARB staff states "there are challenges with properly separating new actions from those that are already occurring due to ARB regulations for engine emissions standards, vehicle efficiency requirements, and policies to reduce transportation fuel carbon intensity". ARB has had a performance based "Fleet Rule for Transit Agencies" regulation in effect for many years that set fleet-wide average NOX and diesel PM emission performance standards and has performed well independent of other ARB actions such as the development of the optional low NOX engine standards, the Low Carbon Fuel Standard program, and other regulations. To suggest that updating the "Fleet Rule for Transit Agencies" for NOX and diesel PM emission standards and including new GHG and petroleum reduction standards would be problematic is not explained by CARB staff and is incorrect.
4. **Inability to utilize the National Transit Database (NTD) due to fluctuations in fuel use, mileage, and passenger counts**. ARB staff lists this as a potential barrier but does not explain why the fluctuation in NTD information would prevent the use of a performance based regulation.

ARB staff identifies several other potential compliance methods, including a "zero-emission-miles-based fleet-wide approach". This method is extremely impractical and would not result in gaining the most emission reductions in the most efficient manner. Transit agencies operate varying routes and duty cycles and there is not a one size fits all approach. Zero emission buses may work well for some transit agencies, but not for others depending on the routes, operations, and economic considerations. A transit agency that chooses to not fully utilize zero emission buses (ZEBs) because of these considerations would be forced to modify its operations to use ZEBs for a set number of miles despite these considerations. A zero-emission-miles-based approach is of particular concern because ZEBs are better suited for very short routes, which would not log as many miles as longer routes. Also, there is no mileage requirement for transit agencies who meet the purchase requirements.

The purpose of the performance based option is to "provide for the greatest opportunity to let market forces drive the form of the emission benefits." This method clearly does not meet this goal as a strict technology mandate will not accomplish that goal. The performance based option should solely be based on emission reductions.

Emission reductions should be the focus of the regulation

Any fuel and technology capable of meeting the emission performance goals established by ARB should be an option for transit operators to retain and maximize operational flexibility, control and reduce costs, and ensure no service curtailments or interruptions. As an example, the average carbon intensity of RNG is 60-80 percent lower than diesel. Based on the source, RNG

can have a carbon intensity (CI) up to 400 percent lower than diesel, and can be carbon negative, as RNG mitigates emissions that would have otherwise occurred. ARB recently awarded the company, AMP Americas, a renewable energy company, a CI score of -254.94 grams of carbon dioxide per megajoule (g CO_2e/MJ) for RNG, which is the lowest CI score ever issued by ARB for any fuel or technology. In comparison, the California electric grid has an energy efficiency ratio corrected CI value of approximately 20 g CO_2e/MJ. Clearly, RNG can meet and exceed the greenhouse gas emission reductions resulting from the use of electricity and should be an option for transit fleet operators in any new regulation.

The Cummins Westport Inc. has had a 9-liter engine certified to the Optional Low Nitrogen Oxide (NOx) standard at the lowest level of 0.02 grams/bhp-hr. Last week Cummins Westport Inc. also certified a 12-liter engine to the Optional Low NOx standard. While it meets the standard, the engine was actually certified to 0.01 grams NOx, which is 95% lower than existing diesel (certifications attached). A study commissioned by ARB and completed by Southwest Research Institute (SWRI) was recently released that showed that in some transit duty cycles, the natural gas 12 liter near zero engine showed 0.000 grams of NOx per brake horsepower/hour (g/bhp-hr). [4] The SWRI report concluded that 2010-compliant natural gas engines could be modified, using existing technology, that reduced NOx tailpipe emissions to zero.

Additionally, LA Metro's recent study found that "…the use of RNG and transition to low NOx buses, will be more effective at reducing in-basin PM, total CO_2, total GHGs, and total NOx from the LAMTA fleet over the next 40 years than transition to either electric or fuel cell buses…This approach will also be less expensive than transition to either electric or fuel cell buses."[5] In other words, existing natural gas technologies combined with the use of renewable natural gas achieve more emission reductions at a lower cost than ZEBs. A long-term technology mandate for ZEBs leaves significant emission reductions on the table, while the technology is still being developed. ARB should focus on emission reductions rather than picking aspiration goals to be achieved by a specific technology. ARB's plan should allow for alternative compliance, which would likely result in greater emission reductions at a faster rate.

Costs

The Discussion Document states that "on a one-for-one basis in California, the operational savings can make the total cost of ownership comparable to conventional buses even without incentives." In several workshops, multiple transit agencies have stated that this is not true. A study conducted by LA Metro, using actual data rather than the conservative assumptions used in ARB's Transit Fleet Cost Model, shows that electric buses have higher cost

[4] "Evaluating Technologies and Methods to Lower Nitrogen Oxide Emissions from Heavy-Duty Vehicles", Southwest Research Institute, April 2017

[5] "Zero Emissions Bus Options: Analysis of 2015-2055 Fleet Costs and Emissions," Ramboll Environ (Feb. 5, 2016) (prepared for LA Metro), *available at*: https://media.metro.net/board/Items/2016/09_september/20160914atvcitem4.pdf.

of total ownership than its current natural gas fleet[8]. LA Metro did not include a cost comparison to diesel buses because they do not have diesel buses in their fleet, however it is safe to assume that they cost difference between diesel and electric buses would be even greater.

In addition to the total operating costs, significant investment must be made to purchase, install and maintain charging infrastructure to power ZEBs. This cost would be passed to customers – transit users and/or electric customers – in the form of reduced service and/or increased costs. Not only would this increase consumer costs, this could also result in stranded assets and investments into existing fueling infrastructure.

ICT should support the State's Short-Lived Climate Pollutant (SLCP) goals

SLCPs, such as methane and black carbon, have a much higher global warming potential than other greenhouse gases. Reductions of these emissions are critical for curbing climate change. ARB's SLCP Strategy states, "While reducing CO_2 emissions limits climate change over the long term, reducing emissions of SLCPs will effectively slow the rate of climate change in the near-term. Therefore, the best path forward is to emphasize parallel strategies for reducing SLCP and CO_2 emissions."

In its SLCP Strategy, ARB has a goal to reduce methane emissions by 40 percent. The SLCP Strategy proposes the capture of biogas to be used as a transportation fuel, injected into natural gas pipelines, and used to generate on-site renewable electricity and heat.[9] Increasing the use of renewable gas as a transportation fuel would not only reduce methane emissions from organic waste streams, but also reduce black carbon by displacing diesel in older, conventionally fueled heavy-duty vehicles. Renewable natural gas in transit buses, which in many cases already have natural gas infrastructure in place, is an effective way to quickly achieve methane reduction to meet the state's goal.

Low NOx Engines are in use and readily available today

The Discussion Document proposes that agencies include Low NOx engines be included in purchases if they are available. As stated above, Cummins Westport Inc. has two product offerings that meet the 0.02-gram NOx standard in both 9- and 12-liter sizes. The requirement should be modified as the availability of these engines are not in question.

Early Action Credits

The proposal includes "credit" provisions for agencies that purchase ZEBs prior to the requirement years. The credit should be based on emission reductions not on purchases. The credits should also be extended to transit agencies that purchase any type buses technology, such

[8] "Zero Emissions Bus Options: Analysis of 2015-2055 Fleet Costs and Emissions," Ramboll Environ (Feb. 5, 2016) (prepared for LA Metro), *available at*: https://media.metro.net/board/Items/2016/09_september/20160914atvcitem4.pdf.

[9] California Air Resources Board, Proposed Short-Lived Climate Pollutant Strategy, p. 66 (November 2016), *available at*: https://www.arb.ca.gov/cc/shortlived/meetings/11282016/revisedproposedslcp.pdf.

as near zero, natural gas buses powered by renewable natural gas, as long as early emission reductions are achieved.

Thank you for the opportunity to comment and SoCalGas looks forward to working with you on advancing this regulation.

Respectfully submitted,

Kevin Maggay
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