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Electronic Submission Via Website: http://www.casustainablefreight.org

Re: Comments on the Multi-Agency "California Sustainable Freight Action Plan"

Dear State Agency Representatives:

SoCalGas appreciates the opportunity to comment on the California Sustainable Freight Action Plan (CSFAP) shared with the public in May 2016. We hope our comments are taken in the constructive manner we offer them, and also look forward to a follow-up meeting in person to discuss our concerns and ideas with you and other members of the multi-agency CSFAP team.

1. General Concerns with the CSFAP

A. Lack of Specificity on Goals and Objectives

We appreciate the hard work by all the agencies who are engaged in working on the CSFAP – CalEPA, California Natural Resources Agency, California State Transportation Agency, the California Air Resources Board (ARB), the California Energy Commission, the California Governor's Office of Business and Economic Development and CalTrans (State Agencies). We recognize Governor Edmund G. Brown has set an ambitious agenda for this group and

significant resources are required for these agencies to work together to provide a comprehensive CSFAP.

At the same time, the CSFAP fails to articulate specific objectives for air emissions reductions from the freight sector. Throughout the CSFAP, many of the suggested action items are vague, without specific air quality mandates or incentive plans to reach the proposed objectives. Because of this lack of specificity regarding the implementation of proposed action items, SoCalGas is left confused about the roadmap set forth by the CSFAP for public comment.

B. The System Efficiency Metric and Technology Metric Need More Information To Determine Their Efficacy

The CSFAP proposes the following metric to determine freight system efficiency:

$$\frac{\text{CA Gross Domestic Product (NAICS 48-49 minus passenger components)}}{\text{CA Carbon Dioxide Equivalent (from California Freight Movement)}}$$[1]

SoCalGas feels this proposed metric is too vague to determine the efficiency of the statewide freight movement sector. For example, this measurement fails to take into account the tons or miles of goods moved, nor does it account for incremental costs or incentives provided. Cost effectiveness of freight movement is not a factor utilized in this metric at all, and determining how to include that element would be useful in evaluating system efficiency. Such questions and others are left unanswered in the CSFAP presented to the public, and need clarification.

Similarly, with the technology metric proposed in the CSFAP, the multi-agency group proposes to consider the following:

> To measure progress toward the technology target, staff will use vehicle and equipment count, tracking both zero and near-zero emission freight technologies as they are introduced into service. … From a technology perspective, the equipment categories with the greatest potential for zero emission technology and/or zero emission operation include: trucks, locomotives, transport refrigeration units, equipment, commercial harbor craft, and airport ground service equipment.[2]

This proposed metric is even less illuminating than the system efficiency metric in terms providing specifics in how freight-related technology will be evaluated. Aside from a vehicle count, what factors will be considered? Fuel cost, infrastructure costs, location of vehicles, emissions divided by sector, categories of emissions? Again, these questions, and others, must be answered in the next iteration of the CSFAP.

[1] Draft CSFAP Appendix B, at B-1.
[2] Draft CSFAP Appendix B, at B-3 and B-4.

C. SoCalGas Supports Continued Inclusion of the Low Carbon Fuel Standard to Reach Our State's Freight Movement and Larger Air Quality Goals

California has been known as the cradle for innovation and forward thinking in the areas of clean energy technology, and the Low Carbon Fuel Standard (LCFS) is an example of its success. Since its creation in 2010, the LCFS has been instrumental in creating price parity between alternative fuels and fossil fuels, such as gasoline and diesel. The effects are truly remarkable:

- 36 percent increase in the use of clean fuels
- $650 million invested in clean fuel production
- 16.6 million tons of carbon pollution avoided
- $1.6 billion in health costs prevented, and
- 6.6 billion gallons of petroleum have been displaced.

There are not only statistical benefits but also benefits that cannot be measured. The LCFS has been the catalyst for companies and people to innovate in the energy sector. This program has been crucial in spurring the development of low-carbon fuels in California by providing clear market signals to producers that their investments in research and development will yield returns in the long-run. The LCFS has increased demand for alternative fuels, such as renewable natural gas, leading to new technologies to produce, deliver, and use that fuel. For example, in 2015, encouraged by the increasing availability and decreasing price of alternative fuels, Big Blue Bus, the transit agency of the City of Santa Monica, switched its bus fleet to 100% renewable natural gas, reducing its fleet's carbon footprint by an estimated 8,000 tons per year. It's innovations like this that will help California achieve its ambitious climate goals such as those set forth in the CSFAP.

2. SoCalGas Specific Suggestions and Concerns for the CSFAP

A. SoCalGas Supports the Development of Dairy Biogas for Freight Vehicles

The Draft CSFAP listed a number of pilot project concepts that are being further evaluated for possible implementation. SoCalGas is very supportive of the idea of sustainable freight pilot projects to show proof of concept of innovative technologies that can reduce emissions and further our freight system efficiencies. Specifically, SoCalGas supports the proposed Dairy Biogas for Freight Vehicles project in the San Joaquin Valley. (Draft CSFAP, p. 19.) We served as advisors on this project, also known as the "The Kern Dairy Biogas Cluster's R-CNG Sustainable Freight Pilot Project," with California Bioenergy and other partners, and believe it would provide the state with a new, renewable source of natural gas for use as fuel in heavy duty trucks.[3] This cluster of dairies could generate 1.5 to 2.5 million diesel-gallon equivalents per year using dairy waste, with each dairy also capable of generating renewable electricity on site with any excess biogas. It could be the first operating dairy biogas to pipeline interconnection project in California. SoCalGas believes this project achieves several key objectives, such as demonstrating measureable progress towards freight targets within a 2030 timeframe; has system transformation potential; presents opportunities for integrated State agency support; and has

[3] California Bioenergy LLC's Submission to the California Sustainable Freight Action Plan Pilot Project Ideas Request, November 30, 2015. (http://www.arb.ca.gov/gmp/sfti/sfpp/sfpp-037.pdf)

potential for scalability throughout the state, particularly in the Central Valley. (See Draft CSFAP, Appendix D, pages D-1 through D-3.)

It is essential to remember, this Dairy Biogas project relies on methane that would normally be released into our atmosphere and converts it into clean fuel for our freight vehicles. It's a double environmental win - California will reduce emissions from the agriculture sector while generating a renewable energy source for other applications.

The Dairy Biogas project would also specifically further objectives identified in the CSFAP, such as "Utilization of existing transportation infrastructure," and "Continued development of renewable fuels." (Draft CSFAP, p. 15 and item 4, p. 18.) SoCalGas is hopeful that implementation of this pilot project will be part of the final CSFAP submitted to the Governor for his review and approval.

For the above reasons, SoCalGas believes this project should be chosen over rival proposals, because of the greater GHG benefits it will provide. But strictly following the CSFAP Vision statement would result in the wrong choice for California. We recommend that further discussion of the Vision is needed. As a suggested first draft of a revised Vision, we offer the following:

> Utilize a partnership of federal, State, regional, local, and industry stakeholders to move freight in California on a modern, safe, integrated, and resilient system that continues to support California's economy and livability. ***Transporting freight reliably and efficiently by both zero emission equipment, and near-zero emission equipment powered by clean, low- or negative-carbon renewable fuels.***

B. Renewable Natural Gas Can Transform the Freight Sector by Reducing GHGs

SoCalGas supports ARB's Proposed Short-Lived Climate Pollutant Strategy (Proposed Strategy) of capturing biogas to be used as a transportation fuel, injected into natural gas pipelines, and used to generate on-site renewable electricity and heat.[4] Increasing the use of RNG 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.

1. Addressing Technology and Market Barriers

There are multiple technology and market challenges associated with injecting biogas into pipelines. SoCalGas strongly supports the ARB's goals to address these challenges and build market certainty and value for RNG.

We commend ARB for publishing a provisional LCFS Carbon Intensity for dairy biogas that includes the benefit of avoided methane emissions. We believe this is a good first step towards enhancing the project economics to produce RNG from dairy waste and to use it as

[4] California Air Resources Board, Proposed Short-Lived Climate Pollutant Strategy, released April 2016, p. 66. http://www.arb.ca.gov/cc/shortlived/meetings/04112016/proposedstrategy.pdf

transportation fuel. We would support further initiatives to incentivize the capture and use of biogas, particularly by offsetting infrastructure costs. Facilities that connect to the pipeline system are necessary for California to meet its climate change and air quality goals, and provide for the most long-term flexibility for this valuable renewable resource.

- **Overcoming RNG Interconnection Challenges**: The Proposed Strategy points to the challenge of interconnecting distributed sources of renewable energy onto the electricity grid or pipelines. High project startup costs, including the costs of connecting to the pipeline system, are one of the inherent challenges of RNG project development, regardless of feedstock. Interconnection with the pipeline system gives RNG access to the broadest market possible, facilitating the most diverse and flexible utilization opportunities and hence most dynamic and effective incentive strategies to encourage methane capture to achieve the objective of the Proposed Strategy.[5] Additional regulation providing for energy infrastructure investment by California regulated utilities is necessary to accept and transport RNG, and ultimately should be recoverable in rates.

- **Dairy Biogas for Freight Vehicles**: ARB identifies several programs to accelerate project development and emissions reductions at dairies. At SoCalGas, we are conducting education and outreach to developers to help accelerate RNG projects in this and other sectors. As discussed above, SoCalGas has assisted project developers with assessing high-level costs and feasibility for projects like the Kern County Dairy Biogas Cluster, which would help advance the development of California's sustainable freight transportation system. In addition, the project would directly benefit the economically disadvantaged communities adjacent to these dairies and transportation corridors traveled by trucks fueled with RNG by reducing short-lived climate pollutant (SLCP) emissions, improving air and water quality, and boosting economic growth. Extending natural gas infrastructure to these disadvantaged communities in conjunction with dairy-RNG pipeline interconnections could also present an opportunity to transition diesel and propane end-uses to cleaner burning natural gas appliances and vehicles, with the potential added benefit of NOx emission reduction.

- **Emissions from Conventional Combustion Engines:** In Southern California, the South Coast Air Quality Management District (SCAQMD) in February 2008 adopted new standards,[6] which require biogas engines to meet the same emission limits as natural gas fueled engines. These requirements are the cleanest in the nation and apply to all biogas fueled engines (numbering approximately 66 engines in July 2010). According to a technology assessment[7] conducted by the agency in 2010, uncontrolled biogas engine emissions approximated 0.93 tons per day (tpd) of NOx and 0.44 tpd of volatile organic compounds (VOCs) prior to the February 1, 2008 amendments. Once these biogas emissions are controlled as required by Rule 1110.2, the emissions reductions generated from biogas engines will be approximately 0.69 tpd of NOx and 0.16 tpd of VOC. All

[5] The California Public Utilities Commission has taken an initial step by authorizing the natural gas utilities to recover a portion of interconnect costs from ratepayers in D.15-06-029.

[6] South Coast Air Quality Management District Rule 1110.2 adopted on February 1, 2008.

[7] South Coast Air Quality Management District Interim Report on Technology Assessment for Biogas Engines Subject to Rule 1110.2 (July 9, 2010).

new biogas engine installations must also meet these natural gas equivalent emission standards. Such treatment of biogas would likely improve air quality in other areas of the state as will occur in the South Coast Air Basin.

2. Renewable Natural Gas and Transportation

The LCFS identifies RNG from existing organic sources as the lowest carbon intensity standard pathway available, even lower than the current electricity mix or hydrogen. When sourced from dairies and organic waste diverted from landfills, the carbon intensity of RNG is rated as "carbon-negative," due to avoided methane emissions from dairies and landfills.

As detailed in *Game Changer Technical Whitepaper* by Gladstein, Neandross & Associates (GNA), a heavy-duty natural gas engine is now commercially available which meets ARB's lowest-tier optional low-NOx emission standard at 0.02 g/bhp-hr NOx.[8] When paired with RNG, this technology will provide a commercially proven, broad-based, and affordable strategy to immediately achieve major reductions in emissions of criteria pollutants, air toxins, and GHG. As ARB has identified that heavy-duty electric and fuel cell electric vehicles will not be available in the next several decades,[9] RNG provides the single best opportunity for California to achieve its air quality and climate change goals in the on-road heavy-duty transportation sectors. Equally important, major reductions of cancer causing toxic air contaminants can immediately be realized in disadvantaged communities adjacent to freeways and areas of high diesel engine activity, where relief is most urgently needed. The executive summary of this white paper is provided to the record for consideration by the State Agencies in Appendix A.

The most powerful driver to produce RNG in today's market is to fuel natural gas vehicles (NGVs), where RNG can support both California's LCFS and the Federal Renewable Fuel Standard (RFS) programs. According to the LCFS program, in the last half of 2015, the majority of NGV fuel in California was RNG – a huge success for this program, but an indication that RNG supply is approaching parity with demand. Growing the NGV market in California is not only an impactful and cost effective way to significantly reduce NOx and GHG emissions, but will also be critical to increasing the demand for RNG as the existing market becomes increasingly saturated.

In conclusion, by developing appropriate policies and incentives, we have the opportunity not only to simultaneously reduce SLCP, GHG, and criteria emissions, but also replace a significant amount of statewide natural gas usage with biomethane, or RNG, by leveraging and using organic waste resources which would otherwise be discarded and emitted as SLCPs. It is critical to make additional pipeline RNG production incentives available to cultivate the development of these renewable resources and leverage existing pipeline systems, electric generation facilities,

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[8] Game Changer Technical White Paper, Gladstein, Neandross & Associates, May 3, 2016. http://ngvgamechanger.com/pdfs/GameChanger_FullReport.pdf.

[9] See ARB Technology Assessment: Medium and Heavy Duty Battery Electric Trucks and Buses, October 2015, available at http://www.arb.ca.gov/msprog/tech/techreport/bev_tech_report.pdf and ARB Technology Assessment: Medium and Heavy-Duty Fuel Cell Electric Vehicles, November 2015, available at http://www.arb.ca.gov/msprog/tech/techreport/fc_tech_report.pdf.

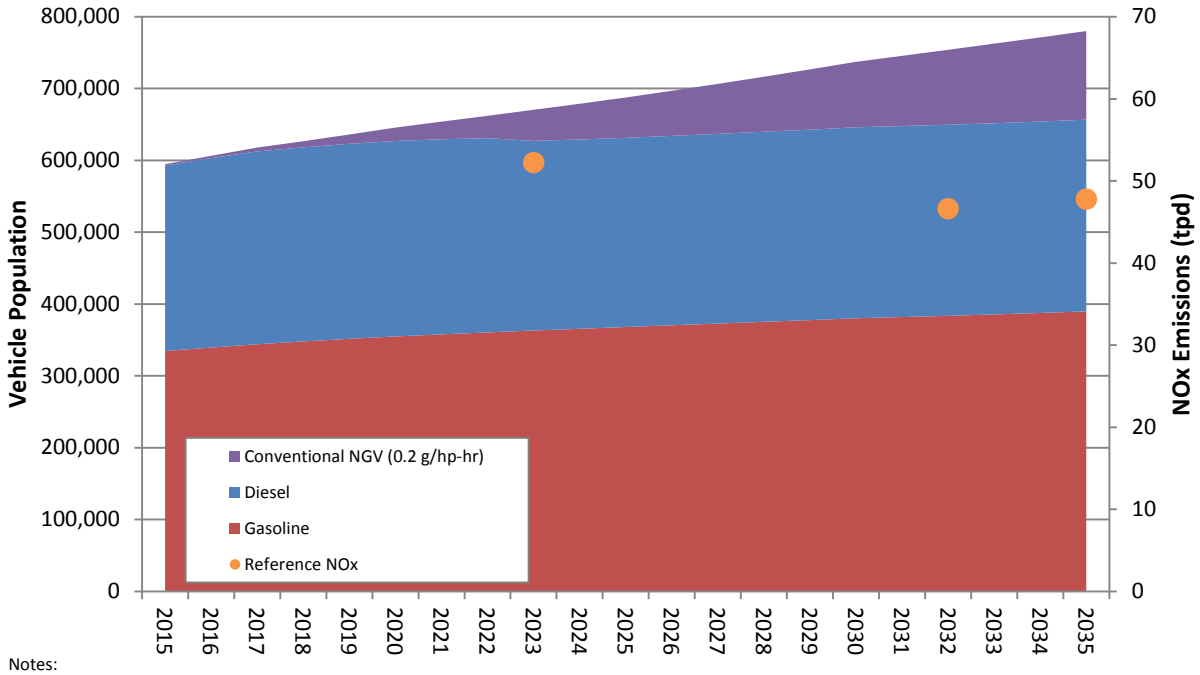
NGV refueling infrastructure, and combined heat and power and distributed generation opportunities.

3. Incentive Funding for Heavy Duty Engines Results in Immediate Air Quality Improvements

Achieving sustainability requires more than just addressing long-term climate change goals, and when solutions are available to effectively address multiple environmental goals simultaneously, they should be prioritized by policymakers. Upgrading the existing population of heavy-duty trucks operating in California is an area where such co-benefits can be achieved cost-effectively and in the near-term. According to ARB's EMFAC (also known as "emissions factors") database, these trucks are responsible for nearly 40% of on-road NO_x emissions, and nearly 15% of on-road GHG emissions, making them a high-impact subject for improvement.

SoCalGas has conducted significant research into the efficacy of investing in low-NOx natural gas heavy duty trucks to help local air districts and the State meet air quality and other goals.[10] Below shows the penetration of such trucks into the South Coast Basin market based upon market forces at the current NOx emission rate of .2 grams of NOx per brake power hour.

Figure 1.

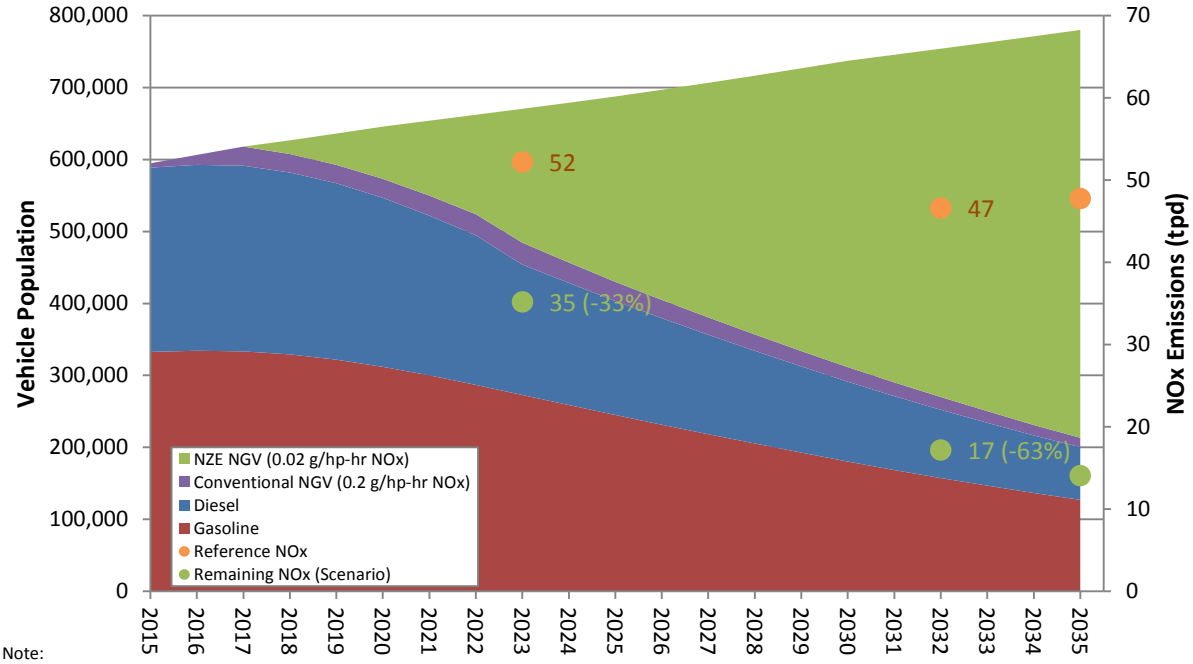


Notes:
1. Analysis includes T7 Drayage, T7 Single, T7 Solid Waste Collection Vehicle, T7 Tractor, T7 Tractor Construction, T7 Agriculture, T7 Single Construction, T7 Public, T7 Utility, T7 IS, T6 Instate Heavy, T6 Instate Small, T6 Utility, T6 Public, T6 TS, T6 Agriculture, T6 Instate Construction Heavy, T6 Instate Construction Small, LHDDT, and LHDGT.
2. Vehicle population is based on the EMFAC2011 data for the South Coast Air Basin.
3. Reference NOx emissions were obtained from the 2012 Air Quality Management Plan (AQMP) from the SCAQMD.

[10] For further discussion and full explanation of assumptions for these Figures, please see "Near-Zero Emission (NOx) Natural Gas Truck Opportunities in the South Coast Air Basin," prepared by Environ International Corporation, December 2014, attached as Appendix C to these comments.

If we look a little further into the future – two years at most – we believe a 12L heavy-duty natural gas engine that would produce 90% less NOx per brake power hour, at .02 grams, will be commercially available. Engines that size could support ultra-low NOx heavy-duty trucks used for drayage and long hauls common in the freight sector. If purchases of such ultra-low NOx natural gas trucks were supported by incentive funds, market penetration of such trucks would be expedited, **leading to a 33% NOx emission reduction by 2023 and 63% NOx emission reductions by 2031 in the South Coast Basin alone.**

Figure 2.

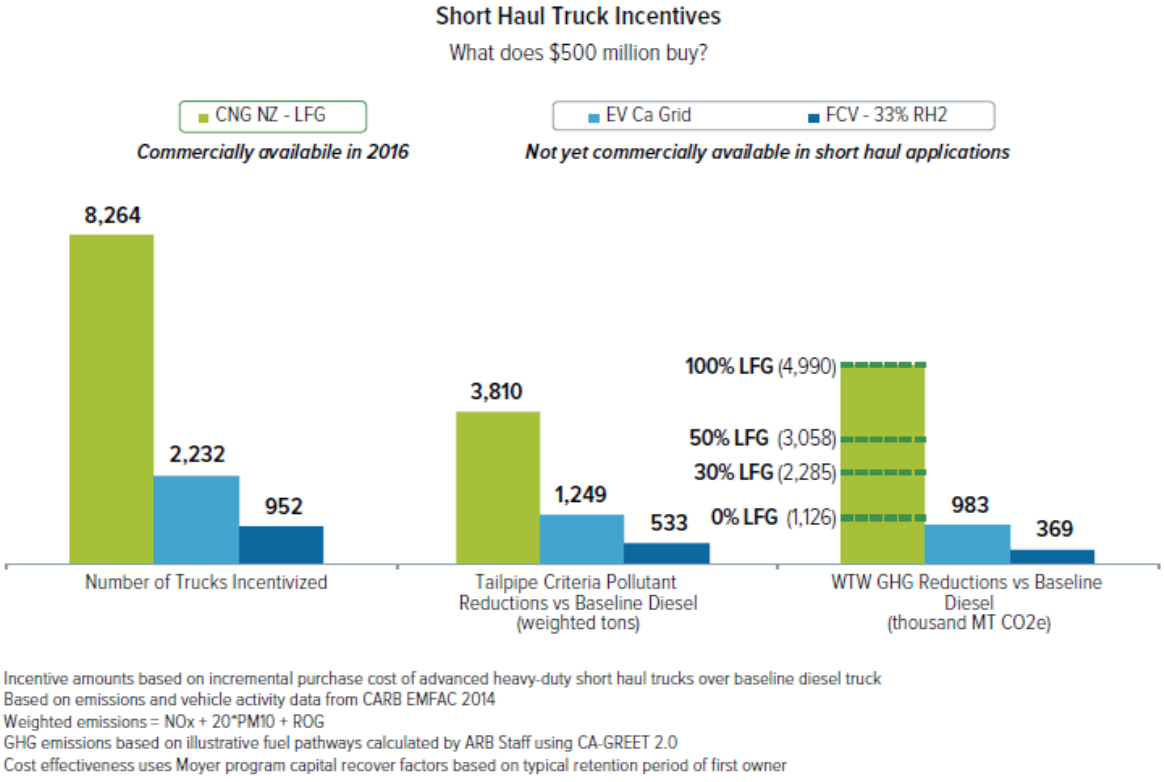


Note:

1. Analysis includes T7 Drayage, T7 Single, T7 Solid Waste Collection Vehicle, T7 Tractor, T7 Tractor Construction, T7 Agriculture, T7 Single Construction, T7 Public, T7 Utility, T7 IS, T6 Instate Heavy, T6 Instate Small, T6 Utility, T6 Public, T6 TS, T6 Agriculture, T6 Instate Construction Heavy, T6 Instate Construction Small, LHDDT, and LHDGT.
2. Maximum incentives range from $15,500 - $35,000/Truck depending on the vehicle type and engine size.
3. Assumed penetration rates after the incentive period ends remain at the 2023 level due to some mechanism.

As discussed at length in the *Game Changer Technical Whitepaper* by GNA, upgrading these traditional heavy-duty trucks with advanced near-zero emission natural gas vehicles can provide a cost-effective solution to help meet our climate change and air quality goals in the near term. Figure 3[11] below demonstrates the relative impact incentives supporting heavy-duty NGVs can have compared to alternative choices – which may not be available for several decades. For example, providing incentives for near-zero emission heavy-duty NGVs fueled with RNG can have three times the tailpipe criteria pollutant reduction and five times the "well-to-wheels" GHG reduction benefits as the next best alternative. Additionally, growing the demand for RNG as a vehicle fuel for California's goods movement sector will promote the development of RNG production facilities, which often present an opportunity to mitigate atmospheric emissions of methane at landfills and dairies. Coupled with the near-term availability of this technology, these leveraged impacts make supporting the adoption of heavy-duty NGVs through the CSFAP a clear choice.

Figure 3.



Incentive amounts based on incremental purchase cost of advanced heavy-duty short haul trucks over baseline diesel truck
Based on emissions and vehicle activity data from CARB EMFAC 2014
Weighted emissions = NOx + 20*PM10 + ROG
GHG emissions based on illustrative fuel pathways calculated by ARB Staff using CA-GREET 2.0
Cost effectiveness uses Moyer program capital recover factors based on typical retention period of first owner

As noted by the ARB in their Mobile Source Strategy, incentive funding is critical to deploying zero emission and near-zero emission heavy duty trucks. "Given the timing and the overlay of current regulatory programs, technology deployment by 2023 must come primarily through

[11] Game Changer, Technical White Paper, Next Generation Heavy-Duty Natural Gas Engines Fueled by Renewable Natural Gas, Figure 4.

incentive mechanisms."[12] Even more specifically applicable to the CSFAP, ARB references the need to incentivize low-NOx heavy-duty trucks:

> In the case of heavy-duty vehicles, combustion is likely to remain a dominant technology through 2031 based on the maturity of current technologies. Thus, the assessment focused on expanded deployment of low-NOx trucks. Under this approach, the population of trucks meeting a low-NOx standard in the South Coast would increase by approximately 150,000, totaling over 430,000 trucks by 2031. **These technologies are anticipated to be available, but will require substantial incentive funding to achieve this additional level of enhanced deployment**.[13]

As a result, a detailed discussion of an incentive funding plan for achieving the goals and objectives set forth in the CSFAP would be appropriate in the final version.

4. SoCalGas Encourages the Use of Natural Gas in Non-Road Freight-Related Engines

SoCalGas believes natural gas and renewable natural gas have an important role to play as transportation fuel for heavy duty engines in the non-road freight sector. Specifically, natural gas can significantly reduce emissions in ocean-going vessels and locomotives, which are large contributors of air pollutants in goods movement. SoCalGas has conducted analysis to evaluate the specific benefits of utilizing natural gas in heavy-duty non-road engines, and is pleased to share our findings here.

a. Ocean-Going Vessels Running on Liquefied Natural Gas Reduce Criteria Pollutants and Black Carbon Emissions

Emission estimates for an International Maritime Organization (IMO) Tier III diesel fueled 8,000 twenty-foot equivalent (TEU) OGV and a similar liquefied natural gas (LNG) OGV travelling from Los Angeles to Shanghai are shown in Table 1 of the attached Appendix B. Two different estimates were made for the diesel OGV - one before 2020 and the other for 2020 and beyond to capture the change in emissions resulting from the switch in fuel oil sulfur content to 0.5% required by IMO Regulation 14. **The results show a reduction of 92% in PM_{10}, 85% in NO_X, >99% in SO_X, and 39% in black carbon prior to 2020.** For calendar year 2020 and beyond, we see a smaller reduction in PM_{10} of 69% due to the use of lower sulfur fuel oil; however, reductions in black carbon emissions increase from 230 pounds per one-way trip (or 39%) to 330 pounds per one-way trip (or 49%).

To understand the potential impact of such a fuel switch, consider a scenario of LNG OGVs increasingly replacing diesel OGVs for container cargo transport between Southern California and Asia. Southern California Association of Governments' (SCAG's) 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) estimates that the Ports of

[12] Mobile Source Strategy, released by ARB May 2016, at p. 43.
http://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf

[13] Mobile Source Strategy, released by ARB May 2016, at p. 44 (emphasis added).

Los Angeles and Long Beach will handle around 36 million TEUs in 2035.[15] More than 90% of this cargo (around 32.4 million TEUs) would be traffic to/from Asia.[16] If LNG OGVs started replacing diesel OGVs in 2020 and carried half of projected 2035 Asian cargo, black carbon emissions from OGVs would be reduced every year after introduction up to approximately 340 tons/year by 2035.

b. LNG-Fueled Line-Haul Locomotives Reduce Black Carbon Emissions

Emission estimates for a 100 rail car double-stacked intermodal container train powered by three Tier 4 diesel locomotives and a similar train powered by three LNG locomotives travelling from Los Angeles to Chicago are provided in Table 2 of the attached Appendix B. Both locomotives (diesel and LNG) meet the USEPA Tier 4 standard; as a result, there are no reductions in PM_{10} or NO_X for the LNG locomotives as compared to the diesel locomotive. We do however see a **thirteen pound per one-way trip or 87% reduction in black carbon emissions with the use of LNG in place of diesel.**

Consider a scenario of LNG replacing diesel for freight trains from Southern California to and from the Midwest (e.g., Chicago). Historically, about 40% of the intermodal container cargo coming into the Ports of Los Angeles and Long Beach went to the Midwest/Chicago by rail. These ports are projected to handle container volumes of around 36 million TEUs in 2035[17] of which around 12.8 million TEUs are estimated to be transported by on- and off-dock intermodal trains.[18] If we assume that 40% of these TEUs travel to Chicago/Midwest region and a 100% of these trains are LNG fueled,[19] black carbon emissions would be reduced every year after the fuel switch up to approximately 85 tons/year by 2035.

For these reasons, SoCalGas would be pleased to partner with the State agencies to urge the federal EPA and the International Maritime Organization to speed their fuel requirements in these sectors and provide for improved air quality and lower GHGs and other emissions from these non-road sectors of freight movement.

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[15] SCAG, 2016 to 2040 RTP SCS - Transportation Goods Movement System Appendix, Adopted April 2016. Available at http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS_GoodsMovement.pdf. Accessed May 2016.

[16] Fact sheets for Ports of Los Angeles and Long Beach. Available at: https://www.portoflosangeles.org/pdf/POLA_Facts_and_Figures_Card.pdf and http://www.polb.com/about/facts.asp. Accessed: May 2016.

[17] SCAG. 2016 to 2040 RTP SCS - Transportation Goods Movement System Appendix, Adopted April 2016.

[18] Per 2016 to 2040 RTP SCS, approximately 35.5% (5-year average 2010 to 2014) of container volumes handled by the Ports of Los Angeles and Long Beach are transported by intermodal trains.

[19] It is assumed that the railroads would do a nearly complete fuel switch by major line to minimize duplicating fueling infrastructure.

Conclusion

SoCalGas is looking forward to reviewing the final CSFAP to be submitted to the Governor later this month, and is eager to help implement what we hope to be a cost-effective and flexible strategy to reach the State's ambitious sustainable freight goals.

Sincerely,

Jerilyn López Mendoza

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