SIEMENS

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Siemens Comments on the Draft California Sustainable Freight Action Plan

To:
California State Transportation Agency,
California Environmental Protection Agency,
California Natural Resources Agency,
California Air Resources Board,
California Department of Transportation,
California Energy Commission,
Governor's Office of Business and Economic Development

Dear Sirs,

Thank you for the opportunity to comment on the Draft California Sustainable Freight Action Plan (Plan).

To reach the 2050 goal of reduced greenhouse gas emissions, freight transport in California needs to make a significant contribution. This is in particular a challenge for the biggest energy consumer and source of emissions: Class 8 over-the-road trucks. Even with existing control programs greenhouse gas (GHG) emissions from California's trucks are expected to grow and reach nearly 35 million metric tons (MMT) CO_2e in 2050 [1]. This is not a unique challenge to California. Globally, GHG emissions from surface freight are growing rapidly and are expected to surpass emissions from passenger transport by 2030 and keep diverging afterwards [2]. Shifting freight to other modes, such as an upgraded rail system, may play a part of the solution. That said, road freight is anticipated to remain a large and vital part of the transport system.

To achieve general goals of cutting petroleum use and GHG, it is imperative that freight trucks are put on a path towards zero emissions. This is a conclusion reached by more and more governments around the world and it is welcome that California wishes to lead this transition with the goal of 100,000 vehicles capable of zero emission operation. That target does not specify what kind of freight vehicles make up the 100,000, but it will be essential to include zero-emission Class 8 that can scale to long distance, since it is doubtful that lighter vehicles or those with shorter range can be extended to such operations in a practical and economical way, which is necessary for the transition to reach also the largest source of emissions[1]. A typical tractor truck is estimated emit nearly 200 tons of CO_2 per year, so if around 30,000 of them were running on renewable electricity instead of diesel, that would mean 6m ton of annual savings. 6m

[1] The ICCT estimates that tractor trucks consume 60% of all fuel used by HDVs bought in the US in 2014.[3]

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ton is also the required saving to met the CSFAP goal of increasing systems efficiency by 25% by 2030, assuming that sector GDP grows as forecast.

Zero emission trucking is also important to reach the air quality goals of California, especially in areas around the main freight corridors. Another important reason to set zero emission as the goal has to do with considerations of the corporate sector. As ARB has written previously, by focusing on the ultimate technology endpoint (zero emissions) that satisfies all of California's air quality goals and supporting needed engineering advances, is it possible to provide the certainty businesses need for long term planning [1]. Business can then be certain that the products they develop, buy and use will be welcome in the market place for foreseeable future. As the CSFAP points out, one way of placing business considerations at the heart of the strategy is to target improvements in system efficiency. Choosing the most cost-effective way of reaching zero emission trucking is essential, as the economic case will underpin technology development and a rapid and broad adoption.

Given the goal of California to generate 50% of electricity from renewable sources, as well as federal plans for decarbonizing power generation, it makes sense to find efficient ways to make this clean energy available to heavy duty trucks. Electro-mobility offers a variety of benefits, including improved local air quality and increased energy efficiency, which lowers operating costs. The main obstacle to electrified road freight has been the size and weight required for on-board storage of electrical energy, as well as the challenge of charging the large amounts of energy required in a reasonable time without diminishing the useable life of the battery. This problem can be solved by providing power to the truck as it is driving through an overhead catenary system [4]. Thanks to an active pantograph, connecting and disconnecting at highway speeds is possible and the hybrid trucks can maintain the operational flexibility of conventional combustion engine trucks. Another strong benefit of this solution is that it allows for enhancing existing freight infrastructure, something the CSFAP has also explicitly called for.

Catenary solutions are currently being demonstrated on public roads. For example, last month the Swedish government inaugurated a demonstration project of a freight truck catenary system built by Siemens [5]. The truck partner Scania has posted brief and informative videos about the goals of the project [6], the final preparations for the inauguration [7] and the inauguration day [8]. The Swedish Transportation Administration is supporting the project in order to generate a knowledge base that will support a decision "in about five years" if the solution should be implemented on the core parts of Swedish highway network. Sweden has a goal of a fossil-fuel independent vehicle fleet by 2030.

In Germany, Siemens is operating catenary test track on a 1.2 mile long private road. This is the result of a joint development project with the German Federal Ministry of Environment. As part of a continuation of the development, the German Federal Highway Research Institute (BASt) was involved in a technical assessment of the system, concluding that an application on Germany's autobahn would be possible. This

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confirms the view of the Swedish road authorities, which approved the catenary infrastructure for the public road demonstration without any exemptions from the existing rules and regulations.

German authorities have also done detailed assessments of the economical and ecological impact of using a catenary hybrid system for carbon neutral road freight. Subsequently the German Federal Environment Agency (UBA) has also come out strongly in favor of catenary hybrids as “the most economic and technologically most efficient option for long-distance transport” [9]. This is also why it is large trucking associations (e.g. BGL in Germany [14]) are advocating this option for achieving a carbon neutral trucking sector by 2050. Giving companies the option with the lowest operating cost and the least volatility in fuel prices is likely to be good for growth. UBA has also published their recommendations [10] for Germany’s “Climate Protection Plan 2050”. There they advocate: *“The federal government should support the further development of catenary-hybrid trucks to an implementable option and with continued good prospects implement the technology; for that purpose the construction of the infrastructure should begin well in advance of 2030”*[11]. Their conclusion led the German federal government to issue a Call for a field trial of catenary hybrids and three federal states have submitted proposals that are currently being evaluated in Berlin. The German government has indicated that they want the project started before the next election (expected around October 2017). A recent news report gives an example of where such a pilot can be put [12].

Independent reports also confirm the economic and environmental benefits of a catenary solution in California [13]. This led the South Coast Air Quality Management District to commission a project, with Siemens, near the ports of Los Angeles and Long Beach in the City of Carson, CA. Construction of the project involves vehicles of several different trucks, one of which is being provided in collaboration with Mack. The goal of the project is to collect data and evaluate the benefits of such a system, especially for highly used road freight operations connecting the ports with local rail yards and logistics centers.

Conclusion

Much of California’s road freight is concentrated on freight corridors, whether it be the I-710, the I-5, SR-99 or Highway 60, all which help form the backbone of California’s freight network. This has been seen as a major challenge to address, but is equally an opportunity for a solution where proven infrastructure can be innovatively used by hybrid and full electric vehicles.

Siemens welcomes the focus by Federal and local and the leading agencies in developing strategies that will reduce road freight emissions to California’s 2050 climate goal (-80% total state emissions) in the most economical and technically feasible way. Building on the progress and analyses around the world in the field of catenary-hybrid trucks this could done by:

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- Considering catenary-hybrids as an option that can contribute significantly to addressing road freight emissions in the 2050 Vision and the intermediate 2030 targets. For instance by:
    - including it in the Well-to-Wheel emissions assessments by ARB
    - deepen the analysis of it in the Technology and Fuels Assessments by ARB
    - conducting a road technical assessment by Caltrans
    - assessing it from an energy efficiency, supply and connection perspective by CEC
- Accelerating the accumulation of knowledge and experience of catenary hybrid systems. For instance by:
    - including catenary hybrid technology in the Advanced Technology for Trucks Corridor pilot project
    - breaking down the overall goal of 100.000 zero emission freight vehicles to include a sub-goal for Class 8 trucks able to scale to long-haul operations in an economical and practical way

Sincerely,
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Sources and references

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[2] http://2016.itf-oecd.org/sites/2016.internationaltransportforum.org/files/documents/en/jari-kauppila-outlook-presentation.pdf
[3] http://www.theicct.org/sites/default/files/publications/ICCT_EU-HDV_mkt-analysis_201512.pdf
[4] An animation explaining the technical concept is available online: https://www.youtube.com/watch?v=Z8l9ieoIazc
[5] http://www.siemens.com/press/en/pressrelease/?press=/en/pressrelease/2016/mobility/pr2016060319moen.htm&content%5b%5d=MO
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[10] https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/klimaschutzplan_2050_der_bundesregierung_0.pdf
[11] Translation from the original German: "*Die Bundesregierung sollte die Weiterentwicklung des OH-Lkw zur umsetzbaren Option fördern und diese Technik bei weiterhin guten Aussichten umsetzen; dazu sollte mit dem Infrastruktur-aufbau deutlich vor 2030 begonnen werden*"
[12] https://www.youtube.com/watch?v=SLINEPY-o1g
[13] http://www.gladstein.org/pdfs/ZETECHMarketStudy.pdf
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