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Submitted via email to Evan Kersnar

April 19, 2018

Mary D. Nichols, Chair  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

Re: Comments to the Innovative Clean Transit Regulation Discussion Document

Dear Chair Nichols and Members of the Air Resources Board:

On behalf of BAE Systems, we hereby submit comments in response to the Innovative Clean Transit (ICT) Regulation Discussion Document dated December 15, 2017, and the Update to that document dated March 27, 2018 (collectively, "ICT Document"), and focus our comments on the following identified areas of interest:

- Transit Progress – *Recognize electric hybrid buses affirmatively as an important part of the pathway to the zero emission fleet goal.*
- Regulation Start Date – *Provide transit agencies with more flexibility, and extend the implementation ramp to meet the zero emission fleet goal, to increase chance of success.*
- Role of Incentives – *Retain and expand the existing hybrid bus incentive in HVIP to include additional forms of electrification, and encourage fleets to purchase lower GHG alternatives instead of buying conventional buses during the transition to full zero emission.*

BAE Systems, a global company, is committed to electrifying transit around the world, and the California market is a key part of our commitment. We have been developing and advancing electric powertrain technology for over 20 years, and have deep experience working closely with bus manufacturers and transit agencies throughout the United States and around the world. Our major fleet end users include Paris, London, New York, Boston, Montreal, Toronto, Seattle, San Francisco and Santa Clara. By the close of 2018, we will have 10,000 transit bus systems operating worldwide and our fleets will have accumulated over 2 billion miles of service.

**Transit Progress** – *Recognize electric hybrid buses affirmatively as an important part of the pathway to the zero emission fleet goal.*

In California, more than 1,000 electric hybrid buses provide safe, efficient, reliable service that saves fuel and reduces GHG emissions. BAE Systems powers over 600 of these buses, including an additional 20 zero emission hydrogen and battery-powered buses in state. Many of our fleet customers use our electric hybrid technology as a pathway to full zero emission. As an example of our continuing investment in, and commitment to, the transit bus market, we recently introduced anti-idle technology and higher capacity batteries to reduce engine idling and further boost vehicle efficiency. We are now working to extend further the pathways to zero emission by adding a plug-in charger option and mid-life electric vehicle (EV) conversion kits.

The ICT Document does not address the considerable contributions that electric hybrid buses have made to the state's goals of petroleum and GHG reduction. By not addressing electric hybrid buses as a part of the solution, the ICT Document essentially treats electric hybrid buses identically to conventional diesel buses.

To remedy this technology disparity, acknowledge the continuing contributions of electric hybrid buses to reducing GHG, and provide investment certainty for transit agencies and their suppliers, we request the revised ICT Document include a statement such as the following:

*During the transition to zero emission fleets, transit agencies are strongly encouraged to continue to deploy near-zero emission options such as electric hybrid buses pursuant to such agencies' respective zero emission transition policies.*

**Regulation Start Date** – *Provide transit agencies with more flexibility, and extend the implementation ramp to meet the zero emission fleet goal, to increase chance of success.*

In addition to electric hybrid systems, BAE Systems provides all-electric powertrains that have directly evolved from, and use common components with, our electric hybrid systems. We are successfully demonstrating battery and hydrogen fuel cell electric powertrains, including full electric accessories, in 20 zero emission buses currently in California. Our company has helped pioneer the early adoption of zero emissions technology in North America and Europe, and we want zero emission buses powered by our technology to succeed for transit agencies and Californians alike. For these reasons, we fully support the ICT Document goal of having 100 percent zero emission fleets by the year 2040.

As a powertrain manufacturer in battery electric and fuel cell electric zero emission buses, however, BAE Systems is concerned about the proposed ramp rate for mandatory purchases of zero emission buses by large transit fleets. Our knowledge and experience in the development, deployment, adoption and support of advanced clean propulsion technologies, including our

understanding of the supply chain and infrastructure challenges for zero emission buses, show that a lower initial rate of adoption towards the 100% goal is an attainable, lower-risk approach. A shaped adoption rate will allow early adopters to immediately deploy zero emission buses while allowing time for mid adopters to become fully prepared to deploy. At the same time, the mid adopters can take full advantage of technology improvements and technology insertions as they naturally develop.

Therefore, in recognition of the wide spectrum of agencies' needs in providing mass transit throughout the state, BAE Systems supports providing transit agencies more flexibility to meet the goal of 100 percent zero emission through broadened technology pathways and adoption rates based upon individual fleet transition policies.

**Role of Incentives** – *Retain and expand the existing hybrid bus incentive in HVIP to include additional forms of electrification (e.g. anti-idle, higher capacity batteries, plug in, and midlife EV conversions), and encourage fleets to purchase lower GHG alternatives instead of buying conventional buses during the transition to full zero emission.*

Currently, the Hybrid and Zero Emission Truck and Bus Voucher Incentive Project ("HVIP") provides an incentive for electric hybrid buses. We strongly urge that ARB retain HVIP to forestall potential backsliding under the ICT Document. We believe that transit agencies in Northern California may be forced, due to funding constraints, to resort to purchasing conventional buses over higher efficiency electric hybrid buses under the ICT Document. We estimate that approximately 1,350 conventional buses could be purchased during the proposed transition period, resulting in an additional 18 million gallons of diesel fuel consumed and 300,000 tons of GHG emitted. A strong electric hybrid statement and robust HVIP voucher program from ARB will help to forestall potential backsliding as an unintended consequence under the proposed rule.

Furthermore, we urge ARB to consider expanding the range of HVIP vouchers to recognize the potential of additional low GHG solutions and encourage them to come to market. Additional incentives for consideration should include anti-idle technologies, higher capacity batteries, plug-in charging, and midlife EV conversions. We would also encourage ARB to consider an incentive to encourage conventional CNG and diesel buses to take advantage of fully electrified accessories to help introduce electrification into legacy markets. All of these partial electric solutions would provide for additional GHG reductions above and beyond what will be achieved with the current ICT Document mandate, help build the industrial base for full scale electrification, and meet the state's long term GHG reduction goals.

In conclusion, electric hybrid buses play an important role in the successful transition to a zero emission fleet in California. As such, BAE Systems strongly urges that ARB include in its ICT regulation the following concepts:

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- 1) Recognize electric hybrid buses affirmatively alongside other near-zero emission technologies;
- 2) Provide transit fleets with more flexibility and a longer ramp to reach the goal of 100 percent; and
- 3) Retain and expand the list of incentives for electric hybrid buses under HVIP to include new technologies that accelerate the conversion of hybrids to all-electric and products that support all-electric buses.

Thank you for your consideration of BAE Systems' comments to the ICT Document. We look forward to working with the ARB team to achieve its goal of 100 percent zero emission fleets by 2040.

Please feel free to contact me with any questions you may have regarding our comments.

Sincerely,



Stephen J. Trichka  
Vice President and General Manager, Power & Propulsion Solutions  
BAE Systems

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