



In accordance with Section 1 of Public Act 22-25, *An Act Concerning the Connecticut Clean Air Act*, the purpose of this letter is to report on:

- (1) the feasibility of creating a competitive bid process for the aggregate procurement of light, medium and heavy-duty battery electric vehicles, fuel cell electric vehicles and zero-emission buses,
- (2) a determination of whether such aggregate procurement would achieve a cost savings on the purchase of such vehicles and buses and related administrative costs,
- (3) a plan to implement zero-emission buses state-wide, and
- (4) the identification any barriers to such implementation.

That report is as follows.

1. The feasibility of creating a competitive bid process for the aggregate procurement of electric vehicles

By way of background, Public Act 22-25 requires that:

1. At least 50% of the cars and light-duty trucks purchased or leased by the state be battery electric vehicles by January 1, 2026;
2. At least 75% of such cars and trucks be electric by January 1, 2028; and
3. That 100% of such vehicles be electric by January 1, 2030.

The first step in converting the state fleet to electric is ensuring that the state has sufficient charging infrastructure to power the new electric vehicles. DAS Fleet Operations and DAS Construction Services are currently in the planning and design phase of installing over 575 electric vehicle charging ports to meet this mandate.

Specifically, DAS is currently contracting with Urban Engineers (UE) to develop a road map for installation of EV chargers at state properties where leased fleet vehicles are regularly garaged. UE is currently finalizing design of five charging stations that will be included in Site Group 1. The locations of those stations are as follows:

- Middletown: CT Valley Hospital
- Norwich: 401 West Thames Street
- Southbury: DDS Southbury Training School
- Hartford: DCF Central Office

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- Torrington: DOL – American Job Center & Torrington: Torrington Superior Court

DAS plans to have this first group of chargers installed and operational towards the end of 2024 and early 2025 for fleet vehicles.

DAS and UE have conducted interviews with the various firms on our EV contract to understand the EV market, review the Electric Vehicle Supply Equipment (EVSE) hardware and software (Network) functionality, and discuss any supply chain issues and challenges that exist. DAS will review this information to provide a recommendation on specific equipment to use for installation.

At this time, the aggregate procurement of light, medium and heavy-duty battery electric vehicles, fuel cell electric vehicles and zero-emission buses is constrained, primarily due to the lack of such electric vehicle charging ports. However, in addition to the aforementioned work on the installation of charging stations, DAS Fleet and DAS Procurement are reevaluating the next iteration of the light-duty vehicle purchase contract to ensure flexibility and longevity. We are hopeful that as the state's efforts to install EV infrastructure come to fruition and the market matures, aggregate procurement opportunities will become feasible.

2. A determination of whether an aggregate procurement of electric vehicles would achieve a cost savings

The cost of the aggregate procurement of electric vehicles and future purchases cannot be quantified at this time due to many factors, including the availability of EV makes and models, pricing for different model years, fleet allocations by manufacturers, and ultimately the build-out of charging infrastructure.

DAS received \$35 million in the FY 24-25 biennial budget to support the purchase of EVs, and planning, programming, and hiring of the contractor to develop our roadmap. DAS has been in communications with the Department of Energy and Environmental Protection (DEEP) for additional funding through the Volkswagen settlement fund the agency manages under a Memorandum of Agreement, and with the utility companies for any potential rebates and incentives from installing EV chargers. DAS is collaborating with the Department of Transportation (DOT) on similar efforts to share ideas and challenges that have come up and developing solutions to move forward towards implementation.

3. A plan to implement zero-emission buses state-wide

CTDOT is committed to meeting the legislative mandates of electrification of the transit system by 2035. CTDOT, through its CTtransit branded bus service, operates the transit systems in the cities of Hartford, New Haven, Stamford, and Waterbury, and provides over 75% of the bus

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service in Connecticut. However, there are limitations beyond our control that may be barriers for full implementation which will be explained below.

4. The identification of any barriers to implementation of zero-emission buses state-wide

Below is a summary of the existing limitations:

Existing power grid: The most significant impediment outside of our control is the capacity of the existing electrical grid to supply the necessary power needed to charge the full deployment of BEBs. We have been coordinating with the local power companies to determine the existing capacity in the vicinity of the CTtransit bus charging facilities and have determined that we can provide the follow percentage of charging at our existing CTtransit facilities today:

Stamford 100%
Hamden 20%
Hartford 30%
Waterbury 50%

Beyond this level will require a multi-year effort by the electrical companies to increase the power availability at these locations that will involve running new feeders and, in the case of the largest facilities, expanded or all new substations. The power demands for the full build out of the fleets for our larger facilities is between 20 to 40 MW in peak demand. These are multi-year projects that will require extensive funding. How these costs will be addressed is part of an ongoing PURA rate hearing process.

Facilities cost: The existing transit facilities will require extensive modifications to accommodate the necessary Battery Electric Bus (BEB) infrastructure including new electrical charging and power distribution systems, improved HVAC and fire protection systems, and BEB maintenance capabilities. The cost to upgrade the existing facilities will likely exceed one billion dollars. The state of Connecticut has been very successful in procuring federal grant funding to date and we are optimistic that this funding will continue to be available but there is no guarantee. It should be noted that a state match of at least 20% will still be required for any federal funding received.

An added complexity is that given the inherently phased approach for this transition will require us to maintain both types of buses in operation while simultaneously doing phased construction projects. We are looking at the feasibility of building additional satellite facilities for CTtransit and the private operators to increase capacity. This may require property acquisition and development of a new bus facility.



BEB costs: All buses procured with federal funds are required to be kept in service for 12 years, therefore CTtransit and other transit districts across the state aim to replace buses on a 12-year cycle. This cyclical replacement program means that CTtransit is constantly procuring and replacing buses when they reach the end of their useful life. The average battery electric bus is approximately \$1,000,000 per bus, but costs are decreasing as the technology improves. The upfront costs are more for the battery electric buses, but ultimately save money over the life of the vehicle. Diesel buses cost approximately \$500,000 per bus.

Cost savings compared to the diesel alternative can be looked at through fuel, maintenance and operations, and additional societal benefits. A typical diesel bus uses 10,000 gallons of fuel a year. Over 12 years, over \$400,000 in reduced fuel costs can be achieved with one electric bus. There is an estimated savings of \$50,000 annually, or \$600,000 over the 12-year life span, in maintenance costs. EPA data estimates the health benefits of replacing one diesel bus with one electric bus in Connecticut saves \$370,000 due to a reduction in respiratory and other health problems over the 12-year life span.

All told, over a million dollars in savings – plus the ancillary health benefits to our communities – can be achieved with one electric bus. According to a 2020 Financial Analysis of Battery Electric Transit Buses by the National Renewable Energy Laboratory, the payback period, or breakeven point, was about 3.5 years. This means there are annual savings for the next 8.5 years of operation.

Energy cost: The amount of electricity required to operate the BEB fleet is significant and due to the increase peak load at some of our facilities (i.e., sometimes 50 time the existing building loads), we could potentially be subject to significant electrical demand charges. We are currently in the process of a PURA hearing to address the electrical costs and have made the case for total electrical costs to be revenue neutral to the cost of diesel on a per mile basis. However, due to the deregulated nature of electrical power generation, some of this is outside the control of state regulators or the distribution companies.

Supply Chain issues: During the global pandemic and increasingly rapid electrification on the transportation and building industries, there has been a vast impact to the global supply chain for electrical components for construction of infrastructure projects. This delay has pushed out projects that typically had a 12-month time for construction to over 24+ months and beyond. It was hoped following the end of the pandemic that these issues would end, and we have seen an improvement of some building components, but electrical components continue to be problematic.

Bus manufacturing capacity and technological development: CTDOT operates under FTA requirement for procurement of BEBs which mandate Buy America clauses. Unfortunately, the US has recently lost two of the four domestic manufacturers of BEBs and the one of the



remaining manufacturers has limited capacity. CTDOT is concerned that the remaining major manufacturer will have difficulty with the increased market share as the deployment of BEBs increases in the US.

Additionally, while there has been great advancement in the development of BEB technology over the last five years, BEBs are still relatively young in their overall lifecycle, and it is anticipated there will be more bumps along the way. Therefore, we will need to keep some of the existing diesel fleets as contingency buses during the transition and maintain both types of buses and associated infrastructure over the ensuing 12 years as we phase out diesel buses.

Special consideration of the Urban transit districts: Additionally, the urban transit districts (GBT/NTD/HART/MTD/MAT now RVTD) that are direct recipients of FTA funding do not have the same level of resources as the State of Connecticut and have historically relied upon CTDOT to supplement their operational costs and help pay for infrastructure upgrades. These agencies may require some future relief from the existing executive orders prohibiting the state from participating in a 20% match for the procurement of non-zero emissions vehicles. Additionally, there are private contractors (New Britain Transportation Co., Dattco), that operate CTtransit buses in certain municipalities out of private garages that have limited resources to upgrade those facilities.

The urban transit districts have their own limitations beyond those mentioned above. To assist these urban transit districts with their deployments, we have prepared feasibility studies for the power needs of these districts and are working with them on advancing their individual programs. Most of the studies have been completed to date, and we are working with them to overcome the limitations identified.

Additionally, we have developed BEBs pilot programs for multiple smaller districts in 2024. These pilots will allow the districts to gain valuable experience on the operating capabilities of BEBs vs diesel buses and to leverage CTtransit knowledge for their support.

Thank you for the opportunity to report on these important topics, and we would be happy to answer any questions that you may have.

Sincerely,

Michelle H. Gilman
Commissioner
Department of Administrative Services

Garrett Eucalitto
Commissioner
Department of Transportation