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NYS ELECTRIC VEHICLE BUS MANDATE & WHAT TO DO ABOUT IT

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The 2022 New York State budget includes a provision that requires school districts to transition their bus fleets to be zero emissions (defined as electric buses). All school bus purchases starting in 2027 must meet this requirement. The entire school bus fleet must be fully electric by 2033 unless the school district applies for a two-year extension.

This new requirement has left school districts challenged as there are a lot of new pieces of information that districts must consider, including: cost (Bus/Fuel/Electricity); route length/range; battery considerations; charger selection; recharge time; infrastructure design/installation; managed or unmanaged charging; utility provider offerings; operational layout; maintenance; and safety. The largest barriers for a district transitioning to electric vehicles are cost and complexity.

Financial

A substantial hurdle that a district will need to tackle is finding funds to pay for the transition to an electric fleet. There are many costs to consider including the cost of the bus, infrastructure costs and cost of electricity. Currently a base model bus would cost a district approximately \$370,000 while

a similarly sized diesel bus is currently around \$130,000. The drastic cost difference will necessitate the need for finding additional funding to supplement the cost difference. Districts should look at grants on a federal, state, local, and private level. Some current options for districts would be the current EPA grant as well as settlement funds like the Volkswagen ZEV Investment Plan.

The purchasing of the electric buses in New York is an aidable expense. Something to keep in mind is that the district will not receive the aid until the year following the purchase, which will require the district to fund the upfront capital. We strongly recommend that a district consult with their financial advisor for creative funding solutions. While the higher costs will be a challenge for districts, there are some potential on-going cost savings that the district might realize including lower maintenance costs and more stable "fuel" prices (electricity).

Given the substantially higher price tag of the electric buses, and with no historical data related to resale value at the end of the financing period, districts will initially have no idea of potential residual value of the electric buses at the end of their investment.

There is existing historical data of residual value in current diesel vehicles, however with amortization shifting from five years to ten years, it is currently unknown if electric buses will retain value after the ten years of amortization. While the district may replace vehicles sooner than ten years, it would be very challenging if a district was amortizing an asset for years after it is no longer an operational asset.

As it relates to financing, districts may also address the option of whether to purchase the electric buses with traditional financing or to lease the new vehicles. This lease option would have both positive and negative consequences. Leasing would release the financial upfront costs of obtaining buses by spreading out the costs over the length of the contract. This may also keep the district in a better position for obtaining the newest technology. On the other hand, leasing would have a larger total cost for the district, there would be the challenge of determining the residual value in the lease cost calculation, and leasing would not help the up-front costs of the infrastructure required. The consideration of leasing is another area that necessitates the effective use of the district's financial advisor.

Infrastructure

A consideration that districts must consider at the onset of implementation is the infrastructure and operational layout. Districts will need to be strategic about charging station locations and parking. Finding space in some districts may become problematic in areas where space is not readily available for charging and parking daily. The

charging stations also require access to 3-phase power, meaning that it is likely the district's utility provider will need to be involved in putting in additional services and running high voltage power to where the buses will be charging. If the district can locate charging near existing adequate power, it would save in capital expense cost as well as time spent on implementation. It is recommended that districts understand and develop relationships with their specific utility representative as it will assist in the infrastructure layout. It typically takes between 6-12 months to get infrastructure installation complete.

Another consideration is exploring your charging needs upfront as this will help determine the amount of power required and the best strategic location for the services. The cost estimates for school districts are typically \$10,000 to \$30,000 in capital expense. Infrastructure is something that must be taken care of before electric buses can start running routes.

Equipment

Typical electric buses have a maximum range of around 120 miles, with an option for additional upgrades to the battery pack to gain additional range. It is recommended to keep at least 20% of the battery charge to prevent early degradation. The battery degradation would typically be around 2% per year. Given the limitations on the range of the electric vehicles (mileage per charge), districts may need to adjust the length of their existing routes and should factor in weather conditions and the elevation changes which could decrease the mileage up to 10% each.

With all these factors, districts should develop a detailed battery strategy. This strategy should include the size of the battery (measured in kilowatt hours), degradation, replacement, and warranties. Important KPIs should include energy used; charge cycles; average state of charge; depth of discharge; cell temperatures; and current rate. With so many considerations, it is critical that districts have a trusted partner to assist them in making appropriate determinations that will impact the district for many years. Battery technology is constantly improving and there is likely to be significant improvement in the next five years with greater efficiencies that will allow the battery to hold more power and improve the distances each bus can travel on a single charge.

There are two main types of power charging options, AC and DC power. Utilizing AC power will be cheaper; however, they will charge the buses more slowly. With an AC charging option, it would take around 8 hours for a full charge depending on the battery size and charging situation. By utilizing DC power, the district may opt for a fast-charging option which is more costly but will charge the buses more quickly. Utilizing a DC fast charging station will allow a full battery charge in around 3 hours. When thinking about which option to choose, districts should consider the cost benefits, bus availability, battery longevity, recharge time, route length, and technology to assist with optimizing charging. In many cases, buses are being used for several morning runs, midday runs, afternoon runs, and late runs.

This does not provide a substantial amount of time to charge in between runs, thereby requiring a fast-charging solution if the total mileage for the day exceeds the capacity of the battery. This is an issue that must also be addressed with the district's utility representative.

Staffing & Training

There are additional considerations involving maintenance and safety. Electric buses are anticipated to have less required maintenance; however, there is an extremely limited no pool of maintenance technicians who are trained on electric buses. Districts will need to be proactive in training existing maintenance technicians in servicing buses safely. Training topics would include cooling, HVAC, air compressors, and power steering. When dealing with high voltage electricity, there are significant safety concerns thereby mandating an extensive amount of training and safety measures that must be put into place.

Operations

Another decision that districts will need to face is the utilization of managed or unmanaged charging. Unmanaged charging is simply plugging a bus in to charge until it is unplugged. This option is a bit

cheaper, but has the drawback of lack of control over charging times, charging the whole fleet at the same time at the end of the day, and charging during peak times. Managed charging utilizes software that determines when charging occurs. This option incurs an upfront and ongoing cost while also requiring the district to manage when charging occurs. However, this option gives the district increased control on charging times which can substantially reduce demand charges and reduce standby power.

Contracts

There are many districts that are currently contracting out some or all their transportation department to an outside vendor, with most of the contracts up to five years in length. Any contract starting in the school year of 2023-2024 with a five-year term will overlap with the start of the mandate for purchases of electric only buses. Each district will need to add language to their future contracts that incorporate contingencies that allow for the transition from diesel to electric buses. The changeover to electric buses will also mean that contractors, who perform transportation services for school districts, will need to commence with all the same planning considerations that a district will need to address.

With these requirements and extensive costs there are several key issues affecting the districts that will arise. The first is due to the extensive additional costs of infrastructure, and cost of the electric buses, those costs will be passed through to the district. Secondly, contract (specification) terms and conditions must be developed to reflect the operating and financial elements of mandating and using electric buses. Additionally, significant capital will be required by the Contractor, thereby making it much more challenging for smaller run contractors to adapt and change.

With the extensive and challenging considerations that are facing school districts, it is imperative to commence the planning and strategy planning soon to allow for enough time to get the appropriate infrastructure in place while securing the appropriate approvals and funding. Having a trusted partner to assist the school district can help bring about clarity and ensure a timely implementation.

If you need further guidance or have any questions on this topic, we're here to help. Please do not hesitate to reach out to our trusted experts to discuss your specific situation.

The right consultant can be a true resource for your organization. We provide our clients with quality, responsive service from consultants who are not burdened by conflicts of interest. Call us today to discuss your specific needs and to request a written proposal.

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