Filing Receipt

Filing Date - 2024-11-22 02:49:50 PM

Control Number - 57236

Item Number - 7

PROJECT NO. 57236

PROJECT TO DEVELOP THE TEXAS

BACKUP POWER PACKAGE PROGRAM

§ § §

PUBLIC UTILITY COMMISSION

OF TEXAS

COMMENTS OF TEXAS ELECTRIC SCHOOL BUS PROJECT

On behalf of the Texas Electric School Bus Project (TESBP), I am writing to express our strong support for integrating Electric School Buses (ESBs) into the Texas Backup Power Package (TBPP). This document highlights how ESBs, when used as dual-purpose assets, offer a cost-effective, scalable, and innovative solution for backup power. We also recommend focusing TBPP funding on the **battery asset** within ESBs and propose the adoption of a **Resilience-as-a-Service (RaaS)** model to maximize program efficiency and accessibility.

Building Resilience Through Electric School Buses

The inclusion of ESBs in the TBPP aligns perfectly with the program's mission to ensure reliable power for critical facilities while promoting clean, sustainable energy use. ESBs serve a **dual purpose**:

1. Providing safe, emissions-free transportation for Texas students during normal operations.
2. Acting as mobile, scalable backup power solutions for critical facilities during emergencies.

Each ESB's high-capacity battery (e.g., 150 kWh +) can provide continuous power to critical facilities, such as police and fire stations, shelters, or nursing homes, ensuring vital services remain operational during outages. This dual-functionality not only supports emergency preparedness but also leverages taxpayer investment for everyday community benefit.

Recommendation to Fund Only the Battery Asset

We propose that TBPP funds focus specifically on the **battery asset** within ESBs, which directly supports emergency power needs. This approach:

- **Maximizes Resource Efficiency**: Funding the battery instead of the full ESB vehicle ensures that TBPP dollars go directly toward the program's resilience goals. Batteries,

which typically cost $30,000–$50,000, are far more affordable than the full vehicle, enabling more facilities to benefit from TBPP funding.
- **Promotes Cross-Sector Collaboration**: Focusing on the battery asset encourages school districts and municipalities to cover vehicle costs through transportation budgets, environmental grants, or other funding sources, while TBPP supports the resilience component.
- **Expands Program Reach**: By reducing the per-unit cost of funding, more critical facilities can benefit, ensuring TBPP has a broader impact across Texas communities.

Leveraging the Resilience-as-a-Service (RaaS) Model

The RaaS model offers an innovative and cost-effective pathway for critical facilities to access ESBs as both transport and backup power solutions. Key benefits of the RaaS model include:

- **Lower Cost of Entry**: Facilities can avoid the high upfront cost of purchasing backup power systems by subscribing to a managed service model.
- **Comprehensive Support**: Service providers handle battery maintenance, system monitoring, and performance testing, ensuring ESBs remain operationally ready.
- **Scalability and Flexibility**: Facilities can scale their subscriptions to match seasonal or emergency demands, making the RaaS model adaptable to evolving needs.

Addressing Challenges and Ensuring Flexibility

We echo TAEBA's recommendation for a **flexible TBPP framework** that accommodates diverse technologies and facility requirements. By including ESBs alongside solar + storage and traditional generators, the TBPP ensures facilities can select solutions tailored to their specific needs.

Additionally, technical standards like **IEEE 1547** should guide interconnection specifications, ensuring safe and efficient integration with facility infrastructure. For ESBs, plug-and-play compatibility should be prioritized, allowing for rapid deployment during emergencies.

Economic and Environmental Benefits

Integrating ESBs into the TBPP provides substantial economic and environmental advantages, including:

- **Lower Operating Costs**: ESBs reduce reliance on diesel, saving districts and municipalities money while improving air quality for students and staff.
- **Local Job Creation**: Supporting Texas-based ESB repowering and battery production creates jobs and stimulates economic growth within the state.

Supporting Long-Term Resilience

To ensure the long-term success of the TBPP, we recommend:

1. Establishing maintenance agreements for all funded assets, with regular testing to ensure readiness.
2. Offering flexible financing options, such as lease-to-own or RaaS, to reduce financial barriers for facilities.
3. Leveraging bulk purchasing agreements to manage supply chain constraints and drive down costs.

Conclusion

The Texas Electric School Bus Project strongly supports the inclusion of ESBs as a cornerstone of the Texas Backup Power Package. By focusing on the battery asset and adopting innovative ownership models like RaaS, the TBPP can provide scalable, cost-effective, and environmentally sustainable solutions that benefit all Texans.

We look forward to collaborating with the PUCT to advance this vision and ensure that Texas communities have the resilient, clean energy solutions they need for a stronger future. Below is a more in-depth review of the previous information along with some examples.

Sincerely,

Jessica Keithan

Founder and Executive Director
Texas Electric School Bus Project

TBPP Funding Directed Only Toward the Battery Asset of Electric School Buses

1. Maximizing Cost Efficiency by Focusing on the Core Backup Power Component

The primary function of the TBPP is to provide reliable backup power to critical facilities during outages. In an ESB, the **battery asset** is the core component that stores and delivers this power. By directing funds solely toward the battery, the TBPP ensures that its investment goes directly to the asset that meets the program's mission of resilience.

The full cost of an ESB includes additional components (e.g., the vehicle chassis, drivetrain, passenger seating) that, while essential for transportation, do not contribute to the backup power function. Funding only the battery allows the TBPP to avoid unnecessary expenses and ensures that limited resources are directed exclusively to the equipment that directly supports emergency power needs.

2. Leveraging the Dual-Purpose Nature of ESBs for Optimal Value

Electric School Buses serve a dual purpose as both student transportation and emergency backup power assets. Funding only the battery allows the TBPP to tap into the power capabilities of ESBs without funding the entire vehicle, which already serves a critical daily function for school districts. The dual-purpose nature of ESBs means that communities benefit from **both clean transportation and backup power**, stretching each dollar further.

With the TBPP funding the battery asset alone, school districts can cover the remaining costs of the ESB through other funding sources, such as transportation budgets or environmental grants. This approach encourages **cross-functional funding**, leveraging various sources to support both educational and resilience goals, rather than relying solely on TBPP resources to cover the entire vehicle cost.

3. Enhancing Affordability and Accessibility Across More Facilities

By limiting funding to the battery asset, the TBPP can support more communities and facilities within its budget. A typical ESB costs between $300,000 and $400,000, while the battery asset alone may cost between $50,000 and $75,000. Directing funds specifically to the battery asset means that each TBPP grant dollar can potentially fund multiple battery assets, providing more widespread access to backup power across the state.

For example, if the TBPP funded the full cost of an ESB, each grant might cover only one or two buses. However, by focusing on the battery asset alone, the TBPP could support several ESBs across multiple facilities, providing a larger-scale impact and ensuring that more communities have access to emergency backup power.

4. Creating a Sustainable Funding Model for Long-Term Resilience

Targeting the battery asset aligns with a sustainable funding model that can be scaled and maintained over time. Since the battery is the most critical and costly component for backup

power, funding it through TBPP grants lowers the financial barrier for communities to access RaaS (Resilience-as-a-Service) models. This model allows school districts or facilities to lease ESBs, with TBPP's contribution covering the backup power capacity.

Funding only the battery creates a model where the **maintenance, ownership, and transportation-related costs** of the ESB are managed by the RaaS provider or the district, with TBPP funds efficiently directed to resilience. This approach spreads costs across multiple entities and ensures the program remains financially viable for the long term, without depleting TBPP funds on non-power-related vehicle costs.

5. Supporting Economic and Environmental Goals with Targeted Investment

By focusing on the battery asset, TBPP also indirectly supports Texas's economic and environmental objectives. Battery production and repowering for ESBs can be done locally, creating jobs in Texas and contributing to the state's clean energy economy. Additionally, by directing funds toward batteries that replace diesel engines, TBPP funding reduces emissions and improves air quality, enhancing public health outcomes for students and communities.

Targeted investment in battery assets means Texas can grow its clean energy infrastructure without redundant spending on full vehicles, focusing instead on the component that meets TBPP's core purpose.

Resilience as a Service using Electric School Buses

A **Resilience-as-a-Service (RaaS) model** provides an approach where critical facilities and school districts can access electric school buses (ESBs) equipped with backup power capabilities without the need to purchase the vehicles outright. Instead, they can pay for the availability and use of backup power as a service in a subscription model. This setup can make it easier for facilities, municipalities or school districts, with limited budgets to access ESBs for both transportation and emergency power needs, with much of the cost spread over time.

How Resilience-as-a-Service Could Work for Electric School Buses (ESBs)

1. **Service Provider Partnership**:
   A third-party service provider, such as an energy services company (ESCO) or a specialized RaaS provider, would purchase and manage a fleet of ESBs. The service provider owns the buses and the battery assets and is responsible for maintenance, battery health monitoring, and operational readiness. They offer these ESBs to critical facilities (like hospitals, fire stations, emergency shelters, or school districts) on a contractual basis.
2. **Subscription or Service Contract**:
   Critical facilities or school districts would enter a RaaS contract with the provider, paying a regular fee to access the ESBs for daily transportation and/or backup power capabilities. This fee structure could vary based on the level of backup power required, the number of ESBs in the contract, and the anticipated duration of use during grid outages.

3. **Dual Functionality - Transportation and Backup Power**:
   The ESBs serve as regular school buses during daily operations, transporting students and meeting educational transportation needs. When there's a grid outage or other emergency, the buses switch to a backup power role, providing energy to critical facilities. The buses could even be strategically deployed to locations in greatest need during emergencies, as they are mobile and flexible.
4. **Benefits of the RaaS Model**:
   - **Lower Upfront Costs**: Facilities pay for the resilience and transportation services rather than the entire bus, spreading costs over time and avoiding the capital expense of purchasing ESBs outright.
   - **Maintenance and Battery Management**: The RaaS provider handles all aspects of maintenance, battery performance monitoring, and end-of-life battery recycling, which reduces the operational burden on the facilities.
   - **Flexibility and Scalability**: Facilities can adjust their RaaS subscriptions to meet changing needs, scaling up or down as needed, and can even opt for additional ESBs during times of higher risk (e.g., storm season).
5. **Funding and Incentive Integration**:
   - **TBPP Funding Support**: Under this model, the TBPP could contribute funds specifically toward the battery asset, reducing the cost basis for the RaaS provider and thus lowering the monthly subscription cost for the facility or school district.
   - **Complementary Financing Options**: The RaaS provider could also leverage state and federal grants or tax credits to lower the overall cost structure, further enhancing affordability.

Example Scenario 1 of Resilience-as-a-Service in Action

Imagine a school district in a rural area with limited budget capacity but a critical need for both school buses and emergency power support for a local shelter or emergency management organization. The district enters a RaaS agreement with an ESB provider:

- **Monthly Payment**: The district pays a monthly fee based on the service level. Let's say they pay $1,500 per month, which includes daily bus operations, regular maintenance, and emergency power availability.
- **Backup Power**: In the event of an outage each ESB represents a mobile battery with at least 150kwh of storage. In the event of a longer outage, multiple ESBs could be rotated or combined to provide power for a sustained period.
- **Lower Costs Through TBPP Contribution**: With the TBPP funding the battery asset, the RaaS provider can reduce costs, passing those savings onto the district through a lower subscription fee.

Key Considerations for Implementing a RaaS Model

1. **Contract Flexibility**: Contracts should be adaptable to allow facilities to increase or reduce their ESB backup power coverage as their needs change over time.

2. **Performance Guarantees**: The RaaS provider would likely need to guarantee that the ESBs meet certain performance standards, especially during critical events, to ensure reliability.
3. **Cost-Benefit for Facilities**: The RaaS model can help facilities avoid high upfront costs and access backup power within budget constraints, especially with the TBPP grant offsetting part of the cost.
4. **Maintenance and Compliance**: The provider must ensure that all ESBs meet the TBPP's technical and operational requirements, including compliance with battery safety and interconnection standards.

Here's an example of how a **Resilience-as-a-Service (RaaS) model** using electric school buses (ESBs) could work to provide backup power to a small town's fire station and police station.

Scenario 2 Overview

Imagine a small town with a fire station and police station that need reliable backup power during grid outages, especially in emergencies like severe storms or heat waves. However, the town has limited budget resources, making the purchase of dedicated backup generators or ESBs costly. By partnering with a Resilience-as-a-Service provider, the town can access ESBs on a subscription basis for both emergency power and additional community needs, without the large upfront capital expense.

Resilience-as-a-Service for Small Town Critical Facilities like Fire and Police Stations

1. **Service Agreement**:
   The town enters a RaaS agreement with a third-party provider that supplies electric school buses with the necessary battery capacity to serve as mobile backup power units. Under the agreement, the town pays a monthly or annual subscription fee, which covers access to ESBs for both daily transport and backup power in emergencies. As the ESBs are dual purpose, districts and municipalities could share the cost of the RaaS/School Bus Fleet as a Service provider.
2. **Subscription Details**:
   - **Monthly Fee**: The town agrees to a monthly payment, for instance, $2,000, which includes access to a set number of ESBs, routine maintenance, battery health monitoring, and operational readiness. This fee is reduced in part by TBPP grant funding allocated to the battery asset on each ESB, making the service more affordable.
   - **Term of Agreement**: The town commits to a 3-year contract, with an option to renew or expand the service to additional facilities or seasonal needs.
3. **ESB Capacity and Power Output**:
   - Each ESB is equipped with at least a 150 kWh battery.
   - In an emergency, the town's ESBs can be connected to the fire station and police station, providing critical backup power to keep essential operations running.
4. **Dual Purpose of ESBs**:

- **Daily Transport**: During normal operation, the ESBs are used by the town's school district to transport students. This dual-use nature reduces costs for the town because the same battery asset serves both as a transportation and a resilience resource.
- **Emergency Power**: When a power outage occurs, the town's fire and police stations can rely on these ESBs for immediate backup power, ensuring they can continue critical operations and emergency response.

5. **Maintenance and Management**:
   - The RaaS provider takes full responsibility for maintaining the ESBs, including battery upkeep, performance testing, and warranty compliance. This relieves the town of the need to manage technical maintenance and ensures the ESBs are always ready to deploy.
   - Regular check-ups and testing, as well as real-time battery health monitoring, are included in the subscription, so the town can rely on the ESBs' readiness without additional costs.

Financial and Operational Benefits

1. **Cost Savings**:
   - The RaaS model allows the town to avoid a large capital expense, paying a predictable monthly fee that fits within its budget constraints.
   - With TBPP funding support directed at the battery asset, the monthly subscription fee is more affordable, as the service provider can pass on the cost savings from the grant.
2. **Scalability and Flexibility**:
   - If the town's needs grow, it can scale up its subscription to include additional ESBs or negotiate seasonal access to more vehicles during high-risk periods.
   - The town can also add other critical facilities, such as the public works or community center, to the RaaS agreement if it wants to expand backup coverage.
3. **Reliability**:
   - By partnering with a RaaS provider, the town can be confident that its critical facilities, like fire and police stations, will have reliable backup power in an outage, with minimal operational burden on town personnel.
   - The provider's responsibility for maintenance and readiness ensures that the ESBs are always available and in optimal condition.

The Resilience-as-a-Service model provides a flexible, scalable, and affordable way for Texas school districts and critical facilities to access clean transportation and backup power without incurring the full cost of ESB ownership. By focusing on the battery asset as part of the TBPP funding, the state can support a sustainable, dual-purpose model that serves everyday needs and enhances community resilience in emergencies. This model effectively leverages the strengths of public-private partnerships to bring innovative, financially accessible solutions to Texas's resilience challenges.

Cost Analysis

In this example we are working to power a Firehouse in a small town continuously for 48 hours without recharging:

Assume price per kwh for the battery is $250 and assuming a 150 kwh battery can safely discharge slowly over 4 hours at a max output of 37.5 watts. Cost per kwh is total cost of the battery divided by the battery capacity or $37,500 divided by 150 kwh and you get $250/kwh of storage. This is the chart from the Patrick Report. In the previous scenario, each ESB could reasonably meet the demand of all of the CFs that have a number lower than 37 in the below chart.

Then, if you need to power 1 CF for 48 hours, and assuming that CF is a Firehouse that needs around 34 kw of continuous energy usage over 1 hour in demand based in load factor, it would take 12 ESBs to power that facility IF you could never recharge them.