DEUSA Fleet Success Stories: Shelby County

Location: Memphis, Tennessee
Fleet type: Medium-duty Electric Work Truck

Narrative: The East Tennessee Clean Fuels Coalition (ETCF) along with staff from the Middle-West Tennessee Clean Fuels Coalition started working with the Memphis & Shelby County Office of Sustainability & Resilience (OSR) in 2016. The OSR resides with the joint city-county Division of Planning & Development and staff serve as green "liaisons" for both city and county mayors and coordinate various regional initiatives related to sustainability and resilience.

Early partners Vivian Ekstrom and Jenna Thompson were beginning to work on electric vehicle ideas for the two governments as part of the Memphis Area Climate Action Plan, which included the following under the Transportation section:

Action Area 2: *Set the Stage for Vehicle Electrification*
Priority Action T.5 *Encourage Electric Vehicle Adoption and the Development of Charging Infrastructure*

They reached out to learn more about EV charging types and current locations in the area. We began talking and meeting with them (and later staffer Dana Sjostrom) to provide EVSE assistance including current sites, different charger types and prototypical locations, and discussed the benefits of EVs. (ETCF had been working with multiple private fleets in the area at the time, looking at and seeking alternative fuel vehicle funding options, like CMAQ[1]). It is also worth noting that Shelby County is the most populous county in the state with the largest density of African American citizens (51.3%) and the second largest overall diversity index (61.4%).[2] So developing more partnerships and projects in Shelby County was a priority.

Our discussions included different project ideas, but in 2020, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (DOE-EERE) released its Fiscal Year 2020 Advanced Vehicle Technologies Research Funding Opportunity Announcement through the Vehicle Technologies Office. Ekstrom and Sjostrom developed a proposal that included purchasing multiple light-, medium-, and heavy-duty (LD, MD, HD) gasoline and diesel vehicles for the Shelby County (SC) Roads, Bridges, and Engineering (RBE) Department that included electric and hybrid vehicles as replacements (at the time there were very few MD and HD EV options). DOE-EERE announced the winners in early 2021, and the SC RBE Department won funding! At that time, there was some significant turnover in the office and new Municipal Planner Leigh Huffman joined OSR and took over the now started DOE-funded project. Jonathan Overly of ETCF was brought on as a consultant on the project.

[1] The FHWA's "Congestion Mitigation and Air Quality (CMAQ) Improvement Program" - https://www.fhwa.dot.gov/environment/air_quality/cmaq/.
[2] (2020 data). "Tennessee: 2020 Census." *United States Census Bureau website.* https://www.census.gov/library/stories/state-by-state/tennessee-population-change-between-census-decade.html.

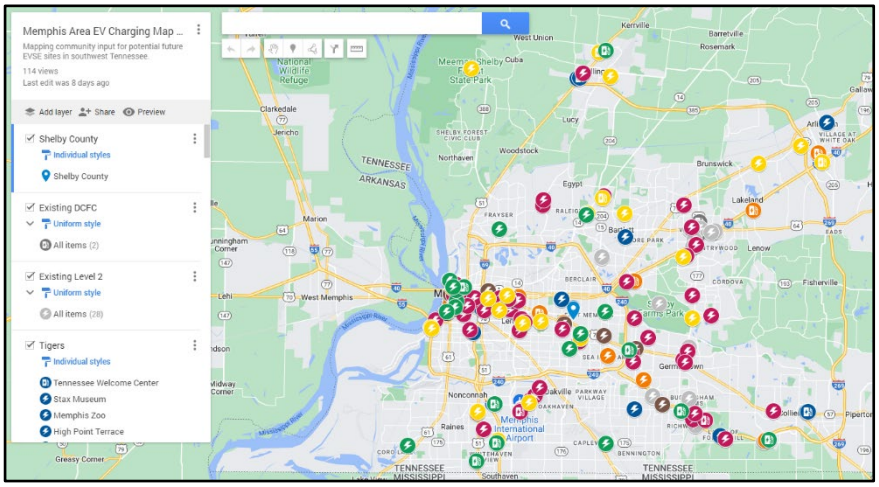
The remnants of COVID and the logistics entanglements that began during that period impacted the project and caused some delays. During this time, Huffman provided excellent leadership to the project team and guided them through several vehicle acquisition issues, which ended up increasing the number of battery electric vehicles (BEVs, all-electric vehicles) in their plan and decreasing the number of hybrid vehicles. As part of the move, DOE-EERE allowed them to alter some vehicle choices, and four smaller hybrid replacements were changed to BEVs. As part of the support, Overly organized an EV Ride & Drive for the RBE Department (at their offices, photo at right) to help better acquaint multiple, involved staff in the department with several different kinds of EVs, including BEVs like the Mustang Mach-E. As of this writing, the LD EVs are working through an assessment of what can be acquired as difficulties in ordering Ford Lightnings or Mach-Es has forced them to look at other options.

On the MD side, Huffman helped the department look at a few different trucks that could replace a diesel tire truck (picks up and hauls abandoned tires in the county). Thanks in part to some serendipity, the RBE Department was able to fairly quickly acquire one of the state's first MD EVs – a Lion Electric class-6 truck. Photos of the truck and its supporting charging infrastructure are shown in the photos herein. As part of the grant, the department is acquiring four Level 2 chargers that will be placed at the RBE Department offices where most of the LD EVs will be put into use by their staff.

More recently, in June 2023, Drive Electric TN (DET) held a few EV educational and participatory events in Memphis that Huffman attended. Working with local utility MLGW and a host of other partners, DET hosted a "Community Forum" and a "Driving EV Leadership" event. The purpose of those events was to help educate area leaders and citizens about the benefits of EVs while discussing important issues (e.g., charging needs, grid capacity, consideration of all community members in designing locations for charging around the county). A critical element of the Community Forum was to gather ideas from all the attendees about good locations for Level 2 and DCFC chargers in the greater Memphis area. The group was prepped with an explanation of what makes good sites for both types of chargers with some examples, and then split into six tables. Each table had an input leader and utilized a Google mapping system to add Level 2 and DCFC icons to a shared map that a) delineated their additions from the other groups, yet b)

showed all the suggestions on a single map (see map image). This allowed for the creation of a single, all-suggestions map/tool that MLGW, the Office of Sustainability and Resilience, and other community partners could use and refer to as they consider locations for adding chargers in the future. An image is shown from that work of one table and their team discussing locations to include in the map, and the person responsible for entering the Google map icons for their team.

Outputs & Outcomes: The outputs of the more recent DOE grant work include the items noted below.



- ✓ the MD EV truck itself
- ✓ the charging equipment
- ✓ reduced criteria pollutant (tailpipe) emissions throughout the county where the truck travels
- ✓ on the order of a 60-70% reduction in greenhouse gas (GHG) emissions, thanks to a TVA grid that is 60+ percent carbon-free, and
- ✓ the beginning of a transition to using more BEVs in the county's fleet

The outcomes include an excellent, first-person learning experience about EVs by county staff (including perhaps most importantly Huffman as a leader in the county's EV adoption). The reductions in pollutants like particulate matter and nitrogen oxides reduce human health impacts to Memphians, that are associated with those emissions. And the GHG reductions help the community begin to realize the larger societal impacts of GHG emissions that that community is responsible for. The use of the LD BEVs from the project will further reduce these direct health effects and help drive much stronger GHG reductions in the county.

Best Practices & Lessons Learned: One of the most interesting things learned about the new Lion6 truck is that its ground clearance was a few inches less than the former diesel truck that handled this service for the county. They had to modify the places and routes that the new Lion6 takes. This taught the project team that depending on what type of service a vehicle may handle now, be sure to check on what might be considered uncommon facets of a new MD EV to ensure it can do the full job of the old one.