Director's Message

By Joseph Oldham

In this edition of the San Joaquin Valley Clean Transportation Center Newsletter, you are going to read about many new projects that are bringing cleaner transportation options to residents of the San Joaquin Valley. Several of these projects involve new advanced electric propulsion systems for buses and vans and the work that is going on to develop the infrastructure to support these vehicles in the Valley.

Electric propulsion systems offer significant advantages for use in heavy-duty vehicles. An electric motor has few moving parts and develops maximum torque at zero rpms. This makes electric propulsion an ideal solution to move heavy loads. It was these attributes of electric motors that persuaded the railroads to change from steam-powered locomotives to diesel-electric locomotives in the 1930s and 1940s. The fact that diesel-electric locomotives could start mile-long trains from a complete stop on 2+% grades without wheel slip, combined with the reduced maintenance costs for the diesel-electric systems compared to steam engines, caused railroads all over the nation to convert to these electric hybrid drive systems. For several railroads in the 1940s and 1950s, the conversion happened so quickly that 1- to 2-year-old steam locomotives were scrapped and replaced by diesel-electric locomotives due to the cost savings and operational efficiency improvements. Today, all the major railroads in the U.S. and overseas use either diesel-electric hybrid or all-electric drive locomotive systems.

Electric drive systems in buses have been around for decades as well, but battery technology has been the limiting factor for them to have sufficient range to be practical for most transit agencies. Today, advances in lithium ion battery technology have produced battery packs that are light enough and have sufficient energy storage capacity to allow transit buses to achieve 150+ miles on a single charge. When combined with advanced carbon fiber composite and aluminum body components to lower overall body weight, many bus manufacturers are offering 30- to 60-foot-long models that are totally propelled by electric motors. As the energy storage capacity of the advanced batteries improves in the coming years, it is highly probable that battery electric transit buses will routinely achieve more than 270 miles per charge within the next five to ten years.

As these advanced transit buses enter service with more and more transit agencies, the challenges of providing adequate electrical power for charging support of these vehicles becomes increasingly important. That is why projects such as the EPIC-funded Fresno Energy Performance District are so critical to the future of expanded use of the electric transit buses and other heavy-duty electric vehicles. The Fresno Energy Performance District project is designed to provide an integrated planning and financing model for how to deploy electrified transportation within a community and reduce overall energy use from the utility electric grid at the same time. The model will look at specific revitalization areas in Fresno and develop plans on how to finance and deploy on-site renewable energy and advanced energy storage, increase the energy efficiency of existing buildings and any new construction, and deploy electric transportation options on these sites. The end goal for the project will be to implement neighborhood-level districts that integrate existing buildings, new building construction, on-site

energy production, and electric transportation into an interdependent system that supports each component and functions synergistically.

The integration of improving the energy efficiency of our existing buildings, deploying renewable energy and advanced energy storage, and providing clean electrified and renewable fueled transportation options for residents is the way we must look at our infrastructure in the future. I am excited to say that the San Joaquin Valley is leading the way in this approach, so stay tuned for future editions of the CALSTART San Joaquin Valley Clean Transportation Newsletter for progress updates on these projects and many more!

The CALSTART San Joaquin Valley Clean Transportation Center is a joint project between CALSTART and the California Energy Commission. It is funded through a grant from the California Energy Commission with the mission to assist residents and businesses in the San Joaquin Valley deploy cleaner transportation options to help improve air quality and promote economic prosperity. For more information about CALSTART, visit www.calstart.org.