

Metro Central Maintenance: The Bus Starts Here



Amy Romero (Senior Director for Metro's Bus Central Maintenance division), Photo © John Livzey, 2018

When you purchase a fleet of buses, you expect their engines to have a long lifecycle. But what do you do when the manufacturer declares they will no longer supply or support those engines halfway through your fleet's life expectancy? Amy Romero knows. And as senior director for Metro's Bus Central Maintenance division, she faced that exact problem.

"We were running a Series 50 Detroit Diesel compressed natural gas engine (CNG) in 1,600 buses, when the manufacturer announced they were discontinuing production of that engine and that they would no longer support it. That meant no more new engines and parts were going to become very scarce. And we're talking about 10 different kinds of buses! Before the announcement, we'd always rebuilt engines and reinstalled them in the buses with easily available parts. It was quick, about 40 hours each. But since we wouldn't be able to get parts, we had to shift to a repower, where you take out one type of engine and replace it with a completely different type of engine."

Thus, the *Metro Bus Engine Repower Project* was born. But simply replacing the engines isn't as easy as it sounds. California has extremely strict air-quality regulations, the toughest in the nation. So, the replacement engines had to have cleaner emissions. Unfortunately, buses are not like Lego. You can't simply snap in a new engine. But Ms. Romero credits both Metro and her team for having the wherewithal to rise to the challenge.

"It takes a lot of engineering work to put in a new type of engine. The key items are connecting lines and electrical harnesses, as the wiring from the bus to the engine is different. There's also a lot of bracketry involved, as the engine size is different as well. We have our own fabrication shop, so all of the redesigned bracketry and mounting equipment was created in-house. But in addition to all of that, the newer engine has a lot more sensors, as part of emissions requirements. If a bus starts to emit more than its allowed, a light goes on on the driver's dash. So, all of that had to be connected as well. It was quite a challenge.

"But Metro is always utilizing the latest and greatest technology, which is both good and bad. It's good for obvious reasons, but it's bad in that you're always the first to encounter a problem and have to deal with it. And that was the case here. In fact, after we'd figured out how to install the new engine, the manufacturer called us and asked us, 'What bracket did you use here?' That's because smaller agencies send their buses back to the manufacturer for a repower, but we can't. Our contract stipulates that our mechanics must do that work in house. But we have fantastic, highly skilled master mechanics. And we brought them on very early in the process, as they have first-hand knowledge of the equipment. They also just love the challenge. They embrace it. And they're very good at what they do."

Ms. Romero emphasizes that the project was really a team effort, a team that included Michael Palmer (master mechanic leader), Gabriel Valdivia (master mechanic leader), Henry Ochoa (master mechanic), Think Hong (master mechanic leader), David Santillanez (master mechanic leader), Ed Hall (master mechanic), and Michael Lozano (production planner). She also credits Metro's machinists, engineers, mechanics, and supervisors, for their advanced ability to adjust and adapt to the project's constant requirements for readjustment and calibration. In addition to the engine replacement, the project team also performed a mid-life overhaul to all of the buses, since they were already being taken out of service for the initial repower.

"So, each bus that got a new engine also got completely refurbished. A lot of mechanical components got changed out. The bus got new exterior paint and new interiors. Our hope is that when the bus goes back to the division that uses it on a daily basis, they feel like they're getting a brand-new bus. That helps save money. It reduces road calls, improves customer service, and we can schedule the work instead of doing it when the bus breaks down or has a problem. So, it's a big advantage and it eases the burden on the divisions using the bus."

In that respect, the repower project also provides another critical advantage. Metro estimates that the project saved the agency more than \$33 million as well as significantly reducing negative impacts, like service interruption, to Metro's customer base. And because the newly installed engines produced cleaner emissions, Metro received a grant from the South Coast Air Quality Management District, saving the agency an additional \$5 million. In addition, the master mechanics and production planner worked to ensure that parts would be available for installation and developed manuals and information to help each bus division maintain the buses for the next seven years.

For Ms. Romero though, the project speaks greatly to the camaraderie and unity of purpose of her people.

"We have 11 operating divisions throughout Los Angeles County. They do light maintenance, but we do all of the heavy maintenance at the facility that I run. And we all think of ourselves as one, one team. We didn't just have one mechanic designing everything. We had everyone from every trade and discipline working together. And they didn't just design it once. Essentially, we had a brand-new bus. It was a brand-new design, a brand-new process. For 12 years, it was a continual effort that everyone embraced. And we worked so well together that now the engine manufacturer comes to *us* with questions about *their* engines. That says a lot."