

CMAQ Project Benefits

Electric Vehicles and Electrification



What is CMAQ?

The Congestion Mitigation and Air Quality Improvement (CMAQ) Program provides funding for surface transportation projects and programs to help meet requirements of the Clean Air Act and its amendments. CMAQ funded projects are required to contribute to attainment and/or maintenance of National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide, particulate matter, and their precursors. States without nonattainment and maintenance areas may use CMAQ funds to support projects that are eligible under CMAQ or the Surface Transportation Block Grant Program. Though the CMAQ Program was created to lower NAAQS levels, certain CMAQ funded projects may additionally contribute to lowering greenhouse gas (GHG) emissions as well as decreasing energy consumption.

Environmental Benefits

The transportation sector accounted for 29 percent of 2019 greenhouse gas emissions in the United States, the largest share of all the sectors. Most light-duty vehicles run on gasoline while medium- and heavy-duty vehicles often use diesel – both fuel types can emit large amounts of carbon dioxide (CO₂) and other pollutants. Replacing internal combustion engines with zero emission electric vehicles can improve air quality by reducing nitrogen oxides and particulate matter emissions. Decreasing emissions of these pollutants reduces the risk of harmful health effects such as cardiovascular and respiratory illnesses. Transitioning the transportation sector to using electricity as a fuel source also results in decreased CO₂ emissions. The CMAQ Emissions Calculator Toolkit can calculate criteria air pollutant, CO₂, and CO₂ equivalent emissions and total energy consumption reductions from electrification projects.

What Electrification Projects are CMAQ-Eligible?

Electrification involves replacing technologies that use fossil fuels with those powered by electricity, such as transitioning a city's transit bus fleet from diesel to all electric or hybrid-electric vehicles. The CMAQ Program can advance electrification in the transportation sector through funding the following project types:

Electric vehicle and engine replacement

- **Reduced Onroad:** all vehicle classes (light-, medium-, and heavy-duty) from passenger cars to transit buses to heavy duty trucks
- **Nonroad:** includes airport ground support, cargo handling, and construction equipment

Charging Infrastructure: electric vehicle charging infrastructure for transit and public fleets as well as for privately owned vehicles

Port and intermodal facility electrification



Project Examples

Installation of 60 Charging Stations in Ohio

CAs as a part of their 2021-2024 Transportation Improvement Plan, the Northeast Ohio Areawide Coordinating Agency (NOACA) allocated \$3M of CMAQ funds to build 60 charging sites across five counties. NOACA began installation of the charging stations in the spring or summer of 2022. Once completed, the charging stations will be available for public use. The project is expected to reduce VOC emissions by 15,000 kg per year, NOx emissions by 16,000 kg per year, and PM_{2.5} by 1,000 kg per year.

Washington State Ferries Fleet Electrification

Washington State Ferries (WSF) is the state's largest consumer of diesel fuel and emitter of GHGs and diesel particulates. In 2019, WSF began converting three of the fleet's largest ferries from diesel to hybrid-electric propulsion with \$6M from the CMAQ program as well as funds from the EPA's Clean Diesel Program. The project, to be completed in 2025, will reduce CO₂ emissions by over 48,000 metric tons per year.

The Port of New York and New Jersey's Cargo Handling Equipment Fleet Modernization Incentive Program

Using a \$2M grant from the CMAQ program, the Port Authority reduced emissions from Cargo Handling Equipment (CHE) by providing incentives for New Jersey Marine Terminal tenants to replace their older straddle carriers, yard trucks, rubber tire gantry cranes, or top loaders with all electric, hybrid, or alternate fuel equipment. This program has reduced particulate matter, carbon monoxide, and CO₂ emissions in the cargo-handling equipment sector.

New York Metropolitan Transportation Authority Hybrid-Electric Locomotives

In July 2020, the MTA purchased 25 electric-diesel hybrid locomotives for use in subway construction, maintenance and repairs, replacing diesel-only locomotives built in 1966 and 1977. The new locomotives will improve air quality, reduce health risks for subway workers, and decrease fuel consumption and CO₂ emissions.

Technology Spotlight

Shore Power Technology at U.S. Ports

Onshore electric power systems have the potential to significantly reduce emissions at U.S. ports. This relatively new emissions reduction strategy requires the installation of vessel-side infrastructure that connect to shoreside power supplies. Instead of running onboard diesel-powered engines, vessels receive their power supply from the grid.

Medium- and Heavy-Duty Electric Vehicles

The majority of medium and heavy-duty vehicles run on diesel fuel, presenting a significant opportunity to lower transportation-related emissions through electrification. Though not nearly as prevalent as light-duty electric vehicles due to higher upfront costs, manufacturers are starting to produce greater percentages of zero-emissions trucks and buses.

Electric Construction Equipment

Equipment manufacturers have begun to roll out models of battery-powered construction equipment, such as excavators, wheel loaders, mining trucks, and forklifts. The Volvo ECR25 Electric excavator is the first commercial excavator with zero exhaust emissions.



Photo: FHWA

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