White Paper

The Volkswagen Settlement's Nitrogen Oxide Mitigation Trust

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Executive Summary

In late October, a federal district court in California formally approved a partial settlement between Volkswagen (VW) and the federal government and State of California concerning allegations that VW violated the Clean Air Act by selling nearly 500,000 diesel vehicles that were equipped with computer software designed to cheat on automotive emissions tests. Among other things, the partial settlement requires VW to pay $2.7 billion into an environmental mitigation trust that "is intended to fully mitigate the total, lifetime excess NOx [nitrogen oxide] emissions from the [affected] vehicles."[1] The $2.7 billion trust will be administered by a court-appointed trustee. Importantly, all 50 states, as well as Puerto Rico, the District of Columbia, and Indian tribes, are slated to receive funds under the trust in proportion to the number of noncompliant vehicles sold and registered in each jurisdiction. The funds are to be used for "eligible [NOx] mitigation actions" as delineated in Appendix D-2 of the settlement.[2]

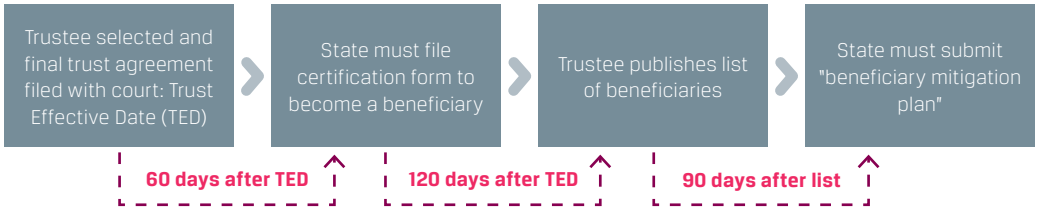
[1] U.S. Environmental Protection Agency, "Volkswagen Clean Air Act Partial Settlement," available at https://www.epa.gov/enforcement/volkswagen-clean-air-act-partial-settlement#health.

[2] A complete version of the settlement can be found at http://www.cand.uscourts.gov/filelibrary/2869/Order-Granting-Entry-of-Consent-Decree.pdf. Appendix D appears on pp. 194–237 of the pdf file.

Although a trustee has yet to be appointed and the final trust agreement has not been filed with the court, states should move quickly to familiarize themselves with the NOx portion of the VW settlement (i.e., Appendix D) and begin taking steps to consider and analyze the potential mitigation actions they can undertake with their anticipated NOx mitigation funds. As detailed below, ICF is well equipped to assist states and others in these regards.

What the Settlement Means for States

Once a trustee has been selected and the final trust agreement has been filed with the court (thus establishing the trust's effective date), states will have 60 days to file a certification form (set forth in Appendix D-3 of the settlement) and thereby become a "Beneficiary" under the trust. The certification form must be provided by the governor's office and identify the state agency that will be the lead agency within the state for purposes of the trust. Within 120 days of the effective date, the court-appointed trustee will publish a list of the designated beneficiaries. This official designation, in turn, will trigger the start of a 90-day period during which states and other beneficiaries must prepare and submit to the trustee a nonbinding "Beneficiary Mitigation Plan" that provides the public with information about the state's general vision for its intended use of its NOx mitigation funds. The following figure illustrates these milestones.



Source: ICF

At a minimum, the beneficiary mitigation plan should address the following: a) the state's overall goal for the use of the funds; b) a list of the eligible mitigation actions that are anticipated and a preliminary estimation of the allocation of funds to each of these; c) a description of how the state will consider the beneficial impact of these actions on air quality in areas that bear a disproportionate share of air pollution; and d) a general description of the ranges of emissions benefits expected from the implementation of these actions.

Mitigation actions allowed under the settlement include projects to reduce NOx emissions from both on-road and off-road diesel emission sources. Within this broad scope, states have the latitude to focus on those technologies and programs that make the most sense for them. Eligible projects include those targeting:

- Large freight trucks and port drayage trucks (Class 8)
- Local freight trucks (Classes 4–7)
- School, shuttle, and transit buses

- Switcher locomotives
- Tugs and ferries
- Shore power for ocean-going vessels
- Airport ground-support equipment
- Forklifts and port cargo handling equipment
- Light-duty zero emission vehicle supply equipment

The initial state-specific allocation amounts appear in Appendix D-1 of the settlement. Note that these amounts may increase once VW and the federal government and California reach a widely expected settlement regarding an additional 80,000 (larger) diesel vehicles.

States beneficiaries must submit requests for eligible mitigation action funds to the trustee. Multiple state beneficiaries can submit joint requests, which enables collaboration across jurisdictional boundaries on programs that, for example, address emission sources that have significant impacts at the regional level. Every eligible mitigation action funding request must include the following:

1. A description of how the funding request/proposed action fits into the beneficiary's mitigation plan.
2. A thorough description of the proposed action that includes the air quality benefits and community benefits more broadly.
3. The expected NOx reductions that would result from the proposed action.
4. A project management plan for the proposed action, including a detailed budget and an implementation timeline.
5. A certification that the selection of any vendor was or will be performed in accordance with applicable state public contracting laws.
6. A detailed cost estimate from prospective vendors for all expenditures in excess of $25,000.
7. A thorough description of how the beneficiary will oversee implementation of the action.
8. A description of any cost share requirements associated with the proposed action.
9. A description of how the beneficiary complied with the requirement to provide notice of the availability of mitigation action funds to relevant federal agencies.
10. A description of the benefits that the proposed action is expected to have on communities that have historically borne a disproportionate share of the adverse impacts of NOx emissions.
11. A plan for reporting on the implementation of the proposed action.

Within 60 days of submission of a request for funds, the trustee will notify the beneficiary by approving, denying, or seeking a modification of the funding request (and associated eligible mitigation action). The trustee will start disbursing mitigation funds within 15 days of the approval of the eligible mitigation action funding request.

Maximizing Program Effectiveness

Given the breadth of equipment types and projects eligible for NOx mitigation funds, states should design their programs carefully to maximize air quality and public health benefits. States should expect active stakeholder engagement and participation from proponents for specific industries and technologies. This can put pressure on states' capacity to process incoming information efficiently and implement programs that deliver the maximum possible return on investment.

NOx emissions vary widely depending on the type, age, and usage of vehicles. Many of these vehicles are also large sources of fine particulate matter (PM2.5) and carbon dioxide (CO_2) emissions. Understanding the current and future emission sources in a state—as well as trends in technologies and fuels—will be critical to an evaluation of program effectiveness. Table 1 shows typical annual emissions for representative vehicle and equipment types.

TABLE 1. TYPICAL ANNUAL EMISSIONS BY EQUIPMENT TYPE

	Typical Emissions per Year		
Equipment Type	**NOx (lbs)**	**PM2.5 (lbs)**	**CO_2 (tons)**
Port drayage truck	880	20	10
Class 8 large freight truck	765	13	216
Class 5 medium freight truck	43	4	41
School bus	21	1	20
Switcher locomotive	16,510	460	560
Tug boat	109,820	3,000	3,440
Ferry	69,060	1,650	1,780
Forklift	790	40	20
Port yard tractor	1,640	80	80
Port rubber tire gantry crane	5,410	170	170
Port container handler	3,530	110	110

Source: ICF

Some of the largest NOx reduction opportunities under the settlement will come from the electrification of vehicles, equipment, and terminals. Ports may provide some of the largest NOx reduction potential because they are concentrated hubs of activity for large diesel engines. As an example, Table 2 shows typical emission

reductions resulting from the installation of shore power at a single port terminal. The emission reductions will vary depending on the type of ships served and the frequency of ship calls, among other factors.

TABLE 2. ANNUAL EMISSION REDUCTION FROM SHORE POWER INSTALLATION AT A PORT TERMINAL

Terminal Type	Annual Emission Reduction (tons)		
	NOx	PM2.5	CO_2
Container terminal—50 ship calls per year	24	0.5	807
Container terminal—300 ship calls per year	144	2.8	4,844
Reefer terminal—50 ship calls per year	37	0.7	1,241
Reefer terminal—300 ship calls per year	221	4.3	7,445
Cruise ship terminal—50 ship calls per year	41	0.7	1,150
Cruise ship terminal—300 ship calls per year	245	4.0	6,901

Source: ICF

Public transit can also offer large NOx reductions through electrification. For government-owned bus fleets, funds from the NOx mitigation trust can cover up to 100% of the cost of a new all-electric vehicle, including the necessary charging infrastructure. Table 3 shows illustrative emission reduction estimates for different scenarios of transit bus electrification. Electrification technologies are evolving rapidly, and such evolutions should be accounted for in state programs that span multiple years. The innovation in this area will continue at a faster pace not only in the technology itself, but also in how to integrate electrified vehicles with the broader transportation system and the electric grid.

TABLE 3. ANNUAL EMISSION REDUCTION FOR THREE SCENARIOS OF BUS ROUTE ELECTRIFICATION

	Route Length (miles)	Minimum Fleet Size Needed	Overnight Charging Candidate	NOx Emissions Reduced (lbs/year)	PM2.5 Emissions Reduced (lbs/year)	CO_2 Emissions Reduced (tons/year)
Route 1	8	6	Yes	2,011	13	241
Route 2	15	6	No	4,564	22	570
Route 3	25	10	No	4,405	26	575

Source: ICF

The cost effectiveness of mitigation actions can also vary widely and needs to be assessed carefully. Emission reduction cost effectiveness will depend on the emission rates, activity levels, and remaining useful life of the old equipment being targeted. For example, Table 4 shows the impacts of scrapping and

replacing three different short-haul combination trucks with a new vehicle. Although replacing the oldest truck (model year 2001) will produce the largest annual emission reduction in the short term, better lifetime emission reductions and cost effectiveness result from targeting the model year 2005 or 2009 truck, since these vehicles have a longer remaining useful life.

TABLE 4. EXAMPLES OF EMISSIONS IMPACTS FROM REPLACING A SHORT-HAUL COMBINATION TRUCK

Old Truck Being Replaced	NOx Reduced per Year (tons)	Lifetime NOx Reduced (tons)	Cost Effectiveness ($/ton lifetime NOx reduced)
Model Year 2009	0.21	2.21	$45,330
Model Year 2005	0.30	2.01	$49,690
Model Year 2001	0.66	1.71	$58,340

Source: ICF

Once states have identified the mitigation actions that will yield the greatest emission reductions for the lowest cost, they will need to consider how to structure a program effectively. To generate adequate interest from commercial fleets, state programs should minimize the administrative burden for applicants and ensure that funds are disbursed in a timely and predictable manner. At the same time, states have an obligation to build in appropriate program checks so that mitigation funds are targeted to the most worthy projects. The following table lists program parameters to consider.

Program Parameter	Common Alternatives
Incentive Type	▪ Full equipment replacement ▪ Cost share ▪ Rebate incentives ▪ Voucher incentives
Disbursement	▪ First come, first served ▪ Ranking of applications
Returns	▪ Financial sustainability ▪ Innovation/transformation impact
Eligibility	▪ Vehicle/equipment owners ▪ Vehicle/equipment suppliers ▪ Partnerships

Source: ICF

How ICF Can Help

ICF can help states design and implement a NOx mitigation program that complies with the settlement terms and maximizes benefits to the state's residents and businesses. Our staff have deep technical knowledge of NOx emission control

strategies for on-road and off-road vehicles and equipment. We have helped federal, state, and local agencies with evaluating candidate control strategies to maximize the cost effectiveness of emission reductions. Our staff have helped to develop clean vehicle incentive programs for state agencies (such as California's Hybrid Truck and Bus Voucher Incentive Program) and for national programs funded through legal settlements (such as the Clean Buses for Kids Program). We have also supported more than 15 electric utilities with assessment or implementation of transportation electrification programs.

ICF's consulting services can be covered by NOx mitigation funds. The list of eligible mitigation actions in the settlement agreement expressly includes contracted services for consulting and evaluation.

About the Authors

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About ICF

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