

S.B. 136 Diesel Emissions Reduction Program Study & Utah Diesel Emissions Reduction Framework

Final Report - November 2023



UTAH DEPARTMENT *of*
ENVIRONMENTAL QUALITY

**AIR
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Executive Summary

This report includes a summary of the activities conducted for Senate Bill 136 (S.B. 136; 2022 General Session), which requires the Utah Department of Environmental Quality (“the Department”) to conduct studies and provide recommendations which inform the development of a Utah-specific diesel emissions reduction framework. As a result, this document is structured into two sections:

- 1) diesel emissions reduction program study; and
- 2) recommendations for a Utah Diesel Emissions Reduction Framework.

The combustion of diesel fuel directly contributes to increased levels of particulate matter, as well as ozone and secondary particulate matter through the emission of precursor pollutants including nitrogen oxides (NO_x) and volatile organic compounds (VOCs). This contributes to degraded air quality throughout the state of Utah. According to the United States (U.S.) Environmental Protection Agency (EPA), “Diesel engines manufactured today are cleaner than ever before. But because diesel engines can operate for 30 years or more, millions of older, dirtier engines are still in use.”¹ Therefore, efforts to remove older engines from sensitive air sheds can result in significant reductions as diesel engines are replaced with newer, cleaner-burning engines, or with alternative technologies. Reducing emissions from diesel engines is important for both human health and air quality, especially in areas not meeting EPA’s National Ambient Air Quality Standards (NAAQS), including the Wasatch Front and the Uinta Basin.

S.B. 136 requires the Department to study current diesel emissions reduction programs in other states and geographic areas (including the Texas Emissions Reduction Plan), potential revenue sources to fund incentive programs (such as registration fees), diesel emissions reduction goals, and to recommend a Utah diesel emissions reduction framework. This study and the resulting framework were led by the Utah Division of Air Quality (UDAQ). Per the requirements of S.B. 136, the UDAQ also studied potential environmental mitigation projects that could reduce emissions within and around the inland port areas and be implemented by the Utah Inland Port Authority (UIPA), resulting in recommendations for port-related mitigation projects. Finally, the UDAQ also studied clean equipment use on state construction projects.

After studying multiple potential options, the resulting overarching Utah diesel emissions reduction framework (Figure 1) includes:

¹ Environmental Protection Agency. (May 19, 2023). *Learn About Impacts of Diesel Exhaust and the Diesel Emissions Reduction Act (DERA)*.

<https://www.epa.gov/dera/learn-about-impacts-diesel-exhaust-and-diesel-emissions-reduction-act-dera>

- recommendations for programs fostering the implementation of new technology (including grant programs/tax credits for cleaner equipment purchases);
- financial incentives for the early retirement of heavy-duty diesel equipment;
- potential expansion of the existing Utah Clean Fleet program (formerly known as the Utah Clean Diesel program) or the Clean Air Retrofit, Replacement, and Off-road Technology (CARROT) program;
- examining other potential diesel emissions reduction strategies, such as the implementation of a non-road registration program, and information about registration surcharges;
- potential environmental mitigation projects for the inland port area to be implemented by the UIPA; and
- incentives for clean equipment use on state construction projects.

As required by S.B. 136, the recommended framework could directly benefit rural communities, inland port areas, underserved or underrepresented communities, and nonattainment areas.

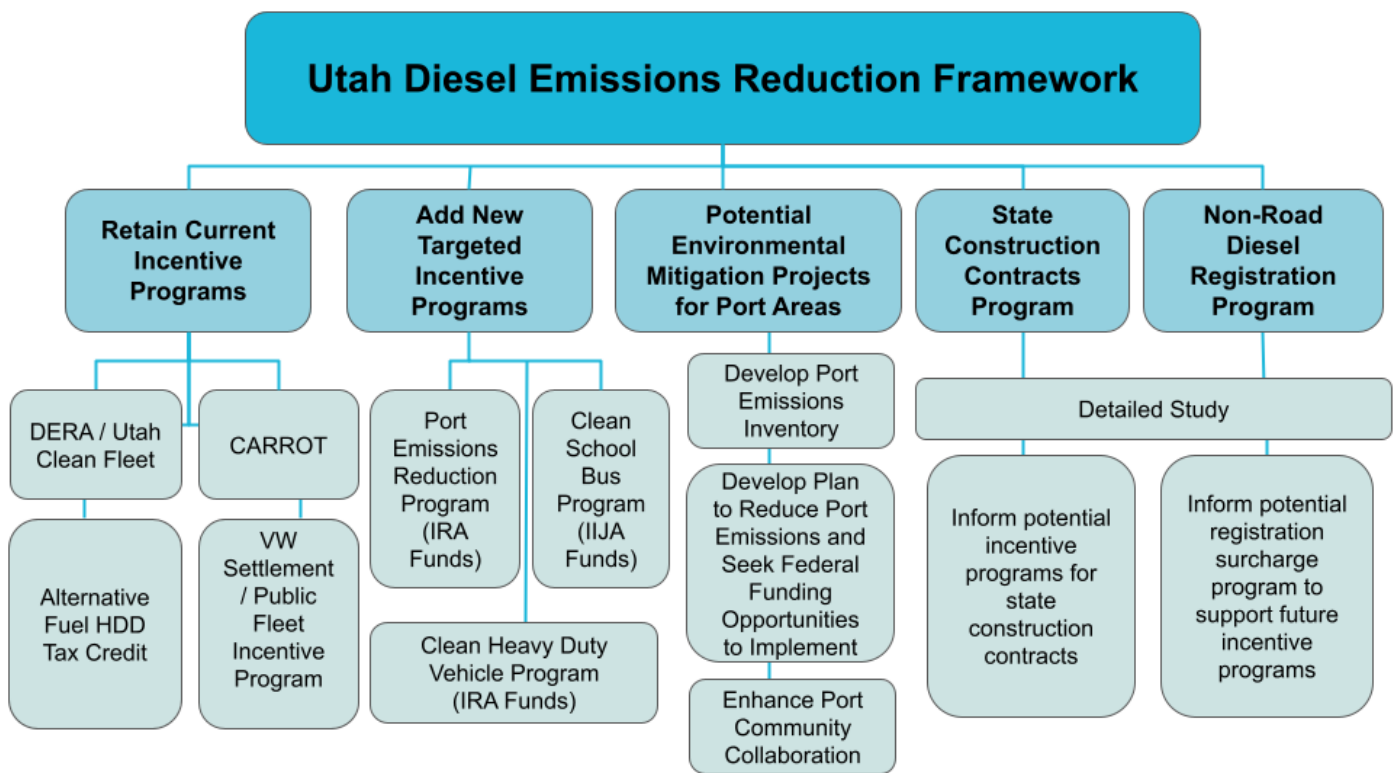


Figure 1: Utah Diesel Emissions Reduction Framework Diagram

1.0 Utah Diesel Emissions Reduction Study

As required by S.B. 136 subsection 3, the UDAQ has conducted an extensive study of diesel emissions reduction programs and policies implemented in other states including the Texas Emissions Reduction Plan (TERP).

1.1 Diesel Emissions Background

1.1.1 Overview

Diesel emissions negatively impact both the air quality and the health of communities across the state of Utah. Emissions from diesel engines contribute to the production of both ground-level ozone and particulate matter (PM). This is the result of direct PM emissions as well as NO_x and VOCs precursor pollutants. Therefore, reducing diesel emissions is important since areas throughout the state of Utah are in nonattainment for EPA's NAAQS, leading to statutory Clean Air Act (CAA) requirements as well as degraded quality of life for the residents of these areas. These nonattainment area (NAA) designations include both historic and ongoing PM_{2.5} and ozone designations (see Section 1.1.2).

Statewide Diesel Emissions

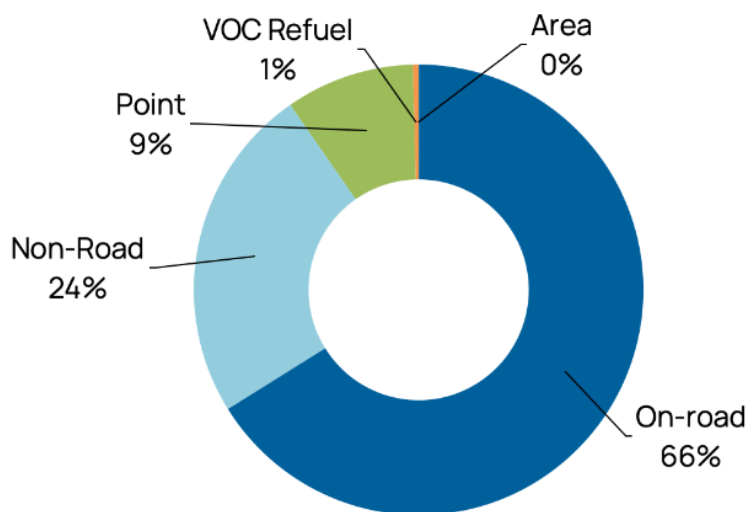


Figure 2: Utah Statewide Sources of Diesel Emissions of NO_x , VOCs, $\text{PM}_{2.5}$, SO_2 , and NH_3

In Utah, statewide diesel emissions are responsible for 17.3% of combined emissions of NO_x , VOCs, $\text{PM}_{2.5}$, sulfur dioxide (SO_2), and ammonia (NH_3). The majority of diesel emissions come from on-road mobile sources (66.1% of combined diesel emissions), followed in order by non-road mobile sources (24.2%), point sources (9.3%), VOC refueling (0.4%), and area sources (0.03%) (Figure 2).

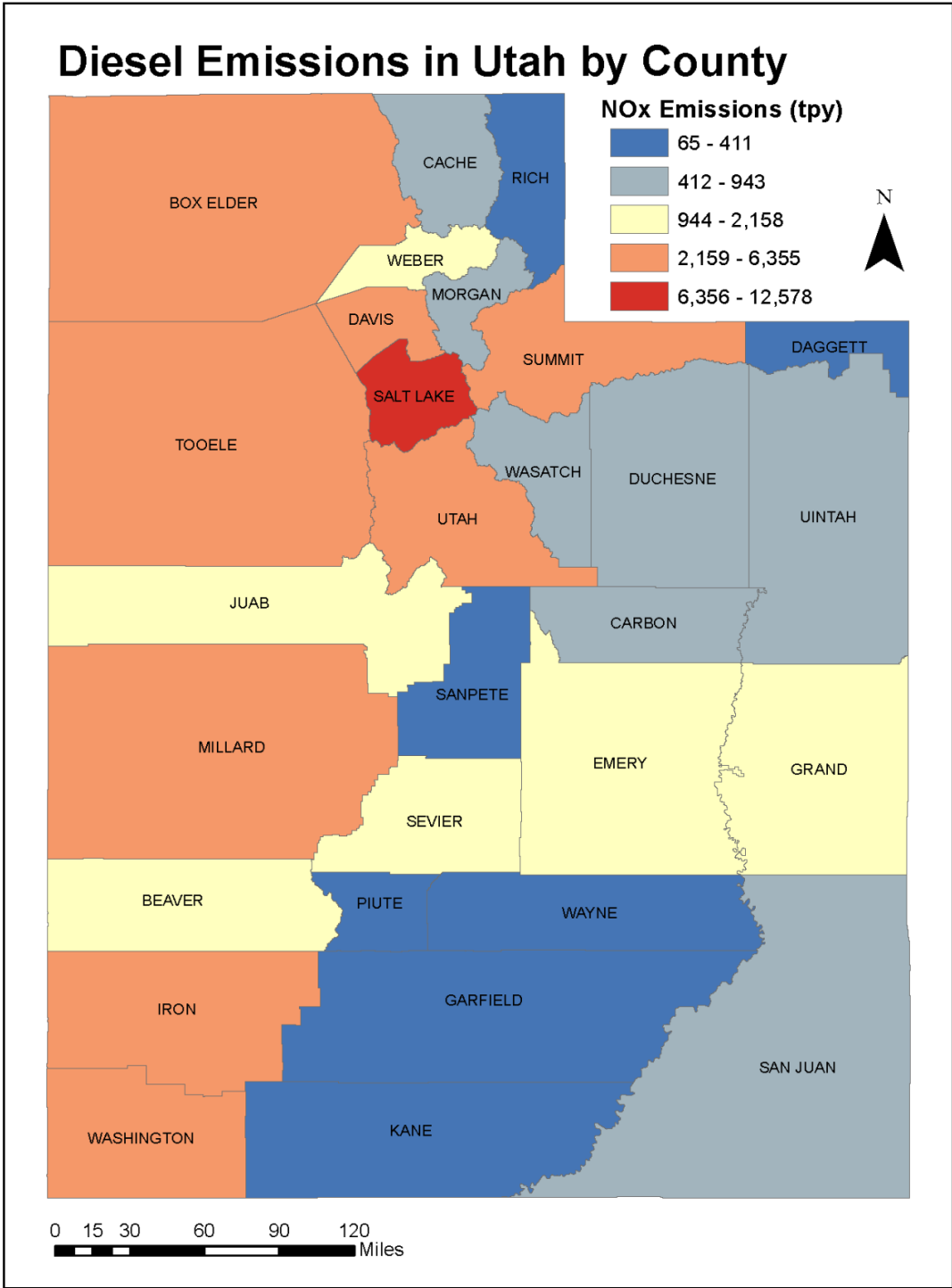


Figure 3: Diesel NO_x Emissions in Utah by County

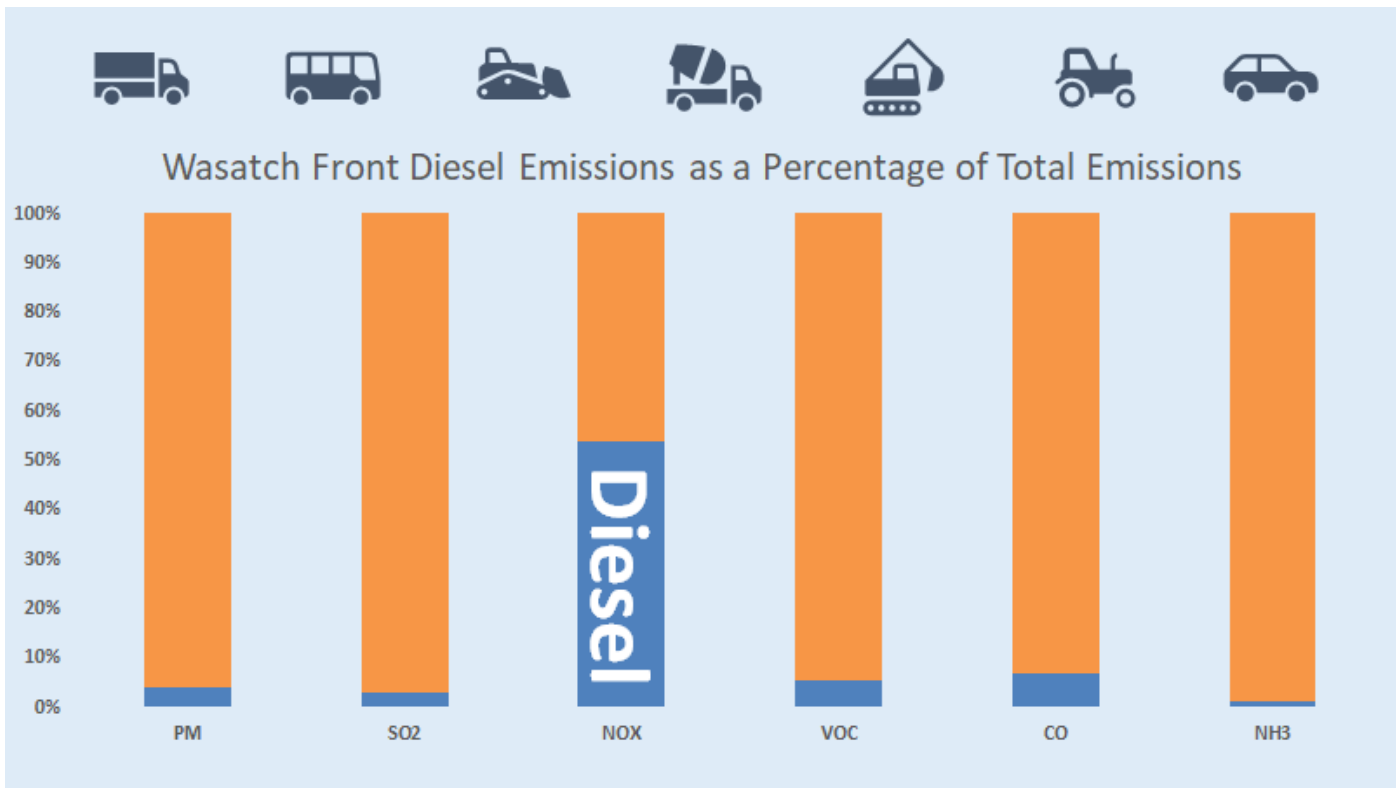


Figure 4: Wasatch Front Diesel Emissions as a Percentage of Total Emissions

Diesel emissions are most prevalent in the more densely populated counties (Figure 3 and Figure 5), and contribute to approximately 50% of total NO_x in the Wasatch Front airshed (Figure 4). The study conducted by the UDAQ includes a breakdown of on-road and non-road diesel emissions in the urbanized areas of the Wasatch Front (Figure 6), which shows that the majority of on-road diesel emissions comes from combination long-haul trucks (51.5% of on-road diesel emissions), and the majority of non-road diesel emissions comes from locomotives/railroad equipment (57.3% of non-road diesel emissions).

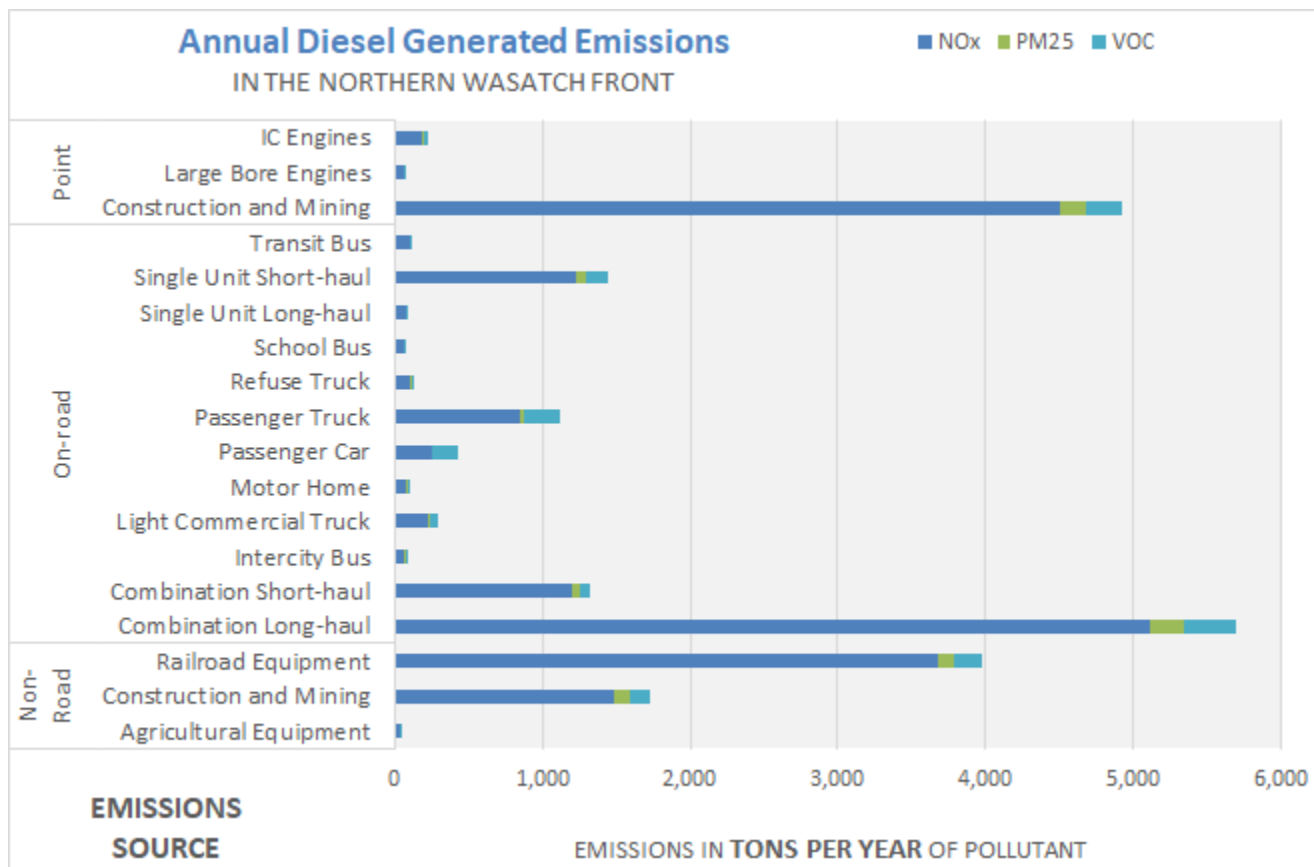


Figure 6: Northern Wasatch Front Diesel Emissions (TPY) by Source Type

The state of Utah is also in a relatively unique position given that one of the largest open pit mines in the world operates near the major metropolitan center of the state, the Wasatch Front, which is currently in nonattainment status for both ozone and PM_{2.5} (Figure 5). The Kennecott Mine and Copperton Concentrator emitted 5,308.3 tons of combined PM₁₀, SO₂, and NO_x emissions in 2017. Of these emissions, approximately 200 pieces of mobile non-road diesel equipment at this facility were responsible for 82.5% of this total (4,376.7 tons), with NO_x emissions accounting for the majority of these combined emissions (4,204 tons). This fact is demonstrated in Figure 6, where the majority of the NO_x emissions observed in the “Point - Construction and Mining Equipment” consist of emissions from the vehicles. These emissions make the Kennecott Mine and Copperton Concentrator one of the largest sources of NO_x in the state of Utah, and on par with the total NO_x emissions from the on-road long-haul trucking segment. While these emissions are substantial, technologies are available that could result in substantial emissions reductions. For instance, the anticipated NO_x and Non-Methane Hydrocarbon (NMHC) emissions reduction from replacing a Tier 1 haul truck with a Tier 4 truck is 65.9%, and the NO_x+NMHC emissions reduction from replacing a Tier 2 haul truck with a Tier 4 truck is 42.3%. Similar reductions are achievable for the other non-road equipment types (graders, water trucks, etc.) at this facility. Because UDAQ has limited regulatory authority over mobile units, emissions reductions mostly occur because of fleet turnover; however,

incentives or other indirect regulatory measures could help ensure these emissions reductions occur at a faster pace.

1.1.2 Utah's Nonattainment Areas

As discussed in Section 1.1, Utah has both historic and ongoing challenges with areas exceeding health-based NAAQS and subsequently being designated as NAAs. Examples of Utah's historic and ongoing NAAs include the Logan, Salt Lake, and Provo NAAs for wintertime $PM_{2.5}$, as well as the Southern Wasatch Front, Northern Wasatch Front (NWF), and Uinta Basin NAAs for ground-level ozone. In all of these areas, emissions from diesel engines contribute emissions that drive these harmful air quality pollutants and impact the area's ability to attain the standard.

Of particular importance, the NWF is currently classified as a moderate ozone NAA. As a result of this designation, the state of Utah recently submitted a State Implementation Plan (SIP) demonstrating the steps the State is taking to reduce emissions and attain the standard. However, based on recent monitoring data, the area will not attain the standard by the required attainment date and will be further reclassified to serious nonattainment status. With this reclassification to serious, additional statutory emissions reductions will be required, including a 9% reduction in ozone precursor emissions (either NO_x or VOCs) from within the NAA. If all of these reduction requirements were to be achieved through reductions of NO_x , this would equate to approximately 9.74 tons per day (tpd) in emissions reductions. Therefore, reductions in NO_x emissions from diesel engines could be a critical tool in achieving these statutory requirements, while simultaneously helping the area improve air quality and attain the standard.

Lastly, the EPA is expected to finalize a more stringent standard for the annual $PM_{2.5}$ NAAQS in 2023. While the final value is still unknown, based on the range of concentrations discussed to date by the EPA, it is anticipated certain ambient air monitors located within Utah will be close to violating this more stringent standard. Diesel emissions reductions will play an important role as the State examines strategies for preventing the costly process of violating a NAAQS and the subsequent nonattainment designations.

1.1.3 Regulatory Landscape of Mobile Sources

CAA Section 209 prohibits states from imposing certain types of mobile emissions standards or policies, narrowing a state's ability to regulate mobile diesel equipment. These prohibitions include:

- 1) on-road mobile sources under Section 209(a); and

2) non-road mobile sources under Section 209(e)(2).

While the CAA preempts states from regulating certain mobile source emissions, the prohibition is not absolute. In regards to on-road mobile sources, states can set emissions standards for non-new vehicles (emission control retrofit technology) and/or impose “in-use” requirements (limit vehicle miles traveled). California has the unique ability to set emissions standards for certain new vehicles if it is able to obtain a waiver from EPA. Other states can then voluntarily adopt an approved California emissions standard.

States have less freedom to limit emissions from non-road mobile sources. States are largely limited to the implementation of “in-use” requirements like limiting the use and operation of non-road engines and hours of usage, imposing daily mass emission limits, anti-idling requirements, or fuel requirements. Aside from a few explicit exceptions, California is able to receive a waiver to create its own emissions standards for non-road sources (Figure 7). States may then adopt California’s approved strategy. Locomotives were previously exempt from these waivers, however, as of November 2023, locomotives are no longer categorically preempted from non-new state regulations. Therefore, if California applies for authorization to implement lower emissions standards on non-new locomotives, states (like Utah) can adopt their standards. New locomotives are still exempt from these waivers.

Therefore, the state of Utah is not preempted from implementing meaningful on-road and non-road mobile source emissions reduction strategies, but any policy implemented by the State would be subject to Section 209 restrictions. For this reason, the majority of regulatory progress made in this sector is accomplished through changes in federal standards, for vehicles, equipment, and fuels.

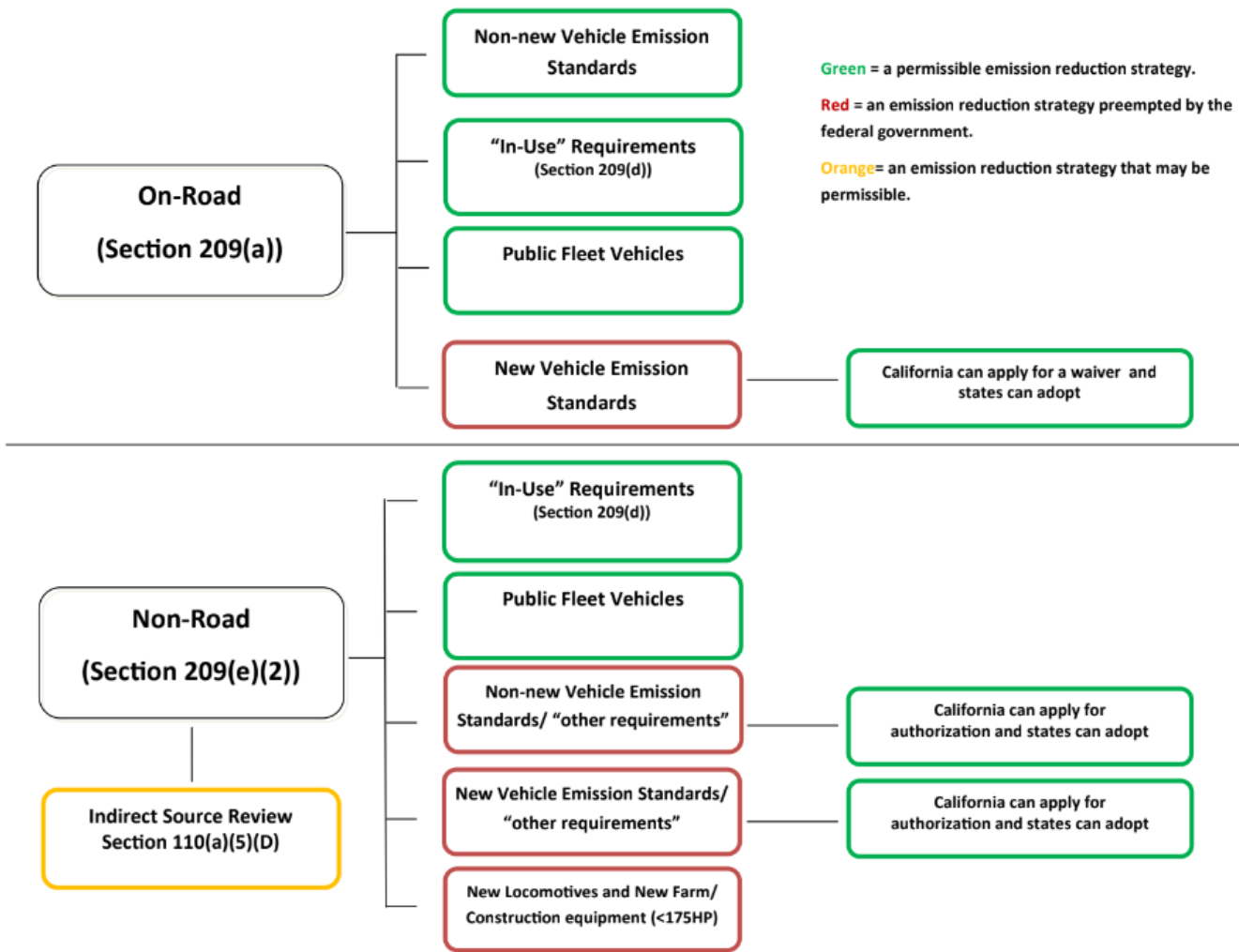


Figure 7: CAA Section 209 Flowchart

1.1.4 Federal Progress in Reducing Mobile Emissions

Federal vehicle standards have improved over the years, and diesel standards have reduced harmful emissions from both on-road and non-road sources by more than 90%. EPA has adopted multiple tiers of emissions standards which have successively regulated and reduced emissions from diesel-fueled vehicles and engines. Figure 8 is an example, specifically with EPA switch locomotive tier standards. These standards are typically² codified on a spectrum of tiers from the oldest and least regulated standards, Tier 0, through the most stringent and recently adopted standards known as Tier 3 or 4 depending on equipment type.

² In some instances, such as with heavy-duty highway vehicles, EPA dispensed with assigning tier levels, and instead used rule-specific nomenclature as seen here:

<https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-smog-soot-and-other-air-polluti-on-commercial>.

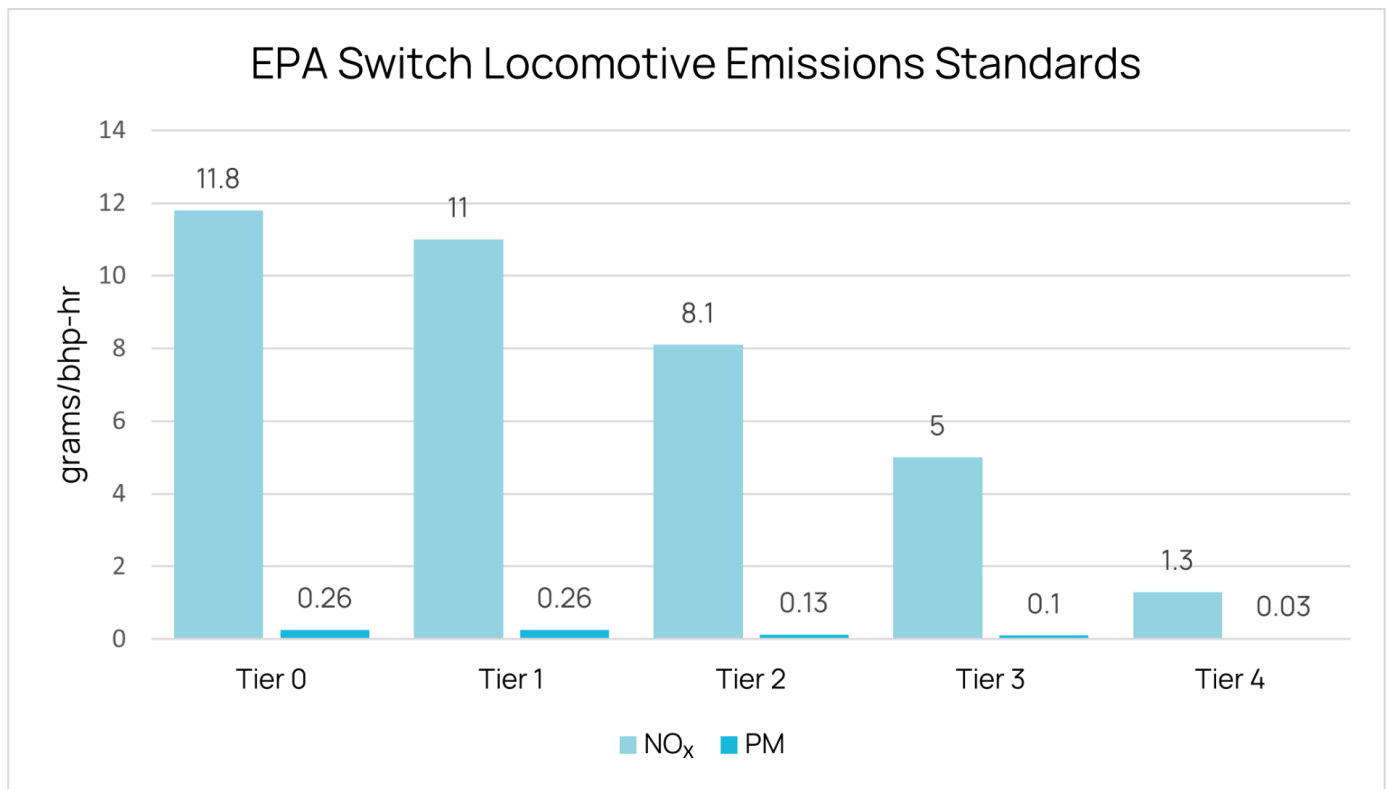


Figure 8: EPA Switch Locomotive Emissions Standards

The most recent standards for non-road engines are known as Tier 4. For light- and medium-duty on-road vehicles, the most recent finalized standards are known as Tier 3, though EPA recently proposed new Tier 4 standards, “Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles,” on April 12, 2023.

On December 20, 2022, EPA updated emissions standards for heavy-duty on-road vehicles and engines. The final rule sets more stringent standards for NO_x, hydrocarbon (i.e. VOC), PM, and CO emissions from heavy-duty engines and vehicles beginning with model year 2027. This rule includes tighter standards for existing laboratory test cycles and new standards for low load cycle and off-cycle test procedures. These changes mean the new standards must be met over a larger range of a heavy-duty engine’s duty cycle, not just under certain conditions. The new standards emphasize reducing heavy-duty engine and truck NO_x emissions and will require an 82.5% NO_x reduction from the previous standard. As a result, EPA estimates by 2045 the final rule will reduce NO_x emissions from the in-use fleet of heavy-duty trucks by almost 50%.

Since the emission control devices required to meet vehicle and engine emissions standards can be damaged by sulfur, EPA has adopted sulfur requirements for in-use diesel fuels. EPA first began regulating diesel fuel sulfur levels in 1993, which were previously as high as 5,000 ppm, and began phasing in regulations to lower the sulfur content in diesel fuel to 15 ppm (also

known as ultra-low sulfur diesel, or ULSD) in 2006. As of 2014, EPA requires all diesel highway, nonroad, locomotive, and marine vehicles or engines must use ULSD.

Collectively, these federal initiatives have led to large emissions reductions, but because diesel engines have a long lifespan, finding ways to accelerate fleet turnover is important.

1.2 Utah's Current Diesel Emissions Reduction Efforts

When considering a Utah diesel emissions reduction framework, it is important to consider what programs are currently in place as those will play an important role in any recommended framework. The State's current efforts for reducing diesel emissions include several programs involving tax credits, incentives, and regulations.

1.2.1 Existing Tax Credit Program

Through the Alternative Fuel Heavy-Duty Vehicle Tax Credit Program, the state of Utah provides an [income tax credit](#)³ for the qualified purchase of a natural gas, a 100% electric, or a hydrogen-electric heavy-duty vehicle, which is defined in Utah Code Section (UAC) 59-7-618.1 and UAC 59-10-1033.1 as a commercial category 7 or 8 vehicle that has never been titled or registered. A Class 7 vehicle has a gross vehicle weight rating (GVWR) between 26,001 and 33,000 pounds, with a Class 8 vehicle having a GVWR higher than 33,000 pounds. These vehicles usually have three axles, but some will have five axles in order to haul a trailer with substantial weight on it. Some examples would be a 5-axle tractor-trailer (semi or 18-wheeler), cement trucks, dump trucks, and refuse haulers. Operators of Class 7 and 8 trucks must have a commercial driver's license, also called a CDL. The Utah Legislature authorized the credit during the 2021 General Session for tax year 2021 through 2030.

1.2.2 Existing Incentive Programs

1.2.2.1 Volkswagen Settlement

The state of Utah is a beneficiary of more than \$35 million from the Volkswagen (VW) Environmental Mitigation Trust, part of a [settlement with VW](#)⁴ for violations of the CAA. The Governor designated the Department as the lead agency to administer this funding for offsetting excess NO_x emissions from non compliant diesel VW, Audi, and Porsche vehicles. As

³ Utah Department of Environmental Quality. (October 6, 2023). *Alternative Fuel Heavy-Duty Vehicle Tax Credit Program*.

<https://deq.utah.gov/air-quality/incentive-programs-aq/alternative-fuel-heavy-duty-vehicle-tax-credit-program>

⁴ Utah Department of Environmental Quality. (October 10, 2023). *Volkswagen Settlement*.

<https://deq.utah.gov/air-quality/volkswagen-settlement>

required by the trust agreement for state beneficiaries, the Department developed an Environmental Mitigation Plan (EMP) that identifies the eligible diesel vehicle and other equipment categories Utah is funding through the settlement. Those categories include Class 8 Local Freight Trucks, Class 4-7 Local Freight Trucks, Class 4-8 School, Shuttle, or Transit Buses, and Light-Duty Zero-Emissions Vehicle Supply Equipment. Utah's EMP directs funding to be used exclusively for public diesel fleets, except for projects funded through the DERA category, providing a double benefit for taxpayers of air quality improvements and tax dollar savings.

1.2.2.2 Utah Clean Fleet Program (previously known as the Utah Clean Diesel Program)

The Diesel Emissions Reduction Act Program (known as DERA) was created under the Energy Policy Act of 2005. This act gave the EPA new grant and loan authority for promoting diesel emissions reductions and authorized appropriations to the EPA of up to \$200 million per year through fiscal year (FY) 2011. Congress appropriated funds for the first time under this program in FY 2008. Over the past decade and beyond, additional federal funding has periodically been appropriated for diesel emissions reductions.

The Utah Clean Fleet Program, funded through the DERA Program, offers [incentives for Utah fleet owners](#)⁵ to voluntarily reduce emissions from heavy-duty diesel engines by upgrading their fleet to cleaner alternatives. The program in its current state offers fleet owners up to 45% cost reimbursement for new Class 5-8 eligible vehicles upon scrapping their older diesel vehicles. With funding from DERA, the UDAQ has facilitated the early retirement of old, dirty diesel vehicles in public and private fleets across the state of Utah. The new, cleaner vehicles have been either all-electric, new California Air Resources Board Low-NO_x, or new diesel—all of which improve air quality in the communities where they operate.

1.2.2.3 Clean Air Retrofit, Replacement, and Off-Road Technology (CARROT) Program

The CARROT Program was enacted in 2014 by the Utah Legislature for UDAQ to encourage fleet owners to reduce emissions from heavy-duty engines and non-road equipment. The [CARROT Program](#)⁶ provides incentives through grants, rebates, exchanges, and low-cost purchase programs. With the first appropriation of \$200,000, UDAQ used the funds to retrofit local government fleet vehicles with diesel exhaust controls, replace one diesel school bus, and offer the first lawn mower exchange program which replaced 388 gas-powered lawn mowers with electric ones. The following year, the Legislature appropriated \$700,000 used to replace 11

⁵ Utah Department of Environmental Quality. (October 10, 2023). *Utah Clean Fleet Program*. <https://deq.utah.gov/air-quality/incentive-programs-aq/utah-clean-fleet-program>

⁶ Utah Department of Environmental Quality. (October 12, 2023). *CARROT Program (Clean Air Retrofit, Replacement, and Off-Road Technology) A Voluntary Emissions-Reduction Program*. <https://deq.utah.gov/air-quality/clean-air-retrofit-replacement-and-off-road-technology-voluntary-emissions-reduction-program-carrot>

diesel school buses, retrofit diesel construction equipment, replace farm equipment, and hold a yard equipment exchange that resulted in replacing 944 gas-powered mowers and 707 gas-powered trimmers with electric versions. Although no further appropriations were made to the Program, UDAQ built on the success of the yard equipment exchanges using settlement monies from CAA violations and continues to offer incentives for reducing emissions from yard equipment. While it is now not specifically a diesel emissions reduction program, CARROT serves to highlight the successes Utah has had in reducing air quality pollutants through incentive programs (Table 2).

Table 1: Utah Statewide Emissions Reduction Estimates Associated with Current Incentive Programs

Year	Vehicles Replaced	NO _x Annual Reduction (tpy)	NO _x Lifetime Reduction (tons)	VOC Annual Reduction (tpy)	VOC Lifetime Reduction (tons)	Program
2017	95	35.77	144.19	8.68	12.77	DERA/NCD
2018	87	9.66	176.40	0.89	16.91	DERA/NCD
2019	60	20.91	62.73	1.04	3.12	DERA/NCD
2020	44	4.75	14.26	0.55	1.65	DERA/NCD
2021	59	7.2	26.34	0.66	2	DERA/NCD
2019-Ongoing	78	23.49	10.34	*	*	VW Settlement
Total	471	101.78	434.26	11.82	36.45	

Note: Not all emissions reductions are solely attributable to diesel reductions, but a substantial portion are a direct result of the successes of existing programs.
 * Quantifications were focused on NO_x for the VW program, thus VOC emissions reduction data was not calculated.

1.2.3 Regulatory Programs

1.2.3.1 Inspection/Maintenance (I/M) Programs

As a result of Utah’s history with NAA designations for PM_{2.5} and ozone pollution, certain areas of Utah have mandatory vehicle emissions Inspection and Maintenance (I/M) programs that require periodic testing to ensure vehicle pollution controls are operating as designed. If a vehicle fails a required I/M test, the owner cannot register the vehicle until it is properly repaired, retested, and passes the I/M test. I/M testing is required in Salt Lake, Cache, Davis, Utah, and Weber counties, and these programs have been adopted into the Utah State Implementation Plan (SIP) making them federally enforceable.

During the 2021 General Session, S.B. 146 required all counties with an existing I/M program to include a diesel emissions inspection component into their program for vehicles model year 2007 or newer with a gross vehicle weight rating of 14,000 pounds or less.⁷

1.2.4 UDAQ's Administrative, Evaluation, and Reporting Requirements

Currently, the five full-time staff in UDAQ's Grants/Incentives Section (GIS) administer 15 different grant/incentive programs and special projects, two of those staff being new additions in 2023. GIS staff are guided by applicable statutes, administrative rules, program guidance, and/or funding agencies' notice of funding opportunities that detail program eligibility and requirements to structure programs and set criteria.

Evaluation processes of programs have varied depending on the characteristics of the program, such as the period of timing, the level of interest, funding availability, and program resources. For example, the VW Environmental Mitigation program received a high level of interest upon announcement of Utah's status as a beneficiary of the one-time funding and offering of up to 65% toward project costs. Hundreds of project vehicles and equipment were submitted for consideration, which required UDAQ to structure a formal prioritization process. An internal evaluation committee was put into place that determined scoring criteria based on the Trust Agreement requirements and the State's priorities. Committee members evaluated individual projects and provided scores that collectively identified projects of highest priority.

Conversely, the Utah Clean Fleet program receives funding annually with more rigid funding restrictions. As such, the level of interest is more moderate and allows for an ongoing application process that makes awards based on eligibility and a first-come, first-served basis.

Other UDAQ incentive programs are structured as rebate programs in which the incentive is provided at the point of sale. For example, the woodstove and yard equipment exchange programs include partnerships with qualifying vendors who contractually agree to document the scrapping of the polluting equipment to be replaced upon selling the new, cleaner equipment at the offered discount. The vendor is reimbursed by UDAQ for the discounts provided. This model works well for consumer products that are identified as emissions reduction measures.

In order to document that emissions reductions occur and ensure program requirements are met, participants of grant and incentive programs must provide documentation and reports to UDAQ periodically throughout the project period that demonstrate progress and compliance with the respective program. Only upon verification that documentation and requirements

⁷ Utah Code Section 41-6a-1642(7)

have been met is reimbursement provided for demonstrating successful completion of the program. Similarly, as a condition of awards, UDAQ must provide quarterly and final reports documenting activities, milestones, expended funds, and project specifications to the funding agencies. UDAQ draws down funding from the award as projects are completed and verified by UDAQ.

UDAQ’s grants and incentive programs are structured to address emissions reduction priorities of the State. As such, many of the programs encourage emissions reductions in nonattainment areas in an effort to work toward attaining the NAAQS in those areas. Participants must submit an application evaluated by GIS staff, enter into a contract with the Department for the proposed activities, demonstrate reasonable progress over the project period, and successfully document the program requirements have been met. GIS staff evaluate compliance with every step of the process and work with applicants/grantees to ensure all requirements are met.

It is important to note these Utah-based programs are implemented and managed by staffing levels significantly below staffing levels of other diesel emissions reduction frameworks examined in this study. As demonstrated in Table 3, UDAQ currently has a similar number of diesel emissions reduction incentive programs as offered by the TERP program (see Section 1.3.1.1) and manages 28% of total TERP funding with approximately 4% of TERP's staff.

Table 2: TERP and UDAQ Program Comparisons

Program	Number of Programs	Number of Staff	Total Funding	Number of Current Contracts (Participants)
TERP grant programs	11	120	\$300-\$320 million	4,000+
UDAQ grant programs	15	5 4% of TERP	\$90.5 million 28% of TERP	205 5% of TERP

1.3 Diesel Emissions Reduction Programs in Other States

The UDAQ studied multiple air quality programs from other states (including TERP), air districts, and local governments. Regulatory and prohibition programs were also examined to provide insight into the full range of program and policy options available when considering a diesel emissions reduction framework. Table 4 shows a high-level summary of all the programs UDAQ studied. More detailed information follows, including a summary of each program, its revenue sources, and its administrative, evaluation, and reporting requirements.

Table 3: State-Implemented Diesel Emissions Reduction Programs: Goals, Methods, and Scope

Program	Targeted Emissions	Percent or Tonnage Reduction Goals	Methods of Reduction	Equipment	Airshed	Program Type
TERP	Mobile NO _x	No specific emissions reduction goals, but reductions are being tracked through SIP revisions	Grants and rebates for vehicle and equipment upgrade or replacement	On- and off-road	Statewide	Incentive
Metro Vancouver NDERP	DPM and NO _x	No specific emissions reduction goals	Phase out of Tier 1, 2, and 3 engines through 2029 and later via registration fees	Off-road	Greater Vancouver	Regulatory and Incentive
Portland CAC	DPM	No specific emissions reduction goals	Idle reduction requirements, specific diesel engine requirements, and a phase-in schedule for Tier 4 off-road and on-road engines	Off-road	Portland Metro Area	Regulatory
CARB DOORS	DPM and NO _x	No specific emissions reduction goals	Diesel engine > / =25hp reporting, phased in ban on adding Tier 2 vehicles	Off-road	Statewide	Regulatory
CARB PERP	DPM and NO _x	No specific emissions reduction goals	Reporting of diesel-fueled portable engines > / =50hp not subject to DOORS and phase-in of Tier 4 engines by 2029	Off-road	Statewide	Regulatory
SJVAPCD	NO _x , VOCs, and PM _{2.5}	No specific emissions reduction goals	Range of programs from replacement of old diesel equipment to mechanic training and alternative fuel infrastructure funding	On- and Off-road	SJV district, southern half of CA Central Valley	Incentive

1.3.1 - Texas Emissions Reduction Plan Incentive Programs

The following sections provide details about the Texas Emissions Reduction Plan grants/incentive programs.

1.3.1.1 Texas Emissions Reduction Plan (TERP)

In 2001, the Texas Commission on Environmental Quality (TCEQ) implemented TERP with the aim of reducing NO_x emissions from mobile sources in Texas’s nonattainment areas. Businesses

and individuals apply for grants and rebates from TERP to replace or upgrade vehicles and equipment with cleaner technology. TERP has an impressive record of reducing 200,000 tons of NO_x since its inception, including replacing nearly 8,000 school buses, and providing rebates for 4,607 electric and hybrid vehicles, and 265 natural gas vehicles. TERP is especially important to TCEQ's emissions reduction strategy since mobile sources are not directly under their authority as discussed in Section 1.1 of this report. However, Texas is still able to impact NO_x reductions from mobile sources because of the financial incentives offered through TERP.⁸ In several ways, TERP's programs are similar to Utah's programs (highlighted in Sections 1.2.1 and 1.2.2). However, TERP is more formalized, more expansive, and more sustainably funded.

TERP currently offers eleven [incentive programs](#)⁹ to achieve its goals including the:

- 1) Light-Duty Motor Vehicle Purchase or Lease Incentive Program;
- 2) Texas Hydrogen Infrastructure, Vehicle, and Equipment Program;
- 3) Seaport and Rail Yard Areas Emissions Reduction Program;
- 4) Texas Natural Gas Vehicle Grant Program;
- 5) Governmental Alternative Fuel Fleet Grant Program;
- 6) Alternative Fueling Facilities Program;
- 7) New Technology Implementation Grant Program;
- 8) Texas Clean Fleet Program;
- 9) Texas Clean School Bus Program,
- 10) Emissions Reduction Incentive Grants; and
- 11) Rebate Grants Program.

See Appendix A for a full comparison table of all TERP programs.

The programs range from direct replacement of older diesel equipment, to programs that implement newer technology at stationary sources. Typically, a program under the TERP framework will specify the type of equipment eligible for replacement, the entities eligible to apply, and the qualifications for replacement technologies. Where new equipment shall be powered by alternative fuels, TERP specifies which fuels qualify, but always includes compressed natural gas (CNG), hydrogen, and electric. Each program lists the total amount of funding available, and specifically how much funding is available per application.

Of all the programs listed above, a specific program of interest is the Seaport and Rail Yard Areas Emissions Reduction (SPRY) Program. SPRY provides incentives for the replacement of older drayage and cargo handling equipment operating at seaports, facilities, and Class I rail

⁸ Texas Commission on Environmental Quality. (2020, December). *Texas Emissions Reduction Plan Biennial Report (2019-2020) Report to the 87th Texas Legislature*.

<https://www.tceq.texas.gov/downloads/air-quality/terp/publications/sfr/179-20.pdf>

⁹ Texas Commission on Environmental Quality. (September 9, 2023). *TERP Grant Programs*.

<https://www.tceq.texas.gov/airquality/terp/programs>

yards in areas of Texas designated as nonattainment areas. These grants are awarded on a first-come, first-served basis. Applicants may be eligible for the maximum grant amount provided in the applicable table¹⁰ or 80% of the eligible costs, whichever is less. Equipment must be in good operating condition, used in its primary function in the routine operations of the applicant, and be capable of performing that function for at least five more years. Grantees must track and report annually on the use and location of all grant-funded equipment over the five-year Activity Life of the project.

1.3.1.2 Revenue Sources

The TERP program was created under Chapter 386 of the Texas Health and Safety Code. Per the Code, TERP collects fees from on- and off-road vehicle sales, titles, registrations, and inspections. For example, all off-road equipment sales are subject to a 1.5% surcharge, and registration of commercial vehicles are subject to a 10% surcharge. This fee revenue resulted in \$505,936,438 for the most recently reported fiscal year, FY 2020-2021 (Texas Commission, 2020).¹¹ In both FY 2020 and 2021, TERP spent approximately \$77 million on grant projects.

1.3.1.3 Administrative, Evaluation, and Reporting Requirements

Funding for some programs are first-come, first-served, while other programs are competitive, based on criteria such as the amount of proposed emissions reductions, number of vehicles to be replaced, and where the project is located. Most programs also list what commitments come with the funding, such as how long the equipment must remain operational, the percentage of time the equipment must operate in Texas and/or designated airsheds, and what reports the recipient must provide to prove compliance with the funding criteria. TERP's many grant and incentive programs—with more than 4,000 contracts—are managed by 120 full-time staff members.

1.3.2 San Joaquin Valley Air Pollution Control District Incentive Programs

The following sections provide details about the San Joaquin Valley Air Pollution Control District grants/incentive programs.

¹⁰ Texas Commission on Environmental Quality. (July 20, 2023). *Seaport and Rail Yard Areas Emissions Reduction (SPRY) Program*. <https://www.tceq.texas.gov/airquality/terp/spry>

¹¹ Texas Commission on Environmental Quality. (2020, December). *Texas Emissions Reduction Plan Biennial Report (2019-2020) Report to the 87th Texas Legislature*. <https://www.tceq.texas.gov/downloads/air-quality/terp/publications/sfr/79-20.pdf>

1.3.2.1 San Joaquin Valley Air Pollution Control District (SJVAPCD)

The San Joaquin Valley Air Pollution Control District (SJVAPCD) is the responsible air agency for the southern half of California's Central Valley. SJVAPCD offers a wide variety of grants and incentives to public agencies, residents, and businesses, and provides an additional example of a diesel emissions reduction framework that predominantly consists of incentive-based programs. Currently, SJVAPCD offers nearly 50 types of grants and incentives to achieve their emissions reduction goals; See Appendix B for a full comparison table of all SJVAPCD programs.

A specific program of interest from SJVAPCD is the Agricultural Tractor Trade-Up Program. This Program provides incentives to pairs of applicants. Beneficiaries (owners of equipment with a Tier 0/Tier 1 engine) will trade-up to Tier 3 equipment supplied by Awardees; Awardees then receive a monetary incentive from the District for the purchase of new Tier 4 equipment. In other words, small farmers are eligible to scrap their old, high-polluting tractor in exchange for a much cleaner, refurbished used tractor with relatively minimal out-of-pocket costs. Meanwhile, larger farms are able to purchase a brand new tractor with the cleanest engine technology available. This program is a win-win for air quality while recognizing the financial difficulty smaller farms often have in purchasing cleaner equipment. All participants must be engaged in agricultural operations as defined by CARB. The District ranks all projects based on their cost-effectiveness, and awards funding based on rank and funds available.

1.3.2.2 Revenue Sources

The revenue to fund the District's annual operating budget comes from the following three sources:

- 1) permit fees paid annually by applicable businesses operating within the District.
- 2) motor vehicle registration fees are generated by a \$19 surcharge fee for every vehicle registered within the District. A part of these fees are used for the internal operations of the District and a portion is distributed to qualified applicants for programs intended to reduce vehicle emissions.
- 3) annual federal and state grants from CARB and EPA.

In Fiscal Year 2021-22, SJVAPCD funded \$243 million in grant projects, reducing 10,307 tons of NO_x, 4,935 tons of VOCs, and 6,105 tons of PM_{2.5} emissions. This was matched by \$471 million from grant recipients (San Joaquin, 2022).¹²

¹² San Joaquin Valley Air Pollution Control District. (2022). 30th Anniversary Edition: Annual Report to the Community 2021-22. <https://ww2.valleyair.org/media/bavfc1ec/annualreport.pdf>

1.3.2.3 Administrative, Evaluation, and Reporting Requirements

SJVAPCD programs range from direct replacement of older diesel equipment to less direct alternative fuel infrastructure funding and mechanic training. The programs generally specify the type of equipment eligible for replacement, the entities eligible to apply, and qualifications for replacement technologies. Most programs have tables detailing how much funding is available per application, which is often based on dollars per horsepower. Funding for some programs is first-come, first-served, while other programs are competitive and ranked on cost-effectiveness. Most programs also require the existing equipment to be destroyed by a certified dismantler and may require an inspection by District Compliance staff. Currently, 112 staff members are in SJVAPCD's Strategies and Incentives Department.

1.3.3 - 1.3.5 Registration Programs

The following sections provide details about the following registration programs: MetroVancouver NDERP, CARB DOORS, and CARB PERP. Registration programs require the owner or operator of specific equipment to register the vehicle's information with a responsible air agency or a cooperating entity. Registration programs are often the first step in collecting valuable data about the number and type of vehicles and engines operating in a state or a disproportionate air quality affected area. These programs often serve as the underpinning for areas that choose to go a step beyond registration programs, and decide to require a surcharge based on criteria for applicable engines.

1.3.3.1 MetroVancouver Non-Road Diesel Engine Regulatory Program (NDERP)

MetroVancouver is a planning entity for 21 municipalities in the Vancouver, British Columbia, Canada, area. As part of their Clean Air Plan, MetroVancouver implemented a Non-Road Diesel Engine Regulatory Program (NDERP), which applies to all diesel non-road engines 25 horsepower or greater. NDERP is a non-road diesel registration and surcharge program. Initially, Tier 0 and 1 engines were not allowed to be registered, but updates to the regulation in 2021 allowed for their operation over 100 meters from sensitive receptors, including hospitals, elementary schools, and day care facilities. MetroVancouver uses an annual fee structure to determine registration fees for each engine as shown in Table 5.

Table 4: NDERP Surcharge Fee Schedule

Annual Fee Rate	Bylaw 1329 Fee Schedule								
	2021	2022	2023	2024	2025	2026	2027	2028	2029 and later
Tier 0 \$/HP	20	20	20	33.79	39.42	45.05	50.69	56.32	57.44
Tier 1 \$/HP	10	10	20	12.56	14.65	16.74	18.83	20.92	21.35
Tier 2 \$/HP	0	0	1.55	2.45	4.71	5.38	8.44	9.38	9.57
Tier 3 \$/HP	0	0	0	1.65	3.22	3.68	5.80	6.44	6.57
Tier 4 \$/HP	0	0	0	0	0	0	0	0	0.94

As seen in Table 5, the lower the tier of the engine, the higher the registration fee. For example, in 2023, a Tier 0 engine would cost \$20 per horsepower to register, meaning the registration for a 100-horsepower engine would cost \$2000. Conversely, registering a Tier 4 engine in 2023 costs nothing.

MetroVancouver offers discounts for installing approved control devices. Previously unregistered engines face a 300% surcharge, or installation of a control device to meet Tier 2 emissions standards. If an owner retires an engine, they can be reimbursed up to 80% of the previous 3 years of payments; in 2025, the reimbursement period will increase to 5 years. There is an exception for moderate-use engines which operate less than 500 hours per year, requiring these engines only pay 60% of the annual fee.

NDERP serves as a good example of how a non-road diesel registration program can benefit an area in understanding and determining the amount and type of diesel engines operating in a given area. Additionally, NDERP goes one step further than a simple registration program with a tier-based surcharge that funds the program in a sustainable manner and serves as a source of revenue for other incentive-based programs.

1.3.3.2 Revenue Sources

NDERP is self-funded by the fees and revenue associated with the registering of engines. On average, NDERP funding totals approximately \$1 million per year. The fees collected are used to

support the program, with a portion of the revenue held in reserve for rebates when registrants retire their engines.

1.3.3.3 Administrative, Evaluation, and Reporting Requirements

First, entities must register their engine by using NDERP’s [Online Registration System](#).¹³ Owners and operators of non-road diesel engines must label the equipment and pay the corresponding fee in Table 5 to operate the equipment in MetroVancouver’s areas. The online registration system requires information including engine manufacture year, engine serial number, engine manufacturer, engine model, company details, and more. The program is managed by 6-8 full-time staff members, and as of 2023 had 4,616 engines registered. In areas under MetroVancouver jurisdiction, owners, operators, or renters of non-road diesel equipment are responsible for compliance. The regulation was written in a way that makes everyone responsible. Failure to comply with the regulation is an offense and may result in tickets (\$1,000 max) or fines (\$200,000 max).

NDERP has minimal reporting requirements. Engines registered in the moderate use category must submit quarterly hour meter readings to prove their exemption, and some engines with emissions reduction measures requiring maintenance or activation have additional required reports. NDERP is an excellent example of a registration and surcharge program that is fairly simple and effective with minimal staffing needs.

1.3.4.1 CARB Diesel Off-Road Online Reporting System (DOORS)

CARB’s Diesel Off-Road Online Reporting System (DOORS) requires self-propelled, off-road diesel vehicles of 25 horsepower or greater statewide to register in its online reporting system. Vehicles must be registered within 30 days of purchase.

Fleet owners must reduce emissions by retiring, replacing, and repowering old engines. Table 6 illustrates how DOORS implements a phased-in ban for Tier 1- and Tier 2- powered vehicles based on fleet size.

Table 5: CARB DOORS Timeline for Requiring the Replacement of Tier 1 engines to Tier 3 as Phased-In Over Time

Fleet Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Medium/ Large	T2				T3					
Small	T1	T2						T3		

¹³ Metrovancouver. (2023). *Non-Road Diesel Online Registration*. <https://apps.metrovancouver.org/NRDE/Security/Login.aspx?ReturnUrl=%2fNRDE%2f>

Medium and large fleets must retire all Tier 2 vehicles by 2018, while small fleets have until 2023. For fleets smaller than a combined 500 horsepower, CARB offers an alternative schedule for all units to be Tier 3 and above as shown in Table 7. In this alternative, very small fleet owners must have 25% of their fleet engines Tier 3 or higher by 2019, and all of their engines Tier 3 or higher by 2029.

Table 6: CARB DOORS Small Fleet Alternative Compliance Schedule

Compliance Date: January 1 of Year	Percent of Fleet (by hp)
2019	25
2022	50
2026	75
2029	100

Finally, under the DOORS program, owners must limit vehicle idling to five minutes, with some exceptions to certain types of engines and use.

1.3.4.2 Administrative, Evaluation, and Reporting Requirements

Registration information includes owner, vehicle, and engine data, and if necessary, the Verified Diesel Emission Control System (VDECS). Once registered, each vehicle has an Equipment Identification Number (EIN). The vehicle's owner must label both sides of the equipment with the EIN within 30 days.

Annually by March 1st, owners must review and update contact and fleet information, and report any retired or sold vehicles. Some special designations, like low-use and agricultural equipment, must also submit hour logs. Owners must also show compliance with the fleet average target, which is based on the horsepower and model year for each engine in the fleet. If the fleet is over their target, owners must install VDECS on a percentage of the engines. The DOORS program is staffed with 4-5 full-time staff members who manage all portions of the program and as of 2023, there were 153,204 pieces of equipment registered.

1.3.5.1 CARB Portable Equipment Registration Program (PERP)

CARB's other applicable registration program is CARB Portable Equipment Registration Program (PERP). This program exists for diesel-fueled portable engines over 50 horsepower not subject to DOORS, primarily because they do not propel mobile equipment. A few examples

of the purposes for these types of engines include power generation, well drilling, and pumps. Engine owners are classified into either small fleets (total horsepower < 750) or large fleets (total horsepower > 750). There is also a separate phase-out schedule for engines rated over 750 horsepower on their own. Small fleet owners must follow the PERP Tier Phase-out Schedule:

Table 7: PERP Tier-Based Phase-Out Schedule for Small and Large Fleets

Tier Phase Out Schedule (required for small fleets, default option for large fleets)			
Engine Certification	Engines rated 50 to 750 bhp		Engines Rated > 750 bhp
	Large Fleet	Small Fleet	
Tier 1	1/1/2020	1/1/2020	1/1/2022
Tier 2 built prior to 1/1/2009	1/1/2022	1/1/2023	1/1/2025
Tier 2 built on or after 1/1/2009	NA	NA	1/1/2027
Tier 3 built prior to 1/1/2009	1/1/2025	1/1/2027	NA
Tier 3 built on or after 1/1/2009	1/1/2027	1/1/2029	NA
Tier 1, 2, and 3 flexibility engines	December 31 of the year 17 years after the date of manufacture. This provision shall not apply to any engine operation before the effective date of this regulation.		

As demonstrated in Table 8, small fleet owners operating under the PERP program must, with the exception of flexibility engines, retire all Tier 3 engines by 2029. Large fleet owners can either follow the Tier Phase-out Schedule, or apply to follow the Fleet Average Standards schedule shown in Table 9.

Table 8: PERP Alternative Compliance Schedule for Fleet Averaging Standards

Compliance Date	Fleet PM Standard (g/bhp-hr)
1/1/2020	0.10
1/1/2023	0.06
1/1/2027	0.03

The fleet PM standard is determined as the average PM emissions factor for all the engines in a fleet. If the average meets or is below the standard for the corresponding year, the fleet is in compliance. For example, by 2020 a fleet owner's average fleet PM emission factor must be 0.1

grams per brake horsepower hour to comply. If the average emission factor is over this value, the owner must replace or retire old engines, or add controls, like a diesel particulate filter, to lower the average emissions factor to meet the standard. CARB's regulation outlining PERP, the "Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines Rated at 50 Horsepower and Greater", also requires a prohibition of sale. It prohibits the sale or offer for sale of diesel-fueled engines according to the schedule shown in Table 10.

Table 9: Compliance Schedule for CARB's Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines Rated at 50 Horsepower and Greater

Engine Certification	Engines rated 50 to 750 bhp	Engines rated >750 bhp
Tier 1	1/1/2020	1/1/2022
Tier 2 built prior to 1/1/2009	1/1/2023	1/1/2025
Tier 2 built on or after 1/1/2009	NA	1/1/2027
Tier 3 built prior to 1/1/2009	1/1/2027	NA
Tier 3 built on or after 1/1/2009	1/1/2029	NA
Tier 1, 2, and 3 flexibility engines	December 31 of the year 17 years after the date of manufacture. This provision shall not apply to any sale of an engine before the effective date of this regulation.	

As demonstrated in this and the previous sections, regulatory frameworks beyond registering and reporting programs can be expansive and complex. The regulatory approaches highlighted in the NDERP, DOORS and PERP sections represent a diesel emissions reduction framework that goes well beyond incentive-based programs like TERP.

1.3.5.2 Administrative, Evaluation, and Reporting Requirements

PERP is voluntary and operates as a revenue-neutral program which allows equipment owners to operate portable equipment throughout California without having to obtain individual permits from local air districts. If an engine is eligible for PERP registration, the fleet owner completes the application forms and pays the registration cost. PERP staff send the owner a placard and sticker which must be displayed on the equipment. Once registered, the fleet owner must contact their home air district to arrange an inspection. The inspection must occur within the first year of registration, and the home air district has the primary responsibility of determining compliance. The fleet owners must keep records proving compliance with the fleet PM standards and operation records, and make them available to local districts or CARB upon request. Low use engines are required to submit annual reports. As of 2023, 8 full-time

staff manage the program and 83,174 registrations. In 2022, PERP registration fees totaled more than \$11 million, nearly half of which reimbursed local air districts for inspections.

1.3.6 Construction-Focused Programs

1.3.6.1 Portland Clean Air Construction (CAC) Program

The Clean Air Construction (CAC) program is a collaboration between the City of Portland, Multnomah County, Washington County, Metro, TriMet, Portland Community College and Port of Portland (“CAC Agencies”). The CAC Agencies work to reduce diesel emissions on construction projects at certain contract thresholds. They aim to accomplish this by implementing a standard set of idle reduction and diesel equipment requirements on job sites and implementing a regional program to verify compliance with the requirements. By adopting the same approach and working together, they work to minimize related administrative burdens on contractors and CAC Agencies. Some idle reduction requirements apply across the board. For example, all non-road diesel equipment must shut down after five minutes of inactivity (as of January 1, 2020). Additionally, there are specific diesel engine requirements and a phase-in schedule for non-road and on-road vehicles and equipment as demonstrated in Table 11.

Table 10: Portland CAC Program Phase-In Schedule for Diesel Engine Requirements

Effective Date of Diesel Engine Requirement	Nonroad Diesel (over 25hp) NOx Annual Reduction (tpy)				On-Road Diesel (concrete mixers and dump trucks)			
	Engine Requirements	Retrofit Options			Engine Requirements	Retrofit Options		
		DPF	DOC (only if DPF or equivalent can't be installed)			DPF	DOC (only if DPF or equivalent can't be installed)	
	All Firms	Non-DMWESB /SDVB Firms	DMWESB /SDVB Firms	All Firms	Non-DMWESB /SDVB Firms	DMWESB/SDVB Firms		
January 1, 2020	No Idling							
January 1, 2021								
January 1, 2022	No Tier 0 engines allowed unless retrofit	Y	Y	Y				
January 1, 2023	No Tier 0 or 1 engines allowed unless retrofit	Y	Y	Y				

Effective Date of Diesel Engine Requirement	Nonroad Diesel (over 25hp) NOx Annual Reduction (tpy)				On-Road Diesel (concrete mixers and dump trucks)			
	Engine Requirements	Retrofit Options			Engine Requirements	Retrofit Options		
		DPF	DOC (only if DPF or equivalent can't be installed)			DPF	DOC (only if DPF or equivalent can't be installed)	
		All Firms	Non-DMWESB /SDVB Firms	DMWESB /SDVB Firms		All Firms	Non-DMWESB /SDVB Firms	DMWESB/SDVB Firms
January 1, 2024	No Tier 0, 1, 2, or 3 engines allowed unless retrofit	Y	N (pre-2024 installs allowed)	N (pre-2024 installs allowed)	N pre-2007 engines allowed unless retrofit	Y	N	N (pre-2024 installs allowed)
January 1, 2025			N					

1.3.6.2 Administrative, Evaluation, and Reporting Requirements

Contractors demonstrate compliance with the CAC requirements on an annual basis by providing to the applicable contracting agency, or approved program operator, all requested diesel equipment/vehicle information needed to verify compliance, including confirmation retrofit devices are maintained on the equipment in proper operating condition. Upon determining compliance with the requirements, the applicable contracting agency, or approved program operator, issues an equipment/vehicle decal for each compliant piece of equipment/vehicle. This decal must be displayed on the compliant equipment/vehicle at all times in a location readily visible to agency staff. In addition, random on-site inspections by agency staff (or approved program operators) are conducted on a project-by-project basis. Additional details regarding consequences for noncompliance are determined on an agency-by-agency basis. Additional implementation and program elements are currently in development.

The CAC program is funded by all its partner agencies, based on their total organizational budgets. The program's total annual budget of approximately \$300,000 funds one full-time Coordinator staff position, supportive contracts, and a small grants program for retrofits to get vehicles and equipment into compliance. As of September 2023, a total of 86 firms were registered with the program.

1.3.7 Regulatory Programs

Below is a brief overview of various regulatory mechanisms states can use to reduce diesel emissions, despite some of the limitations highlighted in 1.1. The regulatory programs highlighted here extend beyond incentive- and registration-based programs, but are

nonetheless emissions reduction tools available to states that can be used to reduce emissions from diesel engines, both on- and non-road.

1.3.7.1 Indirect Source Review (ISR)

Indirect Source Review (ISR) is a regulatory tool established in the CAA and can be included in a SIP revision.¹⁴ ISR involves facility-by-facility review and permitting of indirect sources of air pollution, which are facilities that attract or produce pollutants through additional vehicle trips, but do not emit pollutants themselves. The CAA also establishes that ISR can implement measures to ensure the new or modified indirect source will not attract mobile sources of air pollution that could cause NAAQS exceedances or prevent maintenance of NAAQS.¹⁵ As a result, ISR is a regulatory-based transportation control measure that can be used to place regulations on development projects that increase vehicular mileage traveled.

While ISR could serve as a regulatory mechanism for reducing emissions from mobile sources, there is little legal precedence for the implementation of ISR to gauge the scope of its use. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has implemented [Rule 9510: Indirect Source Review](#)¹⁶ (adopted in 2005, most recently amended in 2018) and [Rule 3180: Administrative Fees for ISR](#)¹⁷ (adopted in 2005, most recently amended in 2019) for the purposes of fulfilling the District's emissions reduction commitments for both PM₁₀ and ozone SIPs, and reducing emissions from construction and development through on- and off-site measures. The SJVAPCD's PM₁₀ and ozone SIPs have determined the implementation of these ISR rules will help the area reach attainment. The Bay Area Air Quality Management District (AQMD), [Feather River AQMD](#),¹⁸ and [San Diego County APCD](#)¹⁹ have also established similar ISR guidelines under the [California Environmental Quality Act. Oregon](#)²⁰ (1999). [Florida](#)²¹ (2002), and [New York](#)²² (2023) are examples of other states that have at least established ISR guidelines.

¹⁴ 42 USC § 7410(a)(5)

¹⁵ 42 USC § 7410(a)(5)(D)

¹⁶ <https://ww2.valleyair.org/media/cjlnn0u1/r9510-a.pdf>

¹⁷ <https://ww2.valleyair.org/media/jool5mh1/r3180-a2.pdf>

¹⁸ <https://www.fraqmd.org/ceqa-planninghttps://www.fraqmd.org/ceqa-planning>

¹⁹ <https://www.sdapcd.org/content/dam/sdapcd/documents/rules/rule-workshops/060823/ISR-Framework-English.pdf>

²⁰ <https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=1561>

²¹ https://www.broward.org/Air/TransportationCleanAir/Documents/FDEPIndirectSourcesGuide_ADA.pdf

²² https://nyassembly.gov/leg/?default_fld=&leg_video=&bn=A01718&term=2023&Summary=Y&Actions=Y&Memo=Y&Text=Y

1.3.7.2 In-Use Requirements

As described in the regulatory background information within Section 1.1, states may impose “in-use” requirements on mobile sources as a means of reducing emissions. In short, in-use requirements impose regulatory restrictions on when or how classes of engines can be operated, while not implementing specific emission limits. While somewhat limited in the total scope of emissions reduction regulatory options, in-use requirements are a tool available that can be implemented to reduce emissions from sources that are difficult to regulate due to Section 209 preemptions.

A recent example of in-use requirements is CARB's [In-Use Locomotive Regulations](#)²³, approved by their Board in April, 2023. These in-use operational requirements for locomotives operating within California will begin in 2030 and include the following:

- only locomotives less than 23 years old will be allowed in California;
- switchers operated by Class I, Class III, industrial, and passenger locomotive operators with an original engine build date of 2030 and beyond will be required to operate in a zero-emission configuration;
- passenger locomotives with an original engine build date of 2030 and beyond will be required to operate in a zero-emission configuration; and
- class I line-haul locomotives with an original engine build date of 2035 and beyond will be required to operate in a zero-emission configuration.

EPA's November 2023 rulemaking that allows California to apply for lower emissions standards for non-new locomotive engines changes the regulatory landscape for locomotives and opens opportunities for Utah to adopt policies to control emissions from this mobile source category.

1.3.7.3 Adoption of Mobile Emissions Standards

As described in Section 1.1, the adoption of emissions standards for mobile sources is somewhat limited due to CAA Section 209 preemptions. As detailed in that section, there are regulatory pathways for states to adopt more stringent mobile emissions reduction frameworks, particularly if a state is adopting a previously approved California standard. For example, both the Advanced Clean Trucks (ACT) regulation, and the Heavy-Duty Engine and Vehicle Omnibus Regulation are both regulatory policies passed in California that can be adopted by other states.

²³ <https://ww2.arb.ca.gov/our-work/programs/reducing-rail-emissions-california/locomotive-fact-sheets>

1.4 Diesel Emissions Reduction Goals In Other States

The states and programs examined in this study have developed a large range of diesel emissions reduction goals—from broad, high-level objectives to specific and quantifiable targets. Figure 9 demonstrates how goals associated with a diesel emissions reduction framework can range from high-level, non-specific goals, to highly specific and quantified goals, as well as the types of programs that fall within this spectrum.



Figure 9: Spectrum of Emissions Reduction Goals From Examined Diesel Emissions Reduction Programs

In this section, examples of both general, high level, and specific quantifiable goals are provided. While not every program examined in Section 1.3 is covered in detail here, Table 4 provides an overview of the types of goals, equipment targeted, methods of reductions, and more, for all programs highlighted elsewhere in this study.

1.4.1 TERP Emissions Reduction Goals

In Texas, the objectives for TERP include:

- 1) achieving maximum reductions NO_x to demonstrate compliance with the Texas SIP;
- 2) preventing areas of the state from being in violation of the NAAQS; and
- 3) achieving cost-savings and multiple benefits by reducing emissions of other pollutants.

These objectives represent a good example of a diesel emissions reduction framework setting high-level goals to target emissions reductions while providing flexibility in implementing individual programs. Higher-level goals are consistent for frameworks largely composed of incentive-based programs, where the absolute amount of reductions can shift over time as the targeted fleet changes over and adopts cleaner technologies.

1.4.2 CARB Emissions Reduction Goals

In California, CARB completed a statewide Diesel Risk Reduction Plan (a comprehensive strategy to control diesel particulate matter emissions) in 2000. The overall goals of the plan were to reduce diesel PM emissions statewide 75% by 2010 and 85% by 2020. Within the plan, reductions in PM are achieved by a combination of approaches including emission regulations for new diesel engines, a low sulfur fuel program, and measures for various categories of in-use on- and off-road diesel engines. The in-use control strategies are generally based on the following types of controls:

- 1) retrofitting engines with emission control systems, such as diesel particulate filters or oxidation catalysts;
- 2) replacement of existing engines with new technology diesel engines or natural gas engines; and
- 3) restrictions placed on the operation of existing equipment.

Relatedly, in 2020, California along with 14 other states and the District of Columbia announced a joint memorandum of understanding committing to work to reduce diesel emissions by advancing the market of electric medium- and heavy-duty vehicles; although trucks only represent a small portion of the total share of vehicles on the road, they result in disproportionately high emissions. Accordingly, this goal ensures that 100% of all new medium- and heavy-duty vehicle sales be zero-emission vehicles by 2050, with an interim target of 30% zero-emission vehicle sales by 2030.

Finally, California adopted ACT in 2020 to address truck emissions. By implementing ACT, California expects to accelerate medium- and heavy-duty ZEV (zero-emissions vehicle) truck adoption and cut up to 17 million tons of CO₂ emissions by 2040. To date, six other states have also adopted this rule: Maryland, Massachusetts, New Jersey, New York, Oregon, and Washington. Compared to the goals set by TERP, the specific measures highlighted under the CARB programs represent quantifiable targets more generally associated with regulatory-based emissions reduction frameworks.

1.5 Utah Inland Port Environmental Mitigation Projects

As required under subsection 3(f) of S.B. 136, the UDAQ studied potential environmental mitigation projects that could reduce emissions within and around the Utah Inland Port. In this section, the UDAQ reports on mitigation strategies implemented at other ports, with specific recommendations made in Section 2 per requirements of subsection 4(b)(ii).

1.5.1 Utah Inland Port Authority (UIPA) Background

The Utah Inland Port Authority (UIPA) and Inland Port were created as legal entities by the Utah Legislature in 2018. The current mission of UIPA is to “maximize long-term economic benefits in Utah by developing and optimizing economic project areas and logistics-based infrastructure.” Currently, the Utah Inland Port includes four official project areas: Northwest Quadrant (in the northwest corner of Salt Lake County), Iron Springs (in Iron County), Golden Spike (in Box Elder County), and Verk Industrial Park (in Utah County). As UIPA is still in initial growth stages, opportunities to implement operational strategies and emissions reduction programs are prime for mitigating diesel emissions.

UDAQ has established two ambient air monitoring facilities at the Salt Lake UIPA sites to track pre-development and early development baseline data. These facilities include a sensor system consisting of monitors to measure levels of particulate matter, ozone, and NO_x.

In general, activities associated with inland ports include the operation of cargo handling equipment, locomotives, trucks, vehicles, and storage/warehousing facilities related to transporting cargo, as well as the development and maintenance of supporting infrastructure. In simple terms, cargo and shipping containers are transferred between road vehicles and/or trains at inland port facilities.

1.5.2 Best Practices for Port Areas

The EPA has published the Ports Initiative Program’s national guidance on ways to reduce emissions. This Program includes [Best Practices](#)²⁴ for port general operational strategies, which are the basis for the Department’s recommendations.

Figure 10 shows ports across the country that have implemented EPA’s Best Practices. These practices include:

- 1) developing an emissions inventory;
- 2) implementing emissions reduction targets/activities;
- 3) supporting community engagement; and
- 4) seeking funding (such as DERA) as described in Section 1.2.2 of this report.

As demonstrated in Figure 10, ports across the nation have adopted a wide range of actions. Port Houston in Texas is one of the few ports to have implemented all of the identified best practices.

²⁴ Environmental Protection Agency. (October 4, 2023). *Best Port-wide Planning Practices to Improve Air Quality*. <https://www.epa.gov/ports-initiative/best-port-wide-planning-practices-improve-air-quality>

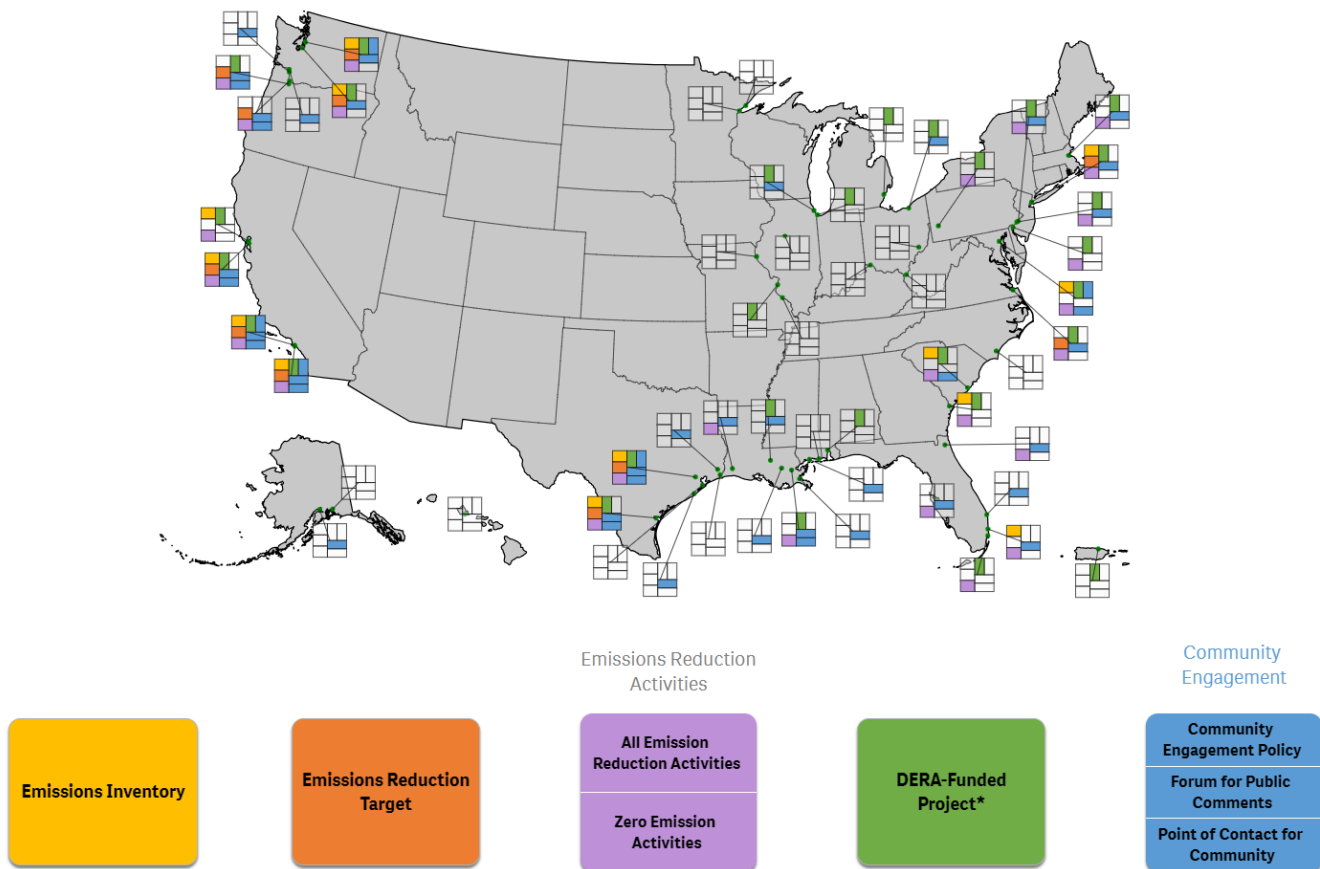


Figure 10: Ports That Have Adopted EPA's Best Practices for Ports

Additionally, multiple funding opportunities beyond DERA could advance environmental mitigation planning/projects for UIPA. As they continue supporting the expansion of the State's logistics-based infrastructure, the Utah Inland Port can follow many aspects of the EPA Ports Initiative Program's national guidance on ways to reduce emissions.

2.0 Recommended Utah Diesel Emissions Reduction Framework

2.1 Utah Diesel Emissions Reduction Framework Overview

As S.B. 136 subsection 4(a) requires, the UDAQ has identified a range of potential recommendations that could serve as a Utah diesel emissions reduction framework. As highlighted in Section 1.3 of this report, there is a wide spectrum of ways to structure diesel emissions reduction programs, ranging from educational and incentives initiatives to regulatory policies. Figure 11 demonstrates the range of potential policies Utah could adopt.

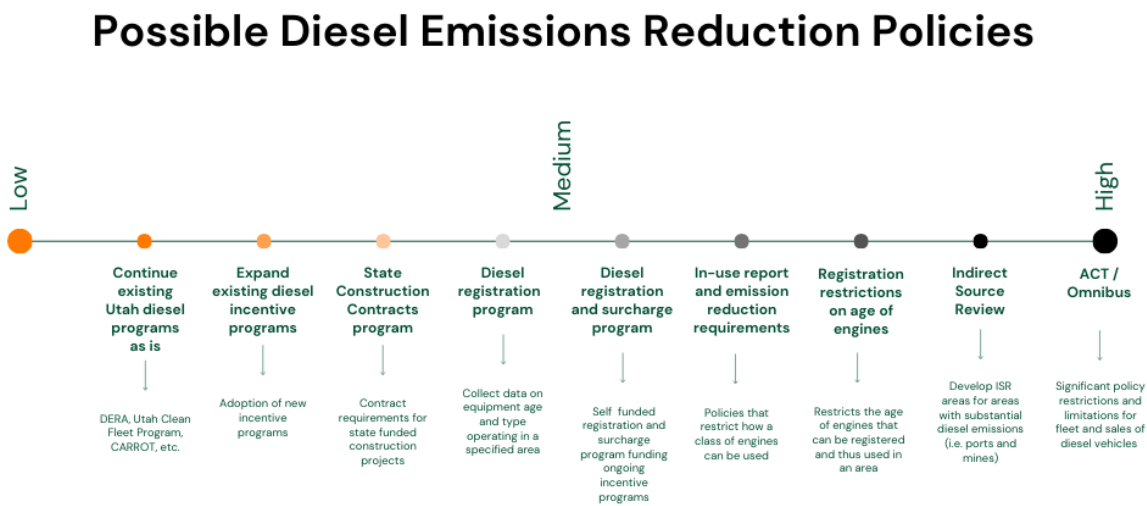


Figure 11: Range of Potential Policies Utah Could Adopt for a Diesel Emissions Reduction Framework

Given Utah's past experience and success in operating diesel emissions reduction incentive programs, as highlighted in section 1.2, and the challenges facing Utah in attaining and maintaining NAAQS, the UDAQ believes that the adoption and expansion of existing policies similar to those described in the TERP program would be beneficial tools in reducing diesel emissions throughout the state of Utah while providing benefits to rural and underserved communities.

The UDAQ has also identified incentive-based programs in Section 1.3 that could be beneficial in achieving Utah-specific goals of reducing emissions in underserved and rural communities (Section 2.2); specifically the Texas Seaport and Rail Yard Areas Emissions Reduction Program

could be a model for incentive-driven programs to reduce emissions within and around Utah Inland Port areas.

Additionally, the UDAQ has identified that a state construction contracting program like the Portland Clean Air Construction (CAC) Program described in Section 1.3.3.1 has a relatively low administrative burden relative to the potential benefits. However, more detailed data is needed to formulate a successful incentive-based program for the State's construction contracts; therefore the UDAQ recommends performing a detailed follow-up study of equipment usage in this area (see Section 2.7).

Lastly, the UDAQ has identified the need to collect and evaluate data regarding the number, age, and type of non-road diesel engines operating in the State and in disproportionate air quality-affected areas beyond the construction contracts discussed above. Thus, a diesel registration program, like the underlying registration requirements for the MetroVancouver program highlighted in Section 1.3.3.1, could serve as an invaluable tool in examining current emissions prior to the further development of emission-reduction policies. A registration program of this type could assist in the implementation, reporting, and verification requirements for all other elements of any potentially adopted framework. Once a registration program is in place, a registration surcharge program similar to NDERP could be implemented. Figure 12 highlights what a framework that encompasses these recommendations could look like.

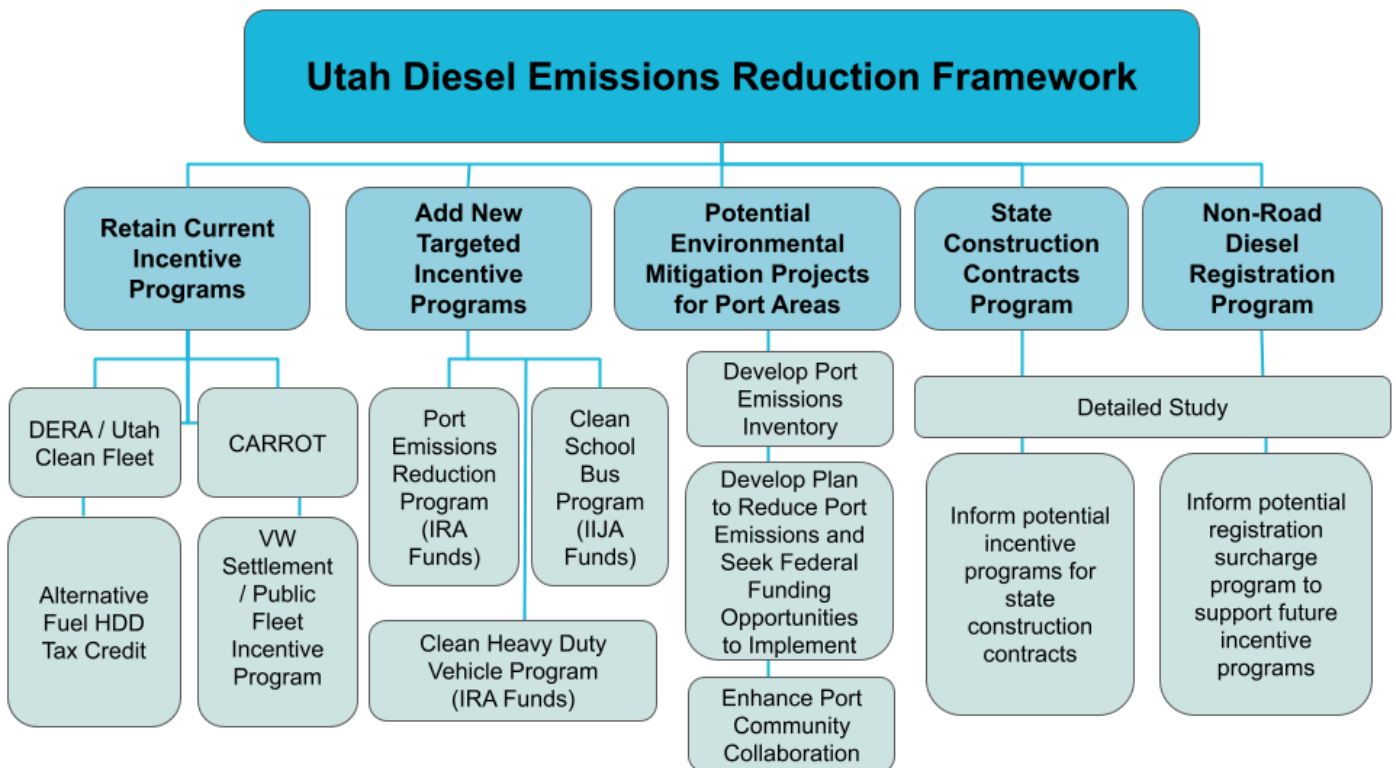


Figure 12: Possible Utah Diesel Emissions Reduction Framework

While Figure 12 highlights possible incentive and reporting programs that could serve as a Utah-specific framework, the UDAQ has provided a more expansive range of policies to highlight the full range of possible diesel emissions reduction programs that could be adopted, as shown in Figure 11. However, given past success with incentive-based programs as highlighted in Table 2, and ongoing data needs, the UDAQ believes that programs like those highlighted in Figure 12 are most appropriate for a Utah-specific diesel emissions reduction framework.

As highlighted in Figure 12, the UDAQ has concluded that a possible diesel emissions reduction framework could consist of the following:

- 1) retain and further fund existing Utah diesel emissions reduction incentive programs;
- 2) add new targeted incentive programs;
- 3) implement a study to better understand requirements for a potential future statewide Construction Contracts program;
- 4) implement a non-road diesel registration program to inform emissions and future incentive programs; and
- 5) recommendations for environmental mitigation projects for port areas.

2.2 Diesel Emissions Reduction Goals

As required under subsection 4(a)(i) of S.B 136, the UDAQ recommends that an appropriate goal for a potential Utah diesel emissions reduction framework could be similar to those described by the TERP program and highlighted in Section 1.3. Additionally, as Utah will have specific NO_x emissions reduction requirements for the NWF NAA under a serious designation as described in Section 1.1.2, it may be appropriate to include these specific requirements in the goals. These goals could target additional emissions reductions from sources difficult to regulate due to CAA Section 209 preemptions, and would:

- 1) help bolster and support ongoing and future State Implementation Planning efforts, including assisting in achieving a 9% reduction in NO_x emissions throughout the NWF NAA;
- 2) assist current nonattainment areas in progressing towards attaining health-based standards, and preventing future nonattainment designations throughout the State;
- 3) ensure that projected emissions reductions associated with federal standards and policies occur as anticipated and endeavor to accelerate the pace of these reductions where possible;
- 4) maximize federal funding sources to address diesel emissions and coordinate/collaborate with relevant stakeholders; and
- 5) maximize benefits to achieve emissions reductions in communities across Utah, especially in underserved and rural areas.

2.3 Financial Incentive Programs

As required under subsection 4(a)(ii) of S.B. 136, and as overviewed in Section 2.1 (Figure 11), the UDAQ has identified a range of incentive programs that could serve to fulfill a Utah diesel emissions reduction framework, with the recommendation that the state of Utah retain and further fund existing programs, while also adopting new targeted incentive programs that help fulfill the goals highlighted in Section 2.2.

Many of the programs included in this potential framework already exist in Utah, including:

- 1) DERA/the Utah Clean Fleet program;
- 2) The Alternative Fuel Heavy Duty Diesel Tax Credit;
- 3) the Public Fleet Incentive Program as funded by the VW settlement; and
- 4) CARROT.

While most of these programs have dedicated UDAQ staffing and funds associated with them (see Sections 1.2.4 and 2.5.1 for more details), it is worth noting the CARROT program has not

received additional funding since 2015, and the retention of that program would likely require additional funding support.

Beyond retaining and funding existing programs, the UDAQ has highlighted three programs it believes would work towards achieving the emissions reduction goals if implemented.. These incentive programs include:

- 1) a program similar to the TERPs Seaport and Rail Yard Areas Emissions Reduction (SPRY) Program;
- 2) a dedicated Clean School Bus Program; and
- 3) a Clean Heavy Duty Vehicle Program.

All three of these programs could initially receive one-time funding available through the IRA and IIJA (see Appendix D for more details), or receive ongoing funding provided by other revenue sources as described in Section 2.4. Utah could build on the successes of existing programs by creating new incentive programs to achieve additional diesel emissions reductions in and around port areas, using TERP programs as a model.

Lastly, after examining the Portland CAC Program (Section 1.3.6.1), the UDAQ believes implementing an incentive-based program for state construction contracting could result in diesel emissions reductions supporting the goals of this framework. However, after engaging with relevant stakeholders, the UDAQ has determined that prior to making specific recommendations, granular data related to the type, amount, and use of existing equipment in Utah is required. Therefore, the UDAQ recommends that the State's agencies, including the Utah Department of Transportation (UDOT) and Utah Division of Facilities Construction and Management (DFCM), should begin tracking construction equipment used on state contracts. A follow-up study could examine this collected data to guide a possible state Construction Contracts Program.

As the State works towards reducing emissions from diesel engines, it is critical to ensure that the programs included in this framework directly benefit rural communities, inland port areas, underserved/underrepresented communities, and disproportionate air quality affected areas whenever possible. One way to accomplish this is by targeting and prioritizing small businesses with the incentive programs provided in this framework. Often, the oldest, dirtiest vehicles and equipment end up with smaller, "mom and pop" businesses, which have little economic leverage to turn their fleet over and pursue cleaner vehicles/equipment independently. Small businesses likely also lack the time and staff to investigate incentive opportunities available to them. Therefore, it is critical for UDAQ's GIS to have the staff and resources necessary to perform outreach to entities like these small businesses, who may benefit the most from incentive programs.

It is also important to note that while the UDAQ has had great success in implementing emissions reduction incentive programs in the past, the addition of new programs would require additional staffing resources. Details on the administrative requirements associated with adopting these programs are further examined in Section 2.5.

2.4 Possible Revenue Sources

In accordance with subsection 4(a)(iv), the UDAQ has examined how other states have funded incentive-based programs and has made recommendations where appropriate and relevant to the proposed framework identified in Section 2.1 (Figure 12). Typically, funding for incentive-based programs like those included in this proposed framework falls into one of two categories:

- 1) one-time funding from settlements, grants, or appropriations; or
- 2) sustainable, recurring revenues generated through mechanisms like fees from vehicle titles, registrations, or surcharges.

Examples of the first model outlined above and studied in Section 1 of this report would be Utah's public fleet incentive program, funded by the VW settlement, or Utah's CARROT program, funded through state appropriations, as well as programs that foster new technology implementation like Utah's Tax Credit Program. Examples of the second, self-sustaining model, would be the incentive programs included under the TERP framework as funded through fees generated from vehicle titles, truck-tractors and commercial motor vehicle registrations, and inspections (see Section 1.3.1.2), or the MetroVancouver NDERP non-road registration and surcharge program (Section 1.3.3.1).

Utah could take multiple avenues when considering funding mechanisms for existing or new incentive programs in order to achieve diesel emissions reductions, as well as to foster new technology implementation. However, it is important to draw attention to the unprecedented amount of one-time funding opportunities available to states through the IRA and IIJA, as discussed throughout this report and summarized in detail in Appendix D. Both of these programs could provide initial funding opportunities for many of the incentive programs discussed in this framework. This funding could serve as a critical tool in building a diverse diesel emissions reduction framework built upon multiple programs that could later be supported by other revenue models.

Beyond the one-time funding opportunities through the IRA and IIJA, the UDAQ has provided multiple examples of programs funded through fees, licensing, and registration surcharges in section 1.3. In these examples, fees collected through registrations or surcharges provided these programs with ongoing funding. It is worth noting that several of the programs highlighted in Section 1 have had particular success in funding incentive programs through a

non-road registration and surcharge program. For example, MetroVancouver has registered about 4,600 non-road diesel engines since the inception of NDERP, and has funded this registration program and its 6-7 full-time staff members through the fees associated with the surcharges collected (Table 5).

While the UDAQ believes that a non-road registration and surcharge program could prove to be a critical tool in providing ongoing funding for the incentive programs included in a Utah diesel emissions reduction framework, the data needed to adequately understand appropriate surcharges is not currently available. Therefore, the UDAQ is recommending that the State first implement a non-road diesel registration program supported through one-time funding or possibly registration fees. Once a non-road diesel registration program has been implemented, and a better understanding of existing diesel equipment populations and operations has been established, a surcharge program could then be adequately studied and implemented if warranted. With a registration and surcharge program, funds collected from this program could potentially be deposited into a special revenue fund with the purpose of providing sustainable funding to all programs included in a Utah diesel emissions reduction framework. A non-road diesel registration program could similarly serve as a critical tool in developing port-specific registration programs, state construction contract programs, and serve to inform decisions associated with all existing diesel emissions reduction incentive programs.

2.5 Implementation of a Utah Diesel Emissions Reduction Framework

In accordance with S.B. 136 subsection 4(a)(iv)(A) - (C), the UDAQ has provided recommendations for which State agency should be responsible for the implementation and administration of a Utah diesel emissions reduction framework and the included programs, the evaluation processes for included programs, as well as reporting requirements.

2.5.1 Administration/Responsible State Agency

With its years of experience in managing and administering emissions reduction planning and grants, UDAQ recommends that it continue to manage any Utah-specific diesel emissions-focused framework and the incorporated programs. However, the creation of additional programs would require hiring an appropriate level of full-time staff to manage and implement the programs. As mentioned in Section 1.2.4, the UDAQ currently manages more than \$90 million in grant funding covering 12 existing programs, with five full-time staff members overseeing these programs. It is important to note that other programs examined in Section 1 typically have substantially larger staffing associated with these programs, with Utah currently implementing its programs with 4% of the staffing relative to a program like TERP. Therefore, it is important to keep in mind appropriate staffing levels when considering

expanding a Utah diesel emissions reduction framework, while also recognizing that as staff associated with programs increases, additional staffing requirements grow in associated positions such as communications, administrative, and policy staffing.

2.5.2 Evaluation and Reporting Requirements

UDAQ's current administrative, evaluation and reporting processes, as described in Section 1.2.4, serves as a good framework for successful incentive programs. For instance, engine-related grant programs could require the existing vehicles/equipment to operate in Utah's nonattainment areas, have multiple years of use left, and be destroyed.. Depending on the program, eligible activities, level of interest, funding availability, and program resources, evaluation could be first-come, first-served or include specific prioritization criteria. Programs should require documentation from participants demonstrating that program requirements are met and regular reporting to ensure that reasonable progress is made.

The additional targeted new incentive programs highlighted in Section 2.1 (Figure 11), including a Port and Rail Yard Areas program, a dedicated Clean School Bus program, and a Clean Heavy Duty Vehicle program, should follow similar evaluation and reporting requirements as Utah's existing programs described in Section 1.2.4. Additionally, the evaluation and reporting requirements used in TERPs implementation of similar programs should serve as a model for any explicit requirements if these programs were to be implemented within a Utah diesel emissions reduction framework. Lastly, if federal funds from the IRA or IJJA are used to develop these programs, the specific requirements of those programs will need to be included in evaluation criteria and documentation to demonstrate compliance.

If a State Construction Contracts Program study were to be implemented as part of a Utah diesel emissions reduction framework, the reporting and evaluation requirements highlighted in the Portland CAC Program (Section 1.3.6.2) could serve as a good model for the data needed to adequately examine a potential incentive program. Section 2.7 also provides a detailed description of collaborative efforts between the UDAQ and other state agencies to understand the scope of equipment operating on the State's construction sites, and provides findings of data needs including annual tracking of diesel equipment use on all state-funded projects.

Finally, if a non-road diesel registration program were to be adopted as part of a diesel emissions reduction framework, the evaluation and reporting requirements should follow one of the examples highlighted in Section 1.3, such as the MetroVancouver NDERP program. In this example, all non-road diesel engines 25 hp or greater operating in the specified area are required to register with the responsible agency. As the UDAQ sees this program as a data gathering tool, additional annual reporting requirements that are helpful in understanding the amount of equipment, age, type, use and associated emissions could be appropriate to be required, including: operator or owner name, engine family (or tier rating), date acquired,

original build date, engine manufacturer name, engine serial number, horsepower, hours of use per county, operation status, etc.

2.6 Environmental Mitigation Projects for the Utah Inland Port Area

Per the requirements of S.B. 136 subsection 4(b)(ii), the UDAQ recommends that the UIPA should follow EPA's Best Practices for reducing emissions at ports. Specifically, UIPA should implement the following:

- 1) develop a comprehensive port-wide emissions inventory;
- 2) develop a plan to reduce emissions from port equipment;
- 3) enhance port collaboration with surrounding communities; and
- 4) seek additional funding.

As discussed throughout this report, a framework for diesel emissions reductions—either statewide or port-specific—can span a range of positions from largely incentive-based programs to more regulatory-focused. Recommendations for environmental mitigation projects for the inland port areas are shown as a spectrum in Figure 13. Additional details are outlined in Sections 2.6.1 - 2.6.4 as considerations.

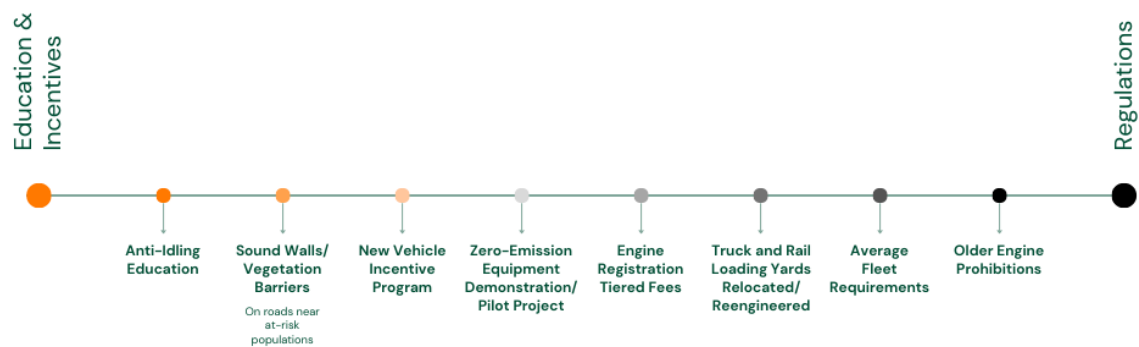


Figure 13: Port-Specific Diesel Emissions Reduction Programs and Policies

Additional information and details for EPA's Best Practices for Ports can be found in Appendix C and were previously highlighted in Section 1.5.

2.6.1 Develop a Comprehensive Port-Wide Emissions Inventory

A mobile source emissions inventory is a quantification, or accounting, of all air emissions of selected pollutants that are emitted within a designated area by mobile sources for a given

time period. Emissions inventories can help to assess the negative or positive impacts of port expansion, fleet changes, or increased activity and provide a baseline that can be used to inform emission mitigation strategies. As discussed in Section 1.5.2, the EPA has provided extensive [guidance for reducing emissions from ports](#)²⁵ including best practices for developing an emission inventory. According to the EPA, 13 ports in the U.S. produce emissions inventories, and seven of those have set emissions reduction targets. The ports of Los Angeles, Long Beach, and New York and New Jersey have produced the most recent and consistent emission inventories.

Criteria pollutants and precursor emissions from port activities that should be included in a port-specific emission inventory include: NO_x, PM_{2.5}, PM₁₀, SO₂, and VOC. The simplest and most common approach for developing an emission inventory such as the one recommended here is the “bottom-up” approach. This approach for developing inventories generally starts with a comprehensive registration program for all on-road vehicles (i.e. diesel trucks) and non-road equipment (i.e. forklifts, generators and pumps) in order for them to access port facilities. By requiring registration of all engines, the UIPA can understand port-related emissions that inform the development of policies and incentive programs that can be used for long-term planning.

Similar to a non-road diesel registration program, a port-specific registration program would be helpful in understanding the amount of equipment, age, type, use and associated emissions. Inventory verification methods do exist, but have limitations depending on whether the equipment exclusively stays in port boundaries or if it travels in and out of the port. At the Port of Oakland for example, researchers developed and implemented a truck-traffic survey in West Oakland, California. During the manual truck counts, the license plates of at least 10 trucks that entered the survey intersection per hour were recorded. License plate information was cross-referenced with a California Department of Motor Vehicles database to gather information on the model year, fuel type, manufacturer's maximum gross vehicle weight ratings (GVWR), the number of axles, the city of registration, and zip code of registration. While ultimately verification is an important step in validating an emission inventory, this step cannot be implemented until an inventory exists, and thus at this time the UDAQ is not specifically recommending verification methods be required, but is rather highlighting additional steps that can be taken once an inventory has been established.

Additionally, registration of vehicles operating in a port area could take multiple forms in terms of fees and policies depending on how strongly leaders want to mandate or incentivize emissions reductions. Registration could be no-cost and all engines would be allowed to access the port. Alternatively, there could be tiered fees based on how clean the engine is (i.e. older, dirtier engines pay higher fees to access the port). At the most stringent end of the

²⁵ Environmental Protection Agency. (October 11, 2023). *Port Emissions Inventory Guidance*. <https://www.epa.gov/state-and-local-transportation/port-emissions-inventory-guidance>

policy spectrum, there could be a combination of tiered fees along with fleet standards/phase-out requirements (requiring eventual phase-out of the dirtiest engines, like Tier 0) and incentive programs to support cleaner engines operating in the port. An example is the Port of Portland's Diesel Engine Requirements and a Phase-In Schedule mentioned in Section 1.3.6. It should be noted that incentive programs could complement registration requirements regardless of what form that takes.

2.6.2 Develop a Plan to Reduce Emissions

2.6.2.1 Overview

The UDAQ recommends the UIPA adopt a port-specific emissions reduction plan which incorporates the following:

- 1) the emission inventory recommended in Section 2.6.1;
- 2) specific emissions reduction targets or goals; and
- 3) specific programs or policies that achieve those goals;

A clean air/emissions mitigation plan should be developed and describe all specific actions UIPA and its port operators are taking or are planning to undertake to reduce emissions from diesel emissions sources (e.g., equipment upgrades, use of cleaner fuels, operational improvements, etc.). Ideally, the clean air plan should specify emissions-reduction targets and implementation dates for specific criteria air pollutants. These targets can be in percentage (i.e. 5%) or absolute (i.e. 500 tons per year) terms. Targets should reflect total emissions or emissions rates per unit of activity (e.g., per ton of cargo handled, number of passengers served, etc.).

UIPA could adopt multiple policies as part of a port-wide emissions reduction goal as demonstrated in Figure 13. For instance, UIPA could implement an anti-idling policy like the program implemented by the Port of Vancouver (U.S.) which developed an anti-idling campaign in cooperation with Southwest Clean Air Agency, which included posting "no-idle zone" signs throughout the port. Meanwhile, the Port of Portland has a stronger rule which requires that "all nonroad diesel equipment must shut down after 5 minutes of inactivity." Going beyond in-use-like requirements, UIPA could reduce emissions by incentivizing the retirement of older equipment/diesel engines and replacing them with newer models whenever feasible. While upgrading any older model will yield emission benefits, benefits can be maximized by upgrading the oldest equipment/engines with the highest annual hours of operation first.

Further, UIPA could include in a plan policies that implement minimum requirements in the contract solicitation process when seeking third-party entities for their port operations and equipment. These minimum requirements could include things like following idling rules,

banning the dirtiest older truck engine models, or requiring Tier 4 locomotives. Finally, UIPA could facilitate the purchase and installation of zero-emission port equipment/technology whenever possible. Funding and carrying out a smaller demonstration project can be a first step to achieving larger port-wide implementation. ASPIRE, Rocky Mountain Power, and UIPA have already committed to collaborating on an electrified roadway demonstration project within the Utah Inland Port jurisdictional area for the purpose of wirelessly charging electric vehicles. Another real-world example at a different port is the [Green Terminal Demonstration Project](#)²⁶ in the Port of Los Angeles. This project funded two battery-electric Class 8 on-road trucks, four battery-electric yard tractors, three battery-electric 21-ton forklift repowers, one At-berth Vessel Emission Control System (ShoreKat), and one solar-powered microgrid.

Moreover, UIPA could take several steps in each specific area of their port operations: [drayage trucks](#),²⁷ [rail](#),²⁸ and [cargo handling equipment](#).²⁹

2.6.2.2 Drayage Trucks

Drayage trucks are typically diesel-fueled, heavy-duty (Class 7 or 8) trucks that transport containers and bulk freight between the port and intermodal rail facilities, distribution centers, and other near-port locations. UIPA could include in an emissions reduction plan goals to decrease the average age of the fleets using the Port by retiring older trucks and engines and replacing them with newer vehicles. Newer, cleaner diesel trucks can provide immense emissions reductions and clean air benefits compared to older diesel models. Additionally, new truck models with low NO_x tailpipe emissions (e.g., natural gas and liquid petroleum gas) and zero tailpipe emissions (e.g., electric and fuel cell) should be considered as they increasingly come into the market. UIPA could similarly require newer engine model years, and/or can create an incentive program in order to decrease the average age of the truck fleets using the port.

Two examples of truck replacement programs at U.S. ports include a Port of New Orleans program funded by the EPA and the Louisiana Department of Environmental Quality, and a Port of Savannah program funded by a DERA grant. UIPA can also support participation in the EPA SmartWay Program. This program helps truckers increase efficiency and fuel economy as well as provides the corresponding documentation. If dray truck fleets that serve the port are not SmartWay partners, UIPA can encourage or require them to join. Port operators also can encourage fleet operators to utilize SmartWay tools and resources to measure and improve performance. Additionally, port operators can reach out to known cargo owners and customers who are SmartWay shippers to encourage the dray truck carriers they work with to join and improve their performance. Another step UIPA could take is increasing use of locomotive

²⁶ <https://www.portoflosangeles.org/getmedia/5d9a2350-9887-41ce-813a-8c51f37c3e53/Pasha-Fact-Sheet>

²⁷ <https://www.epa.gov/ports-initiative/drayage-truck-best-practices-improve-air-quality>

²⁸ <https://www.epa.gov/ports-initiative/rail-facility-best-practices-improve-air-quality>

²⁹ <https://www.epa.gov/ports-initiative/cargo-handling-equipment-che-best-practices-improve-air-quality>

operations (rather than trucks) as much as possible; when done effectively, this can help a port increase the fraction of cargo moved by the most energy-efficient modes (i.e. trains) and reduce overall emissions. Lastly, UIPA could designate truck routes that avoid at-risk populations altogether or at least establish physical/vegetation barriers to improve near-road air quality. For instance, UIPA could route existing or projected traffic away from populated areas to a more industrial setting (e.g., truck-only routes). When trucks must be routed through communities, physical structures like sound walls and vegetative barriers between the road and the at-risk populations can be beneficial to reduce exposure to air pollutants.

2.6.2.3 Rail

When examining emissions associated with rail operations serving the inland port, it is important to keep in mind that there are generally two types of locomotives which support port-related cargo operations: 1) switcher locomotives, and 2) line-haul locomotives. Switchers, also referred to as “yard engines,” assemble and disassemble trains. Line-haul locomotives are the engines that move cargo long distances, including between states, and are typically larger than switchers. Similar to trucks, newer, higher tier rated switchers and line-haul locomotives pollute significantly less than older models. Incentive programs and/or requirements are some of the ways to upgrade to newer models. As mentioned previously, UIPA could require certain locomotives, like Tier 2 or above; Union Pacific is using Tier 4 locomotives in California. Locomotive idle emissions can be reduced by implementing a temperature-dependent idling policy and requiring technologies like automatic engine shut-down/start-up (AESS). UIPA should also strive to minimize and mitigate locomotive activity near at-risk populations, like the residents of Westside neighborhoods in Salt Lake City. If properly designed, vegetation barriers can be used to reduce air pollution, either alone or in combination with solid structures like sound walls. SLC’s Westside neighborhoods experience disproportionate air quality issues, like high exposure to diesel particulate matter (compared to the rest of the state of Utah), according to EPA’s EJ Screening and Mapping Tool as well as an EPA EJ Assessment about these neighborhoods completed in 2023. The EPA’s [EJ Screening and Mapping Tool](#)³⁰ is based on nationally consistent data and an approach that combines environmental and demographic indicators in maps and reports.

2.6.2.4 Cargo Handling Equipment

A port-specific emissions reduction plan should also examine operations associated with cargo handling equipment (CHE), which plays an important role in both port operations and air quality. CHE includes a wide variety of equipment types such as yard tractors, forklifts, cranes, railcars, and trucks. According to EPA’s National Ports Strategy Assessment, for a typical port with significant container operations, the bulk of CHE emissions are associated with yard trucks, cranes, and container handlers (side picks and top handlers). Similar to the

³⁰ <https://www.epa.gov/ejscreen>

recommendations for the other sectors, best practices for reducing CHE emissions include upgrading older equipment and optimizing operations (i.e. loading time and practices). Retiring older equipment and replacing it with newer CHE should be the main priority. However, even retrofitting existing equipment with exhaust emissions reduction technology, like diesel particulate filters (DPFs) and diesel oxidation catalysts (DOCs), can provide immense emissions reduction benefits. This can be accomplished through incentive programs and/or requirements. For instance, the Port Authority of New York and New Jersey has a program which incentivizes the purchase of [new cargo handling equipment](#)³¹ with Tier 4 engines or alternative powered equipment (including all electric, diesel electric or hydraulic hybrids, and liquefied or compressed natural gas).

To help streamline cargo handling operations across a port, UIPA could also consider implementing a port management information system (PMIS) to electronically track and coordinate CHE use. Primarily designed for container operations, integrated CHE management can improve the efficiency of manual CHE operations, as well as enable increased automation, allowing for more rapid loading and unloading of trucks. UIPA could also consider relocating/reengineering truck and rail loading yards for the greatest cargo efficiencies. For example, the Port of Cincinnati worked to relocate its truck and rail loading yards to reduce the frequency that cargo is handled while at the port and they also prioritized rail over trucks. Along the same lines, UIPA could support its operators in implementing co-loading practices (which could potentially result from implementing a PMIS). Co-loading is like ride-sharing for freight, in that it involves transporting pooled cargo from various companies through the same vehicle (i.e. a truck or train car) with the goal of maximizing the fullness of vehicles, resulting in cost savings for companies as well as emissions reductions for port areas.

2.6.2.5 Summary

All of the programs detailed here (highlighted in Figure 12) serve as possible emissions reduction strategies that could be adopted in a port-specific emissions reduction plan. These are to serve as examples of strategies that have worked in other port areas, but are not to be interpreted as specific recommendations by the UDAQ. Rather, the UDAQ is recommending that UIPA adopt an emissions reduction plan that could consist of some of these strategies, or other strategies not listed here, as best suits UIPA operations and the emissions reduction goals included in any emissions reduction plan.

2.6.3 Enhance Community-Port Collaboration

The UDAQ further recommends that UIPA enhance port collaboration with surrounding communities. Emissions from diesel equipment operating at ports disproportionately impact

³¹

<https://www.panynj.gov/port/en/our-port/sustainability/cargo-handling-equipment-modernization-program.html>

nearby communities that are often composed of low-income populations and communities of color—communities which are located near UIPA's project sites. While there are clearly multiple ways to mitigate diesel emissions affecting near-port communities, it is also critical for UIPA to promote active community-port collaboration for effective long-term planning and engagement. EPA offers an [Environmental Justice Primer for Ports](#),³² which can serve as a tool for the UIPA and relevant stakeholders to learn more about engaging with low-income and disadvantaged near-port communities.

Steps to support collaboration include things as simple as providing a clear staff point of contact (phone number/email listed on UIPA website) for community issues and complaints specific to or inclusive of air quality. Beyond that, UIPA can continue to work to provide an accessible forum for public comments (e.g., commission/board meetings where public input is part of the agenda). For instance, Port Houston has adopted a formal Public Comment Policy, public comments are available up to an hour before each Port Commission meeting, and staff contacts are clearly listed online (among other steps they have taken to increase accessibility for public commenting). While more complex, UIPA can also work to establish a more in-depth policy/process to engage local residents in their project areas and get their input on port operations and projects that impact air quality (e.g., a standing citizens advisory committee). This can include a collaborative problem-solving process or other approaches described in EPA's [Community-Port Collaboration Toolkit](#)³³ to identify key issues and potential solutions. While these community solutions can be as simple as installing air filtration units in the most sensitive near-port locations (like schools and daycares), ports can definitely go above and beyond these types of smaller projects. The Port of Long Beach Community Grants Program (CGP) invests in community projects outside the Harbor District to minimize port impacts related to air, noise, water, and traffic; the CGP prioritizes projects in the neighborhoods and corridors where these impacts are most acutely felt. Previously funded projects have ranged from new filter replacement/filtration/HVAC systems in nearby schools to community outreach/health efforts to tree plantings to solar electricity generation.

EPA has identified several case studies with lessons learned from ports across the country. For example, the [Port of Seattle](#),³⁴ one of its near-port communities (Duwamish Valley), and a local health equity nonprofit engaged in in-person site visit/tours, dialogues, and workshops to discuss the challenges confronting the community, past and current engagement with the Port, as well as the identification of near, medium and long-term priorities. Community partners eventually formed the Port Community Action Team (PCAT). Port staff and the PCAT collaborated to co-write and adopt Resolution 3767—the Duwamish Valley Community Benefits

³² <https://www.epa.gov/community-port-collaboration/environmental-justice-primer-ports>

³³ <https://www.epa.gov/community-port-collaboration/community-port-collaboration-toolkit>

³⁴ <https://www.epa.gov/community-port-collaboration/seattle-community-port-collaboration-pilot-project>

Commitment—a policy directive that guides the implementation of a Community Equity Program and other Port operations that impact the Duwamish Valley community.

It should be noted that UIPA is overseeing a Westside Community Enrichment Initiative, designated exclusively for projects that support communities to the west side of Salt Lake City. Also, in accordance with the Interlocal Agreement between Salt Lake City and UIPA, a health impact assessment, a community impact assessment of the city's Westside neighborhoods, and a traffic study must be completed by third-party research firms by the end of 2023. These studies will serve as baselines and help guide future spending on environmental and community improvements for UIPA's Northwest Quadrant project area. Additionally, the agreement states that a group called the NWQ Review Group will evaluate community and environmental project proposals, developing a priority list for UIPA to review.

2.6.4 Seek Funding

2.6.4.1 Overview

Lastly, the UDAQ recommends that UIPA seek additional funding in support of the goals outlined in these recommendations. UIPA should apply for and manage pass-through funding for operators to implement programs/action items that will achieve emissions reductions, especially for those goals included in a port emissions reduction plan as overviewed in Section 2.6.2. Funding opportunities for reducing diesel emissions associated with UIPA as well as general port sustainability are listed below:

2.6.4.2 State of Utah

As previously discussed, existing sources of diesel emissions-focused funding are available in Utah. However, a new port-specific incentive program could be created. In Texas, the Seaport and Rail Yard Areas Emissions Reduction (SPRY) Program provides financial incentives for the replacement of older drayage and cargo handling equipment operating at seaports, facilities, and Class I rail yards in areas of Texas designated as nonattainment areas under the CAA. A similar program, based on SPRY, could be created in Utah.

2.6.4.3 Federal

The IRA includes a \$3 billion appropriation for the Clean Ports Program, focused on reducing emissions at ports with eligibility criteria that complements the framework requirements of S.B. 136. This funding may be provided for developing a strategic emissions reduction plan that establishes goals, implementation strategies, and accounting and inventory practices that reduce greenhouse gas emissions, hazardous pollutants, and criteria air pollutants. The plan

must also include a strategy to collaborate with, communicate with, and address potential effects on low-income and disadvantaged near-port communities and other stakeholders that may be affected by implementation of the plan and describe measures that will be implemented to increase the resilience of the port involved. Items discussed in this report's environmental mitigation project recommendations for UIPA (as well as items from UIPA's Northwest Quadrant [Sustainability Action Study](#)³⁵) could potentially be integrated into a new qualified emissions reduction plan.

The IRA also established funding for state greenhouse gas planning and implementation efforts. This funding initiative, known as the Climate Pollution Reduction Grants (CPRG) program, includes two phases. Phase I provided formula planning grant funding for states (\$3 million for each state, including Utah), metropolitan areas (\$1 million to each of the 67 largest areas, including the Salt Lake City MSA), territories (\$2 million set-aside), and Tribes (\$25 million set-aside) to develop plans to reduce greenhouse gas emissions. Phase II will provide \$4.6 billion nationwide in competitive implementation grant funding for government and Tribal entities participating in Phase I. UIPA is a critical stakeholder in the CPRG process for Utah, also known as the [Beehive Emission Reduction Plan](#).³⁶

As previously mentioned, additional federal funding opportunities for port sustainability include EPA's DERA program as well as the Department of Transportation's Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Discretionary Grant program (formerly known as TIGER or BUILD).

The EPA Ports Initiative provides an updated, comprehensive running list of federal, state, local, and private [funding opportunities for ports and near-port communities](#)³⁷ to reduce emissions and improve the environment. Additionally, Appendix D of this document provides an overview of current IRA and IJA diesel-related funding opportunities, including those that apply to port-specific programs.

2.7 Clean Equipment Use On State Construction Projects

As required by S.B. 136 subsection 4(v), the UDAQ has examined programs that incentivize the use of the most current generation of federal emissions standards, clean alternative fuels, or electric alternatives on state construction contracts. The UDAQ collaborated with the Utah Department of Government Operations (GovOps), Division of Facilities Management (DFCM), and the Utah Department of Transportation (UDOT) to better understand the type of equipment that is currently operating on Utah's construction sites, the scope of the State's

³⁵ <https://inlandportauthority.utah.gov/northwest-quadrant/2022-sustainability-action-study/>

³⁶ <https://deq.utah.gov/air-quality/beehive-emission-reduction-plan>

³⁷ <https://www.epa.gov/ports-initiative/funding-opportunities-ports-and-near-port-communities>

construction projects, how potential incentives could affect the contract solicitation process, and the effects incentives may have on the construction industry.

In October 2022, the UDAQ attended the DFCM quarterly meeting with members of the Association of General Contractors (AGC) to introduce them to S.B. 136 and get feedback on the most effective ways to engage with a broader representation of their industry and to learn more about the type, age, and ownership of equipment being used throughout the State's construction projects. Additionally, UDAQ sought information on how incentives for clean equipment use may affect their industry, and gauge their initial level of support for incentives offered during the contract solicitation process for clean equipment use. The types of incentives that were discussed included offering higher points for clean equipment use, financial incentives, or a combination of both.

This group of 18 members was surveyed on the types of incentives that would be most effective to encourage the use of clean equipment on Utah's construction projects and the responses were split with 55.5% in favor of financial incentives, 33.3% in favor of a combination of both, and 5% in favor of higher points offered through the contract solicitation process. One respondent explained that if the State were to implement incentives through a point system, 3-5 years to prepare a financial plan for clean equipment would be necessary. Overall, the majority of the group was in favor of the State implementing incentives for clean equipment use on construction projects. Most in attendance were general contractors who primarily own on-road gasoline vehicles. They advised that most of the heavy equipment that is used on the State's construction sites is provided by subcontractors and primarily rent equipment during construction projects.

A survey question asked about the best way for the State to learn more about the non-road diesel equipment that is operating on construction sites.

Responses included:

- posting a Request for Information (RFI) through U3P, the Utah Public Procurement Place;
- online surveys, including surveying subcontractors who are under contract;
- advisory groups;
- registration database; and
- contacting equipment managers within each contractor's organization

Based on the feedback from the industry group, the Department and GovOps posted an RFI on the Utah Public Procurement Place (U3P) on October 24, 2022, for 30 days. The RFI went out to more than 3,800 vendors that are associated with heavy construction equipment, including roads, landscaping, maintenance support equipment, nonresidential buildings, warehouse, and specialized trade construction, etc. who are registered with the U3P. More than 100 vendors opened the solicitation. Additionally, while some preliminary data (including total

number of projects, type of project, and funding source) was collected by UDOT and DFCM over the past five years, neither agency currently tracks their equipment use specifically.

In order to better understand construction equipment statewide, the UDAQ recommends these agencies track equipment use moving forward. This information could be included in a statewide non-road diesel registration program, if such a program was pursued, however a standalone study collecting this information would serve as an invaluable tool in understanding how a state of Utah construction contracts program could or should be implemented. Therefore, the UDAQ is recommending an in-depth study to better guide potential construction contract incentives for clean equipment in Utah. A 2020 report, “Oregon Nonroad Diesel Equipment Survey and Emissions Inventory” completed by the Eastern Research Group for the Oregon Department of Environmental Quality, helped guide the development of the Portland Clean Air Construction Program and could serve as a helpful guide in implementing this proposed study.

Lastly, the UDAQ would like to bring attention to one program that was overviewed in the Diesel Emissions Reduction Study included in Section 1. This program, the SJVAPCD Agricultural Tractor Trade-Up Program (Section 1.3.2.1) could serve as a somewhat novel model for a program which could prove to be successful for a State Construction Contracts Program. In short, this program allows for larger companies, the kind that often apply for and are awarded state contracts, to purchase newer, cleaner equipment and trade some of their older polluting equipment to smaller companies who in-turn then retire very old, highly polluting equipment. While the SJVAPCD program is targeted towards agricultural equipment, it could be similarly adopted for construction equipment used on state construction contracts. While the UDAQ believes this could be a viable program for this area, first data must be collected on equipment currently used in the State’s construction contracts before the absolute viability could be determined. Therefore, the recommendation remains that first, a study be conducted to determine what equipment is currently used on these projects, and this data could be used to inform if a program like the SJVAPCD Trade-Up Program could be a viable option.

2.8 Benefited Areas

Programs and policies included in the potential Utah diesel emissions reduction framework and detailed throughout Section 2 of this report span a wide array of incentive and data collection policies that could directly benefit all residents of Utah. Many of Utah’s existing diesel emissions reduction incentive programs help reduce emissions in highly populated areas and thus directly benefit disproportionate air quality areas and underrepresented communities. However, building on the success of these programs, the programs highlighted under the UDAQ’s second recommendation of adding new targeted incentive programs, specifically a program similar to the TERP’s SPRY Program, a dedicated Clean School Bus Program, and a Clean Heavy Duty Vehicle Program, will directly benefit rural communities and inland port areas,

while further benefiting underrepresented communities and disproportionate air quality affected areas such as NAA's.

The implementation of a Port and Rail Yard Areas Emissions Reduction Program like TERP's SPRY Program would directly benefit inland port areas and the surrounding disproportionate air quality areas as it could result in the adoption and implementation of cleaner technologies in and around port areas, including at UIPA ports located in the rural portions of the State. Implementation of a dedicated Clean School Bus program could similarly directly benefit rural communities.

As diesel emissions occur throughout the state of Utah, the implementation of a state construction contracts study and a non-road diesel registration program, as recommended in this report, and any resulting programs implemented based on the data collected through these efforts, could result in improved air quality for residents throughout the State. Lastly, emissions reductions and associated improvements in ambient air quality associated with the programs included in this proposed Utah diesel emissions reduction framework could further assist the state of Utah in achieving ongoing CAA statutory requirements for existing NAA's, and help prevent future NAA designations altogether.

3.0 Summary

States are increasingly in a unique situation with air quality issues. EPA continues to lower health-based standards as we collectively learn more about pollutants and their long-term and short-term effects on humans. As emissions reduction technologies improve, emissions of all pollutants have decreased over time even as population has increased. However, it is becoming increasingly difficult to find emissions reductions, particularly for mobile diesel sources when factoring in Section 209 of the CAA.

S.B.136 tasked the Department with recommending a diesel emissions reduction framework for the state of Utah within the constrained regulatory framework. Through a combination of studying other states' experiences with incentive and registration programs, reviewing guidance and best practices for reducing emissions at ports, identifying funding opportunities for potential programs in Utah, engaging with industry groups, and collaborating with relevant agencies and organizations, the Department has laid the groundwork for the next phase of research, collaboration, and planning for a Utah-specific diesel emissions reduction program.

With the combination of unprecedented federal funding opportunities and regulatory changes (such as the November 2023 EPA rulemaking for non-new locomotives), the non-road diesel regulatory landscape is dynamic, offering new opportunities for emissions reductions. As part of its mission, UDAQ will continue researching and evaluating this ever-evolving topic.

Appendices

Appendix A: TERP Program Summary Table

Program	Goals/Targets	Eligibility	Funding	Commitments
Alternative Fueling Facilities Program (AFFP)	Provide fuel access for alternative fuel vehicles Stimulate market	Construction/ reconstruction of alternative fueling facility	1/3 funds for small businesses CNG or LNG = \$400K CNG & LNG = \$600K	Report 2x a year Remain operational for 3 years
Emissions Reduction Incentive Grants (ERIG)	Upgrade, replace equipment Rail relocation /improvement	On-road >= 8501 lbs non-road, stationary >= 25 HP	\$35.5 million available >= 80% of cost to purchase + install - scrap	55% use/25% mileage in eligible areas for 5 years
Governmental Alternative Fuel Fleet Grant Program (GAFF)	Help agencies purchase/lease alternative fuel vehicles, refueling infrastructure	Government entity must own/operate >= 15 vehicles	\$6 million available Competitive process	Proof of destruction within 90 days Monitor use for 3-years
Light-Duty Motor Vehicle Purchase or Lease Incentive Program (LDLIP)	Rebates for purchase/lease of alternative fuel vehicle	New purchase Alternative fuels include: CNG, LPG, Hydrogen, Electric (plug-in/plug-in hybrid)	<= \$5000 CNG, LPG <= \$2500 hydrogen, electric	None
New Technology Implementation Grant Program (NTIG)	Implement technology to reduce emissions at stationary sources	Renewable electricity storage projects Not eligible if required by law	>= \$1 million for Electricity Storage Projects Reimbursement <=50% of cost	Report for 5 years
Rebate Grants Program	Repower, replace diesel mobile equipment	On-road > 8500 pounds Non-road >= 25 HP	>= \$1 Million small businesses, >= 1 engine must be diesel <= 80% of cost	55% of usage must occur in eligible counties Destroy retiring equipment

Program	Goals/Targets	Eligibility	Funding	Commitments
Seaport and Rail Yard Areas Emissions Reduction Program (SPRY)	Replace drayage, heavy-duty, and non-road, self-propelled cargo handling equipment	Retiring equipment >= 26,000 lbs, routinely used, capable of operating for >= 5 more years	Receive less of maximum grant amount or 80% of eligible costs First come/first served	Report for 5 years Must operate 200 days/year for 5 years Destroy retiring equipment
Texas Clean Fleet Program (TCFP)	Replace diesel vehicles with alternative/hybrid fuels Targets Large fleets	Fleet must be >= 75 on-road vehicles Heavy-duty >8500 lbs, light < 10,000 New vehicle must be new, powered by alternative fuel	\$7.8 million available <= 80% of total cost - scrap value - additional incentives	Must replace >= 10 diesel vehicles >= 75% mileage in Texas Destroy retiring equipment
Texas Clean School Bus Program (TCSB)	Reduce exposure to children from diesel school bus emissions Replace with newest model	Pre-2007 diesel-fueled Must operate daily route during school year	Replacement <= 80% of cost Retrofit <= 100% of cost First come/first served	Must operate daily route for 5 years Submit usage reports Destroy retiring equipment
Texas Natural Gas Vehicle Grant Program (TNGVGP)	Repower/replace vehicles with natural gas engines (CNG, LNG, or LPG)	New vehicle/engine: on TCEQ eligibility list, >=25% less NO _x	\$15.4 million available First come/first served <= 90% of eligible costs	>=75% of new vehicle use must be in clean transportation zone Destroy or remove retiring equipment from US
Texas Hydrogen Infrastructure, Vehicle, and Equipment Program (THIVE)	Incentivize hydrogen vehicles, equipment, and refueling infrastructure	Installing hydrogen refueling infrastructure; new or replacement on-road heavy-duty motor vehicles and non-road heavy-duty equipment with hydrogen-powered models or powertrains	Competitive program based on criteria in statute	Must be in eligible counties Destroy retiring equipment

Appendix B: SJVAPCD Program Summary Table

Program	Goals/Targets	Eligibility	Funding	Commitments
Charge Up!	Funding for EV chargers to support growth of clean technology	Public agencies, businesses, multi-unit dwelling property owners	Based on charger type (see table) Can be paired with additional funding opportunities	Possible visits by District staff
Drive Clean	Provide rebates for clean-air vehicles	Residents or businesses < =2006 model year vehicle	Purchase or lease < = \$3000 based on vehicle (see table) Free repair at District sponsored event	
Alternative Fuel Mechanic Training	Develop education for alternative fuel vehicle maintenance And safe operation	Government, private companies, public educational institutions	< = \$15,000/training	Certificate of completion
New Alternative Fuel Vehicle Purchase	Provide funding to purchase new alternative fuel vehicles	Alternative fuel = electric, plug-in hybrid, CNG, LNG, LPG Cities, counties, districts, public education institutions	1st come/1st served < = \$20K/vehicle < = \$100K/agency/year	
Alternative Fuel Infrastructure	Alternative Fuel Infrastructure Projects	Cities, counties, districts, public education institutions		
Clean Vehicle Fueling Infrastructure Program	New stations, conversion, expansion	Heavy-duty Hydrogen, Natural gas, or electric battery charging Public or Private entities	1st come/1st served < = 50% baseline < = 65% solar/wind < = 100% public school buses	Inspection by District Staff Annual reports
Hybrid Voucher Program	Increase market for clean, low-carbon hybrid/electric trucks, buses	Any size fleet public or private	\$494 million available statewide	Destruction for some School Buses
Emergency Vehicle Replacement Program	Replace In-use diesel with cleanest technology for Cities, counties, fire protection districts, etc.	Existing equipment: diesel < = 2009 model year, > = 14,000 lbs Operate 75% in CA, 50% in District New vehicle: < = CARB 2010 emissions standard	1st come/1st served max amount calculated by cost-effectiveness and percentage limits	Destroy retiring equipment Subject to pre-purchase, post-dismantler, and post-purchase inspections

Program	Goals/Targets	Eligibility	Funding	Commitments
Zero-Emission School Bus Replacement Incentive Program	Replace existing school buses with zero-emissions buses Priority for disadvantages/low-income communities	Public school districts, joint Power Authorities, privately owned school buses that transport public school children Diesel	<= 100% of purchase/installation of charging equipment <=\$400K <= 10 buses per entity	District or self-inspection Destroy retiring equipment
Heavy Duty Waste Haulers	Replace engine with >=2011 engine (.2 g/bhp-hr NO _x , .01 g/bhp-hr PM)	Solid waste to landfill, NOT garbage/recycling collection trucks Diesel, 1996-2003 model year, >= 26,001 lbs >= 75% in District	prioritize 100% in District <=\$50K/truck	Destroy retiring equipment
Trucks: Prop 1B	Reduce air pollution, health risks along trade corridors through truck replacements, retrofits	Heavy duty diesel trucks Based on weight, model year, and miles/year (see table) Operate 75% in CA, 10% in District	Based on Engine class, model year, and replacement technology chosen (see table)	Operate >= 90% in CA Register with CARB
Truck Replacement	Replace on-road diesel trucks with alternative fuel	standard truck: 2010-2016 model year, class 4-8. New truck = EV or Low-NO _x Operate 75% in CA, 50% in District	priority for low-income/disadvantaged locations Funding based on existing truck class and new truck technology	Destroy retiring equipment 75% in CA, 50% in District Register with CARB
Locomotives: Proposition 1B	Reduce air pollution, health risks along trade corridors through locomotive replacement/retrofit	Existing equipment: uncontrolled Tier 0, 1, or 2 diesel >= 2 years prior in CA ~20,000 gal/year prior 2 years	Based on year project becomes operational, type, and future CA operation (see table) applications ranked	Existing equipment either destroyed or banned from CA
Locomotive Program	Replace older locomotives with Tier 4 engines, including switchers	Operate 100% in CA, 50% in District Class 3, passenger, military, and industrial	<= 85% of cost	Remain owner for 15 years
Off-Road Replacement	Incentives to replace heavy-duty off-road mobile equipment	Self-propelled diesel >=25 HP Operate 75% in CA, 50% in District New engine = newest model year	<= 80% of cost Amount of funding based on new engine HP	

Program	Goals/Targets	Eligibility	Funding	Commitments
Off-Road Repowers	Funding for non-road mobile engine replacements	Existing equipment: Diesel > 25 HP Operate 75% in CA, 50% in District	First-come, first-served 80% of Tier 2 cost 85% of Tier 3, Tier 4i, Tier 4	Destroy retiring equipment
Farmer Ag Truck Replacement Program	Replace heavy-duty diesel ag trucks	Operate 100% in CA, 75% in District > = 14,001 lbs < = 2009 model year New truck < = .2 g/bhp-hr NOx	first-come, first-served 65% of replacement cost	Destroy retiring equipment
Ag Pump Program	Replacement/repower of engines for ag pumps	Diesel-Diesel Diesel/NG -Electric Diesel/NG -Electric w/ line extension	1st come/1st served Amount of funding based on new engine HP Line extension = 50% cost	Install hour meter, annual reports, remain at same location, Destroy retiring equipment
Small Farmer Certified Pre-Owned Agricultural Equipment Pilot Program	Replace in-use, off-road, self-propelled, compression-ignition mobile ag equipment	< = 100 total acres Existing equipment = Tier 0 or 1, > = 25 HP Operate 75% in CA, 50% in District New equipment > = pre-owned Tier 3	first-come, first-served < = 80% of cost purchased through Original Equipment Manufacturer	Destroy retiring equipment
Agricultural Tractor Replacement Program	Replace in-use, off-road, self-propelled, compression-ignition mobile ag equipment	Existing equipment = Tier 0 or 1, > = 25 HP Operate 75% in CA, 50% in District New equipment = newest model year	first-come, first-served Funding based on farm acreage (see table)	Destroy retiring equipment
Agricultural Tractor Trade-Up Program	Award \$ to farmers for Tier 4 Final purchase, who pass Tier 3 tractor to farmer that destroys Tier 0/1 tractor	Mobile, off-road, in-use, self-propelled, diesel tractor Operate 100% in CA, 100% in District Tier 3 < 10,000 hours Like-for-like replacement	< = 72% of Tier 4f cost based on \$/hp (see table) Applications ranked on cost-effectiveness	Destroy retiring equipment
Zero-Emission Ag Utility Terrain Vehicle (UTV) Voucher Program	Provide monetary incentives to replace ATVs, UTVs, or tractors for agricultural operations	diesel or gasoline powered < 25 HP New equipment = ZEV, towing capacity > = 500 lbs, weight > = 700 lbs	first-come, first-served < = 75% of cost Maximum \$13,500	100% in District

Program	Goals/Targets	Eligibility	Funding	Commitments

Appendix C: EPA Ports Best Practices Summary Table (As They Apply to the UIPA)

Recommendation		Approach		
		Low	Medium	High
1) Develop an Emissions Inventory: A mobile source emissions inventory is a quantification of all air emissions of selected pollutants that are emitted within the UIPA jurisdictional area by mobile sources for a given time period. EPA provides extensive emission inventory guidance for ports.				
A	Develop computer-based modeling/estimates of baseline air pollutants	N/A		
B	Require a registry (engine registration) for access to port areas	No fees, all engines allowed to access without restrictions.	Tiered fees based on engine model years.	Fees, fleet emissions standards, prohibitions, and I/M testing.
2) Develop a Plan to Mitigate Emissions: The Environmental Mitigation Plan should describe specific actions and targets that UIPA/operators are taking or are planning to undertake to reduce emissions from mobile sources port-wide, and/or in specific sectors (rail, trucks, and cargo handling equipment). UIPA could work to implement all of the following environmental mitigation projects.				
Port-Wide Projects/Actions				
A	Develop anti-idling policy (with reasonable exceptions)	Educational campaign/voluntary compliance.	Warnings first, then citation/fees.	
B	Implement minimum requirements in third-party contract solicitation process	Follow anti-idling and encourage retiring of older equipment through incentive programs.	Follow anti-idling and require a certain minimum amount of newer equipment and technology.	Follow anti-idling and prohibitions on oldest/dirtiest equipment.
C	Retire older vehicles/diesel engines and replace them with newer models (ie all-electric, Low-NO _x , new diesel)	Incentive program only, all vehicles/engines allowed.	Tiered fees based on engine model years.	Fees, fleet emissions standards, prohibitions.
D	Support purchasing/installation of zero-emission port equipment/technology	Incentive program only.	Implement demonstration projects, require a certain minimum amount of new	Require all new equipment and technology to be zero-emission.

			equipment and technology to be zero-emission, etc.	
Projects/Actions Specific to Trucks, Rail, Cargo Handling Equipment				
E	Drayage trucks: Address trucking activity near at-risk populations	Establish physical barriers (sound walls/vegetation barriers) on roads near at-risk populations.	Minimize trucking activity near at-risk-populations as much as possible.	Establish new truck-only routes a minimum distance away from at-risk populations.
F	Drayage trucks: Support adoption of EPA SmartWay Program	Encourage fleets to become SmartWay partners.	Require fleets to become SmartWay partners.	
G	Rail: Retire older engines/equipment	Incentive program only.	Require Tier 2 locomotives to achieve a 33% reduction. Require removal of at least one Tier 0 to add more Tier 4s.	Require Tier 4 locomotives.
H	Rail: Reduce idle emissions	Establish a locomotive-specific temperature-dependent idling policy.	Require technologies like automatic engine shut-down/start-up (AESS).	
I	Rail: Address locomotive activity near at-risk populations	Establish physical barriers (sound walls/vegetation barriers) near at-risk populations.	Minimize locomotive activity near at-risk-populations as much as possible.	Find alternative locations for rail operations (ie relocating maintenance).
J	Cargo Handling Equipment: Retire/retrofit older equipment	Incentive program only.	Require a certain minimum amount of newer/retrofitted equipment.	Prohibitions on the oldest/dirtiest equipment.
K	Cargo Handling Equipment: Optimize loading/operations	Implement port management information system (PMIS).	Relocate/reengineer truck and rail loading yards for greatest cargo efficiencies, implement co-loading	

			practices, etc.	
<p>3) Enhance Community-Port Collaboration: Emissions from diesel equipment operating at ports disproportionately impact nearby communities that are often composed of low-income populations and communities of color—communities which are located near UIPA’s project sites. While there are clearly multiple projects which can mitigate diesel emissions affecting near-port communities, it is also critical to promote active community-port collaboration for effective long-term planning.</p>				
A	Support two-way communication with near-port communities	Clear staff point of contact (with phone number/email on website) for community issues/complaints.	Committee/board meetings where community input is welcomed and part of the agenda.	Standing citizens advisory committee, formal Policy/ Resolution in place with the community, etc.
B	Develop collaborative solutions with especially vulnerable nearby groups	Fund improved air filtration in nearby sensitive locations (schools, daycares, health care facilities, etc.).	Work to change/relocate port activities to reduce pollutants near the most sensitive locations, fund community health projects, etc.	
<p>4) Seek Funding Opportunities to Implement Emissions Reductions: UIPA can manage/apply for pass-through funding for operators to implement the programs/action items that will achieve emissions reductions.</p>				
A	State: Allocate funding for Port-specific Incentive Program		N/A	
B	Federal: Seek funding from IRA Clean Ports, DERA, RAISE, etc. for Incentive Program and/or other actions		N/A	

Appendix D: Federal Funding Summary Table

Since the enactment of the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA), the Department has been working to identify appropriations from those laws that may correlate to potential diesel emissions reduction activities in Utah. A list of relevant programs from each law is provided in the table below.

Infrastructure Investment and Jobs Act (IIJA)

Office	Section	Program	Appropriation	Expires
EPA	71101	Clean School Bus Program (zero-emission buses only)	\$2.5B	FY2026
	71101	Clean School Bus Program (zero-emissions buses or lower emissions buses)	\$2.5B	FY2026
DOT	11115	Congestion Mitigation and Air Quality (CMAQ) Improvement Program	\$13.2B	FY2026
	11129	Grants for Charging and Fueling Infrastructure	\$2.5B	FY2026
	11402	Reduction of Truck Emissions at Port Facilities	\$250M	FY2026
	11403	Carbon Reduction Program	\$6.42B	FY2026
	30018	Grants for Buses and Bus Facilities	\$3.94B	FY2026
	Division J	National Electric Vehicle Formula Program	\$5B	FY2026
	NA	Port Infrastructure Development Program	\$2.25B	FY2026
DOE	40109	State Energy Program	\$500M	FY2026
	40541	Grants for Energy Efficiency Improvements and Renewable Energy Improvements at Public School Facilities	\$500M	FY2026

Inflation Reduction Act (IRA)

Office	Section	Program	Appropriation	Expires
EPA	60101*	Clean Heavy Duty Vehicles	\$600M	9/30/2031
	60102*	Reduction of Air Pollution at Ports	\$3B	9/30/2027
	60103*	GHG Reduction Fund	\$27B	9/30/2024
	60104	Diesel Emissions Reductions	\$60M	9/30/2031
	60105*	Air Pollution	\$235.5M	9/9/2031
	60106*	Air Pollution at Schools	\$50M	9/30/2031
	60107*	Low Emissions Electricity Program	\$70M	9/30/2031
	60108	Section 211(O) of the Clean Air Act	\$5M	9/30/2031
	60109*	Implementation of the American Innovation and Manufacturing Act	\$15M	9/30/2026
	60110*	Enforcement Technology and Public Information	\$3M	9/30/2031

Office	Section	Program	Appropriation	Expires
	60112	Environmental Product Declaration Assistance	\$250M	9/30/2031
	60113*	Methane Emissions Reduction Program	\$1.55B	9/30/2028
	60114	Greenhouse Gas Air Pollution Planning Grants	\$250M	9/30/2031
	60114	Greenhouse Gas Air Pollution Implementation Grants	\$4.75B	9/30/2026
	60201	Environmental and Climate Justice Block Grants	\$2.8B	9/30/2026
DOT	40007*	Alternative Fuel and Low-Emission Aviation Technology Program	\$297M	2024
UST	13201	Extension of Incentives for Biodiesel, Renewable Diesel and Alternative Fuels (40A)	\$5.57B	12/31/2024
	13403	Qualified Commercial Clean Vehicles (45W)	\$3.58B	2032
DOE	50121	Home Energy Performance-Based, Whole-House Rebates	\$4.3M	9/30/2031
	50122*	High-Efficiency Electric Home Rebate Program	\$4.5B	9/30/2031
	50123	State-Based Home Energy Efficiency Contractor Training Grants	\$200M	2032
	50131	Assistance for Latest and Zero Building Energy Code Adoption	\$1B	2029
	50145	Tribal Energy Loan Guarantee Program	\$75M	2028

Through the Beehive Emission Reduction Plan, UDAQ staff have also been tracking all energy and climate-related funding (beyond the diesel-focused funding listed in the table above). UDAQ is in the ongoing process of collaborating with relevant agencies and partners to apply for federal funding where eligibility requirements align. Staff from the Governor's Office of Planning and Budget (GOPB), as well as several other agencies, continue to be invaluable in efforts to track and coordinate federal funding opportunities.