Environmental Defense Fund

TERP AND TRUCKS

How Texas' Clean Air Program Can Maximize Efficiency and Increase Competition

TERP AND TRUCKS

How Texas' Clean Air Program Can Maximize Efficiency and Increase Competition

Authors

Phillip Martin
Environmental Defense Fund

Cliff Gladstein, Bri Lawrence, Mark Conolly, Fernando Ochoa Servin
GNA, a TRC Company

Acknowledgments
The report authors would like to acknowledge the many stakeholders that contributed their time, feedback and ideas to this report. The opinions expressed in this report are a summation of the dozens of hours of interviews conducted among individuals working in a wide range of public and private entities; each recommendation and idea does not necessarily reflect those of each individual who participated in the process. Environmental Defense Fund bears sole responsibility for the report's contents.

Environmental Defense Fund
Environmental Defense Fund is dedicated to protecting the environmental rights of all people, including the right to clean air, clean water, healthy food and flourishing ecosystems. Guided by science, we work to create practical solutions that win lasting political, economic and social support because they are nonpartisan, cost-effective and fair.

Totally chlorine free 100% post-consumer recycled paper

TABLE OF CONTENTS

CREDIT: NORTH AMERICAN COUNCIL FOR FREIGHT EFFICIENCY

EXECUTIVE SUMMARY

The Environmental Defense Fund (EDF) engaged Gladstein, Neandross & Associates (GNA), a TRC Company, in June 2023 to perform an analysis of the incentive programs that the Texas Commission on Environmental Quality (TCEQ) administers under the Texas Emission Reduction Program (TERP). EDF sought GNA's expertise on this report due to GNA's proven and successful history working with fleet owners to secure federal and state incentives. GNA utilized a two-pronged approach; the first element consisted of interviews with industry stakeholders, while the second consisted of a comparison of TERP programs with major transportation-related incentive-based emission reduction programs from other states.

Throughout the course of discussing the many attributes and features of TERP with program participants and other stakeholders, some elements were almost universally agreed upon. Others were dependent on the needs of the organization, demonstrating that a weakness for one organization may be a strength for another.

Feedback from stakeholders centered around the number and type of programs, eligible project locations and air quality considerations, as well as program administration. Overall, stakeholders spoke positively of TERP and their experiences with various programs. Where relevant, stakeholders also provided constructive feedback. The comparison of TERP programs with other state-level programs also shed light on adjustments that TCEQ could make to promote participation and enhance the applicant experience.

Regarding the number and type of programs, stakeholders recommended an evaluation of current program offerings to identify areas for consolidation, which has the potential to decrease TCEQ staff time and allow for easier navigation of programs by interested fleet owners. TERP's focus on non-attainment areas was upheld by stakeholders; however, they urged TCEQ to consider expanding eligibility to include neighboring counties and heavily trafficked corridors outside of current non-attainment areas. To acknowledge advances in available transportation technologies and the shrinking pool of older equipment and vehicles, stakeholders advised a review of the methodology used to calculate emission reductions as well as tiered cost-effectiveness thresholds for zero- and near-zero emission replacement options.

Scrappage was a popular topic, and participants urged for an expansion option across programs as well as updated tables for

funding levels based on age, usage and new technology type.

Again, while feedback was consistently positive regarding TCEQ staff and program administration, the comparison to similar offerings by other state agencies revealed opportunities for program modifications. These included hosting webinars further ahead of a program's release date; moving programs from a first-come, first-served model to a competitive model with an application window of at least three months; standardizing reporting processes across programs; re-introducing an online portal to house previous and current applications, and offering programs at more consistent intervals throughout the year.

EDF continuously confers with stakeholders to solicit feedback regarding their impressions and experiences with TERP to understand the most and least impactful elements of the program with the goal of helping the state improve and enhance the program's effectiveness. Given Texas' biennial system (under which the State's Legislature convenes for only 140 days in odd-numbered years) EDF has ventured to produce this report in the hope that it will help inform the debate regarding the optimization of TERP in the next legislative session that begins in January 2025.

METHODOLOGY

The report consists of results from interviews GNA conducted with industry stakeholders, as well as comparative analysis of Texas' TERP programs with similar transportation-related incentive programs in other states. For the interview portion, EDF and GNA developed a list of thought leaders, with a goal of completing 15 to 20 interviews. The list included fleets that had previously participated in TERP's programs, utilities, original equipment manufacturers (OEMs), vehicle dealers, councils of government and professional associations, amongst other entities. Then, EDF and GNA created a questionnaire to capture feedback around program design, participant satisfaction and program administration; the Appendix contains a copy of the questionnaire. Midway through the interview process, GNA added two questions to better capture feedback around incentive levels and the potential role of voucher programs.

GNA staff collected contact information for each stakeholder and sent introductory messages requesting a 30-minute to one-hour conversation. One to three GNA team members attended each conversation, asking the same set of questions and taking down the interviewees' responses. GNA collected notes in a central location as it conducted interviews through December 2023 and began synthesizing findings from the conversations simultaneously. In addition to private entities that have directly applied to TERP programs, interviews were also conducted with government agency staff, including regional metropolitan planning organizations (MPOs) as well as leaders of some of the state's largest Clean Cities Coalitions. GNA met with 16 stakeholders whose feedback informed the sections of this report pertaining to program design, participant satisfaction and program administration. Where possible, GNA includes direct quotes from the stakeholder interviews.

For incentive program comparison, GNA began by creating a list of state funding programs that are comparable to TERP. GNA focused on programs that, like TERP, are state-funded and state-designed, rather than focusing on incentives that are governed by

federal guidelines like the Clean Diesel (Diesel Emission Reduction Act) Programs or Volkswagen Environmental Mitigation Trust Funds. GNA had a goal of comparing four existing TERP programs with up to 10 programs from other states. GNA analyzed eight program offerings from California, Colorado, Maryland, Massachusetts, New Jersey and Pennsylvania. After identifying the incentives, GNA developed criteria for comparison to systematically determine the 'fleet friendliness' of each program. The Program Comparison section of this report contains a list of incentive programs and their attributes that GNA analyzed. Examples of attributes that were assessed include the length of the application window, the regularity of each program's schedule and communications leading up to the release date of the program.

EDF sought GNA's expertise on this report due to GNA's proven and successful history working with fleets to secure federal and state incentives. To date, GNA has completed more than 650 applications for state and federal transportation-oriented incentive programs and evaluated the qualifications and program suitability of twice as many potential applicants. Based on this extensive experience, GNA created a rubric of fleet friendly attributes for each incentive program. GNA compared each of the selected programs to reach a score, which then allowed GNA to look at the score of each TERP program compared to offerings from other states.

EDP and GNA welcome the opportunity to discuss this report and its recommendations. Please contact Phillip Martin at pmartin@edf.org with questions or to request additional information.

INTRODUCTION AND HISTORY

The 77th Texas Legislature established the Texas Emissions Reduction Program in 2001 through Senate Bill 5 (SB 5). This legislation was a response to the need for Texas to address air quality issues and comply with federal regulations regarding air pollution. The goal of TERP was to maximize reductions in nitrogen oxides (NOx) from medium and heavy-duty vehicles to facilitate compliance with National Ambient Air Quality Standards (NAAQS) established by the United States Environmental Protection Agency (EPA) under authority of the Federal Clean Air Act (CAA). SB 5 established TERP under Texas Health and Safety Code (THSC) Chapter 386 and simultaneously authorized the Texas Commission on Environmental Quality to administer the TERP program.

TERP provides financial incentives to support the generation of surplus reductions from voluntary projects that decrease emissions of NOx and other pollutants from mobile sources and non-road equipment. TERP programs aim to improve Texas' air quality by encouraging the replacement of older, high-emission vehicles and equipment with cleaner technologies or retrofitting older technologies with improved emission control equipment. It targets various sectors, including transportation, industry and other sources contributing to air pollution in nonattainment and near-nonattainment areas of Texas. The program has been a critical instrument in addressing air quality challenges in the state and promoting advanced technologies to reduce harmful emissions.

TERP FUNDING AND PRESCRIBED PROGRAMS

House Bill (HB) 1365 amended TERP in 2003 to have a designated stream of funding that came from specific statewide surcharges that were initially aimed to generate about $130 million in funding per fiscal year through 2008. These initial TERP funding sources were surcharges and fees applied to the sales, use, storage, registration and inspection of heavy-duty off-road and on-road vehicles and motors, including truck-tractors and semi-trailers.

Over the last 20 years, developments in the state economy, advancements in transportation technology and evolving air quality improvement priorities in Texas have led to changes in the TERP funding mechanism. In 2019, HB 3745 established a

trust fund that is outside of the state treasury, held by the comptroller and administered by TCEQ. The TERP Trust Fund consists of TERP fees and any grant money recaptured under the TERP programs. In 2021, HB 4472 amended the code to require TCEQ to remit at least 35% of the TERP Trust Fund to the state highway account for congestion mitigation projects administered by the Texas Department of Transportation (TxDOT). The Fiscal Year 2022–2023 biennium revenue into the TERP Trust was estimated to be nearly $500 million. After the required transfer of no less than 35% of the fund to TxDOT, more than $342 million remained available for TERP programs and administration, and approximately $336 million is expected to be available in FY 2024-2025. HB 4885, which became effective on September 1, 2023, lists TERP's programs and specifies the latest adjustments to their respective funding allocations.

THSC Chapter 386 requires the implementation of emission reduction programs by TCEQ. The chapter outlines several program objectives with application and eligibility requirements that include prescribed proportions of funding for each program. The typical program is designed to give incentives for the early retirement and replacement of older commercial vehicles and equipment while providing funding for new, reduced-emission technologies to make them more affordable. TERP programs prioritize the nonattainment counties in Texas that have not yet met NAAQS for NOx and other criteria air pollutants.

When TERP was first developed in 2001, it consisted of the Diesel Emission Reduction Incentive Program (DERI), Motor Vehicle Purchase or Lease Incentive Program and the New Technology Research and Development Program, with DERI allocated 72% of the funds. The DERI program created the baseline for vehicle replacement activity in TERP programs and its eligibility guidelines have applied generally to all subsequent programs. DERI requires that proposed projects:

- Repower or replace heavy-duty non-road equipment that is 25 horsepower or greater;
- Repower or replace on-road vehicles of 8,500 lbs. or greater;
- Achieve a minimum threshold of operation in a nonattainment area;
- Deploy replacement technologies that emit at least 25% less NOx than the engines they replace;
- Achieve a specific cost-effectiveness threshold per ton of NOx reduced.

The cost effectiveness limit was initially set in 2001 at $13,000/ton NOx reduced and it has been subject to change depending on the application and vocation of the equipment. The cost effectiveness goal also has undergone periodic reevaluation over the decades as emission standards have gotten lower and costs have increased. Similarly, the program offerings were tailored over the years to target more specific market segments with funding opportunities that result in the most cost-effective reductions in NOx emissions. These changes must be adopted by the legislature at each biennial legislative session and written into the appropriate sections of the THSC.

Today, there are 11 programs in TERP that are administered by TCEQ to directly fund emission reduction projects:

1. **Diesel Emissions Reduction Incentive (DERI)** includes two programs: the Rebate Grants and the Emissions Reduction Incentive Grants (ERIG) programs. Both provide grants to upgrade or replace on-road vehicles, non-road equipment, stationary equipment, marine vessels and locomotives, as well as add or expand

> **TERP programs have a strong source of revenue; they are steady, and you can count on them. The programs are efficient, and the process has moved fairly quickly without being overly cumbersome.**
>
> —
>
> **Bill Zobel,**
> Director, Alternative Fuels Pilot

on-vehicle electrification and idle reduction infrastructure, and rail relocation and improvement projects. ERIG allows applicants to submit competitive applications that are evaluated based on specific project and equipment costs that yield a calculated NOx reduction, measured in tons. This is the cost-effectiveness of a project and it allows TCEQ to prioritize each project to fund up to the funding limits of the program. The Rebate Grants program allows applicants to request funding for new or replacement equipment in a much more streamlined process that utilizes pre-approved maximum grant amounts based on the selected technology. DERI also includes funding designated for small businesses.

2. **Texas Natural Gas Vehicle Grants Program (TNGVGP)** provides grants to upgrade or replace existing diesel or gasoline vehicles with natural gas vehicles, including CNG and LNG.
3. **Seaport and Rail Yard Areas Emissions Reduction Program (SPRY)** provides grants to replace older drayage trucks and equipment operating at eligible seaports and rail yards in areas of Texas designated as nonattainment areas under the CAA.
4. **Texas Clean Fleet Program (TCFP)** provides grants to large fleet owners (at least 75 vehicles) to replace a minimum of 10 diesel vehicles with new alternative fuel or hybrid vehicles powered by natural gas, propane, hydrogen, methanol (85% by volume) or electricity.
5. **Light-Duty Motor Vehicle Purchase or Lease Incentive Program (LDPLIP)** provides rebates for the purchase of light-duty vehicles operating on compressed natural gas (CNG), liquefied petroleum gas (LPG), electricity (plug-in or plug-in hybrid), or hydrogen fuel cells.
6. **Texas Clean School Bus Program (TCSB)** is not restricted to nonattainment areas and provides grants to replace or retrofit older school buses to reduce emissions of diesel exhaust.
7. **Alternative Fueling Facilities Program (AFFP)** provides grants for the construction or reconstruction of facilities to store, compress, or dispense alternative fuels, including biodiesel, hydrogen, methanol (85% by volume), natural gas, LPG, or electricity.
8. **New Technology Implementation Grant Program (NTIG)** provides grants for electricity storage projects related to renewable energy, or to reduce emissions of pollutants from stationary sources and oil and gas activities in Texas.
9. **Port Authority Studies and Pilot Programs (PASPP)** funds incentives through port authorities to encourage lower emission cargo movement activity, targeting NOx and particulate matter (PM) emissions.
10. **Governmental Alternative Fuel Fleet Grant Program (GAFF)** provides grants to assist state agencies and political subdivisions in purchasing or leasing new motor vehicles that operate primarily on CNG, liquefied natural gas (LNG), LPG, hydrogen fuel cell or electricity.
11. **Texas Hydrogen Infrastructure, Vehicles, and Equipment Program (THIVE)** is the newest program available from TERP and provides funding for the replacement, repower, conversion and new purchase of hydrogen powered vehicles and non-road equipment. It also funds up to 50% of the cost of hydrogen refueling infrastructure.

MODIFICATIONS TO THE TERP PROGRAM

The original TERP legislation in SB 5 left open the idea for expansion or modification of incentive programs, which the Legislature has done numerous times since 2001. Although changes to TERP are codified by the state legislature, TCEQ has discretion to make some changes within a limited scope based on their role as the TERP program administrators. TCEQ is tasked with projecting the emission reductions, creating the protocols to calculate project cost-effectiveness and creating safeguards to ensure that the emission reductions are voluntary and are not double counted.

To this point, TCEQ may offer changes to the cost-effectiveness limits, within the justification of their calculation protocols, and they may offer changes to the administrative requirements of documentation and reporting procedures. However, expanding the program offerings and other deviations from the prescribed guidelines requires legislative action. Historically, if a need is identified, stakeholders work with legislators to propose TERP modification amendments at each biennial legislative session.

PROGRAM ORGANIZATION AND GOALS

Participants had varied opinions on program consolidation, with some supporting a more centralized approach and others favoring program-specific tracks. Those in favor of the current division of programs like the separation of various technology types; those in favor of consolidation spoke to the potential of improving program efficiency for both the applicants and the agency.

Another perspective supported consolidating the programs and allowing a third party to supervise the selection process based on cost-effective emission reductions. This would remove any potential suspicion of bias from TCEQ and give them the freedom to administer a consolidated program. Other reasons for supporting consolidation included:

- Less variance between application and eligibility requirements
- More consistency in open and close dates between biennia
- Less time needed for program administration

Table 1 displays the TERP programs and the project types they support, excluding the Port Authority Studies and Pilot Programs. Nine of the 10 programs fund on-road vehicles, four of the 10 programs subsidize off-road vehicles and equipment, and five of the 10 programs finance infrastructure. There are natural gas and hydrogen-specific programs; however, a battery-electric focused program does not exist at this time. With the exception of the DERI programs, the remaining nine programs have additional restrictions around weight classes, fuel type, entity type, and location. Multiple programs may be applicable to one fleet, depending on an applicant's fleet makeup. It is the applicant's responsibility to track when each program opens and closes, which program(s) may be a competitive for the applicant, the potential award for each program, and application requirements, amongst other items. For example, a fleet that operates heavy-duty natural gas vehicles and stations may be eligible for six of the 10 programs, and that fleet must navigate the various program deadlines and requirements.

TABLE 1

TERP Programs and Eligible Project Types

Characteristic	Input	On-Road	Off-Road	Infrastructure	BE	HFC	NG	Conventional
LDPLIP	Light-duty only	■			■		■	
GAFF	Government only	■		■	■		■	
TNGVGP	Natural gas only	■					■	
SPRY	Seaport and rail only	■	■		■		■	■
TCSB	School bus only	■			■		■	■
THIVE	Hydrogen only	■	■	■		■		
AFFP	Infrastructure only			■	■	■	■	
ERIG	All project types	■	■	■	■	■	■	■
RGP	All project types	■	■	■	■	■	■	■
TCFP	All on-road vehicles	■			■		■	

As described earlier, the legislature has continued to add programs to TERP's portfolio. In 2023, the legislature added its 11th program, THIVE, as a reflection of the growing interest in and the potential for hydrogen projects throughout the state. To counter the growing number of programs, some stakeholders recommended sunsetting programs that are no longer as effective as they once were.

Finally, interest in TERP programs has not necessarily matched the allocated funding level set by statute. Providing TCEQ with more autonomy to amend funding allocations and/or program offerings would allow for funding to be spent more efficiently and effectively.

CREDIT: NORTH AMERICAN COUNCIL FOR FREIGHT EFFICIENCY

GEOGRAPHIC CONSIDERATIONS

There were mixed opinions on the statewide versus localized prioritization of distributing grant funds. Some participants noted that the distribution based on the attainment status of a county was not always the best method for deriving the most effective emission reduction projects. There were suggestions to consider upwind contributors, prioritizing interstate corridors, address nonattainment fees and provide flexibility for fleet operators to make a case for eligibility based on their activity areas (some fleets may be based in an attainment county but operate primarily in non-attainment areas).

Respondents noted that nonattainment restrictions are not universal in the TERP programs. GAFF and Clean School Bus programs are statewide and the infrastructure funding was made available beyond nonattainment areas with the creation of the Clean Transportation Zone (Figure 1). Particularly when it comes to infrastructure, most respondents understand that there is a large portion of the state's emissions that result from mileage by vehicles that are domiciled outside of the nonattainment areas but travel long distances. This results in significant mileage across multiple nonattainment counties in multiple priority areas. Stakeholders recommended allowing the apportionment of funds for over-the-road trucks that operate partially in nonattainment areas and/or the clean transportation zone. With GPS technology, this should be feasible.

Due to the proscribed nature of TERP mandates, legislative action will be required to allow these new solutions for expanding eligibility to adjacent or associated counties that do not have the NOx nonattainment designation. Ideally, TCEQ would be able to make these decisions because they have the ability to move faster and adapt programs to increase emission reductions. Further, the addition of other emission reductions such

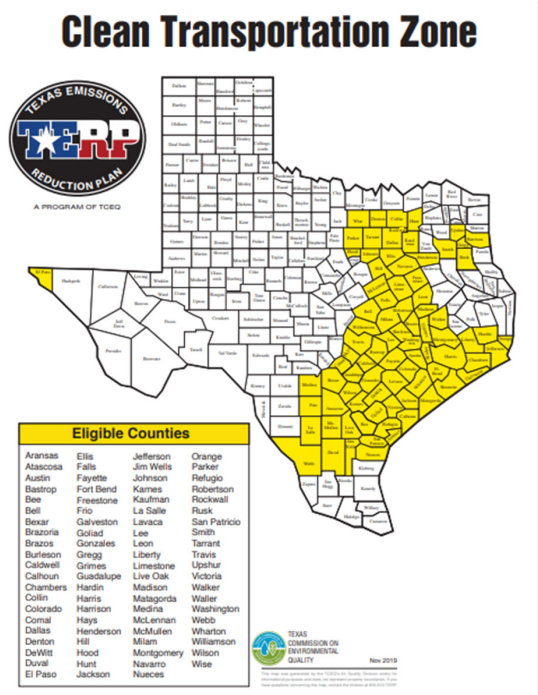

Figure 1. Texas's Clean Transportation Zone

as PM 2.5 and diesel particulate matter into the consideration of attainment standards helps to spread the funding eligibility into geographies where projects can provide even more impactful emission reductions. As the EPA prepares to update air quality standards, the state of Texas will likely need to address this wider scope of emissions standards in the immediate future.

Regionality can potentially allow geographies to hone programs to local needs more efficiently. Statewide funding may optimize equity, but it reduces recognition of regional concerns such as local impacts of long-haul trucking. In the case of Houston, while the nonattainment areas are well-defined and the drayage industry is a direct target for the SPRY program, freight hauling remains one of the biggest contributors to local air pollution. Sixty percent of the Houston economy is related to freight and the movement of goods, and many of the diesel miles driven within the Houston-Galveston priority area are driven by vehicles that are domiciled outside of the area. Based

on the existing framework of legislatively guided objectives, TCEQ is not allowed the discretion to change programs to focus on the freight market segment of the transportation industry. Such a move would allow fleets based outside the area to compete for funding for the mileage that does occur in nonattainment areas.

> **Programs are not always accurately named to reflect what is in the program and the qualification language is lengthy. An interactive matrix would be helpful and could provide explanations, like around scrappage for example.**
>
> —
>
> **Elizabeth Munger**
> Director
> Lone Star Clean Fuels Alliance

AIR QUALITY CONSIDERATIONS

Most TERP grant programs use cost effectiveness as the primary metric for which applicants receive awards. Incentive limits are based upon the cost per ton (CPT) of NOx reduced. CPT limits typically vary by project type from $20,000 CPT to $35,000 CPT. TCEQ then ranks applications based upon CPT and cost-effective projects receive higher award scores

Some stakeholders claimed that the methodology used to determine NOx emissions and CPT is obsolete. There are tools from the EPA and Argonne National Laboratory (the Diesel Emission Quantifier and Alternative Fuel Life-Cycle Environmental and Economic Transportation, AFLEET, Tool) that fleets are familiar with and that other funding agencies

TABLE 2

TERP vs. EPA Calculations of Lifetime NOx Emissions

Characteristic	Input
Existing Vehicle Type	Haul Truck
Existing Vehicle Quantity	1
Existing Vehicle Model Year	2010
Existing Vehicle Remaining Lift (EPA DEQ ONLY)	1 Year
Existing Vehicle Fuel Use (EPA DEQ ONLY)	7,500 gallons
Existing Vehicle Fuel Type	Diesel
Existing Vehicle Weight Class	8
Existing Vehicle Usage	60,000 miles per year
Existing Vehicle Emission Level	0.2 g/bhp-hr
New Vehicle Fuel Type	Battery Electric
New Vehicle Weight Class	8
New Vehicle Usage	60,000 miles per year
New Vehicle Deployment Year	2024
Lifetime NOx Emissions (TERP)	**0.189 tons NOx**
Lifetime NOx Emissiosn (EPA)	**0.269 tons NOx**
Difference	**0.080 tons NOx (30% lower)**

often use for their programs that TCEQ should consider adopting. The existing calculator does not allow a user to input the remaining useful life or expected lifespan of the new vehicle. Also, Texas's tool makes assumptions around annual milage and fuel economy, which can dramatically impact the expected emission reductions. Using the same existing and new vehicle information in TERP's calculator for the Texas Clean Fleet Program and in the EPA's DEQ yields different results, as seen in (Table 2).

Further, one of the biggest issues is the dwindling population of Model Year 2010 and older diesel vehicles, the replacement of which are a pre-requisite for several TERP programs. This cohort is not as large as it once was, yet the requirement has not evolved to reflect that. While diesel to diesel projects are often the most cost-effective, due to the lower cost of new diesel technology relative to new alternative fuel and zero-emission vehicles (AFVs and ZEVs), there are many fleets interested in purchasing such vehicles that are not able to compete if the program allows for diesel replacement projects. TNGVP and THIVE are great examples of alternative-fuel friendly programs; however, as interest in zero-emission technologies continue to grow, some interviewees encourage the legislature to consider TERP modifications such as a higher CTP for zero-emission projects, looking at greenhouse gas emission reductions, or integrating tailpipe diesel PM and VOC reductions into the calculation of cost effectiveness.

> **The proportion of funding that goes to on-road diesel projects is huge, and if you look at TERP program results year over year, you often see the same awardees. We worry that these companies have started assuming TERP incentives as part of their normal business operations, rather than the funding being used to really motivate change among fleets.**
>
> —
>
> **Lori Clark**
> Senior Program Manager, Clean Fleet & Energy Programs
> NCTCOG

PROGRAM DESIGN

Private companies provided feedback related to improvements to TERP that addressed barriers to program participation and receipt of funds. In general, the end-users of grant funds appreciate the benefits of financial incentives, but would prefer fewer restrictions on operation, higher incentive amounts, less administrative documentation and a quicker application and contracting process.

Equity was an issue often raised by private companies. Some of the program features inherently favor some companies over others. Larger companies with greater resources are better able to hire contractors to write and submit TERP applications and to manage the administrative obligations of grant award, particularly the collection of and regular reporting of data. Smaller companies lack such resources and may find it difficult to perform these activities at the same time as meeting the heavy requirements of operating a small business.

On the other hand, larger fleets tend to turn their rolling stock over more frequently, and thus tend to lack the older units that are required for scrappage. Smaller fleets keep their trucks longer and are more likely to have units that are eligible for replacement. Several stakeholders suggested the development of mechanisms for TCEQ to match these parties more easily through a more robust and transparent 3rd party scrappage program.

Scrappage and the hurdle it creates for fleets was a common thread amongst interviewees. Aside from the availability of older vehicles that also meet operational requirements, it is much more difficult for fleets to plan to submit TERP applications if program funding cycles do not match their replacement schedule. It is a challenge for fleet managers to keep older, program eligible trucks registered and in operation when those older units are much more expensive to operate. However, if the fleet idles the truck to retain it for scrappage, the vehicle may no longer meet TERP operational requirements. This presents a perverse incentive for fleets to keep older, much dirtier trucks in operation longer than they would otherwise, thus adding to the state's air pollution challenges. One possible mitigation is for TCEQ to establish regular schedules for TERP funding cycles that fleets can depend on and plan around.

A variety of fleet operations and management characteristics may create problems with eligibility requirements and documentation requirements and serve as significant barriers to funding program participation. Public agencies have different problems with scrappage, operational and registration requirements. Public fleets are not required to register vehicles each year, and some have reported being unable to participate in TERP programs because they did not anticipate the registration requirement. Additionally, the 2006 or older model year requirement for School Buses is frequently an issue for fleets because they do not run the older buses with enough annual mileage to meet usage requirements – making these administratively eliminated from participation. Removing or augmenting certain requirements for registration documentation and continuous ownership in specific fleet sector cases may enable valid and meaningful replacement of old equipment.

A topic for which there were inconsistent responses was the adequacy of funding levels. Some stakeholders believe that the funding levels are generous and adequate; some believe that they need to be increased, particularly for zero-emission technology projects. All stakeholders agree that increasing funding levels would benefit the state and would drive greater participation in clean air projects.

Regardless of the nature of the stakeholder, there was near universal appreciation for the level of service applicants receive from TCEQ staff. Comments included regular

TABLE 3

Notable Strengths and Barriers of TERP Programs

Strengths	Barriers
Collaboration with stakeholders	Lack of alignment between program schedule and fleet turnover/order cycles
Consistency of funding	Fear of returning funds due to inability to meet usage requirements with new technologies
Ability to receive funding for vehicles and infrastructure together (DERI Programs)	Inability to compete with conventional fuels (DERI Programs)
Healthy incentive levels	Misalignment between state and federal requirements, particularly for transit agencies
Flexibility in requirements through the waiver process	Scrappage and continuous registration requirements

recognition that TCEQ staff have been prompt, thorough, clear and friendly. The availability of bilingual assistance in the application process by the agency was also praised. Table 3 highlights key strengths and barriers that stakeholders shared in relation to TERP programs.

While TERP has many strengths including collaboration, efficiency and healthy funding levels, there are areas for improvement, such as adjusting scrappage requirements, optimizing alignment with federal models and enhancing program flexibility. Insights from stakeholder feedback provided a multifaceted view of TERP, focusing on simplifying processes, program consolidation and the importance of communication and predictability. From the standpoint of interviewees, an ideal TERP incentive program would address these issues, provide increased support for ZEVs, streamline processes and adapt to different fleet needs. Beyond the shape of the programs and the adaptations that become necessary over time, applicants will always require a certain level of sophistication to be able to apply and participate in the program, and there will always be some resources required of the applicant. This necessitates a sustained review and evaluation of agency communication and the education of potential applicants. Whether it be online or in-person formats with multi-lingual considerations, the needs will change, but the impact of communication will always remain a top priority for program success. Figure 2 provides a summary of the most common comments from stakeholders regarding program administration.

Stakeholder Feedback Regarding TERP Program Administration

Administrative Strengths

- Responsiveness
- Straightforward application, reporting and reimbursement processes
- Calendar of opportunities
- Helpful resources (webinar, guides and presentation)

Administrative Areas of Improvement

- Staff turnover
- Lack of uniformity in reporting templates and of examples
- Lack of flexibility in program design
- Contracting, reporting and reimbursement delays

SUGGESTIONS FOR IMPROVING TERP INCENTIVE PROGRAM DESIGN

In summary, stakeholder recommendations regarding program design fall into three overarching categories.

Project Types:

- Support and codify set-asides for specific technologies like battery electric vehicles and hydrogen fuel cell vehicles.
- Establish a larger set-aside for new vehicle purchase category; this will spur adoption of the desired technology type and does not leave only the fleets that are most likely to have an appropriate turn-in vehicle for scrappage.
- Provide assistance for charging infrastructure along with vehicle incentives (all programs).

Program Requirements:

- Modify scrappage requirements and consider alternatives such as point-of-sale (POS) or milestone-based incentives.
- Allow flexibility in age/date requirements for replacement vehicles.
- Remove public access requirement for infrastructure.
- Allow for second generation/second-hand vehicle trade system (3-way) for grant funded vehicles, opening the possibility to transfer clean trucks to a low-income operator.

Funding Levels:

- Increase flat-rate rebates for ZEVs and provide higher funding caps.
- Tier reimbursement amounts, prioritizing ZEV, then low-NOx, and then other fuel technologies to maximize the reduction of multiple pollutants.
- Harmonize TERP funding to coincide with Federal funding so that TERP can be used as a non-Federal match.

Additional subjects for discussion and debate arose when talking to the stakeholders. Some of the perspectives focused on the experience of the applicants and end-users of the funding, and other perspectives focused on what is legally feasible based on the mandate of TCEQ and their role as the administrator.

COMPARISON TO OTHER STATE LEVEL PROGRAMS

GNA utilized its experience in the grant writing space to identify funding programs across the United States that, like TERP programs, are state-funded and state-designed. This selection criteria ensured that the selected programs reflect state interests and abide by individual state initiatives, while at the same time guaranteeing that they are not bound to overarching program guidelines directed by national incentive programs such as the Clean Diesel or Diesel Emission Reduction Act Programs or Volkswagen Environmental Mitigation Trust Funds.

GNA selected offerings from California, Colorado, Maryland, Massachusetts, New Jersey and Pennsylvania to provide geographic diversity and mitigate the effects of regional coalitions (such as the one between the Pacific Northwest states and California), increasing the odds that the incentive programs selected reflect independent state interests. Additionally, the programs selected allow for a variety of project types from new vehicle purchases, vehicle replacements, and refueling infrastructure deployment projects. The variety enabled GNA to spotlight differences between offerings among project types.

The out-of-state incentive programs selected for this analysis include:

- California's Carl Moyer Memorial Air Quality Standards Attainment Programs (CMP)
- California's Hybrid and Zero Emission Truck and Bus Voucher Incentive Project (HVIP)
- Colorado's Clean Fleet Vehicle & Technology Grant Program (CFVTGP)
- Maryland's Clean Fuels Incentive Program (CFIP)
- Massachusetts' Offers Rebates for Electric Vehicles (MOR-EV)
- New Jersey's Zero Emission Incentive Program (NJZIP)
- Pennsylvania's Alternative Fuels Incentive Grant Program (AFIG)

The programs above satisfied the selection criteria, enabling a fair comparison across funding offerings. As it pertains to incentive programs available in Texas, the GNA team selected TERP-funded programs that allow for a range of project types comparable to the out-of-state programs and that provide similar levels of funding to their out-of-state

TABLE 4

Definitions of Analysis Parameters

Parameters	Barriers	Score
Narrative	No narrative required by application	1
Number of Attachments	Zero to five (0-5) attachments required for submission	1
Reporting Frequency	Grant reporting follows an annual schedule	1
Length of Reporting	Grant reporting period is between one and three (1-3) years	1
Webinar	A webinar is provided prior of the opening of the grant program	1
Webinar Timeline	A webinar is held at least one month prior to the opening date	1
Online Submission	Online submission portal is available	1
Grant Rounds per Year	One round of grant program is made available annually	1
Application Window	Submission period lasts at least three months	1
FCFS vs Competitive	Applications are evaluated on a competitive basis	1
Total		**10**

counterparts. With these criteria in mind, the selected programs were:

- Alternative Fueling Facilities Program (AFFP)
- Emission Reduction Incentive Grants (ERIG)
- Rebate Grants Program (RGP)
- Texas Clean Fleet Program (TCFP)

The range of program selection allows for a comprehensive evaluation of each funding program's attributes. The parameters for fleet friendliness are listed in the table above. Attributes that are more fleet friendly include consistency in program availability, long application windows and availability of resources (such as a webinar) from the funding agency. Alternatively, less fleet friendly programs are less consistent, have shorter application windows and less adequate resources. GNA based this methodology on the concept that more fleet friendly programs encourage ongoing and increased participation in programs. In GNA's experience, if a program is too complex, has contractual requirements that are too demanding or long-term, or if the program is hard to keep track of, participation is not as strong.

After identifying these offerings, GNA selected ten parameters for evaluation. The parameters were selected in order to best represent the ease with which a fleet might apply to and comply with each funding program as they are currently structured. The selected parameters were then defined by the GNA team after conducting a series of interviews with TERP stakeholders and utilizing GNA's knowledge base and decades of grant writing and client experience in this field. For the purpose of this analysis, programs that satisfy seven of the 10 criteria were considered fleet friendly. Table 4 below shows the full list of parameters used for the analysis alongside the definitions GNA used and the weighting for fleet friendliness score. GNA's analysis consisted of reviewing publicly available solicitations and sample contracts, webinars and internal databases to identify how each of the programs satisfied the criteria above. Given changes to funding programs between each round, the analysis was based on the last round offered by each program to ensure consistency.

Using these evaluation criteria, GNA found that the Massachusetts MOR-EV program was the most fleet friendly funding program, closely followed by California's CMP and HVIP offerings and Pennsylvania's AFIG

program. The same analysis uncovered that the least fleet friendly out-of-state incentive program was Maryland's CFIP program, receiving a score of six, missing points due to the narrative requirement, reporting frequency and lack of webinar.

As a whole, Texas TERP programs had lower scores in five main categories: length of reporting, webinar timeline, online submission, grant rounds per year and application window. Three of the four Texas offerings required a reporting period of at least four years, a period which is often difficult to manage for fleets. Similarly, only one of the four in-state grant programs held a webinar at least a month before the application window opened, meaning that fleets had little opportunity to receive information on the programs. While Texas offerings accept applications via email, all the programs lack a central online submission portal where applicants can track application status and have streamlined communications with TCEQ. The biannual program schedule of in-state TERP incentive programs, coupled with application windows of two months across three of the four offerings means that fleets have a small window of opportunity to apply for funding, and that window does not return until the following biennium. Table 5 below shows the results of the program analysis conducted by GNA.

As they currently stand, Texas incentive programs received the lowest fleet friendliness scores in GNA's analysis due to five key administrative factors. Notably, TERP programs are offered on a biannual basis, do not offer informational webinars prior to the opening of the application window, tend to have an application window of less than three months, do not offer a centralized application portal and tend to have reporting periods that are longer than

TABLE 5

Results of Program Analysis

Characteristic	Input	Number of Attachments	Reporting Frequency	Length of Reporting	Webinar	Webinar Timeline	Online Submission	Grant Rounds per year	Application window	FCFS versus competitive	Score
MA MOREV	N	3 required, 1 conditional	Annual	1 year	Y	N/A	Y	1	Open on a Rolling Basis	FCFS	9
PA AFIG	Y	5	Quarterly	2 years	Y	2 months	Y	1	6 months	Competitive	8
CA HVIP	N	1	Annual	3 years	Y	N/A	N	1	Open on a Rolling Basis	FCFS	8
CA CMP	N	8	Annual	Up to 7 years	Y	1 month	Y	1	4 months	Competitive	8
NJ ZIP	Y	7	Not required	3 years	Y	N/A	Y	1	FCFS	FCFS	7
CO CFVTGP	Y	optional	Monthly	5 years	Y	3 months	Y	1	3 months	Competitive	7
MD CFIP	Y	optional	Quarterly	3 years	N	N/A	Y	1	4 months	Competitive	6
TX AFFP*	Y	optional	Biannual and annual	3 years	Y	2 months	N	1 every 2 years	6 months	Competitive	6
TX ERIG*	N	optional	Biannual and annual	4 years	Y	Webinar occurred after program opened	N	1 every 2 years	2 months	Competitive	4
TX RGP*	N	optional	Annual	5 years	Y	Webinar occurred after program opened	N	1 every 2 years	2 months	FCFS	4
TCFP*	N	optional	Annual	5 years	Y	1 week	N	1 every 2 years	2 months	Competitive	4

*TERP program

three years. While these factors lowered the scoring of TERP offerings across the board, they are features that are within the purview of TCEQ to change. Conversely, TERP offerings have strengths across the board with other key factors. For example, in-state offerings do not require a substantial narrative component as part of the application, have a small number of required attachments, offer consistent webinar hosting, annual reporting periods and largely competitive structure demonstrates that the application processes for these offerings have the potential to be fleet friendly. Further, TERP programs offer flexibility and increased funding that many programs in other states do not.

With the exception of the Texas Volkswagen Environmental Mitigation Program (TxVEMP) All-Electric Grant Program and the new THIVE program, all other funding programs administered by TCEQ allow applicants to pursue funding for the technologies best suited for their operations. Additionally, TERP incentive programs allow for a combination of project types between vehicle and infrastructure deployments, a feature that was typically absent in out-of-state offerings. Finally, the high regard for TCEQ's TERP staff among program participants significantly enhances stakeholder attitudes toward the program. Ultimately, implementing changes that align with these fleet friendliness factors will allow TCEQ to boast that it offers the most fleet-friendly programs within a year.

CLOSING THOUGHTS

In sum, interviewees spoke very highly of TERP's programs and TCEQ staff. They appreciate the state's dedication to reducing emissions in priority areas and their openness to feedback. The following summary of recommendations for consideration serves as a starting point for ongoing dialogue.

Number and Type of Programs:

- Consider program consolidation to reduce TCEQ staff time requirements; ensure allocation of funds; and alleviate the burden placed on the applicant to navigate the matrix of programs

Eligible Locations:

- Continue to prioritize nonattainment counties, while allowing applications for projects along key corridors or in neighboring counties

Cost Effectiveness and Air Quality Considerations:

- Update the methodology for CPT calculations to include PM and VOCs and/or adopt another widely used tool for emission reduction and cost-effectiveness calculations
- Provide a separate CPT threshold for zero-emission projects, similar to California's Carl Moyer Program

Program Design:

- Re-evaluate funding levels by fuel type and weight class; update the tables that display funding levels by age and usage
- Provide an expansion option across programs and/or introduce a point-of-sale voucher style offering that does not request scrappage

Application and Contracting Processes:

- Host program webinars one to two months ahead of the program release date
- Extend the submission window for competitive programs to a minimum of three months across programs
- Standardize the reporting period across programs
- Develop and launch an online submission portal that contains information for all historical submissions and active awards
- Improve consistency in timing for the release of programs

APPENDIX

The following questions were used as a baseline for interviewees regarding the TERP grant program.

1. Can you describe the role you / your organization has had with TERP in the past, and what your experience either administering or applying for grants in the program was like?
2. What are the strengths of TERP? What does the program do really well? What design elements of TERP are well-suited to enabling deployment of zero-emission MHDVs?
3. What are the weaknesses of TERP? What can the program do better? Are there design elements of TERP that could act as a barrier to entities applying for grant funding?
4. (For fleets) If you could design a TERP incentives that maximized your ability to transitionyour fleet to zero-emission, what attributes would such an incentive program have?
5. Should TERP consider raising or lowering incentive levels based on the program or project type? (added halfway through interview process)
6. Thinking about how TERP grants are organized – we want to ask a few questions:
    a. How should nonattainment be prioritized in awarding TERP funds for MHDVs? Should funds also be made available for areas of the state not facing air quality standards attainment challenges?
    b. Should the TERP grants be consolidated? If so, how?
    c. Do you think there is a role for voucher programs to meet TERP's goals and provide more fleet-friendly options? (added halfway through interview process)
    d. Are there other methods of managing and/or distributing TERP resources that should be considered? If yes, please provide examples.
    e. Are there air quality considerations in addition to securing NOx reductions that should be considered when awarding TERP funds?
7. Thinking about the TERP application process – how could the application process be streamlined or improved? Is there anything about the existing process you would change?
8. Thinking about the TERP contracting and reporting processes – how could the contracting, reporting and close out processes be streamlined or improved? Is there anything about the existing process you would change?
9. Are there any other ideas to improve TERP that you'd like to share with us today?