North Central Texas
Council of Governments

TEXAS EMISSIONS REDUCTION PLAN (TERP)

NORTH TEXAS EMISSIONS REDUCTION GRANT

Guidelines

Revised – June 27, 2006

North Central Texas Council of Governments (NCTCOG)
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(Based on the TCEQ Guidelines for Emissions Reduction Incentive Grants – RG-388)

Contents

Chapter 1

Summary

These guidelines contain the criteria for grants under the Texas Emissions Reduction Plan (TERP), authorized under Chapter 386, Subchapter C of the Texas Health and Safety Code. The North Central Texas Council of Governments (NCTCOG) has adopted rules to implement this program under 30 Texas Administrative Code (TAC) Chapter 114, Subchapter K.

Purpose

This program was established by the Texas Legislature to provide monetary incentives for projects to improve air quality in the state's nonattainment areas. These areas have been determined to not meet certain air quality standards established by the Environmental Protection Agency (EPA). Other eligible counties of the state that may face air quality challenges in the future are also eligible for incentives under this program.

As required under the statutes, these guidelines establish the standards and criteria for grants issued under the TERP. Along with the statutory and regulatory provisions applicable to this program, the criteria set forth in these guidelines must be adhered to by recipients of incentive funding.

The NCTCOG may also establish more specific criteria, through contracts or other funding mechanisms, consistent with these guidelines.

Funding

This program is funded through revenue deposited into the Texas Emissions Reduction Plan Fund. The fund consists of fees and surcharges established by the Texas Legislature.

The amount of funds available for grants during each year may vary depending on the cash flow to the program and the amount of revenues received, as well as the appropriations made to the program. The NCTCOG will periodically issue notices and information regarding the grants, including information on the amount of funds available.

How to Contact Us

Interested entities should check our Web site for information about the grants program. Go to **www.nctcog.org/NTERG**. The TERP Web site also contains copies of this guidance document, the *Technical Supplement* to the guidelines, and the application forms, as well as other information that may be helpful to a potential applicant.

Staff at the NCTCOG are available to answer questions about this program and to assist you if you are unable to access the Web site. If you are unclear about whether your proposed project would qualify for a grant, please feel free to contact us to discuss the project.

You can contact the program by calling Carrie Reese at (817) 608-2353 or Amanda Brimmer at (817) 608-2354.

You can contact us by mail at:

North Central Texas Council of Governments
Transportation Department
North Texas Emissions Reduction Grant Call for Projects
Attn: Carrie Reese
P.O. Box 5888
Arlington, TX 76005-5888

You can also contact us by e-mail at: creese@nctcog.org or abrimmer@nctcog.org

Chapter 2

Definitions

Terms as they are defined in Texas Health and Safety Code, Chapter 386, and the NCTCOG rules (30 TAC '114.620) apply to this program, except as such terms are further defined and have the meanings as explained below.

1. **Cost-effectiveness** The total dollar amount expended, adjusted using a discount rate of 3 percent per year, divided by the total number of tons of reductions in nitrogen oxide emissions attributable to that expenditure.

2. **Incremental cost** The cost of an applicant's project, less a baseline cost that would otherwise be incurred by an applicant in the normal course of business, and may include added lease or fuel costs, as well as additional capital costs.

3. **Motor vehicle** A self-propelled device designed for transporting persons or property on a public highway that is required to be registered under Texas Transportation Code, Chapter 502.

4. **Non-road equipment** A piece of equipment, excluding a motor vehicle or on-road heavy-duty vehicle, that is powered by a non-road engine, including: non-road and nonrecreational equipment and vehicles; construction equipment; industrial equipment; mining equipment; locomotives; marine vessels; and other high-emitting engine categories.

5. **Non-road engine** An internal combustion engine that is in or on a piece of equipment that is self-propelled or that propels itself and performs another function, excluding a vehicle that is used solely for competition; or a piece of equipment that is intended to be propelled while performing its function; or a piece of equipment designed to be capable of being carried or moved from on location or another. In general, an engine that will stay at a single site for at least a full year will be considered a stationary engine, rather than a non-road engine. The NCTCOG will make the final determination of the type of engine.

6. **On-road heavy-duty vehicle** An on-road motor vehicle that has a gross vehicle weight rating of 8,500 pounds or more.

7. **Person** An individual, corporation, organization, government or governmental subdivision or agency, business trust, partnership, association, or any other legal entity. This may include a corporation headquartered outside of the state of Texas, but which operates equipment or vehicles primarily in an eligible county in Texas.

8. **Qualifying fuel** Any liquid or gaseous fuel or additive that is ultimately dispensed into a motor vehicle, on-road heavy-duty vehicle, non-road equipment, or a stationary engine that provides reductions of nitrogen oxides emissions, as determined by the NCTCOG, beyond reductions required by state or federal law.

9. **Repower** To replace an old engine with a new engine, a used engine, a re-manufactured engine, or electric motors, drives, or fuel cells.

10. **Retrofit** To equip an engine and/or fuel system with new emissions-reducing parts or technology after the manufacture of the original engine and/or fuel system.

11. **Stationary engine** An internal combustion engine used either in a fixed application or in a portable (transportable) application in which the engine will stay at a single site for at least a full year (12 consecutive months). The NCTCOG will make the final determination of the type of engine.

Chapter 3

Eligible Applicants

Applicants are potentially eligible for incentive funding if they operate or plan to operate on-road heavy-duty vehicles, non-road equipment, or stationary engines primarily in one or more of the nonattainment areas or other affected counties of the state (listed below), or who otherwise contribute to the state inventory of oxides of nitrogen (NOx) emissions. Applicants are potentially eligible for incentive funding.

For infrastructure activities, persons owning and operating the infrastructure in an eligible county may also be eligible for funding. For demonstration projects, persons may be eligible for funding if they own the technology to be demonstrated in an eligible county, or if they own the vehicles or equipment on which the technology will be demonstrated.

For particular funding periods, the NCTCOG may limit eligibility to certain types of applicants. The NCTCOG may also allow a person other than the owner or operator of the vehicle or equipment to apply for and receive a grant, as long as the grant-funded project supports activities that meet these guidelines and will help to achieve the goals of the TERP.

The counties eligible under this program include those counties within the nonattainment areas designated under the Federal Clean Air Act, '107(d), as well as other AAffected Counties@ identified in Texas Health and Safety Code, '386.001(2) and NCTCOG rules (30 TAC '114.629). The 41 *eligible counties* currently located within a nonattainment area or designated as an affected county are listed below. Any change to the list of affected counties in the statute and rules, or changes to the boundaries of the nonattainment areas, are incorporated by reference into this list, without requiring an amendment to these guidelines.

Table 3-1. Counties in Texas Eligible for TERP Program

Collin	Dallas	Denton	Ellis
Hood	Hunt	Johnson	Kaufman
Parker	Rockwall	Tarrant	

The NCTCOG may limit funding under a grant period to eligible projects in only some of the eligible counties, based on the funding allocation decisions for that period.

Chapter 4

Eligible Activities

Activities eligible for funding under this program are intended to reduce NOx emissions in eligible counties. NOx is usually a by-product of high-temperature combustion. Everyday functions, like driving a motor vehicle or operating heavy equipment, contribute to the creation of NOx. It reacts with volatile organic compounds (VOCs) in the presence of sunlight to form harmful ground-level ozone.

Activities that may be eligible under this program are outlined below. Vehicles and equipment used primarily for competition or recreational purposes are not eligible for funding under any of the project categories. The NCTCOG may more narrowly define or limit the types of eligible activities for a particular funding period. The criteria for each of these categories are contained in the subsequent chapters.

- **On-road heavy-duty vehicles** (8,500 lb or more)
    - Purchase or lease
    - Replacement
    - Repower
    - Retrofit or add-on of emission-reduction technology
- **Non-road equipment**
    - Purchase or lease
    - Replacement
    - Repower
    - Retrofit or add-on of emission-reduction technology
- **Marine vessels**
    - Purchase or lease
    - Replacement
    - Repower
    - Retrofit or add-on of emission-reduction technology
- **Locomotives**
    - Purchase or lease
    - Replacement
    - Repower
    - Retrofit or add-on of emission-reduction technology
- **Stationary engines**
    - Purchase or lease
    - Replacement
    - Repower
    - Retrofit or add-on of emission-reduction technology
- **Refueling infrastructure** (for qualifying fuel)
- **On-site electrification and idle reduction infrastructure**
- **On-vehicle electrification and idle reduction infrastructure**
- **Use of qualifying fuel**
- **Demonstration of new technology**

Chapter 5

On-Road Heavy-Duty Vehicles

This chapter contains the criteria for projects involving on-road heavy-duty vehicles. For the purposes of the TERP, vehicles with a gross vehicle weight rating (GVWR) of greater than 8,500 lb are considered to be heavy-duty vehicles. The majority of these vehicles are powered by compression-ignition (CI) internal combustion engines typically using diesel fuel. However, to the extent vehicles using other fuels qualify under the program criteria, those vehicles may also be eligible for funding, subject to decisions by the NCTCOG for particular funding periods.

The methods for calculating the NOx emission reductions for an on-road vehicle project are also included in this chapter. Most of the calculations will require input of a NOx emission factor applicable to the engine and/or vehicle. The emission standards and emission factors applicable to this program are provided in a *Technical Supplement*, which will be made available in conjunction with these guidelines. Examples of the calculations will also be available in the supplement, along with other materials prepared by the NCTCOG. Potential grant applicants should contact the NCTCOG for copies of the supplement and for questions about the applicable emission standards and emission factors.

Eligible Activities and Costs

On-road heavy-duty vehicles with a gross vehicle weight rating (GVWR) of 8,500 lb or more are eligible for grants under this program. The eligible activities and costs under each project category are explained in this section. The NCTCOG may further limit the types of eligible activities, and may more narrowly define eligibility requirements under a particular funding period, as needed to best achieve the goals of the TERP.

Purchase or Lease of On-Road Heavy-Duty Vehicles

This category is for the purchase or lease of *new* on-road heavy-duty vehicles.

For this category, the NCTCOG does not consider whether the applicant is replacing an existing vehicle, and the baseline for comparison of emissions is the current federal NOx emission standard for that vehicle.

To be eligible for funding, the new vehicle must be certified to emit at least 25 percent less NOx than required under the current federal standard for that vehicle. Certification means approved by the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), or otherwise accepted by the NCTCOG.

A *lease* is considered the use and control of a new on-road heavy-duty vehicle, in accordance with a lease contract for a period of 12 or more consecutive months. The NCTCOG will reimburse the incremental costs of the lease. The incremental costs are those costs that are above the costs that would otherwise have been paid for the lease of a baseline vehicle.

A *purchase* is considered buying a new on-road heavy-duty vehicle. The NCTCOG will reimburse the incremental cost of the purchase. The incremental cost is the difference between the manufacturer's suggested retail price (MSRP), the documented dealer price of a baseline vehicle, or other appropriate baseline cost established by the NCTCOG, and the actual cost of the cleaner vehicle.

For new purchases, not less than 75 percent of the annual use of the vehicle projected for the five years following the purchase must be projected to take place in one or more of the eligible counties. Leases must be for at least one year, and 75 percent of the annual use over the lease period must be projected to take place in one or more of the eligible counties. Annual use will be measured by either miles of operation or fuel consumption.

Replacement of On-Road Heavy-Duty Vehicles

This category is for the replacement of an on-road heavy-duty vehicle with a new or newer on-road heavy-duty vehicle.

For a replacement project, the NCTCOG will evaluate whether the vehicle being replaced would have otherwise been used in the eligible counties for the period within which the emission reductions will be claimed. Standards that apply include **all** of the following:

1. The applicant must have owned the vehicle for a minimum of two years immediately preceding the grant application.
2. Unless otherwise approved by the NCTCOG, the vehicle must have been registered and used in the DFW region for the preceding two years.
3. The vehicle must be in operating condition, or, if repairs are needed, it must be shown that the vehicle can be repaired to operating condition.
4. The vehicle must have a current safety inspection (if a safety inspection is required for that vehicle and use).

Additional documentation to verify that the vehicle would have been used within the eligible counties may be required.

The replacement vehicle must be certified to emit at least 25 percent less NOx than the vehicle being replaced. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

The replacement vehicle should also be intended for use in the same application or vocation (for example, long haul, regional delivery) as the vehicle being replaced.

The applicant must agree to either destroy or render permanently inoperable the old vehicle (including the engine) within 90 days of purchasing the replacement vehicle. In lieu of scrapping the old vehicle, the NCTCOG may consider on a case-by-case basis, evidence that the vehicle will be transferred, sold, or otherwise disposed of outside of Texas, and will not be brought back into Texas. A certification of the disposition of the old vehicle must be provided, using forms

provided by the NCTCOG. In some cases, a certified or duplicate Texas Salvage Vehicle Title or Non-repairable Vehicle Title may be accepted as evidence that the vehicle has either been scrapped or designated for scrappage.

The grant recipient may be eligible for reimbursement of costs associated with the purchase or lease of the replacement vehicle, not to exceed an incentive amount that results in a cost-effectiveness of $5,500 or less per ton of NOx reduced. The NCTCOG may further limit the incentive amounts to a cost-effectiveness lower than $5,500 per ton for particular funding periods, as needed to best achieve the goals of the TERP.

The total incentive amount also must not exceed the cost of the replacement vehicle, minus the scrappage value or, if approved by the NCTCOG, the trade-in or sale value of the old vehicle. If the vehicle is in need of repairs to bring it to operating condition, the estimated cost of those repairs must also be subtracted from the cost of the replacement vehicle, to determine the incremental cost that could be reimbursed.

Not less than 75 percent of the annual usage projected for the five years immediately following the purchase of the replacement vehicle must be projected to take place in one or more of the eligible counties. Annual usage will be measured by either miles of operation or fuel consumption.

Repower of On-Road Heavy-Duty Vehicles

This category is for the replacement of an existing engine on an on-road heavy-duty vehicle with a new, rebuilt, or remanufactured engine.

The engine must be certified to emit 25 percent less NOx than the engine being replaced, based on the federal standard for that engine. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

Repowers resulting in any alteration from an original configuration of a vehicle or engine must comply with the provisions of EPA Memorandum 1A (Memo 1A), related to ensuring that altered vehicles and engines continue to meet required emission standards. Copies of Memo 1A are available from the EPA and the NCTCOG, and will be made available on the NCTCOG Web site.

Eligible rebuilt or remanufactured engines must use original engine manufacturer (OEM) components only and be purchased from the OEM or its authorized dealers and distributors. The NCTCOG may accept engines provided by other entities not connected with the OEM, subject to a case-by-case determination.

The NCTCOG will reimburse the incremental cost of the purchase and installation of the replacement engine. The incremental cost is the cost to purchase and install the replacement engine and associated equipment, minus the scrappage value, or, if approved by the NCTCOG, the trade-in or sale value of the old engine.

Expenses for in-house labor and travel will not be covered. Costs that may be reimbursed, subject to approval by the NCTCOG, include:

- invoice cost of the new engine, including sales tax and delivery charges;
- invoice cost of additional equipment that must be installed with the new engine;
- associated supplies directly related to the installation of the engine;
- costs to remove and dispose of the old engine;
- installation costs;
- reengineering costs, if the vehicle or equipment must be modified for the new engine to fit; and
- other costs directly related to the project, subject to approval by the NCTCOG.

The applicant must agree to either destroy or render permanently inoperable the old engine within 90 days of purchasing the replacing the engine. In lieu of scrapping the old engine, the NCTCOG may consider on a case-by-case basis, evidence that the engine will be transferred, sold, or otherwise disposed of outside of Texas, and will not be brought back into Texas. A certification of the disposition of the old vehicle must be provided.

Not less than 75 percent of the annual usage of the vehicle projected for the five years following the repower must be projected to take place in one or more of the eligible counties. Annual usage will be measured by either miles of operation or fuel consumption.

Retrofit or Add-On of Emission-Reduction Technology

This category is for the retrofit of an existing engine on an on-road heavy-duty vehicle, or adding on devices to the vehicle.

To be eligible for funding, the retrofit or add-on systems must be certified or verified to emit at least 25 percent less NOx than the engine prior to the retrofit or add-on. Certification or verification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

Retrofits and add-on activities resulting in any alteration from an original configuration of a vehicle or engine must comply with the provisions of EPA Memorandum 1A (Memo 1A), related to ensuring that altered vehicles and engines continue to meet required emission standards. Importantly, aftermarket systems for converting a vehicle and engines to alternative fuel operation must comply with EPA certification requirements under Memo 1A. Copies of Memo 1A are available from the EPA and the NCTCOG, and will be made available on the NCTCOG Web site.

The NCTCOG will reimburse the incremental cost of the purchase and installation of the retrofit and/or add-on technology. If the engine is to be rebuilt to install the emission-reduction devices, the incremental cost is the difference between the cost of rebuilding the existing engine and the cost of rebuilding the engine to include the retrofit or add-on technology. If the engine does not need to be rebuilt in conjunction with installing the new technology, then the incremental cost will be the full cost of purchasing and installing the technology.

Expenses for in-house labor and travel will not be covered. Costs that may be reimbursed, subject to approval by the NCTCOG, include:

- invoice cost of the retrofit kit or add-on devices, including sales tax and delivery charges;
- associated supplies directly related to the installation of the devices;
- installation costs;

- reengineering costs, if the vehicle or equipment must be modified for the retrofit or add-on devices to be installed and used; and
- other costs directly related to the project, subject to approval of the NCTCOG.

Not less than 75 percent of the annual usage of the vehicle projected for the five years following the retrofit or add-on installation must be projected to take place in one or more of the eligible counties. Annual usage will be measured by either miles of operation or fuel consumption.

Project Criteria

In addition to the eligibility criteria previously presented, the following list of criteria applies to projects involving on-road heavy-duty vehicle activities. The NCTCOG may impose additional criteria, and may more narrowly define the criteria established in this guide, under a particular funding period, as needed to best achieve the goals of the TERP.

- One or more eligible *activities* may be included under one *project* application.

- Vehicles and equipment used primarily for competition or recreational purposes are not eligible for funding under any of the project categories.

- On-road heavy-duty vehicle activities must provide a NOx emission reduction compared to baseline NOx emissions. The NOx emissions of vehicles, engines, and retrofit/add-on devices used to achieve the emission reductions must be certified or verified by the EPA, the CARB, or otherwise accepted by the NCTCOG. In situations where the model year of the vehicle and the model year of the existing engine are different, such as a vehicle that has already had the engine replaced with a newer engine, the model year of the engine must be used to determine the baseline emission standard for emission-reduction calculations. The application of the 25 percent reduction criteria for each type of activity is explained below.

    - **Purchases and leases.** Purchases and leases are allowed based on what year the purchase or lease is completed. At a minimum, the vehicle and engine being purchased or leased must be certified to emit at least 25 percent less NOx than the current federal NOx emission standard for that vehicle.
    - **Replacements.** The replacement vehicle and engine must have been certified to emit at least 25 percent less NOx than the vehicle being replaced. For example, if you want to replace a 1989 bus with a 1999 bus, the replacement bus and engine must have been certified to emit 25 percent less NOx than the 1989 emission standard.

    - **Repowers.** The replacement engine must be certified to emit at least 25 percent less NOx than the engine being replaced.

    - **Retrofits and add-ons.** Emission standards for retrofit and add-on activities are based on the year of the engine being retrofitted. The retrofit or add-on technology must be certified or verified to emit at least 25 percent less NOx than the standard for the vehicle and engine being retrofitted. For example, if you want to retrofit the engine on your bus in 2002, and the bus engine was originally manufactured in 1996, then the retrofit kit must have been certified or verified to result in NOx

emissions that are 25 percent less than the original (1996) certified emission level of the vehicle and engine.

- **Combined technologies.** In instances where two technologies are combined on the same vehicle and/or engine (for example, repower plus retrofit), the NCTCOG may consider the combined reductions from the two technologies in meeting the 25 percent requirements. This decision will be solely at the discretion of the NCTCOG, and will be based on a determination that the combination of the two technologies will result in a permanent reduction in emissions of at least 25 percent.

- The cost-effectiveness of a project, other than a demonstration project, must not exceed $5,500 per ton of NOx emissions reduced in the eligible counties for which the project is proposed. Individual activities included under a single project application may exceed this amount, but the combined project must meet the cost-effectiveness standard.

- Infrastructure activitiesCincluding infrastructure costs that are part of a broader repower, retrofit, replacement or add-on projectCare excluded from the cost- effectiveness limit of $5,500 per ton.

- An activity is not eligible if it is required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. However, this restriction does not apply to an otherwise qualified activityCregardless of the fact that the state implementation plan assumes that the change in equipment, vehicles, or operations will occurCif, on the date the grant is awarded, the change is not required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. This restriction also does not apply to the purchase of vehicles or equipment that is required only by local law or regulation, or by corporate or controlling board policy of a public or private entity. Demonstration projects used to demonstrate a technology that may be used to comply with an emission reduction requirement may be funded, as long as the reductions directly attributable to the demonstration project are not used to comply with those requirements.

- The incremental cost of the proposed activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

- In the areas of the state where Texas Low Emission Diesel (TxLED) must be provided by suppliers beginning April 1, 2005, the baseline and reduced emission rate calculations, for diesel engine usage after March 2005 must be adjusted using a correction factor, in addition to any other calculation adjustments.

Figure 5-1. Correction Factor for TxLED

The TCEQ has adopted rules (30 TAC '114.312 to '114.319) requiring that beginning on April 1, 2005, diesel fuel sold or supplied for use in compression-ignition engines in certain counties in Texas must meet new low emission diesel (TxLED) standards.

The counties affected by the new TxLED requirements currently include all of the counties eligible for TERP incentive funding, as listed in Chapter 3, except for El Paso County.

The new requirements set a maximum aromatic hydrocarbon content standard of 10 percent by volume per gallon. The requirements also set a minimum cetane number for TxLED of 48.

The TxLED requirements are intended to result in reductions in NOx emissions from diesel engines. Currently, reduction factors of **5.7 percent** (0.057) for on-road use and **7.0 percent** (0.07) for non-road use have been accepted as estimates for use of TxLED. However, this reduction estimate is subject to change, based on the standards accepted by the EPA for use in the Texas State Implementation Plan (SIP). The NCTCOG will identify the appropriate reduction factor to use in the *Technical Supplement* prepared to support these guidelines.

On-road:
TxLED Correction Factor = 1 - (0.057)
Non-road:
TxLED Correction Factor = 1 - (0.070)

- An activity involving a new emission-reduction measure that would otherwise generate marketable credits under state or federal emissions reduction credit averaging, banking, or trading programs is not eligible for funding under this program unless:
    - the activity includes the transfer of the reductions that would otherwise be marketable credits to the state implementation plan or the owner or operator as provided under ' 386.056, Texas Health and Safety Code; and
    - the reductions are permanently retired.
- For repower activities, eligible rebuilt or remanufactured engines must use original engine manufacturer (OEM) components only and be purchased from the OEM or its authorized dealers and distributors. The NCTCOG may accept engines and components provided by other entities not connected with the OEM, subject to a case-by-case determination.
- For activities other than leases, the activity life must be for at least five years. Not less than 75 percent of the annual usage of the vehicle projected for the activity life must be projected to take place in one or more of the eligible counties. Leases must be for at least one year, and 75 percent of the annual usage over the lease period must be projected to take place in one or more of the eligible counties.
- For most on-road vehicles, annual usage will be measured using miles of operation. For refuse vehicles and street sweepers operating in stop-and-go applications, fuel consumption normally should be used as the usage factor. The NCTCOG may consider using either miles of operation or fuel consumption for particular applications, but on a case-by-case basis.
- Applicants should refer to the *Technical Supplement* to these guidelines for the maximum acceptable activity life established by the NCTCOG for each type of activity.
- Applicants must agree to monitor the use of the grant-funded vehicles, equipment, infrastructure, and/or fuel, and to report to the NCTCOG for the life of each grant-funded activity.

- Applicants must also agree to notify the NCTCOG of any changes during the life of the following activities: termination of use; change in use, sale, transfer, or accidental or intentional destruction of grant-funded vehicles or equipment; or change in use of the qualifying fuel.

- The NCTCOG may impose additional criteria for certain projects and funding periods, consistent with these guidelines.

NOx Emission Standards

The baseline NOx emission standards for this program will be the federal standard for NOx emissions applicable to the type of engine and model year of vehicle. The federal NOx emission standards for on-road (highway) heavy-duty engines are listed in the *Technical Supplement* available from the NCTCOG. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate baseline standards are used.

Calculating NOx Emission Reductions

In general, the emission-reduction benefit represents the difference in the emission level of a baseline vehicle/engine and a reduced-emission vehicle/engine. In situations where the model year of the vehicle chassis and the model year of the existing engine are different, the model year of the engine must be used to determine the baseline emissions for benefit calculations. The emission level is calculated by multiplying an emission factor, an activity level, and a conversion factor, if necessary. Because conversion factors and the activity levels may be expressed in different units for the existing and replacement engines, the emission levels for the baseline and reduced-emission vehicles/engines should be calculated separately and then differences taken to determine emission reductions.

Different types of on-road vehicles operate very differently. For most on-road applications, the activity level should be established by the annual mileage. Refuse haulers (garbage trucks) and street sweepers are an exception to this, and the activity level should be determined based on annual fuel consumption. Emission-reduction calculations should be consistent with the type of records maintained over the life of each activity.

Calculation of NOx Emission Reductions Using Annual Mileage

See *Technical Supplement for On-Road Heavy-Duty Vehicles.*

For retrofit and add-on activities, as well as other activities, where the emission reductions are based on a percentage reduction from the baseline, the certified/verified percentage reduction factor can be applied to the applicable emission factor to determine the reduced NOx emission factor.

Alternatively, for activities where the emissions of the new or replacement engine are certified at a specific emissions level (g/bhp-hr), such as purchases or repowers, a conversion factor is needed to determine an appropriate emissions factor in grams per mile. Appropriate conversion factors, to convert g/bhp-hr to g/mile, are included in the *Technical Supplement* available from the NCTCOG.

Calculation of NOx Emission Reductions Using Annual Fuel Use

Refuse vehicles and street sweepers operating predominantly in stop-and-go applications accrue low mileage, yet intermittently operate at high load during compaction or sweeping mode. Therefore, annual fuel use is a more appropriate emission factor to use for these vehicles. Alternatively, an applicant may base the emission reductions on annual mileage for these types of vehicle uses, provided sufficient supporting documentation is submitted as determined by the NCTCOG.

If annual fuel consumption is the basis for the emission reductions, an energy consumption factor is used to convert g/bhp-hr to g/gal of fuel used. There are two ways of calculating an engine-specific energy consumption factor:

1. divide the hp of the engine by the fuel economy in units of gal/hr; or
2. divide the density of the fuel by the brake-specific fuel consumption of the engine.

While actual fuel receipts or other documentation may support the annual fuel consumption for a baseline engine, the annual fuel consumption of the new vehicle or engine is an estimated proportion to the change in the energy consumption factor.

Heavy-duty diesel engines typically have a brake-specific energy consumption of 6,500 to 7,000 Btu (British thermal unit) per hp-hour on the certification cycle. Diesel fuel has an energy density of about 18,000 Btu/lb and a mass density of 7.0 lb/gallon. This results in an energy consumption factor of about 18.5 hp-hour/gallon of fuel consumed, which should be used as the default for refuse vehicles operating predominantly in stop-and-go applications.

Default fuel consumption rate factors may be included in the *Technical Supplement* to these guidelines.

Calculating Cost-Effectiveness

Only the amount of incentive funds requested under the program can be used in cost-effectiveness calculation for on-road heavy-duty vehicles. The incremental costs for each activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

To determine the cost-effectiveness of an activityCwith the exception of qualifying fuel activitiesCthe incentive amount for the activity included in the project must be amortized over the activity life designated by the applicant, with a discount rate of 3 percent.

The following amortization formula yields a *capital recovery factor* (CRF).

capital recovery factor (CRF) = $\mathbf{[(1 + i)^n (i)] \; / \; [(1 + i)^n - 1]}$

where, i = discount rate (3 percent)
n = activity life

The discount rate of 3 percent reflects the opportunity cost of public funds. This is the level of earning that reasonably could be expected by investing state funds in various financial instruments, such as U.S. Treasury securities.

The incentive amount should be multiplied by the incremental cost, or incentive amount requested to determine the annualized cost.

Incremental Cost x CRF = Annualized Cost

Capital recovery factors for use in calculations for up to 20 years are presented in Table 5-1.

Table 5-1. Capital Recovery Factors (CRFs) Using a Discount Rate of 0.03

Activity Life	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CRF	1.00	.5226	.3535	.2690	.2184	.1846	.1605	.1425	.1284	.1172
Activity Life	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
CRF	.1081	.1005	.0940	.0885	.0838	.0796	.0760	.0727	.0698	.0672

For projects that include more than one activity, the total project incentive amount must be used to determine the cost-effectiveness of the project. The applicant may request an incentive amount that is less than the full incremental costs, in order to meet the cost-effectiveness criteria.

The cost-effectiveness must be determined by first adding all of the annualized costs for the activities included in the project. The annual emission reductions of each activity should also be added together to determine an annual emission reduction for the project.

The cost-effectiveness of the projects is then determined by dividing the combined annualized costs for all activities included in the project application, by the total annual NOx emission reductions for the combined project activities.

Total Annualized Cost / Total Annual NOx Reductions = Project Cost-Effectiveness

Chapter 6

Non-Road Equipment

This chapter contains the project criteria for non-road equipment. Most of the non-road engines eligible under this program will be powered by diesel-fueled compression-ignition (CI) engines. However, engines powered by other fuels may also be eligible, subject to decisions by the NCTCOG for particular funding periods and geographic areas.

The methods for calculating the NOx emission reductions for a non-road equipment project are also included in this chapter. The emission standards and emission factors applicable to this program are provided in a *Technical Supplement*, which will be made available in conjunction with these guidelines. Examples of the calculations will also be available in the supplement, along with other materials prepared by the NCTCOG. Potential grant applicants should contact the NCTCOG for copies of the supplement and for questions about the applicable emission standards and emission factors.

Eligible Activities and Costs

Non-road equipment powered by an engine 25 horsepower (hp) or greater is eligible for grants under this program. For replacement and repower projects, this requirement refers to the horsepower of the engine being replaced and does not apply to the replacement engine or technology.

The eligible activities and costs under each project category are explained in this section. The NCTCOG may further limit the types of eligible activities, and may more narrowly define eligibility requirements, under a particular funding period, as needed to best achieve the goals of the TERP.

Purchase or Lease of Non-Road Equipment

This category is for the purchase or lease of new non-road equipment. For this category, the NCTCOG does not consider whether the applicant is replacing an existing piece of equipment, and the baseline for comparison of emissions is the current federal NOx emission standard for a non-road engine of that horsepower.

To be eligible for funding, the engine on the new piece of equipment must be certified to emit at least 25 percent less NOx than required under the current federal standard for that horsepower of a non-road engine. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

A *lease* is considered the use and control of a new piece of non-road equipment in accordance with a lease contract for a period of 12 or more consecutive months. The NCTCOG will reimburse the incremental costs of the lease. The incremental costs are those costs that are above and beyond the costs that would otherwise have been paid for the lease of a baseline vehicle.

A *purchase* is considered buying a new piece of non-road equipment. The NCTCOG will reimburse the incremental cost of the purchase. The incremental cost is the difference between the documented dealer price of a baseline piece of equipment, or other appropriate baseline cost established by the NCTCOG, and the actual cost of the cleaner equipment.

For new purchases, not less than 75 percent of the annual use of the equipment projected for the five years following the purchase must be projected to take place in one or more of the eligible counties. Leases must be for at least one year, and 75 percent of the annual use over the lease period must be projected to take place in one or more of the eligible counties. Annual use will be measured by either hours of operation or fuel consumption.

Replacement of Non-Road Equipment

This category is for the replacement of non-road equipment with a new or newer piece of non-road equipment. For this category, the applicant must be replacing a piece of equipment with at least five years of remaining useful life, and the baseline for comparison of emissions is the difference between the emissions of the equipment being replaced and the emissions of the equipment being purchased.

For a replacement project, the NCTCOG will evaluate whether the equipment being replaced would have otherwise been used in the eligible counties for the period within which the emission reductions will be claimed. Standards that apply include **all** of the following:

1. The owner must have owned the equipment for a minimum of two years immediately preceding the grant application.
2. Unless otherwise approved by the NCTCOG, the equipment must have been located and used in Texas over the preceding two years.
3. The equipment must be in operating condition or, if repairs are needed, it must be shown that the equipment can be repaired to operating condition.

Additional documentation to verify that the equipment would have been used within the eligible counties may be required.

The engine on the replacement equipment must be certified to emit at least 25 percent less NOx than the engine being replaced. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

The replacement equipment should also be intended for use in the same application or vocation (for example, excavator, compactor, grader) as the equipment being replaced.

The applicant must agree to either destroy or render permanently inoperable the old equipment (including the engine) within 90 days of purchasing the replacement equipment. In lieu of scrapping the old equipment, the NCTCOG may consider, on a case-by-case basis, evidence that the equipment will be transferred, sold, or otherwise disposed of outside of Texas, and will not be brought back into Texas. A certification of the disposition of the old equipment must be provided, using forms provided by the NCTCOG.

The grant recipient may be eligible for reimbursement of costs associated with the purchase or lease of the replacement equipment, not to exceed an incentive amount that results in a cost-effectiveness of $5,500 or less per ton of NOx reduced. The NCTCOG may further limit the incentive amounts to a cost-effectiveness that is lower than $5,500 per ton for particular funding

periods and as needed to best achieve the goals of the TERP.

The total incentive amount also must not exceed the cost of the replacement equipment, minus the scrappage value or, if approved by the NCTCOG, the trade-in or sale value of the old equipment. If the equipment is in need of repairs to bring it into operating condition, the estimated cost of those repairs must also be subtracted from the cost of the replacement equipment, to determine the incremental cost that could be reimbursed.

Not less than 75 percent of the annual usage projected for the five years immediately following the purchase of the replacement equipment must be projected to take place in one or more of the eligible counties. Annual usage will be measured by either hours of operation or fuel consumption.

Repower of Non-Road Equipment

This category is for the replacement of an existing engine on a non-road piece of equipment with a new, rebuilt, or remanufactured engine.

The engine must be certified to emit at least 25 percent less NOx than the engine being replaced. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

Eligible rebuilt or remanufactured engines must use original engine manufacturer (OEM) components only and must be purchased from the OEM or its authorized dealers or distributors. The NCTCOG may accept engines provided by other entities, not connected with the OEM, subject to a case-by-case determination.

The NCTCOG will reimburse the incremental cost of the purchase and installation of the replacement engine. The incremental cost is the cost to purchase and install the replacement engine and associated equipment, minus the scrappage value, or, if approved by the NCTCOG, the trade-in or sale value of the old engine.

Expenses for in-house labor and travel will not be covered. Costs that may be reimbursed, subject to approval by the NCTCOG, include:

- invoice cost of the new engine, including sales tax and delivery charges;
- invoice cost of additional equipment that must be installed with the new engine;
- associated supplies directly related to the installation of the engine;
- costs to remove and dispose of the old engine;
- installation costs;
- reengineering costs, if the vehicle or equipment must be modified for the new engine to fit; and
- other costs directly related to the project, subject to approval by the NCTCOG.

The applicant must agree to either destroy or render permanently inoperable the old engine within 90 days of purchasing the replaced engine. In lieu of scrapping the old engine, the NCTCOG may consider on a case-by-case basis evidence that the engine will be transferred, sold, or otherwise disposed of outside of Texas, and will not be brought back into Texas. A certification of the disposition of the old engine must be provided.

Not less than 75 percent of the annual usage of the equipment projected for the five years following the repower must be projected to take place in one or more of the eligible counties. Annual usage will be measured by either hours of operation or fuel consumption.

Retrofit or Add-On of Emission-Reduction Technology

This category is for the retrofit of an existing engine on non-road piece of equipment, or adding on devices to the equipment.

To be eligible for funding, the retrofit or add-on systems must be certified or verified to emit at least 25 percent less NOx than the engine prior to the retrofit or add-on. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

The NCTCOG will reimburse the incremental cost of the purchase and installation of the retrofit and/or add-on technology. If the engine is to be rebuilt to install the emission-reduction devices, the incremental cost is the difference between the cost of rebuilding the existing engine and the cost of rebuilding the engine to include the retrofit or add-on technology. If the engine does not need to be rebuilt in conjunction with installing the new technology, then the incremental cost will be the full cost of purchasing and installing the technology.

Expenses for in-house labor and travel will not be covered. Costs that may be reimbursed, subject to approval by the NCTCOG, include:

- invoice cost of the retrofit kit or add-on devices, including sales tax and delivery charges;
- associated supplies directly related to the installation of the devices;
- installation costs;
- re-engineering costs, if the vehicle or equipment must be modified for the retrofit or add-on devices to be installed and used; and
- other costs directly related to the project, subject to approval by the NCTCOG.

Not less than 75 percent of the annual usage of the equipment projected for the 5 years following the retrofit or add-on installation must be projected to take place in one or more of the eligible counties. Annual usage will be measured by either hours of operation or fuel

consumption.

Project Criteria

In addition to the eligibility criteria previously presented, the following list of criteria applies to projects involving non-road equipment activities. The NCTCOG may impose additional criteria, and may more narrowly define the criteria established in this guide, under a particular funding period, as needed to best achieve the goals of the TERP.

- One or more eligible *activities* may be included under one *project* application.

- Vehicles and equipment used primarily for competition or recreational purposes are not eligible for funding under any of the project categories.

- Non-road equipment activities must provide a NOx emission reduction compared to baseline NOx emissions. The NOx emissions of equipment, engines, and retrofit/add-on devices used to achieve the emission reductions must be certified or verified by the EPA, the CARB, or otherwise accepted by the NCTCOG. In situations where the year of manufacture of the equipment and the year of manufacture of the existing engine are differentCsuch as equipment that has already had the engine replaced with a newer engineCthe year of manufacture of the engine must be used to determine the baseline emission standard for emission-reduction calculations. The application of the 25 percent reduction criteria for each type of activity is explained below.

    - **Purchases and leases.** Purchases and leases are allowed based on what year the purchase or lease is completed. At a minimum, the equipment and engine being purchased or leased must be certified to emit at least 25 percent less NOx than the current federal NOx emission standard for that engine.

    - **Replacements.** The replacement equipment and engine must have been certified to emit at least 25 percent less NOx than the engine being replaced.

    - **Repowers.** The replacement engine must be certified or verified to emit at least 25 percent less NOx than the engine being replaced.

    - **Retrofits and add-ons.** Emission standards for retrofit and add-on activities are based on the engine being retrofitted. The retrofit or add-on technology must be certified or verified to emit at least 25 percent less NOx than the standard for the engine being retrofitted.

    - **Combined technologies.** In instances where two technologies are combined on the same equipment and/or engine (for example, repower plus retrofit), the NCTCOG may consider the combined reductions from the two technologies in meeting the 25 percent requirements. This decision will be solely at the discretion of the NCTCOG, and will be based on a determination that the combination of the two technologies will result in a permanent reduction in emissions of at least 25 percent.

- The cost-effectiveness of a project, other than a demonstration project, must not exceed $5,500 per ton of NOx emissions reduced in the eligible counties for which the project is

proposed. Individual activities included under a single project application may exceed this amount, but the combined project must meet the cost-effectiveness standard.

- Infrastructure activitiesCincluding infrastructure costs that are part of a of broader repower, retrofit, replacement or add-on projectCare excluded from the cost-effectiveness limit $5,500 per ton.

- In the areas of the state where Texas Low Emission Diesel (TxLED) must be provided by suppliers, beginning April 1, 2005, the baseline and reduced emission rate calculations for diesel engine usage after March 2005 must be adjusted using a correction factor, in addition to any other calculation adjustments.

Figure 6-1. Correction Factor for TxLED

The NCTCOG has adopted rules (30 TAC '114.312 to '114.319) requiring that beginning on April 1, 2005, diesel fuel sold or supplied for use in compression-ignition engines in certain counties in Texas must meet new low emission diesel (TxLED) standards.

The counties affected by the new TxLED requirements currently include all of the counties eligible for TERP incentive funding, as listed in Chapter 3, except for El Paso County.

The new requirements set a maximum aromatic hydrocarbon content standard of 10 percent by volume per gallon. The requirements also set a minimum cetane number for TxLED of 48.

The TxLED requirements are intended to result in reductions in NOx emissions from diesel engines. Currently, reduction factors of **5.7 percent** (0.057) for on-road use and **7.0 percent** (0.07) for non-road use have been accepted as estimates for use of TxLED. However, this reduction estimate is subject to change, based on the standards accepted by the EPA for use in the Texas State Implementation Plan (SIP). The NCTCOG will identify the appropriate reduction factor to use in the *Technical Supplement* prepared to support these guidelines.

On-road:
TxLED Correction Factor = 1 - (0.057)
Non-road:
TxLED Correction Factor = 1 - (0.070)

- An activity is not eligible if it is required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. However, this restriction does not apply to an otherwise qualified activityCregardless of the fact that the state implementation plan assumes that the change in equipment, vehicles, or operations will occurCif, on the date the grant is awarded, the change is not required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. This restriction also does not apply to the purchase of vehicles or equipment that are required only by local law or regulation, or by corporate controlling board policy of a public or private entity. Demonstration projects used to demonstrate a technology that may be used to comply with an emission-reduction requirement may be funded, as long as the reductions directly attributable to the demonstration project are not used to comply with those requirements.

- An activity involving a new emission reduction measure that would otherwise generate marketable credits under state or federal emission-reduction credit averaging, banking, or trading programs is not eligible for funding under this program unless:

    - the activity includes the transfer of the reductions that would otherwise be marketable credits to the state implementation plan or the owner or operator, as provided under ' 386.056, Texas Health and Safety Code; and
    - the reductions are permanently retired.

- The incremental cost of the proposed activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

- For repower activities, eligible rebuilt or remanufactured engines must use original engine manufacturer (OEM) components only, and must be purchased from the OEM or its authorized dealers and distributors. The NCTCOG may accept engines and components provided by other entities that are not connected with the OEM, subject to a case-by-case determination.

- For activities other than leases, the activity life must be for at least five years. For new purchases, not less than 75 percent of the annual usage of the equipment projected for the five years immediately following the award of a grant must be projected to take place in one or more of the eligible counties. Leases must be for at least one year, and 75 percent of the annual usage over the lease period must be projected to take place in one or more of the eligible counties. Annual usage will be measured by either hours of operation or fuel consumption.

- For most non-road equipment, annual usage will be measured using hours of operation. For equipment without an hour meter installed, and no viable mechanism for measuring the hours of operation, fuel consumption will be used as the usage factor.

- Applicants should refer to the *Technical Supplement* to these guidelines for the maximum acceptable activity life established by the NCTCOG for each type of activity.

- Applicants must agree to monitor the use of the grant-funded vehicles, equipment, infrastructure, and/or fuel, and to report to the NCTCOG for the life of each grant-funded activity.

- Applicants must also agree to notify the NCTCOG of any changes during the life of the following activities: termination of use; change in use, sale, transfer, or accidental or intentional destruction of grant-funded vehicles or equipment; or change in use of the qualifying fuel.

- The NCTCOG may impose additional criteria for certain projects and funding periods, consistent with these guidelines.

NOx Emission Standards

The baseline NOx emission standards for this program will be the federal standards for NOx emissions applicable to the type of engine and year of manufacture. The federal NOx emission standards for non-road engines are listed in the *Technical Supplement* available from the NCTCOG. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate baseline standards are used.

Calculating NOx Emission Reductions

In general, the emission-reduction benefit represents the difference in the emission level of a baseline engine and a reduced-emission engine. In situations where the year of manufacture of the equipment and the year of manufacture of the current engine are different, the year of the engine must be used to determine the baseline emissions for benefit calculations.

The emission level is calculated by multiplying an emission factor, an activity level, and a conversion factor, if necessary. Because conversion factors and the activity levels may be expressed in different units for the existing and replacement engines, the emission levels for the baseline and reduced-emission engines should be calculated separately, and then differences taken to determine emission reductions.

For most non-road applications, the activity level should be established by the annual hours of operation. For equipment without an hour meter installed, and no other mechanism to track hours of operation, the activity level should be determined based on annual fuel consumption. Emission-reduction calculations should be consistent with the type of records maintained over the life of each activity.

Calculation of NOx Emission Reductions Using Annual Hours of Operation

Appropriate baseline NOx emission factors and default load factors are included in the *Technical Supplement* to these guidelines. Use the emission factors associated with engine horsepower and year of manufacture. Use the load factor associated with the type of equipment. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate factors are used.

For retrofit and add-on activities, as well as other activities where the emission reductions are based on a percentage reduction from the baseline, the certified or verified percentage reduction factor can be applied to the baseline emission factor to determine the reduced NOx emission factor.

Alternatively, for activities where the emissions of the new or replacement engine are certified at a specific emissions level (g/bhp-hr), such as purchases or repowers, that emission level should be used as the emission factor.

Calculation of NOx Emission Reductions Using Annual Fuel Use

If the annual fuel consumption is used, the activity level should be based on actual annual fuel receipts or other available documentation to estimate the expected annual fuel use of the equipment. An energy consumption factor must also need to be calculated. The energy consumption factor converts the emission factor in terms of g/bhp-hr to g/gal of fuel used. There are two ways of calculating the energy consumption factor:

1. by dividing the hp of the engine by the fuel economy in units of gal/hr; or
2. by dividing the density of the fuel by the brake-specific fuel consumption of the baseline engine.

Check with your equipment dealer to confirm the fuel economy or fuel consumption of the equipment for the type of application.

Default fuel consumption rate factors may be included in the *Technical Supplement* to these guidelines. Applicants should consult with the NCTCOG for the appropriate calculations for projects involving nondiesel engines.

Calculating Cost-Effectiveness

Only the amount of incentive funds requested under the program can be used in cost-effectiveness calculations. The incremental costs for each activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

To determine the cost-effectiveness of an activityCwith the exception of qualifying fuel activitiesCthe incentive amount for the activity included in the project must be amortized over the activity life designated by the applicant, with a discount rate of 3 percent.

The following amortization formula yields a *capital recovery factor* (CRF).

capital recovery factor (CRF) = $\mathbf{[(1 + i)^n (i)] / [(1 + i)^n - 1]}$

where, i = discount rate (3 percent)
n = activity life

The discount rate of 3 percent reflects the opportunity cost of public funds. This is the level of earning that reasonably could be expected by investing state funds in various financial instruments, such as U.S. Treasury securities.

The incentive amount should be multiplied by the incremental cost or incentive amount requested to determine the annualized cost.

Incremental Cost x CRF = Annualized Cost

For use in the calculations, capital recovery factors for up to 20 years are presented in Table 6-1.

Table 6-1. Capital Recovery Factors (CRFs) Using a Discount Rate of 0.03

Activity Life	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CRF	1.00	.5226	.3535	.2690	.2184	.1846	.1605	.1425	.1284	.1172
Activity Life	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
CRF	.1081	.1005	.0940	.0885	.0838	.0796	.0760	.0727	.0698	.0672

For projects that include more than one activity, the total project incentive amount must be used to determine the cost-effectiveness of the project. The applicant may request an incentive amount that is less than the full incremental costs, in order to meet the cost-effectiveness criteria.

The cost-effectiveness will be determined by first adding all of the annualized costs for the activities included in the project. The annual emission reductions of each activity should also be added together to determine an annual emission reduction for the project.

The cost-effectiveness of the projects is then determined by dividing the combined annualized costs for all activities included in the project application, by the total annual NOx emission reductions for the combined project activities.

Total Annualized Cost / Total Annual NOx Reductions = Project Cost-Effectiveness

Chapter 7

Marine Vessels

This chapter contains the project criteria for marine vessels. Most of the engines eligible under this program will be powered by diesel-fueled compression-ignition engines. However, engines powered by other fuels may also be eligible, subject to decisions by the NCTCOG for particular funding periods and geographic areas.

The methods for calculating the NOx emission reductions for a marine vessel project are also included in this chapter. Most of the calculations will require input of a NOx emission factor applicable to the engine. The emission standards and emission factors applicable to this program are provided in a *Technical Supplement*, which will be made available in conjunction with these guidelines. Examples of the calculations will also be available in the supplement, along with and other materials prepared by the NCTCOG. Potential grant applicants should contact the NCTCOG for copies of the supplement and for any questions about the emission standards and factors to use.

Eligible Activities and Costs

Marine vessels powered by engines of at least 25 horsepower (hp), and associated auxiliary marine engines of at least 25 hp, are eligible for grants under this program. For replacement and repower projects, the requirement refers to the horsepower of the engine being replaced and does not apply to the replacement engine or technology.

The types of vessels that may be eligible for funding are diverse, and may include both ocean-going vessels and harbor craft. However, to be eligible for funding, a vessel must operate at least 75 percent of the time in the bays adjacent to an eligible county, or in the Texas Intracoastal Waterway. Therefore, it is expected that there will be few projects involving large ocean-going vessels.

The NCTCOG may also consider, on a case-by-case basis, vessels that operate in coastal or international waters, where it can be definitively shown that the emissions from those vessels operating in the subject area are included by the NCTCOG in the inventory of emissions for an eligible county or area made up of eligible counties. This decision will be solely at the discretion of the NCTCOG. It is recommended that potential applicants contact the NCTCOG to discuss this type of project prior to submitting an application.

The discussion in this chapter, as well as the information on emission factors provided in a *Technical Supplement* to support these guidelines, will focus on commercial harbor craft and vessels likely to be used in the Texas Intracoastal Waterway (such as vessels associated with barge traffic). Eligible projects for ocean-going vessels will be considered on a case-by-case basis.

In addition, many marine vessels will have one or more propulsion engines, as well as one or more auxiliary engines. In most cases, for lease/purchase and replacement projects, the combined NOx emissions for both the propulsion and the auxiliary engine will be used to determine the NOx emission reductions for the project. For engine repower, retrofit, and add-on projects, the NOx emission reductions will be based on the individual engines being replaced or

retrofitted.

The eligible activities and costs under each project category are explained in this section. The NCTCOG may further limit the types of eligible activities, and may more narrowly define eligibility requirement under a particular funding round, or by geographic area, as needed to best achieve the objectives of the TERP.

Purchase or Lease of Marine Vessels

This category is for the purchase or lease of new marine vessels. For this category, the NCTCOG does not consider whether the applicant is replacing an existing piece of equipment, and the baseline for comparison of emissions is the current NOx emission standard for a marine engine of that horsepower and use.

To be eligible for funding, the engine on the new piece of equipment must be certified to emit at least 25 percent less NOx emissions than required under the current standard for that engine. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

A *lease* is considered the use and control of a new marine vessel in accordance with a lease contract for a period of 12 or more consecutive months. The NCTCOG will reimburse the incremental costs of the lease. The incremental costs are those costs that are above and beyond the costs that would otherwise have been paid for the lease of a baseline vehicle.

A *purchase* is considered buying a new marine vessel. The NCTCOG will reimburse the incremental cost of the purchase. The incremental cost is the difference between the documented dealer price of a baseline vessel or other appropriate baseline cost established by the NCTCOG and the actual cost of the cleaner vessel.

For new purchases, not less than 75 percent of the annual use of the marine vessel projected for the five years following the purchase must be projected to take place in the Texas Intracoastal Waterway or in bays adjacent to an eligible county. Leases must be for at least one year, and 75 percent of the annual use over the lease period must be projected to take place in the Texas Intracoastal Waterway or in bays adjacent to an eligible county. Annual use will be measured by either hours of operation or fuel consumption.

Replacement of Marine Vessels

This category is for the replacement of marine vessels with a new or newer marine vessel. For this category, the applicant must be replacing a vessel with at least five years of remaining useful life, and the baseline for comparison of emissions is the difference between the emissions standard (or in some cases, the certified emission level) for the engine(s) on the vessel being replaced, and the certified emissions level of the engine(s) installed on the vessel being purchased.

For a replacement project, the NCTCOG will evaluate whether the vessel being replaced would have otherwise been used in the bays adjacent to the eligible counties or in the Texas Intracoastal Waterway for the period within which the emission reductions will be claimed. Standards that apply include **all** of the following:

1. The owner must have owned the vessel for a minimum of two years immediately preceding the grant application.

2. Unless otherwise approved by the NCTCOG, the vessel must have been located and used in Texas over the preceding two years.
3. The vessel must be in operating condition, or, if repairs are needed, it must be shown that the vessel can be repaired to operating condition.

Additional documentation to verify that the vessel would have been used within the bays adjacent to the eligible counties or in the Texas Intracoastal Waterway may be required.

The combined NOx emissions of the engines on the replacement vessel must be certified to be at least 25 percent less than the combined NOx emissions of the engines on the vessel being replaced, based on the emission standard for those engines. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

The replacement vessel should also be intended for use in the same application or vocation (for example, tug, fireboat, pusher) as the vessel being replaced.

The applicant must agree to either destroy or render permanently inoperable the old vessel (including the engine) within 90 days of purchasing the replacement vessel. In lieu of scrapping the old vessel, the NCTCOG may consider on a case-by-case basis, evidence that the vessel will be transferred, sold, or otherwise disposed of outside of Texas, and will not be brought back into Texas. A certification of the disposition of the old vessel must be provided, using forms provided by the NCTCOG.

The grant recipient may be eligible for reimbursement of costs associated with the purchase or lease of the replacement vessel, not to exceed an incentive amount that results in a cost-effectiveness of $5,500 or less per ton of NOx reduced. The NCTCOG may further limit the incentive amounts to a cost-effectiveness lower than $5,500 per ton for particular funding periods, and as needed to best achieve the TERP objectives.

The total incentive amount also must not exceed the cost of the replacement vessel, minus the scrappage value, or, if approved by the NCTCOG, the trade-in or sale value of the old vessel. If the vessel is in need of repairs to bring it into operating condition, the estimated cost of those repairs must also be subtracted from the cost of the replacement vessel, to determine the incremental cost that could be reimbursed.

Not less than 75 percent of the annual use of the marine vessel projected for the five years following the purchase must be projected to take place in the Texas Intracoastal Waterway or in bays adjacent to an eligible county. Annual use will be measured by either hours of operation or fuel consumption.

Repower of Marine Vessels

This category is for the replacement of an existing engine on a marine vessel with a new, rebuilt, or remanufactured engine.

The engine must be certified to emit at least 25 percent less NOx emissions than the engine being replaced, based on the standard for that engine. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

If the engine being installed is rebuilt or remanufactured, the engine must have been certified to emit at least 25 percent less NOx emissions than the standard for the engine being replaced.

Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

Eligible rebuilt or remanufactured engines must use original engine manufacturer (OEM) components only and be purchased from the OEM or its authorized dealers or distributors. The NCTCOG may accept engines provided by other entities not connected with the OEM, subject to a case-by-case determination.

The NCTCOG will reimburse the incremental cost of the purchase and installation of the replacement engine. The incremental cost is the cost to purchase and install the replacement engine and associated equipment, minus the scrappage value, or, if approved by the NCTCOG, the trade-in or sale value of the old engine.

Expenses for in-house labor and travel will not be covered. Costs that may be reimbursed, subject to approval by the NCTCOG, include:

- invoice cost of the new engine, including sales tax and delivery charges;
- invoice cost of additional equipment that must be installed with the new engine;
- associated supplies directly related to the installation of the engine;
- costs to remove and dispose of the old engine;
- installation costs;
- reengineering costs, if the vessel must be modified for the new engine to fit; and
- other costs directly related to the project, subject to approval by the NCTCOG.

The applicant must agree to either destroy or render permanently inoperable the old engine within 90 days of purchasing the replacing the engine. In lieu of scrapping the old engine, the NCTCOG may consider on a case-by-case basis, evidence that the engine will be transferred, sold, or otherwise disposed of outside of Texas, and will not be brought back into Texas. A certification of the disposition of the old vehicle must be provided.

Not less than 75 percent of the annual use of the marine vessel projected for the five years following the repower must be projected to take place in the Texas Intracoastal Waterway and/or in bays adjacent to an eligible county. Annual usage will be measured by either hours of operation or fuel consumption.

Retrofit or Add-On of Emission-Reduction Technology

This category is for the retrofit of an existing engine on a marine vessel, or for adding on devices to the vessel.

To be eligible for funding, the retrofit or add-on systems must be certified or verified to emit at least 25 percent less NOx emissions than engine(s) prior to the retrofit or add-on. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

The NCTCOG will reimburse the incremental cost of the purchase and installation of the retrofit and/or add-on technology. If the engine is to be rebuilt to install the emission-reduction devices, the incremental cost is the difference between the cost of rebuilding the existing engine and the cost of rebuilding the engine to include the retrofit or add-on technology. If the engine does not need to be rebuilt in conjunction with installing the new technology, then the incremental cost will be the full cost of purchasing and installing the technology.

Expenses for in-house labor and travel will not be covered. Costs that may be reimbursed, subject to approval by the NCTCOG, include:

- invoice cost of the retrofit kit or add-on devices, including sales tax and delivery charges;
- associated supplies directly related to the installation of the devices;
- installation costs;
- reengineering costs, if the marine vessel must be modified for the retrofit or add-on devices to be installed and used; and
- other costs directly related to the project, subject to approval by the NCTCOG.

Not less than 75 percent of the annual use of the equipment projected for the five years following the retrofit or add-on installation must be projected to take place in the Texas Intracoastal Waterway or in bays adjacent to an eligible county. Annual use will be measured by either hours of operation or fuel consumption.

Project Criteria

In addition to the eligibility criteria previously presented, the following list of criteria applies to projects involving marine vessels. The NCTCOG may impose additional criteria, and may more narrowly define the criteria established in this guide, under a particular funding round, or by geographic area, as needed to best achieve the goals of the TERP.

- One or more eligible *activities* may be included under one *project* application.

- Marine vessels used primarily for competition or recreational purposes are not eligible for funding.

- Marine vessel activities must provide at least a 25 percent NOx emission reduction compared to baseline NOx emissions. The NOx emissions of engines and retrofit/add-on devices used to achieve the emission reductions must be certified or verified by the EPA, the CARB, or otherwise accepted by the NCTCOG. In situations where the year of manufacture of the marine vessel and the year of manufacture of the existing engine are differentCsuch as a vessel that has already had the engine replaced with a newer engineCthe year of manufacture of the engine must be used to determine the baseline emission standard for emission-reduction calculations. The application of the 25 percent reduction criteria for each type of activity is explained below.

    - **Purchases and leases.** Purchases and leases are allowed based on what year the purchase or lease is completed. At a minimum, the combined NOx emissions of the vessel being purchased or leased must be certified to be at least 25 percent less than the NOx emissions would have been if the engine(s) only met the minimum standard.

    - **Replacements.** The replacement combined certified NOx emissions of the replacement marine vessel must be at least 25 percent less than the combined NOx emissions of the vessel being replaced, based on the emission standards for those engines.

    - **Repowers.** The replacement engine must be certified to emit at least 25 percent

less NOx than the engine being replaced, based on the federal standard for that engine.

- **Retrofits and add-ons.** Emission standards for retrofit and add-on activities are based on the engine being retrofitted. If you want to retrofit or add on a device, the technology must be certified to emit at least 25 percent less NOx than the standard for the engine being retrofitted.

- **Combined technologies.** In instances where two technologies are combined on the same vessel or engine (for example, repower plus retrofit), the NCTCOG may consider the combined reductions from the two technologies in meeting the 25 percent requirements. This decision will be solely at the discretion of the NCTCOG, and will be based on a determination that the combination of the two technologies will result in a permanent reduction in emissions of at least 25 percent.

- The cost-effectiveness of a project, other than a demonstration project, may not exceed $5,500 per ton of NOx emissions reduced in the eligible counties for which the project is proposed. Individual activities included under a single project application may exceed this amount, but the combined project must meet the cost-effectiveness standard.

- Infrastructure activitiesCincluding infrastructure costs that are part of a cost-effectiveness limit of broader repower, retrofit, replacement or add-on projectCare excluded from the $5,500 per ton.

- An activity is not eligible if it is required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. However, this restriction does not apply to an otherwise qualified activityCregardless of the fact that the state implementation plan assumes that the change in equipment, vehicles, or operations will occurCif, on the date the grant is awarded, the change is not required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. This restriction also does not apply to the purchase of vehicles or equipment that is required only by local law or regulation or by corporate or controlling board policy of a public or private entity. Demonstration projects used to demonstrate a technology that may be used to comply with an emissions reduction requirement may be funded, as long as the reductions directly attributable to the demonstration project are not used to comply with those requirements.

- In the areas of the state where Texas Low Emission Diesel (TxLED) must be provided by suppliers beginning April 1, 2005, the baseline and reduced emission rate calculations for diesel engine usage after March 2005 must be adjusted using a correction factor, in addition to any other calculation adjustments.

Figure 7-1. Correction Factor for TxLED

The NCTCOG has adopted rules (30 TAC '114.312 to '114.319) requiring that beginning on April 1, 2005, diesel fuel sold or supplied for use in compression-ignition engines in certain counties in Texas must meet new low emission diesel (TxLED) standards.

The counties affected by the new TxLED requirements currently include all of the

counties eligible for TERP incentive funding, as listed in Chapter 3, except for El Paso County.

The new requirements set a maximum aromatic hydrocarbon content standard of 10 percent by volume per gallon. The requirements also set a minimum cetane number for TxLED of 48.

The TxLED requirements are intended to result in reductions in NOx emissions from diesel engines. Currently, reduction factors of **5.7 percent** (0.057) for on-road use and **7.0 percent** (0.07) for non-road use have been accepted as estimates for use of TxLED. However, this reduction estimate is subject to change, based on the standards accepted by the EPA for use in the Texas State Implementation Plan (SIP). The NCTCOG will identify the appropriate reduction factor to use in the *Technical Supplement* prepared to support these guidelines.

On-road:
TxLED Correction Factor = 1 - (0.057)
Non-road:
TxLED Correction Factor = 1 - (0.070)

- An activity involving a new emission-reduction measure that would otherwise generate marketable credits under state or federal emissions reduction credit averaging, banking, or trading programs is not eligible for funding under this program unless:
    - the activity includes the transfer of the reductions that would otherwise be marketable credits to the state implementation plan or the owner or operator as provided under ' 386.056, Texas Health and Safety Code; and
    - the reductions are permanently retired.
- The incremental cost of the proposed activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.
- For repower activities, eligible rebuilt or remanufactured engines must use original engine manufacturer (OEM) components only, and must be purchased from the OEM or its authorized dealers or distributors. The NCTCOG may accept engines and components provided by other entities not connected with the OEM, subject to a case-by-case determination.
- For activities other than leases, the activity life must be for at least five years. Not less than 75 percent of the annual use of the marine vessel projected for the activity life following the purchase must be projected to take place in the Texas Intracoastal Waterway or in bays adjacent to an eligible county.
- For most marine vessels, annual use must be measured using hours of operation. For vessels with no viable mechanism for measuring the hours of operation, fuel consumption normally should be used as the usage factor.

- Applicants should refer to the *Technical Supplement* to these guidelines for the maximum acceptable activity life established by the NCTCOG for each type of activity.

- Applicants must agree to monitor the use of the grant-funded vehicles, equipment, infrastructure, and fuel, and to report to the NCTCOG for the life of each grant-funded activity.

- Applicants must also agree to notify the NCTCOG of any changes during the life of the following activities: termination of use; change in use, sale, transfer, or accidental or intentional destruction of grant-funded vehicles or equipment; or change in use of the qualifying fuel.

- The NCTCOG may impose additional criteria for certain projects and funding periods, consistent with these guidelines.

NOx Emission Standards

Until recently, the emissions of marine vessels have been unregulated. However, both the International Maritime Organization (IMO) and the EPA have recently adopted standards for regulating marine engine emissions.

International Maritime Organization (IMO) Regulations

The IMO established NOx emission standards in Annex VI to the International Convention for the Prevention of Pollution from Ships in 1997. The standards apply to diesel engines over 130 kilowatt (kW) (174 hp) installed on new vessels (ocean-going ships). The NOx standards range from 9.8 to 17 g/kW-hr, depending on the rated engine speed.

The IMO standards do not become enforceable until ratified by 15 countries that represent at least 50 percent of the gross tonnage of the world's merchant shipping. To date, the standards have not been ratified by the United States and other countries. However, the standards are retroactive to January 1, 2000, if ratified, so engine manufacturers have generally produced IMO-compliant engines since that date.

EPA Standards for Marine Engines

The EPA adopted exhaust emission standards for new marine diesel engines, effective April 29, 2004. These standards apply to the following:

- **Marine diesel engines with per-cylinder displacement at or above 30 liters.** These engines are also known as Category 3 marine diesel engines. They range in size from about 2,500 to 70,000 kilowatts (3,000 to 100,000 hp). These are very large marine diesel engines used for propulsion power on ocean-going vessels such as container ships, oil tankers, bulk carriers, and cruise ships.

- **Marine diesel engines with per-cylinder displacement between 2.5 and 30 liters**. These engines are also known as Category 1 and Category 2 marine diesel engines. They range in size from about 500 to 8,000 kilowatts (700 to 11,000 hp). These engines are used to provide propulsion power on many kinds of vessels,

including tugboats, pushboats, supply vessels, fishing vessels, and other commercial vessels in and round U.S. ports. They are also used as stand-alone generators for auxiliary power on many types of vessels.

For purposes of this program, the EPA standards for marine engines will be used for propulsion engines, where applicable. These standards are included in the *Technical Supplement* to these guidelines. To determine the emission levels for engines manufactured before the EPA standards apply to that engine, the NCTCOG will work with the grant applicant to determine the most appropriate emission level to use for that engine, based on information provided by the manufacturer and from other sources.

For new leases and purchases, where the vessel's NOx emissions must be at least 25 percent less than the current minimum standards, and where the EPA standards do not yet apply to the engines installed on the vessel, the NCTCOG will work with the grant applicant to determine whether the engines meet the requirements for this program.

In most cases, the EPA standards for non-road engines will be used for determining the emissions of auxiliary engines on marine vessels.

For activities involving ocean-going vessels, the NCTCOG will work with the grant applicant to determine the appropriate standards to use, on a case-by-case basis.

Calculating NOx Emission Reductions

In general, the emission-reduction benefit represents the difference in the emission level of a baseline engine and a reduced-emission engine. In situations where the year of manufacture of the marine vessel and the year of manufacture of the current engine are different, the year of the engine must be used to determine the baseline emissions for benefit calculations.

The emission level is calculated by multiplying an emission factor and an activity level.

Because conversion factors and the activity levels may be expressed in different units for the existing and replacement engines, the emission levels for the baseline and reduced-emission engines should be calculated separately, and then differences taken to determine emission reductions.

For most marine applications, the activity level should be established by the annual hours of operation. For engines without an hour meter installed, and no other mechanism to track hours of operation, the activity level should be determined based on annual fuel consumption. Emission-reduction calculations should be consistent with the type of records maintained over the life of each activity.

Calculation of NOx Emission Reductions Using Annual Hours of Operation

Appropriate baseline NOx emission factors are included in the *Technical Supplement* available from the NCTCOG. Use the emission factors associated with engine horsepower and year of manufacture. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate factors are used.

For retrofit and add-on activities, and other activities, where the emission reductions are based on a percentage reduction from the baseline, the certified/verified percentage reduction factor can be applied to the baseline emission factor to determine the reduced NOx emission factor.

Alternatively, for activities where the emissions of the new or replacement engine are certified at a specific emissions level (g/bhp-hr), such as purchases or repowers, that emission level should be used as the emission factor.

Calculation of NOx Emission Reductions Using Annual Fuel Use

If annual fuel consumption is the basis for the emission reductions, an energy consumption factor is used to convert g/bhp-hr to g/gal of fuel used. There are two ways of calculating an engine-specific energy consumption factor:

1. divide the hp of the engine by the fuel economy in units of gal/hr; or
2. divide the density of the fuel by the brake-specific fuel consumption of the engine.

While actual fuel receipts or other documentation may support the annual fuel consumption for a baseline engine, the annual fuel consumption of the new vehicle or engine is an estimated proportion to the change in the energy consumption factor. Check with your equipment dealer to confirm the fuel economy or fuel consumption of the equipment for the type of application.

Otherwise, there are two ways of calculating an engine-specific energy consumption factor:

1. divide the hp of the engine by the fuel economy in units of gal/hr; or
2. divide the density of the fuel by the brake-specific fuel consumption of the engine.

While actual fuel receipts or other documentation may support the annual fuel consumption for a baseline engine, the annual fuel consumption of the new vehicle or engine is an estimated proportion to the change in the energy consumption factor. For example, a reduced-emission engine having an energy consumption factor of 18.5, which replaces a baseline engine that uses 5,000 gallons/year, and that has an energy consumption factor of 17.8, would have an estimated annual fuel consumption of 5,197 gal/yr.

Default fuel consumption rate factors may be included in the *Technical Supplement* to these guidelines. Applicants should consult with the NCTCOG for the appropriate calculations for projects involving non-diesel engines.

Calculating Cost-Effectiveness

Only the amount of incentive funds requested under the program will be used in cost-effectiveness calculations for marine vessels. The incremental costs for each activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

To determine the cost-effectiveness of an activityCwith the exception of qualifying fuel activitiesCthe incentive amount for the activity included in the project must be amortized over the activity life designated by the applicant, with a discount rate of 3 percent.

The following amortization formula yields a *capital recovery factor* (CRF).

capital recovery factor (CRF) = $\mathbf{[(1 + i)^n (i)] / [(1 + i)^n - 1]}$

where, i = discount rate (3 percent)
n = activity life

The discount rate of 3 percent reflects the opportunity cost of public funds. This is the level of earning that reasonably could be expected by investing state funds in various financial instruments, such as U.S. Treasury securities.

The incentive amount should be multiplied by the incremental cost or incentive amount requested to determine the annualized cost.

Incremental Cost x CRF = Annualized Cost

For use in the calculations, capital recovery factors for up to 20 years are presented in Table 7-1.

Table 7-1. Capital Recovery Factors (CRFs) Using a Discount Rate of 0.03

Activity Life	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CRF	1.00	.5226	.3535	.2690	.2184	.1846	.1605	.1425	.1284	.1172
Activity Life	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
CRF	.1081	.1005	.0940	.0885	.0838	.0796	.0760	.0727	.0698	.0672

For projects that include more than one activity, the total project incentive amount must be used to determine the cost-effectiveness of the project. The applicant may request an incentive amount that is less than the full incremental costs, in order to meet the cost-effectiveness criteria.

The cost-effectiveness must be determined by first adding all of the annualized costs for the activities included in the project. The annual emission reductions of each activity should also be added together to determine an annual emission reduction for the project.

The cost-effectiveness of the projects is then determined by dividing the combined annualized costs for all activities included in the project application, by the total annual NOx emission reductions for the combined project activities.

Total Annualized Cost / Total Annual NOx Reductions = Project Cost-Effectiveness

Chapter 8

Locomotives

This chapter contains the project criteria for locomotives. Most of the engines eligible under this program will be powered by diesel-fueled compression-ignition engines. However, engines powered by other fuels may also be eligible, subject to decisions by the NCTCOG for particular funding periods.

The methods for calculating the NOx emission reductions for a locomotive project are also included in this chapter. The emission standards and emission factors applicable to this program are provided in a *Technical Supplement*, which will be made available in conjunction with these guidelines. Examples of the calculations will also be available in the supplement, along with other materials prepared by the NCTCOG. Potential grant applicants should contact the NCTCOG for copies of the supplement and for questions about the emission standards and factors to use.

Eligible Activities and Costs

Locomotives are eligible for grants under this program. The eligible activities and costs under each project category are explained in this section. The NCTCOG may further limit the types of eligible activities, and may more narrowly define eligibility requirements under a particular funding round or by geographic area, as needed to best achieve the goals of the TERP.

Purchase or Lease of Locomotives

This category is for the purchase or lease of new locomotives. For this category, the NCTCOG does not consider whether the applicant is replacing an existing locomotive, and the baseline for comparison of emissions is the current federal NOx emission standard for that locomotive.

To be eligible for funding, the engine on the new locomotive must be certified to emit at least 25 percent less NOx emissions than required under the current federal standard for that engine. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

A *lease* is considered the use and control of a new locomotive in accordance with a lease contract for a period of 12 or more consecutive months. The NCTCOG will reimburse the incremental costs of the lease. The incremental costs are those costs that are above and beyond the costs that would otherwise have been paid for the lease of a baseline locomotive.

A *purchase* is considered buying a new locomotive. The NCTCOG will reimburse the incremental cost of the purchase. The incremental cost is the difference between the documented dealer price of a baseline locomotive or other appropriate baseline cost established by the NCTCOG, and the actual cost of the cleaner locomotive.

For new purchases, not less than 75 percent of the annual use of the locomotive projected for the five years following the purchase must be projected to take place in one or more of the eligible counties. Leases must be for at least one year, and 75 percent of the annual use over the lease period must be projected to take place in one or more of the eligible counties. Annual use will be measured by fuel consumption.

Replacement of Locomotives

This category is for the replacement of a locomotive with a new or newer locomotive. For this category, the applicant must be replacing a locomotive with at least five years of remaining useful life, and the baseline for comparison is the emissions of the locomotive being replaced and the emissions of the locomotive being purchased.

For a replacement project, the NCTCOG will evaluate whether the locomotive being replaced would have otherwise been used in the eligible counties for the period within which the emission reductions will be claimed. Standards that apply include **all** of the following:

1. The owner must have owned the locomotive for a minimum of two years immediately preceding the grant application.
2. Unless otherwise approved by the NCTCOG, the locomotive must have been located and used in Texas over the preceding two years.
3. The locomotive must be in operating condition, or, if repairs are needed, it must be shown that the equipment can be repaired to operating condition.

Additional documentation to verify that the locomotive would have been used within the eligible counties may be required.

The engine on the replacement locomotive must be certified to emit at least 25 percent less NOx than the engine being replaced. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

The replacement locomotive should also be intended for use in the same application or vocation (for example, switcher, long-haul) as the equipment being replaced.

The applicant must agree to either destroy or render permanently inoperable the old locomotive (including the engine) within 90 days of purchasing the replacement locomotive. In lieu of scrapping the old locomotive, the NCTCOG may consider on a case-by-case basis evidence that the locomotive will be transferred, sold, or otherwise disposed of outside of Texas, and will not be brought back into Texas. A certification of the disposition of the old locomotive must be provided, using forms provided by the NCTCOG.

The grant recipient may be eligible for reimbursement of costs associated with the purchase or lease of the replacement locomotive, not to exceed an incentive amount that results in a cost-effectiveness of $5,500 or less per ton of NOx reduced. The NCTCOG may further limit the incentive amounts to a cost-effectiveness lower than $5,500 per ton for particular funding periods, and as needed to best achieve the TERP objectives.

The total incentive amount also must not exceed the cost of the replacement locomotive, minus the scrappage value, or, if approved by the NCTCOG, the trade-in or sale value of the old equipment. If the locomotive is in need of repairs to bring it into operating condition, the estimated cost of those repairs must also be subtracted from the cost of the replacement locomotive, to determine the incremental cost that could be reimbursed.

Not less than 75 percent of the annual use projected for the five years immediately following the purchase of the replacement locomotive must be projected to take place in one or more of the eligible counties. Annual use will be measured by fuel consumption.

Repower of Locomotives

This category is for the replacement of an existing engine on a locomotive with a new, rebuilt, or remanufactured engine.

The engine must be certified to emit at least 25 percent less NOx than the engine being replaced, based on the federal standard for that engine. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

Eligible rebuilt or remanufactured engines must use original engine manufacturer (OEM) components only, and must be purchased from the OEM or its authorized dealers and distributors. The NCTCOG may accept engines provided by other entities not connected with the OEM, subject to a case-by-case determination.

The NCTCOG will reimburse the incremental cost of the purchase and installation of the replacement engine. The incremental cost is the cost to purchase and install the replacement engine and associated equipment, minus the scrappage value, or, if approved by the NCTCOG, the trade-in or sale value of the old engine.

Expenses for in-house labor and travel will not be covered. Costs that may be reimbursed, subject to approval by the NCTCOG, include:

- invoice cost of the new engine, including sales tax and delivery charges;
- invoice cost of additional equipment that must be installed with the new engine;
- associated supplies directly related to the installation of the engine;
- costs to remove and dispose of the old engine;
- installation costs;
- reengineering costs, if the locomotive must be modified for the new engine to fit; and
- other costs directly related to the project, subject to approval by the NCTCOG.

The applicant must agree to either destroy or render permanently inoperable the old engine within 90 days of purchasing the replacing the engine. In lieu of scrapping the old engine, the NCTCOG may consider on a case-by-case basis, evidence that the engine will be transferred, sold, or otherwise disposed of outside of Texas, and will not be brought back into Texas. A certification of the disposition of the old engine must be provided.

Not less than 75 percent of the annual usage of the locomotive projected for the five years following the repower must be projected to take place in one or more of the eligible counties. Annual use must be measured by fuel consumption.

Retrofit or Add-on of Emission-Reduction Technology

This category is for the retrofit of an existing engine on a locomotive, or for adding on devices to the locomotive.

To be eligible for funding, the retrofit or add-on systems must be certified or verified to emit at least 25 percent less NOx than engine prior to the retrofit or add-on. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

The NCTCOG will reimburse the incremental cost of the purchase and installation of the retrofit

and/or add-on technology. If the engine is to be rebuilt to install the emission-reduction devices, the incremental cost is the difference between the cost of rebuilding the existing engine and the cost of rebuilding the engine to include the retrofit or add-on technology. If the engine does not need to be rebuilt in conjunction with installing the new technology, then the incremental cost will be the full cost of purchasing and installing the technology.

Expenses for in-house labor and travel will not be covered. Costs that may be reimbursed, subject to approval by the NCTCOG, include:

- invoice cost of the retrofit kit or add-on devices, including sales tax and delivery charges;
- associated supplies directly related to the installation of the devices;
- installation costs;
- reengineering costs, if the vehicle or equipment must be modified for the retrofit or add-on devices to be installed and used; and
- other costs directly related to the project, subject to approval by the NCTCOG.

Not less than 75 percent of the annual use of the locomotive projected for the five years following the retrofit or add-on installation must be projected to take place in one or more of the eligible counties. Annual use must be measured by fuel consumption.

Project Criteria

In addition to the eligibility criteria previously presented, the following list of criteria applies to projects involving locomotives. The NCTCOG may impose additional criteria, and may more narrowly define the criteria established in this guide, under a particular funding round or by geographic area, as needed to best achieve the objectives of the TERP.

- One or more eligible *activities* may be included under one *project* application.

- Locomotives used primarily for competition or recreational purposes are not eligible for funding.

- An activity must provide a NOx emission reduction compared to baseline NOx emissions. The NOx emissions of locomotives, engines, and retrofit/add-on devices used to achieve the emission reductions must be certified or verified by the EPA, the CARB, or otherwise accepted by the NCTCOG. In situations where the year of manufacture of the locomotive and the year of manufacture of the existing engine are differentCsuch as a locomotive that has already had the engine replaced with a newer engineCthe year of manufacture of the engine must be used to determine the baseline emission standard for emission-reduction calculations. The application of the 25 - percent reduction criteria for each type of activity is explained below.

    - **Purchases and leases.** Purchases and leases are allowed based on what year the purchase or lease is completed. At a minimum, the locomotive and engine being purchased or leased must be certified to emit at least 25 percent less NOx than the current federal NOx emission standard for that locomotive.

    - **Replacements.** The replacement locomotive and engine(s) must have been certified to emit at least 25 percent less NOx than the locomotive being replaced.

- **Repowers.** The replacement engine must be certified to emit at least 25 percent less NOx than the engine being replaced.

- **Retrofits and add-ons.** Emission standards for retrofit and add-on activities are based on the engine being retrofitted. If you want to retrofit or add on a device, the technology must be certified to emit at least 25 percent less NOx than the standard for the engine being retrofitted.

- **Combined technologies.** In instances where two technologies are combined on the same locomotive and/or engine (for example, repower plus retrofit), the NCTCOG may consider the combined reductions from the two technologies in meeting the 25 percent requirements. This decision will be solely at the discretion of the NCTCOG, and will be based on a determination that the combination of the two technologies will result in a permanent reduction in emissions of at least 25 percent.

- The cost-effectiveness of a project, other than a demonstration project, must not exceed $5,500 per ton of NOx emissions reduced in the eligible counties for which the project is proposed. Individual activities included under a single project application may exceed this amount, but the combined project must meet the cost-effectiveness standard.

- Infrastructure activitiesCincluding infrastructure costs that are part of a broader repower, retrofit, replacement, or add-on projectCare excluded from the cost-effectiveness limit of $5,500 per ton.

- An activity is not eligible if it is required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. However, this restriction does not apply to an otherwise qualified activityCregardless of the fact that the state implementation plan assumes that the change in equipment, vehicles, or operations will occurCif, on the date the grant is awarded, the change is not required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. This restriction also does not apply to the purchase of vehicles or equipment that is required only by local law or regulation, or by corporate or controlling board policy of a public or private entity. Demonstration projects used to demonstrate a technology that may be used to comply with an emissions-reduction requirement may be funded, as long as the reductions directly attributable to the demonstration project are not used to comply with those requirements.

- In the areas of the state where Texas Low Emission Diesel (TxLED) must be provided by suppliers beginning April 1, 2005, the baseline and reduced emission rate calculations for diesel engine usage after March 2005 must be adjusted using a correction factor, in addition to any other calculation adjustments.

Figure 8-1. Correction Factor for TxLED

The NCTCOG has adopted rules (30 TAC '114.312 to '114.319) requiring that beginning on April 1, 2005, diesel fuel sold or supplied for use in compression-ignition engines in certain counties in Texas must meet new low emission diesel (TxLED) standards.

The counties affected by the new TxLED requirements currently include all of the counties eligible for TERP incentive funding, as listed in Chapter 3, except for El Paso County.

The new requirements set a maximum aromatic hydrocarbon content standard of 10 percent by volume per gallon. The requirements also set a minimum cetane number for TxLED of 48.

The TxLED requirements are intended to result in reductions in NOx emissions from diesel engines. Currently, reduction factors of **5.7 percent** (0.057) for on-road use and **7.0 percent** (0.07) for non-road use have been accepted as estimates for use of TxLED. However, this reduction estimate is subject to change, based on the standards accepted by the EPA for use in the Texas State Implementation Plan (SIP). The NCTCOG will identify the appropriate reduction factor to use in the *Technical Supplement* prepared to support these guidelines.

On-road:
TxLED Correction Factor = 1 - (0.057)
Non-road:
TxLED Correction Factor = 1 - (0.070)

- An activity involving a new emission-reduction measure that would otherwise generate marketable credits under state or federal emissions-reduction credit averaging, banking, or trading programs is not eligible for funding under this program unless:

    - the activity the activity includes the transfer of the reductions that would otherwise be marketable credits to the State Implementation Plan or the owner or operator, as provided under '386.056, Texas Health and Safety Code; and

    - the reductions are permanently retired.

- The incremental cost of the proposed activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

- For repower activities, eligible rebuilt or remanufactured engines must use original engine manufacturer (OEM) components only, and must be purchased from the OEM or its authorized dealers and distributors. The NCTCOG may accept engines and components provided by other entities not connected with the OEM, subject to a case-by-case determination.

- For activities other than leases, the activity life must be for at least five years. For new purchases, not less than 75 percent of the annual usage of the locomotive projected for the

five years immediately following the award of a grant must be projected to take place in one or more of the eligible counties. Leases must be for at least one year, and 75 percent of the annual use over the lease period must be projected to take place in one or more of the eligible counties.

- Annual use normally should be measured using fuel consumption.
- Applicants should refer to the *Technical Supplement* to these guidelines for the maximum acceptable activity life established by the NCTCOG for each type of activity.
- Applicants must agree to monitor the use of the grant-funded vehicles, equipment, infrastructure, and/or fuel, and to report to the NCTCOG for the life of each grant-funded activity.
- Applicants must also agree to notify the NCTCOG of any changes during the life of the following activities: termination of use, change in use; sale, transfer, or accidental or intentional destruction of grant-funded vehicles or equipment; or change in use of the qualifying fuel.
- The NCTCOG may impose additional criteria for certain projects and funding periods, consistent with these guidelines.

NOx Emission Standards

The EPA adopted emission standards for locomotives in December 1997. The standards took effect in the year 2000. Federal standards apply to locomotives originally manufactured in 1973 and later, and any time they are rebuilt or remanufactured. Not regulated are electric locomotives, historic steam-powered locomotives, and locomotives originally manufactured before.

The baseline NOx emission standards for this program will be the federal standards for NOx emissions applicable to the type of locomotive and year of manufacture or remanufacture. The federal NOx emission standards for locomotives are listed in the *Technical Supplement* to these guidelines. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate baseline standards are used.

Calculating NOx Emission Reductions

In general, the emission-reduction benefit represents the difference in the emission level of a baseline engine and a reduced-emission engine. In situations where the year of manufacture of the locomotive and the year of manufacture of the current engine are different, the year of the engine must be used to determine the baseline emissions for benefit calculations.

The emission level is calculated by multiplying an emission factor, an activity level, and a conversion factor, if necessary. Because conversion factors and the activity levels may be expressed in different units for the existing and replacement engines, the emission levels for the baseline and reduced-emission engines should be calculated separately and then differences taken to determine emission reductions.

For most locomotive applications, the activity level should be based on annual fuel consumption. Emission-reduction calculations should be consistent with the type of records maintained over the life of each activity.

Calculation of NOx Emission Reductions Using Annual Fuel Use

If the annual fuel consumption is used, the activity level should be based on actual annual fuel receipts or other available documentation to estimate the expected annual fuel use of the equipment. An energy consumption factor will also need to be calculated. The energy consumption factor converts the emission factor in terms of g/bhp-hr to g/gal of fuel used. There are two ways of calculating the energy consumption factor:

1. by dividing the hp of the engine by the fuel economy in units of gal/hr; or
2. by dividing the density of the fuel by the brake-specific fuel consumption of the baseline engine.

Check with your equipment dealer to confirm the fuel economy or fuel consumption of the equipment for the type of application.

For most locomotive applications, a default fuel consumption rate factor of 20.8 bhp-hr/gal should be used. The *Technical Supplement* to these guidelines will include the appropriate emission factors, as well as any alternative fuel consumption factors.

Applicants should consult with the NCTCOG for the appropriate calculations for projects involving nondiesel engines.

Calculating Cost-Effectiveness

Only the amount of incentive funds requested under the program can be used in cost-effectiveness calculations for locomotives. The incremental costs for each activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

To determine the cost-effectiveness of an activity, the incentive amount for the activity Cwith the exception of qualifying fuel activitiesCincluded in the project must be amortized over the activity life designated by the applicant, with a discount rate of 3 percent.

The following amortization formula yields a *capital recovery factor* (CRF).

capital recovery factor (CRF) = $\mathbf{[(1 + i)^n (i)] / [(1 + i)^n B 1]}$

where, i = discount rate (3 percent)
n = activity life

The discount rate of 3 percent reflects the opportunity cost of public funds. This is the level of earning that reasonably could be expected by investing state funds in various financial instruments, such as U.S. Treasury securities.

The incentive amount should be multiplied by the incremental cost or incentive amount requested to determine the annualized cost.

Incremental Cost x CRF = Annualized Cost

For use in the calculations, capital recovery factors for up to 20 years are presented in Table 8-1.

Table 8-1. Capital Recovery Factors (CRFs)Using a Discount Rate of 0.03

Activity Life	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CRF	1.00	.5226	.3535	.2690	.2184	.1846	.1605	.1425	.1284	.1172
Activity Life	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
CRF	.1081	.1005	.0940	.0885	.0838	.0796	.0760	.0727	.0698	.0672

For projects that include more than one activity, the total project incentive amount must be used to determine the cost-effectiveness of the project. The applicant may request an incentive amount that is less than the full incremental costs, in order to meet the cost-effectiveness criteria.

The cost-effectiveness must be determined by first adding all of the annualized costs for the activities included in the project. The annual emission reductions of each activity should also be added together to determine an annual emission reduction for the project.

The cost-effectiveness of the projects is then determined by dividing the combined annualized costs for all activities included in the project application, by the total annual NOx emission reductions for the combined project activities.

Total Annualized Costs / Total Annual NOx Reductions = Project Cost-Effectiveness

Chapter 9

Stationary Equipment

This chapter contains the project criteria for stationary equipment powered by a stationary engine.

The methods for calculating the NOx emission reductions for a stationary engine project are also included in this chapter. Most of the calculations will require input of a NOx emission factor applicable to the engine. The emission standards and emission factors applicable to this program are provided in a *Technical Supplement*, which will be made available in conjunction with these guidelines. Examples of the calculations will also be available in the supplement and other materials prepared by the NCTCOG. Potential grant applicants should contact the NCTCOG for copies of the supplement, and for questions about the emission standards and factors to use.

Eligible Activities and Costs

Activities involving stationary engines of at least 25 hp are eligible for grants under this program. For replacement and repower projects, this requirement refers to the horsepower of the engine being replaced and does not apply to the replacement engine or technology.

Note under the AProject Criteria@ section that an activity is not eligible if the activities and/or emission-reductions to be funded are already required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. In addition, any emission reduction credits generated by a project must be transferred to the state for the State Implementation Plan, and permanently retired.

Because of the wide variety of regulatory and permitting requirements that may apply to the emissions from stationary equipment and engines, potential applicants, as well as dealers and suppliers of stationary equipment and engines, should contact the NCTCOG early in the process to determine if a project is eligible for funding. As a general rule, stationary equipment and engines used in agricultural applications are exempt from regulatory and permitting requirements pertaining to emissions. Other stationary equipment may need to be evaluated for eligibility by the NCTCOG on a case-by-case basis. In some cases, where the regulatory or permitting requirements are unclear, the NCTCOG may need to consider a project ineligible until the requirements are fully understood.

The eligible activities and costs under each project category are explained in this section. The NCTCOG may further limit the types of eligible activities, and may more narrowly define eligibility requirements, under a particular funding round or by geographic area, as needed to best achieve the goals of the TERP.

Purchase or Lease of Stationary Equipment

This category is for the purchase or lease of new stationary equipment. For this category, the NCTCOG does not consider whether the applicant is replacing an existing piece of equipment, and the baseline for comparison of emissions is the current NOx emission standard for an

engine of that horsepower.

To be eligible for funding, the engine on the new piece of equipment must be certified to emit at least 25 percent less NOx than required under the current standard for that horsepower of engine. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

A *lease* is considered the use and control of a new piece of equipment in accordance with a lease contract for a period of 12 or more consecutive months. The NCTCOG will reimburse the incremental costs of the lease. The incremental costs are those costs that are above and beyond the costs that would otherwise have been paid for the lease of a baseline vehicle.

A *purchase* is considered buying a new piece of equipment. The NCTCOG will reimburse the incremental cost of the purchase. The incremental cost is the difference between the documented dealer price of a baseline piece of equipment or other appropriate baseline cost established by the NCTCOG and the actual cost of the cleaner equipment.

For new purchases, not less than 75 percent of the annual use of the equipment projected for the five years following the purchase must be projected to take place in one or more of the eligible counties. Leases must be for at least one year, and 75 percent of the annual use over the lease period must be projected to take place in one or more of the eligible counties. Annual use will be measured by either hours of operation or fuel consumption.

Replacement of Stationary Equipment

This category is for the replacement of stationary equipment with a new or newer piece of equipment. For this category, the applicant must be replacing a piece of equipment with at least five years of remaining useful life, and the baseline for comparison of emissions is the difference between the emissions of the equipment being replaced and the equipment being purchased.

For a replacement project, the NCTCOG will evaluate whether the equipment being replaced would otherwise have been used in the eligible counties for the period within which the emission reductions will be claimed. Standards that apply include **all** of the following:

1. The owner must have owned the equipment for a minimum of two years immediately preceding the grant application.
2. Unless otherwise approved by the NCTCOG, the equipment must have been located and used in Texas over the preceding two years.

3. The equipment must be in operating condition, or, if repairs are needed, it must be shown that the equipment can be repaired to operating condition.

Additional documentation to verify that the equipment would have been used within the eligible counties may be required.

The engine on the replacement equipment must be certified to emit at least 25 percent less NOx than the engine being replaced. Certification means approved by the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), or otherwise accepted by the NCTCOG.

The replacement equipment should also be intended for use in the same application or vocation

(for example, well pump, generator) as the equipment being replaced.

The applicant must agree to either destroy or render permanently inoperable the old equipment (including the engine) within 90 days of purchasing the replacement equipment. In lieu of scrapping the old equipment, the NCTCOG may consider on a case-by-case basis evidence that the equipment will be transferred, sold, or otherwise disposed of outside of Texas, and will not be brought back into Texas. A certification of the disposition of the old equipment must be provided, using forms provided by the NCTCOG.

The NCTCOG will reimburse the grant recipient for costs associated with the purchase or lease of the replacement equipment, not to exceed an incentive amount that results in a cost-effectiveness of $5,500 or less per ton of NOx reduced. The NCTCOG may further limit the incentive amounts to a cost-effectiveness lower than $5,500 per ton for particular funding periods and as needed to best achieve the TERP objectives.

The total incentive amount may also not exceed the cost of the replacement equipment, minus the scrappage value, or, if approved by the NCTCOG, the trade-in or sale value of the old equipment. If the equipment is in need of repairs to bring it into operating condition, the estimated cost of those repairs must also be subtracted from the cost of the replacement equipment, to determine the incremental cost that could be reimbursed.

Not less than 75 percent of the annual use projected for the five years immediately following the purchase of the replacement equipment must be projected to take place in one or more of the eligible counties. Annual use will be measured by either hours of operation or fuel consumption.

Repower of Stationary Equipment

This category is for the replacement of an existing engine on a piece of stationary equipment with a new, rebuilt, or remanufactured engine.

The engine must be certified to emit at least 25 percent less NOx than the engine being replaced, based on the federal standard for that engine.Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

Eligible rebuilt or remanufactured engines must use original engine manufacturer (OEM) components only and must be purchased from the OEM or its authorized dealers and distributors. The NCTCOG may accept engines provided by other entities not connected with the OEM, subject to a case-by-case determination.

The NCTCOG will reimburse the incremental cost of the purchase and installation of the replacement engine. The incremental cost is the cost to purchase and install the replacement engine and associated equipment, minus the scrappage value, or, if approved by the NCTCOG, the trade-in or sale value of the old engine.

Expenses for in-house labor and travel will not be covered. Costs that may be reimbursed, subject to approval by the NCTCOG, include:

- invoice cost of the new engine, including sales tax and delivery charges;
- invoice cost of additional equipment that must be installed with the new engine;
- associated supplies directly related to the installation of the engine;
- costs to remove and dispose of the old engine;
- installation costs;

- reengineering costs, if the vehicle or equipment must be modified for the new engine to fit; and
- other costs directly related to the project, subject to approval by the NCTCOG.

The applicant must agree to either destroy or render permanently inoperable the old engine within 90 days of purchasing the replacing the engine. In lieu of scrapping the old engine, the NCTCOG may consider on a case-by-case basis evidence that the engine will be transferred, sold, or otherwise disposed of outside of Texas, and will not be brought back into Texas. A certification of the disposition of the old engine must be provided.

Not less than 75 percent of the annual use of the equipment projected for the five years following the repower must be projected to take place in one or more of the eligible counties. Annual use will be measured by either hours of operation or fuel consumption.

Retrofit or Add-On of Emission-Reduction Technology

This category is for the retrofit of an existing engine on a stationary piece of equipment, or for adding on devices to the equipment.

To be eligible for funding, the retrofit or add-on systems must be certified or verified to emit at least 25 percent less NOx emissions than the engine prior to the retrofit or add-on. Certification means approved by the EPA, the CARB, or otherwise accepted by the NCTCOG.

The NCTCOG will reimburse the incremental cost of the purchase and installation of the retrofit and/or add-on technology. If the engine is to be rebuilt to install the emission- reduction devices, the incremental cost is the difference between the cost of rebuilding the existing engine and the cost of rebuilding the engine to include the retrofit or add-on technology. If the engine does not need to be rebuilt in conjunction with installing the new technology, then the incremental cost will be the full cost of purchasing and installing the technology.

Expenses for in-house labor and travel will not be covered. Costs that may be reimbursed, subject to approval by the NCTCOG, include:

- invoice cost of the retrofit kit or add-on devices, including sales tax and delivery charges;
- associated supplies directly related to the installation of the devices;
- installation costs;
- reengineering costs, if the vehicle or equipment must be modified for the retrofit or add-on devices to be installed and used; and
- other costs directly related to the project, subject to approval by the NCTCOG.

Not less than 75 percent of the annual usage of the equipment projected for the five years following the retrofit or add-on installation must be projected to take place in one or more of the eligible counties. Annual usage will be measured by either hours of operation or fuel consumption.

Project Criteria

In addition to the eligibility criteria previously presented, the following list of criteria applies to projects involving stationary engines. The NCTCOG may impose additional criteria, and may

more narrowly define the criteria established in this guide, under a particular funding period, as needed to best achieve the goals of the TERP.

- One or more eligible *activities* may be included under one *project* application.

- Stationary equipment used primarily for competition or recreational purposes, or used primarily to support those types of activities, are not eligible for funding.

- Stationary equipment activities must provide at least a 25 percent NOx emission reduction compared to baseline NOx emissions. The NOx emissions of equipment, engines, and retrofit/add-on devices used to achieve the emission reductions must be certified or verified by the EPA, the CARB, or otherwise accepted by the NCTCOG. In situations where the year of manufacture of the equipment and the year of manufacture of the existing engine are differentCsuch as equipment that has already had the engine replaced with a newer engineCthe year of manufacture of the engine must be used to determine the baseline emission standard for emission-reduction calculations. The application of the 25-percent reduction criteria for each type of activity is explained as follows.

    - **Purchases and leases.** Purchases and leases are allowed based on what year the purchase or lease is completed. At a minimum, the equipment and engine being purchased or leased must be certified to emit at least 25 percent less NOx than the current standard for that engine.

    - **Replacements.** The replacement equipment and engine must have been certified to emit at least 25 percent less NOx than the standard for the engine installed on the equipment being replaced.

    - **Repowers.** The replacement engine must be certified to emit at least 25 percent less NOx than the engine being replaced, based on the standard for that engine.

    - **Retrofits and add-ons.** Emission standards for retrofit and add-on activities are based on the engine being retrofitted. If you want to retrofit or add on a device, the technology must be certified to emit at least 25 percent less NOx than the standard for the engine being retrofitted.

    - **Combined technologies.** In instances where two technologies are combined on the same equipment and/or engine (for example, repower plus retrofit), the NCTCOG may consider the combined reductions from the two technologies in meeting the 25-percent requirements. This decision will be solely at the discretion of the NCTCOG, and will be based on a determination that the combination of the two technologies will result in a permanent reduction in emissions of at least 25 percent.

- In the areas of the state where Texas Low Emission Diesel (TxLED) must be provided by suppliers, beginning April 1, 2005, the baseline and reduced emission rate calculations for diesel engine use after March 2005 must be adjusted using a correction factor, in addition to any other calculation adjustments.

Figure 9-1. Correction Factor for TxLED

The NCTCOG has adopted rules (30 TAC '114.312 to '114.319) requiring that beginning on April 1, 2005, diesel fuel sold or supplied for use in compression-ignition engines in certain counties in Texas must meet new low emission diesel (TxLED) standards.

The counties affected by the new TxLED requirements currently include all of the counties eligible for TERP incentive funding, as listed in Chapter 3, except for El Paso County.

The new requirements set a maximum aromatic hydrocarbon content standard of 10 percent by volume per gallon. The requirements also set a minimum cetane number for TxLED of 48.

The TxLED requirements are intended to result in reductions in NOx emissions from diesel engines. Currently, reduction factors of **5.7 percent** (0.057) for on-road use and **7.0 percent** (0.07) for non-road use have been accepted as an estimate for use of TxLED. However, this reduction estimate is subject to change, based on the standards accepted by the EPA for use in the Texas State Implementation Plan (SIP). The NCTCOG will identify the appropriate reduction factor to use in the *Technical Supplement* prepared to support these guidelines.

On-road:
TxLED Correction Factor = 1 - (0.057)
Non-road:
TxLED Correction Factor = 1 - (0.070)

- The cost-effectiveness of a project, other than a demonstration project, must not exceed $5,500 per ton of NOx emissions reduced in the eligible counties for which the project is proposed. Individual activities included under a single project application may exceed this amount, but the combined project must meet the cost-effectiveness standard.

- Infrastructure activitiesCincluding infrastructure costs that are part of a broader repower, retrofit, replacement, or add-on projectCare excluded from the cost-effectiveness limit of $5,500 per ton.
-
- An activity is not eligible if it is required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. However, this restriction does not apply to an otherwise qualified activityCregardless of the fact that the state implementation plan assumes that the change in equipment, vehicles, or operations will occurCif, on the date the grant is awarded, the change is not required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. This restriction also does not apply to the purchase of vehicles or equipment that is required only by local law or regulation or by corporate or controlling board policy of a public or private

- entity. Demonstration projects used to demonstrate a technology that may be used to comply with an emissions-reduction requirement may be funded, as long as the reductions directly attributable to the demonstration project are not used to comply with those requirements.

- An activity involving a new emission-reduction measure that would otherwise generate marketable credits under state or federal emissions reduction credit averaging, banking, or trading programs is not eligible for funding under this program unless:

    - the activity includes the transfer of the reductions that would otherwise be marketable credits to the state implementation plan or the owner or operator as provided under ' 386.056, Texas Health and Safety Code; and
    - the reductions are permanently retired.

- The incremental cost of the proposed activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

- For repower activities, eligible rebuilt or remanufactured engines must use original engine manufacturer (OEM) components only, and must be purchased from the OEM or its authorized dealers and distributors. The NCTCOG may accept engines and components provided by other entities not connected with the OEM, subject to a case-by-case determination.

- For activities other than leases, the activity life must be for at least five years. For new purchases, not less than 75 percent of the annual use of the equipment projected for the five years immediately following the award of a grant must be projected to take place in one or more of the eligible counties. Leases must be for at least one year, and 75 percent of the annual use over the lease period must be projected to take place in one or more of the eligible counties. Annual use will be measured by either hours of operation or fuel consumption.

- For most equipment, annual use normally will be measured using hours of operation. For equipment without an hour meter installed, and no viable mechanism for measuring the hours of operation, fuel consumption normally should be used as the usage factor.

- Applicants should refer to the *Technical Supplement* to these guidelines for the maximum acceptable activity life established by the NCTCOG for each type of activity.

- Applicants must agree to monitor the use of the grant-funded vehicles, equipment, infrastructure, and/or fuel, and to report to the NCTCOG for the life of each grant-funded activity.

- Applicants must also agree to notify the NCTCOG of any changes during the life of the following activities: termination of use; change in use, sale, transfer, or accidental or intentional destruction of grant-funded vehicles or equipment; or change in use of the qualifying fuel.

- The NCTCOG may impose additional criteria for certain projects and funding periods, consistent with these guidelines.

NOx Emission Standards

The baseline NOx emission standards for this program normally should be the federal standards for NOx emissions applicable to the type of engine involved. For most agricultural irrigation pump activities, the standards applicable to non-road engines will apply. The federal NOx emission standards for non-road engines are listed in the *Technical Supplement* available from the NCTCOG. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate baseline standards are used.

Calculating NOx Emission Reductions

In general, the emission-reduction benefit represents the difference in the emission level of a baseline engine and a reduced-emission engine. In situations where the year of manufacture of the equipment and the year of manufacture of the current engine are different, the year of the engine must be used to determine the baseline emissions for benefit calculations.

The emission level is calculated by multiplying an emission factor, an activity level, and a conversion factor, if necessary. Because conversion factors and the activity levels may be expressed in different units for the existing and replacement engines, the emission levels for the baseline and reduced-emission engines should be calculated separately, and then differences taken to determine emission reductions.

For most stationary engine applications, the activity level should be established by the annual hours of operation. For equipment without an hour meter installed, and no other mechanism to track hours of operation, the activity level should be determined based on annual fuel consumption. Emission-reduction calculations should be consistent with the type of records maintained over the life of each activity.

Calculation of NOx Emission Reductions Using Annual Hours of Operation

Appropriate baseline NOx emission factors and default load factors are included in the *Technical Supplement* to these guidelines. Use the emission factors associated with engine horsepower and year of manufacture. Use the load factor associated with the type of equipment. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate factors are used.

For retrofit and add-on activities, and other activities, where the emission reductions are based on a percentage reduction from the baseline, the certified or verified percentage reduction factor can be applied to the baseline emission factor to determine the reduced NOx emission factor.

Alternatively, for activities where the emissions of the new or replacement engine are certified at a specific emissions level (g/bhp-hr), such as purchases or repowers, that emission level should be used as the emission factor.

Calculation of NOx Emission Reductions Using Annual Fuel Use

If the annual fuel consumption is used, the activity level should be based on actual annual fuel receipts or other available documentation to estimate the expected annual fuel use of the equipment. An energy consumption factor must also be calculated. The energy consumption factor converts the emission factor in terms of g/bhp-hr to g/gal of fuel used. There are two ways of calculating the energy consumption factor:

1. by dividing the hp of the engine by the fuel economy in units of gal/hr; or
2. by dividing the density of the fuel by the brake-specific fuel consumption of the baseline engine.

Check with your equipment dealer to confirm the fuel economy or fuel consumption of the equipment for the type of application.

Default fuel consumption rate factors may be included in the *Technical Supplement* to these guidelines.

The calculation of NOx emission reductions using annual fuel use is outlined in Table 9-2. Applicants should consult with the NCTCOG for the appropriate calculations for projects involving nondiesel engines.

Calculating Cost-Effectiveness

Only the amount of incentive funds requested under the program will be used in cost-effectiveness calculations.

The incremental costs for each activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

To determine the cost-effectiveness of an activityCwith the exception of qualifying fuel activitiesCthe incentive amount for the activity included in the project must be amortized over the activity life designated by the applicant, with a discount rate of 3 percent.

The following amortization formula yields a *capital recovery factor* (CRF).

capital recovery factor (CRF) = $\mathbf{[(1 + i)^n (i)] / [(1 + i)^n - 1]}$

where, i = discount rate (3 percent)
n = activity life

The discount rate of 3 percent reflects the opportunity cost of public funds. This is the level of earning that reasonably could be expected by investing state funds in various financial instruments, such as U.S. Treasury securities.

The incentive amount should be multiplied by the incremental cost or incentive amount requested to determine the annualized cost.

Incremental Cost x CRF = Annualized Cost

Capital recovery factors for up to 20 years are presented in Table 9-1, for use in the calculations.

Table 9-1. Capital Recovery Factors (CRFs) Using a Discount Rate of 0.03

Activity Life	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CRF	1.00	.5226	.3535	.2690	.2184	.1846	.1605	.1425	.1284	.1172
Activity Life	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
CRF	.1081	.1005	.0940	.0885	.0838	.0796	.0760	.0727	.0698	.0672

For projects that include more than one activity, the total project incentive amount will be used to determine the cost-effectiveness of the project. The applicant may request an incentive amount that is less than the full incremental costs, in order to meet the cost-effectiveness criteria.

The cost-effectiveness will be determined by first adding all of the annualized costs for the activities included in the project. The annual emission reductions of each activity should also be added together to determine an annual emission reduction for the project.

The cost-effectiveness of the projects is then determined by dividing the combined annualized costs for all activities included in the project application, by the total annual NOx emission reductions for the combined project activities.

Total Annualized Costs / Total Annual NOx Reductions = Project Cost-Effectiveness

Chapter 10

Refueling Infrastructure

This chapter contains the project criteria for refueling infrastructure, that provides qualifying fuel. The emission reductions should be estimated using the applicant's information on the type of vehicles and equipment using the fuel. The emission reduction for the activity will be the difference in the emission level in tons of NOx expected to be produced by baseline vehicles and equipment, and the emission level in tons of NOx expected to be produced through the use of the qualifying fuel by the vehicles and equipment, within the eligible counties.

The emission standards and emission factors applicable to this program are provided in a *Technical Supplement*, which will be made available in conjunction with these guidelines. Potential grant applicants should contact the NCTCOG for copies of the supplement and for questions about the emission standards and factors to use.

Eligible Activities and Costs

An eligible activity may include the purchase and installation of stationary or mobile on-site infrastructure for refueling motor vehicles, on-road heavy-duty vehicles, and non-road equipment with a qualifying liquid or gaseous fuel. In some cases, the NCTCOG may accept applications for refueling infrastructure related to stationary equipment. The applicant will need to provide information to show that the infrastructure is needed and will be used in an eligible county.

The NCTCOG may further limit the types of eligible activities, and may more narrowly define eligibility requirements, under a particular funding round or by geographic area, as needed to best achieve the objectives of the TERP.

The grant recipient may be eligible for reimbursement of the cost of the purchase and installation of the infrastructure. However, expenses for in-house labor, travel, and land purchases will not be covered. Costs that may be reimbursed by the NCTCOG include:

- invoice cost of the infrastructure equipment, including sales tax and delivery charges;
- associated supplies directly related to the installation of the infrastructure;
- installation costs;
- design and engineering work directly necessary for the installation of the infrastructure; and
- reengineering and construction costs, if the existing site must be modified to allow for installation of the infrastructure.

Project Criteria

In addition to the eligibility criteria previously presented, the following list of criteria applies to projects involving non-road equipment activities. The NCTCOG may impose additional criteria, and may more narrowly define the criteria established in the guide, under a particular funding round or by geographic area, as needed to best achieve the objectives of the TERP.

- One or more eligible *activities* may be included under one *project* application.

- Infrastructure for fueling vehicles and equipment used primarily for competition or recreational purposes is not eligible for funding.

- The infrastructure project must result in new, surplus emission reductions that will then be available to the NCTCOG for use in the State Implementation Plan (SIP). In general, the NCTCOG will not accept as a new emission reduction, the conversion of a vehicle or equipment fleet that occurred earlier than 12 months before the grant application deadline.

- An activity is not eligible if it is required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. However, this restriction does not apply to an otherwise qualified activityCregardless of the fact that the State Implementation Plan assumes that the change in equipment, vehicles, or operations will occurCif, on the date the grant is awarded, the change is not required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. This restriction also does not apply to the purchase of vehicles or equipment that is required only by local law or regulation, or by corporate or controlling board policy of a public or private entity. Demonstration projects used to demonstrate a technology that may be used to comply with an emission-reduction requirement may be funded, as long as the reductions directly attributable to the demonstration project are not used to comply with those requirements.

- An activity involving a new emission-reduction measure that would otherwise generate marketable credits under state or federal emissions reduction credit averaging, banking, or trading programs is not eligible for funding under this program unless:

    - the activity includes the transfer of the reductions that would otherwise be marketable credits to the state implementation plan or the owner or operator as provided under '386.056, Texas Health and Safety Code; and
    - the reductions are permanently retired.

- The incremental cost of the proposed activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

- In the areas of the state where Texas Low Emission Diesel (TxLED) must be provided by suppliers, beginning April 1, 2005, the baseline and reduced emission rate calculations for diesel engine use after March 2005 must be adjusted using a correction factor, in addition to any other calculation adjustments.

Figure 10-1. Correction Factor for TxLED

The NCTCOG has adopted rules (30 TAC '114.312 to '114.319) requiring that beginning on April 1, 2005, diesel fuel sold or supplied for use in compression-ignition engines in certain counties in Texas must meet new low emission diesel (TxLED) standards.

The counties affected by the new TxLED requirements currently include all of the counties eligible for TERP incentive funding, as listed in Chapter 3, except for El Paso County.

The new requirements set a maximum aromatic hydrocarbon content standard of 10 percent by volume per gallon. The requirements also set a minimum cetane number for TxLED of 48.

The TxLED requirements are intended to result in reductions in NOx emissions from diesel engines. Currently, reduction factors of **5.7 percent** (0.057) for on-road use and **7.0 percent** (0.07) for non-road use have been accepted as estimates for use of TxLED. However, this reduction estimate is subject to change, based on the standards accepted by the EPA for use in the Texas State Implementation Plan (SIP). The NCTCOG will identify the appropriate reduction factor to use in the *Technical Supplement* prepared to support these guidelines.

On-road:
TxLED Correction Factor = 1 - (0.057)
Non-road:
TxLED Correction Factor = 1 - (0.070)
If the new equipment is powered by a nondiesel engine, the calculation of the emission factor for the new equipment would not be reduced by the TxLED Correction Factor.

- Infrastructure activities including infrastructure costs that are part of a broader repower, retrofit, replacement, or add-on projectCare excluded from the cost-effectiveness limit of $5,500 per ton.

- For infrastructure activities, the activity life must be for at least five years. Not less than 75 percent of the annual usage of the qualifying fuel dispensed from the infrastructure projected for the five years immediately following the award of a grant must be projected to take place in one or more of the eligible counties. For infrastructure activities to provide fuel for marine vessels, not less than 75 percent of the annual usage of the qualifying fuel dispensed from the infrastructure projected for the five years immediately following the award of the grant must be projected to take place in bays adjacent to one or more of the eligible counties, or in the Texas Intracoastal Waterway.

- Annual usage normally should be measured using fuel consumption by the vehicles or equipment being provided the fuel from the infrastructure. Therefore, a grant recipient must have a viable mechanism for tracking and reporting on the use of the fuel dispensed from the infrastructure.

- The NCTCOG will determine an acceptable activity life for infrastructure activities on a case-by-case basis.

- Applicants must agree to monitor the use of the grant-funded vehicles, equipment, infrastructure, and/or fuel, and to report to the NCTCOG for the life of each grant-funded activity. If the grant recipient does not own or operate the vehicles or equipment to be provided fuel from the infrastructure, the grant recipient will need to explain what mechanism will be used to ensure that the vehicles and equipment are operated within the eligible counties for the time period required as a condition of the grant.

- Applicants must also agree to notify the NCTCOG of any changes during the life of the following activities: termination of use; change in use, sale, transfer, or accidental or intentional destruction of grant-funded vehicles, equipment, or infrastructure; or change in use of the qualifying fuel.

- The NCTCOG may impose additional criteria for certain projects and funding periods, consistent with these guidelines.

NOx Emission Standards

The baseline NOx emission standards for this program normally should be the federal standards for NOx emissions applicable to the engines being provided the fuel from the infrastructure. The federal NOx emission standards for various categories of engines are listed in the *Technical Supplement* available from the NCTCOG. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate baseline standards are used.

Calculating NOx Emission Reductions

In general, the emission-reduction benefit represents the difference in the emission level of a baseline engine and a reduced-emission engine. For refueling infrastructure activities, the NOx emission reductions should be calculated based on information regarding the type of vehicles and equipment using the fuel.

In most cases, the annual usage factor for calculating the emission reductions from a refueling infrastructure activity should be based on fuel consumption. Grant applicants should refer to Chapter 13, related to qualifying fuel projects, for guidance on how the emission reductions will be calculated for a refueling infrastructure activity. The NCTCOG may consider alternative approaches on a case-by-case basis.

Calculating Cost-Effectiveness

Only the amount of incentive funds requested under the program will be used in cost-effectiveness calculations. The incremental costs for each activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

To determine the cost-effectiveness of an activityCwith the exception of qualifying fuel activitiesCthe incentive amount for the activity included in the project must be amortized over the activity life designated by the applicant, with a discount rate of 3 percent.

The following amortization formula yields a *capital recovery factor* (CRF).

capital recovery factor (CRF) = $\mathbf{[(1 + i)^n (i)] / [(1 + i)^n - 1]}$

where, i = discount rate (3 percent)
n = activity life

The discount rate of 3 percent reflects the opportunity cost of public funds. This is the level of earning that reasonably could be expected by investing state funds in various financial instruments, such as U.S. Treasury securities.

The incentive amount must be multiplied by the incremental cost or incentive amount requested to determine the annualized cost.

Incremental Cost x CRF = Annualized Cost

Capital recovery factors for up to 20 years are presented in Table 10-1, for use in the calculations.

Table 10-2. Capital Recovery Factors (CRFs) Using a Discount Rate of 0.03

Activity Life	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CRF	1.00	.5226	.3535	.2690	.2184	.1846	.1605	.1425	.1284	.1172
Activity Life	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
CRF	.1081	.1005	.0940	.0885	.0838	.0796	.0760	.0727	.0698	.0672

For projects that include more than one activity, the total project incentive amount will be used to determine the cost-effectiveness of the project. The applicant may request an incentive amount that is less than the full incremental costs, in order to meet the cost-effectiveness criteria.

The cost-effectiveness should be determined by first adding all of the annualized costs for the activities included in the project. The annual emission reductions of each activity should also be added together to determine an annual emission reduction for the project.

The cost-effectiveness of the projects is then determined by dividing the combined annualized costs for all activities included in the project application, by the total annual NOx emission reductions for the combined project activities.

Total Annualized Costs / Total Annual NOx Reductions = Project Cost-Effectiveness

Chapter 11

On-Site Electrification and Idle Reduction Infrastructure

This chapter contains the project criteria for on-site electrification and idle reduction infrastructure. The emission reductions should be estimated using the applicant's information on the type of vehicles and equipment being provided the electricity or serviced by the idle reduction infrastructure. The emission reduction for the activity will be the difference in the emission level in tons of NOx expected to be produced by baseline vehicles and equipment, and the emission level in tons of NOx expected to be produced through the electrification or reduction in idling of the vehicles and equipment, within the eligible counties.

The emission standards and emission factors applicable to this program are provided in a *Technical Supplement*, which will be made available in conjunction with these guidelines. Potential grant applicants should contact the NCTCOG for copies of the supplement and for questions about the emission standards and factors to use.

Eligible Activities and Costs

An eligible activity may include the purchase and installation of on-site infrastructureC including auxiliary power unitsCdesigned to dispense electricity to motor vehicles, on-road heavy-duty vehicles, and non-road equipment. The electricity may be provided to replace the power normally supplied by the engine while the vehicle or equipment is parked (idle reduction), or to recharge electric vehicles or equipment being used in lieu of vehicles or equipment powered by an internal combustion engine. The applicant will need to provide information to show that the infrastructure is needed and will be used in an eligible county.

Subject to approval of the NCTCOG, the on-site infrastructure may also include other services, in addition to providing electricity, as part of an idle reduction program. These other services may include air conditioning and heating, phone and cable TV access, and other Ahotel@ services directly related to reducing vehicle idling.

In some cases, the NCTCOG may also accept applications for infrastructure related to electrification of stationary equipment, in lieu of equipment powered by an internal combustion engine.

Note that in the Houston-Galveston Nonattainment Area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties), idling operation of on-road vehicles is limited by state regulations. Accordingly, the project emission reductions used to determine the cost-effectiveness for infrastructure activities in the Houston-Galveston Area may not include the replacement of idling hours of operation for on-road vehicles. Non-road equipment and other eligible uses of the electricity by on-road vehicles are not covered by this restriction.

The NCTCOG may further limit the types of eligible activities, and may more narrowly define eligibility requirements, under a particular funding round or by geographic area, as needed to best achieve the objectives of the TERP.

The grant recipient may be eligible for reimbursement of the cost of the purchase and installation of the infrastructure. However, expenses for in-house labor, travel, or land purchases will be not be covered. Cost that may be reimbursed by the NCTCOG include:

- invoice cost of the infrastructure equipment, including sales tax and delivery charges;
- associated supplies directly related to the installation of the infrastructure;
- installation costs;
- design and engineering work directly necessary for the installation of the infrastructure;
- reengineering and construction costs, if the existing site must be modified to allow for installation of the infrastructure; and
- other costs directly related to the project, subject to approval of the NCTCOG.

Project Criteria

In addition to the eligibility criteria previously presented, the following list of criteria applies to projects involving electrification infrastructure. The NCTCOG may impose additional criteria, and may more narrowly define the criteria established in this guide, under a particular funding round or by geographic area, as needed to best achieve the objectives of the TERP.

- One or more eligible *activities* may be included under one *project* application.

- Infrastructure used to service vehicles and equipment used primarily for competition or recreational purposes is not eligible for funding.

- The infrastructure project must result in new, surplus emission reductions that will then be available to the NCTCOG for use in the State Implementation Plan (SIP). In general, the NCTCOG will not accept as a new emission reduction, the conversion of a vehicle or equipment fleet that occurred earlier than 12 months prior to the grant application deadline.

- In the areas of the state where Texas Low Emission Diesel (TxLED) must be provided by suppliers, beginning April 1, 2005, the baseline and reduced emission rate calculations for diesel engine usage after March 2005 must be adjusted using a correction factor, in addition to any other calculation adjustments.

Figure 11-1. Correction Factor for TxLED

The NCTCOG has adopted rules (30 TAC '114.312 to '114.319) requiring that beginning on April 1, 2005, diesel fuel sold or supplied for use in compression-ignition engines in certain counties in Texas must meet new low emission diesel (TxLED) standards.

The counties affected by the new TxLED requirements currently include all of the counties eligible for TERP incentive funding, as listed in Chapter 3, except for El Paso County.

The new requirements set a maximum aromatic hydrocarbon content standard of 10 percent by volume per gallon. The requirements also set a minimum cetane number for TxLED of 48.

The TxLED requirements are intended to result in reductions in NOx emissions from diesel engines. Currently, reduction factors of **5.7 percent** (0.057) for on-road use and **7.0 percent** (0.07) for non-road use have been accepted as estimates for use of TxLED. However, this reduction estimate is subject to change, based on the standards accepted by the EPA for use in the Texas State Implementation Plan (SIP). The NCTCOG will identify the appropriate reduction factor to use in the *Technical Supplement* prepared to support these guidelines.

On-road:
TxLED Correction Factor = 1 - (0.057)
Non-road:
TxLED Correction Factor = 1 - (0.070)

- Infrastructure activitiesCincluding infrastructure costs that are part of a broader repower, retrofit, replacement, or add-on projectCare excluded from the cost-effectiveness of $5,500 per ton.

- An activity is not eligible if it is required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. However, this restriction does not apply to an otherwise qualified activityCregardless of the fact that the State Implementation Plan assumes that the change in equipment, vehicles, or operations will occurCif, on the date the grant is awarded, the change is not required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. This restriction also does not apply to the purchase of vehicles or equipment that is required only by local law or regulation, or by corporate or controlling board policy of a public or private entity. Demonstration projects used to demonstrate a technology that may be used to comply with an emission-reduction requirement may be funded, as long as the reductions directly attributable to the demonstration project are not used to comply with those requirements.
- An activity involving a new emission-reduction measure that would otherwise generate marketable credits under state or federal emission-reduction credit averaging, banking, or trading programs is not eligible for funding under this program unless:

    - the activity includes the transfer of the reductions that would otherwise be marketable credits to the state implementation plan or the owner or operator as provided under ' 386.056, Texas Health and Safety Code; and
    - the reductions are permanently retired.

- The incremental cost of the proposed activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

- For infrastructure activities, the activity life must be for at least five years. Not less than 75 percent of the annual use of the electricity dispensed from the infrastructureC or the idling operation reduced, projected for the five years immediately following the award of a

grantCmust be projected to take place in one or more of the eligible counties. For infrastructure activities involving marine vessels, not less than 75 percent of the annual use of the electricity dispensed from the infrastructure projected for the five years immediately following the award of the grant must be projected to take place in bays adjacent to one or more of the eligible counties, or in the Texas Intracoastal Waterway.

- Annual use will normally should be measured using hours of operation by the vehicles or equipment being provided the electricity from the infrastructure. Therefore, a grant recipient must have a viable mechanism for tracking and reporting on the use of the vehicles or equipment provided electricity from the infrastructure.

- The NCTCOG will determine an acceptable activity life for infrastructure activities on a case-by-case basis.

- Applicants must agree to monitor the use of the grant-funded vehicles, equipment, infrastructure, and/or fuel, and to report to the NCTCOG for the life of each grant-funded activity. If the grant recipient does not own or operate the vehicles or equipment to be provided electricity from the infrastructure, the grant recipient will need to explain what mechanism will be used to ensure that the vehicles and equipment are operated within the eligible counties for the time period required as a condition of the grant.

- Applicants must also agree to notify the NCTCOG of any changes during the life of the following activities: termination of use; change in use, sale, transfer, or accidental or intentional destruction of grant-funded vehicles, equipment, or infrastructure; or change in use of the qualifying fuel.

- The NCTCOG may impose additional criteria for certain projects and funding periods, consistent with these guidelines.

NOx Emission Standards

The baseline NOx emission standards for this program normally should be the federal standards for NOx emissions applicable to the engines being provided the electricity from the infrastructure. The federal NOx emission standards for various categories of engines are listed in the *Technical Supplement* available from the NCTCOG. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate baseline standards are used.

Calculating NOx Emission Reductions

In general, the emission-reduction benefit represents the difference in the emission level of a baseline engine and a reduced-emission engine. For electrification infrastructure activities, the NOx emission reductions should be calculated based on information regarding the type of vehicles and equipment using the electricity.

Electrification of Vehicles and Equipment

Electrification infrastructure may be purchased to support the purchase of new electric vehicles or equipment, in lieu of vehicles or equipment powered by internal combustion engines.

Infrastructure may also be purchased to support the electrification of existing vehicles or equipment.

The NOx emission reductions should be calculated based on the difference between the baseline emissions and the emissions from the electric-powered engine. In most cases, electric engines will be considered zero-emission sources.

Grant applicants should refer to the chapter of these guidelines pertaining to the type of vehicle or equipment being purchased, repowered, or retrofitted, for information on the methodology that should be used to determine the NOx emission reductions attributable to the use of the electric-powered engines, in lieu of an internal combustion engine. The applicable emission factors for use in the calculations will be provided in the *Technical Supplement* to these guidelines. Activities for which appropriate emission factors are not provided should be discussed with the NCTCOG.

The usage factor for electrification of on-road vehicles normally should be miles of operation, while the usage factor for non-road and stationary equipment normally should be hours of operation.

Normally, the NOx emissions that may be attributable to the generation of the electricity should not be considered in determining the NOx emission reductions, if the electricity is provided through the central power grid or other central power supply.

However, if the electricity will be provided by a local generating source, any NOx emissions from the generating source may need to be included in the calculations. As part of the grant application, the grant applicant will need to explain the source of the electricity to be provided.

Note that, if the vehicle or equipment purchases or conversions are included in the grant application as part of a combined project, the NOx emission reductions attributable to the overall project will only be counted once, in conjunction with the purchase or conversion activities.

Alternatively, if the purchases or conversions are to be funded from another source, the NOx emission reductions attributable to the electrification of the vehicles or equipment should be used to determine the NOx emission reductions for the infrastructure project. The grant recipient must ensure that the NOx emission reductions are surplus and available to apply to this program, and are not already being claimed by the other funding program or for another purpose.

Idle Reduction

On-site electrification of truck stops, rest stops, and other areas may also be funded under this program, in support of idle reduction programs to reduce NOx emissions in the eligible counties. The NOx emission reductions will be calculated based on the reduction in idling NOx emissions for the engine.

In general, the emission-reduction benefit represents the NOx emissions that would have normally been generated by the engine at idle. The idling emission level is calculated by multiplying an emission factor, an activity level, and a conversion factor, if necessary.

For most applications, the idling activity level should be established by the annual hours of idle

operation. The calculation of emissions and emission reductions using annual hours of operation as the usage factor is determined by the steps shown in Table 11-1.

Table 11-1

Step 1. Calculate the NOx Idling Emission Reduction Using Annual Hours of Operation

NOx idling emission factor (g/hr)	
x TxLED correction factor *(diesel engines only)*	
= grams per hour (g/hr)	
x annual hours of idling reduced (within the eligible county)	
= grams per year reduced (g/year)	
divide by 907,200 grams per ton	/ 907,200
= estimated annual NOx emissions reduction (tons/yr)	
x activity life (years)	
= estimated activity life NOx emissions reduction (tons)	

Appropriate baseline NOx idling emission factors are included in the *Technical Supplement* to these guidelines. Use the emission factors most closely associated with the vehicle or engine. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate factors are used.

Normally, the NOx emissions that may be attributable to the generation of the electricity should not be considered in determining the NOx emission reductions, if the electricity is provided through the central power grid or other central power supply. However, if the electricity will be provided by a local generating source, any NOx emissions from the generating source may need to be included in the calculations. As part of the grant application, the grant applicant will need to explain the source of the electricity to be provided.

Note that if the vehicle or equipment purchases or conversions are included in the grant application as part of a combined project, the NOx emission reductions attributable to the overall project should only be counted once, in conjunction with the purchase or conversion activities.

Alternatively, if the purchases or conversions are to be funded from another source, the NOx emission reductions attributable to the electrification of the vehicles or equipment should be used to determine the NOx emission reductions for the infrastructure project. The grant recipient must ensure that the NOx emission reductions are surplus and available to apply to this program, and are not already being claimed by the other funding program or for another purpose.

Calculating Cost-Effectiveness

Only the amount of incentive funds requested under the program should be used in cost-effectiveness calculations. The incremental costs for each activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

To determine the cost-effectiveness of an activityCwith the exception of qualifying fuel activitiesCthe incentive amount for the activity included in the project must be amortized over the activity life designated by the applicant, with a discount rate of 3 percent.

The following amortization formula yields a *capital recovery factor* (CRF).

capital recovery factor (CRF) = $\mathbf{[(1 + i)^n (i)] / [(1 + i)^n - 1]}$

where, i = discount rate (3 percent)
n = activity life

The discount rate of 3 percent reflects the opportunity cost of public funds. This is the level of earning that reasonably could be expected by investing state funds in various financial instruments, such as U.S. Treasury securities.

The incentive amount should be multiplied by the incremental cost or incentive amount requested to determine the annualized cost.

Incremental Cost x CRF = Annualized Cost

The cost-effectiveness calculations are presented in Table 11-2 that follows. Capital Recovery Factors for up to 20 years are presented in Table 11-3, for use in the calculations.

Table 11-2. Calculating Cost-Effectiveness

Step 1. Determine the Capital Recovery Factor (CRF)	
$CRF = [(1+i)^n (i)] / [(1+i)^n - 1]$ i = discount rate (.03); n = activity life	
Capital Recovery Factor:	
Step 2. Determine the annualized cost	
Incentive amount x CRF = Annualized cost	
Annualized cost ($/year):	
Step 3. Determine cost-effectiveness	
Annualized cost ($/year) / Annual NOx emissions reduction (tons/year) = Cost-effectiveness ($/ton)	
Cost-effectiveness ($/ton):	$

Table 11-3. Capital Recovery Factors (CRFs)Using a Discount Rate of 0.03

Activity Life	1	2	3	4	5	6	7	8	9	10
CRF	1.00	.5226	.3535	.2690	.2184	.1846	.1605	.1425	.1284	.1172
Activity Life	11	12	13	14	15	16	17	18	19	20
CRF	.1081	.1005	.0940	.0885	.0838	.0796	.0760	.0727	.0698	.0672

For projects that include more than one activity, the total project incentive amount should be used to determine the cost-effectiveness of the project. The applicant may request an incentive amount that is less than the full incremental costs, in order to meet the cost-effectiveness criteria.

The cost-effectiveness should be determined by first adding all of the annualized costs for the activities included in the project. The annual emission reductions of each activity should also be added together to determine an annual emission reduction for the project.

The cost-effectiveness of the projects is then determined by dividing the combined annualized costs for all activities included in the project application, by the total annual NOx emission reductions for the combined project activities.

Total Annualized Costs / Total Annual NOx Reductions = Project Cost-Effectiveness

Chapter 12

On-Vehicle Electrification and Idle Reduction Infrastructure

This chapter contains the project criteria for on-vehicle electrification and idle reduction infrastructure. The emission reductions should be estimated using the applicant's information on the type of vehicles or equipment on which the infrastructure is being installed. The emission reduction for the activity will be the reduction in the idling emission level in tons of NOx expected to be produced by baseline vehicles, within the eligible counties.

The emission standards and emission factors applicable to this program are provided in a *Technical Supplement*, which will be made available in conjunction with these guidelines. Potential grant applicants should contact the NCTCOG for copies of the supplement and for questions about the emission standards and factors to use.

Eligible Activities and Costs

An eligible activity may include the purchase and installation of equipment that enables a vehicle or equipment to use electric power to operate while the vehicle or equipment is parked, the systems normally supplied power by the propulsion engine, or another on-board internal combustion engine that emits NOx.

Eligible equipment may include: (1) the add-on of devices to enable acceptance of electricity from an external power source, or (2) the purchase and installation on the vehicle or equipment of an auxiliary power unit (APU) to generate electricity.

The NCTCOG may also accept, on a case-by-case basis, idle-limiting devices for locomotives, as well as other types of idle reduction devices.

Note that in the Houston-Galveston Nonattainment Area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties), idling operation of on-road vehicles is limited by state regulations. Accordingly, the project emission reductions used to determine the cost-effectiveness for infrastructure activities in the Houston-Galveston Area may not include the replacement of idling hours of operation for on-road vehicles. Non-road equipment and other eligible uses of the electricity by on-road vehicles are not covered by this restriction.

The NCTCOG may further limit the types of eligible activities, and may more narrowly define eligibility requirements, under a particular funding round or by geographic area, as needed to best achieve the objectives of the TERP.

The grant recipient may be eligible for reimbursement of the cost of the purchase and installation of the infrastructure. However, expenses for in-house labor, travel, or land purchases will be not be covered. Costs that may be reimbursed by the NCTCOG include:

- invoice cost of the infrastructure equipment, including sales tax and delivery charges;
- associated supplies directly related to the installation of the infrastructure;
- installation costs;
- reengineering costs, if the vehicle or equipment must be modified to allow for installation of the

infrastructure; and
- other costs directly related to the project, subject to approval of the NCTCOG.

Project Criteria

In addition to the eligibility criteria previously presented, the criteria listed below apply to projects involving electrification infrastructure. The NCTCOG may impose additional criteria, and may more narrowly define the criteria established in the guide, under a particular funding round or by geographic area, as needed to best achieve the objectives of the TERP.

- One or more eligible *activities* may be included under one *project* application.

- Infrastructure used to service vehicles and equipment used primarily for competition or recreational purposes is not eligible for funding.

- Infrastructure activitiesCincluding infrastructure costs that are part of a broader repower, retrofit, replacement, or add-on projectCare excluded from the cost-effectiveness limit of $5,500 per ton.

- An activity is not eligible if it is required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. However, this restriction does not apply to an otherwise qualified activityCregardless of the fact that the state implementation plan assumes that the change in equipment, vehicles, or operations will occurCif, on the date the grant is awarded ,the change is not required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. This restriction also does not apply to the purchase of vehicles or equipment that is required only by local law or regulation, or by corporate or controlling board policy of a public or private entity. Demonstration projects used to demonstrate a technology that may be used to comply with an emissions reduction requirement may be funded, as long as the reductions directly attributable to the demonstration project are not used to comply with those requirements.

- In the areas of the state where Texas Low Emission Diesel (TxLED) must be provided by suppliers, beginning April 1, 2005, the baseline and reduced emission rate calculations for diesel engine use after March 2005 must be adjusted using a correction factor, in addition to any other calculation adjustments.

Figure 12-1. Correction Factor for TxLED

The NCTCOG has adopted rules (30 TAC '114.312 to '114.319) requiring that beginning on April 1, 2005, diesel fuel sold or supplied for use in compression-ignition engines in certain counties in Texas must meet new low emission diesel (TxLED) standards.

The counties affected by the new TxLED requirements currently include all of the counties eligible for TERP incentive funding, as listed in Chapter 3, except for El Paso County.

The new requirements set a maximum aromatic hydrocarbon content standard of 10 percent by volume per gallon. The requirements also set a minimum cetane number for TxLED of 48.

The TxLED requirements are intended to result in reductions in NOx emissions from diesel engines. Currently, reduction factors of **5.7 percent** (0.057) for on-road use and **7.0 percent** (0.07) for non-road use have been accepted as estimates for use of TxLED. However, this reduction estimate is subject to change, based on the standards accepted by the EPA for use in the Texas State Implementation Plan (SIP). The NCTCOG will identify the appropriate reduction factor to use in the *Technical Supplement* prepared to support these guidelines.

On-road:
TxLED Correction Factor = 1 - (0.057)
Non-road:
TxLED Correction Factor = 1 - (0.070)

- An activity involving a new emission-reduction measure that would otherwise generate marketable credits under state or federal emissions reduction credit averaging, banking, or trading programs is not eligible for funding under this program unless:
    - the activity includes the transfer of the reductions that would otherwise be marketable credits to the state implementation plan or the owner or operator as provided under '386.056, Texas Health and Safety Code; and
    - the reductions are permanently retired.
- The incremental cost of the proposed activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.
- For infrastructure activities, the activity life must be for at least five years. Not less than 75 percent of the annual use of the electricity dispensed from the infrastructure, or the idling operation reduced, projected for the five years immediately following the award of a grant, must be projected to take place in one or more of the eligible counties. For infrastructure activities involving marine vessels, not less than 75 percent of the annual use of the electricity dispensed from the infrastructure projected for the five years immediately following the award of the grant must be projected to take place in bays adjacent to one or more of the eligible counties, or in the Texas Intracoastal Waterway.

- Annual use will normally should be measured using hours of idling operation by the vehicles or equipment being replaced by the electricity from the infrastructure.

- The NCTCOG will determine an acceptable activity life for infrastructure activities on a case-by-case basis.

- Applicants must agree to monitor the use of the grant-funded vehicles, equipment, infrastructure, and/or fuel, and to report to the NCTCOG for the life of each grant-funded activity.

- Applicants must also agree to notify the NCTCOG of any changes during the life of the following activities: termination of use; change in use, sale, transfer, or accidental or intentional destruction of grant-funded vehicles, equipment, or infrastructure; or change in use of the qualifying fuel.

- The NCTCOG may impose additional criteria for certain projects and funding periods, consistent with these guidelines.

NOx Emission Standards

The baseline NOx emission standards for this program normally should be the federal standards for NOx emissions applicable to the engines being provided the electricity from the infrastructure. The federal NOx emission standards for various categories of engines are listed in the *Technical Supplement* available from the NCTCOG. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate baseline standards are used.

Calculating NOx Emission Reductions

In general, the emission-reduction benefit represents the difference in the emission level of a baseline engine and the auxiliary power unit (APU), if it emits NOx. For infrastructure to allow a vehicle or equipment to accept electricity from an external source, the emission-reduction benefit will be the reduction in emissions from the on-board internal combustion engine as a result of the use of electricity.

For APUs and idle-limiting devices on locomotives, the emission-reduction benefit will need to be determined by the reduction in fuel use or hours of idling operation. Grant applicants should consult with the NCTCOG to determine the most appropriate methodology to use in calculating the NOx emission reductions attributable to these types of locomotive projects.

The NOx emission reductions should be calculated based on information regarding the type of vehicles and equipment using the electricity. The idling emission level is calculated by multiplying an emission factor, an activity level, and a conversion factor, if necessary.

Calculating NOx Idling Emission Reductions Using Hours of Operation

For most applications, the idling activity level should be established by the annual hours of idle operation. The calculation of emissions and emission reductions using annual hours of

operation as the usage factor is determined by the steps shown in Table 12-1.

Table 12-1
Step 1. Calculate the TxLED Correction Factor

Fraction of the activity life that will occur after March 31, 2005 *no. of months after March 31, 2005 / total no. of months*	
TxLED Correction Factor *1 - (0.057 x fraction of activity life)*	

Step 2. Calculate the NOx Idling Emission Reduction Using Annual Hours of Operation

Baseline		**APU**	
NOx Idling emission factor (g/hr)		APU NOx emission factor (g/bhp-hr)	
		x TxLED correction factor *(diesel engines only)*	
x TxLED correction factor *(diesel engines only)*		x APU load factor	
		x APU horsepower	
= NOx emission factor (g/hr)		= NOx emission factor (g/hr)	
Baseline g/hr - APU emission g/hr			
x annual idling hours			
x percent within affected counties (%)			
= grams per year reduced (g/yr)			
		divided by 907,200 grams per ton	
= estimated annual NOx emission reduction (tons/yr)			
x activity life (years)			
= estimated activity life NOx emission reduction (tons)			

For activities involving the add-on of idle-limiting devices or devices to enable acceptance of electricity from an external power source, the emission reductions can be calculated using just the baseline emissions. The APU emissions would be set at zero.

Appropriate baseline NOx idling emission factors, APU NOx emission standards, and APU load factors are included in the *Technical Supplement* to these guidelines. Use the factors most closely associated with the vehicle or engine. Potential grant applicants should consult with the

NCTCOG to ensure that the appropriate factors are used.

Calculating Cost-Effectiveness

Only the amount of incentive funds requested under the program should be used in cost-effectiveness calculations. The incremental costs for each activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance. To determine the cost-effectiveness of an activityCwith the exception of qualifying fuel activitiesCthe incentive amount for the activity included in the project must be amortized over the activity life designated by the applicant, with a discount rate of 3 percent.

The following amortization formula yields a *capital recovery factor* (CRF).

capital recovery factor (CRF) = $\mathbf{[(1 + i)^n (i)] / [(1 + i)^n - 1]}$

where, i = discount rate (3 percent)
n = activity life

The discount rate of 3 percent reflects the opportunity cost of public funds. This is the level of earning that reasonably could be expected by investing state funds in various financial instruments, such as U.S. Treasury securities.

The incentive amount should be multiplied by the incremental cost or incentive amount requested to determine the annualized cost.

Incremental Cost x CRF = Annualized Cost

The cost-effectiveness calculations are presented in Table 12-2 that follows. Capital recovery factors for up to 20 years are presented in Table 12-3, for use in the calculations.

Table 12-2. Calculating Cost-Effectiveness

Step 1. Determine the Capital Recovery Factor (CRF)	
$CRF = [(1+i)^n (i)] / [(1+i)^n - 1]$ i = discount rate (.03) n = activity life	
Capital Recovery Factor:	
Step 2. Determine the annualized cost	
Incentive amount x CRF = Annualized cost	
Annualized cost ($/year):	
Step 3. Determine cost-effectiveness	

Annualized cost ($/year) / Annual NOx emissions reduction (tons/year) = Cost-effectiveness ($/ton)	
Cost-effectiveness ($/ton):	$

Table 12-3. Capital Recovery Factors (CRFs) Using a Discount Rate of 0.03

Activity Life	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CRF	1.00	.5226	.3535	.2690	.2184	.1846	.1605	.1425	.1284	.1172
Activity Life	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
CRF	.1081	.1005	.0940	.0885	.0838	.0796	.0760	.0727	.0698	.0672

For projects that include more than one activity, the total project incentive amount should be used to determine the cost-effectiveness of the project. The applicant may request an incentive amount that is less than the full incremental costs, in order to meet the cost-effectiveness criteria.

The cost-effectiveness should be determined by first adding all of the annualized costs for the activities included in the project. The annual emission reductions of each activity should also be added together to determine an annual emission reduction for the project.

The cost-effectiveness of the projects is then determined by dividing the combined annualized costs for all activities included in the project application, by the total annual NOx emission reductions for the combined project activities.

Total Annualized Costs / Total Annual NOx Reductions = Project Cost-Effectiveness

Chapter 13

Use of Qualifying Fuel

This chapter contains the project criteria for the purchase and use of a qualifying fuel or fuel additives. In order to be considered a qualifying fuel, the fuel or fuel additives must be verified by the EPA, the CARB, or otherwise accepted by the NCTCOG to result in less emissions of NOx than the baseline fuel for the vehicle or equipment in which the qualifying fuel is used. The baseline fuel used for comparison normally will be either standard on-road or non-road diesel fuel, or gasoline.

The methods for calculating the NOx emission reductions for a qualifying fuel project are also included in this chapter. Most of the calculations will require input of a NOx emission factor applicable to the engine and/or vehicle. The emission standards and emission factors applicable to this program are provided in a *Technical Supplement*, which will be made available in conjunction with these guidelines. Potential grant applicants should contact the NCTCOG for copies of the supplement and for any questions regarding the emission standards and factors to use.

Eligible Activities and Costs

The incremental costs associated with the purchase and use of a qualifying fuel or fuel additive in a motor vehicle, on-road heavy-duty vehicle, or non-road equipment may be eligible for funding under this program. The incremental cost is the difference in cost between the qualifying fuel and a baseline fuel. For the purchase of fuel additives, the incremental costs include the full cost of the additive.

To determine an incremental cost for fuel purchases, the cost per gallon of the baseline fuel should be compared with the cost for an equivalent amount of the qualifying fuel. Equivalency between the qualifying fuel and the baseline fuel will normally should be determined based on the energy content of the fuel, as measured by the use for mile or hour, or other method.

Due to contracting and budget constraints, a qualifying fuel activity normally may not extend beyond 18 months after the state fiscal year in which the grant is awarded. The state fiscal year runs from September 1 through August 31. Grant recipients may apply for additional grants in the future, to continue the reimbursement of fuel costs.

The reimbursements for incremental fuel costs under this category should be made over the life of the activity, based on the actual amount of fuel purchased and the cost of that fuel. The incentive amounts included in the grant contract should be a maximum amount that may be reimbursed under the grant. The actual reimbursement will depend upon the cost differential between the baseline fuel and the qualifying fuel at the time of the purchase.

In some cases, the NCTCOG may preapprove a reimbursement amount per unit of qualifying fuel, for all activities using the fuel. Grant applicants and/or suppliers of qualifying fuel should consult with the NCTCOG regarding alternative approaches for establishing an approved reimbursement amount.

Project Criteria

In addition to the eligibility criteria previously presented, the following list of criteria applies to projects involving qualifying fuel activities. The NCTCOG may impose additional criteria, and may more narrowly define the criteria established in this guide, under a particular funding round or by geographic area, as needed to best achieve the objectives of the TERP.

- One or more eligible *activities* may be included under one *project* application.
- Fuel used in vehicles and equipment used primarily for competition or recreational purposes is not eligible for funding.
- When required under federal law, fuel additives must be registered by the EPA to be eligible under this program.
- When required, qualifying fuel to be used in on-road vehicles must be registered by the EPA for on-road use, to be eligible under this program.
- The NOx emission reductions attributable to the qualifying fuel must be verified by the EPA, the CARB, or otherwise accepted by the NCTCOG.
- Qualifying fuel technologies will be reviewed by the NCTCOG's technical staff. Any questions regarding the effects of a fuel or fuel additive on health or the environment will need to be resolved before the fuel is considered eligible for funding. Manufacturers and suppliers of a qualifying fuel are encouraged to discuss their products with the NCTCOG early in the process, before a grant application is submitted.
- The cost-effectiveness of a project, other than a demonstration project, must not exceed $5,500 per ton of NOx emissions reduced in the eligible counties for which the project is proposed. Individual activities included under a single project application may exceed this amount, but the combined project must meet the cost-effectiveness standard.
- In the areas of the state where Texas Low Emission Diesel (TxLED) must be provided by suppliers, beginning April 1, 2005, the baseline and reduced emission rate calculations for diesel engine usage after March 2005 must be adjusted using a correction factor, in addition to any other calculation adjustments.

Figure 13-1. Correction Factor for TxLED

The NCTCOG has adopted rules (30 TAC '114.312 to '114.319) requiring that beginning on April 1, 2005, diesel fuel sold or supplied for use in compression-ignition engines in certain counties in Texas must meet new low-emission diesel (TxLED) standards.

The counties affected by the new TxLED requirements currently include all of the counties eligible for TERP incentive funding, as listed in Chapter 3, except for El Paso County.

The new requirements set a maximum aromatic hydrocarbon content standard of 10 percent by volume per gallon. The requirements also set a minimum cetane number for TxLED of 48.

The TxLED requirements are intended to result in reductions in NOx emissions from diesel engines. Currently, reduction factors of **5.7 percent** (0.057) for on-road use and **7.0 percent** (0.07) for non-road use have been accepted as an estimate for use of TxLED. However, this reduction estimate is subject to change, based on the standards accepted by the EPA for use in the Texas State Implementation Plan (SIP). The NCTCOG will identify the appropriate reduction factor to use in the *Technical Supplement* prepared to support these guidelines.

On-road:
TxLED Correction Factor = 1 - (0.057)
Non-road:
TxLED Correction Factor = 1 - (0.070)

- An activity is not eligible if it is required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. However, this restriction does not apply to an otherwise qualified activityCregardless of the fact that the State Implementation Plan assumes that the change in equipment, vehicles, or operations will occurCif on the date the grant is awarded the change is not required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. This restriction also does not apply to the purchase of vehicles or equipment that is required only by local law or regulation, or by corporate or controlling board policy of a public or private entity. Demonstration projects used to demonstrate a technology that may be used to comply with an emission-reduction requirement may be funded, as long as the reductions directly attributable to the demonstration project are not used to comply with those requirements.

- An activity involving a new emission-reduction measure that would otherwise generate marketable credits under state or federal emission-reduction credit averaging, banking, or trading programs is not eligible for funding under this program unless:

    - the activity includes the transfer of the reductions that would otherwise be marketable credits to the State Implementation Plan, or the owner or operator, as provided under ' 386.056, Texas Health and Safety Code; and
    - the reductions are permanently retired.

- The incremental cost of the proposed activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

- The use of qualifying fuel funded under this program must take place in one or more of the eligible counties.

- For most qualifying fuel activities, annual use will be measured using calculations based on the fuel use. The NCTCOG may consider using either miles of operation or hours of operation using the qualifying fuel for particular applications, on a case-by-case basis.

- Applicants must agree to monitor the use of the grant-funded vehicles, equipment, infrastructure, and/or fuel, and to report to the NCTCOG for the life of each grant-funded activity.

- Applicants must also agree to notify the NCTCOG of any changes during the life of the following activities: termination of use; change in use, sale, transfer, or accidental or intentional destruction of grant-funded vehicles or equipment; or change in use of the qualifying fuel.

- The NCTCOG may impose additional criteria for certain projects and funding periods, consistent with these guidelines.

NOx Emission Standards

The baseline NOx emission standards for this program should be the federal standards for NOx emissions applicable to the type of engine and model year of vehicle. The federal NOx emission standards for engines are listed in the *Technical Supplement* available from the NCTCOG. Potential grant applicants should consult with the NCTCOG to ensure that the appropriate baseline standards are used.

Calculating NOx Emission Reductions

The NOx emission reductions for a qualifying fuel activity will be based on the types of vehicles and equipment using the fuel.Grant applicants should refer to the chapter or chapters of these guidelines applicable to the vehicles and equipment being fueled, to determine how the emission reductions will be calculated.

In most cases, the NOx emission reductions should be determined based on the difference between the NOx emissions using the baseline fuel and the NOx emissions using the qualifying fuel. The grant applicant will be required to list the vehicles and equipment that will be fueled using the qualifying fuel.

For many types of qualifying fuel, the NCTCOG may allow the grant applicants to list the vehicles and equipment by vehicle/equipment category, rather than listing each individual vehicle or piece of equipment. The *Technical Supplement* to these guidelines will include information on the categories that may be used for listing vehicles and equipment in a qualifying fuel application.

Calculating Cost-Effectiveness

Only the amount of incentive funds requested under the program should be used in cost-effectiveness calculations. The incremental costs for each activity must be reduced by the value of any existing financial incentive that directly reduces the cost of the proposed activity, including tax credits or deductions, other grants, or any other public financial assistance.

The cost-effectiveness of qualifying fuel activities should be determined somewhat differently than for other activities. Whereas the incentive amount for other types of activities must be amortized over the activity life, using a 3 percent discount rate, the incentive amount for qualifying fuel activities do not need to be amortized.

The cost-effectiveness calculations are presented in Table 13-1 that follows.

Table 13-1. Calculating Cost-Effectiveness for Qualifying Fuel Activities

Total cost ($) / Total NOx emissions reduction (tons) = Cost-Effectiveness ($/ton)	
Cost-effectiveness ($/ton):	$

For projects that include more than one activity, the total project incentive amount should be used to determine the cost-effectiveness of the project. The applicant may request an incentive amount that is less than the full incremental costs, in order to meet the cost-effectiveness criteria.

The cost-effectiveness should be determined by first adding all of the annualized costs for the activities included in the project. For purposes of calculating the cost-effectiveness of a project that includes other types of activities, the annualized cost for the qualifying fuel activity should be the total activity cost.

The annual emission reductions of each activity should also be added together to determine an annual emission reduction for those activities. Again, the total emission reductions for the qualifying fuel activity should be added to the annualized emission reductions from the other activities.

The cost-effectiveness of the projects is then determined by dividing the combined annualized costs for all activities included in the project application, by the total annual NOx emission reductions for the combined project activities.

Total Annualized Costs / Total Annual NOx Reductions = Project Cost-Effectiveness

Chapter 14

Demonstration of New Technology

This chapter contains the project criteria for demonstration of new technology projects. This type of project must be applied for separately from the other eligible activities.

Eligible Activities and Costs

Projects under this category must demonstrate practical low-emission retrofit technologies, repower options, and advanced technologies for on-road heavy-duty diesel vehicles and diesel-powered non-road equipment. Projects under this category may include:

- use of retrofit, repower, and add-on technologies to reduce NOx emissions from the existing stock of heavy-duty diesel vehicles and non-road diesel equipment; and
- use of advanced technologies, including use of qualifying fuels, for new engines and vehicles that produce very-low or zero emissions of NOxCincluding stationary and mobile fuel cellsCwhich could replace the use of higher-emitting diesels.

In general, the emission reductions attributable to the technologies demonstrated under this program should already be provenCfor example, through certification or verification by the EPA or the CARB. This program can then be used to help encourage the implementation and use of the technology in the areas of the state where the emission reductions are needed.

However, the NCTCOG may also consider technologies that are still in the testing and/or verification stage of development. The funding decisions may be based on the likelihood that the emission reductions will be proven and accepted.

The grant recipient may be eligible for reimbursement of all expenses attributable to the project. No cost-effectiveness requirements will be applied to a demonstration project, but the applicant will need to provide information to show that the technology is viable and can be expected to achieve significant reductions in NOx emissions.

Project Criteria

In addition to the eligibility criteria previously presented, the following list of criteria applies to projects involving qualifying fuel activities. The NCTCOG may impose additional criteria, and may more narrowly define the criteria established in this guide, under a particular funding round or by geographic area, as needed to best achieve the objectives of the TERP.

- The NCTCOG will select demonstration projects on a case-by-case basis, based on a full review of the project proposal and a determination that the project can lead to broader use of the technology.

- In general, a demonstration project should involve a limited number of vehicles or equipment (for example, one to five), so that the project can be considered a demonstration and not implementation of the technology.

- The demonstration project must take place within an eligible county. However, testing and other work required for completing the project may take place outside of the eligible counties, subject to approval by the NCTCOG.

- Unless otherwise authorized by the NCTCOG, the technology must be demonstrated on vehicles or equipment that are actually being used for the purposes intended for that vehicle or equipment. Again, projects under this category normally should be for demonstration-proven technologies on real-world applications.

- It is expected that demonstration projects will normally last one year. The NCTCOG will consider projects that last for a different time period. However, due to contracting and financial management requirements, projects may not extend beyond 18 months after the end of the state fiscal year of the grant award. The state fiscal year extends from September 1 through August 31.

- The grant recipient must monitor the use and effectiveness of the technology, including costs associated with its use. A project report must be prepared at the end of the project. The report must provide information and conclusions regarding the effectiveness and efficacy of the using the technology on the application demonstrated. The project report must be accepted by the NCTCOG before the project will be considered completed.

- An activity is not eligible if it is required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. However, this restriction does not apply to an otherwise qualified activityCregardless of the fact that the State Implementation Plan assumes that the change in equipment, vehicles, or operations will occurCif, on the date the grant is awarded, the change is not required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. This restriction also does not apply to the purchase of vehicles or equipment that is required only by local law or regulation, or by corporate or controlling board policy of a public or private entity. Demonstration projects used to demonstrate a technology that may be used to comply with an emission-reduction requirement may be funded, as long as the reductions directly attributable to the demonstration project are not used to comply with those requirements.

- An activity involving a new emission-reduction measure that would otherwise generate marketable credits under state or federal emission-reduction credit averaging, banking, or trading programs is not eligible for funding under this program unless:

    - the activity includes the transfer of the reductions that would otherwise be marketable credits to the state implementation plan or the owner or operator as provided under ' 386.056, Texas Health and Safety Code; and
    - the reductions are permanently retired.

- The NCTCOG may impose additional criteria for certain projects and funding periods, consistent with these guidelines.

Chapter 15

Grant Procedures

The chapter contains the general procedures that will be used for application, award, and administration of grants provided under this program. The NCTCOG may adjust these procedures and develop more detailed procedures, as needed, to ensure the effectiveness of the program.

It is expected that grant funds will be awarded and distributed through three primary grant approaches:

- **project grants** which are awarded through submission of an application by the owner/operator of the vehicles or equipment, then reviewed and selected by the NCTCOG, and finally executed with a grant contract between the NCTCOG and the grant recipient;
- **small business grants** for limited purchases; and
- **third-party grants** to entities other than the owner/operator of the equipment, for pass-through of the grant funds to support activities consistent with these guidelines.

The NCTCOG may establish other grant mechanisms, as needed to meet the goals of the TERP. These three grant approaches are explained in the following sections.

Project Grants

Project grants will be solicited through periodic or open-ended Requests for Applications (RFAs) and through other mechanisms to solicit grant applications. Copies of the RFAs and the necessary application forms will be made available on the NCTCOG's TERP Web site and directly from the NCTCOG.

The NCTCOG encourages potential applicants, as well as vendors and manufacturers of eligible technologies, to consult with the NCTCOG at any time prior to submitting an application, to determine if a project would be eligible and the amount of grant funding that could be awarded for that project. The NCTCOG particularly encourages the pre-assessment of classes of technologies and projects as a tool for marketing a technology and a type of project to potential applicants.

Project Review and Selection

Grant applications will be reviewed and evaluated according to criteria established in these guidelines and the RFA. Project selections will be made using ranking and scoring procedures that will be explained in the RFAs. In general, the selection priorities may include allocation of the funding among each nonattainment area and other near-nonattainment areas, as well as allocation among the various types of project categories.

The NCTCOG may also establish a cost-effectiveness threshold for particular funding periods and geographic areas. Projects with a cost-effectiveness below the threshold may be processed and awarded on a first-come-first-served basis.

Grant Award and Contracting

Projects selected for funding will be awarded a grant through the development and execution of a grant contract that is signed by the grant recipient and by the NCTCOG. Grant contracts may contain additional and more specific requirements than those contained in these guidelines. Grant recipients should review the contract language carefully before accepting and signing the contract.

Because the funding for this program is provided by revenue that is received throughout the year, all grant awards and contracts will be contingent upon the receipt of sufficient revenue to cover the grant. Grant contracts may be issued on a contingency basis, subject to a follow-up Notice to Proceed being provided by the NCTCOG, once sufficient funds are received.

Reimbursement and Reporting

Grant payments will be provided on a reimbursement basis, meaning that payment will be made after the eligible expense has been incurred by the grant recipient. Grant recipients will also have the option to assign their grant payments directly to the dealer or service provider. The NCTCOG will provide reimbursement request and reporting forms for use by the grant recipient.

In some cases, particularly for large and lengthy projects, the NCTCOG may also authorize advance payments, based on a percentage of the expected final costs.

The grant contract and the reimbursement forms will include requirements for documentation of expenses.

A project status and completion report must also be submitted quarterly, for the period designated by the NCTCOG in the grant contract, and upon final completion of all grant-funded purchases.

Upon completion of all grant-funded purchases, the grant recipient will need to submit a final request for reimbursement of all remaining unreimbursed expenses. The final reimbursement request must include a completed and signed release of claims.

Project Monitoring and Reporting

For projects other than Demonstration Projects, the grant recipient must agree to monitor and track the use of grant-funded vehicles, equipment, infrastructure, and/or qualifying fuel for the activity life designated in the grant contract. The activity life is used to determine the total NOx emission reductions and cost-effectiveness of the activities and the project.

Monitoring reports must to be submitted to the NCTCOG on an annual or semi-annual basis. These reports will include the usage information over the required reporting period.

Return of Grant Payments

The grant contracts will include provisions for the grant recipient to return a prorated share of the grant payments if the NOx emission reductions originally projected for the project are not achieved.

Small Business Grants

In accordance with Texas Health and Safety Code, ' 386.116, the NCTCOG is required to establish and administer a grant program targeted at small businesses and other entities that operate only a limited number of eligible vehicles and equipment.

Under this program, a Asmall business@ is defined as a person who:

- owns and operates not more than two vehicles or pieces of equipment, one of which is:
    - an on-road diesel heavy-duty vehicle with a pre-1994 engine model; or
    - a non-road diesel-powered piece of equipment with an engine with uncontrolled emissions; and
- has owned the vehicle or equipment previously described for more than one year.

At a minimum, the Small Business Grants will be available for the replacement or repower of an on-road heavy-duty vehicle with a pre-1994 engine, and for the replacement or repower of non-road equipment with an engine with uncontrolled emissions.

Based on the success of the program at encouraging small businesses to participate, the NCTCOG will consider expanding the program to other types of vehicles and equipment and other project categories that are otherwise eligible for funding under these guidelines. The grant announcements issued by the NCTCOG will identify what types of projects are being accepted for funding under the limited purchase process.

Project Application

The NCTCOG will make available information on times when applications may be filed for Small Business Grants, based on the expected availability of funding for the program. To the extent possible, the NCTCOG will keep dealers and installers informed of the availability of funds for the program. The NCTCOG may also limit the grants to certain geographic areas, based on the needs of the program.

In many cases, it is expected that applications for a Small Business Grant will be submitted at the time the work is completed. However, the application forms will allow for submission prior to the work being conducted, in which case the applicant would proceed with the work after receiving approval from the NCTCOG, and would then submit the reimbursement request forms to obtain payment.

Grant Award, Contracting, and Reimbursement

During the period in which applications are accepted, and subject to any special priorities given to certain geographic areas, applications will be processed on a first-come-first-served basis. Applications and applicants will be reviewed for eligibility. Eligible applications will be approved by the NCTCOG, and the grant recipient will be notified.

Projects selected for funding will be awarded a grant through the development and execution of a grant contract signed by the grant recipient and by the NCTCOG. Grant contracts may contain additional and more specific requirements than those contained in these guidelines. Grant recipients should review the contract language carefully before accepting and signing the contract.

Because the funding for this program is provided by revenue that is received throughout the year, all grant awards and contracts will be contingent upon the receipt of sufficient revenue to cover the grant. Grant contracts may be issued on a contingency basis, subject to a follow-up Notice to Proceed being provided by the NCTCOG, once sufficient funds are received.

Grant payments will be provided on a reimbursement basis, meaning that payment will be made after the eligible expense has been incurred by the grant recipient. Grant recipients will also have the option to assign their grant payments directly to the dealer or service provider. The NCTCOG will provide reimbursement request and reporting forms for use by the grant recipient.

Project Monitoring and Reporting

The grant recipient must agree to monitor and track the use of grant-funded vehicles, equipment, infrastructure, and/or qualifying fuel for the activity life designated in the grant contract. The activity life is used to determine the total NOx emission reductions and cost-effectiveness of the activities and the project.

Monitoring reports must to be submitted to the NCTCOG on an annual or semi-annual basis. These reports must include the usage information over that reporting period.

The NCTCOG will also complete contractor evaluations annually, or on another schedule to be determined by the NCTCOG. The evaluations will assess the grant recipient's compliance with the terms of the grant contract.

Return of Grant Payments

The grant contracts will include provisions for the grant recipient to return a prorated share of the grant payments if the NOx emission reductions originally projected for the project are not achieved.

Third-Party Grants

The Texas Health and Safety Code, ' 385.103(a), authorizes the NCTCOG to allow a person other than the owner to apply for and receive a grant in order to improve the ability of the program to achieve its goals.

Project Review and Selection

The NCTCOG may periodically solicit applications, either in conjunction with the Request for Applications (RFA) issued to receive applications for the regular Project Grants, or through a separate RFA and other mechanisms to solicit applications for grants to third-parties. It is expected that most of these types of grants will be to entities that operate a program to pass-through funding to help implement the types of projects that are also eligible for funding under this program.

In some cases, the NCTCOG may require that a third-party have already identified the projects to be funded prior to submitting an application.

Applications will be reviewed and selected according to selection criteria established by the NCTCOG prior to soliciting grant proposals.

Grant Award and Contracting

Projects selected for funding will be awarded a grant through the development and execution of a grant contract that is signed by the grant recipient and by the NCTCOG. Grant contracts may contain additional and more specific requirements than those contained in these guidelines. Grant recipients should review the contract language carefully before accepting and signing the contract.

Grant contracts will include the minimum requirements for use of the funds, including the pass-through of funding by the recipient. Administrative costs of the third-party grant recipient will not be eligible for funding under this program.

To the extent needed to ensure compliance with the program requirements, the NCTCOG may require preapproval authority over the funding decisions of the grant recipient and over the contracts and agreement used by the recipient as part of a pass-through program.

Any pass-through agreements and other contracts used by the grant recipient must ensure compliance with these guidelines and other requirements imposed by the NCTCOG.

Payment and Reporting

The NCTCOG will establish the payment and reporting processes on a case-by-case basis. Payments may be provided on a reimbursement basis, meaning that payment will be made after expenses are incurred by the grant recipient. In some cases, the NCTCOG may also authorize advance payments, based on the expected or final selection of pass-through projects or other projects.

The grant contract and the payment forms will include requirements for documentation of expenses. The NCTCOG may also require approval authority over the payment processes used by the grant recipient to fund a pass-through project or other project.

A project status and completion report must also be submitted quarterly, for the period designated by the NCTCOG in the grant contract, and upon final completion of all grant-funded purchases.

Project Monitoring and Reporting

The grant recipient will be required to establish a mechanism to monitor and track the use of grant-funded vehicles, equipment, infrastructure, and/or qualifying fuel for the life of the activities.

Monitoring reports must be submitted to the NCTCOG on an annual or semi-annual basis. These reports will include the usage information over that reporting period.

Return of Grant Payments

The grant contracts will include provisions to ensure the return of a prorated share of the grant payments if the NOx emission reductions originally projected for the projects are not achieved. The grant recipient will need to include appropriate provisions in its contracts to ensure that grant funds may be recaptured from the ultimate recipient of the funding.