

Appendix 7

On-Site Electrification and Idle-Reduction Infrastructure

This appendix outlines the criteria for project eligibility and gives the methods for calculating the reductions in NO_x emissions for an on-site electrification and idle-reduction infrastructure project. The emissions reductions will be estimated using applicant-supplied information on the types of vehicles and equipment being supplied the electricity or serviced by the idle-reduction infrastructure. The emissions reduction for the activity will be the difference in the emissions level in tons of NO_x expected to be produced by baseline vehicles and equipment, and the emissions level in tons of NO_x expected to be produced through the electrification or reduction in idling of the vehicles and equipment, within the eligible counties.

The emissions standards and emissions factors applicable to this program appear in a technical supplement, which will be made available in conjunction with these guidelines on the TERP website at <www.terpgrants.org>. Potential grant applicants should contact the TCEQ for copies of the supplement and for answers to questions about which emissions standards and factors to use.

In accordance with Texas Health and Safety Code 386.104(j) and TERP program rules, 30 TAC 114.622(g), the executive director or his or her designee has the authority to waive certain eligibility requirements, based on a finding of good cause. Situations where good cause may be determined and a waiver granted are explained in the discussion of eligibility requirements in this appendix or the appendix applicable to the type of vehicle or equipment activities used to show that emissions reductions will be achieved as a result of the infrastructure project.

The executive director may identify other eligibility criteria for which a waiver may be considered, based on a finding of good cause and subject to the statutory and regulatory requirements. Waiver options will be explained in the grant-application materials.

In determining good cause and deciding whether to grant a waiver, the executive director shall ensure that the emissions reductions that will be attributable to the project will still be valid and, where applicable, meet the conditions for assignment for credit to the State Implementation Plan.

Eligible Activities and Costs

An eligible activity may include the purchase and installation of on-site infrastructure—including auxiliary power units—designed to dispense electricity to motor vehicles,

on-road heavy-duty vehicles, non-road equipment, stationary equipment, locomotives, or marine vessels. The electricity may replace the power normally supplied by the engine while the vehicle or equipment is parked (idle reduction), or recharge electric vehicles or equipment being used in lieu of vehicles or equipment powered by an internal combustion engine. The applicant will need to show that the infrastructure is needed and will be used in an eligible county.

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

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

State agencies may apply for grants to fund the lease, purchase, or installation of idle-reduction technologies and facilities at rest areas and other public facilities on major highway routes in eligible areas, and on eligible water routes. The TCEQ may approve operating costs for initial setup and for ensuring proper operation of the infrastructure at these facilities. Idle-reduction facilities are encouraged at the state's ports and border crossings.

In some areas, idling operation of on-road vehicles may be limited by state regulations. Accordingly, the project emissions reductions used to determine the cost-effectiveness for infrastructure activities in an area with such a requirement 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 TCEQ may further limit the types of eligible activities, and may more narrowly define eligibility requirements, during a particular funding period or by geographic area, as needed to best achieve the objectives of the TERP.

Projects Other than Idle-Reduction Infrastructure Installed by Other State Agencies

For such projects, the grant recipient may be eligible for reimbursement up to 50% of the total eligible costs for the purchase and installation of the infrastructure. However, expenses for salaries, travel, land purchases, and overhead, including indirect costs, will not be covered. Costs that may be reimbursed by the TCEQ, subject to its approval, include:

- the invoice cost of the infrastructure equipment, including sales tax and delivery charges;
- the cost of associated supplies directly related to the installation of the infrastructure;

- installation costs;
- the costs of 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.

All grant-funded idle-reduction equipment and infrastructure must be purchased and not leased.

Idle-Reduction Infrastructure Installed by Other State Agencies at Rest Stops and Other Public Facilities

Up to the full cost of idle-reduction infrastructure installed at rest stops and other public facilities by another state agency may be eligible for funding under the grant. In addition, the cost of leasing or contracting for the infrastructure installation and start-up operation of the infrastructure may be included in the grant, subject to limitations on the length of time the funds are available under the grant contract.

Project Criteria

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

- One or more eligible activities of the same project type (i.e., on-road, non-road, locomotive, etc.) that will occur in the same primary area may be included under one project application.
- Infrastructure used to service vehicles and equipment used primarily for competition or recreation are not eligible for funding.
- The infrastructure project must result in new, surplus emissions reductions that will then be available to the TCEQ for assignment to the State Implementation Plan. In general, the TCEQ will not accept as a new emissions 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 TxLED is required, the baseline and reduced emissions-rate calculations for diesel engine usage after September 2005 must be adjusted using a correction factor, in addition to any other calculation adjustments.

Figure A7.1 Correction Factor for TxLED

The TCEQ adopted rules (30 TAC 114.312–19) requiring that diesel fuel sold or supplied for use in compression-ignition engines in certain counties in Texas must meet low-emission-diesel standards.

The counties affected by the TxLED requirements currently include all those eligible for TERP incentive funding, as listed in Table 3.1, except for El Paso County.

The requirements set a maximum for content of aromatic hydrocarbons of 10% by volume. The requirements also set a minimum cetane number for TxLED of 48.

The TxLED requirements are intended to result in reductions in NO_x emissions from diesel engines. Currently, reduction factors of **5.7%** (0.057) for on-road use and **7.0%** (0.07) for non-road use have been accepted as estimates for use of TxLED. However, these estimates are subject to change, based on the standards accepted by the EPA for use in the Texas State Implementation Plan. The TCEQ will identify the appropriate reduction factors to use in the technical supplement prepared to support these guidelines.

For activities in the applicable counties, a correction factor will need to be applied when calculating the baseline or reduced emissions for diesel engines.

On-road:

$$\text{TxLED correction factor} = 1 - 0.057 = \mathbf{0.943}$$

Non-road:

$$\text{TxLED correction factor} = 1 - 0.070 = \mathbf{0.93}$$

- The cost-effectiveness of a project, other than a demonstration project, may not exceed any limits established by the TCEQ on the cost per ton of NO_x emissions reduced in the eligible counties for which the project is proposed.
- 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 activity—regardless of the State Implementation Plan’s assumption that the change in equipment, vehicles, or operations will occur—if, on the date the grant is awarded, the change is not yet required by any state or federal law, rule, regulation, memorandum of agreement, or other legally binding document. This restriction also does not apply to a purchase of vehicles or equipment that is required only by local law or regulation, or by controlling-board policy of a public or private enterprise or authority. 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 project are not used to comply with those requirements.
- An activity involving a new emissions-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 Texas Health and Safety Code 386.056; 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 a minimum of five years. The TCEQ will establish the required activity life for each grant period. Not less than 75% of the annual use of the electricity dispensed from the infrastructure—or the idling operation reduced—must take place in one or more of the eligible counties throughout the life of the project. For infrastructure activities involving marine vessels, not less than 75% of the annual use of the electricity dispensed from the infrastructure must take place in bays adjacent to one or more of the eligible counties, or in the Texas portion of the Gulf Intracoastal Waterway, throughout the life of the project.
- Annual use will normally be measured using hours of operation by the vehicles or equipment receiving the electricity from the infrastructure. Therefore, a grant recipient must have a viable mechanism for tracking and reporting on the use of those vehicles or that equipment.
- Applicants must agree to monitor the use of grant-funded vehicles, equipment, infrastructure, and fuel, and to report to the TCEQ for the life of each grant-funded activity. If the grant recipient does not own or operate the vehicles or equipment to receive electricity from the infrastructure, the recipient will need to explain, as a condition of the grant, what mechanism will be used to ensure that the vehicles and equipment are operated within the eligible counties for the specified time period.
- Applicants must also agree to notify the TCEQ of any changes in the following during the activity life: 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.
- Administrative costs and other internal costs of the grant recipient, including but not limited to personnel expenses, internal salaries—indirect costs, and travel—are not eligible. This restriction also applies when the grant recipient acts as a transportation provider for delivery of the grant-funded vehicle or equipment before or after accepting it.
- Consultant fees for the preparation of a grant application, either directly or as an addition to the cost basis of the grant-funded vehicle, equipment, or engine, are not eligible.
- Fees for a third-party consultant hired by the grant recipient to manage and administer the grant-funded activities, including coordination of the work and submission of reports and paperwork to the TCEQ for the grant recipient,

are not eligible. This restriction is not intended to limit the ability of the vehicle or equipment supplier to include reasonable and necessary costs for managing the work to be performed in the price of the vehicle, equipment, or installation. The costs for professional services, including engineering and technical work, required for completion of the activity may be included, subject to the restrictions pertaining to that type of project. Per the Uniform Grant Management Standards, the “cost plus a percentage of cost” method of contracting for professional services must not be used.

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

NO_x Emissions Factors

The baseline NO_x emissions factors for this program normally should be the federal standards for NO_x emissions applicable to the engines receiving electricity from the infrastructure. The federal NO_x emissions standards for various categories of engines are listed in a technical supplement available from the TCEQ. Potential grant applicants should consult with the TCEQ to ensure they use the appropriate baseline standards.

Calculating Reductions in NO_x Emissions

In general, the emissions-reduction benefit represents the difference in the emissions level of a baseline engine and a reduced-emissions engine. For electrification infrastructure activities, the reductions in NO_x emissions 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.

NO_x-emissions 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-emissions sources.

Grant applicants should refer to the chapter of this guide 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 reductions in NO_x emissions attributable to the use of the electric-powered engine in lieu of an internal combustion engine. The applicable emissions factors for use in the calculations will

generally appear in the technical supplement to these guidelines. Activities for which appropriate emissions factors do not appear should be discussed with the TCEQ.

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

Note that, if the vehicle or equipment purchases or conversions are included in the grant application as part of a combined project, the NO_x-emissions 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 NO_x-emissions reductions attributable to the electrification of the vehicles or equipment should be used to determine the reductions in NO_x emissions for the infrastructure project. The grant recipient must ensure that the 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 NO_x emissions in the eligible counties. The reductions are to be calculated based on the reduction in idling NO_x emissions for the engine.

In general, the emissions-reduction benefit represents the NO_x emissions that would have normally been generated by the engine at idle. The idling emissions level is calculated by multiplying an emissions 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 emissions reductions based on annual hours of operation as the usage factor is determined by the steps shown in Table A7.1.

Table A7.1
Calculating the NO_x Idling Emissions Reduction Based on Annual Hours of Operation

Applying the TxLED Correction Factor

The counties affected by the TxLED requirements currently include all those eligible for TERP incentive funding, as listed in Table 3.1, except for El Paso County.	
TxLED correction factor for on-road: <i>1 - 0.057</i>	0.943

Calculate the Reduction in Idling NO_x Emissions

NO _x idling emissions factor grams per hour (g/hr)	
× TxLED correction factor <i>(diesel engines only)</i>	
= g/hr	
× annual hours of idling reduced (within the eligible county)	
= grams per year reduced (g/year)	
	÷ 907,200 grams per ton
= estimated annual NO _x -emissions reduction (tons/yr)	
× activity life (years)	
= estimated activity-life NO _x emissions reduction (tons)	

Appropriate baseline idling NO_x emissions factors are included in the technical supplement to these guidelines. Use the emissions factors most closely associated with the vehicle or engine. Potential grant applicants should consult with the TCEQ to ensure they use the appropriate factors.

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

Note that, if the vehicle or equipment purchases or conversions are included in the grant application as part of a combined project, the NO_x-emissions 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 reductions in NO_x emissions attributable to the electrification of the vehicles or equipment should be used to determine the reductions in NO_x emissions for the infrastructure project. The grant recipient must ensure that the NO_x-emissions 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 calculating cost-effectiveness. 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—with the exception of qualifying fuel activities—the incentive amount for the activity included in the project must be amortized over the activity life designated by the applicant, at a discount rate of 3%.

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

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

where i = discount rate (3%)
 n = activity life

The discount rate of 3% reflects the opportunity cost of public funds—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.

$$\text{incremental cost} \times \text{CRF} = \text{annualized cost}$$

The cost-effectiveness calculations appear in Table A7.2. Capital-recovery factors for up to 20 years appear in Table A7.3, for use in the calculations.

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.

To determine the cost-effectiveness: First sum all of the annualized costs for the activities included in the project. Also sum the annual emissions reductions from each activity to determine an annual emissions reduction for the project. Then divide the

combined annualized costs for all activities included in the project application by the total annual reductions in NO_x emissions for the combined project activities.

$$\text{total annualized costs} / \text{total annual NO}_x \text{ reductions} = \text{project cost-effectiveness}$$

Table A7.2
Calculating Cost-Effectiveness

Step 1. Determine the capital-recovery factor (CRF)	
$\text{CRF} = [(1 + i)^n (i)] / [(1 + i)^n - 1]$ $i = \text{discount rate (.03)}$ $n = \text{activity life}$	
Capital-recovery factor:	
Step 2. Determine the annualized cost	
Incentive amount × CRF = annualized cost	
Annualized cost (\$/year):	
Step 3. Determine cost-effectiveness	
$\text{Annualized cost (\$/year)} / \text{annual NO}_x\text{-emissions reduction (tons/year)}$ $= \text{cost-effectiveness (\$/ton)}$	
Cost-effectiveness (\$/ton):	\$

Table A7.3
Capital-Recovery Factors 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