

# Clean Diesel Funding Assistance Program FY 2019 Transport Refrigeration Unit (TRU) Factsheet

## What is a “reefer?”

Refrigerated, insulated cargo trailers, straight trucks, intermodal shipping containers, and rail cars can all commonly be referred to as “reefers.” It originates from the word “refrigerated.”

## What is a “TRU?”

A Transport Refrigeration Unit (TRU) is a refrigeration system installed on insulated cargo trailers, straight trucks, intermodal shipping containers, and rail cars used in transporting temperature sensitive goods. A conventional TRU is powered by a small diesel engine.

Truck TRUs are used to refrigerate insulated cargo vans mounted on the frame of a straight truck. Trailer TRUs are used to refrigerate insulated trailers mounted on semitrailers. Railcar TRUs are used to refrigerate insulated railcars.

## What is an “eTRU?”

Electric Transport Refrigeration Unit or “eTRU” is a term sometimes used to describe different types of alternatives to conventional diesel powered TRUs including hybrid electric TRUs, standby electric TRUs, and all-electric TRUs. In an eTRU, the refrigeration system’s compressor is driven by an electric motor all or at least part of the time. eTRUs can be powered by a plug-in electrical connection from electrical grid power (commonly referred to as shore power) while parked or being loaded. eTRUs may be powered by a battery pack for shorter distances or a diesel-powered TRU generator set for longer distances while operating on the road. Integral diesel generators, engine-mounted or transmission power-take-off generators or other range extenders may also be used to provide electrical power to the unit when in transit.

Refrigerated shipping containers typically employ all-electric TRUs which are powered by ocean-going ship electric power, dock-side shore power, or TRU generator sets for travelling shorter distances. Often, insulated trailers with shore powered all-electric TRUs are used for stationary operations to increase holiday and summer season cold storage capacity at grocery stores.

## Hybrid Electric TRU

In a hybrid electric TRU (also called a hybrid plug-in eTRU), the refrigerator's compressor is driven solely by an electric motor. When over-the-road, electric power is supplied by an integral diesel genset located within the TRU housing; when stationary (e.g., loading at a distribution center), the hybrid electric TRU plugs-in to available electric grid shore power.

## Standby Electric TRU

In a standby electric TRU (also called a standby plug-in eTRU), the refrigerator's compressor is both mechanically driven by an integral diesel engine and electrically driven by an integral electric motor. When over-the-road, the unit is powered by the diesel engine; when stationary, the electric standby feature allows the TRU to be plugged into electrical power and the diesel engine to be turned off.

## What is a TRU generator set (genset)?

A TRU genset provides electric power to an all-electric TRU when the unit is not plugged into ocean-going ship electric power or dock-side shore power.

- “Pin-on” TRU gensets are pinned onto the front of refrigerated shipping containers, just above the container's built in all-electric refrigeration system.
- “Under-slung,” or “belly mount” TRU gensets are clamped to the frame rails of intermodal trailer chassis.
- A “powerpack” TRU genset consists of several diesel generators installed into a shipping container, which then provides electric power to multiple refrigerated shipping containers and are generally limited to railcar use and longer periods of transport.

## What types of TRU projects are eligible under DERA?

Diesel powered TRUs and TRU gensets are eligible as nonroad equipment under DERA if the existing engines meet the applicable nonroad eligibility criteria defined in Section III.D of the Request for Applications (e.g. operating hours, horsepower, model year and tier).

Replacement may consist of the following projects:

- Removing the old, diesel-powered TRU from the truck or trailer, scrapping it, and installing a new TRU, electric standby TRU, hybrid electric TRU, or all-electric

TRU. EPA will fund up to 25% of the cost of an eligible piece of equipment powered by an engine certified to EPA emission standards. EPA will fund up to 45% of the cost of an eligible zero tailpipe emission piece of equipment. Please note that the 45% EPA funding is only eligible if the new unit will operate solely on grid, battery, solar, or other zero emission power sources. eTRUs that will be powered by diesel engines or diesel gensets are only eligible for the 25% EPA funding.

- Scrapping the entire TRU-equipped truck, trailer, or shipping container and purchasing a new truck, trailer, or shipping container with new, eligible TRU, eTRU, electric standby TRU or hybrid electric TRU technology installed. New trailers can gain additional efficiencies and fuel savings. EPA will fund up to 25% of the cost of an eligible piece of equipment powered by an engine certified to EPA emission standards. EPA will fund up to 45% of the cost of an eligible zero tailpipe emission piece of equipment. Please note that the 45% EPA funding is only eligible if the new unit will operate solely on grid, battery, solar, or other zero emission power sources. eTRUs that will be powered by diesel engines or diesel gensets are only eligible for the 25% EPA funding; or
- Scrapping a TRU genset and installing a new TRU genset. EPA will fund up to 25% of the cost of an eligible TRU genset powered by an engine certified to EPA emission standards.

In stationary applications, replacement may also consist of the following:

- Scrapping TRU gensets and installing electrical grid infrastructure. EPA will fund up to 45% of the cost of the electrical infrastructure to enable the use of grid power by existing eTRUs; or
- Scrapping a TRU, installing a new eTRU, and running grid shore power to the eTRU. In this case, the project consists of the replacement of the TRU with an eTRU and the purchase and installation of electrical infrastructure or equipment to enable the use of power. EPA will fund up to 45% of the cost of the eTRU and the electrical infrastructure to enable the use of power.

Electrified Parking Spaces (EPS), also known as Truck Stop Electrification (TSE), provide off-board electrical power to operate a plug-in capable refrigeration system that would otherwise be powered by an engine. Funding can cover up to 30% of the cost (labor and equipment) of eligible electrified parking space technologies, including the cost of modifications, attachments, accessories, or auxiliary apparatus necessary to make the equipment functional. Eligible EPS costs include, but are not limited to, the purchase and installation of electrical infrastructure or equipment to enable the use of power for transport refrigeration units (TRUs) at distribution centers, intermodal facilities, and other places where trucks congregate.

An EPS project may be implemented as a stand-alone project, as described above. Or, EPS may be implemented in combination with the replacement of TRUs with electric standby TRUs or hybrid electric TRUs. In this latter example, the EPS costs may be funded at 30% and the TRU costs may be funded at 25%.