

Smart way forward for U.S. Reefer Trailers

Use of existing proven technologies can substantially reduce fuel use and emissions amongst U.S. trailers. All that is needed is for Federal & State support so that critical annual sales are achieved so that incremental system costs can be reduced to attractive levels

Background

There are about 2.5 million trailers in the U.S. A significant sub section of these trailers are refrigeration or reefer trailers.

These reefer trailers are responsible for virtually all the diesel fuel use and harmful emissions related to trailers.

The diesel engines used by these trailers are typically rated at about 25 HP and the average annual emission per trailer are approx. 0.5 tons of NO_x, CO and Non Methane Hydrocarbons plus 27 Kg of Diesel Particulate Matters.

The diesel refrigeration engines on these trailers consume billions of dollars of diesel fuel annually.

Current Existing Proven Technologies

The following proven technologies are currently commercially available:

- Hybrid Tractors that have significant Power Packs with the potential to provide AC power for all electric reefer trailer systems.
- AC Generator power sources driven by the tractor main engine that can provide AC power for all electric reefer trailer systems.
- Lithium Ion and other high capacity battery packs that can provide back up power when tractor is not moving and that can be rapidly recharged.

Annual sales of 2000 to 3000 units can result in significant price reduction in these technologies. These prices reductions would then generate further market penetration.

Targeted Fuel and Emission reductions

Diesel engine reefer engines consume approximately 1 gallon per hour of diesel fuel. The incremental torque from the main engine to provide the power for an all electric reefer trailer system will require about 0.2 gallons per hour of diesel fuel.

So diesel fuel savings will be about 80% and the net emission reductions from reefer trailers will be even greater than that. Forums such as HTUF (Hybrid Truck User Forum) have highlighted and documented these fuel and emission reductions.

Commercially available hybrid reefer mid size trucks and AC generator based mid sized reefer trucks have already proven these fuel and emission

reductions. Federal & State agencies need to encourage industry to make the same transition to the reefer trailer market.

The Goal

The Federal & State goals for reefer trailers should be:

- a) When trailer is moving – the reefer should be powered by the tractor AC generator or tractor Hybrid Power Pack
 - b) When the trailer is stationary or parked – the reefer should be powered by shore power or battery power.
 - c) When the trailer is unloading – the reefer should be powered by battery power
- Achieving these goals would result in trailer emission levels well below 1990 levels and these targets could be met well ahead of the Year 2050 target set by CARB.

Meeting these goals will result in pollution free reefer trailers as they move between and within cities.

Incentive and grant programs should be designed to meet those goals.

Incentives Proposed

The Federal & State incentives for tractor / trailers to help meet goals set above and to help industry meet critical sales volume levels are as follows:

- Hybrid Tractors that can pull reefer trailers should receive additional rebates if they have potential to export 15 kW to 20 kW power needed for all electric reefer trailer systems. (Suggested amount \$15,000)
- Existing or new non hybrid tractors that can pull reefer trailers should receive rebates if they install 15 kW to 20 kW mobile AC power generators that can power all electric reefer trailer systems. (Suggested amount \$10,000)
- Purchasers of new reefer trailers that have electric standby option should receive a rebate/ grant. (Suggested amount \$3,000)
- Purchasers of all electric reefer trailers should receive a rebate / grant (Suggested amount \$8,000)

Demonstration Projects Proposed

In addition to the incentive rebate / grant programs suggested above there is also a need to finance demonstration projects that document the fuel and emission reductions. This will further help promote and market the new technologies.

Benefits to the U.S

There are multiple benefits to the U.S. from supporting the above incentive and demonstrations projects as follows:

- Substantial reduction in fuel use and emissions
- Significant boost to U.S. industry and U.S. job creation

- Potential for export of new technologies

Summary

The fastest and shortest duration payback plus greatest emission reductions are when one can remove a secondary engine such as a reefer diesel engine.

This is also the best way to help industry reach the 2000 to 3000 annual sales target when prices will gain volume sales benefits.

It is imperative for Federal & State governments to implement rebate and grant incentive programs, as above, to reduce trailer fuel use and emissions levels.

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