

# Renewable Diesel – A Catalyst for Decarbonization

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## EXECUTIVE SUMMARY



Prepared by the American Transportation Research Institute

# Renewable Diesel

## A CATALYST FOR DECARBONIZATION

Building on its prior research that examined pathways for reducing the trucking industry's carbon footprint, the newest research from the American Transportation Research Institute (ATRI) found that renewable diesel (RD) has significantly higher potential for reducing the industry's CO<sub>2</sub> emissions at a much lower cost than transitioning the nation's trucks to battery electric vehicles (BEVs).

A transition from petroleum diesel to RD will result in a **67.3 percent decrease** in per truck life-cycle CO<sub>2</sub> compared to a **30.0 to 39.5 percent decrease** in per truck life-cycle CO<sub>2</sub> for BEV trucks. To achieve comparable CO<sub>2</sub> reductions over 15 years, the transition to RD would cost **\$203 billion**, compared to **\$1.19 trillion** for BEV trucks.

### WHAT IS RENEWABLE DIESEL?

RD is a fuel that is produced to be "chemically identical" to petroleum diesel; thus, RD can be mixed with petroleum diesel in any amount or used as a standalone, drop-in fuel in a traditional diesel truck without consequences.

There currently is research that aims to develop RD from new waste streams, as well as algae.



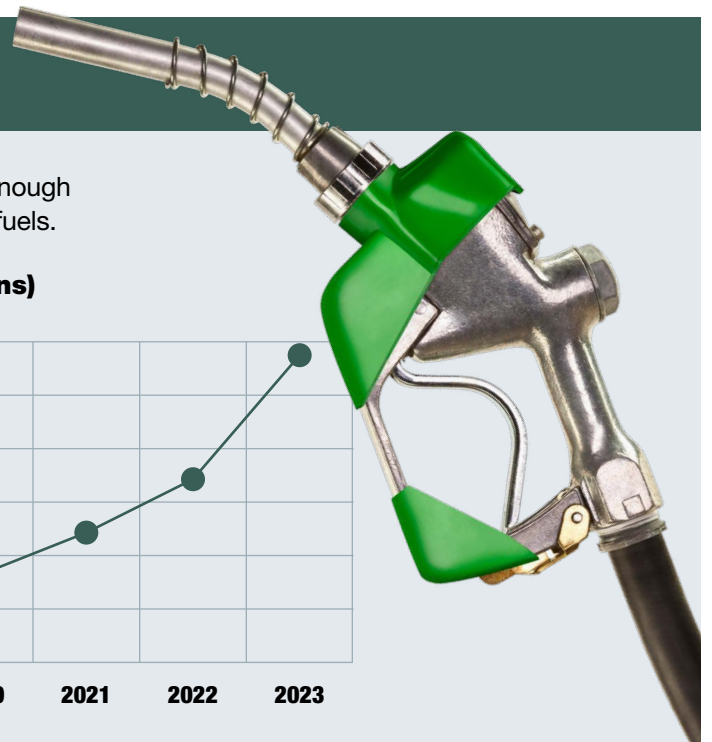
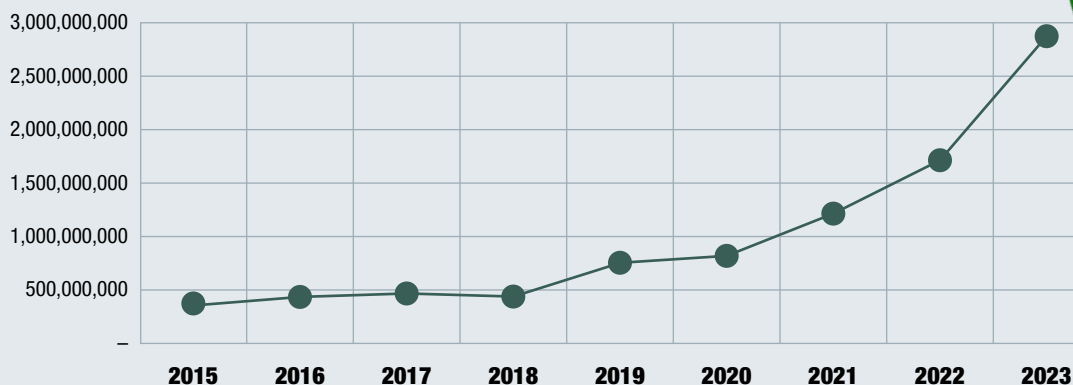
**RD is typically made from vegetable oils or animal products, including:**

- ✓ **Used Cooking Oil**
- ✓ **Soybean Oil**
- ✓ **Tallow**
- ✓ **Corn Oil**
- ✓ **Canola Oil**

### THE TRANSITION TO RENEWABLE DIESEL IS HAPPENING NOW

U.S. consumption of RD in 2023 was nearly 3 billion gallons – enough RD to transition nearly 300,000 tractor-trailers away from fossil fuels.

#### Annual U.S. Consumption of Renewable Diesel (Gallons)



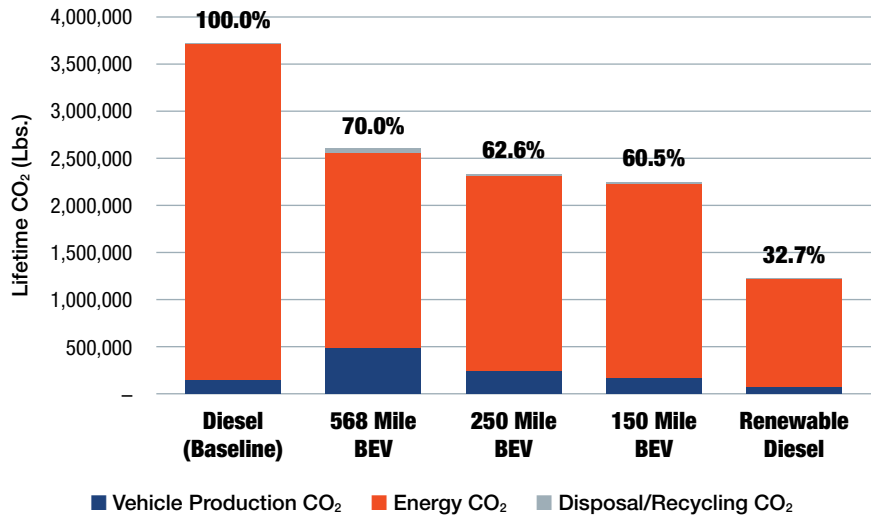
# RD HAS GREATER ENVIRONMENTAL BENEFITS

ATRI's RD analysis utilized the GREET model, which was developed by the U.S. Department of Energy's Argonne National Laboratory, to analyze CO<sub>2</sub> decreases that could be achieved through the use of alternative energy sources.

When the analysis considers full life-cycle CO<sub>2</sub> emissions – from mining for the battery materials to vehicle production, power generation and vehicle disposal – there is simply more CO<sub>2</sub> emitted by a BEV truck than an existing truck using renewable diesel.

If your fleet is exclusively using RD today, shifting to BEV will more than DOUBLE your life-cycle CO<sub>2</sub> emissions.

## COMPARISON OF LIFE-CYCLE CO<sub>2</sub> EMISSIONS FOR FIVE CLASS 8 TRUCK CONFIGURATIONS



# BEV TRUCK ADOPTION IS SLOW, WITH LITTLE PENETRATION IN THE LONG-HAUL SECTOR

In 2023 there were only 441 Class 8 BEV trucks sold in the U.S. – which is far less than the number of Class 8 trucks using RD today. There are other headwinds that will complicate BEV truck deployment, especially in the long-haul sector. These include required electric infrastructure upgrades to power plants, transmission and distribution lines, and substations, as well as the nationwide deployment of truck chargers. These tasks will take decades to complete to a level that meets the needs of the trucking industry.

## DECARBONIZATION WITH RD IS ACHIEVABLE TODAY WHILE BEV IS BURDENED WITH COMPLEXITY AND UNCERTAINTY

Operationally, BEV trucks cannot do the same job as trucks using RD – in terms of uninterrupted mileage, revenue weight and even the ability to refuel when needed. All of these factors limit the potential emission reductions of BEV trucks.

RD requires no operational changes.

### TRUCKS AND FUELING REMAIN UNCHANGED

NO NEED FOR:



New Power Plants



Transmission/ Distribution Lines



Truck Chargers



Expensive New Trucks

RD facilitates long-haul trucking with lower carbon output but without the issues of:

- **Battery Range Limitations** – BEV trucks can drive a fraction of the distance before refueling is needed
- **Battery Weight Issues** – BEV trucks carry less cargo weight, meaning more trucks are needed to haul the same amount of freight

# RD REPRESENTS LOWER CO<sub>2</sub> EMISSIONS AND LOWER COSTS FOR AMERICA'S SUPPLY CHAINS – A WIN-WIN FOR AMERICAN CONSUMERS

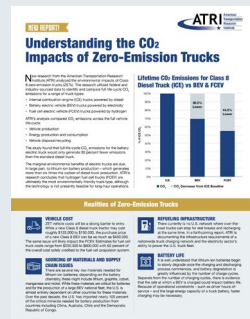
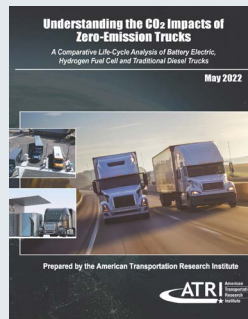
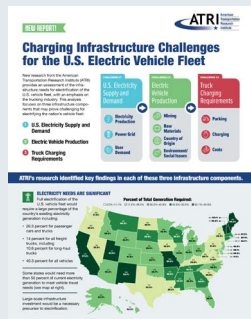
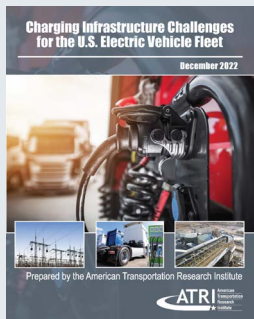
The cost of transitioning to BEV is 5.8 times higher than RD; these costs will ultimately be borne by American consumers who rely on all things delivered by trucks. To reach a goal of 22.6 percent reduction in CO<sub>2</sub> within 15 years, the cost would be \$203 billion for an RD fleet and \$1.19 trillion for a BEV fleet.

## SUMMARY OF COSTS AND BENEFITS OF ICE RD vs BEV



	ICE Truck Using Renewable Diesel	Battery Electric Truck
<b>Environmental Benefits</b>	67.3 percent decrease in per truck life-cycle CO <sub>2</sub> from ICE diesel	30.0 to 39.5 percent decrease in per truck life-cycle CO <sub>2</sub> from ICE diesel
<b>Operational Changes</b>	No operational changes from ICE diesel	Limited range and cargo capacity; substantial operational challenges using today's BEV equipment
<b>Costs to Reach 22.6% CO<sub>2</sub> Decrease</b>	\$203 billion across 15 years	\$1.19 trillion across 15 years
<b>Cost per Percentage Point Decrease in CO<sub>2</sub></b>	\$8.98 billion	\$52.65 billion

To learn more about ATRI's research examining ways to reduce the industry's carbon footprint and to download the full report, visit [TruckingResearch.org](https://www.TruckingResearch.org).



The following data sources were utilized for this document: U.S. Energy Information Administration (2010-2023); Federal Highway Administration (2022); American Trucking Associations (2023); American Transportation Research Institute (2022-2024); Argonne National Laboratory GREET Model (2021); CALSTART (2024); Clean Freight Coalition (2024).