

# Advancing Clean Solutions for Trailer Refrigeration

ConMet® is a leading global supplier of wheel end products, aluminum and iron castings, and interior and exterior plastics to original equipment manufacturers in the commercial vehicle industry. The company was founded in 1964 and is backed by its parent company, Amsted Industries, with over 120 years of expertise in the automotive, rail, and industrial infrastructure sectors.

ConMet eMobility was launched in 2020 to provide electrification solutions for the medium- and heavy-duty markets. Currently, ConMet eMobility's Nmotion™ TR series supports refrigerated trailer fleet electrification with innovative power generation systems that feature eHub™ 80 in-wheel electric motors. ConMet eMobility is partnered with Carrier Transicold, Great Dane, Penske, Sysco Foods, and UNFI, as well as key stakeholder groups such as the Department of Energy's 21st Century Truck Partnership, the Electric Freight Consortium, CALSTART, Forth Mobility, and the Columbia-Willamette and Western Washington Clean Cities Coalition.

## TRU Emissions

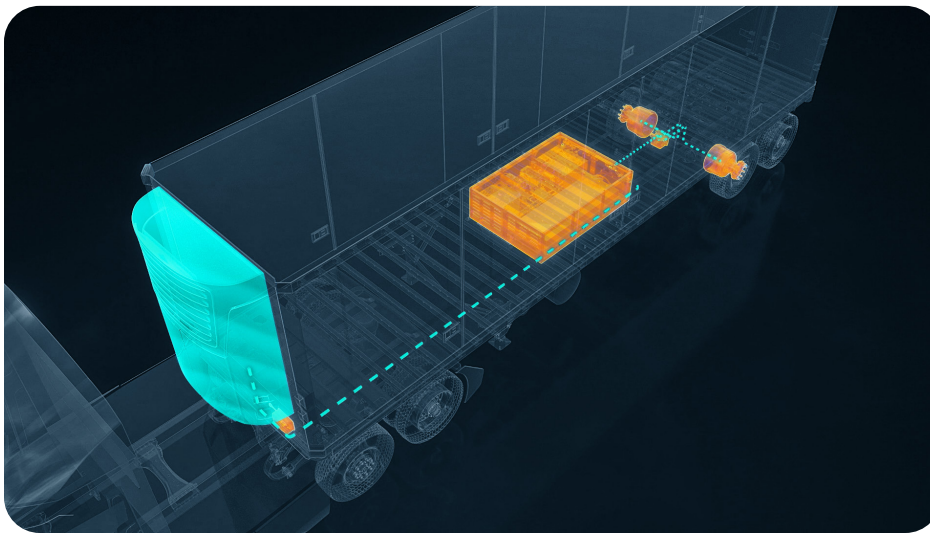
As of 2021, greenhouse gas (GHG) emissions from the transportation sector accounted for nearly one-third of total U.S. GHG emissions. Medium- and heavy-duty vehicles (MHDV) represent only 5% of total vehicles on the road, yet they are responsible for 21% of all transportation emissions. This makes them the second-largest transportation emissions contributor following light-duty vehicles.<sup>1</sup>

There are 500,000 trailer refrigeration units (TRUs)<sup>2</sup> in the U.S. powered by diesel engines with little mitigation on exhaust. This can create significant particulate matter (PM2.5), nitrogen oxides (NOx), and carbon dioxide (CO<sub>2</sub>) pollution, including up to 500 times the PM2.5 and double the NOx of a standard diesel Class 8 tractor – making TRUs outsized contributors to emissions.<sup>3</sup> Since goods distribution centers are often stationed in or near disadvantaged communities, frequent TRU use can create additional pollution and noise emissions, negatively impacting community health.

## Nmotion Technology and Benefits

ConMet eMobility's Nmotion TR 160-45 generates energy when the vehicle is in motion using the eHub™ 80, an in-wheel electric motor. The system can power an electric TRU and store energy in the system's battery for future use, significantly reducing overall fuel consumption and emissions.

Learn more here: [conmet.com/emobility](https://conmet.com/emobility)



## ADVANTAGES OF ZERO-EMISSION REFRIGERATION



Fuel & Maintenance Savings



NOx Reduction



CO<sub>2</sub> Reduction



Less Noise Pollution

## References

- 1 – Department of Energy, USA (2023). <https://www.energy.gov/sites/default/files/2023-01/the-us-national-blueprint-for-transportation-decarbonization.pdf>
- 2 – Technology & Maintenance Council, USA (2023). [https://tmc.trucking.org/sites/default/files/TMC\\_IR\\_2022\\_1\\_Next\\_Gen\\_Reefer\\_Trailer\\_EXEC\\_SUM.pdf](https://tmc.trucking.org/sites/default/files/TMC_IR_2022_1_Next_Gen_Reefer_Trailer_EXEC_SUM.pdf)
- 3 – Zemo Partnership, UK (2021). [https://www.zemo.org.uk/assets/reports/Zemo\\_TRU\\_emissions\\_report2021.pdf](https://www.zemo.org.uk/assets/reports/Zemo_TRU_emissions_report2021.pdf)

## Federal Commitment to Transportation Decarbonization

Bipartisan congressional leadership and the Biden administration continue to prioritize transportation decarbonization efforts that create jobs, spur domestic innovation, and reduce emissions. With the Biden administration's goal of having 50% of all new vehicles sales be electric vehicles (EVs) by 2030 and the enactment of the Infrastructure Investment and Jobs Act (IIJA) – the largest federal investment in American infrastructure in a decade – decarbonizing the transportation sector has never a higher priority. The impact of critical provisions in the IIJA, including building out electric vehicle supply chains in the United States, upgrading public transportation, renewable energy sources, implementing electric vehicle charging corridors, and investing in new technologies to decarbonize American manufacturing industries, are already being felt in the United States. In addition, the Inflation Reduction Act (IRA) created the 45W Commercial Clean Vehicle Credit, a tax incentive for commercial electric and other types of clean vehicles. Click the links below to read more:

Fact Sheet: [https://www.energy.gov/sites/default/files/2023-01/EERE\\_TranspoDecarb\\_factsheet-508\\_0.pdf](https://www.energy.gov/sites/default/files/2023-01/EERE_TranspoDecarb_factsheet-508_0.pdf)

Full Document: <https://www.energy.gov/sites/default/files/2023-01/the-us-national-blueprint-for-transportation-decarbonization.pdf>

To ensure these investments have the greatest impact, TRU electrification must be integrated as a key priority within medium- and heavy-duty fleet initiatives.

### Importance of Trailer Electrification

- ▶ There are 500,000 TRUs<sup>2</sup> in the U.S., similar to the number of school buses. Each of which consumes over 1,000 gallons of diesel fuel per year.<sup>4</sup>
- ▶ TRUs can produce twice as much NOx as diesel truck engines and 500 times the PM2.5.<sup>3</sup>
- ▶ Use of refrigerated trailers in residential areas can lead to significant CO<sub>2</sub>, PM2.5, and noise pollution that impacts the local population.
- ▶ Despite the considerable impact TRU electrification would have on transportation decarbonization and community health, federal transportation programs rarely, if ever, address trailers and auxiliary power needs currently being fulfilled by diesel generators.

### Fleets Prefer a Diesel Fail-Safe Option

- ▶ Due to the value of the goods transported in refrigerated trailers, such as food and pharmaceuticals, fleets often opt to keep a diesel fail-safe unit on electrified trailers.
- ▶ Diesel fail-safe units complicate eligibility with federal electrification programs, such as the EPA's Diesel Emission Reduction Act (DERA) program, despite the diesel rarely, if ever, being used.

### The Value of Retrofitting

- ▶ ConMet's eHub technology can be used with hybrid and fully electric applications, and it is easily retrofittable, making it a useful electrification solution for fleets with new and existing trailers.
- ▶ With many federal funding programs limiting technology retrofit capabilities and TRU eligibility, this is a missed opportunity for reducing greenhouse gas emissions, decarbonizing the transportation sector, and increasing innovation, research, and development of new technologies.

### State-Level Policies:

- ▶ Eight states have passed Advanced Clean Trucks (ACT) rules, while others are in the process of adopting similar regulations. ACT requires manufacturers to sell an increasing percentage of zero-emission medium- and heavy-duty vehicles every year starting in 2024.<sup>5</sup>
- ▶ Seventeen states, plus Washington D.C., have signed a Memorandum of Understanding (MOU) to push for 30% of all new medium- and heavy-duty vehicle sales to be zero emissions by 2030 and 100% by 2050.<sup>6</sup>
- ▶ California is leading the charge in zero-emission policies with regulations regarding trailer TRUs slated to go to the California Air Resource Board in 2026 and implementation expected around 2028.<sup>7</sup>
  - ▶ This does not include truck-mounted TRUs, for which regulations began in 2024.

#### References

4 – Carrier, USA (2023). *TRU diesel consumption calculated assuming 200 operating days/year, 8 hours/day, and 0.67 gallons/hour.*

5 – CALSTART, USA (2023). <https://calstart.org/companies-applaud-five-states-for-acc-act-rules-action/#:~:text=Eight%20states%20have%20already%20adopted,process%20of%20adopting%20the%20rule.>

6 – Department of Energy, USA (2020). <https://afdc.energy.gov/laws/12460>

7 – California Air Resources Board, USA (2022). [https://ww2.arb.ca.gov/sites/default/files/2023-04/2022%20TRU%20ATCM%20FAQ\\_English.pdf](https://ww2.arb.ca.gov/sites/default/files/2023-04/2022%20TRU%20ATCM%20FAQ_English.pdf)