



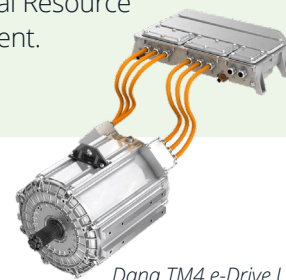
# Hybrid Tractor-Trailer Project

**Driving productivity, efficiency, and safety in forestry trucks**



FPInnovations is moving forward on a cutting-edge project to develop and test a hybrid tractor-trailer for use in forestry operations. The objective is to replace one of the conventional axles on forestry trailers with a drive axle powered by an electric motor. The system would be combined with a conventional tractor to create a parallel hybrid configuration.

The project is primarily funded by Natural Resources Canada through the Clean Growth Program. FPInnovations also gratefully acknowledges the financial support of the Province of British Columbia through the Ministry of Forests, Lands, Natural Resource Operations and Rural Development.



## The potential benefits are numerous



### Fuel savings

The electric propulsion system can increase the fuel efficiency of Class 8 trucks by up to 15%, depending on the application and drive cycle. Although average values of fuel savings will be less than 15%, the improvement in efficiency can translate into significant cost savings for the operator as well as reduced exposure to volatility in fuel prices.



### Greenhouse gas reduction (CO<sub>2</sub>)

As a direct result of the fuel savings, the hybrid configuration can result in significant greenhouse gas reductions reaching 40 tonnes per truck per year, depending on its utilization rate. That's the equivalent of taking approximately 8 cars off the road!



### Improved traction and superior braking

Adding an electrically driven axle to the trailer can increase a truck's traction by almost 50% on slippery terrain. The system also provides additional power for going up steep hills. This means safer and more reliable access to fibre as well as less downtime due to stuck trucks, resulting in costs savings and therefore more income for the operator. The electric motor can provide up to 250 kW (335 hp) of regenerative braking power which will recharge the batteries as well as reduce the use of service brakes on sustained descents. Not only does this increase braking capacity, but it also reduces the likelihood of brake fade on mountainous terrain.

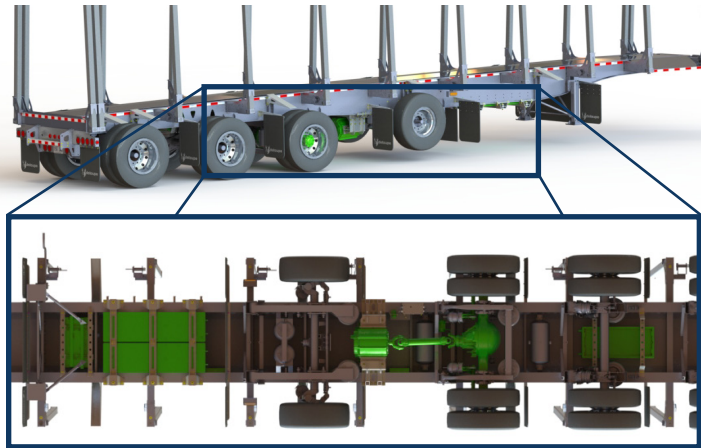


## Applications

The hybrid system is being designed with a variety of forestry applications in mind. The system will be initially designed for log and biomass trailers; however, the technology can be adapted to other forestry applications as well as other resource industries. The system will be initially designed for trailers from Deloupe and TYCROP Trailers.

## Project outlook

The project is divided into numerous phases and the development of the trailers is being conducted sequentially, beginning with Deloupe's logging trailer followed by TYCROP's biomass trailer. The project involves component specification and integration, vehicle design, prototyping, and testing. The scope also includes studying contemporary operational data, conducting fleet surveys, evaluating possible weight exemptions, as well as possible homologation towards financial aid programs for technology acquisition. The testing of the first prototype, a Deloupe logging trailer, is scheduled to begin in the autumn of 2021. Once testing of both trailers (logging trailer and biomass trailer) is complete, data analysis and component optimization will be conducted. Lastly, a comprehensive report along with the final business case evaluation will be produced.



Render of an electrified semi-trailer.



## Proven collaborators and suppliers

The system is being developed in partnership with two of Canada's leading trailer manufacturers: Deloupe and TYCROP Trailers. LTS Marine, a leading hybrid and electric powertrain supplier, is supplying the electric propulsion system and is also supporting its development and testing. The electric system's thermal management will be optimized by components supplied by Grayson Thermal Systems. Promark Electronics will play a key role in developing and providing a prototype harness for the system. The powertrain is composed of a Meritor axle with differential lock and an electric motor from Dana TM4. For superior performance, the trailers are fitted entirely with tires provided by Michelin and chosen with their support. Hendrickson is providing a truck suspension and is also supporting its unique integration onto a forestry trailer, alongside Hendrickson trailer suspensions. Moreover, the technology's directed end-users will also be contributing to the development and testing; these include Arrow Transportation Systems, Boisaco, and Star Express. For testing in Quebec, Mack Ste-Foy will be providing bespoke trucks specifically configured for logging operations. Before in-field testing, PMG Technologies will be supporting controlled testing at the Motor Vehicle Test Center in Blainville, Quebec.



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