



Mine Truck Electrification Demonstration Project Opportunity



March 1, 2023

David Chura, Manager – Emerging Initiatives

Industrial Scale Benefits of Electrification



1 Mine Truck (240 ton)

520 passenger vehicles

In the US Steel demonstration project analysis, adding trolley assist to Tier IV mine trucks reduces CO₂ by 14,359 metric tons when supplied with 100% carbon free electricity. **To achieve those same reductions, it would require electrifying 3,122 gasoline passenger vehicles, or 520 passenger vehicles per mine truck. This is the equivalent of increasing the number of EVs in Minnesota by 14%.**

Key Findings

- MTE significantly reduces fossil fuel consumption, resulting in reduced emissions near key Class I airsheds, such as the Boundary Waters Canoe Area Wilderness, Voyageurs National Park, and several defined areas of environmental justice
 - Diesel fuel consumption on the trolley line section is reduced over 95% (~1.4 million fewer gallons of diesel annually) = a decrease of more than 14,000 metric tons of CO₂
- Enables additional interruptible electric load
- The economics are site specific (slope, distance, life)
- Upfront infrastructure and equipment costs are sizable barriers
- Financial support needed to support the transition

Infrastructure and Equipment Needs

Equipment Needs

- New electric drive mine trucks (~\$6M each)
and/or
- Modification of existing electric drive mine trucks (~\$1.1M each)

Infrastructure Needs

- Trolley infrastructure costs are ~\$5M/mile
- Overhead powerline and poles/support structure
- Power rectifier station/portable substation
- Service extension to trolley line substation

