

Supporting Green Technologies

Guide to Trolley-Assist



1. Trolley-assist systems utilize external electrical power sources during uphill segments to produce the energy required to power electric wheel motors
2. The diesel engine is bypassed entirely when the trolley-assist mode is engaged on diesel-electric haul trucks and
3. Power consumption is redirected to the draw from overhead lines



The advantage of trolley-power is that the electrical power drawn to move the haul truck is generated from a cleaner source than that of the diesel engine while also improving fleet productivity.

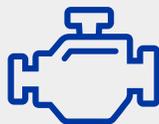
TROLLEY-ASSIST IS PART OF A KOMATSU'S COMPREHENSIVE INNOVATIONS TO SUPPORT SUSTAINABLE MINING SOLUTIONS LEVERAGING NEW GREEN TECHNOLOGIES INTO THE MINE FLEET.

Improving GHG emissions and lowering your cost per ton

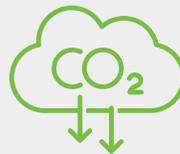
Improved grade performance can significantly impact truck productivity, personnel requirements, fuel consumption, and operating and capital costs.



Travel uphill nearly
2X faster



Extend engine life



Reduce CO2 emissions



Burn **70%** less fuel



Improved fleet productivity with shorter mine cycle times and maintenance schedules



Setting the foundation for building towards zero-emissions future

Experience provides assurance

There are infrastructure, component, and design requirements to consider before implementing a trolley-assist system.

- Catenary system
- Traction substation
- Illumination of catenary system
- Signalling
- Pantograph kits

We are working in close collaboration with our key partners to ensure successful implementation of sustainable solutions to reduce greenhouse gasses from mining operations

Mike Brown, EVP, Technology & Innovation



LET OUR EXPERTS HELP ASSESS HOW TROLLEY-ASSIST AND OTHER MINING SOLUTIONS CAN HELP MEET YOUR GHG REDUCTION REQUIREMENTS AND LOWER TCO OF YOUR MOBILE FLEET.

Trolley-assist considerations

Operations that are the most suitable for trolley assist have specific characteristics.

There are six application-specific factors considerations to maximize value to trolley-assist operations.

1

Time

Trolley segments can stay in operation for significant periods > 1 year.

2

Road Surface

Site operations can keep the road surface well maintained.

3

Power

Adequate electrical power capacity is available.

4

Energy Cost

Electric energy costs less than diesel fuel.

5

Application

20% or more of the truck cycle is on an uphill grade.

6

Regulations

Unique noise, emission requirements.