CharIN — towards greater interoperability & standardisation in charging systems for mine haulage

Iain Curran – BHP
The mining industry needs to be at the forefront of tackling the climate challenge.

We've made progress, but decarbonisation isn't a challenge we can solve alone.

~25 billion litres
The collective annual consumption of diesel by 28,000 mining trucks*.

~69Mt CO₂ p.a
54Mt for Scope 1, and an additional 15Mt CO₂ for Scope 3*.

> 90% emissions reduction
from renewable energy procurement

Electrification of these trucks (through batteries) would reduce the local/on-site emissions to zero (equivalent to 0g CO₂ Scope 1 & ~3Mt CO₂ Scope 2 emissions).

* Rocky Mountain Institute 2019, EPA 2021
The Challenge
Safely deliver megawatts of electricity to each haul truck within each haul cycle.

Interoperability
A range of charging solutions made interoperable with industry collaboration.

Ruggedized Solutions
Making megawatt charging work for extreme environments.

Impact Potential
Replacing ~25 billion litres of diesel, emitting ~69Mt CO₂ annually > 90% emissions reduction from renewable energy procurement*

* Rocky Mountain Institute 2019, EPA 2021
Industry Problem
Interoperability as a bottleneck

Avoid multiples of charging stations and plugs
A complex landscape of charging connectors in mining operations affects reliability and supportability

Truck Constraint
It is desirable that the electrical connectors, battery and cooling system on the truck is less than:
- 17 tonne
- 23m3

Haul Cycle
The industry requires safe solutions that can be applied across the many and varied mines, mine infrastructure and truck manufacturers, and that maintain or improve productivity.
Interoperability is the ability and capacity of systems and products to function and interact with other systems and products via shared exchange of data, protocols, standards and communications.

**Legend**
- Work collaboratively
- OEMs' domain
- Leave for future discussions
- Technology providers' domain
- Take into consideration
Interoperable solutions developed with **Industry wide collaboration**

**Taskforce Members**
- 50+ companies including
  - ABB
  - BHP
  - Black & Veatch
  - Burns & McDonnell
  - Cavotec
  - Cummins
  - GHD
  - Hitachi Energy
  - Komatsu
  - Olitek / BluVein
  - Rio Tinto
  - Roy Hill
  - Siemens
  - Shell
  - Stäubli ECS
  - Teck
  - Tritium

**Taskforce Subgroups**
- Grid Comms
- Charging protocols
- Ruggedized Megawatt Charging System
- X-MCS
- Dynamic charging interface

**Charln Focus Groups**
- Grid Integration
- Charging Communication
- Charging Connection
- Charging Infrastructure
- Conformance Test & Interoperability

Individual Company IP Protected
The Challenge
Safely deliver megawatts of electricity to each haul truck within each haul cycle.

Interoperability
Potential to have an interoperable charging solution for every electric vehicle on this planet.

Deployment Potential
Potential to accelerate deployment across 650+ sites, alongside other solutions, as a partner of ICMM’s Innovation for Cleaner, Safer Vehicles (ICSV) initiative.

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Interoperable solutions developed in collaboration

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Join one of the subgroups

Ruggedized MCS

X-MCS

Dynamic Charging Interface

Visit the CharIN website
https://www.charin.global/

ICMM - Mining with Principles

Visit the ICMM ICSV website

View the media release