

# e·blue print

Low Emission Transport

## CHALLENGE



BHP CHALLENGE – ESCONDIDA MINE

E-Blueprint: Low Emission Transport



### Context:

Currently, at a global level, BHP has thousands of buses and light vehicles for transporting personnel from urban centers to and within its sites. Escondida Mine uses around 30 vans, 120 buses and over 1,000 pickup trucks that circulate daily, all of which use diesel fuel.

BHP's operational decarbonization plan is focused on reducing greenhouse gas emissions and incorporating clean technologies to achieve zero operational emissions by 2050.

With this background and within the framework of the company's corporate objectives, BHP Minerals America is interested in promoting the "E-blueprint: Low emission transport" challenge to search globally for technological solutions or development capabilities to enable the energy transition and the replacement of the diesel fleet with clean technologies.

This challenge is oriented to three different focuses, for which the applicants submit separate proposals:

1. Integrated fleet management platforms
2. Personnel transport vehicles
3. Charging or filling stations

## 1. Integrated fleet management platforms

### Objective

Technological solutions are sought to **manage fleets of low-emission vehicles** (buses, vans and trucks, among others), integrating energy requirements, infrastructure and resources of each area in a systematized, centralized and optimized manner.

### Requirements

- Optimize the allocation of resources (vehicles and charging stations) based on vehicle charging percentage and criteria of distance, availability, fleet energy demand, charging and maintenance times.
- Agnostic platform that allows connection to the vehicle fleet and cargo infrastructure. In addition, it must have the capacity to interconnect with databases or other company platforms that contain personnel identification data, permits, capacities or roles associated with each function such as drivers, cargo operators and maintainers.
- The platform must notify and alert the control center in case of risk events (loss of GPS connection or signal, data transmission cessation, etc.) and include road behavior monitoring.
- The system must generate reports or provide information related to loading times, travel times, routes, maintenance records and similar. The reports must be customizable and adaptable to the client's requirements.
- The solution requires network coverage for data transmission and energy characteristics that allow an on-line connection. Each supplier must specify requirements to comply with the above.



## 2. Personnel transport vehicles

### Objective

Passenger transport vehicles (vans, buses, pickup trucks) using clean energy sources are sought that meet the following requirements:

### Bus requirements

- It must have a range of at least 200 km, to transport personnel from the coast to the high mountain range, at an altitude of 3000 m.a.s.l.
- Must have at least 450 kWh or equivalent.
- Minimum capacity 46 passengers.
- Charging time of 6 hours maximum.
- Finish routes with at least 20% of battery capacity or equivalent.
- Chassis and body must be independent of each other.
- It is desirable to include protocols for risk events, such as fires.

### Van and pickup requirements

- Range of at least 210 km.
- Compatible with operations at 3000 m.a.s.l.
- Minimum van capacity of 9 to 15 passengers.
- It is desirable to include protocols for risk events, such as fires.

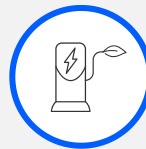
### Excluded solutions

- Pickup conversion.

### General Requirements

- Fire safety and driver behavior systems.
- GPS devices, 3-axis accelerometer, cruise control, automatic braking, tire pressure monitoring, 80 dB reversing alarm, climate control, refractory tape, nut loosening control system ("spider" type device is not allowed), proximity detection (mine), front camera recording at least 48 hours.
- Audible and visual alerts.

- Have a process for capturing, processing, and managing data provided by the speed and driving monitoring system that can be integrated. In addition, consequence and recognition management to encourage expected behaviors and manage deviations from the site's driving standards.
- The communication radio and any other device to be used by the driver must be installed in compliance with ISO 3958.
- Identify, evaluate and define those trips that, given their characteristics (e.g., geographic altitude, continuous driving hours, weather and environmental conditions on the route, among others), require additional controls to manage fatigue and drowsiness.



## 3. Charging or filling stations

### Objective

- Charging or filling infrastructure for low-emission vehicles (e.g., electric, hydrogen, a mixture or other) is sought.
- The stations can be powered by or rely on different sources of **clean energy**.
- They must have high safety standards.

## AREAS INVOLVED

### BHP Enterprise Innovation & Decarb Procurement

Our objective as a sourcing function is to bring the best of the innovation world to BHP, to solve current problems that need a solution or optimization. The area enables an Open Innovation methodology at BHP to access technological and business capabilities to solve operational challenges. It does this by identifying and prioritizing critical business challenges, aligned with BHP's priorities, and launching them to the market, not by specifying a product or service, but by asking for a solution. It then awards an on-site pilot to demonstrate that the solution is viable.

#### Expande

Expande aims to promote the development of ecosystems that allow the creation of virtuous cycles between industry challenges and innovative solutions from local and international suppliers. Under a model of open innovation and associativity, we seek that companies and suppliers capture value for their businesses through high impact technologies that contribute to a more sustainable industry.

#### Confidentiality

The delivery of personal information to register in the Expande platform, such as details related to technological solutions to apply for Expande's open innovation processes is strictly confidential; as is the information contained in the contact forms with information of these processes' subsequent stages.

### Conceptual background required\*

- Focus to which you are applying (more than one application/focus can be submitted separately).
- Description of the technological solution and degree of maturity (under development, tested, implemented or in operation).
- Previous experience in similar solutions or in the technological field of the challenge. Describe success stories.
- Relevant skills of the team members who will solve the challenge.
- Ability to deliver on-site operation and/or maintenance services.
- International suppliers must declare availability to operate in Chile or through technical and/or commercial representatives.
- Business model (sale, lease, service, license, etc.).

*\*This information must be completed in the application form. As a complement to the form, it is recommended to attach presentations, brochures or supporting documentation about the information declared, with a maximum of 10 MB per file. The proposed solutions must comply with Chilean regulations.*

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