RFI – Request for Information
"Electric Vehicles for Transportation of Workers"

1. Purpose, scope and dates

The purpose of this RFI is to know the capacities and possibilities of the different Original Vehicles Manufacturers, OVMs, hereinafter MANUFACTURERS, to supply new vehicles with ***Zero Diesel*** technology; preferably **100% Electric Vehicles**, y in this case Service, **hereinafter SEV**, or optional to a lesser extent, for the Divisions of the CORPORACIÓN NACIONAL DEL COBRE, **hereinafter CODELCO**. RFI in relation with Safety & Occupational Health & Green Energy Sustainability.

This RFI applies and is not limited to, among others: Buses, Mini-buses, Van, Pickup and/or Car.

For this purpose, CODELCO invites you to participate in this RFI by providing the information requested in this document, required for market knowledge, evaluation of options and feasibility of technological innovation in electro mobility applied to the scope of CODELCO requirement.

Participation in this RFI is voluntary and those MANUFACTURERS that comply with the background delivery and meet CODELCO's aforementioned needs will be considered in the respective records for the following pre-qualification stages of companies and they will be considered in future developments within **Zero *Diesel*** line of projects, as Strategic Manufacturers.

CODELCO may use part or all the information provided in the preparation of formal bidding terms for each CODELCO Division. MANUFACTURERS that do not respond to this RFI or refrain from participating, may not be considered in future bidding processes for the category.

Main Activities Calendar:

Stage	Date
Submission of RFI	Tuesday 17 April, 2018
Queries to RFI	Wednesday 18 April, 2018 Submit directly by email
Answers to Queries	Thursday, 26 April, 2018
Responses to RFI	Thursday, 03 May 2018
Companies Presentation	As of Monday, 14 May 2018
Electric Vehicle Pilot Program	Work in collaboration with MANUFACTURES

(*) CODELCO may request a technical presentation of the Companies' capabilities and services that respond to this RFI. Also, may request to carry out technical visits to the corresponding centers and/or factories. These requests will be made with due anticipation.

2. Backgrounds

Background information indicated below, shall be considered as referential by the MANUFACTURER and exclusive use of CODELCO. Manufacturers will not be able to publish, share, or mention outside their company the foregoing information.

CODELCO Divisions

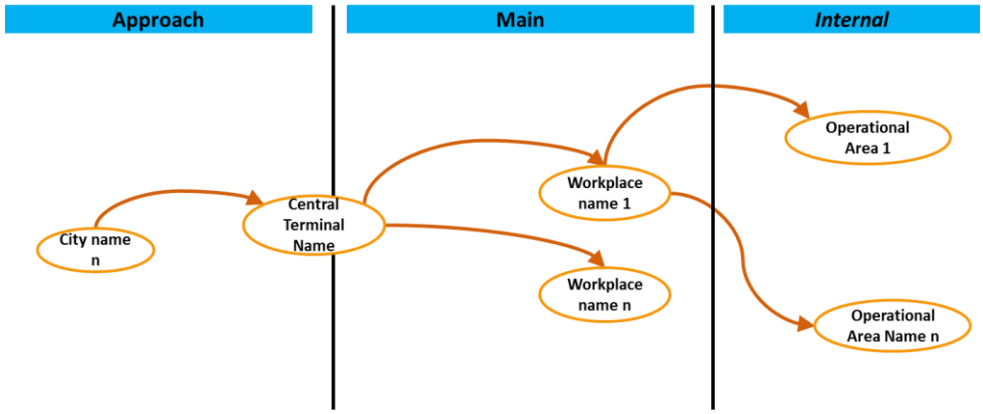
CODELCO Divisions (www.codelco.com) comprised correspond to:

DIVISION		Open Pit	Underground
Chuquicamata	DCH	X	X
Ministro Hales	DMH	X	NA
Radomiro Tomic	DRT	X	NA
Gabriela Mistral	DGM	X	NA
Andina	DAN	X	X
El Teniente	DET	X	X
Salvador	DSA	X	X

X: Applicable
NA: Not Applicable

General Diagram of Worker Transportation.

The routs, which are generally operated in the different sites, are described in the attached diagram, where in some divisions they may NOT include an Approach Route, because they do not operate with a Central Terminal, in these cases the route is made directly between City - Workplace.



Approach: They are the routes that cover from the City (origin) to a Central Terminal BEFORE entering the industrial site (Workplace). It is possible that this routes this does not exist in some divisions, because the route is made from City to Workplace directly.
Main: They are the routes that exist from the city or terminal (s) (origin) to Workplace (s) (destination).
Internal: These are the routes that exist from the Workplace A (origin) to Workplace (for example, mine, plant, foundry or other). They are usually captive vehicle.
Workplace: are the places like Houses of Change or administrative offices that are within the industrial site. There may be several sites as destination or origin.

Current and future situation

CODELCO is exploring the technological and economic feasibility to acquire vehicles with ***Zero Diesel*** technology; **preferably 100% Electrical,** or alternative to a lesser extent, for CODELCO Divisions.

The MANUFACTURER's proposal for **SEV** must be equivalent or better in terms of: physical dimensions, availability, reliability, interoperability, automation, safety, environment, sustainability, productivity and production-operation & maintenance costs, among others, in comparison with current technologies.

Fleet Summary

Generally listed below are the types of vehicle that are part of the fleets that must be considered as:

- Buses
- Mini-buses
- Van
- Pickup
- Car

3. Requested Information

This RFI seeks to gather information on capabilities and approach relative to the above, which will be treated with absolute confidentiality between the MANUFACTURER Company and CODELCO.

1. The general experience of the MANUFACTURER regarding vehicle with ***Zero Diesel*** technology; **preferably 100% Electrical, SEV**, or optional to a lesser extent, and also the specific experience with respect to the equipment described herein.

2. It is mandatory that the MANUFACTURER explain and justify for each **SEV**, the technology and type applied, whether it is based on, for example: batteries - (quick/normal charging time, estimated service life and reuse) high power capacitors, or optional such as: hybrid, combustion, water, solar, co-regenerative electromechanical conversion, autonomous, semi-autonomous, etc.

3. The MANUFACTURER shall justify and explain, among others, the advantages and/or disadvantages of **SEV**, among others, in terms of, and not limited to: standard, simplicity and safety; control and quality assurance-QA/QC; sustainability and environment; noise emissions, temperature, ventilation, altitude derating; performance, efficiency, effectiveness; productivity and CAPEX/OPEX costs; reliability, availability; interoperability and multi-brand mobility, communication, data transfer, data driven & science analytics & IIoT, vital signs, cognitive intelligence-IC, AI-AI; predictive, proactive, prescriptive and optimizing; in real time, among other attributes, will be well considered by CODELCO.

4. If the MANUFACTURER has manufactured, is manufacturing or is planning to manufacture such equipment; its Innovation, Development and Development Plan, Research and Technological Transfer or new approaches, R+D+i+TT, at what level, similar contracts it has had and/or has, quantities of equipment, deadlines, place, etc. CODELCO hereby declares that it respects patents and technological confidentiality of the MANUFACTURER participating in this RFI.

5. The Environmental Management and Sustainability, Risks, Personnel, Quality, Knowledge (training and certification) policies of the MANUFACTURER, among others, will be well considered by CODELCO.

6. Which brands and models of equipment can the MANUFACTURER propose? Do you have a preference for any particular brand and model?

7. Indicate if the MANUFACTURER is planning Joint Venture and/or strategic alliances and with whom.

8. Optional Solutions as a variant of CODELCO's RFI provisions, or if it can represent a completely new solution, whose adoption, implementation and proposal mean notorious economic and/or technological advantages for CODELCO.

9. The MANUFACTURER shall indicate whether the implementation of its technology represents: modifying, adapting or changing the mining design and/or infrastructure, as well as feeding and distribution, loading or by-pass systems that must be incorporated, among others.

10. The MANUFACTURER must indicate the availability of testing with SEV at the different CODELCO sites (Divisions). MANUFACTURER must send:

    - "Electric Vehicle Pilot Program" where it is at least: itinerary, characteristic of the equipment, necessary requirements for this activity.
    - The Concept Tests Protocols; PoC and/or Validation, PoV, in order to demonstrate with verifiable indicators and/or keys, KPI, measurable by instruments and/or sensors of the SEV and/or by third-auditors/inspectors; and/or with the ability to dispose and/or transmit the data-variables of interest such as: vital signs, motor

system, operational system, reportability, among others, must be made explicit. The KPIs and attributes, should also consider and highlight aspects regarding S&SO & SEV, they will be welcomed by CODELCO.

11. Others to be explained by the MANUFACTURER.

Companies interested in participating in this RFI are requested to answer these queries in the attached questionnaire called **"RFI Electric Vehicles for Transportation of Workers",** and to comment during the Queries round, if they consider it appropriate in order to show their capacity and vision as clearly as possible.

4. Electric Vehicle Pilot Program

Preliminary routes have been selected in some of the sites to carry out tests with the equipment. The technical description is specified in "Additional Information N1".

In the case of MANUFACTURER want to test the vehicle on site, CODELCO will be the facilitator so that said vehicle can be tested through the current operator of the personnel transport service.

5. Details for Information submission

Please complete this RFI, including any attachments, comments or other information deemed necessary to supplement the information requested, and return it to the subscriber via **e-mail** no later than **Thursday, 03 May, 2018.**

Business Name _____

ID TRADE No. _____

Address_____

_____

Contact name_____

Position within the Organization_____

Telephone _____Fax_____

Email _____

[ ] We enclose responses to your RFI.

[ ] We will not participate.

If you do not participate, we will appreciate filling the information on this page anyway, and send it also on the date and manner indicated above.

Contact in CODELCO

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ADDITIONAL INFORMATION N1- PRELIMINARY TECHNICAL INFORMATION OF AVAILABLE ROUTES TO PERFORM TESTS

DIVISION NAME		**SALVADOR (DSAL)**
Name Route:	:	Administrative and Operative Workers Transportation
Operation workplace		
Where to Operate	:	City-Workplace
Geo-Referencing of origin and destination	:	Salvador (city) – Plant (workplace)
Geo-Referencing of the route. (distance and altitude)	:	10.4 km y 2375 masl
Maximum slope of the route (%)	:	12.2%
Operating hours		
Service start time (One-way)	:	7:20 hrs.
Service duration	:	1.5 hrs.
Time available at destination. (to charge batteries)	:	6 hrs.
Start time of the service (return)	:	8:20 hrs.

DIVISION NAME		**EL TENIENTE (DET)**		
Name Route:	:	Approach to Rancagua (bus 44 asientos o menos)	Workplace "Obras Mina" (bus 44 asientos)	Workplace "Interior Mina" (bus 24 asientos o similar)
Operation workplace				
Where to Operate	:	El Olivar - Rancagua	Rancagua-Sewell	Interior Área Mina
Geo-Referencing of origin and destination	:	El Olivar hasta Lider Carretera el Cobre (Circuito continuo)	Lider Carretera el Cobre - Sewell	Colón – Interior Mina - Colón
Geo-Referencing of the route. (distance and altitude)	:	10 Km / 600 masl	62 km / 600 masl - 2100 masl	20 km/ 1800 masl - 2100 masl
Maximum slope of the route (%)	:	0%	14% (max)	14% (max)
Operating hours				
Service start time (One-way)	:	5:00 / 7:00 y 13:00 / 15:00	7:00	7:20
Service duration	:	2:00	1:30	0:45
Time available at destination. (to charge batteries)	:	5:00	6:00	0:30
Start time of the service (return)	:	n/a	16:20	9:00
Observations	:	The buses in DET must satisfy with the restrictions of maximum height and dimensions to pass through the Copado Tunnel and the Internal Mine entrance. In addition, buses must be verified that they can reach the maximum speed of Carretera El Cobre (90 m / hr).		

DIVISION		ANDINA (DAND)		
Name Route:	:	Workers of Mina Rajo	Administrative Saladillo	Maintenance Mina Rajo
Operation workplace				
Where to Operate	:	City-Industrial site	City-Saladillo site	Workplace "Interior Área Mina Rajo"
Geo-Referencing of origin and destination	:	Los Andes - Área Industrial Edificio Rock Point	San Felipe - Saladillo	San Felipe - Mina Rajo
Geo-Referencing of the route. (distance and altitude)	:	86,5 Km / 800 masl - 2900 masl	60 km / 800 masl - 1500 masl	123 km / 800 masl - 4000 masl
Maximum slope of the route (%)	:	12%	8%	15%
Operating hours				
Service start time (One-way)	:	5:00 / 17:00	6:00	4:30 / 16:30
Service duration	:	1:40	1:30	2:45
Time available at destination. (to charge batteries)	:	1:35	9:30	0:15
Start time of the service (return)	:	8:15 / 20:15	17:30	7:30 / 19:30

DIVISION		RADOMIRO TOMIC (DRT)
Name Route:	:	Calama - DRT - Calama
Operation workplace		
Where to Operate	:	City-Workplace
Geo-Referencing of origin and destination	:	Different sites around city from route 50 to Workplace DRT
Geo-Referencing of the route. (distance and altitude)	:	50 kms / 3.000 masl
Maximum slope of the route (%)	:	DRT=3.000 masl; Calama = 2.400 masl, with different slops (average 25%) (low level crossing towards Chiu-Chiu).
Operating hours		
Service start time (One-way)	:	Administrative and Operative buses are shown in "Tabla 1 y 2"
Service duration	:	Tiempos se indican en Tablas 1 y 2
Time available at destination. (to charge batteries)	:	Max 40 minute en workplace
Start time of the service (return)	:	Time is shown in "Tablas 1 y 2"
Observations	:	Tabla 1 TURNO A OPERATIVOS MINA (Casino Mina) Bus N° / Inicio / Llegada 1106-Op. Mina RT-1 6:20 7:23 1107-Op. Mina RT-2 6:18 7:24 1108-Op. Mina RT-3 6:20 7:24 1109-Op. Mina RT-4 6:22 7:26 1111-Op. Mina RT-5 6:19 7:25 1112-Op. Mina RT-6 6:15 7:16 1113-Op. Mina RT-7 6:15 7:22 OPERATIVOS PLANTA (OFICINAS CO3) Bus N° / Inicio / Llegada 1114-Op. Planta RT-1 6:15 7:22 1115-Op. Planta RT-2 6:16 7:19 1116-Op. Planta RT-3 6:21 7:24 Tabla 2 TURNO B OPERATIVOS MINA (Casino Mina) Bus N° / Inicio / Llegada 1106 -Op.Mina RT-1 18:22 19:25 1107-Op. Mina RT-2 18:16 19:34 1108-Op. Mina RT-3 18:22 19:26 1109-Op. Mina RT-4 18:19 19:30 1111-Op. Mina RT-5 18:15 19:29 1112-Op. Mina RT-6 18:17 19:34 1113-Op. Mina RT-7 18:17 19:22 OPERATIVOS PLANTA (OFICINAS CO3) Bus N° / Inicio / Llegada 1114-Op Planta RT-1 18:17 19:29 1115-Op. Planta RT-2 18:15 19:26 1116-Op. Planta RT-3 18:16 19:27

DIVISION		VENTANAS (DVE)
Name Route:	:	Transport from City to Ventanas
Operation workplace		
Where to Operate	:	Ventanas
Geo-Referencing of origin and destination	:	Quilpue Administrative
Geo-Referencing of the route. (distance and altitude)	:	86 Km, 140 Masl
Maximum slope of the route (%)	:	5-30%
Operating hours		
Service start time (One-way)	:	06:35
Service duration	:	01:20
Time available at destination. (to charge batteries)	:	8 hrs
Start time of the service (return)	:	17:00

DIVISION		CHUQUICAMATA	
Name Route:	:	Approach to Chuquicamata route 24 (bus 44 sets or less)	Inside DCH door 2 y 4 (bus 44 sets)
Operation workplace			
Where to Operate	:	Calama – Chuquicamata Central Terminal	Chuquicamata Central Terminal - operational area
Geo-Referencing of origin and destination	:	Start Antofagasta – door 2 Chuquicamata (continuous circuit)	Door 2 - Door 4 (area)
Geo-Referencing of the route. (distance and altitude)	:	16 Km / 3000 Masl	20 km / 3000 Masl
Maximum slope of the route (%)	:	7%	8% (max)
Operating hours			
Service start time (One-way)	:	5:00 / 7:00 / 13:00 / 15:00	7:00
Service duration	:	1:00	1:30
Time available at destination. (to charge batteries)	:	0:30 fleet reuse	0:30 fleet reuse

Start time of the service (return) :

	Entry	Exit
A	3:30	13:00
	3:45	13:15
	3:50	13:20
	3:55	13:30
	4:00	
	4:20	

	Entry	Exit
B	11:30	21:00
	11:45	21:15
	11:50	21:20
	11:55	21:30
	12:00	
	12:10	

	Entry	Exit
C	19:30	5:00
	19:45	5:15
	19:50	5:20
	19:55	5:30
	20:00	
	20:10	

Masl: meters above sea level