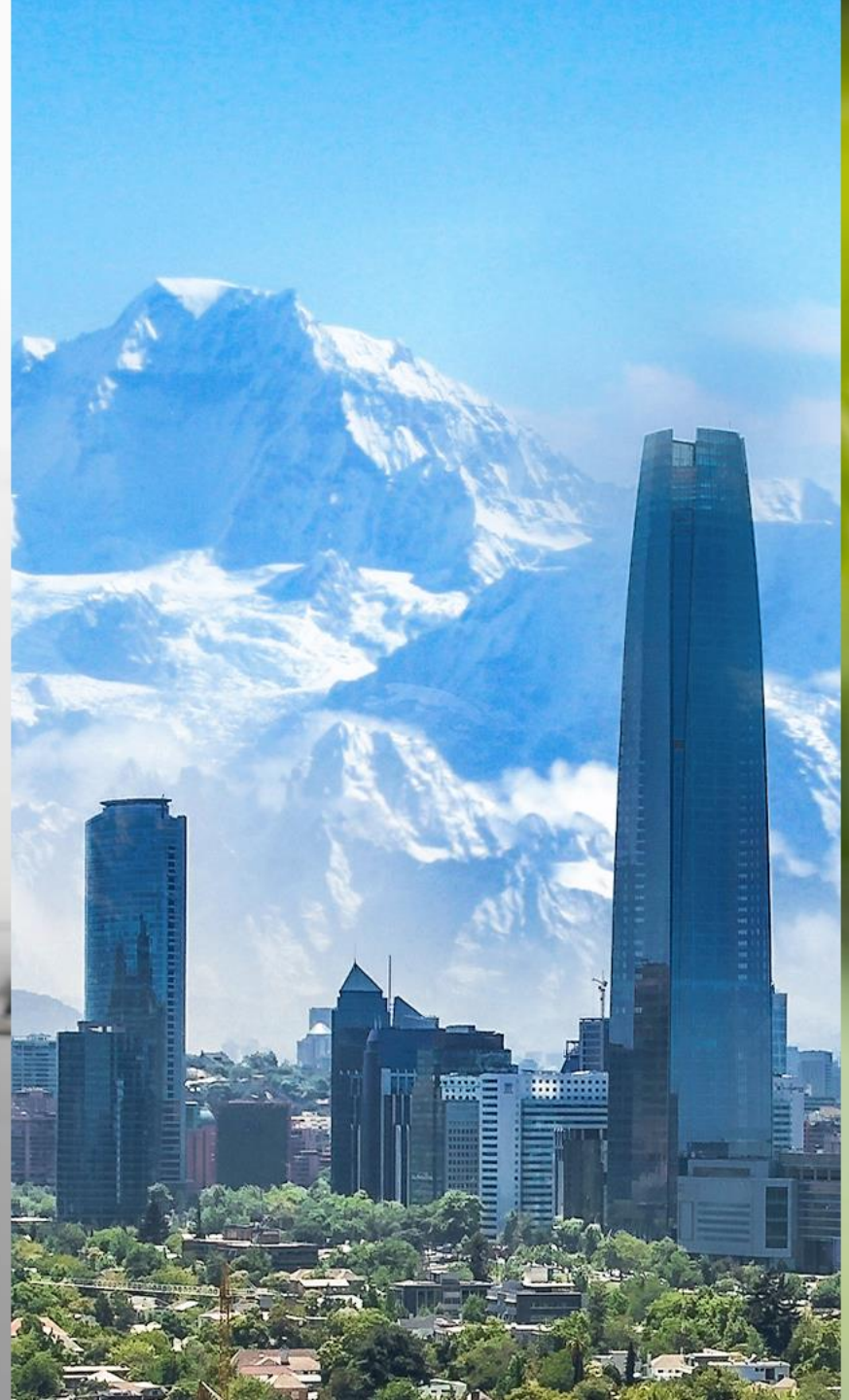


ABB Tech Talks Chile

Panel 6

Desafíos de la Electromovilidad & Sostenibilidad en las Industrias chilenas

15:30 – 16:25 hrs

Moderador

Andrés Barentín Calvo

Ingeniero electrónico de la Universidad Técnica Federico Santa María. Emprendedor y Consultor en los campos de la gestión energética y la electromovilidad. Ha liderado proyectos de gestión energética por más de 14 años y proyectos de electromovilidad desde 2008.

Andrés Barentín Calvo
Presidente de la AVEC, Asoc. de Vehículos Eléctricos AG., Chile

Panelistas

Ricardo Repenning B.
Co-fundador y Gerente de Tecnología, Reborn Electric Motors SpA

Jesús Pérez L.
HUB Product Marketing Manager, Latam, Process Automation Business, ABB

Cristian Martin
Country e-Mobility Manager, Electrification Business, ABB

Ricardo Repenning B.

Co-fundador y Gerente de Tecnología, Reborn Electric Motors SpA

REBORN
ELECTRIC MOTORS

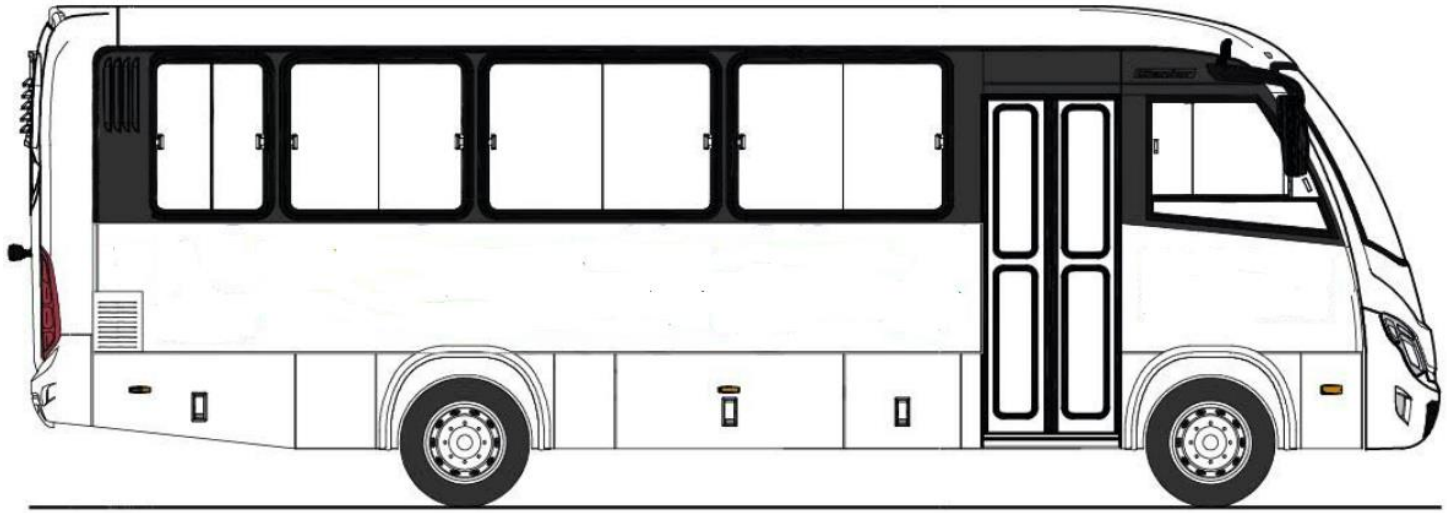
FABRICACIÓN DE BUSES ELECTRICOS CHILENOS

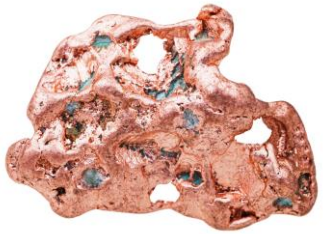
Presentador

Ricardo Repenning Bzdigian

BUSES ELÉCTRICOS

OPORTUNIDADES PARA CHILE





180-450 kg

22-56 kg

290-570 MWh

* https://copperalliance.org/wp-content/uploads/2017/05/2017.04-E-Mobility-Factsheet-4.pdf
** https://www.linkedin.com/pulse/how-much-lithium-li-ion-vehicle-battery-paul-martin/

REBORN ELECTRIC

¿QUIENES SOMOS?

Clientes

Apoyado por:

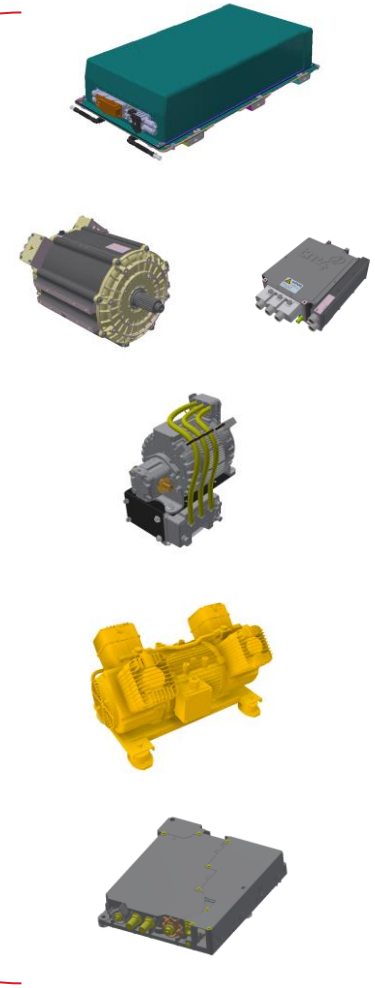
Premios:

Reborn Electric Motors (REM) es una fabrica Chilena enfocada en la fabricación y refabricación de buses eléctricos.

ELECTRIFICACIÓN DE BUSES

TECNOLOGÍA

Desarrollo REM



Alianzas estrategicas

BUSES MINEROS

EXPERIENCIA A LA FECHA

278.000
Total Km

189.000
Pasajeros
Transportados

17.600
Viajes Interior
Mina

*Datos a Septiembre

PROYECTO ELECTRIFICACIÓN

DIVISIÓN EL TENIENTE

Queltehue

Tricahue

72 Queltehue
32 Tricahue

Ahorro
3.175 tCO2/año

FÁBRICA – CENTRO I+D

FÁBRICA

Ubicada en Rancagua, Chile

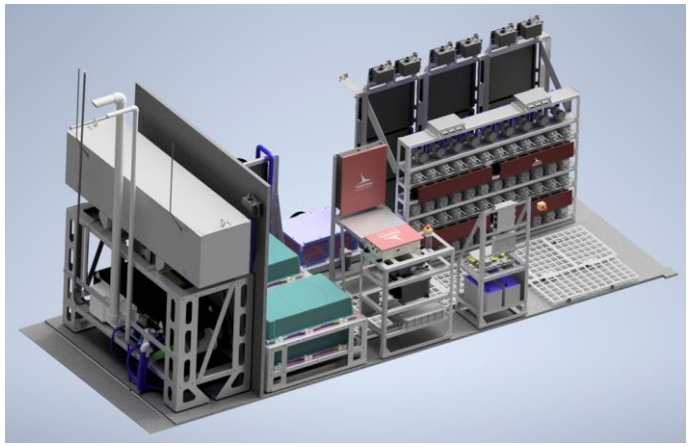
Se inauguró en julio 2022

Superficie total 2.880 m2

Proyectada para fabricar 200 buses al año

DESARROLLO H2

CONSORCIO HYDRA



REBORN
ELECTRIC MOTORS

Jesús Pérez Ludueña

HUB Product Marketing Manager, Latam, Process Automation Business, ABB

ABB is committed to a more sustainable future for mining.

We work hand in hand with our customers and partners to convert existing mines from fossil fuel energy to all electric.

While still keeping them competitive and ensuring high productivity at the highest safety standards.

Novemb

Slid

ABB Ability™
eMine. For your

Introducing ABB Ability™ eMine. For your world, and mine.

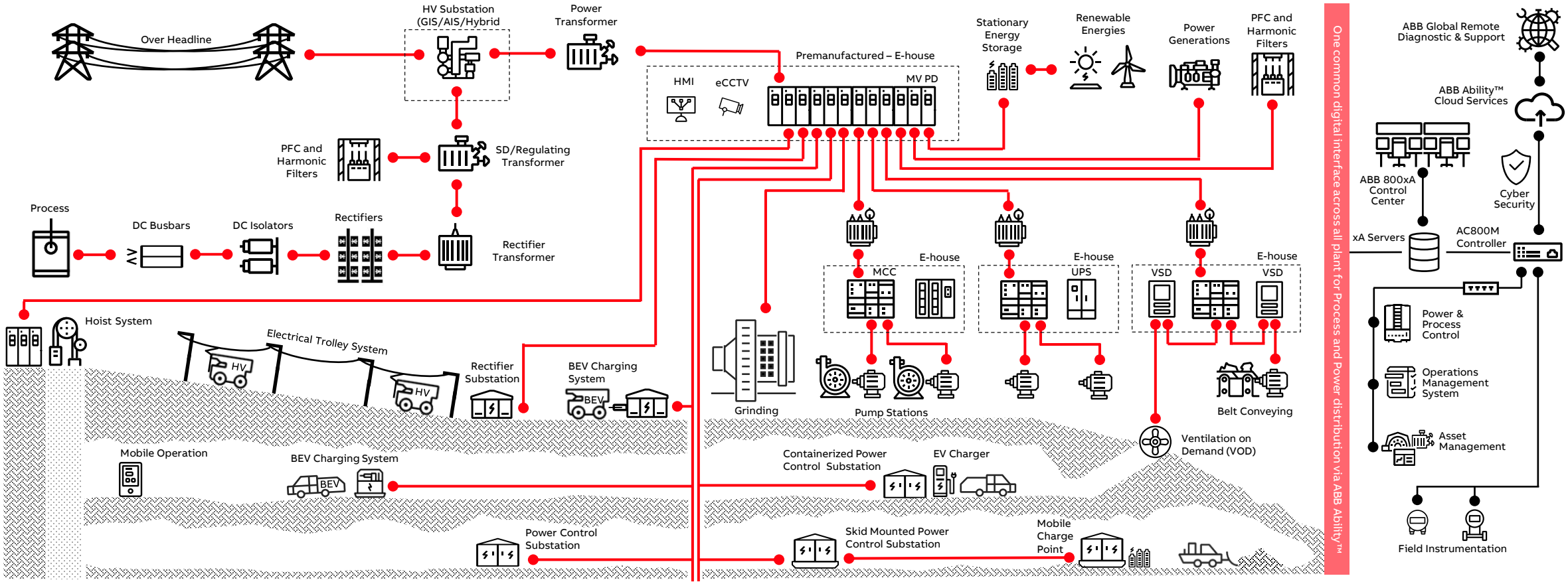
Electrifying your operations, from the mine to the port.

eMine™ makes the all-electric mine possible through our purposeful approach, proven methods and integrated systems. The framework is built on five pillars that encompass the entire process.

- ABB's Broad Portfolio
- Strategic Collaboration
- Consultancy and Mine Design
- Fit-for-Purpose and Tailored Solutions
- Lifecycle Services

We start with a strong foundation: ABB's broad portfolio.

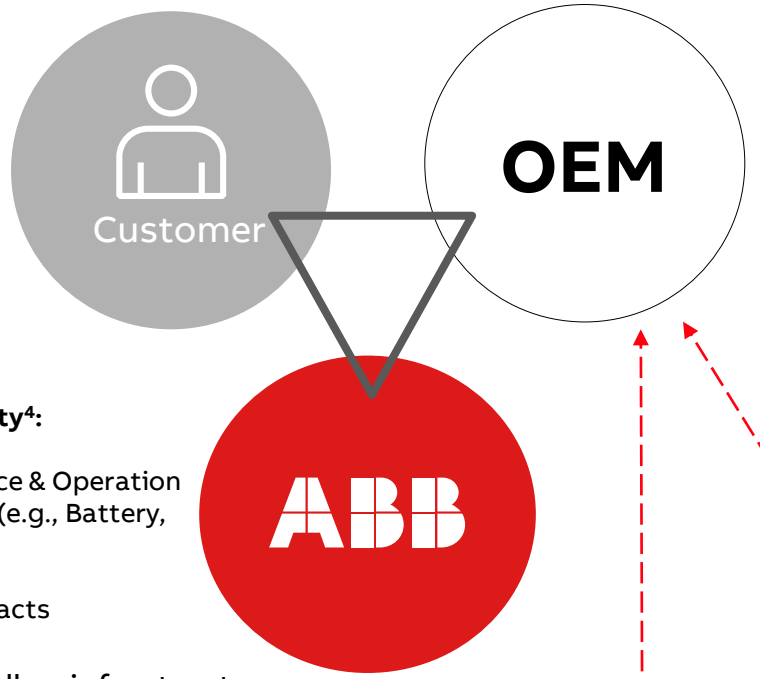
From pit to port and mine to market, we are equipped to electrify your mine.



We collaborate to combine expertise and optimize outcomes.

The all-electric mine requires working together.

Customer buys new BEVs & Infrastructure
- t/day specified
- Defines application
- Buys EV from OEM
- Buys infrastructure & operation process solution



Defined BEV product portfolio
- Fixed vehicle specs in defined segments
- Choice of charge interface
- Estimate degradation of the battery

Process/system design& supply
- Design & supply anchor application in infrastructure & automation/digital
- Grid assessment & extension
- System & process embedment
- BESS onsite

Consulting & feasibility[4]:
- Point of charge
- Connection Interface & Operation
- Process Operation (e.g., Battery, payload, etc.)
- TCO Analysis
- Environmental impacts

Electrification System & Process

Automation & Digital Control

Electrification solutions & Mine Design Impact

Charging or Trolley infrastructure

Charging &Rectifier -Station[1]

Interop. feature

OHL System

HV

Anchor application

Studies[1]

System coordination

Socket[2]

CCS

Pin / cable connector

Flexible & Adaptive Technology

Drivetrain Components & Solutions

Traction motor

Traction Converter

Storage system

Battery modules

1. Focus on mapping constraints and matching technology throughout the migration from diesel to electric process
2. ABB to supply matching socket to BEV-OEM in case not standardized yet
3. Further interfaces & partners: such as civil & mechanical engineering and other companies possible, e.g., to accommodate mine design changes
4. eProcess expert supports in migration of diesel to electric process
5. Client: End customer, EPC /EPCM, engineering consultant to the client

Direct supply of competent and traction items

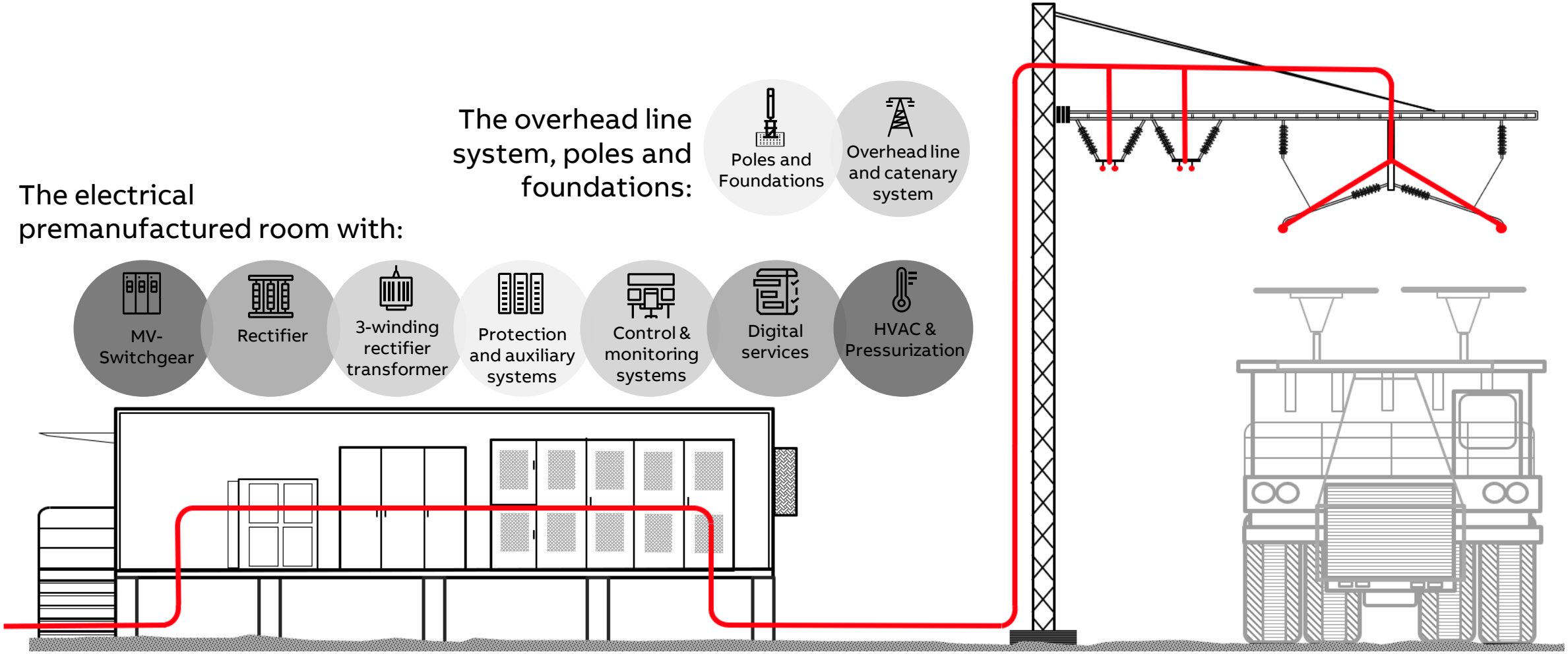
ABB Ability™ eMine Trolley System.

The overhead line system, poles and foundations:

- Poles and Foundations
- Overhead line and catenary system

The electrical premanufactured room with:

- MV-Switchgear
- Rectifier
- 3-winding rectifier transformer
- Protection and auxiliary systems
- Control & monitoring systems
- Digital services
- HVAC & Pressurization



Novemb

ABB Ability™ eMine Trolley System.

Already driving mining companies sustainably forward.

- Reduced CO_2 emissions
- Higher speed on grade
- Reduced costs
- Reduced maintenance
- ROI 2-5 years

ABB is working with Boliden to help drive their electric transformation, reducing GHG emissions by up to 80% and saving ~830 m3 diesel per year. >

ABB's new trolley assist solution will help Copper Mountain reduce carbon intensity by more than 50% in the medium term, with a final target of zero by 2035. >

ABB eMine™ Trolley System

Recently commissioned at Copper Mountain

- CO_2 ↓ Carbon emissions by at least **30%**
- ↑ Performance – **80%** speed increase
- **1 km** Length (PoC)
- **x4** **Four simultaneous** trucks on 1 km segment
- **x1** One powerful substation with two 6MW rectifier systems

Connected to ABB Ability™ System 800xA automation platform to seamlessly integrate and monitor trolley operations and energy consumption.

Pilot system

ABB Ability™ eMine FastCharge.

The future cornerstone of the transition to fully electrified mines.

- For harsh environments
- Mobile system
- Ultra-fast charging time
- Fully automated
- BEV OEM agnostic
- Digitally enabled
- Modular design


→ https://youtu.be/_RtDEbCsBE0

Cristian Martin

Country e-Mobility Manager,
Electrification Business,
ABB

Acompañenme un “minuti”……Grazie!

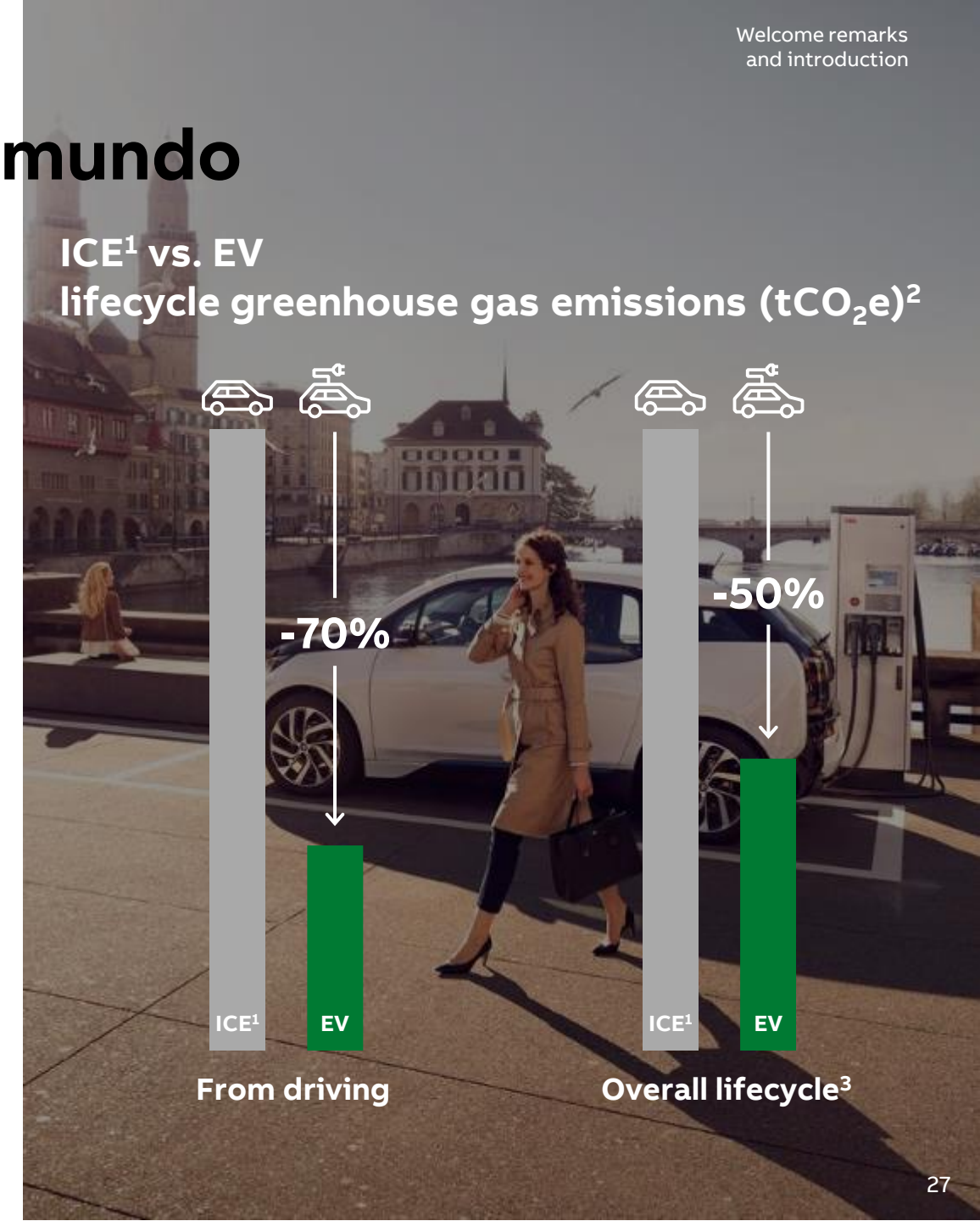
Valdarno, Italy

→ https://youtu.be/qydRAhIW6QA

Tenemos el poder de cambiar el mundo

Somos líderes en la construcción de un futuro de **cero emisiones**, con soluciones de carga de vehículos eléctricos inteligentes, confiables y libres de emisiones

El cambio de un vehículo de gasolina a **un vehículo eléctrico aumenta significativamente la eficiencia y reduce las emisiones**



Source:
Based on IEA data 2020, Comparative life-cycle greenhouse gas emissions of a mid-size BEV and ICE vehicle, www.iea.org/statistics, all rights reserved, as modified by ABB

Note:
1. Internal Combustion Engine
2. For a mid-size vehicle with assumed lifetime mileage of 200,000 km
3. Includes greenhouse gas emissions from driving, manufacturing and batteries

Solo nos quedan 12 años para limitar la catástrofe del cambio climático, advierte la ONU

El mundo ya es 1 °C más cálido hoy

Ahora hay un creciente reconocimiento de que el límite anterior de París negociado de 2 °C es peligroso y debemos limitarnos a 1,5 °C en lugar de 2 ° C.

En el nivel actual de compromisos, el mundo está en camino a un desastroso calentamiento de 3 ° C.

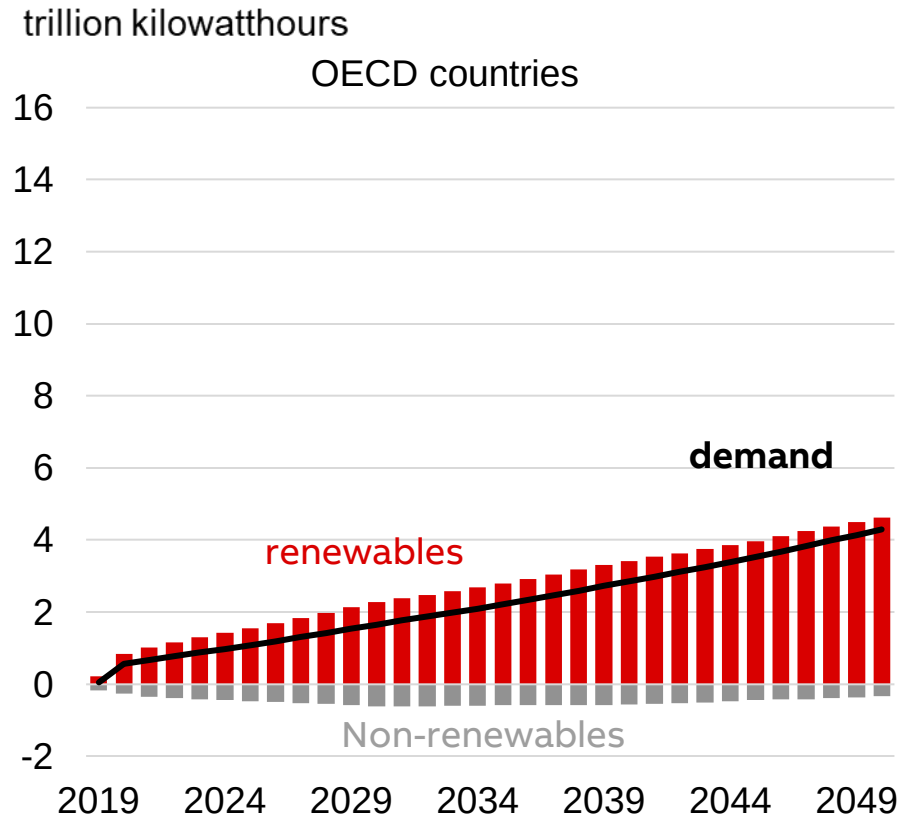
Para mantenerse dentro de 1,5 ° C, la contaminación global de carbono tendría que reducirse en un 45% para 2030, en comparación con un recorte del 20% en la vía de 2 ° C, y reducirse a cero para 2050, en comparación con 2075 para 2 ° C.

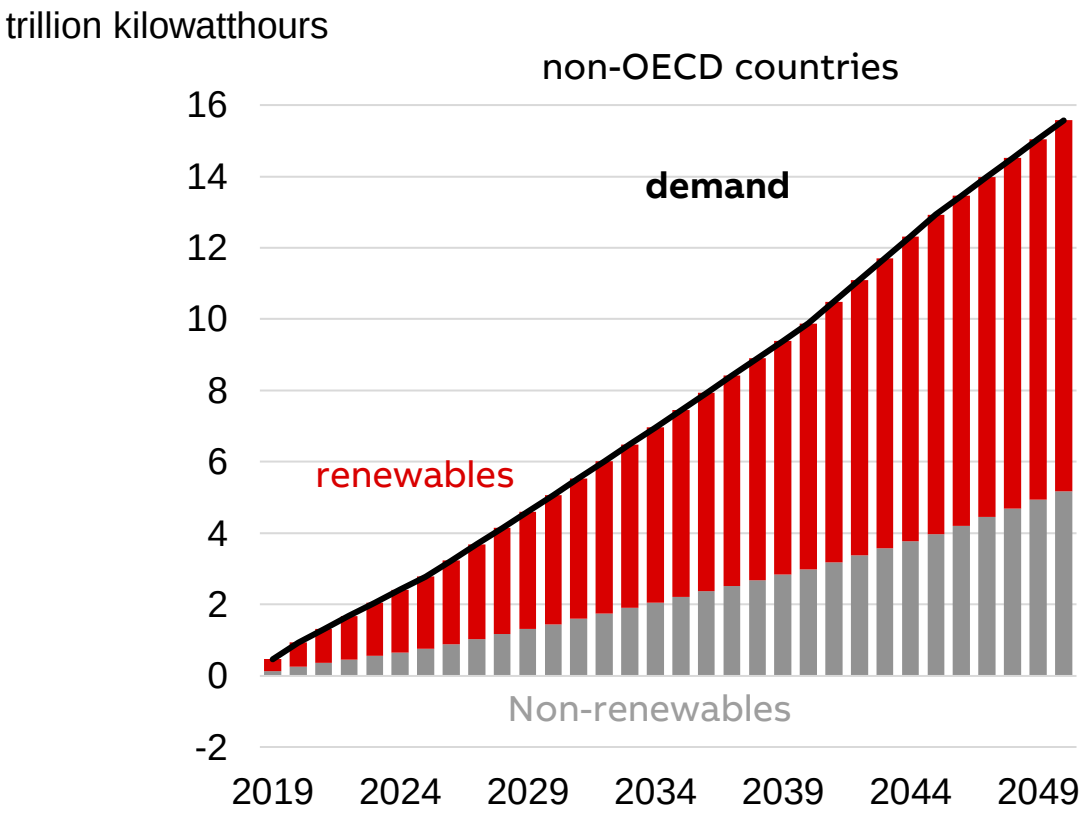
2/3 de la contaminación global de carbono proviene del sector del transporte y la generación de energía

La Energía, desafio en la Industria

Los aumentos en la demanda de electricidad se satisfacen principalmente con la generación de energías renovables

Changes from 2018 in generation and demand





OECD: Organisation for Economic Co-operation and Development
Source: US. Energy Information Administration - International Energy Outlook 2019,

La Electrificación de flotas Industriales una solución?

Middle East largest electric bus infrastructure project Qatar, Mowasalat bus fleet

APPLICATION
EV charging infrastructure for over 1000 buses to transport 50.000 passengers a day

CHALLENGE
Reliable charging infrastructure to operate in depots and public locations under extreme conditions (sand and temperature)

SOLUTION
125 MW of charging capacity, 1,300 connectors for destination charging and 89 opportunity chargers, four of which will be mobile.

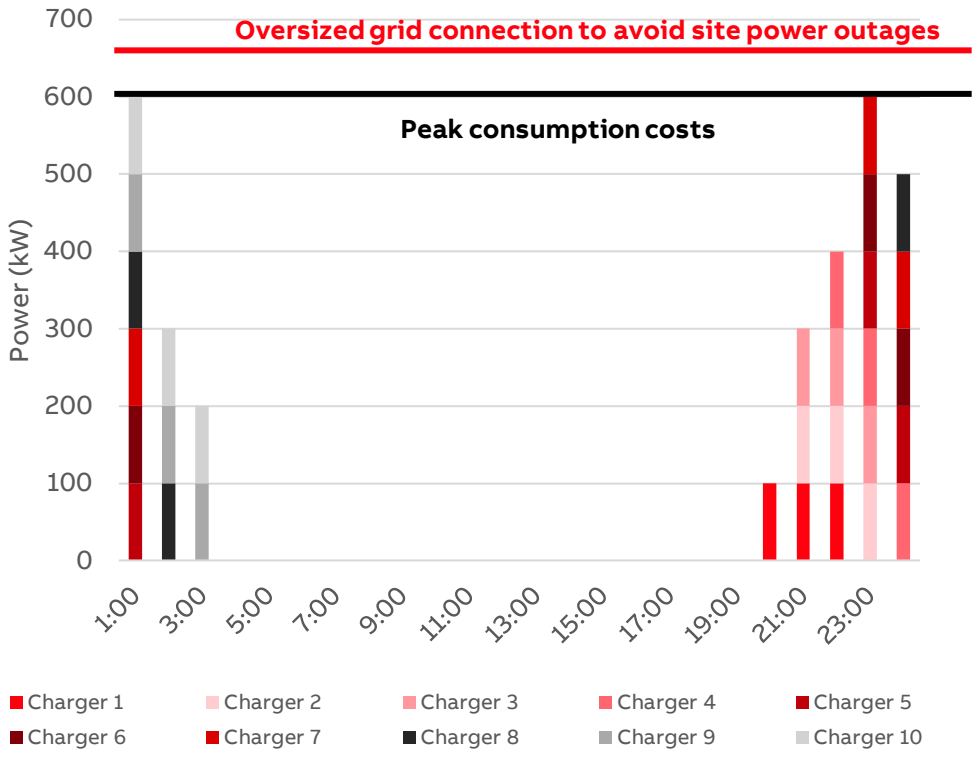
BENEFITS
- Charging does not impact operations
- Fleet Management includes “State of Charge”
- Reliable operations in extreme conditions


1MW
MCS
175/
350kW
CCS
90/
180kW
CCS

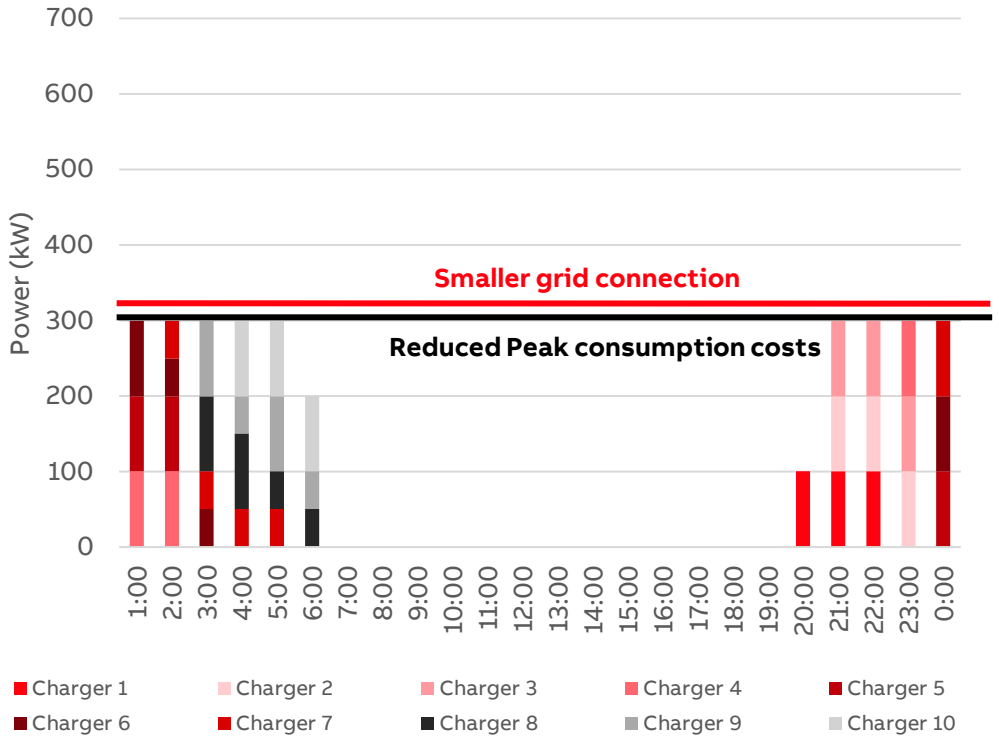
Administración de Energía en Flotas Electricas

Ejemplo de caso de negocio: 10 buses, batería de 300kWh cada uno, carga máxima de 100kW, 10 cargadores

Sin Control de Energía



Con Control de Energía



Cost reductions CAPEX + OPEX

Increased uptime

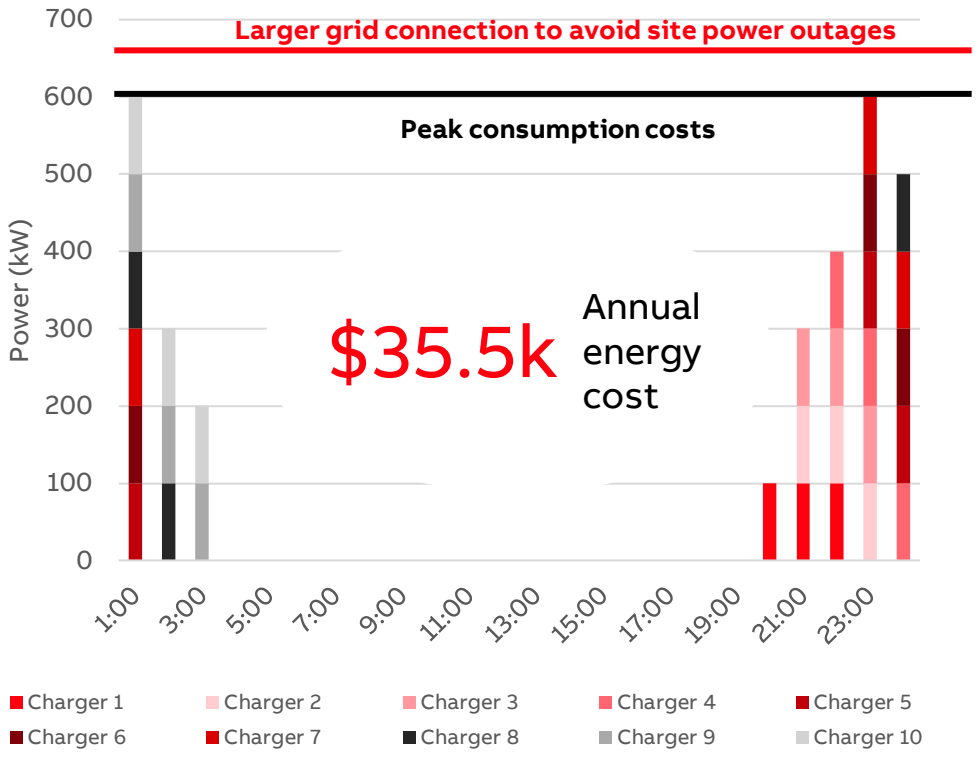
Faster project implementation

* Peak demand rates incurred when exceeded
** Overload of the system, protection devices will trip

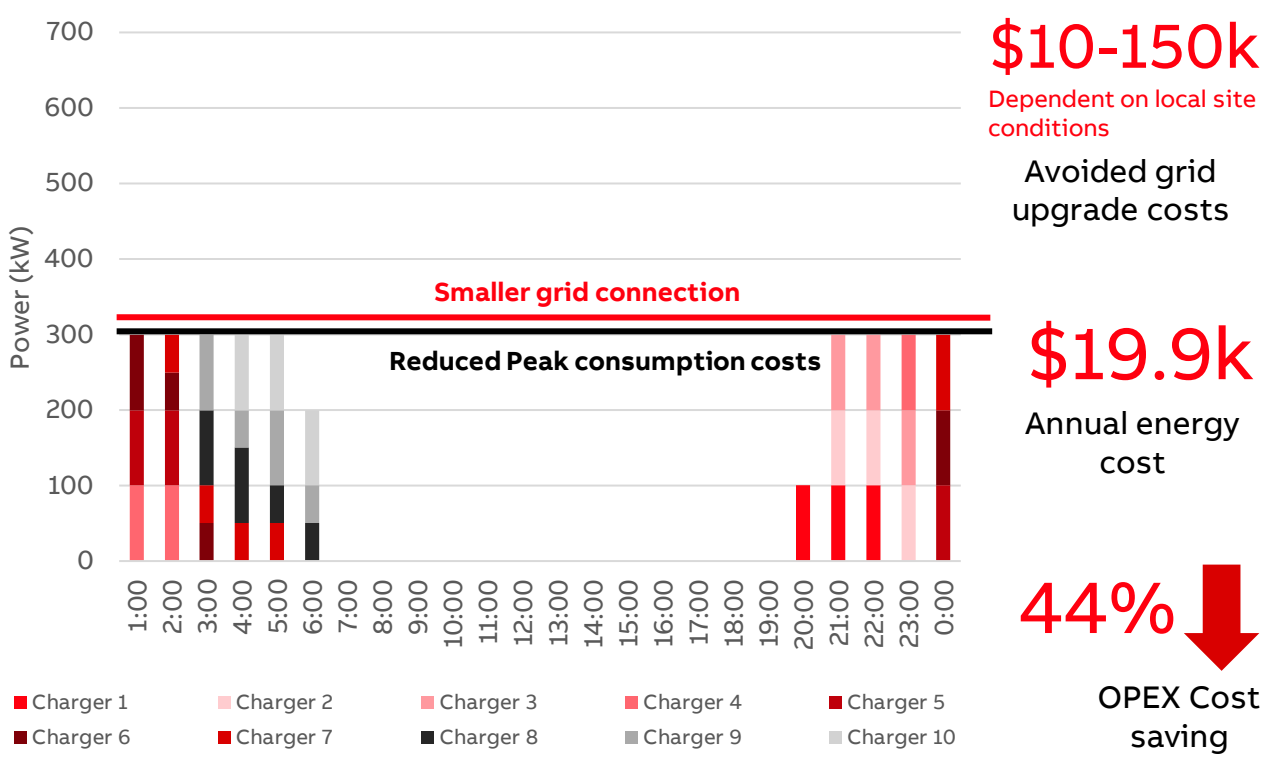
Administración de Energía en Flotas Electricas

Ejemplo de caso de negocio: 10 buses, batería de 300kWh cada uno, carga máxima de 100kW, 10 cargadores

Sin Control de Energía



Con Control de Energía



$10-150k

Dependent on local site conditions

Avoided grid upgrade costs

$19.9k

Annual energy cost

44%

OPEX Cost saving

* Peak demand rates incurred when exceeded

** Overload of the system, protection devices will trip

Segmentos emergentes para la carga de vehículos eléctricos

Revolucionando la carga para los viajes aéreos regionales


ABB