Motion in Sustainable Transport
Capital Markets Day 2021
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- market acceptance of new products and services
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We enable the transition to sustainable transport

**Our technology**
- Common modular platforms
- High performance control
- Digital

**Our building blocks**
1. Converters (main propulsion and auxiliary)
2. Traction motors (industrial and traction purposes)
3. Power module
4. Industrial drives
5. Energy storage systems
6. Battery chargers

**Our role**
We provide technology and products to our OEM and System Integrator partners

With our domain expertise we help them to apply the technology in multiple applications
Zurich
Energy savings of 30 gigawatt hours per year

- In a recent retro-fit project together with SBB the entire fleet saves around 30 gigawatt hours of energy every year, which correspond the average electricity consumption of 10,000 Swiss households.

- The conversion to the latest converter technology and the cooling systems of the converters operated with water instead of oil enable a reduction in energy consumption and ensure more ecological and safe rail operations.
The Netherlands
Charging electric ferries in Amsterdam

- More and more ferries and short-distance transportation vessels at sea, lakes and rivers are moved by electric powertrain. Like EVs these need to be charged regularly.

- ABB has delivered the power conversion technology to charger of new electrical ferries in Amsterdam reducing carbon, small particle emissions and noise in often very urban areas.
Sweden
Towards an emission-free mine

- Electric trolley truck system enables heavy transportation with electric driven battery vehicles to lower CO₂ emissions and improve the work environment at the underground copper-zinc mine
- Mine truck MT42 powered by ABB motors and drives and additional motor and a drive to running the hydraulic pump
Norway
Clean air and low noise construction site with ABB electrical powertrain

• Electric powertrain is used more and more also in heavy industrial vehicles and construction machines

• The powertrain consist of a new electric motor and a drive that replace the old diesel driven motor for the hydraulics

• ABB has used its broad technology platform to design dedicated products
Reducing emissions with Shore-to-Ship power

- When in harbor, vessel can switch off the diesel generator and use shore power converters to power the vessel instead.

- In this way, the CO$_2$ and other harmful emissions of the vessel during berthing will be lowered down to zero.

- ABB frequency converters are an economic and efficient solution to convert the grid electricity to the appropriate frequency needed on board.
Sustainable fish harvesting

• Specialty vessel are a growing market for electric power conversion and ABB is well positioned for that market

• Asenav and Patagonia Wellboats worked together to create a fleet of hybrid fish carrier vessels in Southern Chile where salmon and trout are harvested from the farms on the fjords and transported to processing plant

• Asenav relies on ABB motors and drives, together with a Power Management System, which improves the ships’ energy use and improves maneuverability in very demanding environment. Patagonia Wellboat cuts down diesel consumption by 20%
Germany
ABB technology conquers the mountains

- ABB is the market leader in providing power to ski-lifts around the world – from the Rockies to Alps to Akaishi

- The new ABB-powered cable car system at to the Zugspitze, Germany’s highest peak, can take as many as 580 passengers an hour to the top of the mountain

- Pulling the gondolas such a long distance at steeps gradients of as much as 104 percent (about 46°) and a speed of 10.6 meter per second requires significant power, which is supplied by two ABB High-power motors
Zurich
ABB enables energy-efficient bus operation on route 83 in Zurich

• More than 100 electric buses with ABB technology are already in use in cities in Switzerland and Europe
• Line 83 of the Zurich Transport Authority (VBZ) has been operated purely electrically since this summer. The eight environmentally friendly battery trolleybuses are equipped with electric motors, drive technology and energy storage systems from ABB and have already proven themselves in practice
• Adrian Vogel, Head of Bus Fleet Management at VBZ, comments: “By switching to electrical operation, we are saving over 200,000 liters of diesel and around 540 tons of CO₂ a year”
Leveraging technology portfolio across mature and emerging segments

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Emerging segments: Trolley eBus, BESS, Heavy Electric Vehicles (HEV)

Business opportunities have various levels of market maturity

1: Management estimate
2: BESS = Battery energy storage
3: HEV = Heavy electric vehicles

S-curve visual is illustrative
We come from a strong order backlog and will continue to outgrow the market.

**Sustainable transport as part of our business**
Orders of ~$1bn, ~15% of MO order intake

**Sustainable transport market growth drivers**

01 Decarbonization
Policy makers and the broader society show a clear trend towards decarbonization, COP26 further reinforced the commitment.

02 Energy efficiency
Energy consumption is the major cost element in transport applications, therefore the energy efficiency is a must.

03 Modernization of public transport
Urbanization and higher demand of comfort drives the need for investments into existing transport systems.

04 Fuel flexibility and battery maturity
Replacement of diesel propulsion to hybrid or full electric vehicles enabled by matured battery technology.

[![ABB Orders Sustainable Transport CAGR](image)](image)

[![Sustainable Transport Market CAGR](image)](image)

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1: End of Q3 L12M, management estimate
2: Management estimate
The future of transport is electric