



HITACHI
Inspire the Next

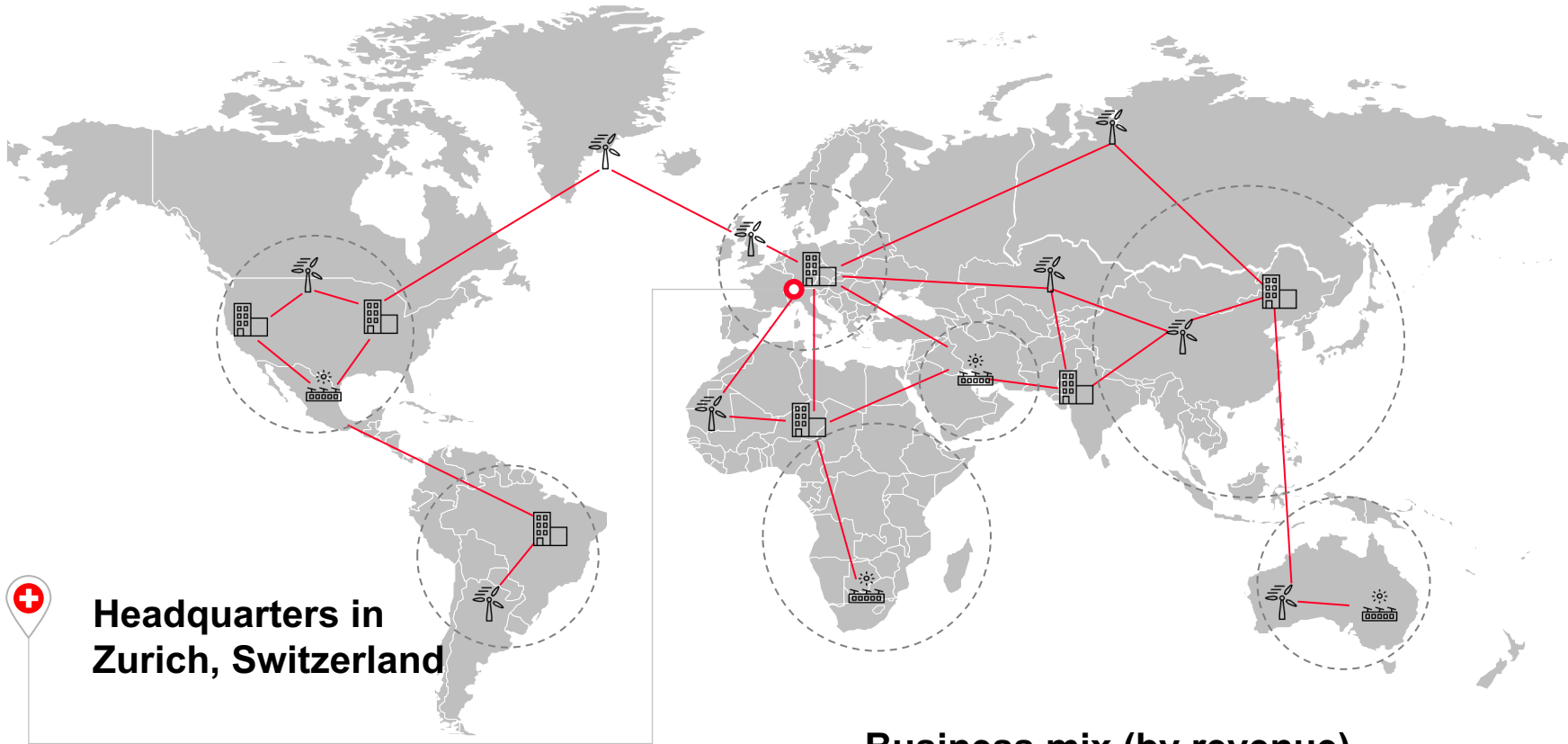
Hitachi Energy

Railway Industrial Clearance Association (Conference – 2024)

Savannah, GA

Hitachi Energy serves customers in the utility, nuclear industry and infrastructure sectors with innovative solutions and services across the value chain. Together with customers and partners, we pioneer technologies and enable the digital transformation required to accelerate the energy transition towards a carbon-neutral future. Hitachi Energy has a proven track record and unparalleled installed base in more than 90 countries & 200+ offices. Headquartered in Switzerland.





38,000 employees

90+
countries with
200 offices

~250
years' heritage
combined

5,500
sales employees
& field engineers

2,000
engineers &
scientists in R&D

Four Business Units

**Grid
Automation**

**High Voltage
Products**

Grid Integration

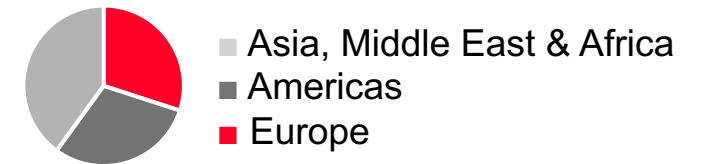
Transformers

Business mix (by revenue)

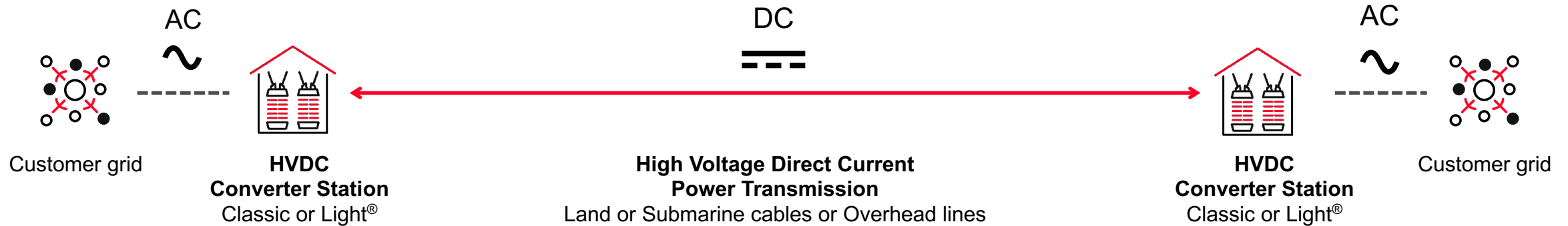
Customers

Offering

Geographies



What is an HVDC transmission system?



Main drivers for using HVDC systems

- Bulk power transmission - long distances
- Lower losses vs AC solutions
- Voltage stability (VSC)
- Integration of renewables
- Connecting asynchronous grids

Key deliverables

- System design / RS's
- Mechanical and civil design
- Civil work
- Control & Protection
- AC/DC equipment incl Trafos, GIS/AIS eq.
- Converter valves
- Auxiliary systems

Climate change extremely urgent and important to limit global warming to

1.5°C



World population reaches

~10bn

(up from 7.8bn people in 2021)



Global demand for steel is projected to

increase

by more than a third through to 2050



Internet of Things expands to

24bn

interconnected devices vs. 10bn connected devices today



Global electrification will be more than

50%

of total energy demand – up from around 20% today



Rapid growth in EV sales rises to

62M

units p.a. globally – up from 6.4M in 2021



Urbanization increases with

68%

of world population living in cities – up from 55% in 2018



Converter Transformers Moving on Rail



Rail Challenges

- **North American Rail Clearance Windows seem to be shrinking** – While Hitachi HVDC designs are increasing in size, as required by current and future energy demands, it seems the North American rail infrastructure is not keeping up in parallel. This creates restrictions in the rail routing and reduces potential rail options as well puts a strain on Hitachi HVDC designs.
- **Special Train Availability and Scheduling** – The majority of Hitachi HVDC converter transformer designs necessitate a special train. There is a variance between the railroads on how special trains are scheduled, handled internally, and blackout dates (such as during the holiday season.) It would be advantageous to be able to schedule special train requirements ahead of time, even during blackout dates with enough notice. Similarly, being able to build out a project schedule with such a variable process is a real challenge.
- **Limited number of 16-axle & larger cars** – DC (Converter) Transformers transport almost exclusively require the usage of 16-axle heavy duty railcars or larger. These Railcars are limited in the NAM market while there are currently and will continue to be, multiple DC Transformers needing to be shipped simultaneously. With such a limited equipment pool, the successful delivery of multiple units at a time becomes exponentially more difficult to account for during planning and execution phases.

Collaboration Opportunities

- **Transparency with Class 1 Railroads at bidding phase** – Hitachi HVDC could reach out directly to Class 1 Railroads about projects directly to provide basic information. This could allow the railroad(s) to have a baseline established before working with the 3PL's, potentially reducing the workload during RFQ.
- **Transparency with Class 1 Railroads for operational planning** – Would it be beneficial for Hitachi HVDC to communicate directly with the railroads on future project execution deliverables, such as Special Train timelines, project delivery schedules, etc.
- **Transparency with equipment owners** – Additionally, Hitachi HVDC could also contact primary equipment owners about upcoming projects to provide visibility of future equipment needs for HVDC projects in the market.



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