



Realize your vision with Bombardier TALENT 3 BEMU

The Battery Electric Multiple Unit Train

APTA 2019 Rail Conference
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2019-06-24



For non-electrified regional lines of up to 100 km, Bombardier's *TALENT 3* battery electric multiple unit (BEMU) offers the best solution in terms of total cost of ownership with significant emission reduction.

The Bombardier TALENT 3 battery electric multiple unit (BEMU)

The ideal solution for non-electrified lines up to 100 km

1. Reduced costs

The TCO of the battery powered *TALENT* 3 train is more than 50% lower than fuel cell Trains and 10% lower than conventional diesel trains

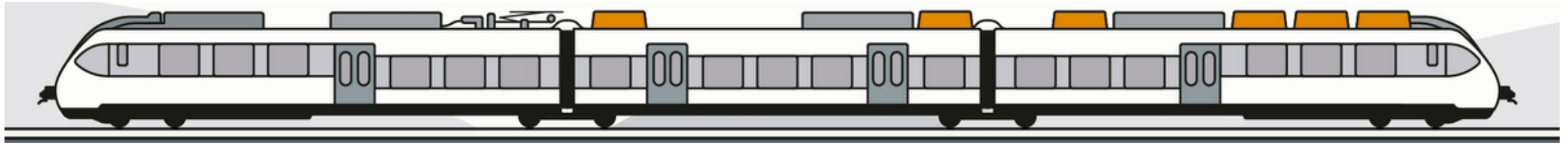
2. Reduced emissions

Lowest CO₂ emissions, compared to diesel and fuel cell trains, as well as NOx and particle emissions.

3. Reduced noise and vibrations

Vibrations and noise emission are reduced by up to 7 decibels, providing passengers with a comfortable ride.

 Modular batteries



4. Improved operability

Improved operability due to fleet standardization, new connections and fast recharging.

5. Avoidance of infrastructure costs

In comparison to fuel cell trains, infrastructure costs are eliminated or reduced thanks to 100% electrical battery train operation.

6. Increased passenger comfort

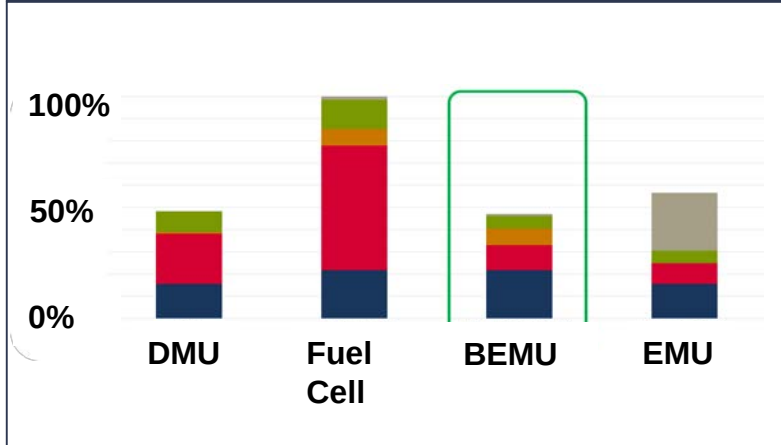
Direct connections and the reduction of travel time leads to increased ridership.

For non-electrified lines of up to 100 km, the *TALENT* 3 BEMU is the best alternative to diesel driven and fuel cell trains, providing unmatched benefits for both operators and passengers.

1. Reduced costs

Significant lower total cost of ownership over the complete asset lifecycle

Best total cost of ownership and 50% lower than fuel cell trains



Low cost and fast implementation time



35% lower energy cost* compared to diesel and fuel cell



The TCO of the battery powered *TALENT* 3 train is best in class and more than 50% lower than a fuel cell train

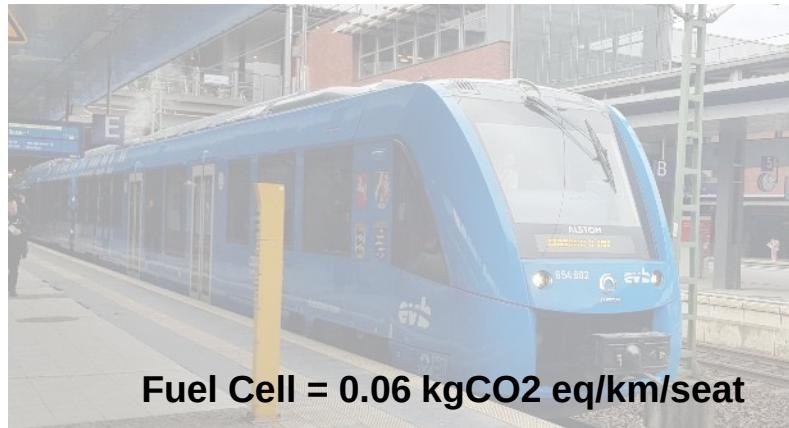
*Based on Germany's current energy mix

2. Reduced emissions

Significant reduction of harmful emissions

Up to 15% reduced emissions*

- By using electricity from the catenary, and Bombardier's *MITRAC* traction batteries, emissions are significantly reduced in comparison to a standard diesel train.



Zero emissions with renewable energy

- With 100% green energy coming from water, wind and solar energy, the battery train can operate 100% emission-free.



Helping countries reach environmental targets

- The *TALENT* 3 battery train is an excellent alternative to DMUs for non-electrified and partial-electrified networks, helping transit authorities keep environmental commitments and reduce emissions.



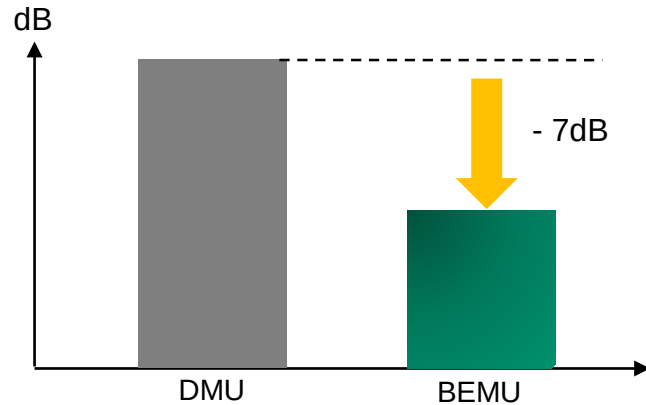
Lowest CO₂ emissions and reduction of NO_x and particle emissions.

*Based on Germany's current energy mix

3. Reduced noise and vibrations

Low noise and vibrations increase comfort for travellers and residents

Up to 7 dB noise reduction



- Additional capsulation of components and systems can be offered as an option to further reduce noise.

Absence of diesel engines



- Absence of a diesel engine enables quieter operation with fewer vibrations, increasing passenger comfort.

Low noise reduces disturbance to nearby residents



- Low noise level provides a quiet living environment for people residing near the railway.

Vibrations and noise emission are **reduced by up to 7 decibels**, providing passengers with a comfortable ride.

4. Improved operability

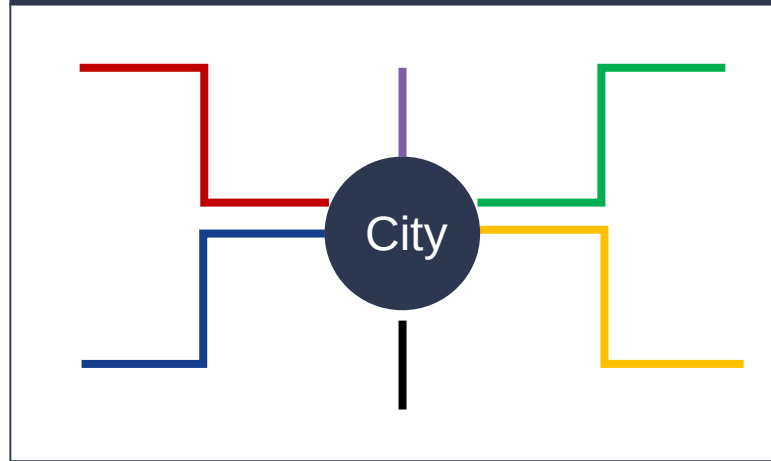
Homogenous fleets and combined networks for more efficient transportation

Homogenous fleet



- Battery trains are able to run on electrified and non-electrified lines. This leads to homogenous fleets with significant advantages in terms of maintenance and driver training.

New connections



- Battery trains open new opportunities for traffic planners and operators by combining electrified networks with non-electrified lines, connecting cities and rural areas with the same fleet.

Fast charging batteries



- Batteries are recharged in as little as 7 to 10 minutes, ensuring short stand time and increasing the operational flexibility and efficiency.

Improved operability due to fleet standardization, new connections and fast recharging.

5. Avoidance of infrastructure costs

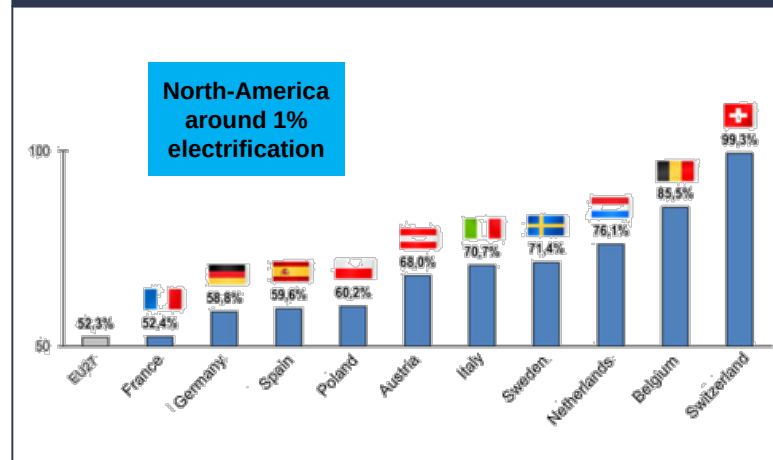
Battery trains are an excellent alternative to costly electrification

High cost for electrification and fuel cell infrastructure



- The battery train connects electrified lines with non-electrified lines, omitting the need for costly electrification infrastructure or additional fuel cell infrastructure

Railway electrification levels



- Electrification costs heavily rely on the current infrastructure, if terminal stations are electrified, no additional investment for electrification is required for the BEMU to operate.

Runs solely on battery power for up to 100 km



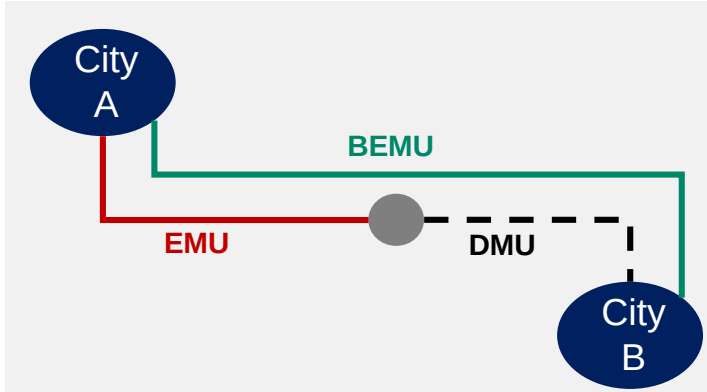
- The German railway network is up to 60% electrified. The majority (86%) of the remaining 40% of the lines are shorter than 100 km.

Infrastructure costs are eliminated or reduced thanks to 100% electrical battery train operation.

6. Increased passenger comfort

High comfort and direct connections for an enjoyable and convenient journey

Direct connections



- By using the same train on different lines within the network, passengers can benefit from more direct connections.

Reduced travel time



- Direct connections without longer stops on crossing stations for passenger exchange reduces the travel time significantly and increases the passenger satisfaction level.

Quiet and comfortable interior



- The reduced noise level, passenger info and entertainment systems as well as comfortable interior arrangements ensure a pleasant and relaxing journey for all passengers.

Direct connections and the reduction of travel times leads to increased ridership.

Awarded innovative technology – Bombardier's battery train

Bombardier wins Brandenburg innovation award in November 2018

This award is a great testament to Bombardier's accomplishments and commitment to deliver innovative and high-performing products that solve today's environmental and mobility challenges.



Proven value of the solution

Lowest total cost of ownership

A recent study by TU Dresden proved the *TALENT 3* battery train is the **most cost-effective and CO₂-free alternative to diesel and fuel cell trains** in terms of total cost of ownership over the entire 30-year service life.



Facts and figures

Did you know?



The *TALENT* 3 battery-train is the **first of it's kind** to enter passenger service in Europe in **over 60 years.**



Over **960 trains** from the *TALENT* product family have been sold around the world over the last 20 years.



Noise reduction by up to 7 dB compared to conventional DMUs.



With 100% green energy, the battery train is **100% emission-free.**

TALENT 3 battery train

Germany

Vehicle data

Vehicle type	Battery Electrical Multiple Unit
Configuration	3-car unit
Power supply	15 kV AC and MITRAC batteries
Train length	56,200 mm
Seats	169
Bogie	<i>FLEXX Compact</i>
Battery charging time	7-10 minutes
Speed	140 km/h
Max acceleration	1.1 m/s ²

Project history

Fleet	1 demonstrator train
Status	In testing and homologation phase. By the end of 2019 the commercial test-run operation will begin with Deutsche Bahn in the Baden-Wuerttemberg region of Germany.





Questions &
answers



Thank you very much!

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