



EURODUAL LOCOMOTIVE OPTIMIZING EUROPEAN RAIL FREIGHT TRANSPORT

Mar Rivas, FERRMED Conference, Paris, 28 February 2019

STADLER

DIVISIONS

STADLER RAIL GROUP

SWITZERLAND



Bussnang
1880 employees



Altenrhein
975 employees



Salt Lake City (USA)
110 employees

GERMANY



Pankow
1100 employees



Velten
115 employees



Reinickendorf
45 employees



Chemnitz
85 employees

CENTRAL EUROPE



Siedlce (PL)
950 employees



Prague (CZE)
60 employees



Minsk (BLR)
620 employees

SPAIN



Valencia
880 employees

COMPONENTS



Winterthur (CH)
280 employees



Bienne (CH)
90 employees



Szolnok (HUN)
480 employees



Środa (PL)
240 employees

SERVICE



Switzerland
100 employees

Hungary
100 employees

Algeria
90 employees

Italy
30 employees

The Netherlands
110 employees

Poland
70 employees

Sweden
50 employees

UK
170 employees

Spain
70 employees

Consolidated Sales 2018 (Budget) : 2,2 Mrd. CHF | Employees 7'660

FULL STEAM AHEAD

LOCOMOTIVES



LOCOMOTIVES

MODEL RANGES AND TAILOR-MADE



900

Locomotives for RENFE, Spain



40

Locomotives for open-access rail freight operators, Spain + Portugal



7

Locomotives for MRS, Brazil



97

Locomotives for Israel Railways, Israel



53

Locomotives for open-access rail freight operators, France



228

Locomotives for SBB Eem 923, Switzerland



44

Locomotives for DRS, UK



10

Locomotives for HVLE, Germany



175

Locomotives for SNCF, France

Sales success: > 2300 units in 17 countries

THE LONGEST TRAIN IN EUROPE

EURO4000



1524 m- long and 4020 ton
two EURO4000 locomotives, one driver

MAINLINE LOCOMOTIVES MODEL RANGES

EUROPE

Co'Co' LOCOMOTIVES



DE LOC – EURO4001



Bi-mode LOC - EURODUAL



E LOC - EURO6000

'Bo'Bo' LOCOMOTIVES



DE LOC – EUROLIGHT / UKLIGHT or Class 68



Bi-mode LOC – UKDUAL or Class 88



E LOC

OTHER MARKETS



DE LOC – EURO4000 and EURO3000



DE LOC - SALi



DE LOC- F125

DUAL TRACTION LOCOMOTIVES

Dual traction locomotives. New Operating Modes



Last Mile operation



Diesel service with electrified stations



Dual operation on electrified and non-electrified lines



Diesel detour to avoid highly populated areas (e.g. cities) and stop time



Power-boost with diesel engine on electrified line

EURODUAL BENEFITS

Operacional flexibility

**DIESEL
TRACTION**



**ELECTRIC
TRACTION**

- Flexibility and better optimization of routes
- No extra-shunting costs
- No problem when overhead power is down
- Lower energy costs
- Environmental friendly

EURODUAL BENEFITS

An impressive Performance

Most powerful locomotive in Europe

up to 7 MW in electric mode and up to 2.8 MW in diesel mode



+ Higher hauling capability

6-axle / up to 500 kN starting tractive effort

Test on the line **Figueras-Perpignan** on September 2018:
EURODUAL was able to start a **2056Tn train** on a constant slope of **18‰**

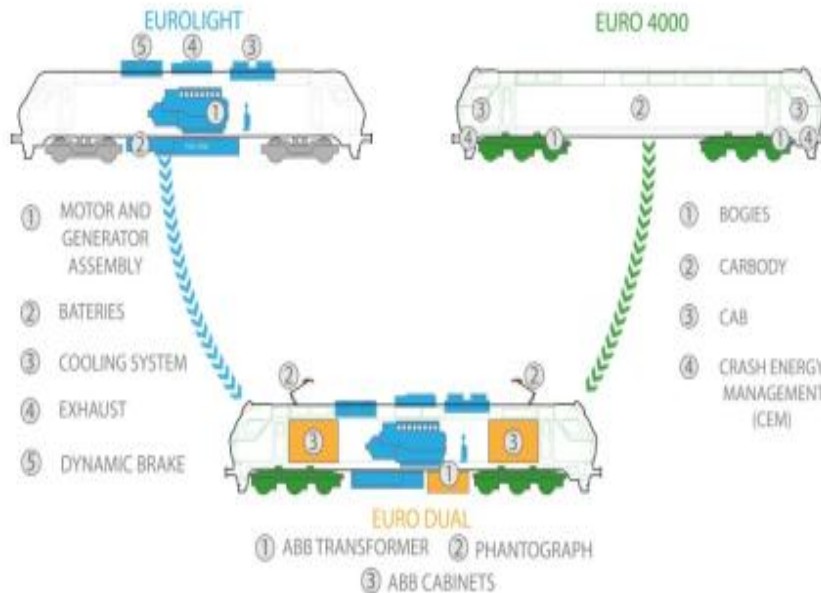
EURODUAL BENEFITS

Very reliable brand-new locomotive based on service proven components and subsystems

Based on EUROLight and EURO4000 locomotives

Reputable suppliers

As free system integrator, Stadler is looking for the best solution for every application



High reliability and low maintenance costs

EURODUAL BENEFITS

ENERGY EFFICIENCY AND ENVIRONMENTALLY FRIENDLY

4.1- RECYCLABILITY AND RECOVERABILITY

The recyclability potential has been calculated applying the “Railway Rolling Stock - Recyclability and Recoverability Calculation Method”.

Eurodual
Recyclability Rate

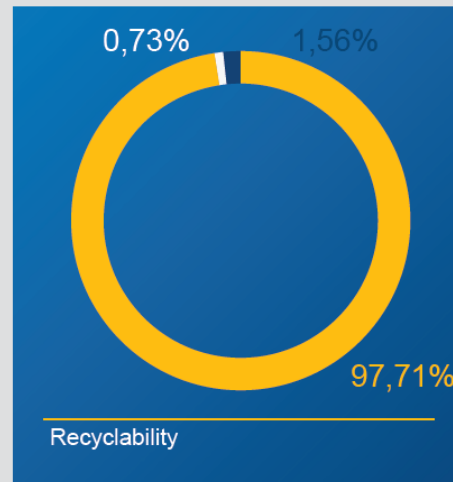
97,7%

Eurodual
Recoverability Rate

99,3%

What does this rate mean?

Average recyclability rates of other rail vehicles are between 93 and 95% (data available on public EPDs). **Eurodual has the highest recyclability and recoverability rate** when compared to data of all public rail vehicles EPDs. Material selection by Stadler engineers for the design of Eurodual and the management of materials throughout its entire life is optimum and environmentally friendly at the highest level.



Sustainable Design: manufacturing and in-service
Low energy costs

EURODUAL BENEFITS

Safety and comfort: **the best office for your drivers**



Right environment improves performance
The office for 21st century drivers

EURODUAL BENEFITIS

A unique 3-axle bogie for a universal locomotive



- Evolution of EURO4000 Bogie
- Frame mounted AC Traction motor
- 160 km/h – 500 kN TE
- Most effective / track friendly bogie solution
- Performances even better than most 2 axle bogies

Extremely low track forces (best non-self steering bogie)

EURODUAL BENEFITS

Why EURODUAL provides **best profitability?**



- **FLEXIBILITY of use**
 - Passenger & Freight
 - Diesel & Electric & Hybrid
- **LCC**
 - Efficiency
 - Easy to maintain
 - Expert System
- **Performance**
 - Up to 7 MW/ 500 kN / 160 km/h
- **Reliability**
 - Based on service proven subsystems
 - Stadler Quality



Energy Economy



Efficiency



Low Maintenance

Why TWO locomotives when you can do all with **ONE?**

EURODUAL REFERENCES

PROJECTS STATUS



- **EURODUAL prototype:**
 - 6-axle / Bi-mode: E(1.5kV DC + 25kV AC) + DE
 - Sold to VFLI (FR)
 - Homologation in FR and BE expected by 05.2019



- **EURODUAL HVLE:**
 - 6-axle / Bi-mode: E(15kV AC + 25kV AC) + DE
 - HVLE (DE) ordered 10 locomotives in 2017
 - Homologation tests in Germany already started



- **EURODUAL ELP:**
 - 6-axle / Bi-mode: E(15kV AC + 25kV AC) + DE
 - 2 NO/SE + 8 DE
- **EURODUAL ITL:**
 - 6-axle / Bi-mode: E(15kV AC + 25kV AC) + DE
 - ITL (DE) ordered 4 locomotives at the end 2018
- **UKDUAL (Class 88):**
 - 4-axle / Bi-mode: E(25kV AC) + DE
 - 10 units sold to BRLL to be used by DRS.
 - Operations started last year.

EURO4001

PURE DIESEL-ELECTRIC VERSION OF THE EURODUAL PLATFORM




- Powerful 6-axle diesel-electric loco (up to 2.8 MW) for operations in main corridors and secondary lines.
- It offers flexibility and high performance.
- High hauling capability (25% higher TE than EURO4000).
- Fully TSI and EC 26/2004 Stage IIIB compliant
- Extremely low track forces (best non-self steering bogie).

– EURO4001 reference:

- 3 VFLI / 9 Alpha Trains to be used VFLI
- Ordered in June 2018
- Delivery end 2019/beginning 2020

**Power, economy and flexibility –
hallmarks of Europe's most muscular DE loco**



The presentation contains forward-looking statements that are based on current estimates and assumptions made by Stadler to the best of its knowledge. Such forward-looking statements are subject to risks and uncertainties, the non-occurrence or occurrence of which could cause a material difference in future

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**THANK YOU
FOR YOUR ATTENTION**

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