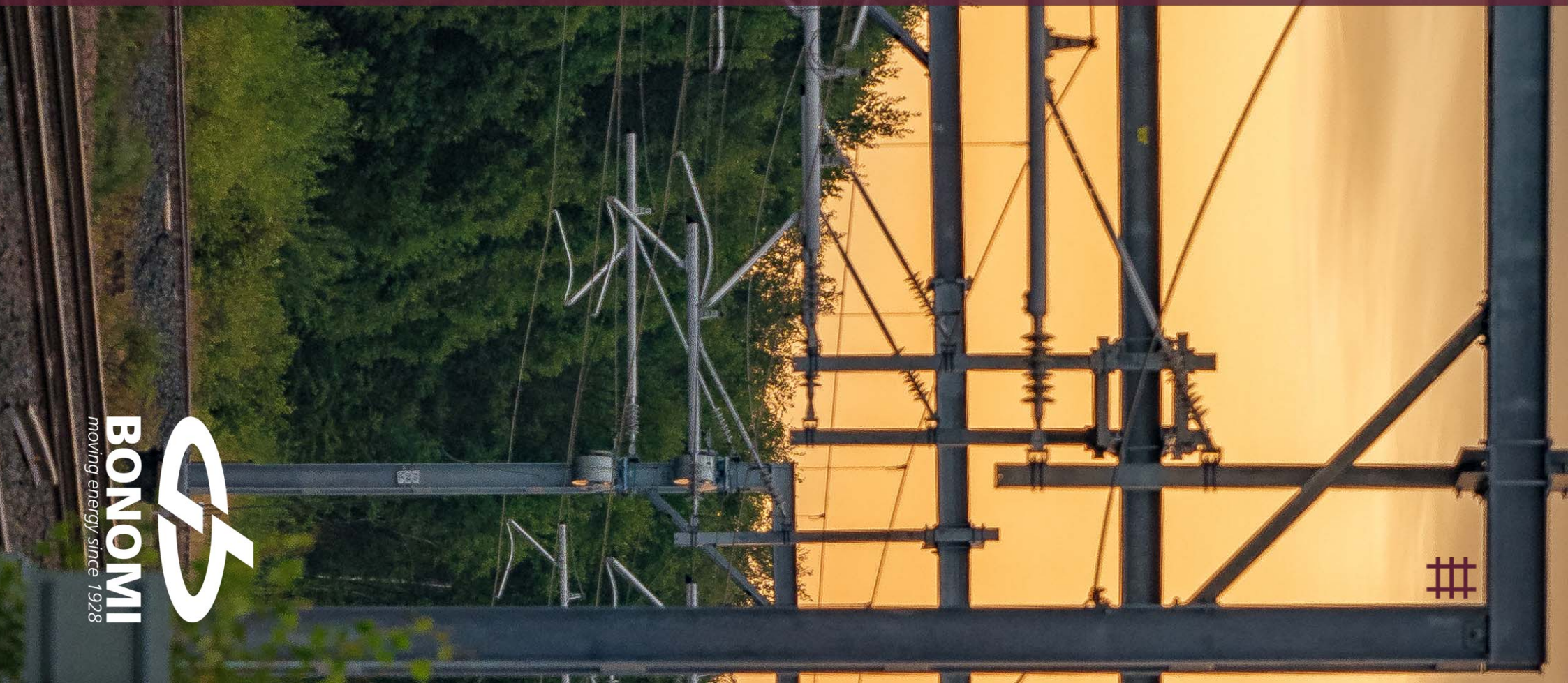
RAILWAY CANTILEVERS: our references speak for themselves



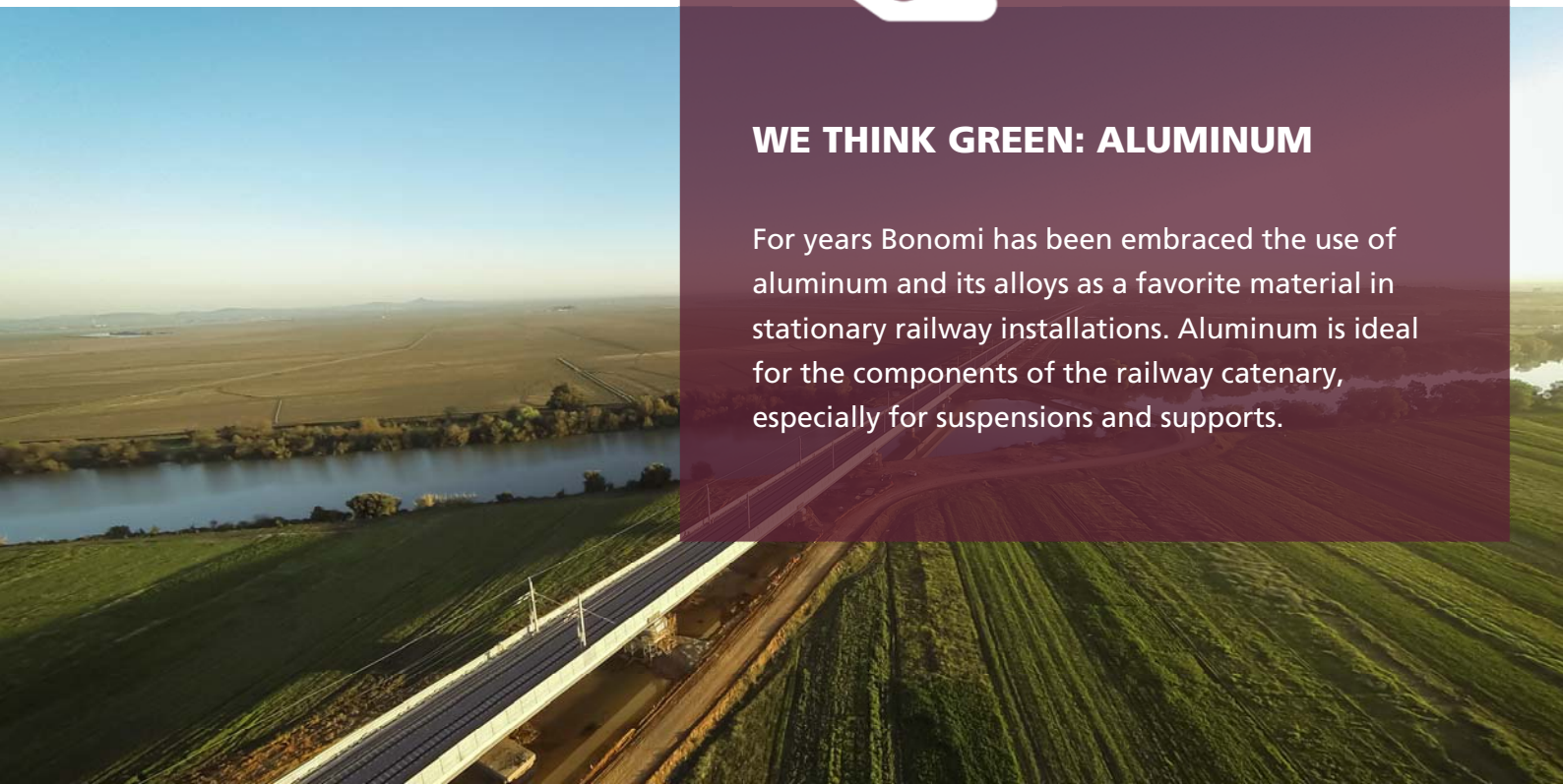
BONOMI
moving energy since 1928

ABOUT OUR RAILWAY CANTILEVERS

ALUMINIUM VS STEEL

Why we prefer our aluminium special alloy to steel

- EXTREMELY REDUCED WEIGHT and better handling;
- SIMPLICITY IN ASSEMBLY;
- RESISTANCE, which is almost equivalent to the one of steel;
- COMPONENTS' LIFE CYCLE EXPONENTAL INCREASE;
- ECO-FRIENDLY MATERIAL;
- ITS FORMULATION ENSURES A TOTAL CORROSION RESISTANCE (no maintenance needed) and an extreme adaptability in terms of environmental impact. This feature is even improved by POSSIBLE ANODIZATION TREATMENTS.



WE THINK GREEN: ALUMINUM

For years Bonomi has been embraced the use of aluminum and its alloys as a favorite material in stationary railway installations. Aluminum is ideal for the components of the railway catenary, especially for suspensions and supports.

OMNIA THE FIRST SMART CANTILEVER

For 3 – 25 kV lines

OMNIA is the first smart cantilever for railway overhead lines. Its project was completed in 2008 by Bonomi, together with two other Italian companies (GCF and Satferr) that have a long experience in railway, tramway and trolleybus sectors.

FROM THE LINE ENGINEERING TO THE CATENARY REALIZATION

This synergie was naturally born from the need to give a complete service to the railway traction market by covering all the client's requests: from the design, to the manufacturing of the catenary system itself ending with its installation. That is why this project was called OMNIA, a word that comes from Latin and stands for "everything".

Why is OMNIA the smart cantilever?

Thanks to its technical details and it easy but functioning design, OMNIA ensures the following features:

OMNIA is made with **a special aluminum alloy** (EN AW-6082 T6 according to EN 586-2). This material guarantees **extreme resistance to corrosion and eternal durability**, even in highly aggressive environments.

Weight reduction and also reduction of components and tools for the assembly. This means a faster installation.

Eco-friendly – low environmental impact both in terms of design and disposal of the materials.

General savings, thanks to the speed of installation, lack of maintenance and the reduction in contact wire consumption.

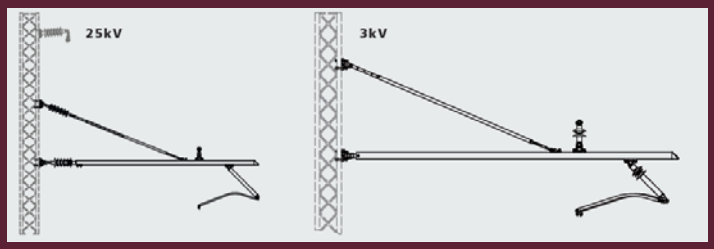
Enhanced mechanical strength.

Extreme versatility: you can cover a very large range of technical needs with a very reduced number of components.

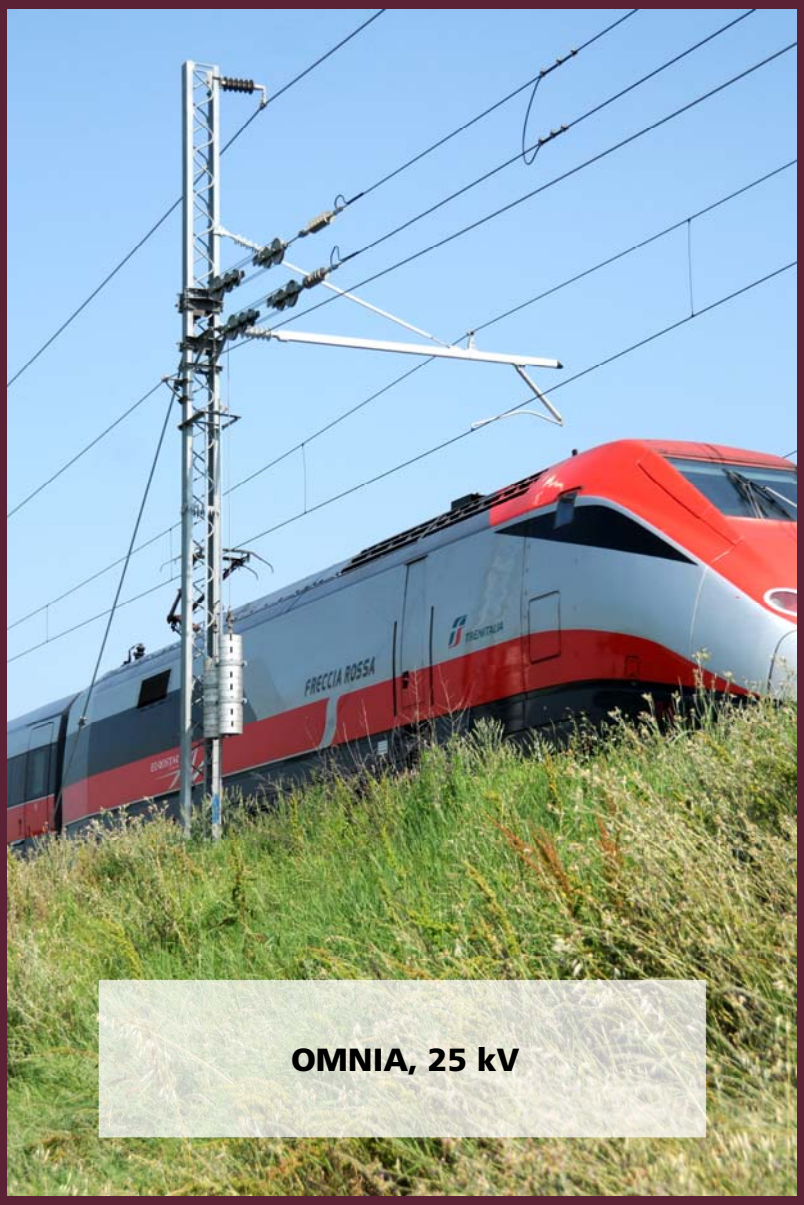
All these features make OMNIA the ideal cantilever in terms of life-cycle saving: the railway companies will experience the advantages of saving in hours of work, in maintenance and duration of the product life-cycle itself.

A study has shown that OMNIA allows a **percentage of savings** in terms of assembly time **that exceeds 65%** (if compared to the assembly of a standard cantilever).

OMNIA IN DETAILS

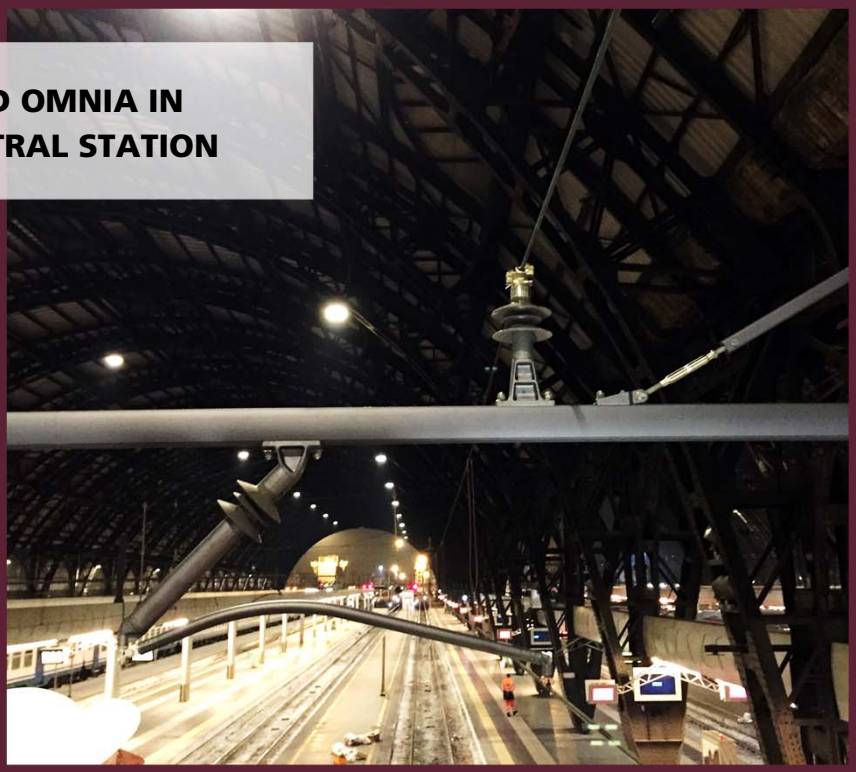


Available in
different configurations



OMNIA, 25 kV

ANODIZED OMNIA IN MILAN CENTRAL STATION



OMNIA, 3 kV

INSTALLED CANTILEVERS from 1993 to date

SINCE THE '90S, WE HAVE BEEN SUPPLYING **MORE THAN 250.000 RAILWAY CANTILEVERS** TO **MORE THAN 15 RAILWAY COMPANIES** WORLDWIDE:

Here is a list of our main projects

BELGIUM	**> 31.570 cantilevers**
Different lines – R3 catenary system – 3 kV cc	7.000
High speed lines – 330 km/h - 2 x 25 kV:	
• LGV 1 Wannehain - Bruxelles	3.800
• LGV 2 Louvain – Liège	3.000
• LGV 3 Liège – German border and	
• LGV 4 Anvers – Dutch border	1.700
Athus – Meuse line - 25 kV	11.100
Line 147 Auvelais – Fleurus - 3 kV / 25 kV	300
Line 24 Montzen – German border - 3 kV / 15 kV	500
Line 162 Namur – Luxembourg border - 3 kV / 25 kV	3.700
Railway connection Liefkenshoek - 3 kV cc Antwerp city center – Beveren – 6 km tunnel	470
VENEZUELA	
Caracas – Tuy Medio line – 25 kV	1.800

CHILE

Biotren – 25 kV	1.000

DENMARK

Aarhus - Greena – 1,5 kV double insulation line	2.500

GREECE

Athens – Thessaloniki line – 25 kV	20.000

PORTUGAL

Porto Undergroung – 1,5 kV cc line	500

MOROCCO

Rabat station Agdal – Mohammedia – Bouznika 3 kV – OMNIA type	770

ENGLAND

Different lines – 25 kV – OMNIA type	More than 3.000
Liverpool – Manchester line – 25 kV – OMNIA type	8.000

SCOTLAND

Edimburgh – Glasgow line - 25 kV – OMNIA type	5.000

TURKEY

Kosekoy – Gebze line - 25 kV	650

ALGERIA

Oued Tlela – Tlemcen line - 25 kV	4.400

ITALY

> 50.000 cantilevers

High speed lines – 300 km/h - 2 x 25 kV:	27.000
• Rome - Neaples	
• Turin - Milan	
• Milan - Bologna	
• Milan – Bologna – 25 kV – OMNIA type	900
• Treviglio – Brescia – 25 kV – OMNIA type	1.000
Rome – Florence «Direttissima» line	
• 250 km/h – 3 kV / 25 kV	6.000
• 25 kV – OMNIA type	1.400
Different lines - 3 kV or 25 kV	
• Pontebbana line	600
• Monte del Vesuvio (Neaples) line	800
• Padua – Mestre line	400
Milan – Bologna line – 250 km/h - 3 kV cc	
• Rogoredro – Melegnano – 3 kV OMNIA type line	430
Line sections	
• Milan – Bologna – 3 kV – OMNIA type	730
• Brescia - Verona – 3 kV – OMNIA type	4.000
• Neaples – Reggio Calabria – 3 kV OMNIA type	600
Other line sections – 3 kV – OMNIA type	1.000
High speed lines – 2 x 25 kV	
Adjustment to the speed of 360 km/h	
• Turin – Milan – 25 kV – OMNIA type	5.000
• Milan – Bologna – 25 kV – OMNIA type	900

INSTALLED COMPONENTS from 1993 to date

MORE THAN 25.000 KM OF WORLDWIDE RAILWAYS HAVE BEEN ELECTRIFIED WITH **BONOMI'S COMPONENTS**

RAILWAY INSULATORS	> 2.200.000
TENSIONING DEVICES	> 11.000
SUSPENSION AND CONNECTION CLAMPS	> 31.000.000
DROPPERS	> 5.500.000
3 | 25 kV SECTION INSULATORS	> 4.000

SOME PICTURE

BELGIUM

LGV 3 Liège – German border

GREECE

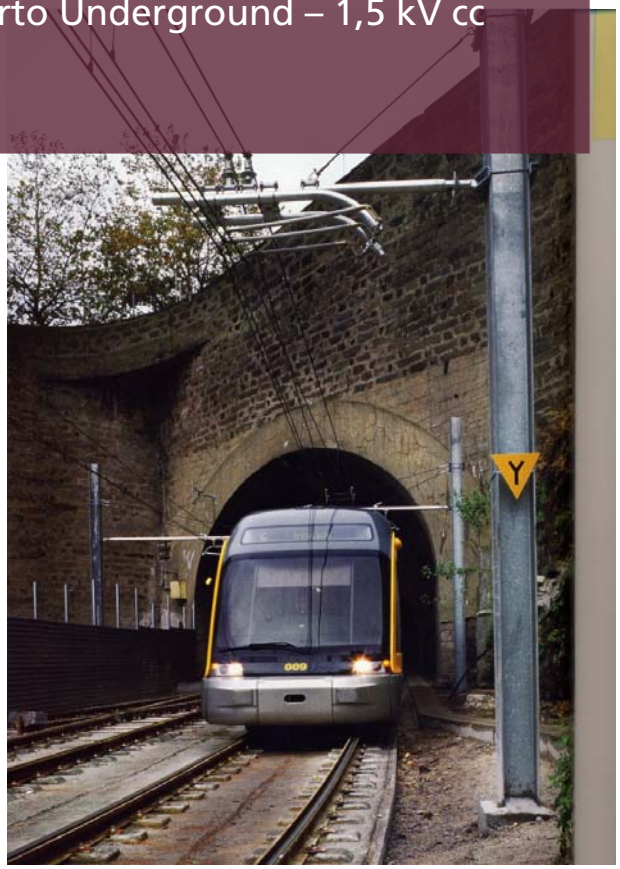
Athens – Thessaloniki line 25
kV 250 km/h

ITALY

High speed line - 2x 25

PORTUGAL

Porto Underground – 1,5 kV cc



ENGLAND

25 kV OMNIA type

Notes

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BONOMI
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