Abstract
This innovative system for rail traction power supply, christened "2x25 kV + +", is achieved by modifying the arrangement of the conductors on the catenary. This concept delivers a substantial decrease in impedance, opening up important avenues for optimisation in system design to improve power supply quality. It reduces the number of substations required for the operation of a railway line. This innovative idea can be implemented without any technological change of components in the catenary and / or sub-stations.

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1. Introduction
Every major railway operation activity today calls for higher standards in order to improve service quality and optimize costs. As a result, the power levels of traction units have generally increased to meet new operational needs. These developments in the railway system have led to an increase in the voltage level of lines supplying traction power in order to attain higher short-circuit power levels, reducing the rate of imbalance caused to the national electricity grid.

In general the density of transmission lines in the national grid is lower where the level of voltage is higher, from high voltage such as 63 kV or 90 kV up to very high voltage such as 225 kV or 400 kV. The connection points between the national grid and transmission lines feeding the traction sub-stations consequently tend to be further apart when the national grid voltage is higher.

To respond to this more difficult and increasingly more common situation, we have devised a simple and robust "2x25 kV++" system. We subsequently filed a patent application for this innovative system.

9. Poland and Croatia
For Poland and Croatia, introduction of or conversion to 2x25 kV would obviously be a major policy decision. If this idea is being seriously considered, it would be worthwhile to also consider 2x25 kV++. As an example, Egis Rail is presently a partner in a consortium designing the modernization and double tracking of the Dugo Selo – Novska railway corridor where such a conversion could be of considered.