Abstract
The narrow-gauge railway line St. Pölten – Mariazell, originally steam-powered, was electrified with the single-phase system 6.5 kV 25 Hz at an early period. Several considerations during the life-cycle of this famous line resulted in maintaining that exceptional power supply system. The article describes the core topics of genesis, development and improvement of the related system components between 1908 and 2015.

Introduction
The single-phase electrified Mariazellerbahn runs from St. Pölten, capital of the province of Lower Austria 60 km westbound of Vienna, on the Rhine – Danube Corridor (TEN 17) to Mariazell in Styria. The single-track 760 mm line was opened in several stages between 1898 and 1907. Passing the Pielach Valley southbound, the line climbs from St. Pölten (267 m above sea-level) with a gradient of max. 2.8%, passing many tunnels and viaducts and turning in spectacular loops to an altitude of 892 m, reaching the summit in km 65.5 in the Gösingtunnel (2368 m long). Eventually, the track runs down to Mariazell (km 84, 849 m), famous for its Saint Mary pilgrim site. Breathtaking views along the whole route have given the line an outstanding position within the narrow gauged lines in Europe from its very beginning. Heavy transport demands showed an unexpected scale, and the steam-operated railway already reached its limit of performance in the first operational year. As a result of deep analyses concerning possibilities of capacity enhancement it was decided to electrify the line as soon as possible. In order to generate electrical power for traction needs it was proposed to use the water powers of Erlauf and Lassing rivers in that area by erecting a hydro-power plant at Wienerbruck. For reserve purposes as well as for times when water is scarce, the provision of large diesel engines in St. Pölten was suggested. To use surplus energy, it was envisaged to feed industry and households along the railway line. This long-term oriented strategy to provide electrical energy in a service area of more than 100 km trespassed for the first time the municipal level at that time. Therefore, the projects for power plants feeding the Mariazellerbahn were the origin of the countrywide electrification in Lower Austria and the roots of today’s Energieversorgung Niederösterreich AG (EVN).

A considerable reason for the choice of the alternating current system was the fact, that in the St. Pölten area several smaller hydro-power and steam-power stations were using the 25 Hz system already and it was foreseen to interconnect all these power plants. Furthermore, Siemens-Schuckert as the electrical supplier already had expertise in that field, since they supplied, among others, the Wien – Baden interurban railway, which had been operated in their core section with AC 500 V 25 Hz since 1906. Even though Siemens-Schuckert at that time fitted the normal gauge Budapest - Vács – Gödöllő line with a 10 kV 15 3/4
Hz system and despite the fact that it became more and more evident that for the AC 50 Hz system a breakthrough could be expected, engineers of the Niederösterreichisches Landeseisenbahnamt were convinced by Siemens-Schuckert during a study tour across Europe to design the electrical power system both for railway propulsion as well as for industrial purposes with the frequency of 25 Hz.

The aim was, that a common distribution system should provide electrical energy for the whole region along the Mariazellerbahn route to strengthen the region both in their economical development and in their quality of life. Indeed, the interaction of Wienerbruck hydro-power station with both the Diesel power station at St. Pölten and the high-voltage transmission line Wienerbruck – St. Pölten together with the municipal power plant at St. Pölten and several others formed an interconnected system to serve as a model for coming developments.

References: