## Grid modernization warsaw



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J?drzejuk, H.; Chwieduk, D. Possibilities of Upgrading Warsaw Existing Residential Area to Status of Positive Energy Districts. Energies 2021, 14, 5984. https://doi/10.3390/en14185984

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J?drzejuk, Hanna, and Dorota Chwieduk. 2021. "Possibilities of Upgrading Warsaw Existing Residential Area to Status of Positive Energy Districts" Energies 14, no. 18: 5984. https://doi/10.3390/en14185984

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Poland"s high voltage transmission network could witness investments worth PLN14 billion in the coming decade. This is to be viewed in the context of around 17 per cent growth in electricity demand expected by the country in 2030. Besides the essential capacity augmentation, the investment outlook for the sector emphasises renewable energy and energy exchanges, both of which hinge on grid connectivity.

Polskie Sieci Elektroenergetyczne (PSE) Operator controls and operates the high voltage transmission network of Poland through five branches in Warsaw, Bydgoszcz, Katowice, Radom and Poznan. Established in 2004, the transmission system operator (TSO) is responsible for ensuring the grid"s synchronous operation with interconnected European power systems, planning and providing for power transfer capacity for cross-border energy exchange, and creating infrastructure for the domestic bulk power market. It is wholly owned by the

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Polish government through the Ministry of Economy.

As of December 31, 2020, Poland"s high voltage transmission grid comprised 281 lines, totalling a length of 15,518 km, a transformer capacity of 57,533 MVA, and 109 substations. Of the total transmission lines, one 114-km line operates at 750 kV; 111lines, totalling a length of 7,822 km, operate at 400 kV; 169 lines, totalling a length of 7,380km, operate at 220 kV; and the remaining are at the 110 kV and 450 kV levels.

There are 12 major transmission lines connecting Poland's power system with the networks of neighbouring countries including Sweden, the Czech Republic, Slovakia, Belarus, Ukraine and Germany. This includes the 254-km, 450 kV direct current (DC) underground connection with Sweden. Half of this line length is owned by Poland's TSO.

The financial performance of the TSO has been fairly sustainable and profitable. The company's net sales grew at a compound annual growth rate (CAGR) of 4.54 per cent, from PLN7,624 million in 2015 to PLN9,106 million in 2019.

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