Study of the impact of electric charging stations on the power grids of the Novosibirsk business zone: baseline forecast until 2035.

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The results of a quantitative assessment of the impact of electric charging stations on distribution networks in the business zone of Novosibirsk for the period up to 2035 are presented. A calculation model was developed based on data from 27 transformer substations using statistical processing of historical loads and linear regression. Operating mode simulation was performed in RastrWin3 for 2025, 2030, and 2035 scenarios. It was established that total transformer currents increase more than *threefold*, line currents more than fourfold, the 95th percentile of loading exceeds 200% of the initial level, and active power losses increase 25-fold while voltage remains within permissible limits. It is shown that uniform distribution of charging station capacity does not prevent equipment overloads and requires a transition to optimization scenarios for placement.

Key words: distribution networks, electric charging stations, electric vehicles, power quality, load forecasting.