

Analysis of the level of battery drop in electric bikes with different night parking options

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Abstract. The study analyzed the level of drop in battery charge of electric bikes under different options for night parking during the summer operating season. An analysis was made of the level of charge drop in the battery of electric bikes under different options for night parking with three storage options (home storage, garage storage, street storage) providing different temperature conditions for the electric bicycle battery. The data obtained reflect the level of drop in battery charge of electric bikes for different options for night parking during the summer operating season. These studies can be used when conducting research aimed at optimizing the level of battery charge loss for electric bikes under different options for night parking in urban conditions.

1 Introduction

Conducting research aimed at preserving the battery charge of electric bikes and other electric vehicles, such as electric cars, electric scooters, electric scooters, etc., is currently of interest to more and more modern researchers.

Preserving the battery charge of electric bikes and other electric vehicles, such as electric cars, electric scooters, electric scooters, etc. to level out the energy costs of urban households is possible by optimizing existing expenses. Analysis of the level of battery charge drop for electric bikes for different options for night parking during the summer operating season can take into account both seasonal and temperature conditions for parking electric bikes at night.

Analysis of the level of battery charge drop for electric bikes under different night parking options during the summer operating season can be divided into three options, providing different temperature conditions for the electric bicycle battery:

- home storage;
- garage storage;
- outdoor storage.

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2 Materials and Methods

This study is aimed at проведение analyzing the level of drop in the battery charge of electric bikes with different options for night parking during the summer season of operation. The analysis of the level of battery drop in electric bikes with different options for night parking during the summer season of operation is carried out (Table 1).

Table 1. Analysis of the level of drop in the battery charge of electric bikes with different options for night parking during the summer season of operation.

Option number	Storage conditions for electric bikes
1	home storage
2	garage storage
3	street storage

For the purposes of data collection and processing, analysis of the level of battery drop in electric bikes with different night parking options during the summer season of operation, various methods were considered [1-23].

3 Results

3.1 Results analysis of the level of battery drop in electric bikes with different night parking options during the summer season of operation (home storage, garage storage, street storage)

3.1.1 Results analysis of the level of battery drop in electric bikes with different night parking options during the summer season of operation under the first storage condition

The results of the analysis of the level of battery drop in electric bikes with different options for night parking during the summer season of operation under the first storage condition are presented in Figure 1.

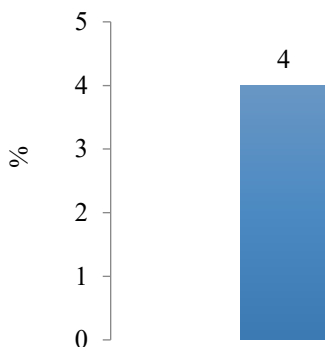


Fig. 1. Decrease in the battery charge level of electric bikes for different night parking options during the summer operating season under the first storage condition.

3.1.2 Results analysis of the level of battery drop in electric bikes with different night parking options in the summer season of operation under the second storage condition

The results of the analysis of the level of battery drop in electric bikes with different night parking options during the summer season of operation under the second storage condition are presented in Figure 2.

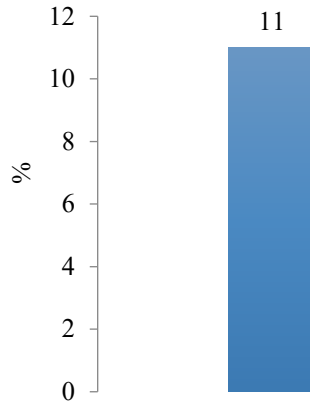


Fig. 2. Decrease in the battery charge level of electric bikes for different night parking options during the summer operating season under the second storage condition.

3.1.3 Results analysis of the level of battery drop in electric bikes under different night parking options during the summer season of operation under the third storage condition

The results of the analysis of the level of battery drop in electric bikes with different night parking options during the summer season of operation under the third storage condition are presented in Figure 3.

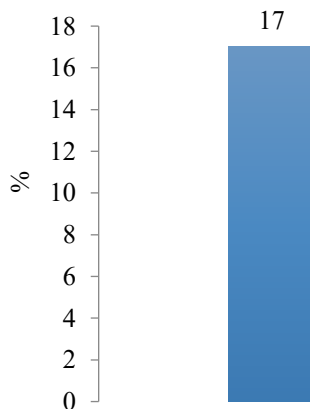


Fig. 3. Decrease in the battery charge level of electric bikes for different night parking options during the summer operating season under the third storage condition.

To process the data, analyze the level of drop in battery charge of electric bikes for different options for night parking during the summer operating season, formulas 1, 2 and 3 were used.

$$SS_{fact} = \frac{\sum_j^p T_j^2}{n} - \frac{(\sum x_i)^2}{N} \quad (1)$$

$$SS_{total} = \sum x_i^2 - \frac{(\sum x_i)^2}{N} \quad (2)$$

$$M = \frac{X_1 + X_2 \dots + X_i}{n} \quad (3)$$

Processing of the results analysis of the level of battery drop in electric bikes with different variants of night parking during the summer season of operation confirmed the Gaussian distribution of data relative to the level of battery drop in electric bikes with different variants of night parking during the summer season of operation.

4 Discussion

From the data obtained (Figure 1, 2 and 3), it follows that the indicator of the level of battery drop in electric bikes with different options for night parking during the summer season of operation is:

- home storage – 4%;
- garage storage – 11%;
- street storage – 17%.

The average indicator of the level of battery drop in electric bikes with different options for night parking during the summer season of operation is presented in Figure 4.

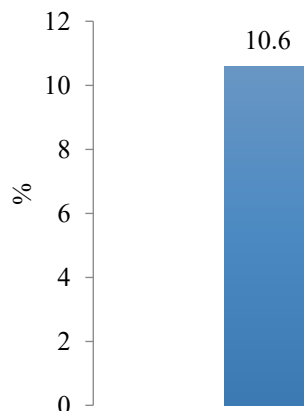


Fig. 4. The average indicator of reduction of the battery charge of electric bikes in different variants of night parking during the summer season of operation.

5 Conclusions

The results of this work contain data on the study of the level of battery drop in electric bikes with different options for night parking during the summer season of operation. The analysis of the level of drop in the battery charge of electric bikes with different options for night parking during the summer season of operation (home storage, garage storage, street storage) providing different temperature conditions for the battery of an electric bikes carried out. The data obtained reflect the level of drop in the battery charge of electric bikes with different options for night parking during the summer season of operation. These studies can be used in conducting research aimed at optimizing the level of battery drop in electric bikes with different options for night parking during the summer season of operation.

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