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Data Article

Data on electrical energy conservation using high efficiency motors for the confidence bounds using statistical techniques



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ABSTRACT

In this article, we describe details of the data used in the research paper “Confidence bounds for energy conservation in electric motors: An economical solution using statistical techniques” [1]. The data presented in this paper is intended to show benefits of high efficiency electric motors over the standard efficiency motors of similar rating in the industrial sector of Pakistan. We explain how the data was collected and then processed by means of formulas to show cost effectiveness of energy efficient motors in terms of three important parameters: annual energy saving, cost saving and payback periods. This data can be further used to construct confidence bounds for the parameters using statistical techniques as described in [1].

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Specifications Table

Subject area	Energy economics, statistical analysis
More specific subject area	Electrical energy conservation using energy efficient motors
Type of data	Tables, figures and graphs
How data was acquired	Using motor data and energy consumption forms while personal visits at surveyed industries
Data format	Raw, filtered, analyzed
Experimental factors	Factors needed to calculate energy saving, cost saving and payback period by a similar rating energy efficient motor in place of an existing standard efficiency motor
Experimental features	Statistical analysis of the data using student's <i>t</i> -distribution in terms of confidence bounds of the energy conservation parameters.
Data source location	1. Hyderabad, Pakistan (latitude 25.367°N, longitude 68.367°E) 2. Jamshoro, Pakistan (latitude 25.26°N, longitude 68.20°E)
Data accessibility	Data is available with this article

Value of the data

- The data highlights the benefits of using high efficiency motors in place of existing standard efficiency motors in industrial sector of Pakistan in terms of annual energy savings, cost savings and payback periods.
- The annual energy consumption and annual operational cost are compared for a sample data of 20 standard and energy efficient motors (EEMs).
- The data described in this article supports the step by step statistical analysis in terms of confidence bounds for the three parameters: annual energy savings, cost savings and payback periods for EEMs.
- The confidence bounds based on the discussed data which are presented in associated research paper [1] can be used to attract financers for large scale purchase and replacement of standard motors (SMs) by EEMs to conserve sufficient amount of electrical energy.
- The procedure described in this article and the underlying research paper [1] can be used by researchers for processing the data related to high efficient motors in other countries (the data in Refs. [2–10]) in order to generate encouraging confidence bounds to promote electrical energy conservation using EEMs [1].

1. Data

The data in this work describe general information about existing low-efficiency motors at surveyed sites, like: motor application type, utility rate being used, annual operating hours and related information from motor nameplates. We also present the comprehensive values of some important parameters for each standard motor in the sample like: input volts, input amperes, input kW, operating speed (in rpm) and power factor.

2. Experimental design, materials and methods

The data presented in this article is basis for the statistical analysis in terms of confidence bounds – as discussed in [1] – for the annual energy savings, cost savings and payback periods of EEMs when replaced for SMs. To acquire the necessary data, some industries based at Pakistan were surveyed and data on existing standard efficiency motors were noted while personal visits. We describe in next section, the acquired data, its processing using different formulas and its descriptive statistical

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