TECHNOLOGY FACTSHEET

ENERGY LOSS REDUCTION BY MEANS OF ENERGY EFFICIENT MOTORS[1]

1. **Sector/ Sub Sector:** Methods of electrical energy reduction that is applicable to all industries using electrical drives (motors).

2. **Introduction:** Electrical energy is a clean energy available for many applications, but can have a high environmental impact due to low overall efficiency from primary energy source (if non-renewable) to the user end. By reducing the usage or making the usage efficient, environmental impact can be greatly reduced. According to global energy surveys, it is estimated that two thirds of electrical energy in the industry is consumed by motors and hence high efficiency requirement is inevitable in view of overall energy efficiency. If every installation could contribute even by a fractional improvement of efficiency, the gross saving would be enormous.

3. **Technology Name: Energy loss reduction by means of energy efficient motors**.

4. **Technology Characteristics:** Energy saving by means of reducing losses of motors and hence with increased efficiency. A general description of the technologies are given in Appendix-1

5. **Country Specific Applicability:** Applicable universally, but can have more benefits in tropical countries like Sri Lanka.

6. **Status of the technology in the country and its future market potential**: The solutions are included in many standards high-efficient motors are available in the market. There are several ESCOs who can provide such solutions, but prefer established organizations with reputed products in view of support.

7. **Barriers:** Initial expenses and technology know how that has to be applied to different types industries.

8. **Benefits:** As a rule of thumb, reduction of one unit of electrical energy can save nearly twice the equivalent energy of primary energy. If non-renewable energy is used, such technologies can provide higher mitigation effects in energy usage applications compared to renewable energy generating and usage.

9. **Operations:** No special operation is required, as all methods are more or less similar to the presently used operations (efficient motors) and the other type (automation) is generally programmed to operate automatically. However, involvement of a trained technical personnel or supplier may require incase of a problem.

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[1] **This fact sheet has been extracted from TNA Report – Mitigation for Sri Lanka. You can access the complete report from the TNA project website** http://tech-action.org/

10. Costs: Cost varies widely with the application from a few thousand to a few million rupees.

Appendix -1

a. Efficient Motors

According to global energy surveys, it is estimated that two thirds of electrical energy in the industry is consumed by motors and hence high efficiency requirement is inevitable in view of overall energy efficiency. If every installation could contribute even by a fractional improvement of efficiency, the gross saving would be enormous. Already there are agreements between motor manufactures and various enactments in the USA and Europe. Energy Policy Act 1992 (Epact 92) has directives for minimum efficiency levels for general purpose motors up to 200HP in USA. Based on such directives NEMA (National Electric Manufacturer's Association) listed different efficiency bands for motors. The motors that have higher efficiency by 2% – 8% than the standard efficiency motors are categorized as "Premium Efficiency Motors'.

Manufacturers state the efficiency classes in three groups – EFF1, EFF2 and EFF3. The highest efficiency of a particular category varies with the power rating (kW or HP), number of poles (or the speed). EFF1 has the highest efficiency. To illustrate these relationships considering a 1.1kW motor, efficiency of EFF1 type is equal or more than 82.8% and that of EFF2 type is equal or more than 76.2% and any type with lower efficiency than the latter falls into EFF3 type. The similar efficiency values for 75kW motor are EFF1 $\geq$ 94.6% and, EFF2 $\geq$ 93.6%.

Energy efficient motors have other benefits in addition to energy savings. They have better life due to high quality insulation, magnetic circuits and bearings. These properties with high quality manufacturing processes also lead to very low vibration and more susceptible to voltage unbalances and overloading.