THE ECONOMIC IMPORTANCE OF TRIBOLOGY
IN THE CONSERVATION OF ENERGY

by

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INTRODUCTION

The danger of a shortage of energy, at least in the form it is traditionally used, is now recognized by all industrial nations. Their Governments have therefore embarked on strategies to effect savings of wasted* (or rejected) energy.

However, whilst much attention has been paid by Governments to the saving of wasted heat in space heating through insufficient insulation and to thermal cycles of machinery, insufficient thought seems to have been given to the direct and indirect loss of energy occasioned by wear and by friction, and to the savings of materials. Then in 1977, an American Government financed report suggested that $16 1/4 billion per annum (at 1976 values) could be saved by a "Strategy for Energy Conservation through Tribology". Updated to 1981 American values and taking into account the increased world price of oil and American inflation, this figure of saving would now exceed $40 billion** a year.

This magnitude of energy savings through tribology alone seemed to be very large. Therefore, in 1980, Dr. Schofield and myself, started our own investigation, the results of which were presented in the 1981 James Clayton Lecture to the Institution of Mechanical Engineers; some of the findings are included in this paper.

**"Wasted" or "rejected" is defined as that portion of input energy which does not appear as useful output in the form of work, electricity, thermal processing and the like. This non-utilization of energy results both from constraints imposed by Carnot cycle efficiencies, and from losses such as heat transfer, friction, wear and leakage.

** a U.S. billion = $10^9