

# Introduction

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- The level of prosperity of a community is related to its capability to produce goods and services. But producing goods and services is strongly related to the use of energy in an intelligent way.
  - Motion and temperature (heat) control are paramount in energy usage.
  - Energy comes into use in a few forms such as thermal, mechanical and electrical.
  - The larger part of electrical energy is converted into mechanical energy in electric motors. Among electric motors, induction motors are most used both for home appliances and in various industries.
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# A Historical Touch

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- Faraday discovered the electromagnetic induction law around 1831 and Maxwell formulated the laws of electricity (or Maxwell's equations) around 1860.
  - The knowledge was ripe for the invention of the induction machine which has two fathers: Galileo Ferraris (1885) and Nicola Tesla (1886).
  - In 1889, Dolivo-Dobrovolsky invented the induction motor with the wound rotor and subsequently the cage rotor in a topology very similar to that used today. He also invented the double-cage rotor.
  - Thus, around 1900 the induction motor was ready for wide industrial use. No wonder that before 1910, in Europe, locomotives provided with induction motor propulsion, were capable of delivering 200 km/h.
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- Three-phase induction motors are the most common and frequently encountered machines in industry
    - simple design, rugged, low-price, easy maintenance
    - wide range of power ratings: fractional horsepower to 10 MW
    - run essentially as constant speed from zero to full load
    - speed is power source frequency dependent
      - not easy to have variable speed control
      - requires a variable-frequency power-electronic drive for optimal speed control
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