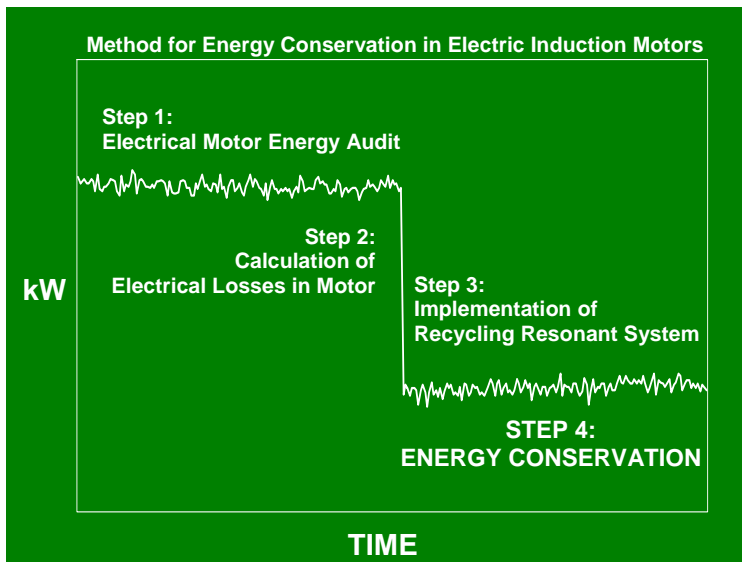


Proprietary Method for Energy Conservation in Electric Induction Motors Saves Energy, Saves Money

INTRODUCTION

Energy Conservation Industries, LLC (**ECI**) has developed a method for **Energy Conservation** of active power (kWatts) in applications using induction motors at <500 VAC (in Delta or Wye configuration). This patent pending procedure is a customized, after-market retrofit process and yields **dollar savings** in the form of reduced motor operating cost. As illustrated below this unique method is accomplished in 4 basic steps:



Step 1: Electrical Motor Energy Audit

The **Electrical Motor Energy Audit** is the collection of actual electrical motor load data including: voltage, current, active power, total power, reactive power, and power factor under normal operating conditions.



ELELCTRICAL MOTOR ENERGY AUDIT

The **Electrical Motor Energy Audit** is performed during the Facility Assessment process which entails a visit to the facility by **ECI** representatives in order to identify eligible motors for the Energy Conservation process.

Prior to the Assessment the Customer is required to provide a complete Motor List of the facility. This List contains basic motor name plate information (e.g. HP, RPM), motor location within the facility, ID number, average annual hours of operation, and if the motor incorporates any Soft Starts, VFD's

or other peripherals. Utility billing information is also generally collected during the Assessment in order to determine the historical average annual utility rate.

Generally, electric induction motors between 5 - 50HP, with at least 50% annual operation time, and without Soft Starts and/or VFD's are the best candidates for application and are the first priority for the **Electrical Motor Energy Audit**.

Normally, a facility representative who is very familiar with the location and operation of the motors is required to assist with locating the eligible motors from the Motor List the **Electrical Motor Energy Audit** can be performed. It is very important that the motor be operating under normal load and operating conditions during the **Electrical Motor Energy Audit**, which usually takes 15 minutes per motor.

ECI recommends and currently uses the Fluke 430 Series Power Quality Analyzer for the **Electrical Motor Energy Audit** process. This is a very accurate, reliable, and user friendly instrument.



FLUKE 430 SERIES POWER QUALITY ANALYZER

Once the Assessment process is complete, **ECI** can generate a Proposal (based on the data collected during the **Electrical Motor Energy Audit**) projecting **Energy Conservation** (in kW) for each application as well as outlining the projected investment, required equipment, payback period, and ongoing cost savings.

After the Proposal is accepted by the Customer, a Purchase Order is submitted to **ECI** with a Production Deposit of 50% of the order amount. This deposit secures the order and initiates the manufacturing process. Delivery is generally made within 6 – 8 weeks, when final payment is also due.

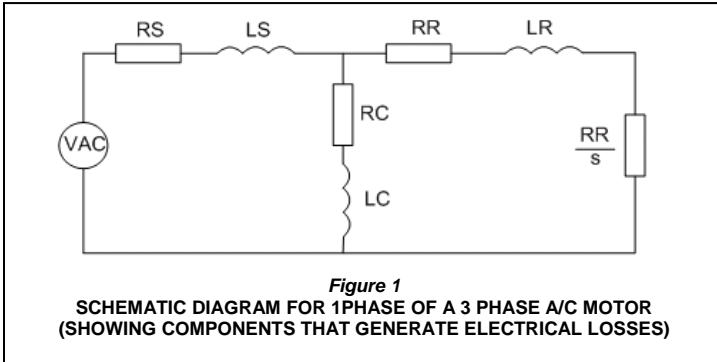
Important Notes:

- (1) **Energy Conservation** projections are based on the data collected during the **Electrical Motor Energy Audit**.
- (2) **Energy Conservation** and dollar savings cannot be extrapolated between treated and untreated applications.
- (3) Annual dollar savings projections are calculated by multiplying the projected **Energy Conservation**, the average annual utility rate and the hours of operation (provided by the Customer). Changes in the utility rate and/or hours of operation will significantly affect the actual payback period.
- (4) The payback period is based on the prior year's average annual utility rate provided by the Customer. Utility rates have consistently risen over the past 10 years.
- (5) Additional savings may be possible if the Utility Company billing structure includes charges for kVAh and/or kVARh.
- (6) All **ECI** equipment carries a full 1 year warranty. Extended warranties are available for an additional charge.
- (7) The expected application life is 10 – 25 years depending on the environment and operating conditions of equipment.

Step 2: Calculation of Electrical Losses in Motor

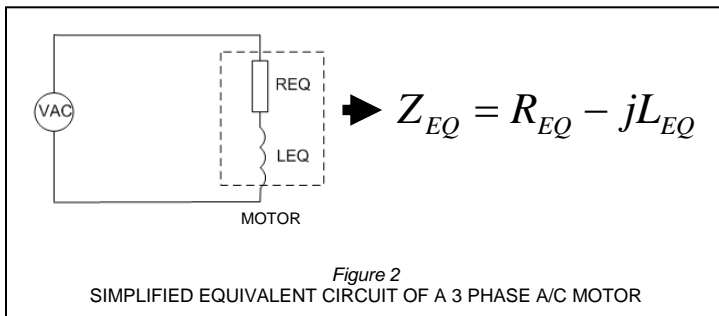
Energy Conservation is achieved by minimizing the electrical losses of the motor, which are generally categorized as:

- Losses in the Stator (across RS)
- Losses in the Rotor (across RR)
- Losses in the Magnetic Core (across RC)



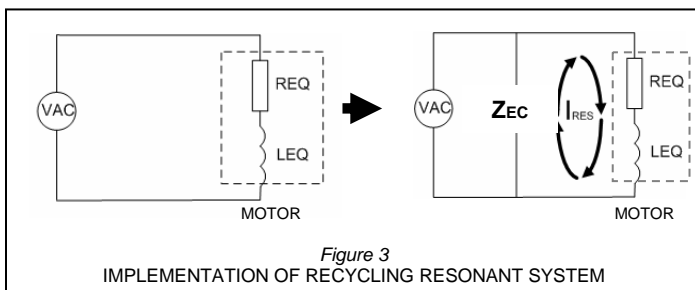
In order to determine the amount of **Electrical Losses in the Motor** a calculation of RS, LS, RR, LR, RC, and LC is made from the data collected during the **Electrical Motor Energy Audit**.

These measured values are then used to accurately calculate and determine the complex equivalent impedance (i.e. resistance and inductance) of the motor (*Figure 2*).



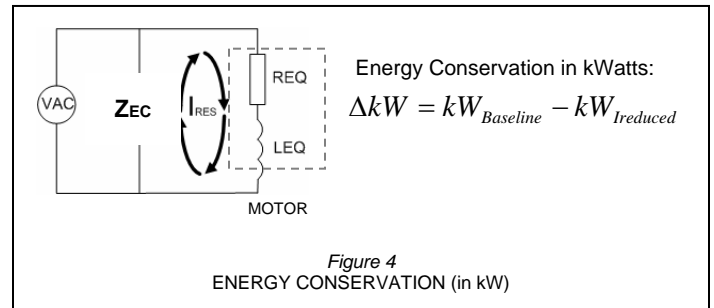
Step 3: Implementation of Recycling Resonant System

Based on these measured and calculated electrical parameters the **ECI Model** then determines the matching impedance to **Implement a Recycling Resonant System**. By matching the impedance of the motor a resonance current is recycled back to the motor which diminishes losses across the motor and lowers the consumption of line side current and active power (Kw) of the main source, without affecting the load (*Figure 3*).



Step 4: ENERGY CONSERVATION

The difference between the original and reduced active power (kW) becomes the **Energy Conservation** (*Figure 4*).



Average **Energy Conservation** ranges from 3 -35% depending on motor load conditions and will **always** be dependent upon the load. Motor applications that are under-loaded, or oversized, have more electrical losses and therefore more potential for **Energy Conservation** and dollar savings.

If necessary an additional **Electrical Motor Energy Audit** can be conducted following Implementation to verify the actual **Energy Conservation** and dollar savings. The verification process simply entails the collection of an average baseline motor load sample (before process) followed by another comparable average motor load sample with the **ECI** method (after process), and the evaluation of the difference. **Energy Conservation** is realized immediately upon Implementation.

Through an exclusive affiliation with Carbon Angel (a Platinum ecohonest company) **ECI** is now able to offer certified carbon offsets and financial support for its **Energy Conservation** projects. Find out more about Carbon Angel and what you can do to participate and support **ECI** and other carbon output reducing projects:



For more information regarding this exclusive technique for **Energy Conservation** or to schedule your Facility Assessment please contact:

Energy Conservation Industries, LLC
energy conservation for a new generation™

Uvalde, TX 78801 USA

830.278.6100

www.energyconservationindustries.com