

# GE Energy

## Transformer Condition Assessment Offerings

### Typical Benefits

- Increased reliability through condition assessments.
- Manage and extend the life of aging assets.
- Complement existing maintenance practices to better understand the health of your fleet.
- Statistical comparison of your transformer fleet to determine which are most at risk of failure.
- Replacement and repair recommendations to optimize transformer expenses.
- Avoid unplanned outages through reliability-based maintenance.

### Transformer Service Solutions

GE's Transformer Service program is a comprehensive offering specifically designed to help our customers increase their reliability, improve their profitability and reduce their risk through transformer condition assessments. Our expert service team members will meet with the customer to identify and assess their critical needs and develop a solution to meet those needs.

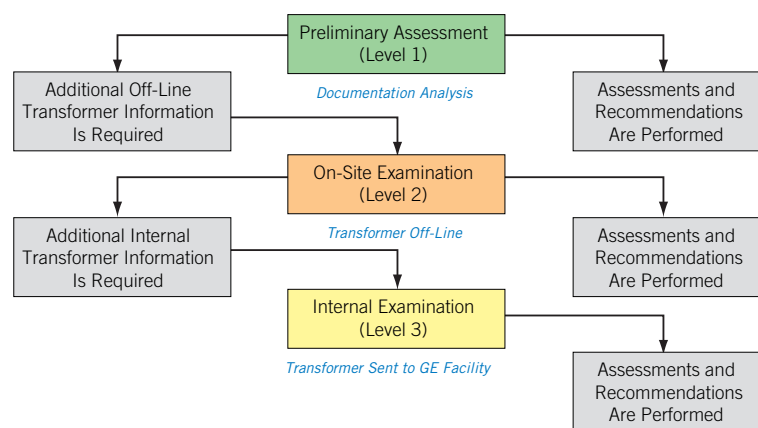
For over 20 years, GE has been in the transformer business and has developed core competencies in the areas of chemistry and physics of transformer insulation systems. In addition, GE has transformer experts who can interpret the oil analysis to determine in part the health and condition of the transformer. GE has over 50 years of transformer design, operation, rewind, and repair experience.

GE is continuously developing more advanced monitoring equipment to increase its ability to analyze GE and non-GE equipment.

### Increase Asset Reliability by Understanding the Health of Transformers

Condition assessments can be applied to a population of units by using methods which are based on historical failure modes. These methods cannot identify the condition or vulnerability of individual units. For individual transformers the evaluation method will be modified or limited by the availability of information from the manufacturer or from the transformer owner's operations and maintenance records.

### Process Flow Chart



There are three types of evaluations or condition assessments that can be performed on a transformer depending upon the level of analysis that is required. All three levels of condition assessments would provide a report to the customer with the current status of their transformer. This would include, but not be limited to: overall transformer condition, areas of concern, recommended maintenance or replacement activities for the particular transformer. The process of benchmarking the probable condition of an individual unit, compared to other units on the system (or in the plant) is often controlled through a three level condition assessment process.



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## Other Services

**GE has many other transformer service offerings. Some of these offerings are:**

- Annual Transformer and Component Planned Maintenance
- Laboratory Analysis (US and Canada)
- Spare Parts / Pooled Inventory
- Unplanned Maintenance
- Installation and Commissioning of Equipment
- Operation and Maintenance of Transformers
- Transformer and Component Assessment
- Oil Dry-out or Replacement
- Cooling Upgrades and Portable Cooling Units
- Making Repairs Versus Replace Decisions on Transformers



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First, a Level 1 or Preliminary Condition Assessment is performed. From the Preliminary Condition Assessment, recommendations such as to install monitoring equipment, to perform a Level 2 or On-Site Assessment, and / or to perform specific preventative maintenance could be recommended. From an On-Site Condition Assessment, recommendations such as a Level 3 or Transformer Internal Examination, additional maintenance, and / or replacement of specific other devices could be recommended. Recommendations from a Transformer Internal Examination are based upon the findings inside the transformer.

### ■ Preliminary Condition Assessment - Level 1

The Preliminary Condition Assessment service will provide the transformer owner with a report on the condition of the transformer based on a review of information given to GE from the customer about their transformer(s). The customer provides data and documentation on the history of the transformer. A GE transformer expert will evaluate the data and documentation and provide a recommendation regarding the transformers evaluated.

### ■ On-Site Condition Assessment - Level 2

The Level 2 condition assessment is an on-site service to determine the fitness of the transformer for continued service. The assessment includes a review of previous Level 1 assessment reports, review of the original manufacturer's test report and specification, an external visual inspection, interviews with site personnel, and off-line tests of the transformer. De-energization of the transformer is required for this assessment. The customer will be provided a summary report that will include any areas of concern found by the GE Transformer Experts in addition to a recommendation list.

### ■ Transformer Internal Examination - Level 3

If a transformer is showing signs of distress, GE personnel would coordinate to perform an internal examination of the transformer. This involves a specially trained team to carry out this work. Depending upon the evaluation required, the transformer may be evaluated at a GE Transformer Repair Facility for continued testing.

## Reduced O&M Costs

GE has numerous products and services that can help detect early fault conditions that could lead to equipment failures and unscheduled outages. Through condition assessments, these products and services will be recommended depending upon the condition of the transformer. These products range from continuous monitoring of dissolved combustible gases (key fault gases) and moisture in oil (HYDRAN®) to monitoring and managing the performance of transformers showing signs of distress (FARADAY® TNU™) to extend their life.

GE also offers long-term contractual service offerings. Each contractual service offering is tailored to meet our customer's needs. Contractual service offerings can range from being as simple as a spare parts agreement to being as complex as operation and maintenance of your transformers.

## Contact

### For more information, contact:

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