EPRI | ELECTRIC POWER RESEARCH INSTITUTE

ON THE WAY

Power Transformer Guidebook: The "Copper Book"

This world-class resource will cover all aspects of power transformer ownership with a view to effective and efficient transformer life management.

Transformers are critical, costly assets with a major influence on power system reliability. EPRI's *Power Transformer Guidebook* will provide a comprehensive reference to help utilities around the world to optimize transformer procurement, operation, maintenance, and life cycle management.

With a projected completion date of 2014, the guidebook will join the landmark series of EPRI power delivery references. These comprehensive guidebooks—each printed with a distinctive colored cover—document and distill the knowledge and experience of the world's leading power delivery experts. In this tradition, the *Power Transformer Guidebook* will be printed with a metallic reddish brown cover and be referred to as the "Copper Book."

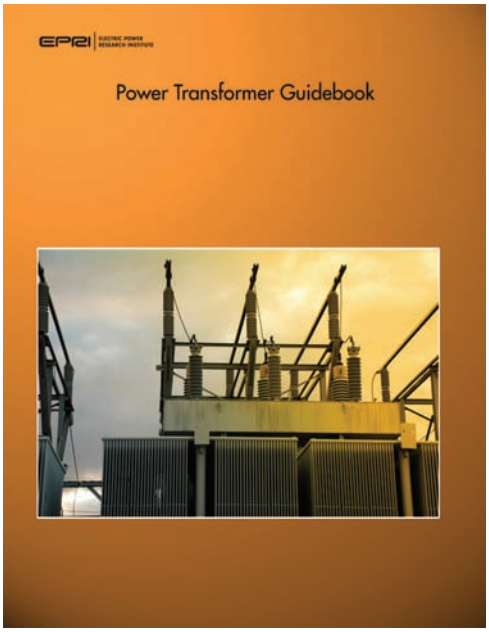
Addressing an Urgent Challenge

Utilities are losing many of their subject matter experts through retirement and downsizing. This is particularly true in the area of power transformers, creating a critical need for a comprehensive reference book geared toward the utility engineer. Most existing books and other published works on power transformers were not written from the perspective of the utility engineer and do not cover many aspects of transformer ownership.

Decades of EPRI transformer research have produced results that have changed the ways transformers are designed, operated, and maintained. These changes include the development of new manufacturing techniques, monitoring equipment and techniques, operating and maintenance procedures, and solutions to some of the major problems experienced by power transformer owners and operators. With this background and access to a worldwide network of transformer experts that covers all aspects of the transformer industry, EPRI is uniquely positioned to produce a world-class transformer guidebook.

Progress to Date

In 2007, EPRI brought together a team of experts to design the guidebook and ensure that all necessary aspects of transformer ownership were included. The design was completed and is described in the report *Transformer Guidebook Design* (1013799). This report identifies and summarizes each chapter. In 2008 and subsequent years, chapters will be assigned to the foremost subject matter experts for the initial compilation of required material. Each chapter will then be reviewed by several others, including utility representatives, to ensure that their needs are met before publication.



In each year of development, completed chapters will be published for immediate use by the industry.

Material and Organization

The guidebook will cover large power transformers, auto-transformers, generator step-up transformers, converter transformers, phase shifting transformers, and reactors. It will include material written by the world's transformer experts as well as the results of years of EPRI research and development.

The book is being structured so that chapters follow a logical sequence from the perspective of transformer ownership and life management for the utility engineer, from the initial planning stage to the retirement of the transformer. Therefore, it can be used as a guide for the day-to-day operation of transformers.

EPRI is producing the book in both hardcover and electronic versions. The electronic version will be a searchable PDF format that will include applets (short software programs) for the many different calculations required for effective transformer life cycle management. The applets will breathe life into the theories and principles described in the guidebook to increase the reader's understanding and reduce the effort necessary for implementation.

Audience, Application, and Value

The *Power Transformer Guidebook* will be a comprehensive reference for utility personnel, including operating and maintenance engineers, design and planning engineers, and students.

For utility engineers and other personnel charged with the life management of transformers, the guidebook will give up-to-date information on currently accepted practices on all aspects of transformer ownership. For the expert seeking more in-depth knowledge on specific and narrowly focused subjects, it will provide details of current and past EPRI research projects, information on the state-of-the-art in transformers and ancillary equipment, and future transformer-related developments. For students and other personnel wishing to gain more knowledge on the design, operation, or maintenance of all types of transformers, it will provide sufficient information and give references to more detailed works.

Benefits of Participation

Additional utilities are welcome to join the development effort. Project funders help guide the book's development and influence its content. Funders also receive regular communication on the technical development, early communication on regional training as soon as the book is released, as well as opportunities for peer-to-peer engagement through the Transformer Task Force.

The publication of a reference book on power transformers is long overdue; however, the subject matter to be covered is sufficiently complex that it will require many different experts, including currently employed utility personnel, which will unavoidably delay timely publication unless sufficient time and personnel resources are made available to the project. Additional utility support will help to ensure the timely completion of this much-needed reference.

Practical Training Tool

The Copper Book will be a valuable training tool and will serve as the textbook for future EPRI transformer training seminars.

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