



Transforming service into reliability.

TLM™ – Transformer Lifecycle Management™

Answers for energy.

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Strategically increase value.

Power transformers are crucial for ensuring a trouble-free supply of power with no interruptions. As reliable, rugged key components, they are frequently in use for decades at a time – and are thus subject to the unavoidable effects of aging and wear.

How can you plan your expenditures in a targeted way, and systematically control the timing of new investments? How can you avoid unforeseeable outages and minimize planned downtimes? And how can you reduce the impact on the environment while maximizing transformer availability?

The answer to these questions is TLM™ – Transformer Lifecycle Management™ – the service concept from Siemens for all the transformers in your network, regardless of age, manufacturer, or power.



With TLM™ – Transformer Lifecycle Management™.



The challenge

- Reliable energy supply
- Strict environmental regulations
- Flexible load requirements
- Increasing cost pressure
- Avoidance of image problems

► *Optimization of the entire transformer lifecycle*

Our solution

- TLM™ – Transformer Lifecycle Management™

► *Seven service modules to ensure availability and optimize service life*

Your benefits

- Maximum availability
- Reduced environmental impact
- Extended service life
- Fewer downtimes
- Minimal service interruptions
- Targeted control of expenditures

► *Higher operational value and reduced costs*

The strategy: Prompt detection and precise steps to avoid damage.

Applied to Transformer Lifecycle Management™, this means:

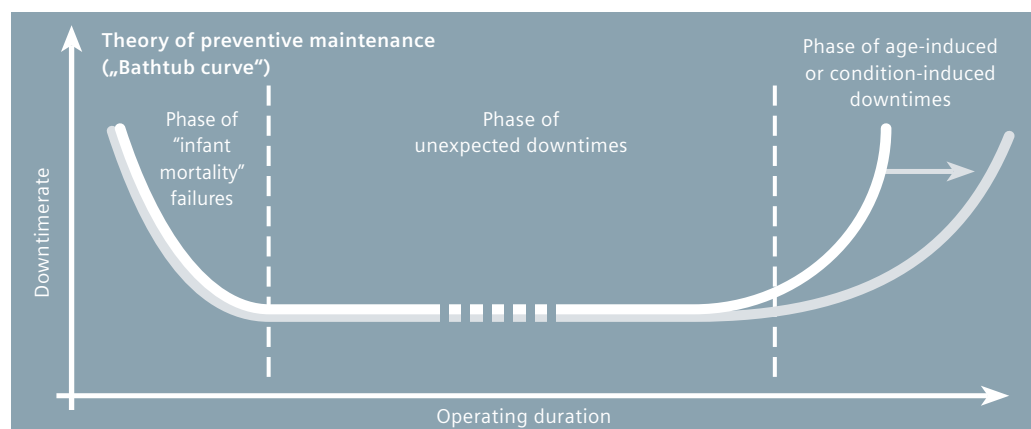
A reliable assessment of conditions, continuous monitoring, maintenance, and repair will help you minimize costs. At the same time, your transformers can be operated at nearly maximum utilization – before they become prone to error, before environmental damage occurs, before natural aging processes have an impact ...

In short, Transformer Lifecycle Management™ allows you to act promptly and responsibly to preserve the value of your transformers in the most effective way and at low cost.





Timely action with TLM™ can play a crucial role in extending the lifecycle of your equipment and bridge long delivery times of new transformers.

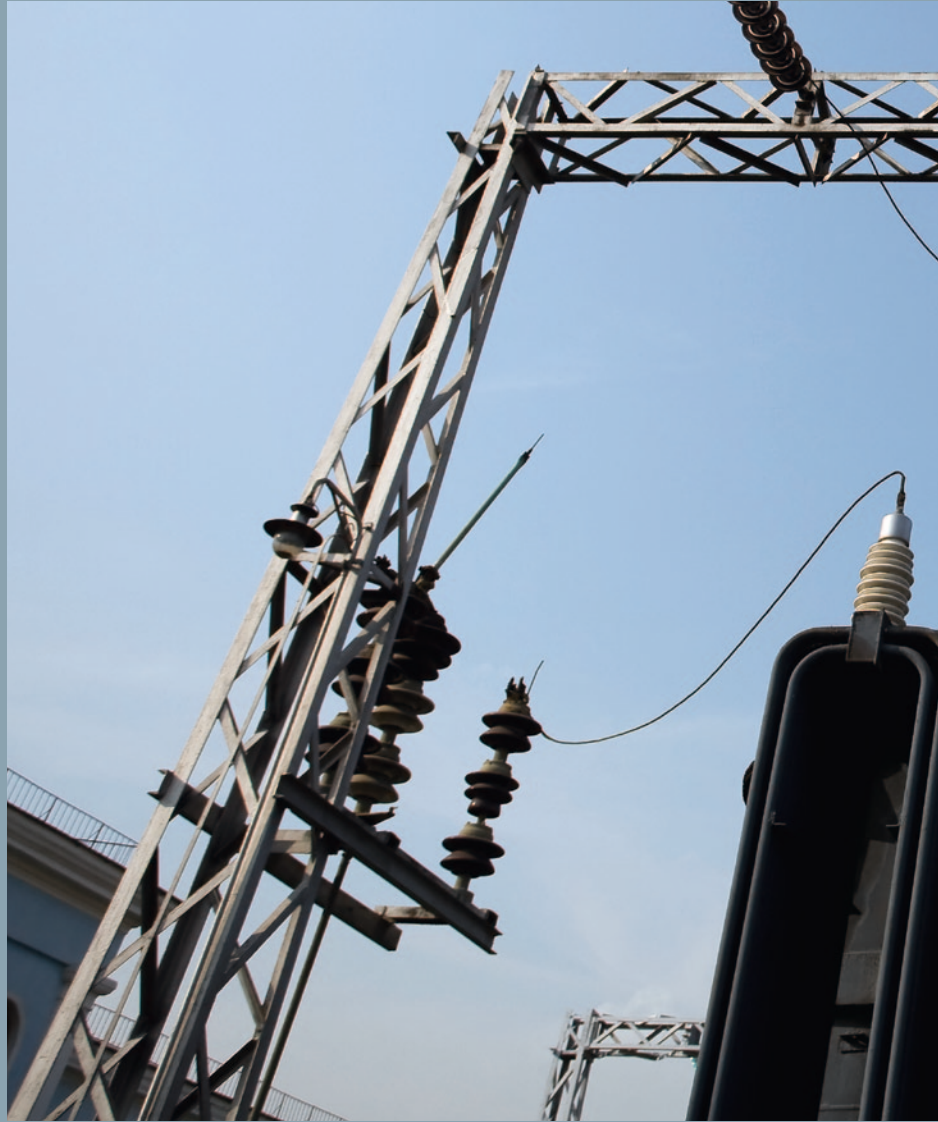


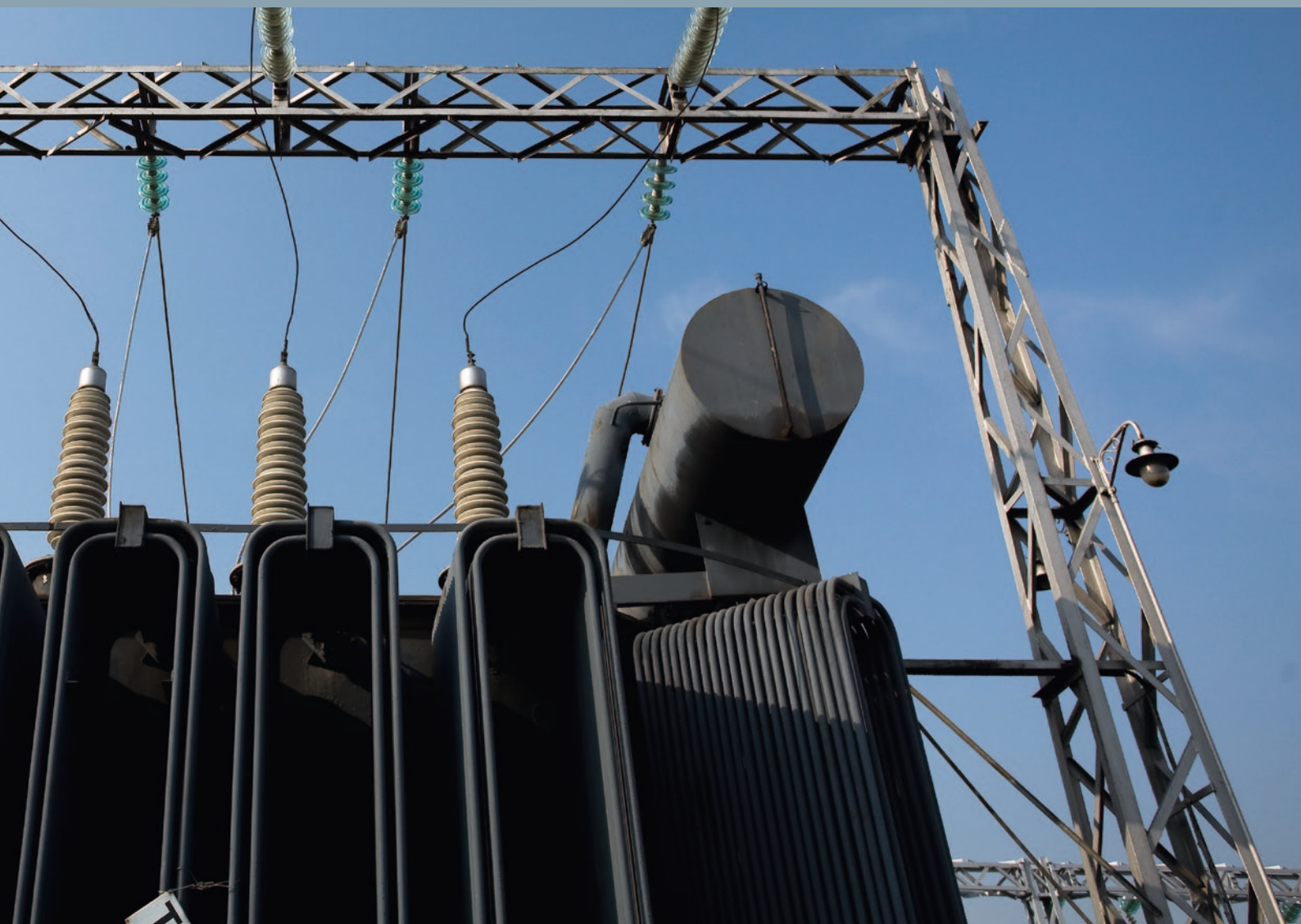
You have clear requirements – we have the service portfolio to meet them.

TLM™ – our service concept for your transformers.

Transformer Lifecycle Management™ stands for innovative, modular, and targeted services.

Our experienced and highly qualified experts guarantee in-depth expertise – and, thanks to our international network, they are available worldwide.





This transformer still has many good years ahead of it.
With Transformer Lifecycle Management™.

Was it built in 2003? 1978? 1963?
Or even earlier? In the power supply
industry, power transformers of all
ages are needed – around the clock.

TLM™ – the strategic lifecycle concept
from Siemens – helps maintain a high
level of availability and reliability to
ensure that you get maximum use from
your transformers right up to very end of
their service life.

Transformer Lifecycle Management™:

Transport, Installation & Commissioning

Our specialists have decades of experience in installing and starting up new units and relocating transformers that are already in service. Our individual solutions include disassembly to prepare for transport, packaging of sensitive components, shipment, reassembly, installation and commissioning, and preparation for energizing – or you can simply choose our complete all-around, worry-free solution.



Condition Assessment & Diagnostics

How is your fleet of transformers really doing? Siemens TLM™ diagnostics makes it possible to detect the current condition with high precision and therefore classify operational reliability for all makes and models and all voltage and power levels.

Especially after extraordinary events such as thunderstorms and lightning, relocations, and similar occurrences, comprehensive testing including on-site high-voltage tests is recommended – and with TLM™, this is possible with the high quality equivalent to testing in the factory. Mobile TLM™

high-voltage tests are also used for acceptance testing following on-site repairs.

You can choose the level of diagnostics that best fits your needs. There are three levels: Essential Diagnostics is performed during your normal operation, while the Advanced Level requires minimum outages. The ultimate level integrates high-voltage testing to optimally evaluate the operational condition and residual life span of each of your power transformers, based on our decades of experiences and highly advanced diagnostic methods.

Decades of experience helps ...

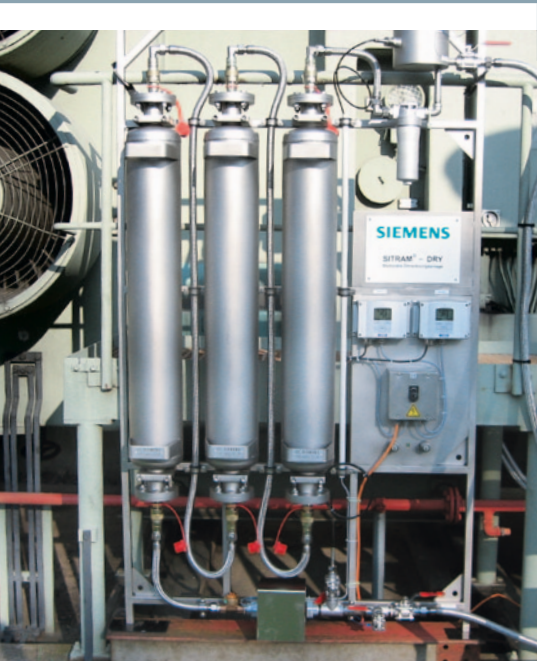
This is partnership and passion...

Online Monitoring

The TLM™ product and service portfolio includes the third generation of online transformer monitoring. While methods and results have been refined from generation to generation, the fundamental benefits have always remained the same: optimized use, monitoring of sensitive components, and the early detection of any emerging problems. Service applications can be meticulously coordinated with and scheduled into your operations.

You can choose the level of online monitoring that best fits your needs. There are three levels ranging from component monitoring to monitoring of individual transformers to comprehensive fleet monitoring.

Our monitoring service also supports you by having our team of experts analyze and interpret your measured data.



Maintenance & Lifecycle Extension

We'll get your transformers back in top form – and without service interruptions. Our TLM™ method for extending service life minimizes the unavoidable, undetectable, and ongoing aging process that is taking place inside your transformers. Our stationary and continuous oil drying systems as well as regeneration of the oil filling are internationally-recognized technologies, and round out our offerings for improving cooling efficiency

with intelligent devices and hermetical sealing. These can easily be integrated as retrofit solutions.

The regeneration of the oil filling in particular not only eliminates frequent oil changes, but also offers substantial economic and ecological advantages, as it is performed during normal operations.

... to implement the right measures at the right time...

...for your transformer...

Repair & Retrofit

Can we make your old transformer as good as new? We can come very close, and usually improve your old transformers with Siemens new state-of-the-art technologies. One highlight of TLM™ is the repair, overhaul, and modernization of your power transformers.

Repairs are performed in one of our dedicated repair shops around the world, but are also done on-site when our mobile workshops come to your facility. In addition, we can retrofit or modernize transformers in various ways.



Consulting & Expertise

What's the best way to optimally use and maintain your assets? We provide you with solid consulting on this question. Ideally, we'll include your entire fleet of transformers in the process, regardless of their age or manufacturer.

This will give you a solid basis for decision-making related to replacement investments, repairs, or maintaining value.

The health of your transformers can be precisely evaluated using the most modern,

risk-free diagnostic methods, and some procedures can even be performed during ongoing operation.

On the basis of a detailed survey, we prepare and suggest an action plan that includes recommendations for preventive, corrective and curative service interventions or replacement investments if applicable for each transformer, depending on its individual condition and operational importance.

... to use the right technologies and the right knowledge ...

...throughout the complete lifecycle.

Spare Parts & Accessories

TLM™ recommends the critical spare parts you need to match your specific requirements. Examples range from secondary monitoring equipment to sealing material to other built-on components such as spare-winding coils, tap-changer components, and bushings. In the process, we'll evaluate different product alternatives and recommend up-to-date replacement solutions. This is especially important if the original equipment manufacturers no longer exist.



... to keep your transformers in top form –
so they're safe, efficient, and environmentally sound.

Our TLM™ Team – dedicated to getting your transformers into shape.

Whether your transformer has failed or you're planning timely corrective maintenance – our TLM™ team of experts is available for short-term repairs.

With its dedicated repair facilities at our technology center in Nuremberg and elsewhere around the world, Siemens has created a professional setting to get your transformers back into shape. Even the largest and heaviest transformers in the world can be easily moved, inspected, and repaired.

The repair facilities handle all problems that arise over the lifecycle of a transformer, including installation of new on-load tap changers and tapping switches, increasing performance, as well as completely replacement of windings. In addition, all components can be reconditioned and retrofitted with the latest materials as needed.

For everything from design to the latest modern winding techniques to final inspection and testing, the manufacturing processes at our renowned transformer plants are continuously being improved. These improvements support the maintenance and repair of your transformers.



Professionals at work
in the factory.

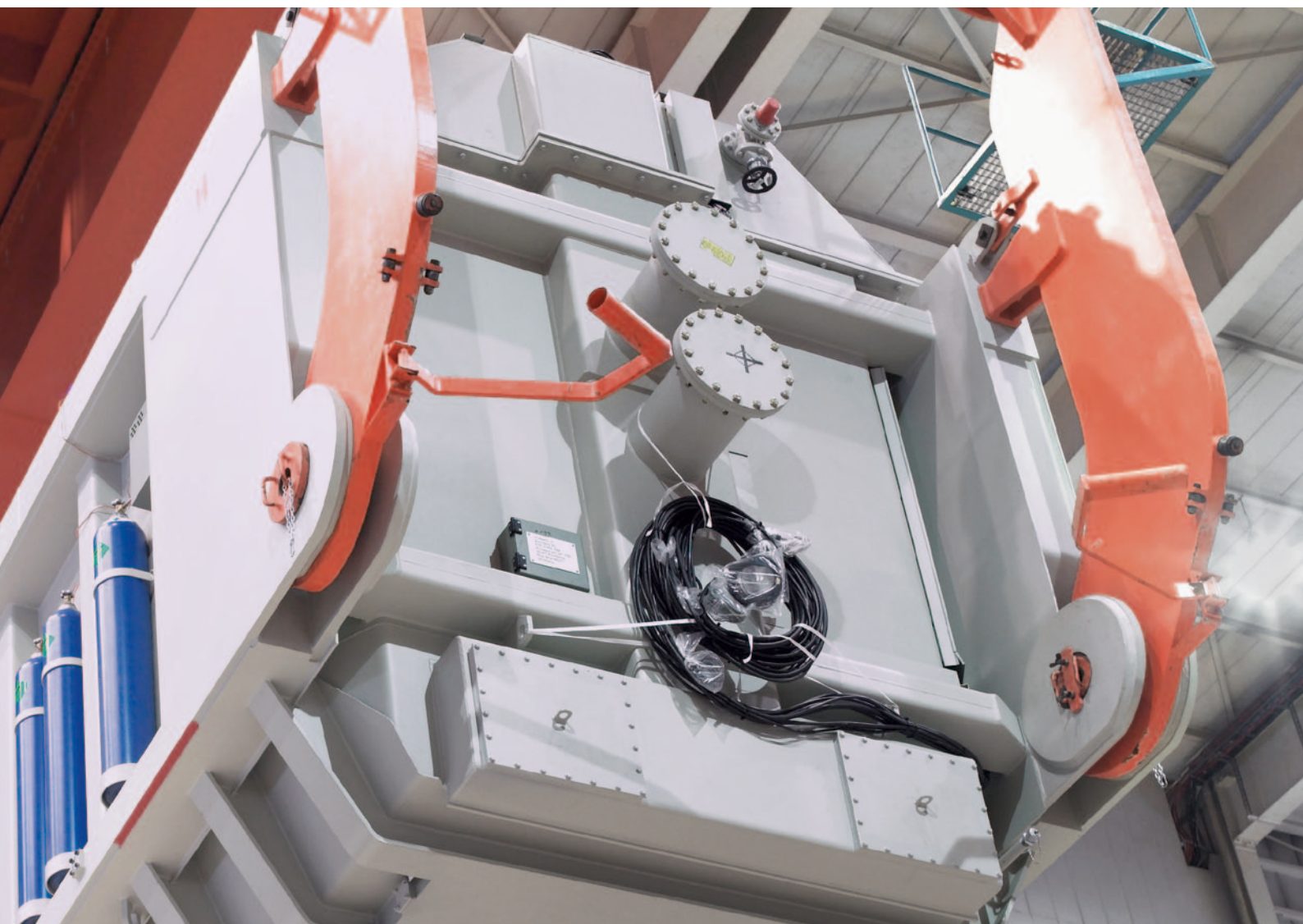


Even the heaviest loads are not a problem, thanks to the power crane system.



Our professionalism guarantees experienced experts, innovative processes, and environmental awareness.

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Extracting a core-and-coil assembly: either repair or replacement is required, depending on its condition.



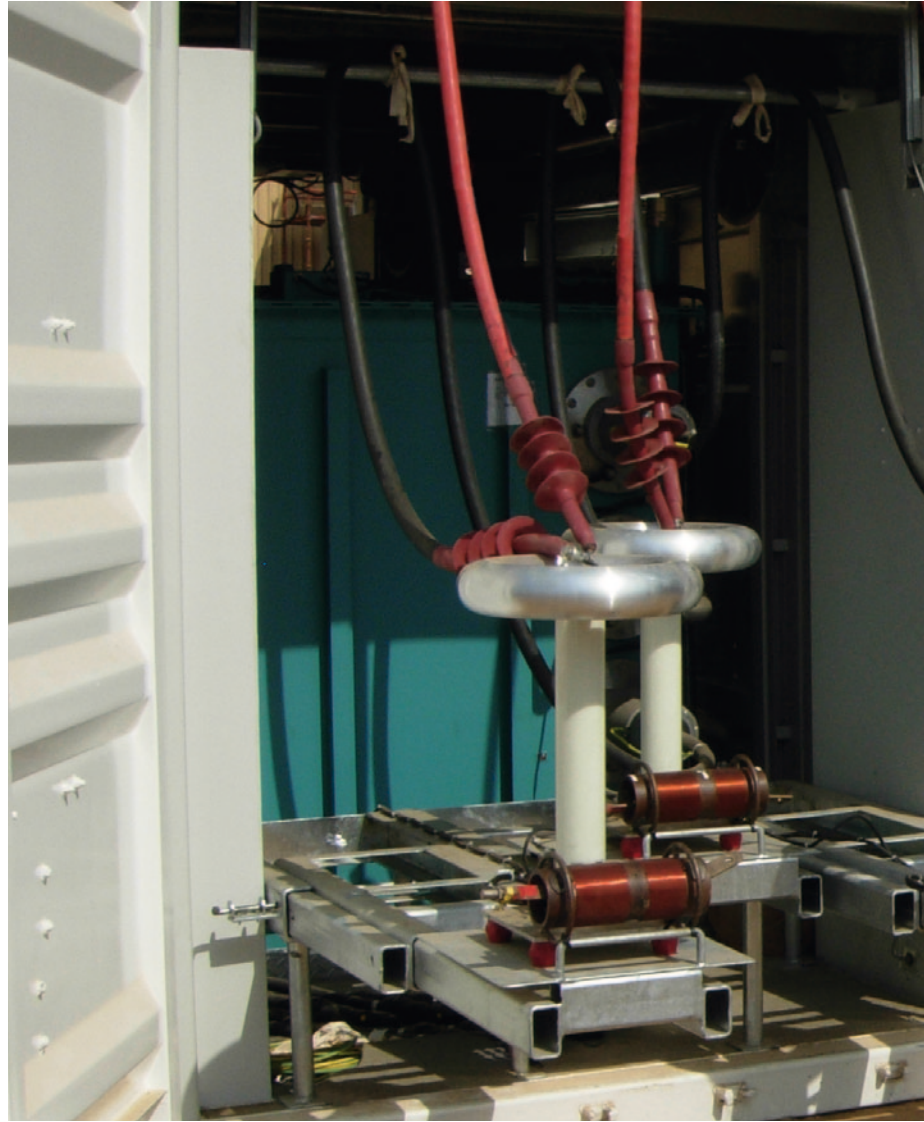
A specialty of the repair facility in Nuremberg: in-house production of windings of every type.

Mobile teams, mobile technologies – we bring transformer service to you.

Your transformers must do one thing first and foremost – they must operate reliably and without interruption. The TLM™ service concept from Siemens is designed to prevent unplanned downtimes and optimize planned maintenance measures.

We're aware that you have fewer and increasingly shorter windows of opportunity even for planned service interruptions. Our response is technologies and methods that are as mobile as our experts. From oil-drying systems to high-voltage testing stations, we provide mobile repair workshops to support you on-site.

Mobile teams and technologies are elements that ideally complement the performance spectrum of Siemens' repair facility – they're fast, flexible, and can be integrated in your operations.





Trendsetting:
Service comes to
the transformer.



Our mobile high-voltage tests on-site reduce service interruptions just like ...



... our mobile workshops, which we can quickly and efficiently set up at almost any location.



On-site oil regeneration is an economical alternative to changing the oil – and it also protects the environment.

No matter its age or manufacturer – we'll keep your entire fleet in top form.

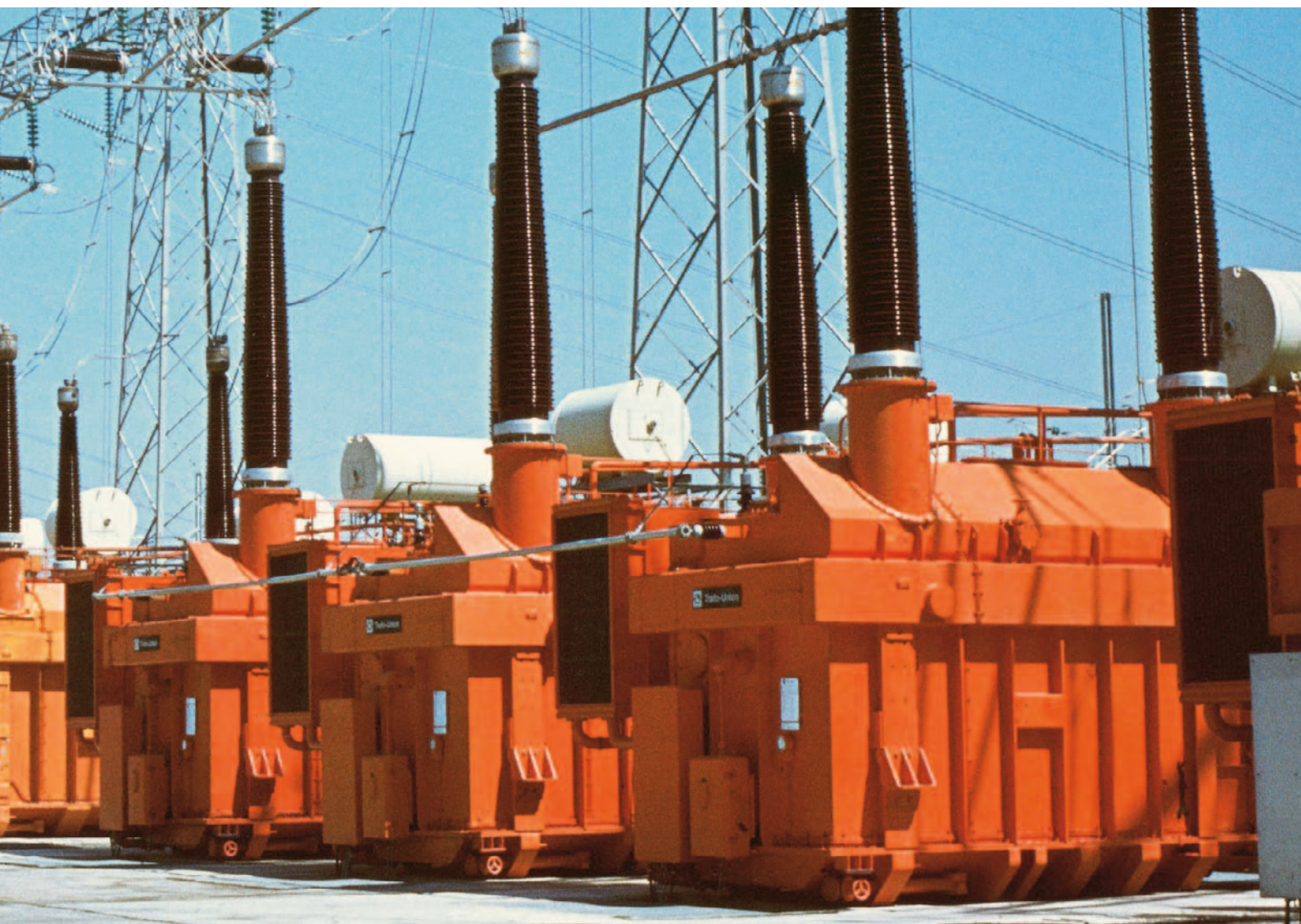
Regardless of age or manufacturer,
regardless of the application:
All transformers in your fleet can benefit
from the complete service portfolio of
Transformer Lifecycle Management™.

We've worked hard to make sure that we
can handle any transformer, no matter what
its age or manufacturer – so you always
have a high-performance fleet at your
disposal throughout your entire network.

Our decades of experience in manufacturing
transformers ensures that we have the ex-
pertise to provide these services. Ultimately,
we want to live up to the challenge of our
motto: "Siemens – the partner of choice for
your entire fleet of transformers, now and
always."



Your transformers are in
expert hands with us ...



... whether they're old veterans from decades past ...



... or new models that should still have many years of sustained, reliable operation ahead of them.

Here are the experts who provide your safety and peace of mind.



Naturally, we offer expert consultation right from the start and, if desired, throughout your transformer's entire service life.



TLM™ experts changing the bushings.

Qualification and
commitment –
for high reliability
and availability.



The experts who assume service responsibility for your transformer at Siemens know exactly what they're doing. Excellent qualifications and ongoing training are the basis for our extensive technical expertise, and play a major role in our professional project planning and coordination at your site.

Around the world, we work together as a strong team grounded in uniform principles: Fulfilling your expectations with innovative solutions quickly, competently, and proactively – to optimize the availability of your transformers.

Could there be a better basis for a successful partnership?

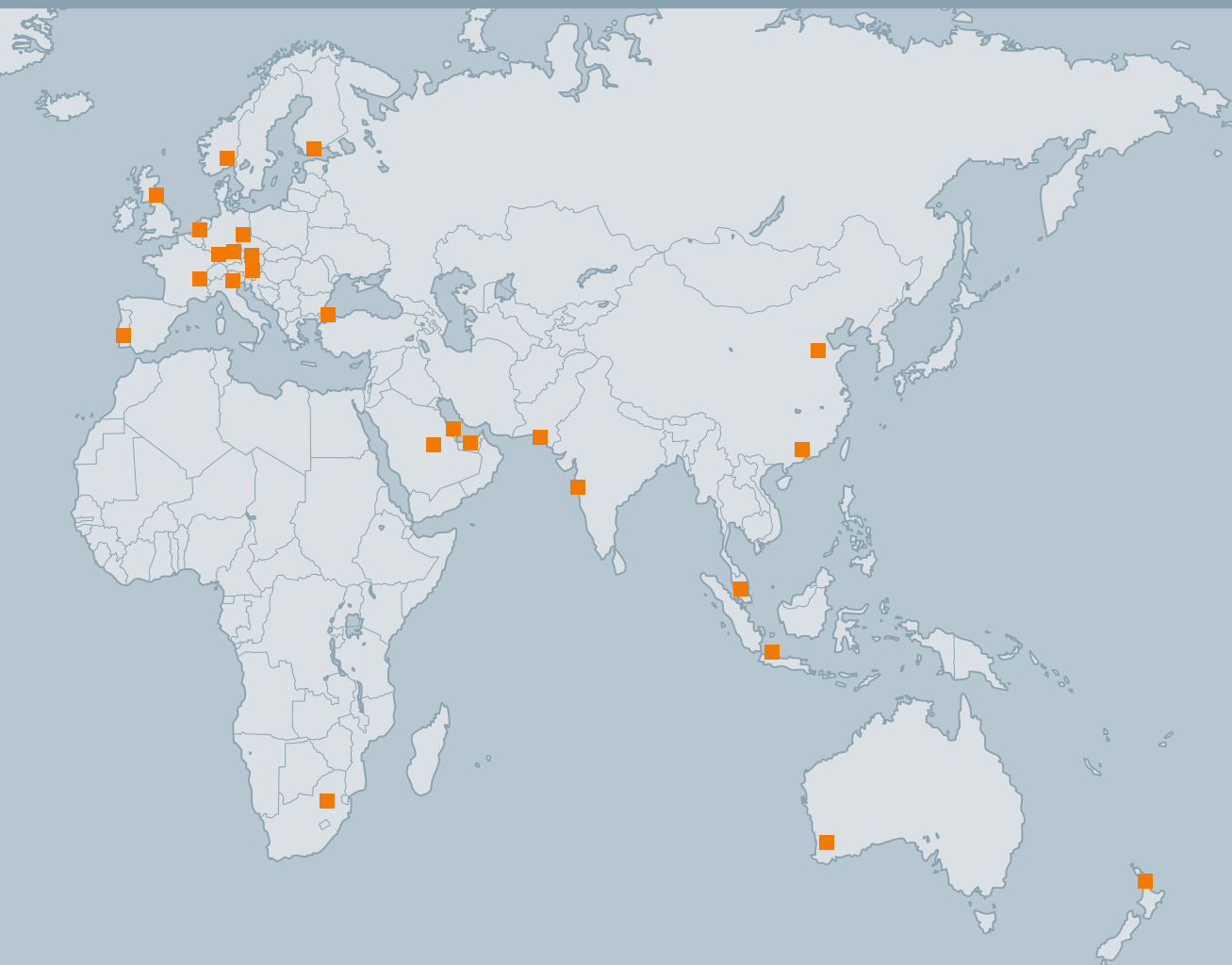
An entire world at your service.

Taking customer proximity literally:

The full scope of TLM™ offerings is available at the six dedicated locations shown on this map. In addition, we provide TLM™ service that's always close to you through our 20 factory locations and over 30 service contact points around the world. Our TLM™ transformer specialists form a global team that draws on expertise from all of our plants for all technical questions.

Naturally, TLM™ solutions can also come to you. With our worldwide network, our experts provide the fastest possible on-site support.





In a nutshell:
Transformer Lifecycle Management™
is a combination of commitment, expertise, leading technologies,
and a worldwide presence.

To ensure that your transformers are always in top form.

Always there for you – no matter when and where you need us.

For questions and problems with any aspect of your power transformer, one thing counts above all: quick, personal, expert support. And you can completely rely on us for that. No matter what continent you're on, there will be a contact person and expert support for your concerns at your nearest Siemens Service Center.

Here's just one example of how our efficient, straightforward consulting works: you can reach every TLM™-Center at the telephone numbers indicated below. You can also reach us with your queries by email, independent of the TLM™-Centers. And finally, you can request pamphlets, brochures and other informational material on our home page.

So when can we help you move ahead?



More information and material?
Visit us at:
www.siemens.com/energy/TLM



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