Electrical equipment is a critical component of your asset portfolio. Beyond its financial value, it plays an even greater role in your business performance.

Due to technological evolutions, vanishing electrical expertise, ageing assets with increasing exposure to failure and continuous pressure on operating and capital expenses, you are exposed to complex and challenging environments.
Optimise your maintenance and replacement decisions

The Alstom suite of innovative solutions and value-added services for smart asset management can optimise your decision-making and deliver the value and reliability your business expects.

**Cost optimisation**
Our solution allows you to move from time-based maintenance to a reliability centered maintenance strategy that prioritises maintenance operations and reduces your related operating costs. Optimising replacement decisions based on health and risk information will be key to reduce your capital expenditures.

**Reliability improvement**
From the detailed health assessment compiled by online condition-monitoring or offline testing for the most critical assets, you can anticipate and take timely actions. Thanks to early detection of incipient failures, your unscheduled outages are reduced, increasing your quality of service.

**Risk management**
A consistent risk evaluation is built by combining the probability of failure with the criticality of each asset. Various factors, such as: cost of repairs, losses in production, environment, safety and operational performance impacts are also factored in. This information supports decision-making for the maintenance and replacement priorities of your electrical assets at fleet level.

**Strategic asset planning**
With our advanced analytics, you have the quantified, reliable and consistent information required to establish strategic plans and justify your investment to your regulator or shareholders, in line with the ISO 55000 standard.
A fully integrated
From the field to

An integrated suite to get the best out of your assets

Alstom provides you with all products and services to build a comprehensive data management and decision chain for your assets.

A flexible suite of products and services
- Field inspection and test
- Alstom mobility suite
- Transformer oil analysis
- Continuous online monitoring
- Analytics platform
- Strategic planning
- Expert advisory services

Reliability and value for your electrical assets
- Expertise in electrical equipment design, manufacturing
- Entire scope covered - from field assessment to Enterprise IT
- Centralised repository of all condition data for decision
- Flexible health models and analytics, expandable to all asset types
- Effective and consistent methodology based on industry standards
- Maintenance and replacement plans integrated with your business processes
end-to-end solution
enterprise operations IT

Inspection and test services by specialists

The solution starts with Alstom’s ability to collect advanced asset condition data from the field on a large scale for all types of electrical assets (Alstom or non-Alstom OEM), using a range of measurement techniques and applying strict processes and methods.

SITE INSPECTIONS & TESTS
Site inspections are supported by a well-defined methodology resulting from decades of experience in servicing power equipment. Our Alstom Grid experts can also provide audits, diagnostics and recommendations to help streamline maintenance and optimise asset expenditures. This is particularly relevant for organisations facing large scale workforce retirements in the coming years.

OIL ANALYSIS
Your oil samples are analysed by Alstom laboratories or a local partner and a report is generated to include remedial actions and condition severity as per IEEE or IEC standards. Data can also be automatically transferred to the enterprise asset health management system, e-terra_assetcare.

MOBILITY TOOL
Our inspection methodology is now supported by advanced mobility tools, running on tablets. The collection of measurements, pictures and other data is fully automated up to enterprise level, increasing productivity while ensuring data integrity and quality.

EXPERT CONSULTANCY SERVICES
Our experts are actively involved at every step of the process to provide periodic analysis and support for your overall fleet, as well as condition & performance reviews. They will also recommend improvements where appropriate, in line with the ISO 55000 process.

Key benefits
- Worldwide coverage
- Covers all equipment brands
- Solid methodology
- Quality and safety processes
- Certified oil laboratories
- Flexible contractual terms
A fully integrated
From the field to

Continuous online condition-monitoring for your critical assets

When certain equipment is critical to your performance, periodic visits and site inspections may not be sufficient. Continuous online condition-monitoring devices will bring the real-time condition assessment and predictive and alert mechanisms your critical assets deserve in order to minimise unplanned outages and avoid major repair costs or collateral damages.

**MS3000: THE REFERENCE FOR POWER TRANSFORMERS**
- Monitoring of all transformer parts: Active part, tapchanger, bushings, cooling unit, conservator
- Advanced models: thermal, aging, moisture, OLTC contact wear, bushings, cooling efficiency, dynamic overloading...
- Advanced functionalities: analysis, expert diagnostics, prognostics, simulator, DGA tool...
- Experienced compatibility with most of the market DGA sensors

**CBWATCH: CIRCUIT BREAKER MONITORING BY A LEADING MANUFACTURER**
- Monitoring of active part, mechanism and auxiliaries
- Advanced analysis: Electrical wear calculation, arcing time, travel curve analysis, SF$_6$ Gas monitoring (density, leakage detection...)

**BWATCH AND PDWATCH: THE GIS ENGINEERING EXPERIENCE**
- Gas density monitoring and forecasting
- Internal arc localisation, CB condition monitoring
- Innovative Alstom digital gas sensors
- Analysis of UHF partial discharge events

**DAP SERVER: CONNECT YOUR CONDITION SENSORS**
- Consolidation of substation data
- Upgrade of legacy RTU
- Migration to IEC 61850 standard
- Visualisation of information for effective operations
- Cyber security technologies for system security
- Integrated condition-monitoring

**Key benefits**
- Continuous, real-time information on asset conditions, applicable to equipment from all manufacturers
- Incipient failure detection up to 70% failure rate reduction
- Maintenance costs up to 30% reduction
- Life extension and CAPEX reduction
- Enables risk management and dynamic rating for network operations
end-to-end solution
enterprise operations IT

e-terra assetcare: Advanced analytics for decision support

e-terra assetcare is Alstom’s advanced software platform for asset health management:

- Central repository of all asset related data, including real-time data, external repositories and manual data
- Powerful and flexible analytics including Asset Health Indices (AHI), end-of-life calculations, criticality and risk assessment
- Events monitoring and actions tracking
- Digital document management
- Reporting

A LIBRARY OF ASSET HEALTH MODELS

e-terra assetcare integrates Alstom’s expertise with electrical equipment. As an example, the asset health model for power transformers is an Alstom offering for a standard set of condition parameters to represent the overall health of the asset.

FLEXIBLE ANALYTICS FOR RISK MANAGEMENT

The analytics and key indices prepared by e-terra assetcare can be used by maintenance departments to establish priorities for actions and to make decisions on condition-based or reliability centered maintenance. The system is also designed for managers and financial departments to build longer term, strategic plans.

CUTTING EDGE TECHNOLOGY

e-terra assetcare uses the latest and greatest software technologies such as HTML5 and geo-referenced displays. It is scalable and fully adaptable to various asset types requested by customers thanks to its powerful calculation engine. With its web-based User Interface, access to the asset information is available to all stakeholders throughout the company for effective decision tracking.

Key benefits

- Flexible interfaces to consolidate all sources
- Libraries of asset health models from Alstom electrical knowhow and experience
- Advanced analytics
- Adaptable to all asset types
- Consistent methodology for decision support
Global presence

A worldwide team of experts

Any significant transformation in business processes necessitates the convergence of multiple capabilities and skills ranging from technology assessment, architectural design, solution engineering and performance planning to legacy integration, commissioning, performance testing and general project management.

Alstom brings to you all the know-how a power utility could require in its transformation plan, including:

- Regional operation model: technical capabilities and project-related skills available in each delivery unit across the world
- Advanced technical and project support from at Alstom’s centres of expertise, enabling worldwide shared knowledge management, methodologies and technical support

SKILLS AND RESOURCES CLOSE BY

- 60 service centres in 36 countries
- 7 services workshops
- 2 transformer repair mobile units
- 5 oil analysis laboratories
- 21 Technical Institutes

Regional operation model: technical capabilities and project-related skills available in each delivery unit across the world

Advanced technical and project support from at Alstom’s centres of expertise, enabling worldwide shared knowledge management, methodologies and technical support
and experience

References in all grid domains

**ASSET FINANCIALS & INTEGRATION (GENERATION, CANADA)**

**Customer context**
In order to support its corporate-wide asset management programme, this Canadian utility seeks to optimise power production asset spending using COTS (Commercially Available Off-The-Shelf) solutions integrated within their own IT environment.

**Challenge**
- Optimise asset expenditure
- Maintain strategic plans

**Solution**
- UISOL, an Alstom company, provides an industry-leading Asset Investment Planning (AIP) solution. Alstom delivers all services associated with the successful deployment of the AIP solution, including project management oversight, installation of the software and training for utility personnel.

**TRANSFORMER FLEET MANAGEMENT (GENERATION, USA)**

**Customer context**
650 power transformers in 72 power plants
- Average transformer age - 38 years

**Challenge**
- Assess condition of the spread asset fleet
- Maximise the life of the transformers, while minimising unplanned outages

**Solution**
- 3-year contract
- Alstom site inspections and audits
- Alstom assessment reports
- Oil analysis
- Recommendations

**ONLINE CONDITION-MONITORING (OFFSHORE WIND FARMS, GERMANY)**

**Customer context**
Offshore substations, critical for wind-farm energy supply, require high availability. However, service access to offshore platforms is limited by weather conditions and safety constraints.

**Challenge**
- Reduce condition assessment and diagnosis visits are reduced to remedial actions only
- Optimise availability and service response time

**Solutions**
- The MS3000 deployment in North Sea offshore platform substations
- Remote condition-monitoring and support of transformers

**GRID CONDITION ASSESSMENT (DISTRIBUTION, QATAR)**

**Customer context**
11,300 Distribution substations
- Risk of failure due to unknown health status

**Challenge**
- Assess health of a large fleet (12 asset types)
- Collect measurements and build advanced analytics
- Set criteria to prioritise actions

**Solution**
- 3-year contract
- Site inspections and mobile data collection tools
- Oil tests from Alstom labs
- e-terra assetcare with focus on health, risk, end-of-life assessment

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Technical Institute

A lever for operational excellence

- Avoid risks and accidents with a skilled workforce that understands and respects the latest regulations and safety rules
- Improve efficiency through greater technical knowledge
- Operate and maintain your equipment and solutions at the optimal level of performance
- Understand new technologies, standards, products and solutions

Training centres for operational excellence

Training matters. It teaches and motivates staff to maintain equipment at peak performance in a safe environment. Gaining hands-on experience and enhancing technical skills also adds long-term value to businesses and careers. You can rely on Alstom Grid technical expertise to support your team’s development.

At Alstom Grid, we are committed to transmitting knowledge and expertise – to sharing our experience as an industry leader in electricity transmission, power electronics and network solutions for the benefit of your performance.

Alstom Grid Technical Institute offers a full range of training options encompassing every aspect of high voltage electricity: electrical grid safety, equipment operations and maintenance, protection and control and network management. These are all components of a comprehensive programme of over 200 courses.

Our expert trainers build confidence while sharing skills and experience. You benefit from access to the latest in technology and personalised, innovative teaching - and sharpen the competitive edge you need to succeed.

Technical Institute courses cover all aspects of electricity - from fundamentals to in-depth equipment knowledge - and are based on several value-adding pillars:

EXPERIENCE from grid network and equipment experts - We have over 30 years of training experience in every segment of electricity transmission, substation technologies and on our current and legacy products and solutions.

AVAILABILITY up to 24/7 - The e-learning modules with tutor support can be used online at any time, anywhere. In addition, with 16 training centres located at our manufacturing sites around the world, we offer the proximity and convenience you expect.

CUSTOMISED TRAINING to fit your needs and installation - We offer a wide portfolio of courses adapted to your trainee’s role, objectives and level of knowledge (operators, managers, engineers...).

COMPREHENSIVE OFFERS that let you choose what works best for you - From tutored e-learning, modular training, software training and competency development programmes to education partnerships.

UP-TO-DATE course content and equipment - Content is continually revised to reflect the latest technologies and local regulatory standards.

Technical Institute

Alstom has one clear mission: to develop innovative solutions for a flexible, reliable, affordable and sustainable electrical grid throughout the world. Active in power transmission and distribution, Alstom designs, manufactures and services the products and systems that empower the planet’s low carbon economy. It ranks among the top three players in the electrical transmission sector, with an annual sales turnover of €3.5 billion.

With over 130 years of experience, Alstom Grid has become a trusted partner for all of its power customers, from the energy source to the smart city.

Technical Institute

Alstom bases its success on the principle of ethics being rigorously implemented by its 93,000 employees, who work closely with the community of stakeholders that make up the Group’s ecosystem. These shared commitments are expressed in the products and services branded by Alstom.
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