Alstom Grid creates and delivers customer-valued network solutions for an energy-efficient future.

Our environmentally-friendly solutions are aimed at meeting major energy challenges of today and tomorrow: energy efficiency, market efficiency, grid reliability and environmental concerns.

Alstom Grid’s ‘green’ solutions offer significant environmental benefits, including better product performance up to 7 ‘green’ criteria, covering the 3 phases of the product life cycle:

- Manufacturing: reduced consumption of natural resources
- Operation: lower CO₂ emissions, limitation of environmental risk, noise reduction, space savings and energy efficiency
- End of life: recycling capabilities of products

Eco-efficient power transformers

Based on customer demand for environmentally friendly products that improve life cycle costs with limited maintenance needs and increased service lifetime, Alstom Grid introduces its Green Power Transformers to accompany and assist customers with today’s eco-management challenges.

A Green Power Transformer (10 to 200 MVA and up to 245 kV) is a sustainable, eco-efficient product with one or more of the following functionalities:

- Filled with ester oil instead of mineral oil
- Hermetically-sealed tank design, equipped with patented expandable radiators and OLTC with vacuum switch
- Innovative technologies to reduce acoustic energy transferred and optimise design of the active part
- Optimised low loss levels
- On-line MS3000 monitoring system

A sustainable range of green eco-efficient power transformers, from 10 to 200 MVA and up to 245 kV

Highlights:

- Over 110 power transformers with our innovative hermetically-sealed tank design sold worldwide
- Highest voltage reference (245 kV) in the world for ester oil transformer applications in Brazil
- State-of-the-art factories around the world able to manufacture eco-efficient power transformers

Answering our customers’ environmental concerns through innovation.

Together, let’s make the green choice!
Innovative characteristics of the Green Power Transformer range

Key customer benefits
Green Power Transformers offer a new alternative for customers who want to preserve the environment by offering a lower carbon footprint, limited pollution risk and optimised life cycle costs thanks to less maintenance. Other advantages include reduced ageing, lower noise levels and increased fire safety.

To further maximise operational management and prevent faults and damages, advanced on-line monitoring systems can also be added.

Environmental and health benefits
One of the key benefits offered by the Green Power Transformers is the prevention of pollution through the use of ester oil instead of mineral oil. Ester oil is biodegradable and less toxic, limiting pollution risk during operation, installation and end of life.

Environmental benefits also include reduced noise levels to limit disturbance in urban or ecologically sensitive areas. Noise level reduction above 10 dB (A) is made possible thanks to our selection of high-performance materials and equipment, optimised design of active parts and innovative mechanical structures.

Increased safety
With a Green Power Transformer, fire safety is improved considerably, offering increased security, not only for operators but also for those in close proximity. Ester oil has a fire point above 350°C, more than twice as high as mineral oil. Green transformers are less flammable and reduce fire spreading.

High eco-efficiency
A major benefit of the Green Power Transformer range is its optimised life cycle cost. In our standardised process, design choice and high-performance materials achieve low losses for the optimal capitalised cost of the transformer.

Alstom Grid’s innovative hermetically-sealed tank design, equipped with patented expandable radiators, goes a step further in reducing life cycle costs: it reduces maintenance, extends life time and increases overload ability by preventing contact between the oil and moisture, and oxygen in the atmosphere. Hermetically-sealed tank design reduces cellulosic insulation and oil aging. It is further-improved with the use of ester oil, which increases a transformer’s insulation life, thanks to higher water solubility and thus the drying effect on paper.

Maintenance costs are also reduced as a result of the hermetic tank design, which requires no oil conservator and no associated devices. The optional vacuum tap changers avoid contact erosion and further reduce maintenance needs.

Comparison between conventional and green eco-efficient power transformers
Key references

Bringing the bulk of energy closer to consumption centres and investigating green solutions

EDF Energy installed the first purpose-built 132/33 kV 90 MVA 3-phase Green Power Transformer filled with ester oil in the United Kingdom. Located in Luton’s interconnection substation, it is equipped with our MS monitoring system to ensure the highest availability possible during operation. This power transformer is installed close to consumption centres, and the fluid is made from edible soya beans, which are fully biodegradable and have greater fire-resistant properties.

Preserving the environment in sensitive areas and using renewable resources

Electrônorte, one of Brazil’s main utilities, bought and installed a 242 kV shunt reactor, filled with ester oil, to promote sustainable development in the protected Amazon region. This is, so far, the highest voltage application for natural ester oil transformers. The solution, developed with oil from renewable resources, also responds to customers’ concerns about the use of petroleum-based fluids in high-voltage applications.

242 kV 22 MVar shunt reactor filled with natural ester oil for major Brazilian utility Electrônorte

Green all the way from generation to transmission

EWO Energietechnologie GmbH in Germany bought Green Power Transformers that feature hermetically-sealed tank design, equipped with patented expandable radiators and a vacuum tap changer and filled with ester oil for wind farm connection. On top of environmental benefits, reduced transformer maintenance is also a direct benefit of this green project.

Lowering maintenance and increasing service provision

In the past 7 years, the national German railway operator Deutsch Bahn purchased large series 10 and 15 MVA hermetically-sealed Green Power Transformers with patented expandable radiators and vacuum tap changers for reduced maintenance costs, optimised overload capacities and longer life time.

Low sound transformers for silent substations

PSE&G, one of the main utilities on the East Coast of the USA, needed to have ‘silent’ substations to be built close to consumption centres with high population densities in New Jersey State. Alstom Grid’s 550 MVA 230 kV auto-transformer with OLTC and ONAF cooling was the right solution. Noise reduction was achieved with optimised active part design, tank decoupling, tank designed for reduced transmission of energy, resonance absorbers and sound panels, up to -10 dB on load sound level.

Summary of ‘green’ functionalities

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