energizing the future

our commitment
to energy
efficiency
and
environmental
responsibility

MTS TESTING SOLUTIONS
be certain.
ENVIRONMENTAL RESPONSIBILITY IS CRITICAL TO OUR FUTURE, AND MTS IS COMMITTED TO ENABLING STEWARDSHIP OF OUR RESOURCES. AS A DEDICATED CITIZEN OF THE GLOBAL COMMUNITY, MTS EMBRACES ENERGY-EFFICIENT AND ENVIRONMENTALLY SOUND BEHAVIORS AND VALUES — AND WE ACT WHEN AND WHERE WE CAN MAKE A DIFFERENCE.
Energy and the environment are tightly linked. Global demand for energy is rising sharply in parallel with awareness of the importance of conservation, sustainability and stewardship. Using all resources wisely — including energy — will no doubt create the path to an environmentally responsible future. The challenge is how to achieve this goal while enabling steady, substantive growth in innovation, productivity and economic opportunity.

MTS understands that the interconnected issues of efficiency, energy and the environment are anything but simple. That is why we approach these complex problems in many different ways, using a wide variety of tools and technologies. In each case, we seek a balance between short-term needs and long-term objectives, between what is possible and what is practical.

Overall, MTS promotes, supports and reinforces environmentally responsible behavior in a comprehensive way that influences our customers’ products and facilities, as well as our own. In the pages that follow, you will find more detail about how our organization:

1. Develops technologies that enable alternative energy to be more cost effective and efficient
2. Helps our customers design products that consume less energy
3. Enables labs to perform tests in more environmentally responsible ways
4. Pursues environmental ideals in our own facilities
The next generation of energy-efficient hydraulic infrastructure starts with the MTS SilentFlo™ 515 HPU, which is up to 8 percent more energy-efficient than previous models.
Empowering the energy industry

Driven by rapidly increasing demand, the global energy industry is exploring every opportunity to increase production. The results are diverse, from massive wind turbines to advanced solar cells to more efficient gas turbines in power plants. MTS remains at the forefront of these innovations. Our knowledge, expertise and technology leadership are proving instrumental in the development of the materials, components and structures used across many segments of the energy industry.

**SOLAR**
Photovoltaic solar cells must be able to withstand the rigors of manufacturing, transportation, installation and usage. Solar panel assemblies must be able to tolerate wind, snow, hail and moisture. MTS solutions enable solar technology manufacturers to test solar panels, arrays, photovoltaic cells and materials, deposition methods and substrates, panel frames and mounting structures to improve performance and durability.

**HYDROPOWER**
Durable hydropower equipment is essential to tidal-, current- and wave-driven systems. For example, submerged turbines must be able to handle powerful natural currents as well as constant exposure to corrosive seawater. MTS systems help create realistic simulations of underwater forces and operating conditions. They also enable manufacturers to test large-scale rotor sections of axial turbines, crossflow turbine components, oscillating devices and related structures.

**POWER GENERATION**
Converting fossil fuels to electricity more cleanly and efficiently requires power plant equipment to operate at higher temperatures over a longer service life. MTS test systems are critical to R&D efforts focused on investigating and evaluating superalloys, ceramic matrix composites, ceramic coatings and other materials that will be used in ultra-efficient gas and steam turbine components, as well as the pipes, valves and pressure vessels used in power plants.

**WIND**
Maximizing the reliability of wind turbines is critical to creating a sustainable, economically viable global wind power infrastructure. MTS test systems help wind turbine manufacturers and suppliers understand the performance and durability characteristics of wind turbine materials, components and structures so they can optimize designs for lower costs and higher uptime. In particular, our vast knowledge in applying precise forces and motion to very large specimens translates perfectly to wind turbine development.
Racing vehicles push the envelope of aerodynamic performance. MTS test solutions assist vehicle developers in these efforts—and help global automotive manufacturers explore similar ways to make passenger vehicles more fuel efficient.
Building smarter products

Across many industries, organizations are significantly changing how products are developed, manufactured, used and recycled. Innovators everywhere are redesigning how products are used in our world, paying special attention to sustainability, durability and energy-efficiency. MTS is committed to helping our customers evaluate and test new materials, structures, products and techniques that increase available energy, optimize efficiency and help sustain the environment.

AEROSPACE MATERIALS

Designers of ultra-efficient aircraft need materials with higher strength-to-weight ratios as well as materials that can withstand higher operating temperatures for longer periods of time. To surpass current limitations, new turbines must run hotter and require less cooling. All components — disks, housings, blades and nozzles — must be fabricated from or coated with materials that perform reliably at high temperatures for extended periods. Accurate high-temperature testing is critical to both higher fuel efficiency and lower emissions.

In the most advanced aerospace test labs, MTS solutions are used to help researchers characterize innovative materials with extreme precision and repeatability in several ranges of elevated temperatures. These complex tests require analysis of material behavior under exacting loads in demanding high-temperature environments, incorporating multiple methods of correlated data acquisition. Our experience in high-temperature testing is invaluable in these circumstances, as is our systems integration expertise, because commercial off-the-shelf solutions do not exist for these types of tests.

AUTOMOTIVE

Consumers expect automobiles to offer reliability, comfort, performance and fuel economy. MTS is a leading provider of the test solutions vehicle developers rely on to design more fuel-efficient vehicles. With more than 40 years of automotive testing technology leadership, MTS has developed a deep and detailed understanding of ground vehicle testing, including the performance testing and aerodynamic simulation that are essential to maximizing fuel efficiency.

MTS test systems are used to characterize a variety of subsystems and components that are vital to the development of conventional, hybrid and electric vehicles. We also offer rolling resistance measurement systems that allow tire manufacturers to design tires that reduce fuel consumption without compromising safety or performance. In addition, MTS engineers are instrumental in the ongoing development of sophisticated kinetic energy recovery systems that recapture the energy of a moving vehicle during braking and store it to provide a subsequent boost during acceleration.

TIRE

Tires provide the critical point of contact between ground vehicles and roadways. This is why the global automotive industry devotes considerable attention to measuring tire characteristics independently of the vehicle and in relation to the vehicle. Previously, manufacturers relied on test track data or extrapolated results from more repeatable indoor test machine data. Today, dynamic tests performed with MTS rolling resistance systems can simulate a specific vehicle, tire and maneuver.

OEMs use MTS force and moment measurement to develop computer models of tires, which are integrated with full-vehicle models to determine overall handling as well as identify new tire requirements. Tire makers use the same force and moment measurement systems to ensure tires meet OEM requirements. In the same way, OEMs use our rolling resistance test systems to establish fuel efficiency targets, and tire makers use them to make sure new tires hit those targets.
MTS expertise and test systems are vital to developing economically viable renewable energy sources such as geothermal, solar, hydropower and wind.

**GEOTHERMAL**

Drilling and exploration for clean, abundant geothermal energy is difficult work that involves orchestrating large equipment in areas where high pressures, temperatures and forces converge. MTS test systems enable effective simulation of actual operating environments, giving geothermal energy producers a better understanding of geomaterials found near areas that show potential for geothermal systems. Our solutions also ensure confidence in the equipment and structures used to perform drilling and extraction.
Making every test count

Mechanical testing is inherently energy-intensive, but MTS is challenging the status quo. MTS remains committed to helping our customers conserve energy and other resources while they complete the work that ultimately helps our world run more efficiently. MTS also strives to help test labs perform tests in the most environmentally friendly way possible. To support these objectives, MTS has made several key R&D investments to enhance the test systems we provide.

**ENERGY-EFFICIENT HYDRAULIC POWER**

Designed with the knowledge gained through years of experience in servohydraulic power generation, MTS SilentFlo™ Hydraulic Power Units (HPUs) deliver superior performance in servohydraulic testing applications. They are designed with standard features that maximize electrical efficiency and minimize water consumption. Variable-displacement piston pumps ensure maximum hydraulic efficiency, even during times of reduced flow demand. And an innovative water-cooling system maintains the proper hydraulic fluid operating temperature. These pumps also offer optional water-shutoff valves to economize water usage.

For even greater energy savings, HPUs can be equipped with real-time run-on-demand capability that reduces electrical power and cooling water consumption when the system is not running at full capacity. All the HPUs in the facility can be operated as a single system, ensuring that none of the individual HPUs generates excess power. Additional options, such as remote monitoring of HPUs and test systems, help reduce overall energy costs in the test facility.

**ADVANCES IN ELECTRIC ACTUATION**

MTS enables test labs to reduce the amount of energy consumed during testing in several ways. Electric dynamic actuators consume less energy than comparable servohydraulic systems and do not require hydraulic power units or related infrastructure. Electric actuators are featured in several systems: MTS Acumen® Test Systems for materials testing; MTS Roehrig EMA Damper Test Systems, which perform single-axis damper characterization and in-line production quality testing; and MTS ePoster systems for full-vehicle evaluation. Both the damper and ePoster systems incorporate patented electromagnetic actuation (EMA) technology.

In addition, MTS has integrated electric actuation into our Flat-Trac® tire testing systems and our MTS Criterion® and Exceed® families of load frames for materials testing. And we will continue to look for opportunities where all varieties of electric and electromechanical actuation can maintain or enhance test system performance while reducing energy usage.

Minimizing environmental impact is also a long-term goal for MTS as we consider the design and maintenance of every test system we offer. To this end, we offer services to improve operating efficiency and help extend the life span of our test systems.
MTS takes an environmentally responsible approach to operations around the world. Shown here is MTS headquarters in Eden Prairie, Minnesota. The facility is situated in a minimally landscaped area that features native grasses and a pond that hosts a variety of local wildlife.
Any organization that outwardly supports environmentally responsible behavior in the industries it serves must live by those same principles internally. This is what we strive for at MTS.

Living up to our ideals

We meet the environmental challenge in many ways, and it starts with people. We encourage bike commuting and recently added a bike shelter for safe year-round storage. To continue these employee-driven initiatives, a new “green team” focuses on ways to involve all employees in our efforts to consume less energy and find new ways to boost efficiency.

We meet the challenge with our solutions as well. Because we frequently test our own systems during development, we make sure that we run our test labs, including HPUs and other components, in the most efficient manner possible. A new closed-loop cooling system reduces water consumption at our headquarters by 40 percent annually. In addition, high-efficiency air compressors generate air on demand instead of running continuously to save energy.

We also minimize hazardous materials wherever possible, and we have strengthened our chemical disposal and management capabilities. MTS identifies opportunities to prevent pollution by setting and achieving goals to reduce both the amount and the toxicity of our waste streams. We actively recycle steel, wood, paper, oil, cardboard and other waste materials and continually look for ways to expand this practice. Enterprise-wide, we are committed to meeting — and when possible, exceeding — regulatory requirements for environmental health and safety. Whenever possible, these activities are verified through third-party audits to make sure we stay on track.

In many facilities, we have changed our processes to conserve cooling water usage. We have upgraded our lighting, HVAC, HPUs and other building systems to reduce our environmental footprint. Employees at our headquarters all received reusable water bottles to reduce reliance on plastic water bottles. Of course, we continue to look for innovative ways to make our footprint even smaller as new methods and technologies become available.

MTS is widely recognized for these achievements. Our headquarters has attained ISO 14001 certification for environmental management and OHSAS 18001 certification for occupational health and safety. And we are working to replicate these results at all of our global locations.