

GE Power

# GE's TM2500 solution offers fast, mobile and flexible power

a product of  
**ecomagination**



**35** **MW**  
power potential on wheels

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**79** **MILLION HOURS**  
accumulated hours of successful heritage operation

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**~1** **MONTH**  
from contract signing to commissioning

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**11** **DAYS**  
from parking first trailer to commissioning

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**10** **MINUTES**  
full power production in less than 10 minutes

## The ultimate solution for fast power needs in the 21st century

Currently, more than 1.3 billion people globally lack access to electricity. GE, whose technologies already help deliver a quarter of the world's electricity, is working to bridge the gap through a portfolio of distributed power solutions. These technologies enable industrial businesses, developing communities and governments to meet their energy needs by positioning power at, or near, the point of use. The TM2500\* fast power solution from GE Power's Gas Power Systems business enables governments, utilities, and businesses around the world to fulfill their generation requirements within days. Thanks to their modular concept, fast installation features and quick production schedules, these units typically can be ready to enter into commercial operation approximately 30 days after your order is placed.

The TM2500 fast power solution harnesses the highly successful LM2500\* aeroderivative gas turbine with more than 2,196 units deployed worldwide and more than 79 million hours of operation.

## Features of the TM2500 fast power solution



### Quick lead times

On-demand power plants delivered in weeks, not months



### Fuel flexibility

Can operate on gas and/or distillate liquid fuel



### Lower emissions

50 percent lower emissions than diesel generators when operating on gas



### Proven technology

More than 2,196 LM2500 gas turbines deployed with 79 million operational hours of experience



### Enhanced design

Two-trailer footprint for high power density



### Scalable, reliable power

Able to add 35 MW blocks of power as demand increases



### Distributed power

Localized power supply, eliminating the need for additional transmission and generation infrastructure



### Project experience

More than 15 years of experience in providing fast and emergency power



### Turnkey design

Delivery of complete energy solution

## Benefits of a TM2500 solution

### Speed

The development of a new power plant could entail months of construction and commissioning. We can shorten that time from months to days under most conditions. Once on the ground, these mobile units can generate power in about 11 days.

### Reliability and availability

Due to our aviation legacy with the LM2500+G4 gas turbine, GE's TM2500 fast power solution represents some of the most reliable distributed power units available. That means consumers will not face frequent interruptions and instabilities due to technical problems related to faulty equipment or an unstable electricity grid.

### Dual fuel capability

TM2500 solutions are capable of running on both natural gas and/or distillate or condensate liquid fuel at an output of up to 35 MW with water injection for NOx abatement.

### Mobility

Mounted on a mobile, two-trailer assembly, TM2500 generator sets can be transported via land, sea, and air to some of the most remote places in the world. Their mobile nature means that they can be swiftly deployed to other sites within days when they are no longer required at the original site.

### Flexibility

Extremely flexible, they have a sub 10-minute start cycle to full power.

### Scalability

The technology is also scalable, allowing the purchase of the number of units needed with the option of adding more power quickly as demand increases.

### Gradual financing

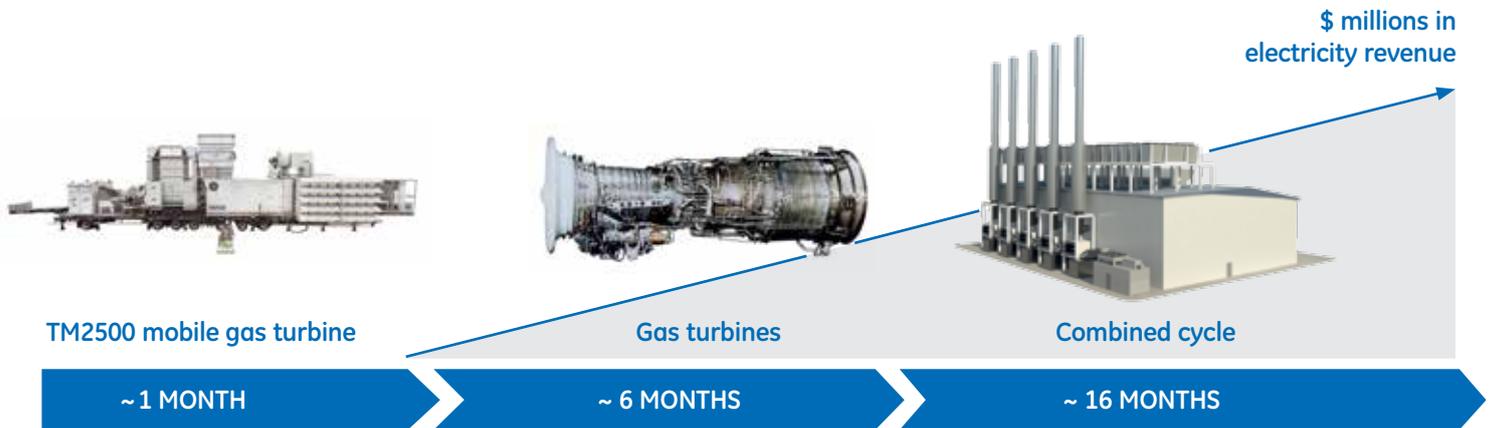
Because large capital expenditure costs can be a barrier for some projects, these units can be purchased gradually for financing ease. In addition, they can be deployed where ever demand exists without the need to invest in capital-intensive transmission and distribution infrastructure.

### Rental

For rental solutions, contact our partner APR Energy at +1 904 223 2278 or visit [www.aprenergy.com](http://www.aprenergy.com).

# The TM2500 solution can be deployed more than six times faster than other technologies

Customers may immediately generate incremental electricity revenue.



The TM2500 can be in commercial operation approximately 30 days after an order is placed, but these times may vary based on project location, site readiness, permitting process, and other variables.

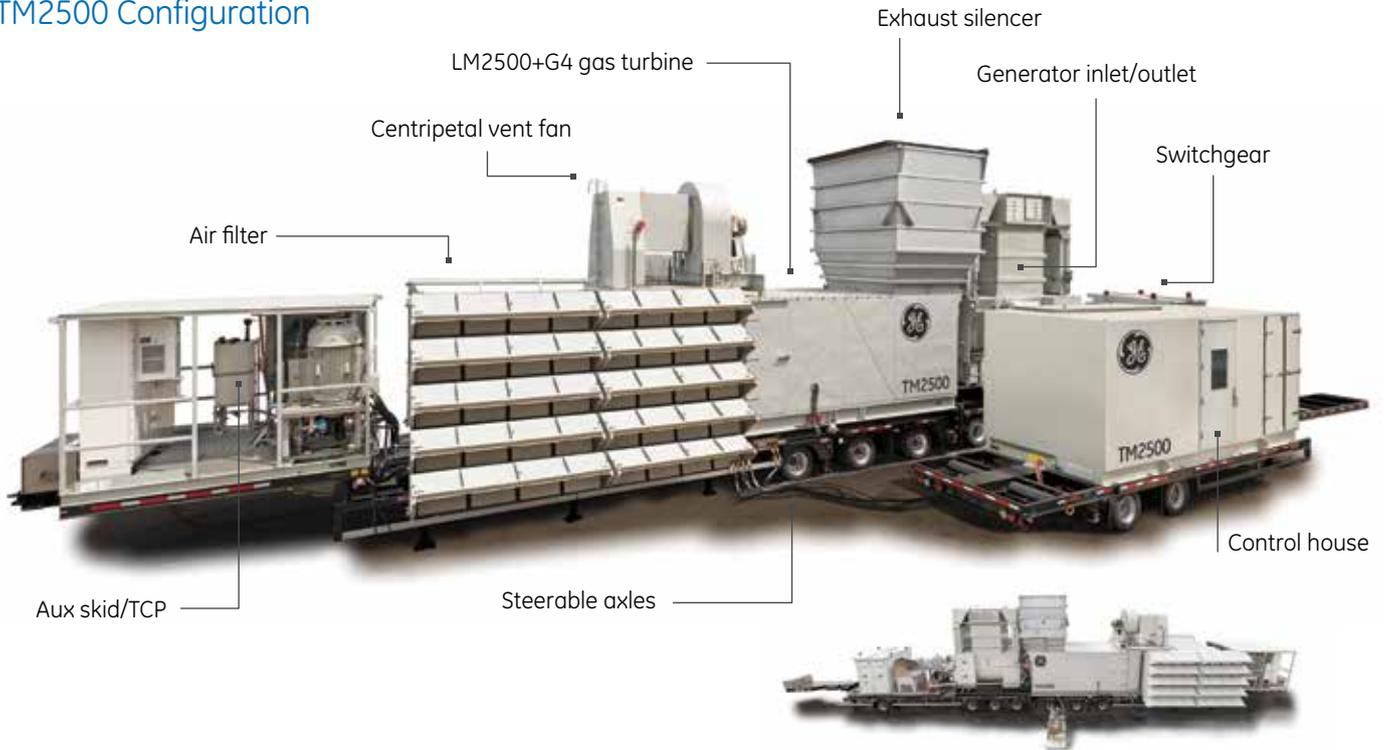
## Multiple applications in a wide range of industries

The TM2500 solution can solve a number of industry challenges. These include, but are not limited to, difficult access to the electric grid, an unstable grid, emergencies and natural disasters, rapid demand growth such as large construction projects, as well as escalating electricity prices and seasonal shortages.

The Challenge	Description	Potential Industries	TM2500 as a solution
 <b>Limited or no access to the electric grid</b>	Cases with challenging access to the electric grid include: <ul style="list-style-type: none"> <li>• Lack of robust transmission and distribution network</li> <li>• Delayed grid access</li> <li>• Remote, islanded and mobile operations</li> </ul>	Oil and gas Mining General industry Power generation	<b>Speed, mobility, and reliability</b> Can deliver power where and when it is needed and bring power online within 10 minutes to stabilize the grid
 <b>Rapid energy demand growth</b>	High and rapid demand for electricity in cases with restricted power availability such as new, large off-grid construction projects	Government Utilities General industry	<b>Speed, reliability</b> Can fulfill power demand in the face of growing needs in a fast and reliable way
 <b>Lengthy buildout of electricity generation infrastructure</b>	Construction lead times on new generation facilities as well as unanticipated delays—meaning pressing electricity needs are not met	Government Utilities General industry	<b>Speed, reliability</b> Can bridge power until new facilities are completed and go online
 <b>Escalating electricity prices</b>	Escalating electricity rates during seasonal or peak periods requiring technologies that enable peak shaving	Government Utilities General industry	<b>Fuel flexibility</b> Can be used as a peak shaving application to help transition off the grid during seasonal or peak periods
 <b>Natural disaster and emergencies</b>	Cases of emergency where power generation sources are impacted and direly needed	Government Utilities	<b>Speed, mobility</b> Can provide emergency power in a fast, reliable and mobile way
 <b>Flare gas</b>	Natural gas flared in oil fields leading to billions of dollars wasted and millions of tons of greenhouse gas emissions	Oil and gas	<b>Fuel flexibility, mobility</b> Can help monetize gas flaring for power generation and help reduce diesel consumption

# Performance you can count on for mobile power

## TM2500 Configuration



Model	Frequency (Hz)	Output (MW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Efficiency (%)	Pressure Ratio	Exhaust Temp (F)	Exhaust Temp (C)	Exhaust Energy (MMBtu/hr)	Exhaust Energy (MMkJ/hr)
TM2500	50	30.7	9,832	10,374	34.7	24.5	963.0	517.0	187	191
TM2500	60	34.9	9,341	9,856	36.5	24.7	950.0	510.0	185	195

**NOTE:** The performance data shown above is at standard ISO (International Organization for Standardization) conditions. The ISO has defined the following standard conditions for comparing gas turbine engines Ambient air: 59°F/15°C, 60% RH; Barometric pressure (14.696 psia / 101.4 kPa); Sea level altitude

**ASSUMPTIONS:** Expected inlet/exhaust losses, ISO conditions, Air-cooled generator, with brushless excitation @ 0.90 PF (60 Hz @ 13.8 kV, 50 Hz @ 11.5 kV) Gas fuel, 100% CH<sub>4</sub> @ 80F, Water injection to 25 ppm NO<sub>x</sub> @ 15% O<sub>2</sub>

## The TM2500 total solution and services support

### A TM2500 fast power solution project may include:

- Installation
- Commissioning
- Project management
- Decommissioning
- Consumable parts kit (filters/lubricants for operation needs)

### In addition, GE offers many services to support the ongoing operation and performance of the units including, but not limited to the following:

- On-call technical advisory services
- Maintenance planning and training
- On-site hot section, combustor, and other modular exchanges
- Depot Repair Services for scheduled overhauls and unscheduled repairs
- Performance testing

# Cases in point



## Egypt

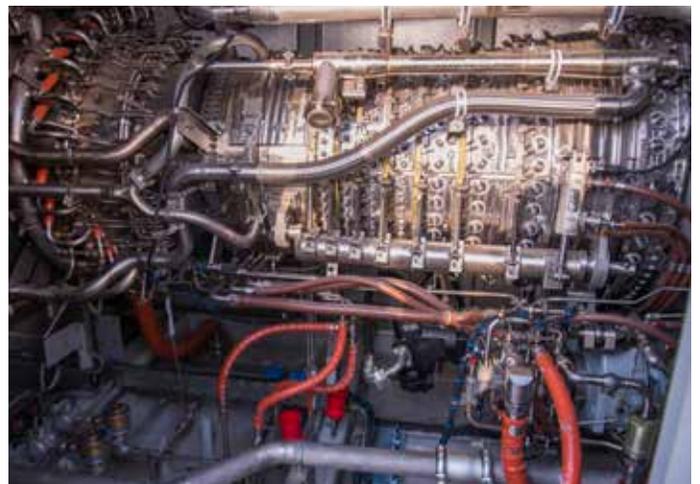
### 500 MW of power, delivered in six months

With rapid economic growth and an expanding population, Egypt is a country in transition. Its desert climate necessitates a massive amount of power generation, and while GE's products currently generate nearly 30% of the country's total installed capacity, its electricity demand is expected to grow at 4.1% per year.

Beginning in December 2014, GE and the Egyptian government took vital steps towards meeting the sharp increase in the country's electricity demand. GE provided 20 TM2500 generator sets – totaling 500 MW of total power – and promised to install and commission all units within six months in order to meet 2015's hot summer months.

The mobile, flexible power provided by the TM2500, combined with the rapid installation and support provided by GE in the region, allows Egypt to meet the challenge of new energy frontiers and support its growing economy. Each unit was able to be delivered to where it needed to be, quickly and safely, saving the Egyptian government tremendous costs and time before power was available to be added to the grid.

By working quickly to get the TM2500 generator sets up and running by June 2015, GE predicts that Egypt will avoid \$24.7 million in economic losses per day—which will add up to \$4.1 billion over the course of the demanding summer season.





## Algeria

### 480 MW† of on-demand power for Algeria

**Algeria faces a drastic need for more power, particularly during the hot summer months when there is close to ten percent annual growth in electricity demand.**

GE delivered 24 TM2500 mobile gas turbine generators that provided more than 480 MW of power. The units were commissioned, delivered and operational in time to meet the northern districts of M'Sila and Fkirina's 2013 summer peak electricity demand. After the seasonal peaks, some of the units were deployed to other cities in the south of the country to serve as permanent power.



## Greece

### 23 MW† for peak shaving in ten days for Greece

**The Greek island of Rhodes is a prime tourist destination. During the summer months, an influx of more than two million people from all over the world swells demand for power to the breaking point.**

To avert blackouts, the island purchased a TM2500 generator set, which was delivered before the summer season and commissioned within a few days of arrival onsite. This provided 23 MW of power generation in tandem with water injection to lower NOx levels to below 25 ppm.



## Angola

### 120 MW for bridging power for Angola

**Only 26 percent of Angola's population of 19 million have access to power. Rich in natural resources, the country is engaged in a priority program to create a modern energy infrastructure.**

The government of Angola ordered five TM2500 mobile gas turbine generator sets. 120 MW of onsite power is bridging the energy gap during ongoing plant construction, improving grid reliability and countering the rising cost of diesel fuel.

†Power output is based in site conditions.

“GE’s TM2500 systems offer the right combination of efficiency and reliability needed to help the Angolan state utility, Empresa Nacional Electricidade-E.P. (ENE), reduce its fuel costs and increase the reliability of grid service in order to support continued economic growth in Angola.”

— NYEMBO ILUNGA  
PRESIDENT, LS ENERGIA AFRICA



## **GAS POWER SYSTEMS**

GE Power's Gas Power Systems is the global industry leader in efficient, reliable, and cost-effective conversion of a broad range of gas and liquid fuels to power—serving diverse applications from small, mobile power to highly efficient, utility-scale power plants. With a rich heritage of innovation and technology leadership—and the world's largest delivered fleet of gas and steam turbines serving the power needs of more than 130 countries—our specialized plant solutions can provide the increased performance, fuel efficiency, lower emissions and operational flexibility that our customers depend on for their success.

For rental solutions, contact our partner,  
**APR Energy at +1 904 223 2278.**

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GEA31885 (11/2015)

