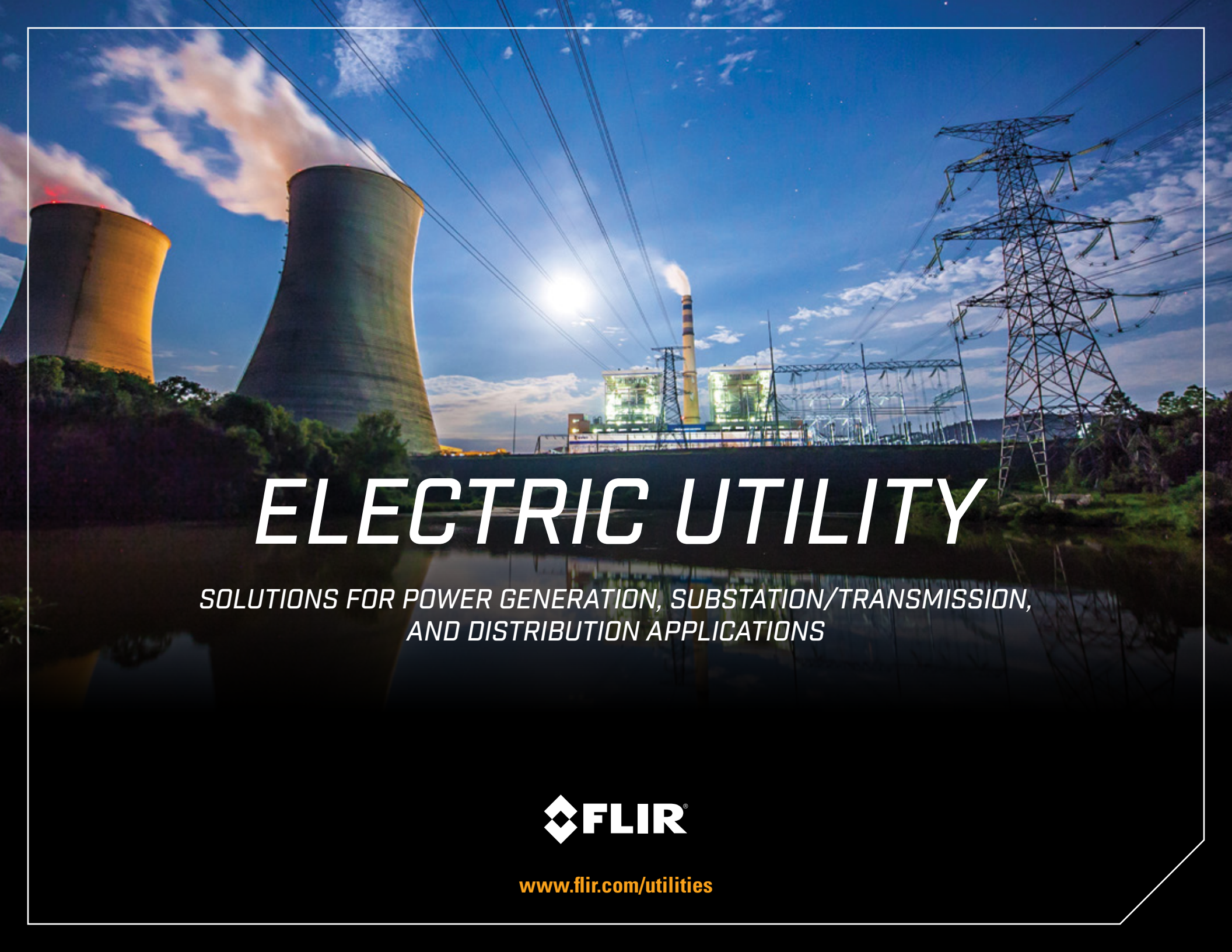

ELECTRIC UTILITY

SOLUTIONS FOR POWER GENERATION, SUBSTATION/TRANSMISSION, AND DISTRIBUTION APPLICATIONS

FLIR®

www.flir.com/utilities

FLIR ELECTRIC UTILITY SOLUTIONS

Save time and ensure equipment sustainability with FLIR's powerful, high-tech tools. Whether it's your responsibility to maintain uptime at electric power generation stations, keep the power flowing through distribution networks, or troubleshoot failures at the residential and commercial level, FLIR offers a complete range of thermal imaging, gas detection and test equipment that will help you diagnose potential problems before they turn into expensive failures.

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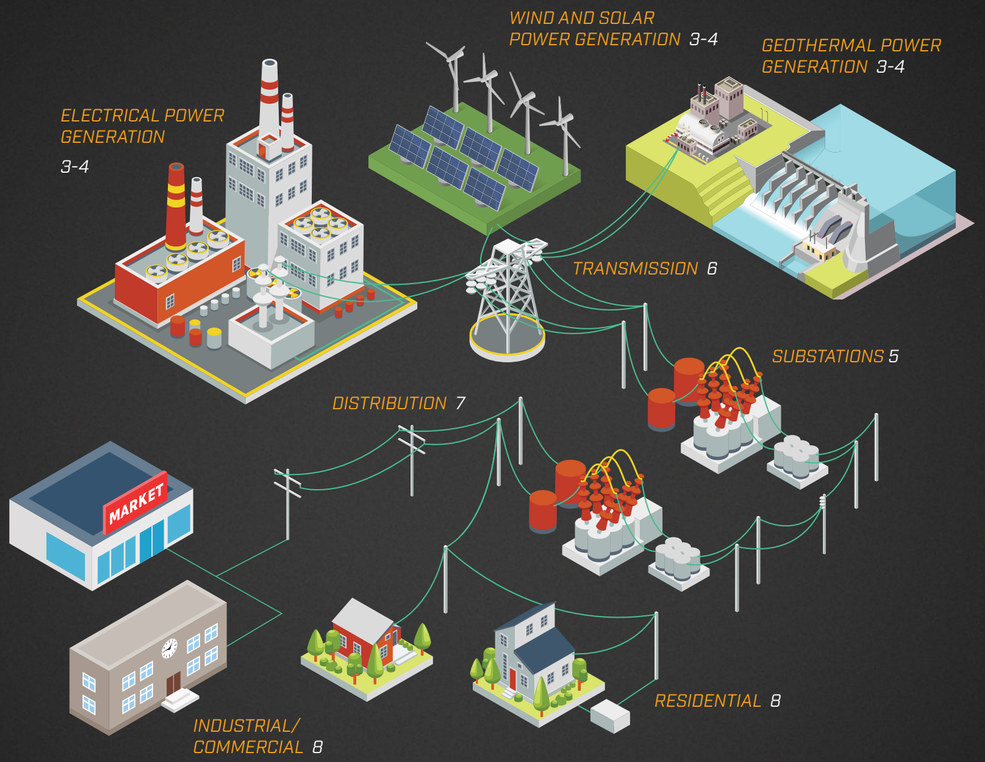
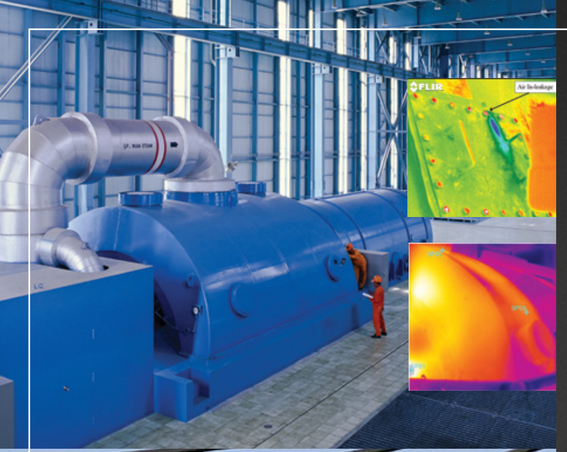




ELECTRIC POWER GENERATION

Steam Turbine Inspections

Locating carbon dioxide (CO_2) leaks on turbine generators can be time consuming when using traditional methods. A small leak left unnoticed can become a big, costly problem — as well as a serious safety concern. But these problems are not always visible to the naked eye, making you more vulnerable to undetected leaks and unexpected downtime. Using a combination of inspection tools such as optical gas imaging, thermal cameras, and electrical test equipment can help you visualize gas in real time to localize small leaks, verify repairs, and avoid outages.

A SOLUTION

FLIR GF343™

FLIR E53™

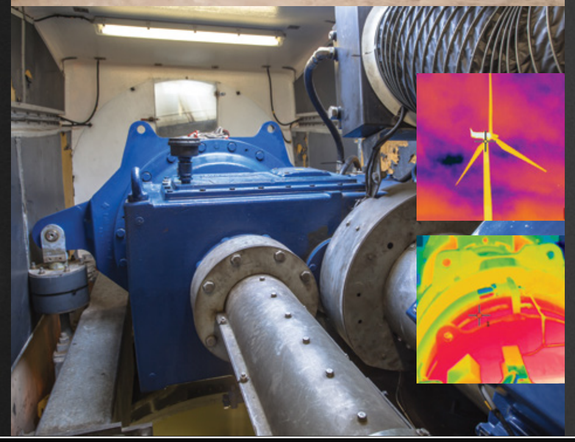
Maintain and Inspect Bushings

Bushing failures can cost your company millions of dollars in lost revenue from downtime, repairs, and overtime pay for workers. Through regular inspections, you can detect bushing failures before they occur. Traditional inspection methods, including Micro-ohm tests or power factor measurement, can be labor-intensive and require you to take the system out of service. Incorporating thermal imaging technology into your inspection routine allows you to collect temperature data in real time, pinpoint hotspots on bushings before a failure occurs, and avoid unnecessary downtime.

A SOLUTION

FLIR T1020™

FLIR A310 f™



Solar Inspections and Diagnostics

Routine solar panel inspections are an essential part of operational efficiency. They are critical to prevent larger breakdowns, manage warranty claims with equipment suppliers, and operate within contracted performance and yield guarantees. A UAS solution with onboard thermal imaging makes it easy to quickly inspect a large target area and pinpoint solar panel problems from the air. Once the problem is identified with infrared, a digital multimeter or clamp meter can help you diagnose electrical issues at the point of failure and determine the proper course of action. Incorporating thermal inspections into your routine maintenance plan will reduce your inspection times, help you work more safely, and improve your overall efficiency.

A SOLUTION

EXTECH MA445

FLIR M210 XT2 R

Wind Power Preventive Maintenance

Wind turbine components are susceptible to wear and can break down. When this happens, the end-result may be costly downtime or a bad accident. That's why preventive maintenance and periodic inspections are so important. Thermal imaging is the only technology that allows you to inspect all electrical and mechanical components of the wind turbine and the surrounding electrical system to detect a problem before a breakdown occurs. Adding a thermal imager to your preventive maintenance routine will help you improve workplace safety, giving field technicians the ability to see problems before they turn into potentially life-threatening situations.

A SOLUTION

FLIR E8™

To learn more about FLIR Solutions for Power Generation visit www.flir.com/power-generation

ELECTRIC SUBSTATION

Insulator Inspections and Diagnostics

When an insulator fails, it may cause a widespread outage. There's a good chance it will affect multiple components in the transmission system – creating a larger, more unmanageable problem. It isn't always easy to inspect for potential failures as insulators are often located up high and out of reach. Regular temperature monitoring using a combination of thermal imaging cameras can help you both inspect and diagnose impending failures before they occur. Using a thermal camera, you can easily scan for temperature differences and hot spots to locate the problem area and diagnose the issue. You'll establish a safer work environment, increase product efficiency across the system, and improve customer satisfaction by ensuring no loss of electricity.

A SOLUTION

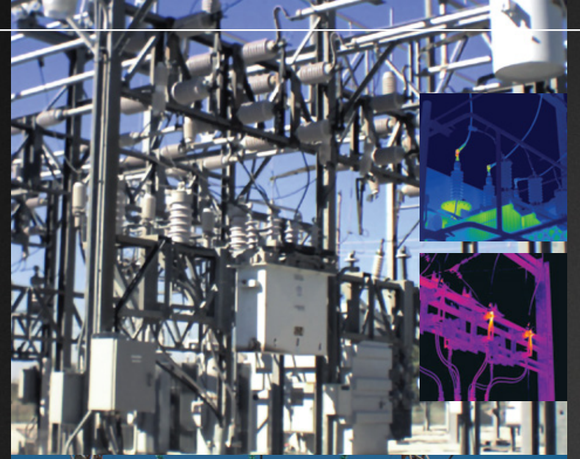
FLIR T640™ FLIR E8™

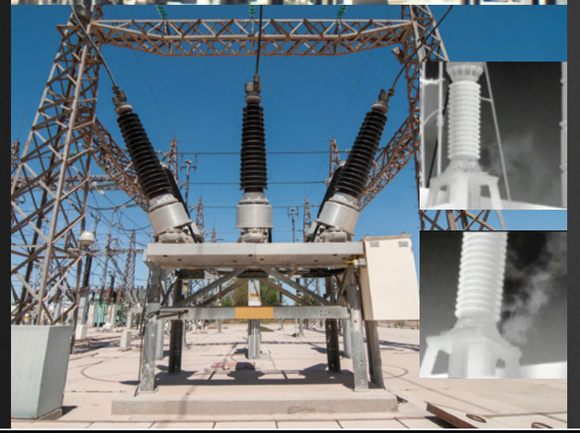
Inspections of Load Tap Changers (LTC)

If a LTC fails, the entire transformer will shut down. Transformer failures can cost your utility millions of dollars, adding overtime pay for workers and additional expenses to expedite repair. This outage will adversely affect numerous distribution circuits and the remaining power grid due to the need to reroute the load to supply the affected circuits. A thermal image sensor is a valuable tool for recording or monitoring temperatures in real-time. Using fixed thermal imagers for regular condition monitoring can help you understand the temperature trends of a LTC and make critical decisions on the health of the transformer before it fails.

A SOLUTION

FLIR AX8™





ELECTRIC TRANSMISSION

Inspecting Connections in Electrical Transmission

If an electrical connection isn't working properly, your transmission system may not operate efficiently or safely. It's important to regularly inspect every connection to ensure that they are in working order, but this can be a challenge. Every system has a lot of small connections, and they are often located high up out of reach. Connections get hot before they fail. Conducting regular surveys of substations and transmission lines using thermal imaging devices can give you a full picture of potential problems. You can measure temperature from a safe distance and diagnose problems before outages occur – minimizing the cost of repairs, maximizing equipment life, and keeping the power on for customers.

A SOLUTION

FLIR T1020™ FLIR M210 XT2 R

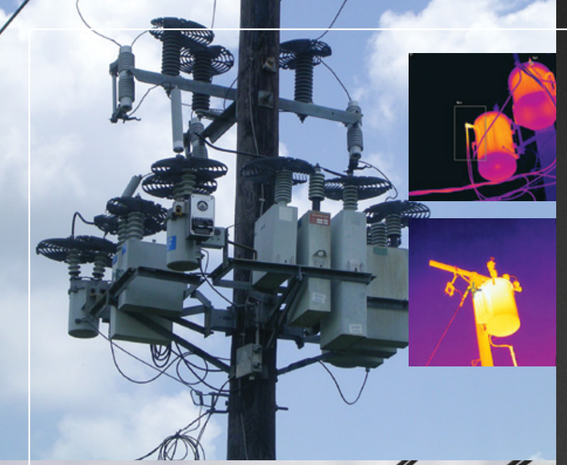
Inspection of SF_6 Circuit Breakers

When you suspect that there's a gas leak in a SF_6 breaker, it's crucial to locate and fix it immediately to minimize downtime and revenue loss. This isn't always easy to do using traditional gas-detection methods such as sniffers or soap bubbles. The longer a leak is left unrepaired, the more revenue lost, and the greater the carbon footprint on the environment. By using a portable, non-contact optical gas imaging camera you can visualize SF_6 and other gas emissions without the need to shut down operations. You can also quickly scan substations for leaks while maintaining a safe distance from high-voltage equipment. Catch leaks early, reducing revenue lost from breakdowns and repairs. Doing so will also help reduce emissions so your company can meet environmental regulations and avoid potential fines.

A SOLUTION

FLIR GF306™

For more information about FLIR Electric Substation/Transmission solutions, or to schedule a product demonstration please visit www.flir.com/substation-transmission



ELECTRIC DISTRIBUTION

Distribution Transformer Inspections

If a transformer overheats and fails, it can be devastating to the utility. A widespread outage might disrupt power to thousands of customers, and the cost to repair or replace equipment is expensive. Regular temperature monitoring using advanced diagnostic thermal imaging cameras can help you easily inspect and monitor the temperature distribution on the outside surface of each transformer to catch impending failures before they occur. It will show you what the naked eye can't see – hot spots that indicate overheating parts – so you know where to investigate further. Find hidden signs of electrical resistance and mechanical wear so you can begin repairs immediately.

A SOLUTION

FLIR T660™

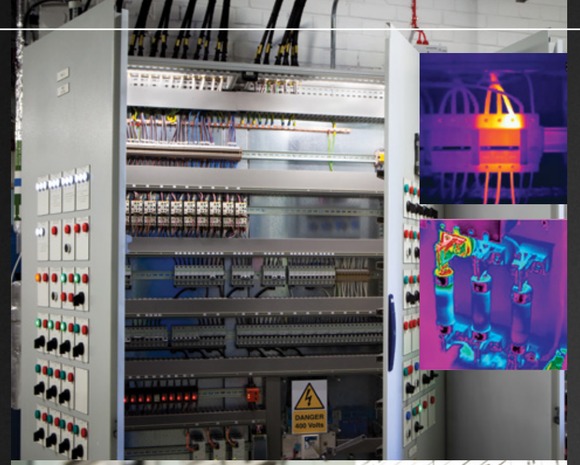
Distribution Powerline Inspections

If you don't catch distribution powerline problems early, you may end up dealing with a costly outage that disrupts power to thousands of customers. That's why regular inspections are necessary. But there's a lot the naked eye can miss, especially when you can't get close enough to what you need to inspect. Equipment gets hot before it fails – regular thermal imaging surveys on distribution powerlines can give you a full picture of potential problems. Since the components you need to inspect are small and likely located out of reach, a high-resolution thermal imager or drone with a combination of infrared and visual payloads can help you detect potential problems quickly and accurately from a distance. Identify hot spots early so you can prevent failures before they occur, reducing the cost of maintenance and repairs.

A SOLUTION

FLIR T1020™

FLIR M210 XT2 R



COMMERCIAL/RESIDENTIAL

HV Electrical Distribution Panel Inspection

Without power, factory operations cannot continue. That's why regular scheduled maintenance is important to ensure your electrical distribution system is in working order. A thermal imager can help you detect hot spots in your distribution system before an outage occurs. Once the source of the problem is identified, a clamp meter can help you diagnose electrical issues at the point of failure and determine the proper course of action. You'll avoid downtime, unnecessary maintenance or repair costs, and lost profit.

A SOLUTION

FLIR T540™

FLIR CM46™

Electrical Panels Inside the House

As an electrician or service provider, it's crucial that you find and fix electrical problems before they turn critical. You rely on pocket-portable thermal imagers and test instruments to investigate failing power inlets, transfer switches, and fuses. Inexpensive thermal imaging cameras can help you locate problems, point them out to customers, and prove they've been repaired. Clamp and digital multimeters enhanced with thermal imaging offer a two-in-one advantage by helping you find the source of a problem and collect the data you need to fix it.

A SOLUTION

FLIR DM166™

FLIR C3™

For more information about FLIR Electric Distribution solutions or to request a product demonstration please visit www.flir.com/power-distribution

FLIR INFRARED CAMERA SOFTWARE AND MOBILE APPS

FLIR helps you work more efficiently and boost productivity through software suites and mobile applications for Android and iOS devices.

SOFTWARE

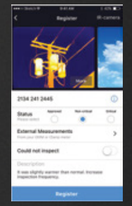
FLIR Tools™ for PC or Mac OS is designed to provide an easy way to create inspection reports on your computer. With FLIR Tools, you can change image settings, add new temperature points, and create standardized reports. This free software is available for download from flir.com.

FLIR Tools+ offers the addition of cutting-edge controls for grouping images, building radiometric panoramas, recording video, and instantly generating comprehensive thermal inspection reports. This software comes included with FLIR T-Series cameras, or can be downloaded as a free 30-day trial from flir.com.

APPLICATIONS

The FLIR Tools mobile app for Android and iOS offer the same great options as the desktop software, optimized for your smartphone or tablet. The app is available for download from the Apple App and Google Play stores.

FLIR InSite™ Inspection Management Application is a professional workflow tool aimed at streamlining inspections and simplifying data collection and reporting. Use this application to plan and prepare for inspections, collect inspection data, and deliver those results to your team or clients through a secure portal.



FLIR Software Development Solutions

FLIR's Software Development Kit (ATLAS SDK) allows companies to use their own Computerized Maintenance Monitoring Systems (CMMS) to support read-out of thermal measurements as well as inclusion of METERLiNK® data, GPS, compass, and other important parameters embedded within the image.

THE INFRARED TRAINING CENTER

Thermal Imaging Value

The greater your knowledge of thermal imaging, the greater the dividends you'll realize for your company and your career. That's why the Infrared Training Center (ITC) offers classes for utility industry applications—from free, online courses to advanced certification training.

ITC courses include:

- *Level I, II, and III Thermography Courses*
- *Electrical Inspection and Level I Electrical Thermography Courses*
- *Optical Gas Imaging Certification Course*

WORLD-CLASS INFRARED TRAINING

ITC thermography certification courses help prepare you to take a leadership role in an infrared inspection program. Level I certifies that you know how a thermal imager works and how to use it. Level II cranks up your credibility with more in-depth concepts and intensive labs. Level III asserts that you have the knowledge and skills to develop and administer your company's thermography program. These certifications offer strong validation to support the work you do as a thermographer.

ITC offers classes at the training center in Nashua, NH, at locations around the country, or in your facility. On-site training is encouraged if your company needs to certify a group of 10 or more. ITC's onsite training courses are the best way to accommodate a large group on a limited budget. Our instructors will travel directly to your facility to limit your travel costs by keeping staff onsite, reducing downtime and short staff issues.

Visit https://flir.com/ITC-onsite-training for more information about onsite training.

For a complete list of courses and a current schedule, visit infraredtraining.com or call 1-866-TrainIR (866-872-4647).

CORPORATE HEADQUARTERS
FLIR Systems, Inc.
27700 SW Parkway Ave.
Wilsonville, OR 97070
PH: +1 877.773.3547

NASHUA
FLIR Systems, Inc.
9 Townsend West
Nashua, NH 06063
USA
PH: +1 603.324.7611

CANADA
FLIR Systems Ltd.
920 Sheldon Ct
Burlington, Ontario L7L 5K6
Canada
PH: +1 800 613 0507

LATIN AMERICA
FLIR Systems Brasil
Av. Antonio Bardella, 320
Sorocaba, SP 18085-852
Brasil
PH: +55 15 3238 7080

EUROPE
FLIR Systems, Inc.
Luxemburgstraat 2
2321 Meer
Belgium
PH: +32 (0) 3665 5100

CHINA
FLIR Systems Co., Ltd
Rm 1613-16, Tower II
Grand Central Plaza
138 Shatin Rural Committee Rd.
Shatin, New Territories
Hong Kong
PH: +852 2792 8955

Specifications are subject to change without notice

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