The Growth Wire: Substations – The "Heart" of Transmission & Distribution Systems

October 2023

ENGLAND COMPANY
INVESTMENT BANKING

Table of Contents

ENGLAND & COMPANY
INVESTMENT BANKING

Substation Overview

Substation Description

ENGLAND & COMPANY
INVESTMENT BANKING

- Substations act as the entry and exit points, as well as junctions, on the electric power highway known as the grid. Though collectively referred to by a singular term, substations are intricate systems made up of diverse devices and components, including transformers, circuit breakers, and control equipment. Their customized nature and integration complexities result in high engineering, planning, acquisition, construction, repair, and modification costs.

- The role of substations within the power grid is indispensable. Firstly, they serve as distribution points where electricity from power plants, whether generated by fossil fuels, nuclear, hydro, or renewable sources, is received and converted to appropriate voltage levels. Secondly, substations facilitate the effective control and regulation of power flow within the grid, ensuring a balanced and stable distribution of electricity across various regions. They act as switching points that can redirect power flows, manage network configurations, and isolate faults to minimize disruptions in case of failures or emergencies. Lastly, they are vital for voltage transformation, allowing efficient long-distance transmission by reducing energy losses. Through step-up and step-down transformers, electricity can be converted to higher voltages for transmission over long distances or converted to lower voltages for use by end users. In conclusion...

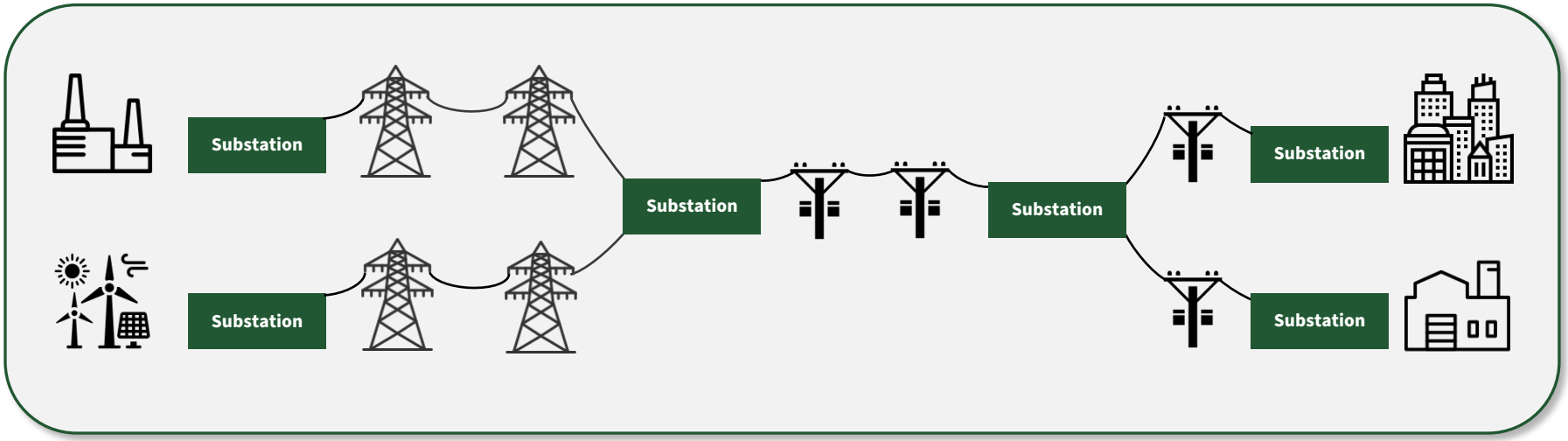
Substations are the "heart" of utility distribution and transmission systems

Main Functions

- ✓ Change or transform voltage levels
- ✓ Isolate a faulted element in a utility system
- ✓ Provide sources of reactive power for power factor correction or voltage control
- ✓ Provide data concerning system parameters such as voltage, current, and power flow
- ✓ Control power flow in the utility systems by switching in / out elements

Components

- ✓ Transformers
- ✓ Conductors
- ✓ Insulators
- ✓ Isolators
- ✓ Busbars
- ✓ Relays
- ✓ Batteries
- ✓ Circuit Breakers
- ✓ Switches
- ✓ Capacitor Banks
- ✓ Metering Instruments
- ✓ Outgoing Feeders

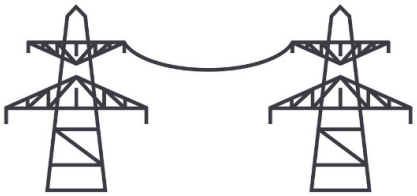


Sources: Advanced Grid Research; ElectronicDesign

Types of Substations

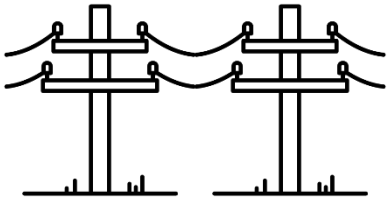
Generation / Collector Substations

Generation / collector substations elevate voltage levels for grid transmission. Found in traditional fossil fuel, hydrogeneration, nuclear, and wind or solar farms, they aggregate energy from multiple generators to channel it to a transmission substation. Additionally, collector substations may offer power factor correction, metering, and house an HVDC converter station.



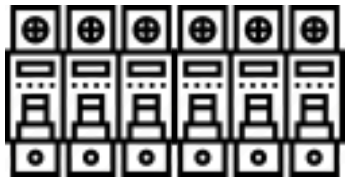
Transmission Substations

A transmission substation serves as a hub connecting multiple transmission lines. Within it, transformers adjust between varying transmission voltages, while devices manage voltage control and power factor correction. Additionally, equipment like phase-shifting transformers regulate power flow between neighboring power systems. Transmission substations vary in complexity, with the most intricate spanning vast areas, featuring multiple voltage levels, numerous circuit breakers, and an extensive array of protection and control equipment.



Distribution Substations

Distribution substations, typically situated at the heart of load areas, can be found as frequently as every two miles in densely populated regions. These substations house power transformers that lower voltage from transmission or sub-transmission levels to distribution levels, generally between 2.4 kV and 19.9 kV. Besides adjusting voltage, they also act as safeguards, isolating faults in the transmission or distribution networks. A standard distribution substation usually features a switch, a single transformer, and basic infrastructure on the low-voltage end.



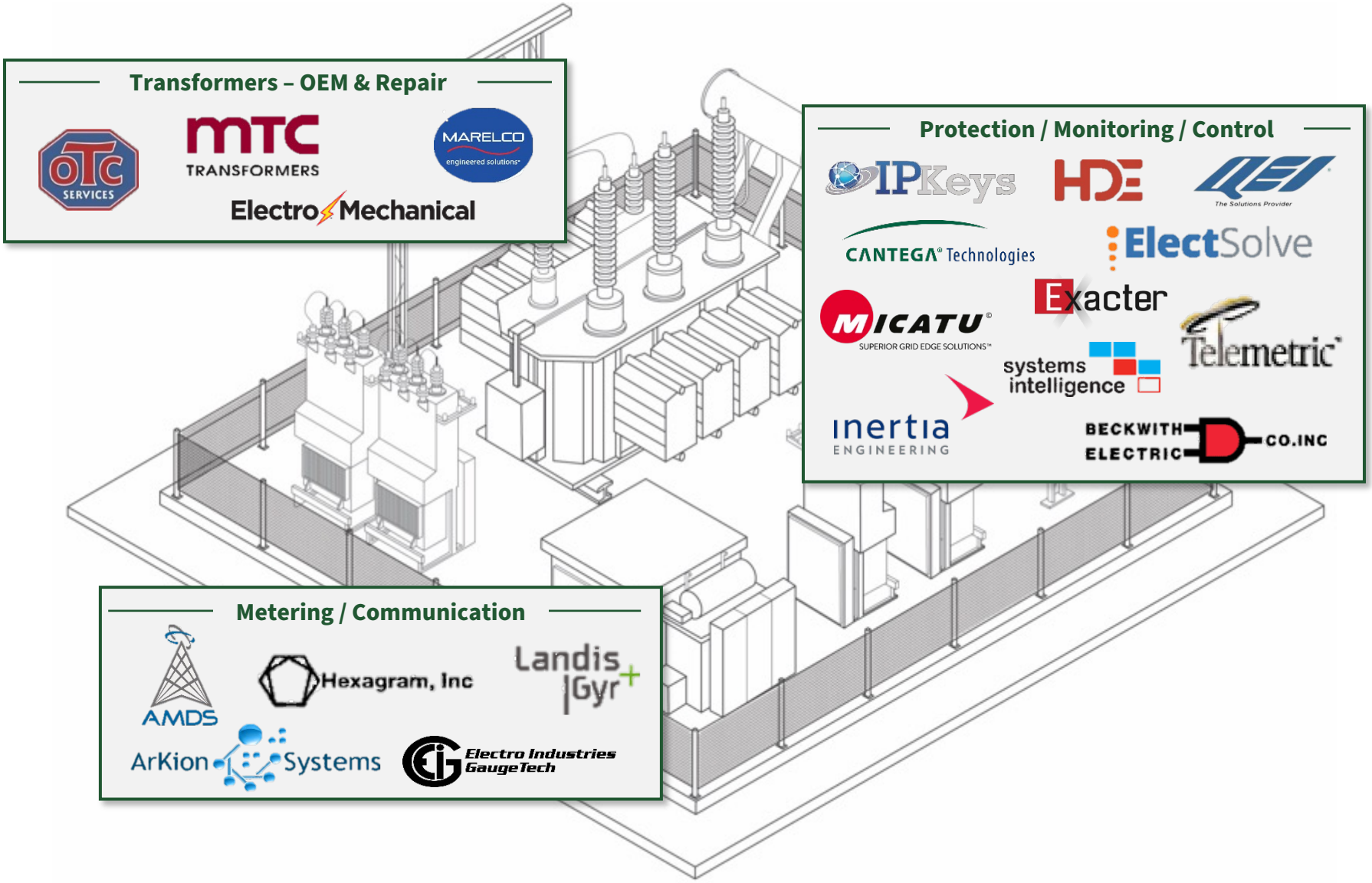
Switching Substations

Switching substations operate without transformers and function at a singular voltage level. Their primary role is to isolate faulty sections of the system. By de-energizing malfunctioning equipment, they prevent further damage, and by quarantining faults they ensure the broader electrical grid remains stable. Occasionally, switching substations can also serve as collector or distribution points.

Sources: StudyElectrical

England's Substation & Grid Experience

ENGLAND & COMPANY
INVESTMENT BANKING



Transformers – OEM & Repair

- OTC SERVICES
- MTC TRANSFORMERS
- MARELCO engineered solutions
- Electro Mechanical

Protection / Monitoring / Control

- IPKeys
- HDE
- The Solutions Provider
- CANTEGA Technologies
- ElectSolve
- MICATU SUPERIOR GRID EDGE SOLUTIONS
- Exacter
- Telemetric
- systems intelligence
- inertia ENGINEERING
- BECKWITH ELECTRIC CO.INC

Metering / Communication

- AMDS
- Hexagram, Inc
- Landis+Gyr
- ArKion Systems
- Electro Industries GaugeTech

Substation Market Trends

Trends within Substation Space

ENGLAND & COMPANY
INVESTMENT BANKING

1

Growing Need for More Substations

As the number of generation sources grows, the demand for substations becomes increasingly crucial to enhance reliability and consolidate and efficiently manage diverse sources of power.

2

Field Service & Repair

Unprecedented, long lead times for substation equipment (especially transformers) have prompted utilities to increasingly opt for expanded maintenance programs and refurbish their existing substation assets, such as transformers and switchgear, aiming to extend the operational lifespan.

3

Control & Monitoring

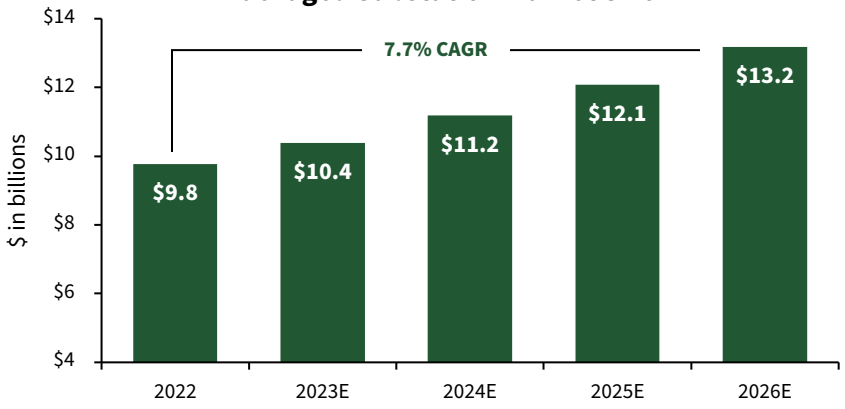
Larger swings in energy inputs from renewables and increasing energy demand from end-users will require a greater amount of substation monitoring and control to keep the grid efficient and stable.

4

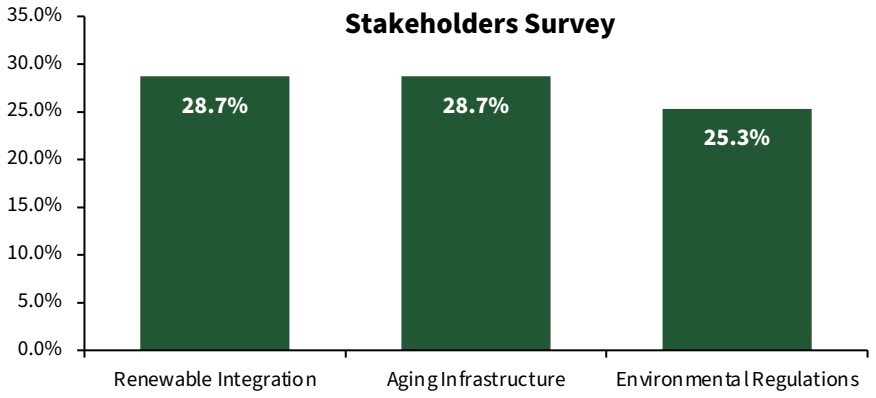
Protection & Security

The rising number of human-related attacks on substations (physical and cyber-related) and the occurrence of outages due to extreme weather events and animal intrusions are drawing heightened public attention to the inadequate security measures for one of the most critical components of the grid.

Packaged Substation Market Size



Most Challenging Grid Issues – 250 Electric Stakeholders Survey



Sources: Black & Veatch; Technavio

Growing Demand for More Substations (1)

ENGLAND & COMPANY
INVESTMENT BANKING

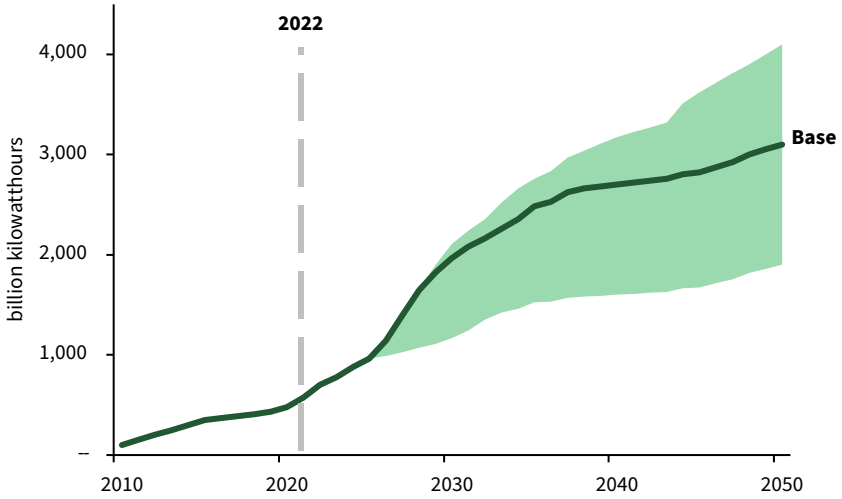
Renewables are Displacing Fossil Fuels in the Electric Power Sector, Increasing the Need for Substations

- Economic growth paired with the increasing electrification in end-use sectors is expected to result in meaningful growth in U.S. electric power demand through 2050. Declining capital costs for solar panels, wind turbines, and battery storage, as well as government subsidies such as those included in the Inflation Reduction Act, have resulted in renewables being increasingly cost-effective when building new power capacity.
- The nature of renewable energy sources is different from traditional power generation plants. Unlike massive power-generation plants fired by fossil fuels and nuclear, which are few in number, renewable energy can be sourced from a plant as small as several solar panels or a few wind turbines, resulting in there being many more smaller generation plants. **As the number of generation sources grows, the demand for substations becomes increasingly crucial to enhance reliability and consolidate and efficiently manage the diverse sources of power.**
- U.S. utility-scale solar capacity has been rapidly increasing recently. The U.S. Energy Information Administration expects that some of the projects delayed in 2022 will begin operating in 2023, along with the already planned installation of 29.1 GW expected for this year. If all the capacity comes online as planned, 2023 will have the most new utility-scale solar capacity added in a single year, more than doubling the current record.

The Role of the Substation Within Renewables

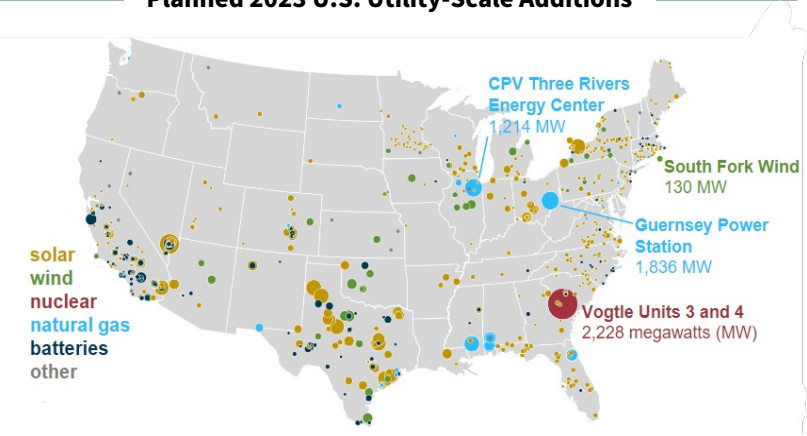
- The new solar and wind plants will need to output power to a grid-tied power substation. The purpose of the substation is to collect all solar array and wind generated power and feed it into the grid after stepping up voltage to transmission level.
- Inside the Solar Farm Substation: Solar plants will produce direct current which needs to be routed through a set of conductors to an inverter, which outputs three-phase alternating current to a step-up transformer. The step-up transformer outputs to a collector, which then flows to the collector arrangement and key protection component. Finally, it is then fed to the grid at approximately 115 kV.

Solar and Wind Electricity Generation



Note: Shaded region represents maximum and minimum values for each projection year. Base = Base case

Planned 2023 U.S. Utility-Scale Additions



Sources: U.S. Energy Information Administration; ElectronicDesign; Electrical Engineering Portal

Field Service & Repair 2

ENGLAND & COMPANY
INVESTMENT BANKING

Long-Lead times, High demand, and Aging Substations

- Over the last several years, many different variables have resulted in extremely long lead times for electrical equipment. Between 2020 and 2022, average lead times to procure distribution transformers for all voltage classes rose 429% based on a survey of 95 utilities.
- These lead times coincide with a period of heightened demand for substations and transformers in the power grid. Presently, significant efforts are underway to replace aging equipment while simultaneously expanding the grid to meet growing needs. Considering that the average current age of installed large power transformers is approximately 40 years, which is close to the end of their operational life, utilities across the nation are trying to expedite orders to facilitate replacements.

Repair Shops

- **Due to the long-lead times to purchase a new substation or equipment, many utilities are opting to repair their existing equipment**. Repair shops provide two primary services to cater to this demand:
  - **Reconditioning:** Refurbishing / restoring the equipment to its optimal operating condition to extend the lifespan without fundamentally altering its design or specifications. This process is usually 10% - 40% less expensive than buying new
  - **Rewinding:** Replacing the existing transformer windings with new ones. This is a more involved and extensive process than reconditioning a transformer

Field Services

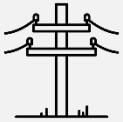
- Utilities have historically relied on three types of maintenance techniques: (1) let assets run until they fail; (2) maintain or repair assets only when absolutely necessary; or (3) implement a fixed service schedule. However, in recent years, fixed scheduled maintenance contracts have taken hold to extend the lifecycle of today's substation equipment.
- **Substation-related field services are positioned to grow across the board**. Demand for field services remains strong and growing as they are essential for installing new substations, conducting tests on recently refurbished and older substations, and providing maintenance for both new and old substations. Notably, older substations require more frequent testing and maintenance, further solidifying the critical role of field services in this sector.

Factors Contributing to Long Lead Times

Supply Chains

Although supply chains have improved since the start of Covid-19, they continue to be stressed

Aging Infrastructure



Substations and related equipment are reaching the end of their lifespans, resulting in increased demand across all utilities

Energy Demand

New consumptions of energy such as the increased use of electric vehicle charging are putting larger strains on the grid

Renewables

An increased amount of solar and wind farms requires more substations to connect their output to the grid

Labor Shortages

Significant portions of the current workforce are getting older and retiring, and there is difficulty in attracting high-skilled individuals for relatively low wages

Sources: American Public Power Association

Control & Monitoring for Substations 3

ENGLAND & COMPANY
INVESTMENT BANKING

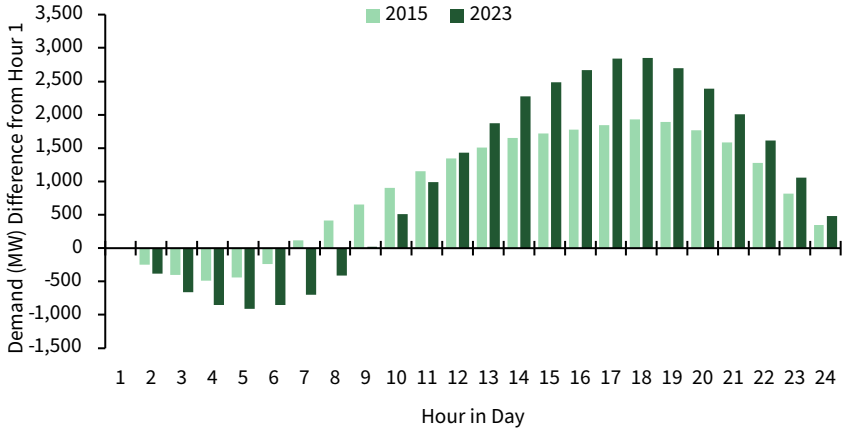
Unpredictability Within the Grid

- A greater deployment of variable renewable resources, such as wind and solar energy generation, are introducing large and fast swings in power injection and voltages on the transmission system. The locations of these facilities are often remote and connected to weak systems that require additional substation equipment or improved controls to ensure voltage stability and reliable system operations. Renewables are also intermittent, while traditional power sources are dispatchable and can ramp up production to meet demand during peak hours, renewables can be unpredictable and can't be controlled by operators.
- On the user side, new loads and applications such as data centers, the electrification of commercial building heating, and the fast charging of electric vehicles can lead to large and quick swings in power consumption that could jeopardize system stability and inject harmonics into the system. Changes in demand due to greater electrification, changing demographic and economic conditions, and new industries are also altering system power flows.
- These new variables within the grid require greater control and monitoring systems to ensure stability.

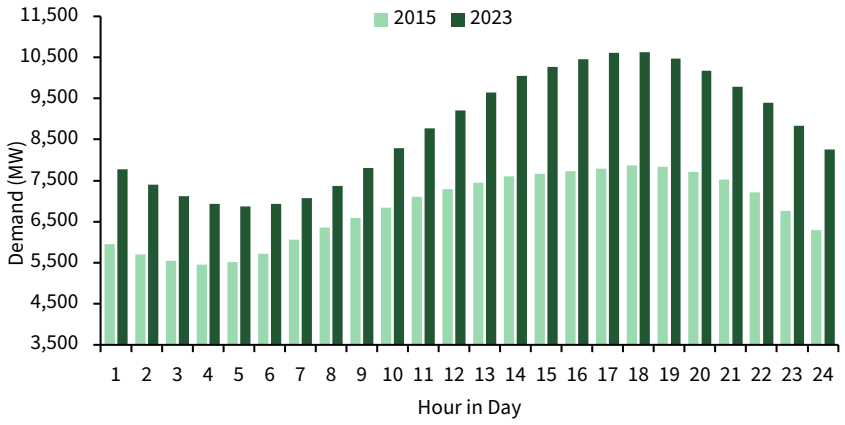
Growth in Substation Control and Monitoring

- **To ensure grid reliability, the implementation of cutting-edge substation monitoring and control devices is imperative**. By leveraging these technologies, operators can proactively manage the fluctuations in power generation consumption, maintain system stability, and enhance overall grid performance.
- Utilities monitor and control substations using Operational Technology ("OT") systems. New sites typically implement a supervisory control and data acquisition ("SCADA") system or some form of Industrial Internet of Things ("IIOT") software to monitor and control substations and related equipment. However, older facilities can also benefit by adding an OT system. A new or upgraded OT system will provide better monitoring and control and extend the life of substations and related equipment by providing current data for troubleshooting small problems before they escalate.
- The hardware aspect of substation control and monitoring encompasses essential components, including a computer processing unit responsible for coordinating commands, remote terminal units, programmable logic controllers, and intelligent electronic devices.

Hourly Differences in Energy Demand



Hourly Energy Demand



Sources: Advanced Grid Research; ElectronicDesign; Electricity-Today; Technavio; U.S. Energy Information Administration

Protection & Security 4

ENGLAND & COMPANY
INVESTMENT BANKING

Increase of Human-related Attacks

- Substations have increasingly become targets for physical and cyber-related attacks as well as vandalism throughout the country. Federal energy studies reported an increase in physical attacks at electrical facilities in 2022, which has been a growing trend since 2017. The Department of Energy stated that human attacks were responsible for 172 electric disturbances incidents in 2022, compared to 99 in 2021.
- The Department of Energy and Department of Homeland Security Cybersecurity and Infrastructure Security Agency recommend a layered security strategy. To accomplish this, states and utilities are looking at how to best prioritize their investments. While building walls around substations is one solution, more remote monitoring, and other technology solutions will need to be considered as well.

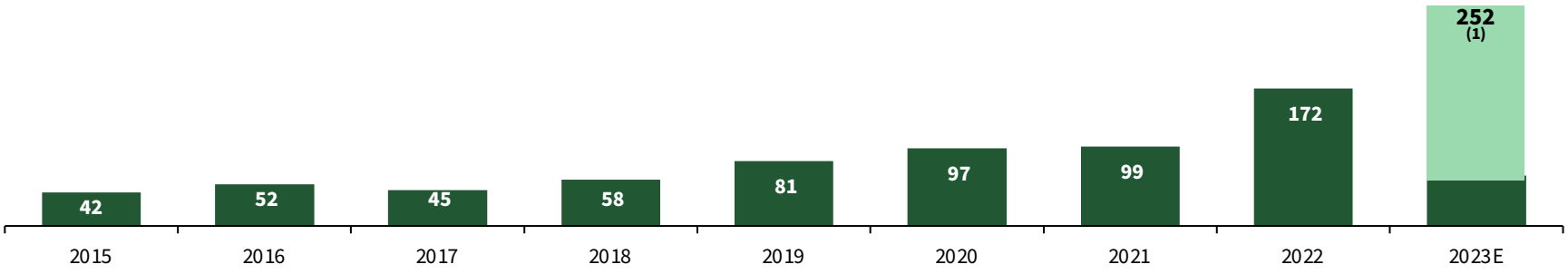
Weather Related Events

- Recent extreme weather events have revealed the weakness in U.S. power infrastructure. Hurricane Ida in New Orleans created a blackout that lasted weeks, as the majority of the network had only been engineered to withstand winds of 95 mph.
- In California, summer heat combined with an outbreak of wildfires caused transmission equipment to fail just as homes and businesses cranked up air conditioners.
- Texas was caught off guard by a prolonged deep freeze in February 2021, triggering a blackout across much of the state. Nearly 250 people died, most from hypothermia, according to the Texas Department of State Health Services.

Conclusion

- **If these weather-related incidents and human attacks persist, the potential consequences could lead to extensive litigation and capital investments aimed at upgrading, protecting, and securing critical components of the grid, including substations.**

Human-Related Disturbances



Note 1: There have been 63 reported cases as of YTD March 2023. 252 represents an annualized version of these accidents

Sources: U.S. Energy Information Administration; NCSL; Reuters; Office of Cybersecurity, Energy Security, & Emergency Response

Substation Market Overview

Significant Players – Services

ENGLAND & COMPANY
INVESTMENT BANKING

Company	HQ Location	Ownership	Description
BETA	Pineville, LA	Private Subsidiary (Crest Industries)	Beta Engineering designs and builds substations, switchyards, transmission lines, gas-insulated switchgear projects, and flexible alternating current transmission systems
DIS-TRAN PACKAGED SUBSTATIONS	Sayreville, LA	Private	Dis-Tran is a manufacturer of packaged substations and provider of construction services for electrical utility projects
EATON Powering Business Worldwide	London, England	Public (NYSE: ETN)	Eaton Corporation operates as a power management company worldwide. Their wide array of products and services includes electrical components, power distribution assemblies, and uninterruptible power supply services
EMERALD TRANSFORMER	Mckinney, TX	Acquired (Insight Equity)	Emerald Transformer is a source for oil-filled electrical equipment with services including repair, re-manufacturing, field technical services, recycling, and disposal
MasTec Infrastructure that Delivers	Coral Gables, FL	Public (NYSE: MTZ)	MasTec is a leading construction company operating mainly in North America across a range of industries
NASS A Voltyx Company	Altamonte Springs, FL	Private Subsidiary (Voltyx)	Nass provides one-stop substation service capabilities by providing substation inspection programs, protection and control commissioning and repairs, and control cabinet engineering
QUALUS POWER SERVICES	Deer, NM	Private (New Mountain Capital)	Qualus is a provider of specialized engineering and technical field services, serving clients across the U.S.
QUANTA	Houston, TX	Public (NYSE: PWR)	Quanta Services provides infrastructure solutions for the electric and gas utility, renewable energy, communications, pipeline, and energy industries
PIKE	Mount Airy, NC	Private (Court Square Capital)	Pike is one of the largest third-party providers of outsourced electric distribution and transmission services in the United States
RESA POWER	Houston, TX	Private (Investcorp)	RESA Power is a national provider of mission-critical solutions for electric power systems. They are experts in serving major power distribution and control equipment and have a large inventory of components

Significant Players – Services

ENGLAND & COMPANY
INVESTMENT BANKING

Company	HQ Location	Ownership	Description
Saber Power	Rosharon, TX	Private (Bath Group)	Saber Power Services is an engineering-led, construction-focused services company specializing in complex medium and high voltage electrical infrastructure
Schneider Electric	Paris, France	Public (XPAR: SU)	Schneider Electric engages in energy management and industrial automation. Additionally, it and offers services for electrical distribution system design, construction, and maintenance
SDMyers	Tallmadge, OH	Private	SDMeyers provides transformer and substation maintenance. More specifically, they provide guidance, testing, servicing and training to maximize the life of electrical equipment
Shermco	Irving, TX	Private (Gryphon Investors)	Shermco is a provider of testing, repair, training, and maintenance and analysis of electric power distribution systems
Southwest Electric Co.	Oklahoma City, OK	Private	Southwest Electric is a leader in remanufacturing, manufacturing, and service for electrical equipment in the central United States
Stark International	New Glasgow, Canada	Private	Stark International provides oil services for transformers, providing on-site inspection, transformer repair, insulating oil services, and PCB services

Significant Players – Control & Monitoring

ENGLAND & COMPANY
INVESTMENT BANKING

Company	HQ Location	Ownership	Description
Hitachi Energy	Zurich, Switzerland	Public (OTCM: HTHIY)	Hitachi Energy offers engineering, products, projects, and services for electricity transmission and related activities internationally
minsait	Peachtree Corners, GA	Indra (MAD: IDR)	Minsait ACS is a provider of power grid control solutions and advanced automation technology for the electric power industry
NovaTech AUTOMATION	Quakertown, PA	Private Subsidiary (Valmet)	NovaTech is a provider of automation and engineering solutions intended for electric utilities and process manufacturing industries
OSI powering the future	Minneapolis, MN	Emerson (NYSE: EMR)	Open Systems International provides open automation and network management solutions for real-time management and optimization for production, transport, and delivery networks for utilities
QEI The Solutions Provider	Springfield, NJ	Private (HCPI)	QEI offers automation products, supervisory control and data acquisition software solutions, distribution management systems, and related services
HUBBELL	Boonton, NJ	Public (NYSE: HUBB)	Hubbell acquired RFL in 2014 and Beckwith in 2020. RFL manufactures a line of communication and protection solutions for the electric utility and transportation markets. Beckwith is a leader in substation control and protection technologies
G&W	Bolingbrook, IL	Private	G&W Electric is a manufacturer of power systems specializing in the switching, protection, and control of electric power systems
SEL SCHWEITZER ENGINEERING LABORATORIES	Pullman, WA	Private	Schweitzer Engineering Laboratories is a provider of control systems and services intended to make digital substations safer and reliable
SIEMENS	Munich, Germany	Public (XETR: SIE)	Siemens is an industrial conglomerate, with businesses selling components and equipment for sectors including automation, electrical distribution, and transit
Survalent.	Brampton, Canada	Private	Survalent is a provider of advanced distribution management systems designed to improve and automate electricity distribution

Significant Players – Protection & Security

ENGLAND & COMPANY
INVESTMENT BANKING

Company	HQ Location	Ownership	Description
CID BUILDINGS	Sarver, PA	Private	CID Associates is a family-owned, engineered to order, manufacturing company that builds turnkey, crane-liftable buildings
MODULAR CONNECTIONS	Bessemer, AL	Private	Modular Connections provides comprehensive design, electrical and mechanical integration, finishing, and logistical support services for concrete building and wall system applications
NUCOR	Charlotte, NC	Public (NYSE: NUE)	Nucor engages in the manufacturing and sale of steel products. They recently announced the location for a second utility structures production facility
PANEL BUILT INCORPORATED	Blairsville, GA	Private	Panel Built offers a complete line of customer modular offices, pre-assembled buildings, and ballistic rated buildings
Southern States	Hampton, GA	Private	Southern States is a provider of essential products and services to electric utilities in the U.S. and Canada to support the Nations Electric Power Infrastructure
SYSTEMS CONTROL	Iron Mountain, MI	Private (Comvest Partners)	Systems Control designs and manufactures systems that are involved in the protection and control of transmission and distribution assets
systems with intelligence	Mississauga, Canada	Private	Systems with Intelligence is a provider of visualization tools for utility and industrial applications in demanding and remote locations
TRACHTE	Oregon, WI	Private (Palladium Equity Partners)	Trachte is a provider of application-engineering protection and control buildings
TRYSTAR	Faribault, MN	Private	Trystar manufactures electrical cable and electrical power panel distribution equipment
valmont UTILITY	Valley, NE	Valmont (NYSE: VMI)	From transmission and distribution poles, substation structures and corrosion protection, Valmont Utility's solutions can be custom-engineered, fabricated, and delivered in any combination of concrete, steel, or a hybrid of the two

Selected M&A Transaction - Services

ENGLAND & COMPANY
INVESTMENT BANKING

Date	Target	Target Description	Acquirer
Jul-23	Saber Power	Delivers a wide range of services, from infra-red thermography and relay calibration to substation construction and emergency response	Bath Group
Jan-23	otera	Offers a diverse range of electrical design, installation, maintenance, and repair from substation construction and lighting systems	VINCI
Feb-22	Sentinel Power Services	Initially specialized in breaker repair and later expanded its offerings to include electrical equipment testing, troubleshooting, and engineering	TechPro Power Group
Feb-22	ComRent Load Bank Solutions	Specializes in load bank rentals, electrical testing equipment, and power distribution solutions for a diverse range of sectors including data centers, alternative energy, and government/military	Sunbelt Rentals
Dec-21	Resa Power	Comprehensive provider of power distribution and control equipment, offering services such as electrical testing, maintenance, and transformer solutions	Investcorp
Aug-21	Sparus	Provides project control services, detection equipment, and mobile workforce solutions. Their offerings include staff augmentation, consulting services, corrosion control, pipeline safety, compliance, and power quality services	Ridgemont Equity Partners
Jun-21	SPX	Specializes in the design, manufacturing, testing, and servicing of transformers. The company offers a wide range of power transformers, transformer components, and related services for the transmission and distribution of electric power	Prolec GE
Jun-21	Sigmasix Solutions	Offers comprehensive electrical testing, commissioning, maintenance, and repair services for a diverse range of AC and DC systems, encompassing industrial, commercial, and power generation sectors	Shermco
May-21	Intren	Provides comprehensive design, construction, and management solutions including overhead and underground distribution, storm response, substation, and renewable energy services	MasTec Infrastructure that Delivers
Apr-21	Sabre Industries	Leading provider of utility and wireless infrastructure solutions. The company also offers services such as tower inspection, modifications, construction, and maintenance	Blackstone

Selected M&A Transaction - Services

ENGLAND & COMPANY
INVESTMENT BANKING

Date	Target	Target Description	Acquirer
Dec-20	PIKE	Specializes in construction and engineering services for electric utilities with a comprehensive suite of energy and communication solutions. The Company offers a range of planning, design, and maintenance options	LIG LINDSAY GOLDBERG
Nov-20	GLOBAL WIND SERVICE	Services include transportation, craning, cable work, health and safety management, testing, maintenance, and more	Fred. Olsen Windcarrier
Jan-20	POTOMAC TESTING	Leading provider of electrical testing, engineering, and field services. Offerings encompass a range of solutions from power system studies and monitoring to maintenance, repairs, and emergency services	TECHPRO POWER GROUP
Sep-19	NEXTGEN TECHNOLOGIES LTD.	Offers comprehensive integrated electrical testing services, including design, testing, commissioning, maintenance, repairs, and turnkey solutions for communication, protection, and control systems	Shermco
Aug-19	EMD, Inc.	Initially focused on automated electrical power generation equipment installation. The Company shifted to offering comprehensive solutions from control systems design to engineering, programming, and control panel fabrication.	Shermco
Aug-19	swn Southwestern Energy	Prominent third-party provider of certified electrical testing and engineering services. The Company serves diverse markets, including the utilities, technology, industrial, and government sectors	Shermco
Jul-19	SUNBELT Transformer	Global manufacturer of new and reconditioned transformers, electrical equipment, and components for diverse markets. Their comprehensive offerings include transformers, switchgear, rental equipment, and repair services	SOLOMON CORPORATION
Mar-19	Sabre Industries	Leading provider of utility and wireless infrastructure solutions. The company also offers services such as tower inspection, modifications, construction, and maintenance	THE JORDAN COMPANY
Jun-18	Shermco	The leading independent provider of electrical testing, maintenance, and repair services in North America	GRYPHON INVESTORS
May-18	otera	Offers a diverse range of electrical design, installation, maintenance, and repair from substation construction and lighting systems for transportation networks to tunnel installations and marine industry solutions	roadworks

Selected M&A Transaction - Products

ENGLAND & COMPANY
INVESTMENT BANKING

Date	Target	Target Description	Acquirer
Jul-23	The Solutions Provider	Specializes in substation automation equipment for electric network monitoring and control. The Company provides clients with support, including engineering, manufacturing, training, and service personnel	
Jun-23	RAUCKMAN Utility Products	Manufactures electric utility products designed for energized electric utility systems, including items like bushings, risers, insulators, and specialized tools for various applications	NATIONAL SAFETY APPAREL
Jun-23	FORTRESS FENCING	Specializes in constructing fences to secure solar farms, substations, and commercial facilities. The Company's expertise spans a range of fence types, ensuring increased security and protection for critical installations across the nation	DSI
May-23	SENTRAN CORPORATION Established 1993	Manufacturer specializes in instrument transformers and transducers. The Company's products include current transformers, sensors, and monitors, computer control systems, and SCADA systems	INRCORE
Apr-23	瑞 恩	Specializes in manufacturing power transformers and box-type substations, offering a range of products including dry-type and oil-immersed transformers, high and low voltage equipment, and substation series	EATON Powering Business Worldwide
Mar-23		Manufactures switchgear and motor control components, offering a range of products such as instrument transformers, relays, protectors, monitors, and arc flash relays, catering to diverse electrical applications	OLYMPIC CONTROLS CORPORATION
Jan-23	TESTCO A PEI-Genesis Company	Distributor of electronic components for industrial purposes. The company offers a range of products including connectors, electromechanical relays, passive electronic components and emergency stop switches	PEI-Genesis
Dec-22	TRANSFORMATEURS LTEE PIONEER TRANSFORMERS LTD	Designs and manufactures specialized liquid-filled and dry-type power transformers. Their tailored products cater to niche applications in industrial, commercial, and backup power markets	ERMCO DISTRIBUTION TRANSFORMERS
Nov-22	Meister	Manufacturer of hardware products original equipment manufacturers and users of switchgear, transformers and bus-duct. Specializes in offering porcelain, cycloaliphatic, polyester insulators, bus boot, cable bushing and wire holders	POWER GRID COMPONENTS, INC.
June-22	SUMMIT UTILITY STRUCTURES	Manufactures tubular poles, specializing in designing, producing, and marketing a range of products such as high voltage transmission poles, wireless poles, substation structures, traffic structures, and custom tubing	NUCOR

Selected M&A Transaction - Products

ENGLAND & COMPANY
INVESTMENT BANKING

Date	Target	Target Description	Acquirer
Jun-22	Substation Concrete Services	Specializes in electrical utility construction focused on substations. They offer a range of services including concrete foundations, drilled pier, cassion, fence installation, control wire electric work, maintenance, and commissioning service installation	DynaGrid
Dec-21	TPMG	Manufactures electrical equipment and custom prefabricated steel buildings, serving as transportable control centers, substations, and housing essential equipment like switchgear and automation systems	TRYSTAR
Sep-21	Electro Mechanical Corporation	Major manufacturer of electrical apparatus. Their divisions, including Line Power, Federal Pacific, and Mirus International. Providing high-quality power distribution components, mining systems, and industry knowledge with customer support	GRAYCLIFF PARTNERS
Aug-21	VF Transformer	Specializes in designing and manufacturing transformers and reactive magnetics. Their product range includes single-phase and three-phase transformers, magnetic components, audio transformers, and custom magnetics for various applications	Spire Power Solutions
May-21	Neeltran Inc.	Specializes in designing and manufacturing rectifier-transformers and rectifiers. Their product offerings include power supplies, transformer rectifier systems, cooling products, power systems, rectifier systems, and programmable controls	amsc
Feb-21	varentec	Develops innovative power electronics equipment for electrical distribution systems. Their platform employs grid-edge device technology to optimize energy efficiency, enhance power delivery infrastructure, and support industrial applications	Sentient Energy
Feb-21	Beckwith Electric Co. Inc.	Manufacturer of markets power system protection designed for the electric utility industry	Hubbell Gas Utility Solutions
Jan-21	COL Group	Manufactures electric utility products designed for energized electric utility systems, including items like bushings, risers, insulators, and specialized tools for various applications	Oaktree Capital Management, LLC
Jan-21	PCE Power Consulting Engineers	Provider specializes in constructing fences to secure solar farms, substations, and commercial facilities. Their expertise spans a range of fence types, ensuring increased security and protection for critical installations across the nation	AMPIRICAL
Aug-20	OSI powering the future	Provider of open automation and network management solutions for real-time management and optimization for production, transport, and delivery networks for utilities	EMERSON

England & Company's Utility and Critical Infrastructure Experience

Experience In Critical Infrastructure

ENGLAND & COMPANY
INVESTMENT BANKING

inertia ENGINEERING has been acquired by MacLean POWER SYSTEMS **Sell-side Advisor**	CG Power and Industrial Solutions Ltd. has divested to H C **Sell-side Advisor**	Electro Industries GaugeTech has been acquired by HUBBELL **Sell-side Advisor**	Hayward Gordon has been acquired by EBARA **Sell-side Advisor**
MITSUBISHI ELECTRIC *Changes for the Better* has acquired CPT **Buy-side Advisor**	systems with intelligence Preferred Stock **Exclusive Placement Agent**	Electro Mechanical has been acquired by GRAYCLIFF PARTNERS **Sell-side Advisor**	MICATU© MEASURING THE FUTURE™ **$10,000,000** Preferred Stock **Exclusive Placement Agent**
BECKWITH ELECTRIC CO.INC. has been acquired by HUBBELL **Sell-side Advisor**	KORTICK has been acquired by SICAME Group **Sell-side Advisor**	LARON has been acquired by OTC Ohio Transmission Corporation **Sell-side Advisor**	CANTEGA® Technologies and its affiliated entity RELIAGUARD have been acquired by HUBBELL **Sell-side Advisor**

Experience In Critical Infrastructure

ENGLAND & COMPANY
INVESTMENT BANKING

IPKeys has acquired n-dimension and received an equity investment from ENERTECH CAPITAL
Financial Advisor

IPKeys has acquired SIGMAFLOW
Buy-side Advisor

ElectSolve Technology Solutions & Services, Inc. has been acquired by IPKeys
Sell-side Advisor

HDE HD ELECTRIC COMPANY has been acquired by GREENLEE A Textron Company
Sell-side Advisor

ELEMENT partners has acquired an interest in Hayward Gordon
Buy-side Advisor

Exacter
$8,000,000
Series B Preferred Stock
Exclusive Placement Agent

METRUM TECHNOLOGIES has been acquired by Aclara
Sell-side Advisor

OTC SERVICES has been acquired by SGB STARKSTROM Partners in Power / SMIT TRANSFORMERS
Sell-side Advisor

MTC TRANSFORMERS Wytheville Operations has been acquired by SCHAFFNER
Sell-side Advisor

Silent Power INC. has been acquired by Hanwha
Sell-Side Advisor

Xtensible Solutions has been acquired by ESCO TECHNOLOGIES
Sell-side Advisor

TEAMSTS Specialized Technical Services has been acquired by Navigation capital partners
Sell-side Advisor

Experience In Critical Infrastructure

ENGLAND & COMPANY
INVESTMENT BANKING

ArKion Systems
has been acquired by
Mueller Water Products
Sell-side Advisor

MARELCO engineered solutions
has been acquired by
BERTRAM CAPITAL
Sell-side Advisor

Advantage Engineering
Geotechnical and Environmental Engineers
has been acquired by
SCHOOR DEPALMA
Engineers and Consultants
Sell-side Advisor

AMDS
Advanced Metering Data Systems
has been acquired by
SENSUS
Sell-side Advisor

Landis+Gyr
has acquired
Hunt Technologies
The Possibilities Are Endless™
Buy-side Advisor

Hexagram, Inc.
has been acquired by
Aclara
Sell-side Advisor

Industrial & Infrastructure Practice

ENGLAND & COMPANY
INVESTMENT BANKING

Founded in 2003, England & Company is an independent investment bank that provides strategic advice on mergers and acquisitions, recapitalizations and restructurings, and capital markets transactions to owners, executives, and boards of directors of domestic and international companies. The firm's clients include leading companies in the Energy & Sustainability, Healthcare, Industrial & Infrastructure, and Technology & Media markets

For further information, please visit: www.englandco.com

England's Industrial & Infrastructure Leadership Team

Glenn Tofil
Managing Director
+1 202-386-6503
gtofil@englandco.com

Bruce Craig
Managing Director
+1 202-386-6502
bacraig@englandco.com

Bill Getz
Managing Director, Debt Advisory
+1 713-357-9447
bill.getz@englandco.com

Kiat Tan
Managing Director
+65 6990-3422
ktan@englandco.com

Erik Augustson
Senior Vice President
+1 202-386-6505
eaugustson@englandco.com

www.englandco.com