Engineering Services

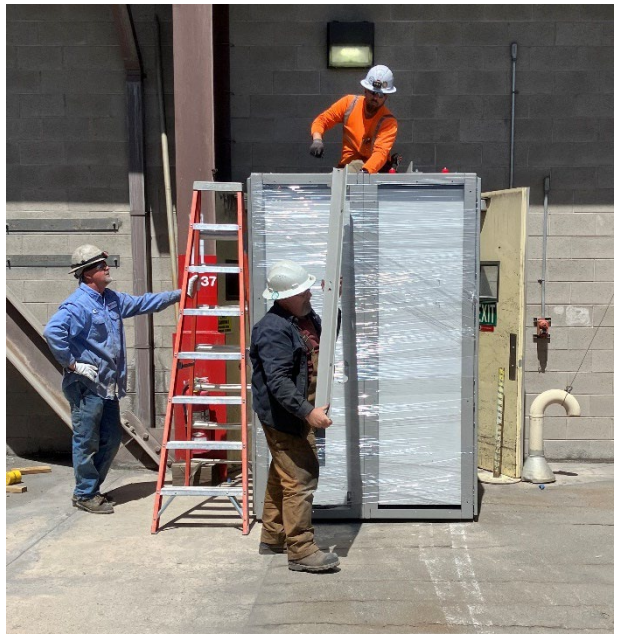
Basler Services has provided reliable, customer-focused turnkey engineering solutions to the power industry for almost forty years.

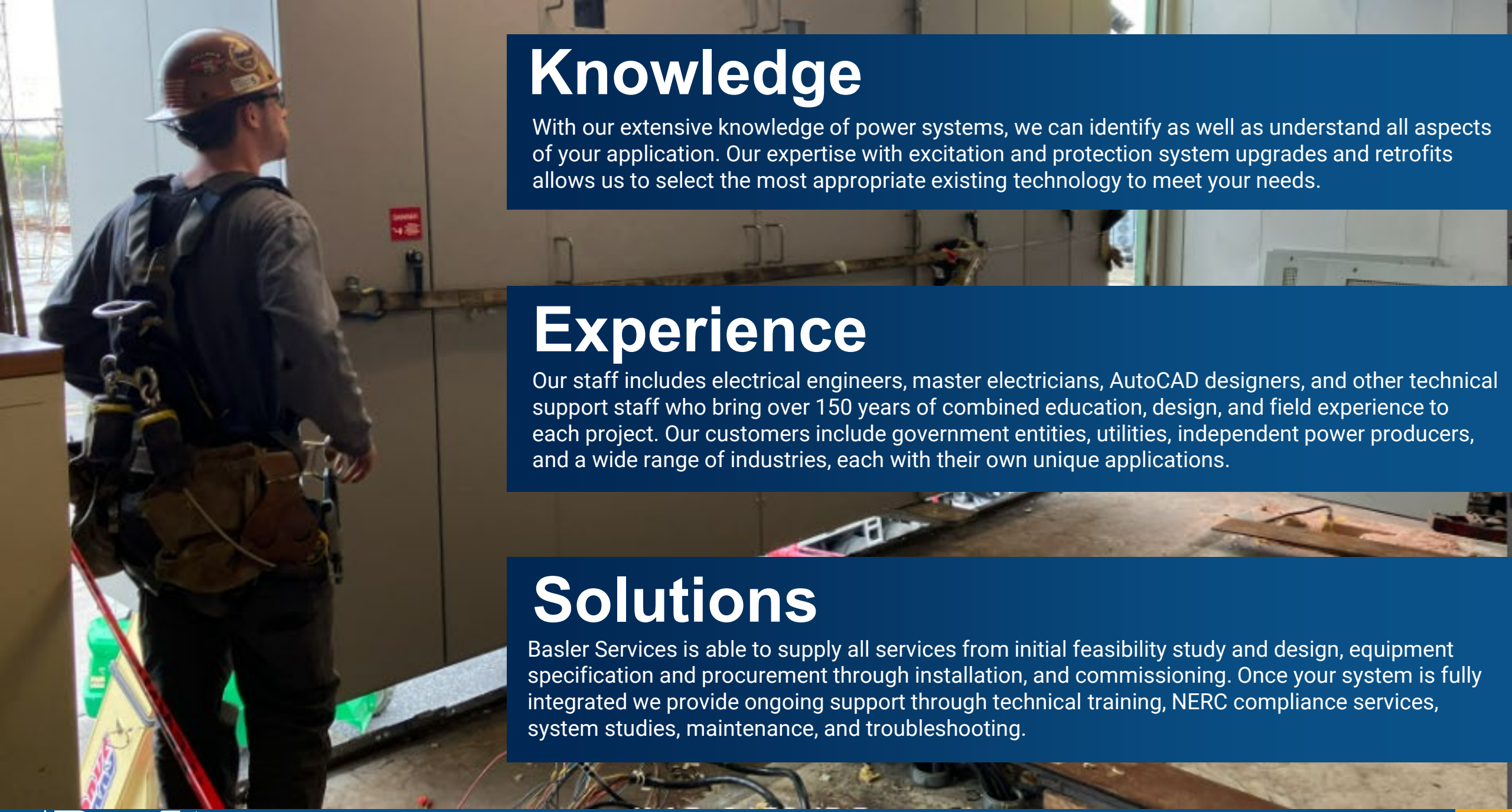
Basler Now Part of Littelfuse

History of Basler Services

Basler Services was formed through the strategic acquisition of E² Power Systems by Basler Electric in 2017, bridging the gap between product manufacturing and engineering services to deliver end-to-end solutions for the power industry.

Today, we stand as a leading full-service electrical engineering and field services partner. From small-scale upgrades to major installations, our engineers and technicians bring deep system knowledge and an unyielding commitment to customer service to every project.





Knowledge

With our extensive knowledge of power systems, we can identify as well as understand all aspects of your application. Our expertise with excitation and protection system upgrades and retrofits allows us to select the most appropriate existing technology to meet your needs.

Experience

Our staff includes electrical engineers, master electricians, AutoCAD designers, and other technical support staff who bring over 150 years of combined education, design, and field experience to each project. Our customers include government entities, utilities, independent power producers, and a wide range of industries, each with their own unique applications.

Solutions

Basler Services is able to supply all services from initial feasibility study and design, equipment specification and procurement through installation, and commissioning. Once your system is fully integrated we provide ongoing support through technical training, NERC compliance services, system studies, maintenance, and troubleshooting.

Engineering Services

Excitation and Relay Protection Systems

Basler Services has a number of offerings that can be tailored to meet your project needs, including fully engineered turnkey solutions. We are happy to discuss and consult on any opportunities you may have.

Standard Engineering Services

- Protection System Upgrades & Coordination Studies
- Excitation System Upgrades
- System Integration and Design
- Maintenance and Testing
- NERC Compliance Testing
- Onsite Technical Direction
- Technical Training
- Startup & Commissioning
- Field Service Troubleshooting Support

Standard Engineering Service Table

Excitation and Relay Protection Service Offerings

Standard Packages	Standard Services											
	Site Design Visit	Equipment Design & Procurement	Factory Acceptance & Witness Testing	Site-Specific Design Drawings	Redline of Existing Customer Drawings	Recommend Spares or Replace Parts	Demo & Install	Onsite Technical Direction	Commissioning	Modeling & Validation	Training	Project Closeout Package
Full Engineering Turnkey Package	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Optional	Yes	Yes
Engineering Design Package	Yes	Yes	Yes	Yes	Yes	Yes	Optional	Optional	Yes	Optional	Optional	Yes
ECS2100 to DECS-2100 Life Extension Retrofit	Yes	Yes		Optional	Yes	Yes	Optional	Optional	Yes	Optional	Optional	Yes
DECS Controller Upgrade	Optional	Yes			Yes	Yes	Optional	Optional	Yes	Optional	Optional	Yes
System Startup									Yes	Optional	Optional	Yes
NERC Compliance										Yes		Yes
Preventative Maintenance						Yes			Yes			Yes
Onsite Troubleshooting						Yes					Optional	Optional

Excitation System Upgrades

Retrofit Experience

Our engineering and installation experts have upgraded hundreds of aging exciters with new systems or digital front-end controls. These systems are customized to reduce project complexity, matching existing terminal locations, existing bus duct entry, system footprint, etc. Retrofit applications include synchronous motor, steam, hydro, and combustion turbine units as well as generators with reciprocating internal combustion engines as the prime mover.

We have retrofit experience related to excitation on all the major turbine/generator sets of 1960s–2000s, such as the GE Frame 5/6/7/9, the Westinghouse W251/W501, and the GE LM2500/LM5000.

Digital Front End

Front-end retrofit kits replace the legacy voltage regulator, leaving the power stage in place. These kits feature Basler Electric's DECS-450 and ECM-2 controllers. They may also include auxiliary pan chassis to house firing control modules, relays, fuses, and other supporting components.

Typical System Features

- Single, redundant, or supervisory AVR control schemes
- Single, redundant, or parallel 6-SCR bridge rectifiers for systems up to 10,000 Adc of field current
- Redundant bridge rectifier cooling
- Field isolation transducers
- Field discharge resistor
- De-excitation and crowbar hardware
- BCM-2 bridge control module(s)
- AC power disconnect (breaker or switch)
- Field flashing contactor and resistors
- Touchscreen HMI
- Field ground detection
- I/O expansion modules
- Power system stabilizer
- Auto-synchronizer
- Protective relays

Excitation System Upgrades

Retrofit Experience

- ABB Unitrol Family
- Allis Chalmers REGULEX
- Alstom (P320)
- Andritz
- Basler Electric DECS-200/200N
- Basler Electric DECS-300/400
- Basler Electric ECS2100
- Basler Electric SSE/SSE-N
- BRUSH MAVR
- BRUSH PRISMIC Family
- EM Regulators
- EMD Vickers
- Emerson/TCSA DGC
- GE 3GFA Regulator
- GE 3S7930SA Regulator
- GE ALTERREX
- GE ALTHYREX
- GE AMPLIDYNE
- GE BUS FED/Potential Source
- GE DS3820 Regulator
- GE EX2000 (Static and AVR)
- GE EX2100 (Static and AVR)
- GE GENERREX
- GE SCT-PPT
- GE SHUNT SCR
- GE Silco
- Siemens
- Siemens RG3
- Westinghouse MGR
- Westinghouse PRX
- Westinghouse WDR2000
- Westinghouse WTA-300/B
- Westinghouse/Cutler-Hammer ECS2100

Excitation System Upgrades

GE SILCO to DECS-2100

Excitation System Upgrades

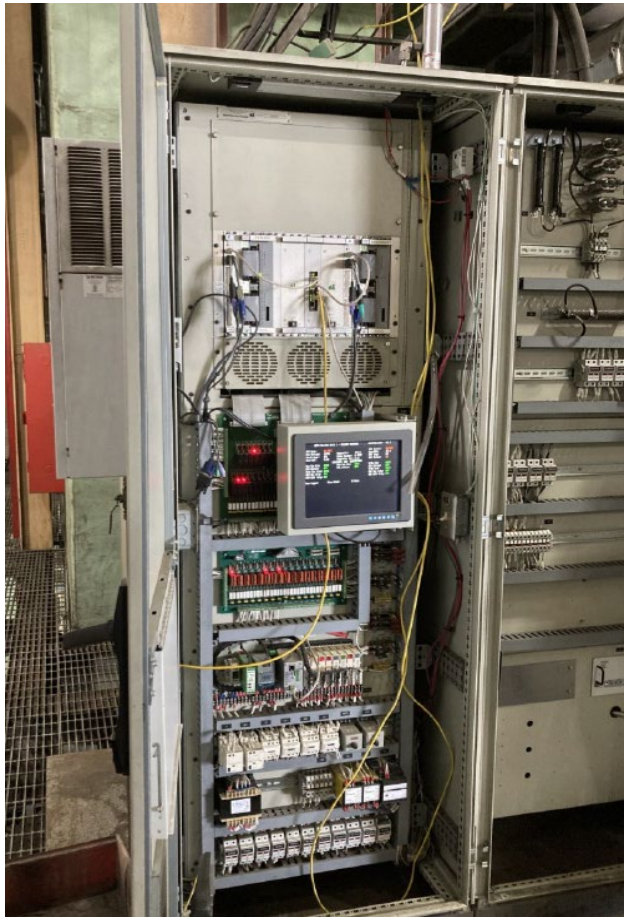
Westinghouse WDR2000 to DECS-2100

Excitation System Upgrades

ABB Unitrol F to DECS-450

Excitation System Upgrades

Emerson DGC to DECS-2100 Digital Front End upgrade



Emerson DGC

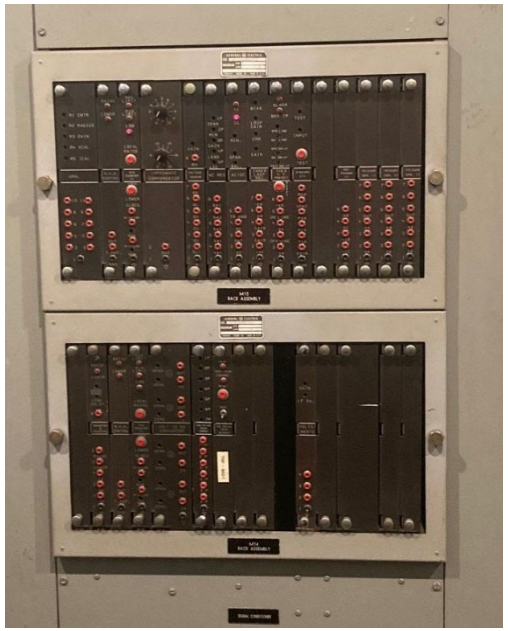
DECS-2100 expansion modules and display

DECS-2100 ECM-2 Control Panel

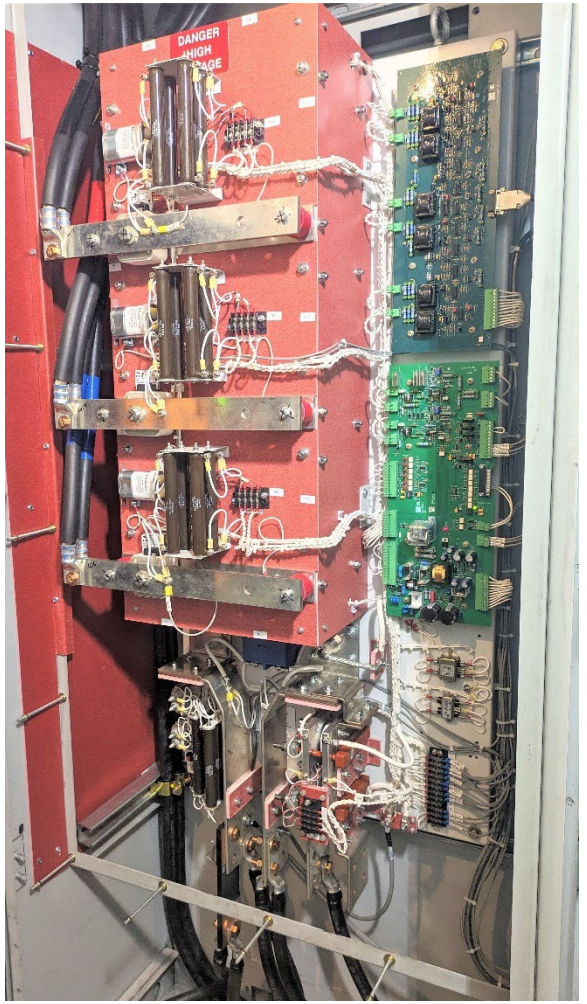
Excitation System Upgrades

GE Busfed to DECS-450 retrofit in existing enclosure

Old Busfed Power Stage



Old Busfed Control Panel

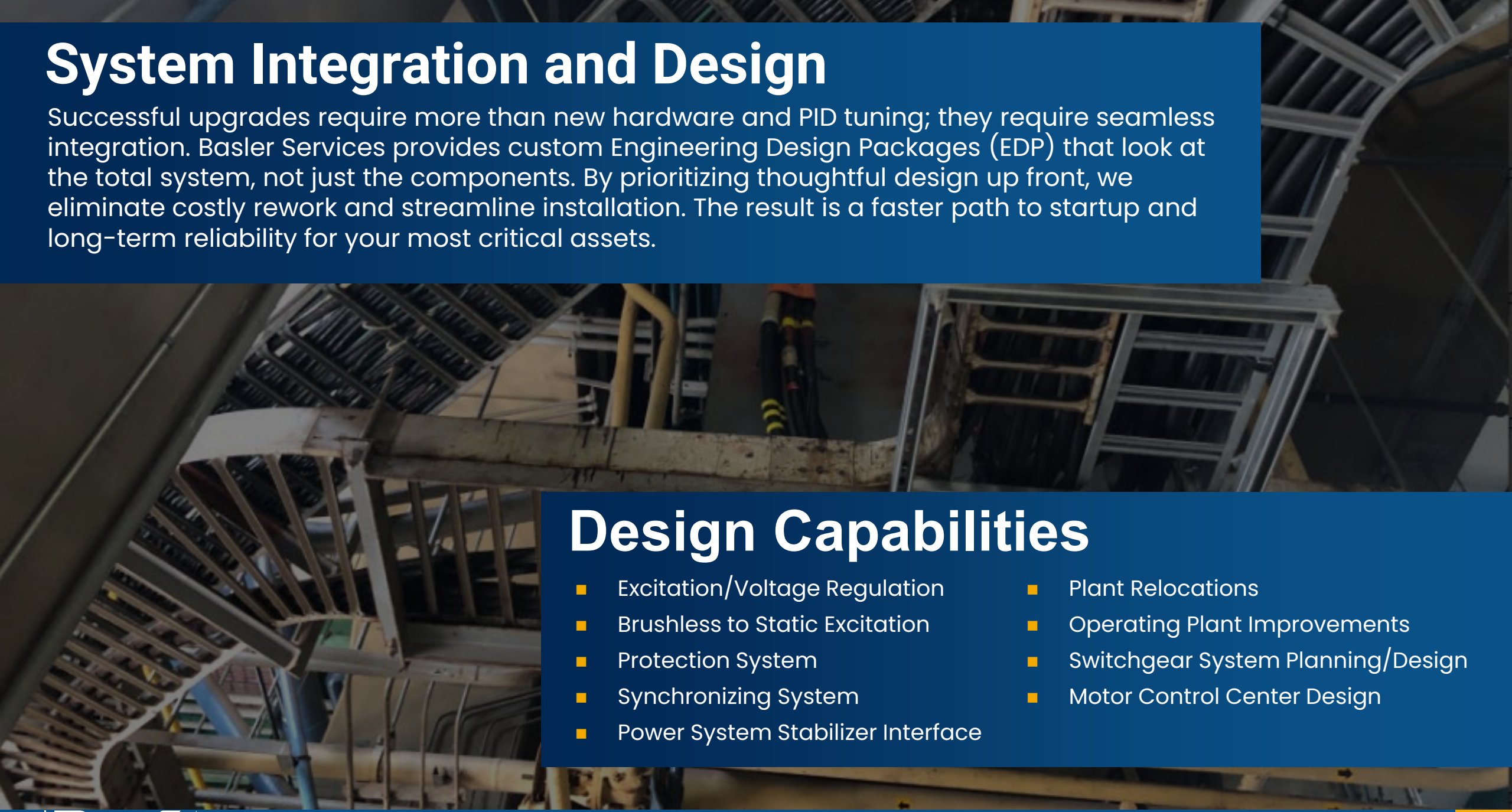


New SSE-N Power Stage

DECS-450 with IDP-801 touchscreen controls

System Integration and Design

Successful upgrades require more than new hardware and PID tuning; they require seamless integration. Basler Services provides custom Engineering Design Packages (EDP) that look at the total system, not just the components. By prioritizing thoughtful design up front, we eliminate costly rework and streamline installation. The result is a faster path to startup and long-term reliability for your most critical assets.



Design Capabilities

- Excitation/Voltage Regulation
- Brushless to Static Excitation
- Protection System
- Synchronizing System
- Power System Stabilizer Interface
- Plant Relocations
- Operating Plant Improvements
- Switchgear System Planning/Design
- Motor Control Center Design

System Maintenance & Testing

Implementing a periodic maintenance and test program is a great way to increase uptime. Basler Services can implement a custom maintenance plan for your system or fleet, increasing the likelihood of catching problems before they cause an unplanned outage.

Standard Tests & Checks

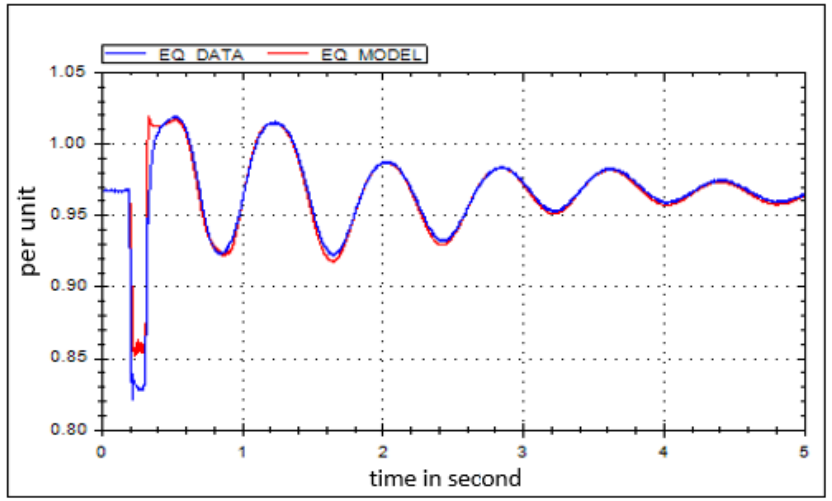
- Inspection & Cleaning
- Unit Trip Tests
- Breaker Electrical Checks
- Field Load Simulation Testing
- Relay Testing and Calibration
- Excitation System Tune-Ups
- Limiter Functionality Checks
- Thermal Imaging of Power Circuit
- Component Replacement
- Synchronizer Adjustment
- Control Sequence Checks
- Excitation (PPT) Transformer Testing
- Sensing Transformer Testing
- Generator Insulation Testing
- Neutral Grounding Transformer Testing
- Metering Validation and Calibration
- Simulation & Operational Testing
- Power Rectifier Bridge Verification Testing
- Spare Part Recommendations

NERC Compliance

Modeling and Reporting

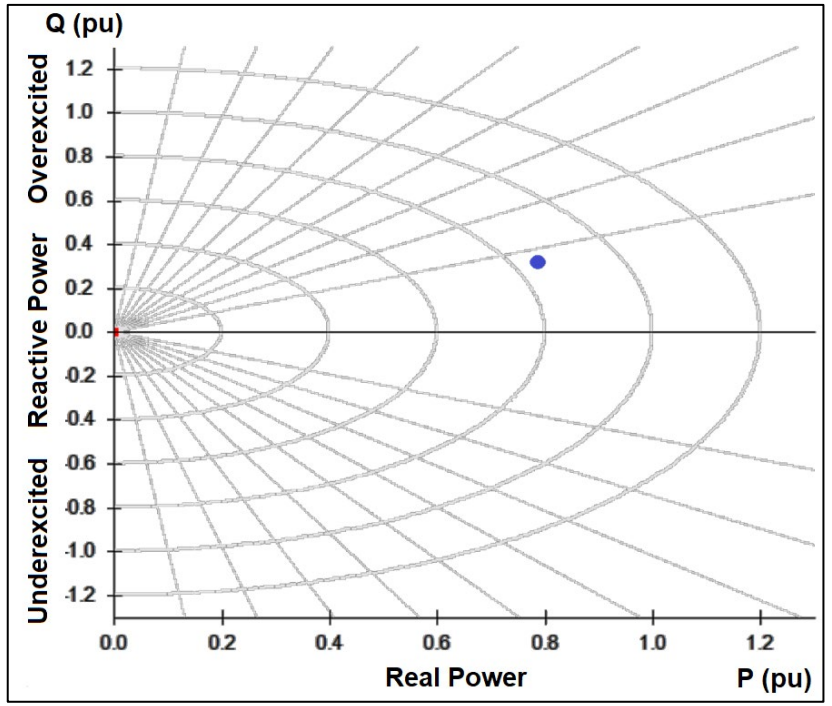
NERC was established to create standards to help ensure the reliability of the bulk electric power system in North America. The NERC standards provide requirements for reporting machine availability, performance, system testing, and periodic validation of machine models.

Basler Services provides NERC compliance testing of generator control, protection, and excitation systems. Typical standards include MOD-25, PSS, MOD-26, MOD-27, PRC-19, PRC-24, etc.



NERC Compliance Services

- Excitation control system and generator modeling
- Onsite testing and verification of your systems
- Remote testing and data collection support
- Compilation of data and modeling information
- Confirmation on the proper operation of equipment
- Calibration testing of protective relays
- Tuning and testing of the Power System Stabilizer (PSS)
- Final report including short- and long-term recommendations and report prep for submittal to NERC

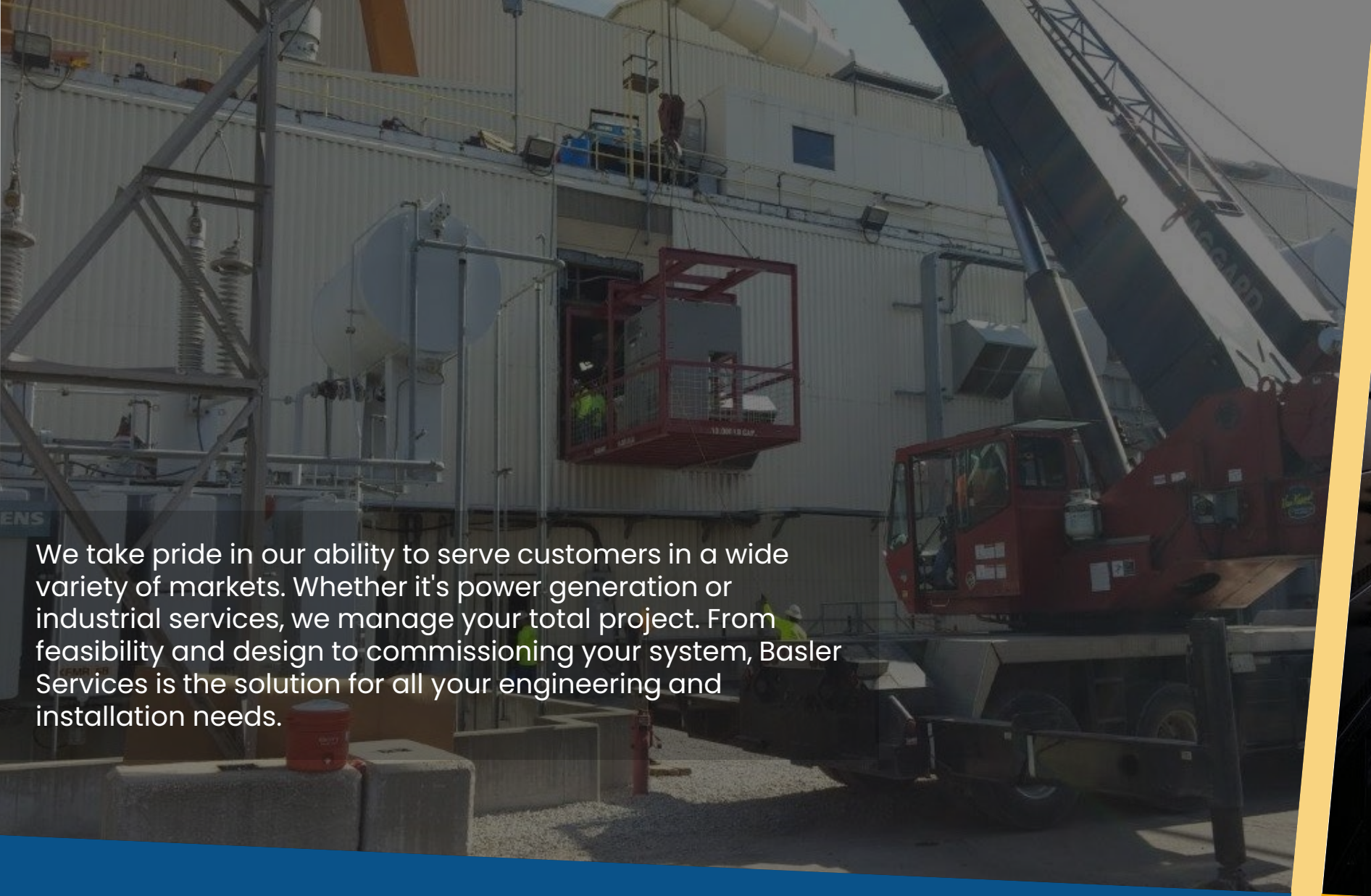


Protection System Upgrades

Reliable power starts with a robust protection system. Basler Services has years of design and field experience necessary to upgrade your protection system or to replace existing protective relays of any brand. Because hardware is only as effective as the settings behind it, we can conduct comprehensive Relay Coordination Studies on your project. Whether you are driven by aging infrastructure, functionality gaps, or the need for enhanced safety, we ensure your equipment operates with predictable, fail-safe precision

Advantages of upgrading protection

- Improved system protection and flexibility
- Cost savings from reduced annual maintenance and calibration testing
- Availability of more functions
- Smaller units for panel or rack mount
- Digital displays with real-time metering and system monitoring
- Communication for metering, alarms, and fault data when monitoring from remote locations
- Reduced replacement costs



We take pride in our ability to serve customers in a wide variety of markets. Whether it's power generation or industrial services, we manage your total project. From feasibility and design to commissioning your system, Basler Services is the solution for all your engineering and installation needs.

Basler® Now Part of Littelfuse®

8115 Shaffer Parkway,
Littleton, Colorado 80127
(303) 378-2244 • Services@basler.com

www.basler.com