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PuP	##	Liquids	GEA Heat Exchangers for Pulp and Paper
PuP	##	Liquids	GEA Collaboration to Improve Microfibrillated Cellulose Process
PuP	##	Liquids	Nederman Filter Media and Filters for P&P
PuP	##	Liquids	Pall Filters for Bleaching and Paper Machines
PuP	##	Liquids	Samson Valves to Control Fibrous Flow
PuP	##	Liquids	Solenis Chemicals for P&P
PuP	##	Liquids	Spray Controllers Optimize Automatic Nozzle Performance
PuP	##	Liquids	Spraying Systems PulaJet Manifold for Precision Spray Control Applications
PuP	##	Liquids	Sulzer, Recycled Fiber Line, Paper Machine, Water, and Power
PuP	##	Liquids	Sulzer - Pumps and Mixers for Pulp and Paper
PuP	##	Liquids	Sulzer Chemical Recovery and Mechanical Pulp Lines
PuP	##	Liquids	Xylem Ozone Systems for Bleaching and Wastewater
PuP	##	Liquids	Xylem Ozone Systems in Use at Fibria
PuP	##	Liquids	Wisconsin Rapids Mill Uses Xylem Underdrains and Media Retainers
PuP	##	Liquids	Xylem Cross Flow Membranes Used in Multiple P&P Applications
PuP	##	Liquids	Filtration group Clear Edge Synthetic, Spiral, and Metal Belts and Cloths for Pulp and Paper
PuP	##	Liquids	Valmet Disc Filter Bags
PuP	##	Liquids	Valmet Pulp Dewatering Wires and Fabrics
PuP	##	Gases	Examples of Emission Processes and Suppliers
PuP	##	Gases	Festo Controls and Emin Ledier
PuP	##	Gases	Filtration Group (Purafil) Air Filtration for Corrosion Protection
PuP	##	Gases	Freudenberg Supplies Pellets for Air Contaminants
PuP	##	Gases	GE Turbine Control System for Recovery Boiler
PuP	##	Gases	GE Precipitators and Scrubbers in Pulp and Paper
PuP	##	Gases	Stora Enso Ventilation Improvement with TM Systems
PuP	##	Gases	IVI Turnkey Ventilation Systems for Converters
PuP	##	Powders	Powders
PuP	##	Powders	Clyde Bergemann Material Handling in P&P
PuP	##	Powders	Kason - Wood Preparation Screens
PuP	##	Powders	Kason Screens - Cooking Liquor
PuP	##	Powders	Kason Screens - Fiber Recovery
PuP	##	Powders	Kopar Conveying Mill Powders and Combustion Ash
PuP	##	Powders	KWS Conveyors, Feeders, Bins
PuP	##	Powders	Pulp & Paper Empowering IIoT with IIoW
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GsT	2	Markets	Gas Turbine, Reciprocating Engine IIoT & Remote Markets for Components
GsT	3	Markets	IIoT is Creating New Market Paths to the \$100 Billion Gas turbine Repair, Replace and Service Market
GsT	4	Markets	Market Segmentation by Major Component
GsT	5	Markets	Valves and Pumps Lead Component Purchases
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GsT	8	Markets	Gas Turbine Opportunities for Valve Companies Shaped by IIoT
GsT	9	Markets	Multiple Gas Turbine Valve Purchasers with IIoT
GsT	10	Markets	Inlet air Filter Monitoring can be Combined with Digitized Sourcing Programs
GsT	11	Support Program	Gas Turbine Product and services Enhanced by IIoT
GsT	12	Support Program	This Program will Help you Make the Paradigm Shift caused by IIoT and Remote Monitoring
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GsT	17	Support Program	IIoT and Remote O&M Programs Allow the Large Owners to Coordinate Operations Across the Fleet
GsT	18	Support Program	Lots of Data Relative to each Component has to be Gathered in a Digital Process Management Program
GsT	19	Support Program	Operating ZLD Systems from McIlvaine GTCC Supplier Program
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GsT	22	Software	ABB Symphony Plus DCS for Collection and Analysis of Plant Data
GsT	23	Software	Schneider Electric iios Providing Comprehensive Services for Power Plants
GsT	24	Software	C31oT Platforms Used at all 24 ENGIE Business Units
GsT	25	Software	AECC Replaces CEMS with Predictive System for Seven Gas Turbines
GsT	26	Third Party O&M	Turbine Services Supports Sites with Different Make Turbines
GsT	27	Third Party O&M	ProEnergy is One of Many Third Party O&M Firms and the Trend is Accelerating
GsT	28	Third Party O&M	IHI has Flexible Suite of O&M Services
GsT	29	Third Party O&M	NRG Energy Services can Provide Digital Process Management and Remote Monitoring of its Own a
GsT	30	Third Party O&M	NRG Energy Services Providing O&M to Golden Spread for Two Large Gas Turbine Plants
GsT	31	Third Party O&M	Wood
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GsT	33	Remote Monitoring	Remote O&M, Data Analytics and Subject Matter Experts
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GsT	35	Remote Monitoring	Ethos Energy Operates Monitoring and diagnostic Center
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GsT	40	Remote Monitoring	MHPS Supplies records of Daily Activity and Insights on Performance and Availability
GsT	41	Remote Monitoring	Parker has Condition Monitoring for Gas Turbines
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T	0	OIL AND GAS
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OIL	2	Oil and Gas IIoT and Remote O&M Expenditures will Rise from \$31 billion this Year to \$168 billion in
OIL	3	IIoT and Remote O&M - Oil and Gas - \$ billions
OIL	4	IIoT and Remote O&M will Boost Sales to the Oil and Gas Industry by \$13 billion this year
OIL	5	\$31 billion Opportunity this Year
OIL	6	Oil and Gas IIoT needs to be Empowered by IIoW
OIL	7	Organizing IIoW to the Same Degree as IIoT
OIL	8	Mcilvaine Valve Decision Guides for Oil & Gas are another Tool to Empower IIoT with IIoW
OIL	9	Oil and Gas
OIL	10	\$168 billion Oil and Gas IIoT & Remote O&M Market by 2030
OIL	11	Capex Expenditures vary from \$700 billion to \$1 trillion
OIL	12	Price and Other Assumptions in the Forecast
OIL	13	Oil Production
OIL	14	U.S. Natural Gas Production Growth is the Result of Continued Development of Shale Gas and Tight
OIL	15	U.S. LNG Export Levels Vary Across Cases and Reflect both the Level of Global Demand-
OIL	16	IIoT will be Utilized to Meet New Regulations
OIL	17	Software Honeywell Software and Dover Energy Domain Knowledge are being Leveraged in O&G
OIL	18	Software Emission Control Collaboration between Aereon and Honeywell
OIL	19	Software Schneider Electric Software Suite
OIL	20	Software Schneider Electric
OIL	21	Software Implico Automating the Complete Supply Chain

OIL	22	Software	Standardized Automation Systems
OIL	23	Software	Ways to Reduce Automation Costs
OIL	24	Software	Reduce Customization and Complexity
OIL	25	Software	RTI is one of the Companies Contributing to the Use of IIoT According to Survey
OIL	26	Software	RTS's Approaches to Utilizing IIoW in Oil and Gas including Five Contributions
OIL	27	Software	RTI- Automating Remote Operations
OIL	28	Software	RTI - Enable Massive Data Collection
OIL	29	Software	RTI - Integrating Analytics
OIL	30	Software	RTI - Securing Operations
OIL	31	Software	Replacing Specialized Software with Internet Platforms
OIL	32	Software	Open process Automation Forum
OIL	33	Wireless	Wireless Invaluable for Remote Facilities (Siemens)
OIL	34	Wireless	Siemens Wireless in Gulf of Mexico
OIL	35	Wireless	Siemens RUGGEDCOM Designed for Harsh Environments
OIL	36	Condition Monitoring	Shell Ormen Lange Provides Condition Monitoring for all Moving Components
OIL	37	Condition Monitoring	Condition Monitoring of the 41 most Critical Shutdown Isolation Valves
OIL	38	Condition Monitoring	Leaks Detected with Acoustic Emission Sensors
OIL	39	Condition Monitoring	Challenge with Very Large Valves and High Pressures
OIL	40	Condition Monitoring	Data is Captured and Utilized within and without the Shell Network
OIL	41	Condition Monitoring	Hortonworks Supplying Big Data Technologies to Noble Energy and Centrica
OIL	42	Condition Monitoring	Rotork Wireless Valve Monitors for Oil and Gas Remote Locations Facilitate Preventive Maintenance
OIL	43	Compressor IIoT	BHP Billiton and L&T Infotech Develop Method to Anticipate Compressor Problems
OIL	44	Compressor IIoT	Logilube Compressor Condition Monitoring
OIL	45	Compressor IIoT	RoviSys Provides Compressor Monitoring System to Columbia Pipeline
OIL	46	Compressor IIoT	Detecting and Reacting to Problems such as Caustic Fumes Arundo
OIL	47	Compressor IIoT	SKF Condition Monitoring for Reciprocating Compressors
OIL	48	Compressor IIoT	GE Bently Nevada Detects Dry Seal Problems
OIL	49	Compressor IIoT	KOC Deals with Problems by Close Monitoring with Bentley Nevada System 1

T	0		POWER PLANTS
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POW	1		Power - \$ billions
POW	2	Digital Data Generation Plants	\$125 billion/yr. Power Plant IoT Instrumentation, Software, and Service Opportunity
POW	3	Digital Data Generation Plants	Smart Instrumentation
POW	4	Digital Data Generation Plants	Component Monitoring in Power Plants
POW	5	Digital Data Generation Plants	Remote Monitoring
POW	6	Digital Data Generation Plants	Remote O&M, Data Analytics and Subject Matter Experts
POW	7	Digital Data Generation Plants	AEP Monitoring with IBM Maximo and Siemens PrismMoni
POW	8	Digital Data Generation Plants	GE says Software Improvements can Reduce CO2 by 1.5 Percent
POW	9	Digital Data Generation Plants	ABB Symphony Plus DCS for Collection and Analysis of Plant Data
POW	10	Digital Data Generation Plants	MHPS Supplies Records of Daily Activity and Insights on Performance and Availability
POW	11	Digital Data Generation Plants	NeuCo, Now Part Of GE Power Digital
POW	12	Digital Data Generation Plants	Schneider Electric is Providing Comprehensive Services for Power Plants
POW	13	Digital Data Generation Plants	Bit Stew Systems Integrates Data from 2 million BC Hydro Smart Meters
POW	14	Digital Data Generation Plants	NVEnergy mPowered Program

POW	15	Digital Data Generation Plants	C3IoT Platforms Used at all 24 ENGIE Business Units
POW	16	Coal Fired Power	SKF Services for Coal Fired Power Plants
POW	17	Coal Fired Power	Boiler Optimization
POW	18	Coal Fired Power	NeuCo's CombustionOpt
POW	19	Coal Fired Power	NeuCo's SootOpt
POW	20	Coal Fired Power	Standardize to Improve Fleet Performance
POW	21	Coal Fired Power	NOx Reduction with Emerson Ovation at Midwest Power Plant
POW	22	Coal Fired Power	Combustion Optimization Module Interaction
POW	23	Coal Fired Power	Laser-based Sensors for Real-time Combustion Optimization
POW	24	Coal Fired Power	Combustion Optimization Dampers and Controls
POW	25	Coal Fired Power	Optimizer Signal Transfer to DCS
POW	26	Coal Fired Power	Reduced O2 for Improved Boiler Efficiency
POW	27	Coal Fired Power	Luminant Remote Monitoring, Modeling and Diagnostics Center
POW	28	Coal Fired Power	Luminant RMC Solves Bearing Rub Problem
POW	29	Coal Fired Power	POC Solves Fan Bearing Problem
POW	30	Coal Fired Power	Cooling Water Pumps Optimized in Cool Weather by POC
POW	31	Coal Fired Power	Air Heater Lube Oil Problem Detected and Solved by POC
POW	32	Coal Fired Power	Pulverizer Lube Oil Problem Identified and Solved by POC
POW	33	Coal Fired Power	Primary Air Fan Lube Problem Identified and Solved by POC
POW	34	Coal Fired Power	Pulverizer Mill Bearing Problem Identified and Solved by POC
POW	35	Coal Fired Power	Luminant Technical Center Lubricant Analysis Workshop
POW	36	Gas Turbine	Gas Turbine and Reciprocating Engine IIoT and Remote Markets for Components
POW	37	Gas Turbine	Parker has Condition Monitoring for Gas Turbines
POW	38	Gas Turbine	Parker Condition Monitoring for Gas Turbines
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POW	41	Gas Turbine	IHI Remote Monitoring Center for Gas Turbines
POW	42	Gas Turbine	Turbine Services Supports Sites with Different Make Turbines
POW	43	Nuclear	Duke Nuclear Using Schneider Electric, PRISM, APR to Monitor Rotating Equipment
POW	44	Renewable Energy	Schneider Electric Using Microsoft for Solar Azure Cloud Platform
POW	45	Renewable Energy	SKF Supplies Remote Monitoring for Marine and Offshore Wind Facilities
POW	46	Generators	JS Power Uses Netbiter for Cloud Control of Backup Power Generators