

Opportunities for Specific Companies

Cooperation among divisions, geographies, and job functions is key to the success of IIoT and it adds the empowering IIoW. Here are some examples of how or why this collaboration is desirable.



Rate of Success = 1 x IIoT + 2 x IIoW

Success for any participant depends more on new ways to develop and utilize subject matter expertise than IIoT. McIlvaine coined the term IIoW (Industrial Internet of Wisdom) to cover the systematic leveraging of subject matter expertise.

Type	IIoT	IIoW
Data	Physical parameters and status of each component	Google, blogs, news (McIlvaine intelligence systems)
Information	Historian, Edge Computing, SCADA	Papers, presentations, magazines, conferences (McIlvaine newsletters and InterWebViews™)
Knowledge	PLC, Data Analytics Remote monitoring with alarm system	Association white papers, structured LinkedIn discussion groups (McIlvaine Knowledge systems)
Wisdom	Digitally powered process management	Leveraging subject matter expertise by plant, industry, product, process, and niche expert (McIlvaine coordinates niche experts and wise crowd insights and has coordination systems for companies to connect individuals in disparate divisions, job functions, and geographies)

Some Companies with Deep Involvement already covered in the report

Company	Involvement
ABB	DCS, drives, inverters, substations, motors but also remote monitoring solutions such as Goliath offshore platform
Accenture (Genpact would be similar)	Offers consulting but also cloud based platforms and outsourcing programs
Evoqua	Wide range of water treatment equipment and world wide service
Flowserve	Has the pumps, valves, wisdom and IIoT collaboration with Honeywell
Grundfos	Major pump supplier with strong focus on smart pumps at IIoT
Kurita	Already has remote monitoring and can supply the treatment chemicals
MHPS	Has remote monitoring center in the Philippines and the power generation equipment, pumps, and many other components
Mann & Hummel	Has an IIoT research center in Singapore and is a major filter supplier
Schneider Electric	Has lots of hardware and software but can integrate Invensys for Wisdom
Xylem	Has treat, transport, and test. So it has the hardware and instruments plus Wisdom in the water sector

Berkshire Hathaway

Group	Importance
BHE (MidAmerican, NV Energy, PacifiCorp)	7% of U.S. power generation - coal, gas, wind solar, hydro and biomass
BHE Renewables	Renewables in the U.S. and other countries
BHE Pipeline	Two gas transmission companies providing more than 6% of U.S. gas
Johns Manville	Insulation for power plants and other industrial facilities
Marmon Filtration	Filters for power plants, industrial, and commercial
Intelligent Energy Solutions (IES)	Cloud based service solutions for retail energy and others
Mcilvaine has a Decision System for the power plants with details on each plant and the synergies in equipment. Nine hours of webinars proved the value of wise crowd initiatives. IES could be the foundation of IIoT for the corporation. More details are found at 4S01 Berkshire Hathaway Energy Supplier and Utility Connect	

ADA-ES

Group	Importance
Bulk Handling Equipment	Monitor bulk flow remotely
Direct Sorbent Injection	Monitor SO2 removal performance, reagent consumption and provide inventory and supply along with a lime supplier
CEMS Reliability	Monitor CEMS data simultaneously with CEMS provider and user and offer niche expert advice
Activated Carbon Injection	Remotely monitor and control activated carbon injection for mercury control
Monitor Mercury in the Coal	Determine bromine injection at the mine for future shipments of coal
Determine Calcium Bromide Injection Rates in the Boiler	Remote monitoring and work with companies such as Chemtura to supply chemical on demand

Berendsen

Group	Importance
Eleven cleanroom laundries in Europe with supply of consumables as well as laundered garments	Cleanroom garments, clogs, goggles, mats and other accessories to cleaning concepts, logistics solutions and even taking over the customer's internal logistics processes.
Remote O&M	Already supplying consumables and can expand to monitoring air quality and filter health and then supply filters
Collaboration	Could collaborate with Freudenberg
Systems at eleven laundries	Remote monitoring of air and water quality in the eleven facilities but expand to do the same for customers

Braden

Group	Importance
Gas Turbine Auxiliaries	The company supplies new equipment and consumables for air treatment and emissions from gas turbines.
Inlet Turbine Filter Elements	Monitor pressure drop across filters and supply a maintenance program to replace
Lubrication and Other Filters	Provide lubrication monitoring and replacement of filters as needed
Emission Control CEMS	Monitor CEMS but share data from suppliers such as ThermoFisher so that both can review it
Emission Control Catalyst	Provide catalyst replacement program based on CEMS data
Urea Supply	Work with Yara who has remote monitoring and supply on demand for urea for the SCR
Dampers and Valves	Remote health monitoring
Noise Suppression	Remote monitoring

Colfax

Group	Importance
Howden Fans and Compressors	Already supplying remote condition monitoring. So this activity can be leveraged
Howden Rotary Heat Exchanger	Important to control this piece of equipment remotely in power plants and refineries
Colfax Pumps	A number of independent pump acquisitions can collaborate as part of IIoT programs . The involvement in lubrication pumps means synergy with fans and compressors but also widespread usage through out the plant and the desirability of remote monitoring and O&M
Howden Gyrol SRE Fluid Drives	Fluid drives are the key to energy efficiency in IIoT programs
Howden South Africa Air Pollution Control	Can integrate Howden fans for complete solutions in power plant and industrial air pollution control with scrubbers and fabric filters. IIoT and condition monitoring will be components of remote O&M

Emerson

Group	Importance
Emerson Valve & Pump Connected Service	Valves and pumps are the soldiers in the IIoT campaign. The acquisition of Pentair Tyco can be much smoother if both groups are sharing a common remote O&M campaign
Plantweb, Integrated Industrial IoT platform with Azure Cloud	Large orders e.g. big LNG contract and lots of power plant opportunities
Optimization Systems	Used by power plants. See Jeff Williams presentation in Mcilvaine Pacific Corp webinar which demonstrates Wisdom (IIoW)
Remote Monitoring	Emerson Solutions Center in Aberdeen, Scotland serves as an iOps control center for 20 North Sea platforms that Emerson monitors for oil and gas customers.
Leveraging Interconnections	Tyco valve has rugged valve for lower maintenance on oil platforms where access is difficult. So there is a chance both to monitor and replace on an O&M contract basis
Instrumentation for Automation	Daniel , Micro Motion , Rosemount Roxar . If valves and pumps are the IIoT soldiers, then instruments are the rifles

Freudenberg

Group	Importance
Freudenberg FIT	Provides digital process management and outsourcing services and can incorporate efforts of the product divisions
Filterair Air Filtration	Monitor health of gas turbine inlet filters and other air filters
Viledon Wastewater Treatment	Monitor health and performance of separators and filters
Vileda	Mops, wipes, disinfectants and robotic floor sweeper with wireless input. So, outsourcing and inventory management of consumables
Eagle Burgmann Seals	Monitor seal condition and set up outsourcing management program
Kluber Lubricants	Cloud based lubricant monitoring for rotating parts along with service and supply of lubricants

There is already a pharma brochure showing the offerings of some of the divisions and how they fit in. But the next step is collaboration and integration with FIT

Honeywell

Group	Importance
Full IIoT Program	Enterprise dashboards, smart collaboration, enterprise history, asset management, operations management, planning and scheduling, predictive analyses
Refining Wisdom	Worlds largest group of refining niche experts with knowledge of all the processes
Training Programs for Customers	Year long programs for refinery engineers – “Wisdom”
Cleanrooms	Sensors and controls and even gloves for controlled environments
Thermal Treatment Automation	Thermal treatment systems as described in Mcilvaine InterWebViews™ Honeywell

Honeywell UOP is the leading candidate to provide O&M services to refineries around the world . But need component wisdom as per molecular sieve switching valve example in Mcilvaine Valve services. UOP has contracted with Mcilvaine for mercury studies but more recently a Mcilvaine mercury investigation for Petronas was unsuccessful. So Petronas funded an R&D project and came up with ionic liquid coatings on pellets for more cost effective mercury removal than activated carbon. IIoW means using the latest technology



I dex

Group	Importance
Smart pumps - I dex Executive	The pumping industry is in the midst of an electronic revolution. ...The notion of unattended pumps running in remote locations, connected to a network that can monitor their performance and regulate their output (based on changing environmental conditions) is no longer a fiction. ... (Smart Pumps) are also increasing their market size with the potential for retrofit opportunities they are creating.”
LMI Pulsafeeder pumps	Innovative Waters is furnishing wireless remote transmitters
ADS LLC	Flow monitoring hardware
Other pump and valve companies	I dex has a number of pump and valve companies operating independently throughout the world. So collaboration around IIoT will be fruitful

M&C Tech

Group	Importance
Extractive Gas Analyses	Supplies sampling train components for coal fired power, cement, and other industries
Work with CEMS suppliers and end users	There are lots of individual items and consumables which are supplied. They can be included in an O&M program supplied by the CEMS provider or someone such as Braden (see previous slide)

OSI Soft

Group	Importance
PI System	Open data infrastructure empowers enterprises in real time, transforming operational data into actionable knowledge and business transformation.
Wind Power Generation	17 of the top 20 wind power generation companies worldwide - integrate enterprise-wide sensor-based real-time data, made possible by the PI System™
Tar Sands	PI System at Suncor SAGD operations
Chemicals	Smart batch monitoring with VBA improves problem identification
Water Utilities	Allows the utility to view its assets in an integrated way, supporting continuous improvement of operations as a whole.

Parker Hannifin

Group	Importance
Thermal Control	Transmitter reveals temperature and differential pressure in pipes and ducts
Clarcor Integration	Inlet filters for gas turbines along with many other filter types to complement Parker. All can be monitored continuously
Clarcor Total Solutions	Parker can expand the activities of this division to supply all the filters in a plant as part of an IIoT filter management program
Parker Condition Monitoring	Expand remote condition monitoring to other parameters
Parker Pumps and Valves	The soldiers of IIoT
Tube Fittings	Sold along with the valves, tubing and thermal control products
Hybrid Actuation Systems	For renewable energy, wastewater treatment for better control

Rexnord

Group	Importance
IloT Smart Gear	Provides network connectivity that allows real-time data monitoring of temperature, vibration and oil quality data via proven industrial strength sensors,
Full Software Program	EtherNet/IP connectivity. Real-time advice, translating data into alerts and recommendations.
Bearings	Can be supported with condition monitoring
VAG	Heavy duty valves for water applications
Mechanical Seals	Can be remotely monitored

