Gas turbine combined cycle plant opportunities for valve companies

By Bob McIlvaine

There are many new gas turbine combined cycle plants (GTCC) under construction and in operation. This represents a market potential of $3.5 billion/yr. for valve suppliers. However, the Industrial Internet of Things (IIoT) is creating a metamorphosis in the route to market and profitability.

Gas turbine owners will spend $2 billion for new valves and $1.5 billion for service and repair of valves in 2017. The Americas and Asia will each spend more than Europe and Africa combined.

Valves for GTCC plants are challenged by the rapid cycling required. Wind and solar are playing an increasing role in power generation but their operations are not constant. As a result, GTCC plants are operated to balance the fluctuating contribution from these other sources. Flow accelerated corrosion and other problems are being addressed but are not necessarily fully resolved.

Valve suppliers realize that revenues and profits are not necessarily directly correlated. Applications can be segmented into general performance and high performance. The route to maximizing profit for general purpose valves has more to do with manufacturing and distribution, whereas maximizing profit for high performance applications has more to do with product performance and application knowledge. The high-performance opportunity represents 50 percent of the revenues but 75 percent of the potential profit.

Smart valves provide a route to increase revenue and profitability. Both on/off and control valves have "smart" capabilities. An on-off valve can be supplied with a controller which is intelligent, having digital communication and a microprocessor capable of on-board diagnostics. The controller can detect deteriorating valve performance. Diagnostics also include high and low temperature monitoring. The on-off valve diagnostics make it possible to more accurately predict the need for maintenance based on how hard the valve is working and how it is performing.

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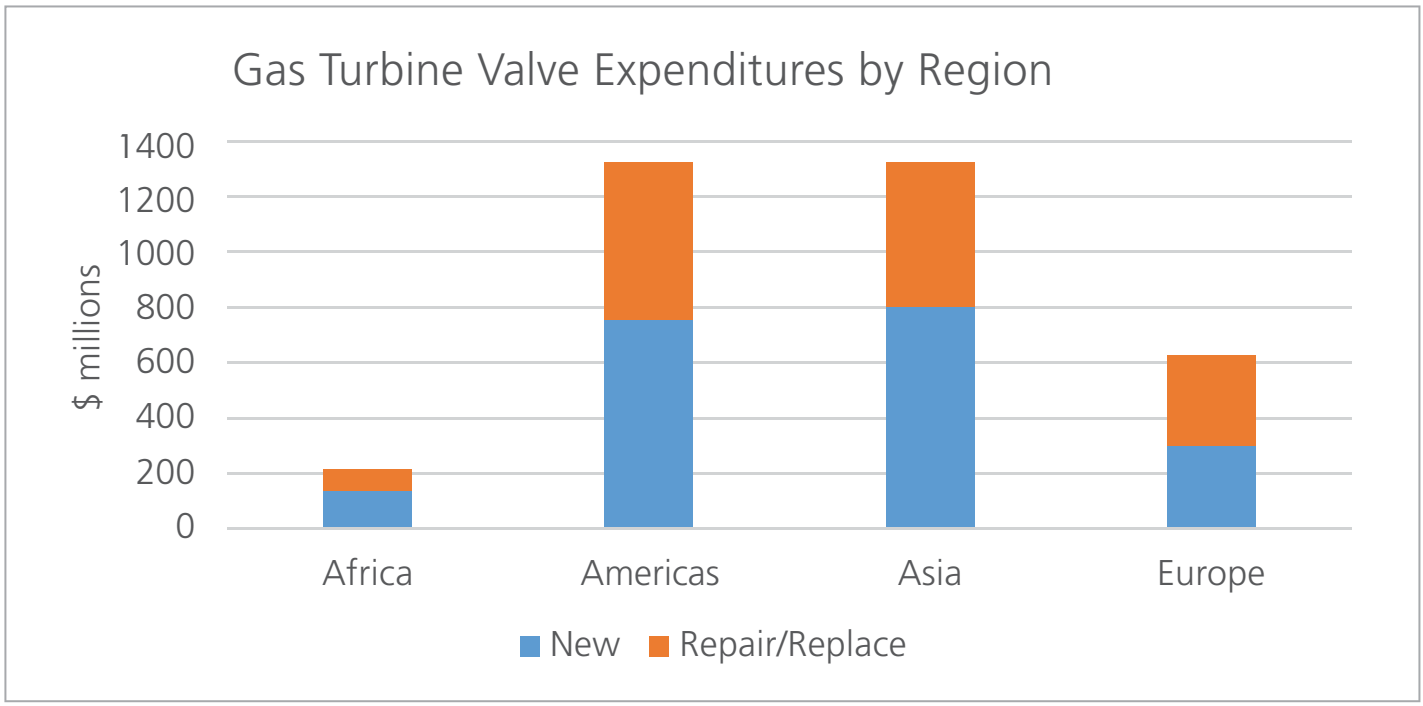
Control valves are critical components in plant automation. Their intelligence can be leveraged to maximize plant improvements. Emerson is incorporating smart valve technology to provide a control Valve Condition Monitoring diagnostic service



performed by certified Fisher valve and instrument product experts focused on providing predictive analysis of a facility's control valves. Its purpose is to identify potential failures and avoid them before they cause unsafe operating conditions and/or unplanned downtime.

Emerson has partnered with software company, Seeq, to improve the data visualization tools used to predict future valve problems. Seeq expertise has helped Fisher Valve Division build a collaborative environment connecting customers with local Fisher service experts and global valve experts. This environment enables data from multiple sources to be visualized and aggregated. It allows authorized people located around the world to look and work on the same data for predictive maintenance and operational improvements.

This initiative is part of the IIoT metamorphosis. Most valve manufacturers do not have the infrastructure to be IIoT leaders. So, they need to identify and work with all the relevant participants.

End users

Large end users are creating fleetwide monitoring systems. Southern Company operates over 280 power generation units at 73 power plants including gas turbine, combined cycle, steam (coal), hydro and solar. Southern Company implemented the first phase of their fleetwide monitoring and diagnostics (M&D) center, beginning in 2007.

Duke Energy is growing its fleetwide monitoring and diagnostics center. Duke's efforts promise to result in maintenance savings and availability improvements, while increasing equipment health visibility and optimizing logistics of maintenance.

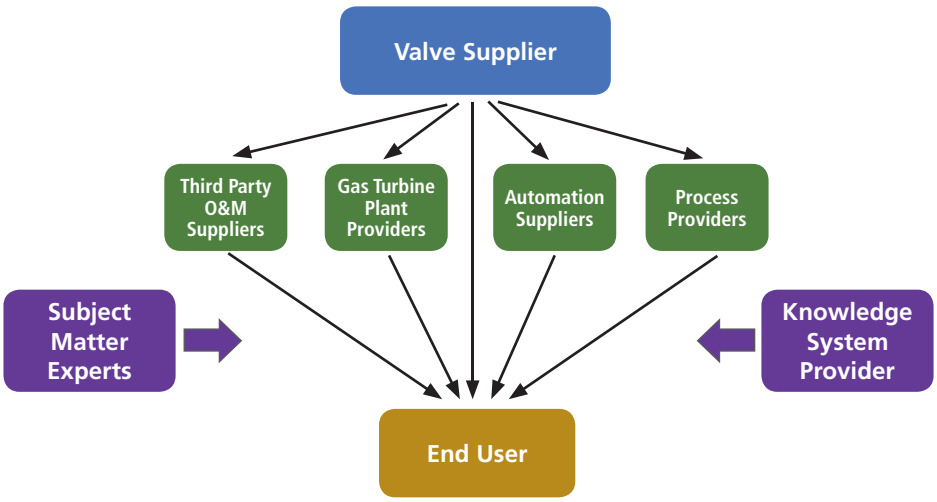
The one hundred largest operators of gas turbines around the world account for the majority of valve purchases. Therefore, working with them should be a high priority.

Gas turbine plant providers

Gas turbine suppliers have remote monitoring centers primarily focused on the health of rotating parts such as turbines. However, this is being expanded. MHPS just opened a remote monitoring center in the Philippines. It is monitoring the balance of plant in addition to the turbines.

Process providers

Suppliers of heat recovery steam generators, ultrapure water, emission controls and water treatment are also purchasers or influencers relative to valves. Nalco has a water quality remote monitoring center which operates around the clock



Automation suppliers

ABB can provide all required gas turbine control and protection functions utilizing the very same ABB DCS platform that controls the rest of the plant. The typical gas turbine functions implemented include fuel control, startup sequence, speed-load-temperature closed loop control, overspeed protection, anti-surge protection, generator protection, auxiliary control, condition monitoring, auto-synchronization, excitation, frequency control, etc.

A valve problem for one supplier can turn into an opportunity for another

Yokogawa has various programs including one which monitors the wastewater from the plant. The automation supplier can be working directly with the end user and not necessarily through the process supplier.

Subject matter experts

When problems arise, which cannot be handled by the dedicated supplier personnel, it is necessary to turn to subject matter experts. A valve problem for one supplier can turn into an opportunity for another as a result of the recommendations of a subject matter expert.

Knowledge system providers

Emerson's use of Seeq software allows incorporation of insights and background data which can be opportunistically displayed to help solve valve problems as they occur. The gathering and organization of this data for use in the software system is a major challenge. Mcilvaine is providing this data in its valve related services but also in systems structured for a single utility. The beta site is for Berkshire Hathaway Energy (BHE) which operates hundreds of gas turbine and other power plants.

O&M third party providers

Many gas turbine combined cycle plants are operated and maintained by third parties. The developments in remote monitoring are making it more attractive to sub contract to a company specializing in O&M. These providers include specialized service companies such as Wood Group and EthosEnergy, power plant operators such as Uniper and RWE who are leveraging their experience to help others, and the plant suppliers such as Siemens and GE who have build own operate (BOO) contracts.

Valve manufacturers have an opportunity in an expanding gas turbine market to take advantage of the IIoT driven changes and to increase not only revenues but gross margins and profits as a percent of those revenues. This will require direct high level communication with several types of organizations.

Bob McIlvaine is President of the McIlvaine Company which he founded in 1974. The company provides technical and market analyses of valves and many other components. It also analyzes the air, water, energy and contamination control industries throughout the world. Bob can be reached at mcilvaine@mcilvainecompany.com