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A New Paradigm for Process Control in the Semiconductor and PV Industries

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The semiconductor industry has long used process control and diagnostic equipment as a cornerstone for the introduction of new processes and for the control of those processes in volume manufacturing. As new technologies have become increasingly complex and operate with an ever more narrow process window the cost of such systems has escalated. New model-based technologies have been introduced that promise to reverse this trend and at the same time provide the opportunity to achieve higher production utilization on processing equipment. Such technologies will become critical to cost effective semiconductor manufacturing.

In contrast, the cost sensitive photovoltaic market has focused on cost reduction efforts while largely ignoring process control as diagnostics with the assumption that the added cost of such systems is prohibitive. But the same technology that is targeted to reduce such costs for semiconductor can be applied in PV with the objective to produce higher efficiency panels. In fact, cost reduction in cell and panel manufacturing has been rapid in recent years and balance of system costs now dominate. So while direct cost reduction of panels is still important, efficiency improvements reduce panel cost and reduce the balance of system cost per watt. By using technology developed for semiconductor, efficiency increases in PV R&D and production can accelerate the drive to grid parity. Such technology can also help manufacturers to differentiate in a commodity market.