



ABC Semiconductor Case Study:
Reducing Costs for Facilities Monitoring in a Multi-Building Site
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CHALLENGE:

- **ABC Semiconductor operates three buildings, including a fab, totaling approximately 50,000 sq-ft on their corporate campus distributed over 25 acres. Supporting facilities equipment include systems for cooling water, scrubbers, air dryers, chillers, boilers, circulating pumps, fans, filters and HVAC equipment.**
- **Many of the equipment only have manual gauges, which are labor intensive and error prone to monitor. Lack of automation means important trends may not be captured which can lead to unplanned downtime of the production processes.**
- **Troubleshooting problems takes longer when there is no easily accessible historical data trend.**

SOLUTION:

- **ABC Semiconductor installed new automation technology which did not incur any disruption to ongoing processes and required minimal installation cost. The solution, a non-invasive wireless sensor which “clips-on” to existing gauges and/or transducers, costs 70% less than using traditional transducers.**

RESULTS:

- **Based on the first two months of use, ABC Semiconductor estimates annual savings to be in the range of \$130,000, which correlates to an investment payback time of approximately six months.**

Challenge: Facilities Monitoring

For ABC Semiconductor, based in San Jose, CA, it is critical to minimize unplanned downtime at its core San Jose fab. This facility has three buildings totaling about 50,000 sq-ft distributed over 25 acres. It is critical that the facilities equipment for this site be working correctly or the production processes will be affected resulting in production scrap or unplanned downtime. The facility support systems include cooling water, deionized water, HVAC, scrubbers, exhaust and venting, compressed air etc. Specific equipment include pumps, compressors, fans, filters, chillers, boilers, air handling units etc.

Figure 1 – ABC Semiconductor Facilities Area (typical)



For years, like many older fabs, maintaining proper operation of the facilities systems meant conducting manual rounds to read gauges on specific pieces of equipment and log them. Because of the large number of equipment and the distributed nature of the site over several buildings, this was a very labor and time consuming process which was error prone due to its manual nature. At ABC Semiconductor, once every 12-hour shift, an employee armed with pen and clipboard would spend two to three hours performing such rounds.

However, even with the labor effort, they would miss important trends because gauges were read only two times per day. When failures do occur, troubleshooting and recovery took a longer time because historical trends and logs were not easily available. Increased downtime, or impaired yield were often the result.

Evaluation of Traditional Automation Solution

ABC Semiconductor considered replacing manual gauges with transducers and wiring them to their building automation system. However, in most cases this required the affected process to be shut down and depressurized while old gauges were removed, transducers installed, leak-check performed, wires run, and I/O panels installed.

Documentation and drawings must be updated, and occasionally, this effort may even invoke a much larger rework of the entire wiring system to conform to the latest safety and fire codes when a legacy subsystem is significantly modified.

ABC Semiconductor chose not to implement this solution due to the prohibitive cost of the installation and rework labor, and most of all, the associated downtime and lost production, which altogether averaged \$4,000 per monitoring point (or about \$200,000 to instrument 50 points).

The Cypress Systems Solution

In 2007, ABC Semiconductor learned of new Wireless Gauge Readers that provide automated gauge monitoring without the high cost and disruption of installing traditional wired transducers. The Wireless Gauge Readers non-invasively “clip” onto the front of the legacy manual gauge, and transmit the reading wirelessly to a central server (Figure 2). Pre-set alarms of minimum and maximum readings may be programmed to alert operator stations, pagers, or cell phones of excursions.

Figure 2 – Non-Invasive Mounting for Wireless Gauge Reader



ABC Semiconductor decided to implement the Cypress solution because it incurred no process downtime, required minimal installation labor and training, and did not need retesting and revalidation for leaks. The installed cost at \$1,250 per point (or \$62,500 to instrument 50 points) is just 35% of the cost of traditional transducers (Figure 3).

**Figure 3 – Comparison of Installed Cost per Point
for Traditional Transducers vs. Wireless Gauge Reader**

	Wireless Gauge Reader	Wired Transducer
Process Downtime (Est.)*	\$0	\$1,000
Transducer/Sensor	\$1,200	\$300
Installation/Wiring Labor, Materials, Design	\$50	\$1,500
Bring legacy system up to present day safety/fire codes (where applicable)	\$0	\$1,000
I/O Panel Termination	\$0	\$200
Total Cost (per point)	\$1,250	\$4,000

Benefits

In the fall of 2007, ABC Semiconductor decided to install 50 Wireless Gauge Readers from Cypress Systems to monitor its most critical facilities equipment, along with the Cypress Systems' Blue Box Receiver, which sends the data to ABC Semiconductor's existing network and operator stations. Each data point required approximately 15 minutes to install, and did not involve breaking any pressure seals anywhere in the system or any process downtime. Additionally, future integration of the data with existing operator software is also possible via industry standard OPC and/or BACNet protocols. Within the first two months of operation, the following benefits were identified:

- Reduce the manpower devoted to making gas rounds by 50% of a full-time equivalent technician, who could then be redeployed to other tasks.
- Decrease average troubleshooting time for incidents by 10-12 hours per month.
- Minimize unplanned downtime by combination of predictive monitoring and proactive maintenance, and also faster time-to-recovery for incidents.

The combined operational savings are estimated to be in the range of \$130,000 per year (Figure 4). The resulting investment payback period is only six months (for \$62,500 initial installed cost).

Figure 4 – Savings from Wireless Gauge Reader

	Annualized Savings
Labor Savings: 50% Full-time equivalent technician for gauge reading	\$62,500
Labor Savings: 12 hours per month less for troubleshooting	\$8,640
Reduced Downtime: \$5,000 per incident, avg. 12 per yr	\$60,000

Total Savings per Year: \$131,140

Figure 5 – Payback Analysis for Wireless Gauge Reader and Wireless Transducer Reader

Cost per point for WGR's	\$1,250
Number of Points installed	50
Total Cost of WGR System	\$62,500
Payback period (based on annual savings of \$131,000)	5.7 Months

About Cypress Systems Corporation:

Cypress Systems is a subsidiary of Cypress Semiconductor (NYSE: CY) with a mission to provide leading edge technologies to legacy buildings , with minimal cost and disruption. The company produces products and solutions to optimize energy and water use, improve uptime, reduce scrap, and lower maintenance costs.

Cypress Systems combines the latest technology knowhow from Cypress Semiconductor with our team's extensive industry and automation experience to deliver solutions with tangible savings.

For more information, please visit: <http://www.cypress.com/systems> or call (408) 943-2644.