

TECHNOLOGY FOR LIFE

Powering growth in the semiconductor
sector with safer lab environments

START THE JOURNEY

Honeywell



INTRODUCTION

STRIKING THE BALANCE BETWEEN SAFETY & PERFORMANCE

Laboratories and semiconductor facilities are spaces for discovery and innovation, enabling breakthroughs in technology that are central to economic growth and advancement. But they can also be spaces of danger if they are not constantly monitored and managed with the utmost precision.

Semiconductor manufacturers contend every day with dangerous chemicals and gases that could have enormously harmful consequences to personnel, so significant risk mitigation is paramount to preventing catastrophic outcomes and, ultimately, business survival. However, pressure to develop the latest technologies at pace – all while driving cost efficiencies, meeting regulations and increasing supply chain agility and sustainability – exists simultaneously in this space, challenging manufacturers to get their balance right.

Developments in gas detection technology are gaining traction to combat the dangers, empowering semiconductor companies to shield employees and strengthen risk management practices. According to Mordor Intelligence, smart sensors are expected to be a [major driver of market growth](#) in the period of 2022-2027, due to both surging demand for IoT-based consumer electronics, as well as sensors being used within devices to improve industrial processes and safety.

However, striking the balance between creating a safe environment and fostering the grounds for innovation demands more than just the most advanced detection tools to monitor the environment – it requires the expertise to continually protect against hazards and build a safety culture with lasting effectiveness.

In this guide, we explore how businesses in the semiconductor space can find harmony between safety and success. From factoring in unique laboratory and facility requirements to assessing the ongoing costs involved in maintaining safe environments, you can find practical steps to making investments in sensors worth it.





HIGH QUALITY & RELIABILITY

DETECT & PROTECT WITHOUT FAIL

Personnel in semiconductor facilities work in the midst of complex and potentially dangerous processes, with exposure to toxic and flammable chemicals and gases being just some of the hazards they face on a daily basis. Gas detection systems therefore need to meet the highest standards of quality and reliability to protect employees, constantly monitoring both working conditions and the performance of any materials and devices in use.

Beyond meeting their duty of care, semiconductor companies have a huge responsibility to meet stringent regulatory requirements for equipment safety standards too. For example, the Occupational Safety and Health Administration (OSHA) dictates requirements for zero-defect products to prevent worker illness, injury or even death. Proper maintenance, servicing and testing protocols are also recommended to verify accuracy and prevent issues such as calibration drift.

HIGH QUALITY & RELIABILITY

DEFENDING AGAINST HIDDEN HAZARDS

Given the potential implications for human life if detection and response protocols are delayed, manufacturers need to ensure they are monitoring all environments effectively. Modernizing legacy designs of gas detection systems offers the ability to create connected solutions that are specifically designed for the unique environment they're used in, with custom sensors developed to enhance performance and reliability. These bespoke engineered products can empower the organization with comprehensive protection against unseen risks, enabling them to quickly evaluate readings, alarms, event logs, real-time trends, and overall system status.

Honeywell has the most complete toxic gas monitoring solutions on the market



When there's a wealth of life safety solutions out there to choose from – all with a range of detection limits – seeking out a partner to determine the right specifications for your organization can relieve the burden of responsibility. For example, Honeywell has the most complete toxic and flammable gas monitoring solutions on the market, including infrared spectroscopy, electrochemical, and colorimetric systems with detection sensitivity as low as parts per billion levels, and can advise the best approach for specific facilities. As such, leading semiconductor fabricators around the world trust us to help them meet strict safety requirements with turnkey gas detection solutions that continue to meet their needs effectively.



DEEP SECTOR AND SENSOR EXPERTISE

BREAKING DOWN THE BARRIERS TO BREAKTHROUGHS

With research and development front of mind, as well as delivering the smooth running of daily operations, finding life safety solutions that truly support long-term ambitions can fall behind a long list of priorities. Yet, to gain peace of mind and focus on innovation, semiconductor companies need to look beyond just a supplier for new products.

When there's no one-size-fits-all solution for lab safety, it's important to identify procedures and tools that fit the local conditions of the facility and the processes already in place, as well as an effective strategy to keep evolving them. Aside from the commissioning and integration of detectors, this applies to how personnel are trained to configure equipment to safety software, test the functionality of gas monitoring systems and verify accurate monitoring. As such, locking down all of these requirements demands end-to-end expertise from a partner – one with in-depth understanding of both sensors and the semiconductor sector.

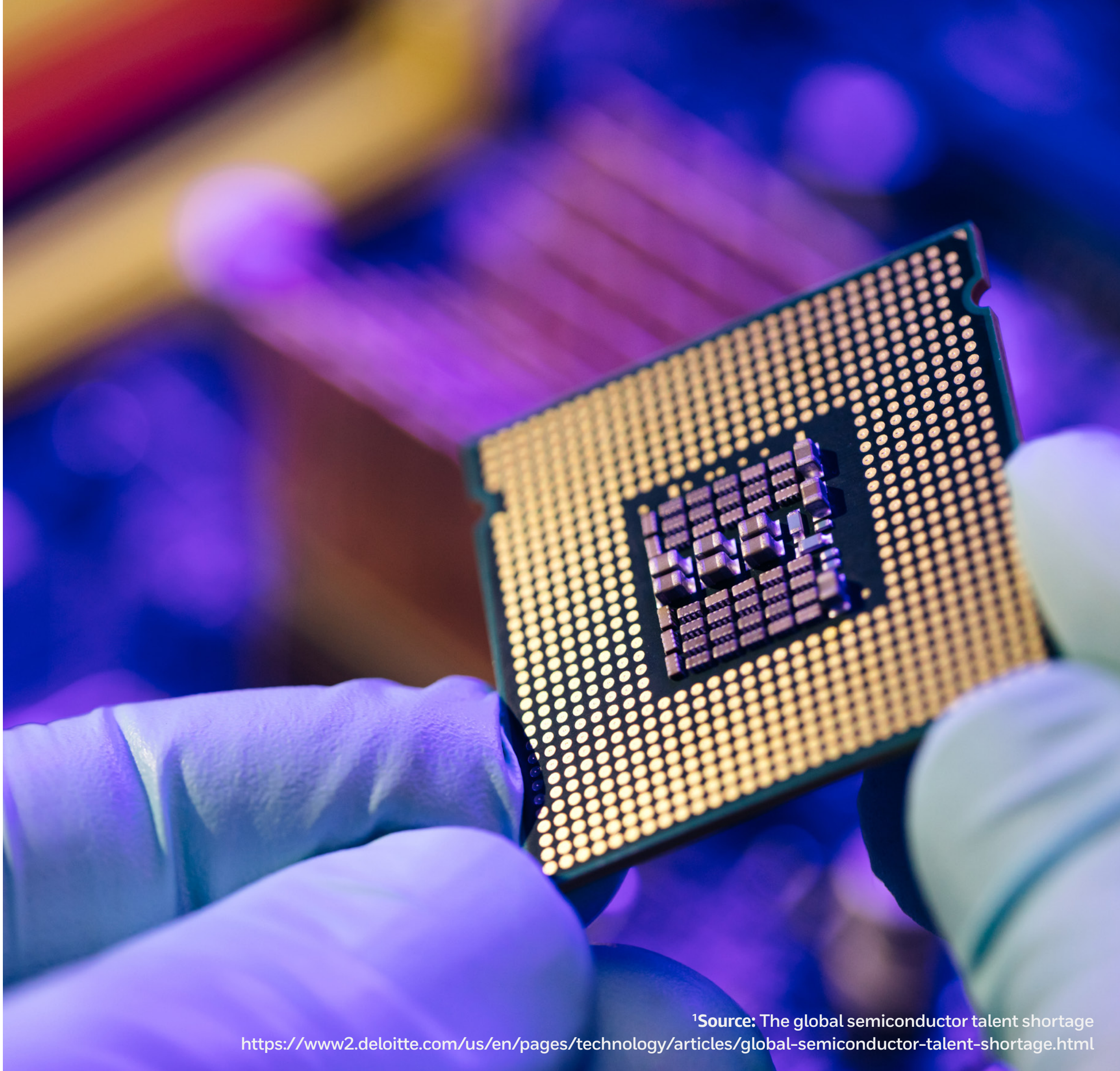
DEEP SECTOR AND SENSOR EXPERTISE

LIFE SAFETY WITH LONGEVITY

By working with a partner, companies can promote long-term strategic value, ensuring every process ranging from project management to execution is taken care of. Experienced personnel complement comprehensive sensor solutions by undertaking essential tasks such as servicing, construction (e.g. tubing, wiring, and shut-down cabling), installation, commissioning, integration of the gas monitoring system, technical consulting, repair, replacement, and upgrading of existing systems.

When working with organizations who are committed to research and development, semiconductor companies can also benefit from solutions that aren't even on the sector's radar yet. This is exactly what Honeywell did with a semiconductor manufacturer in South Korea, developing Vertex™ Edge as a tailored gas detection solution. Honeywell was able to address their facility's challenges with a cutting-edge product, and in turn free the business to focus on exploring cutting-edge technology possibilities without worrying about potential implications for their team's safety.





¹Source: The global semiconductor talent shortage
<https://www2.deloitte.com/us/en/pages/technology/articles/global-semiconductor-talent-shortage.html>

TCO/SERVICE LEVELS

TACKLING TCO & CREATING SPACE TO GROW

When just one day of downtime can cost hundreds of thousands of dollars and spiral into damages to the company's reputation, making smart spending decisions for the long-term is crucial to ensuring profitability and securing the business's future. Many organizations have prioritized the initial outlay of life safety solutions, becoming blindsided to significant costs that may occur later on as a result. A pragmatic approach to bringing down the total cost of ownership (TCO) means factoring in ongoing maintenance requirements and workflows involved, as well as ensuring the availability of skilled teams to effectively manage and maintain the installed gas monitoring systems.

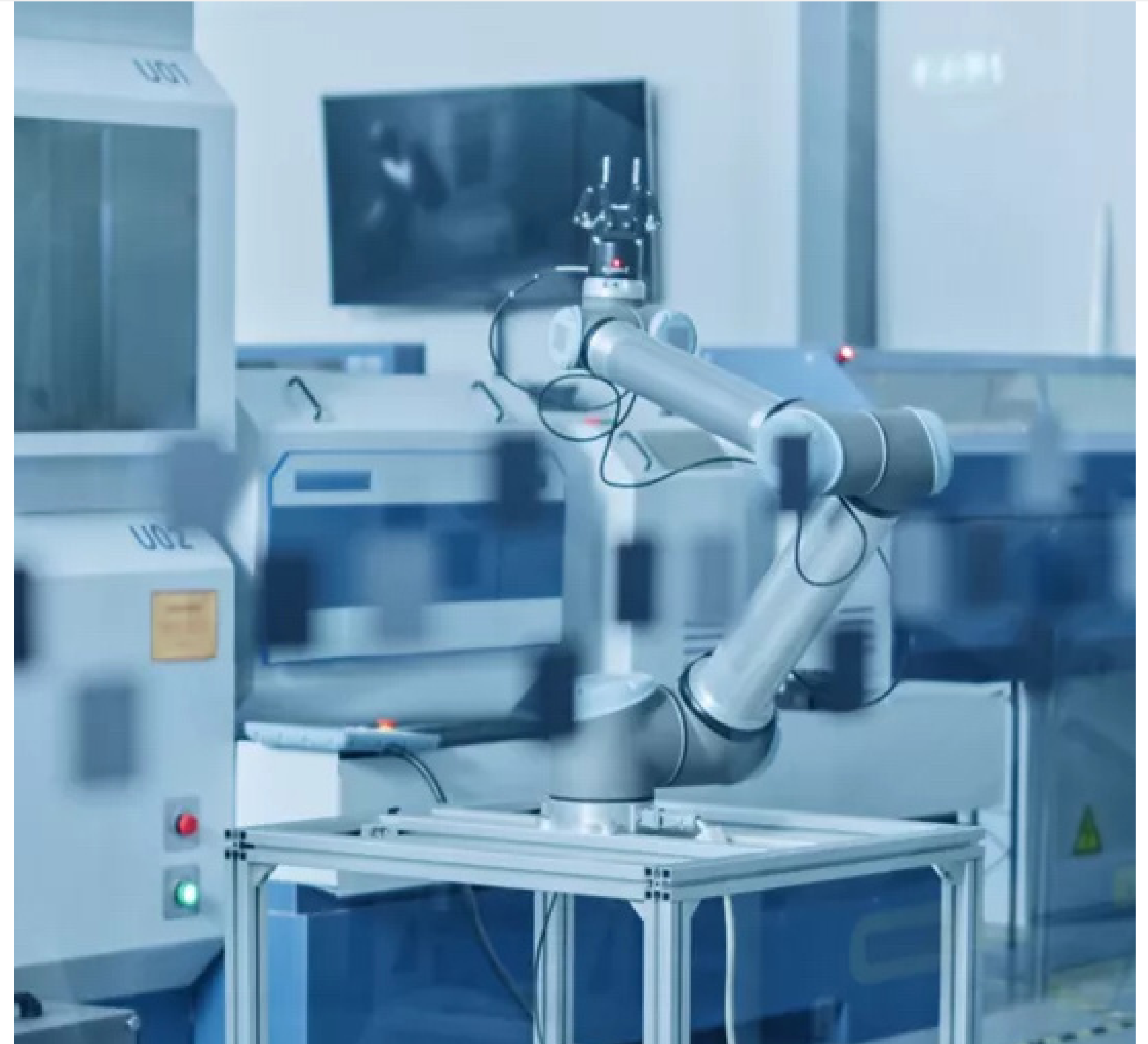
However, achieving best practices is an increasingly tall order amid continued workforce shortages. According to [Deloitte's predictions](#), the semiconductor workforce will need to grow by over 1 million workers by 2030 – yet fewer than 100,000 students are enrolled in computer science and electrical engineering in the U.S. annually. When technical support is lacking and talent prospects aren't set to improve anytime soon, approaching gas detection technology for the long haul requires service management in addition to equipment.

TCO/SERVICE LEVELS

UNLOCKING 24/7 STRATEGIC SUPPORT

With ongoing engineering support beyond the initial sale, companies can ensure that life safety solutions maintain reliability throughout their lifecycle, without the need to take issues into their own hands. For instance, Honeywell provides around-the-clock support to partners to assist successful projects of any size so they can focus their efforts elsewhere. From the initial integration to the long-term outlook on maintenance, every project is carefully assessed to unlock the greatest business value and safety benefits.

As a consultative partner, Honeywell helps leading semiconductor companies deal with rising cost pressures without compromising on quality and safety. For example, when working with a US semiconductor fabricator to upgrade their gas monitoring system, Honeywell was able to replace their LonWorks system with a PLC-based toxic gas monitoring system (TGMS) with Midas detectors – all while making minimal impact to production. Implementing the new system took just one day and has resulted in approximately \$45,000 in cost savings through reduced downtime. Using an existing conduit also stimulated \$22,000 in savings a year, thanks to remote maintenance capabilities.





²Source: Global semiconductor industry outlook for 2023
<https://kpmg.com/sg/en/home/insights/2023/02/global-semiconductor-industry-outlook-for-2023.html>

SUPPLY CHAIN SUSTAINABILITY

BUILDING SUPPLY CHAIN RESILIENCE

With numerous threats to supply chains, including restrictive trade policies due to global tensions, gearing up for new headwinds is becoming a growing priority. According to KPMG's Global Semiconductor Industry Outlook Survey 2023, nearly half (46%) of the semiconductor executives surveyed are looking to increase the geographic diversity of their supply chain to improve agility and resiliency. Ongoing uncertainty has called into question readiness for future events, and with the rising politicization of technology exports and restrictive trade policies in key regions, every partner they rely on also needs to be able to deliver under pressure.

As an industry that's at the heart of operating modern digital infrastructure, meeting the supply-demand gap is essential to the smooth running of sectors ranging from telecommunications to defense and healthcare. Geographic diversification will be at the core of navigating spikes of demand successfully and preventing widespread disruption. This applies to life safety vendors too, who need to be able to deliver a reliable supply of sensors to prevent any safety concerns hindering prospects.

SUPPLY CHAIN SUSTAINABILITY

LEVERAGING GLOBAL REACH & LOCAL SUPPORT

Taking advantage of partners who can offer global reach complemented by local support will be key to gaining long-term resilience. Honeywell's presence extends to over 70 countries and more than 200 locations, enabling a more robust and reliable approach through dual sourcing of essential safety solutions. Whenever new parts are needed or facilities have to evolve their protective measures based on changing laboratory projects or developments, semiconductor companies can rely on a robust supply chain even in the face of the unknown.

What's more, as scrutiny on organizations' environmental impact grows, a sustainable supply chain isn't just one that overcomes vulnerabilities by expanding beyond single sourcing – it's also one that sources parts responsibly. For life safety solutions, this means low power consumption sensors with lasting efficiency from a vendor with proven capabilities in reducing environmental impact. As a Fortune 100 business that is well on its way to making all facilities and operations carbon neutral by 2035, Honeywell is also well placed to ensure semiconductor companies can seize sustainable technologies while transforming the sector.





SUMMARY

SUPERCHARGING ONGOING INNOVATION

The nature of the semiconductor landscape will always be fast paced and dynamic, making the task of ensuring life safety solutions don't fall behind in the process critical. High quality, reliable solutions don't have to compete with delivering innovation or meeting cost efficiency requirements if the right investments are made. With the help of Honeywell as a strategic partner, semiconductor companies can strike the winning balance between protection and profitability.

Honeywell has the proven capabilities and track record of ensuring that devices are in safe hands, with a legacy of working with leading semiconductor organizations around the world. Our consistent commitment and investment in the sector empowers your business to deliver against a backdrop of demands, so you can create cutting-edge discoveries and mitigate evolving challenges. With over 50 years as a leader in life safety technology, we have the unique resources, capabilities and solutions to support a wealth of applications and evolving needs.



To discuss how we can partner with your organization to fuel success long into the future, get in touch with a **Honeywell** expert today.

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