

Unlocking Industrial IoT: Proven Steps to Improve Efficiency, Sustainability and Profitability

Executive Summary

Manufacturers face mounting pressures from rising costs, sustainability demands and evolving customer expectations. The 'Industrial Internet of Things' (IIoT) offers proven, accessible solutions to these challenges, enabling businesses to improve efficiency, reduce costs and enhance compliance.

This white paper aims to define and dismantle common barriers to IIoT adoption, demonstrating that many technologies are readily-available, reliable, easy to deploy and already delivering tangible, real-world benefits.

By starting with manageable, high-impact projects and partnering with experienced providers, manufacturers can quickly realise measurable improvements in operations, sustainability and customer satisfaction. If an enterprise has not already begun their digital transformation journey, they should be exploring this now, or risk obsolescence.

The Good News



**TECHNOLOGY
IS PROVEN**

The Technology is Proven: The digital tools you need probably already exist and have been successfully deployed across multiple industries. Technologies such as PowTechnology's Metron and Siemens' condition monitoring solutions are not experimental—they're tested, reliable and delivering real-world benefits today.

It Doesn't Have to Be Hard: Many IIoT solutions, like PowTechnology's range of telemetry hardware & sensor gateways, can be deployed with minimal technical knowledge and without the need for coding skills. These modular, plug-and-play systems simplify deployment and allow for rapid integration.

**It Doesn't Have
To Be Hard**



**Start Small,
Succeed Fast**



Start Small, Succeed Fast: You don't need to transform your entire operation overnight. We have seen organisations reap massive rewards by starting with a manageable, high-impact project. Show the benefits, build support & scale. When you show tangible returns, it becomes easier to build momentum and secure support for broader initiatives.

Choose the Right Partner: Any journey is easier with an experienced guide. Find a partner with relevant experience and a strong track record, who will take the time to understand your underlying objectives. That partner should then offer you fit-to purpose IIoT solutions, with demonstrable payback, in line with overall organisational strategy.

**Choose the
Right Partner**



Why Organisations Don't Do It

There is wealth of statistics out there explaining the barriers to adoption. Make UK reported that:

- 46% manufacturers point to a lack of technical skills
- 41% mention integration and data challenges
- 38% cite high costs

In my opinion, there is a greater challenge to overcome. 36% of manufacturers offered negative workplace culture as a reason for resisting digital practices!

Ultimately, there is a significant element of the UK workforce that either can't see the benefits or believe that those benefits will come at a personal cost to themselves.

So... Why Do It?

Here are some reasons why adopting IIoT is beneficial:

- **Customer Expectations Are Sky High** Today's customers demand more—better service, faster delivery and real-time updates. 86% of consumers will pay more for better customer experiences¹.
- **Logistics Costs Keep Rising** Fuel prices have risen 45% over the last decade. Post-COVID, salaries for HGV drivers are up by 21%. Businesses must find new efficiencies to stay profitable.²
- **Energy Costs Are Increasing** Energy costs have surged in recent years due to market volatility, global supply issues and growing demand. For manufacturers, this significantly impacts operational cost. Efficient energy management through IIoT can be a major lever for cost control and carbon reduction.
- **Sustainability Is No Longer Optional** From ESG commitments to regulatory pressure, sustainability is central to operations. Technology is absolutely key to efficient and cost-effective tracking and demonstrable compliance to voluntary and legislative targets.

A plethora of issues can be overcome with technology and there are many, proven ways that costs can be reduced, safety improved, compliance ensured and processes optimised.

¹ PWC 2025 survey

² Logistics UK [report](#)



How do organisations overcome the perceived barriers mentioned above?

My 30 years' experience has consistently demonstrated that it's best to identify a real problem, then define the technology needed to solve it, rather than embrace the tech and try to make it fit. Pushing an innovative technology because it's good to be seen to be doing it, or because everyone else is doing it, is not a strategy that is likely to support organisational goals.

I believe that many projects fail because they don't have clear problems identified or a definition for 'solved'. Let's start at the beginning. What is the problem? What can we do better?

Let's use technology to drive measurable improvements and deliver tangible benefits. Then communicate this across the business, driving engagement from colleagues and providing momentum for other areas where improvements can be made.



IIoT Typical Architecture

The starting point is data. Typically, this is acquired using a sensor, which may already be installed or could be retrofitted to the equipment you want to monitor. Alternatively, the data could be available from within your existing infrastructure, such as from a PLC, a HMI, a drive or a SCADA system.

The next stage is a gateway. These devices have had various names over the years, RTU (Remote Telemetry Unit), Telemetry Device, Hub, IO Island. We will use gateway as our preferred term. This is a common method of getting data to a platform. The gateway may perform some processing 'on the edge' so that the amount of data transmitted can be minimised. Data can be transmitted using a variety of communication methods. Cellular is popular for wide area communications. Cellular is great if it's an option. It's easy to deploy & maintain, whilst being cost effective. LoRA, Wi-Fi and Bluetooth are also available as localised wireless communications methods.

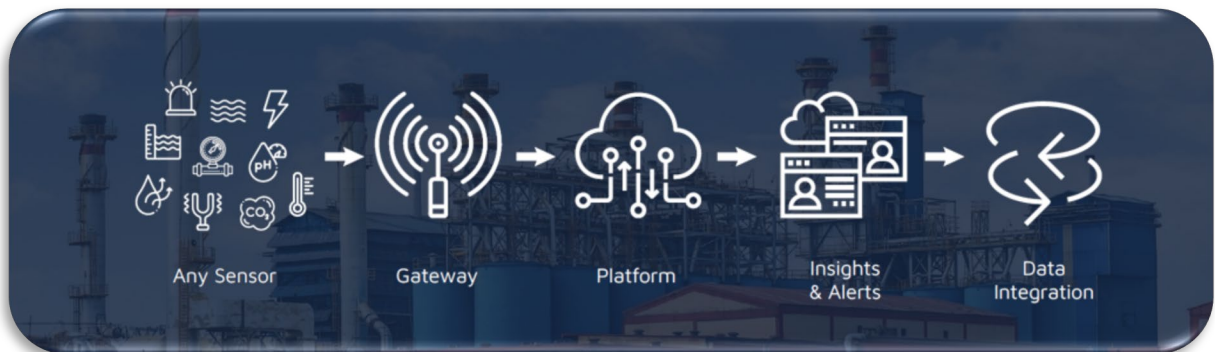


A platform is the central location that the data is gathered to. This can be deployed in various enterprise architectures or is frequently hosted by a vendor. PowTechnology operates its own platform, which provides customers a low cost of entry into this space.

Once in a platform/portal:

- The data can be visualised in graphs and tables.
- Dashboards can be created that may provide summaries or highlight issues.
- Alarms can alert users that an action is required.
- Simple mathematical algorithms, such as rate of change can help users understand priorities.
- More complex calculations can be introduced to add further insight.

Data can be integrated into third party software systems. It can be combined with other data streams to automate & streamline processes, enable further insight and prompt specific responses.



Proven Applications

I invite you to visit [PowTechnology - Case studies](#) where you will find a large number of case studies and customer testimonials, demonstrating the benefits delivered by real IIoT applications. For me, this really highlights how the right partner can help you achieve success. IIoT and Industry 4.0 are real, are achievable and are happening now.

Here are a few example applications where IIoT has proven highly beneficial:



Smart Tanks



Remotely monitoring the level in a storage tank is proven to cut road miles by up to 30%.³ That's 30% less fuel, 30% fewer CO₂ emissions and significant time and maintenance savings. Customer satisfaction improves and emissions targets are more easily met. Production and procurement

benefit from better planning and forecasting. Leaks & thefts can be detected, with run-outs and overspills virtually eliminated. Businesses can avoid costly downtime, product loss, stock discrepancies, time-consuming cleanups, fines and wasted human resource.

If level sensors are not already fitted to tanks, then they can usually be added with minimum cost or disruption. Then, the signal can be connected to a suitable sensor gateway.

As an example, PowTechnology's own [Metron5](#) is great in this application, because it can work with many sensor types (hydrostatic, radar, ultrasonic etc.) and it can process the signal, converting the usual height measurement into volume, even if the tank is irregular in shape.

Metron5 is self-contained, weatherproof (IP67), remotely programmable with power options including external battery & solar, so it's robust and versatile, as well as easy to install & commission.

Tank level telemetry can be cost-effective and highly beneficial even for a single tank, but I have worked with multinational enterprises, such as GreenChem. They service tens of thousands of AdBlue tanks, using the same Metron telemetry solution to manage logistics around the world. They have differentiated themselves through service in a commodity market, whilst simultaneously achieving economic and environmental goals.

Users can view the data using application-specific, web-based applications, such as the [PowTechnology 'TMS' system](#). Alerts can be sent when thresholds are breached and reports can be generated showing consumption and more. 'TMS' can also detect theft and leaks, as well as provide predictions on when a tank will be empty/full.

Chemicals



*"As one of Europe's largest AdBlue® distributors, GreenChem rely upon efficient logistics. PowTechnology's dependable and robust **remote tank level monitoring solution** supports that and helps us deliver exceptional customer service. PowTechnology have been our telemetry partner for over a decade, because their solutions are exceptionally well-proven in many countries and we are fully supported technically and commercially."*



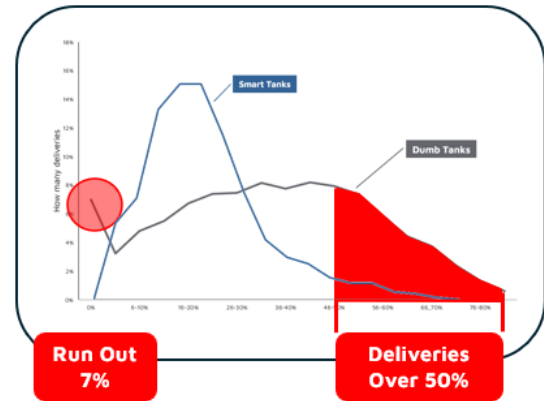
GUY FLOCHLAY
Managing Director, GreenChem Holding BV

[Click to see the full GreenChem tank level/logistics case study](#)

The typical barriers to IIoT adoption were overcome by the client selecting a partner with strong sensor knowledge and the ability to connect OT (operational technology) with IT (information technology) as well as dashboarding skills. The strong ROI overcame cost barriers, but by starting on a small scale and then scaling it was possible to mitigate risk and manage costs. With a system that was easy to install & commission, coupled with intuitive web portals ensured the workforce embraced the use of the technology and benefits maximised.

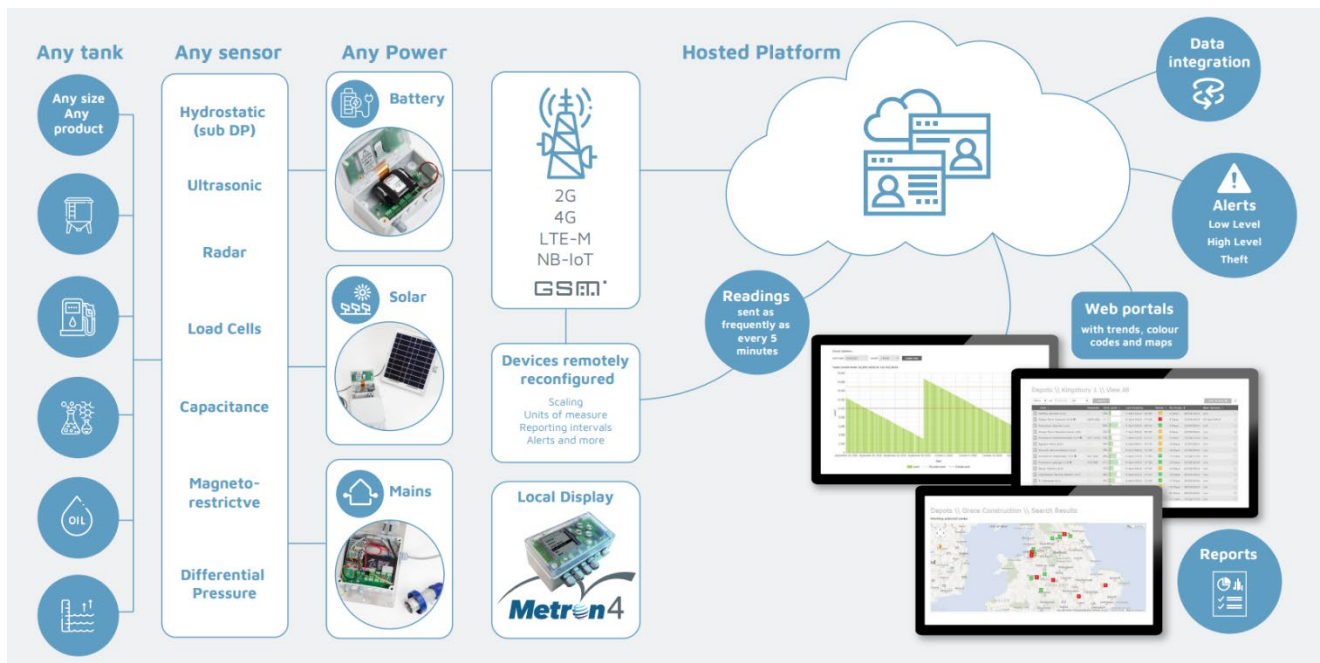


PowTechnology has decades of data, demonstrating that it's not uncommon for deliveries to be made to tanks that are more than 50% full. In the case of the liquefied gas customer, shown in the graph, 7% deliveries were too late, delivered to tanks that were already completely empty. Remotely monitoring the level in tanks and optimising when they are refilled, is proven to result in fewer trips needed to deliver the same amount of product in a given period of time. Fewer miles travelled means reduced vehicle maintenance and human resource, happier customers and increased margins.



In this case, prior to installing remote tank level monitoring, 9.1% of delivery attempts were made to tanks with insufficient capacity to accept delivery. Delivery was aborted.

Those that have adopted remote tank level monitoring technology have improved service levels, customer retention and market share.



Event Monitoring



Sometimes, being alerted to a small change within a process, can be hugely beneficial, such as when a machine has tripped, a filter has blocked, a traffic light has failed or a remote site has lost power.

Getting alerts ensures that the right people act quickly, preventing larger, more impactful or expensive issues. As the proverb goes 'A stitch in time saves nine' - or if you sort out a problem quickly it may save a lot of extra work later..

Simple event data can lead to information about how many hours an asset has run, so maintenance can be performed at the most appropriate time, or when a machine starts and stops. Perhaps energy can be saved if machines are on when they don't need to be? Maybe productivity can be improved or maintenance is required, if machines are off when they should be running?

The data can provide production metrics, such as OEE (Overall Equipment Effectiveness), MTTF (Mean Time Between Failures), MTTR (Mean Time To Repair) and more, especially when combined with count and speed information.

No.	% of Load	Status	Last Tripped	MTTR	MTBF	Availability
1*	0	M	Thu 23 Oct 2025 08:59:49	2h 19m	7d 9h 3m	98.423%
2*	78	H	Thu 23 Oct 2025 08:32:46	1h 26m	2d 6h 34m	97.2769%
1*	5*		Thu 23 Oct 2025 06:40:27	1h 28m	1d 36m	93.8176%
2*			Thu 23 Oct 2025 03:48:53	49m	1d 5h 8m	69.8758%
3			Mon 20 Oct 2025 09:55:51	1h 1m	3h 31m	17.8643%
4*			Thu 23 Oct 2025 08:04:54	1h 29m		
5*	100	H	Thu 23 Oct 2025 03:44:52	49m		

[Click here for the United Utilities case](#)



"I was recommended to PowTechnology by colleagues. We're delighted with the reliability of the hardware, the speed of development of the custom portal and the overall effectiveness of this IIoT solution. PowTechnology have been customer-focused throughout. Our Systems Thinking approach depends on accurate data management and visibility in real time. We are now able to see all the data in one place, helping us improve renewable energy performance, reduce our carbon footprint, and ultimately deliver better service and lower costs to our customers."



ANDY PARKER
Energy Generation Operations & Maintenance Manager

This use case is a great example of how a cost-effective solution was deployed quickly by partnering with an organisation with the technical expertise needed to get data flowing with easy to install and commission hardware, and a customised dashboard created to provide the insight needed. The solution has been expanded to monitor more assets of different types, providing more insight.



Smart Utilities



As the renowned management consultant, Peter Drucker once said “*If you don’t measure it, you can’t improve it!*” This applies to many IIoT applications but none more so than utility monitoring.

Tracking electricity, water, gas and waste can reduce costs and uncover inefficiencies. Where are the leaks? Which machines are inefficient or being left on needlessly? The savings are tangible and environmentally impactful.

In 2024, electricity prices for UK non-domestic users averaged 25.97 pence/kWh, up 75% from 2021.

Smart meters have been shown to reduce energy bills by 10–15% in manufacturing and processing sectors.

Leak detection systems for water can reduce water losses by 20–30%, especially in older industrial

Furthermore, monitoring allows for better compliance with environmental regulations and enhances a business's CSR (Corporate Social Responsibility) credentials. Lower energy consumption directly translates to lower greenhouse gas emissions, helping businesses meet sustainability goals and reduce their environmental impact.

Certain industries are heavily regulated in terms of energy consumption. Reliable, suitably granular monitoring can demonstrate

legal compliance.

Monitoring can also help optimise equipment performance, by revealing inefficiencies in equipment usage, even comparing similar processes for performance anomalies and allowing for timely maintenance to improve performance and extend equipment lifespan.

Detailed data on energy consumption enables strategic, fact-based decision-making in relation to upgrades, operational improvement and resource allocation. Predictive maintenance becomes possible, as monitoring can help identify potential equipment failures before they occur, leading to proactive maintenance and preventing costly downtime.



Smart Packaging



A really great example of how IIoT tech can enhance service, reputation, productivity and sustainability all in one application is the Henkel Smart Packaging Control.

By understanding the amount of adhesive being applied to packages, it is possible to ensure high levels of quality, whilst optimising costs.

Changes in glue temperature & tank pressure as well as line speed can affect the amount of glue applied and result in either:

- Poor quality packaging where insufficient glue lets containers 'pop open'
- Wastage and unnecessary expense if too much glue is applied

Now, a smart, non-invasive monitoring system can be easily retrofitted to a packaging line, enabling remote data collection, reporting and alerting. It's now possible to visualise and analyse the glue being dispensed in near real time, via intuitive dashboards. Reports can be created to improve quality and maintenance.

This smart packaging solution has driven in-spec rates above 95% for Henkel customers, reducing downtime, waste, rework, and returns. Importantly, the investment in IIoT has differentiated Henkel as a supplier in a commodity market, drawing customers into exclusive contracts and creating brand 'stickiness'.



[Click here to see the Henkel case study](#)

Factory Automation



"I've worked with PowTechnology for 20 years and I had no hesitation selecting them as our IIoT development partner. Communication and flexibility have been key factors in this project's success. Their turnkey service has delivered our vision and strengthened our global brand."

"Smart Packaging Control has been shown to increase in-spec rate to over 95% for any given production line and typically pays off in just 3.5 weeks. That makes our customers very happy!"

Henkel Qhesive
SOLUTIONS

DAVID DUCKWORTH
Henkel Engineered Solutions Manager



Smart Trains



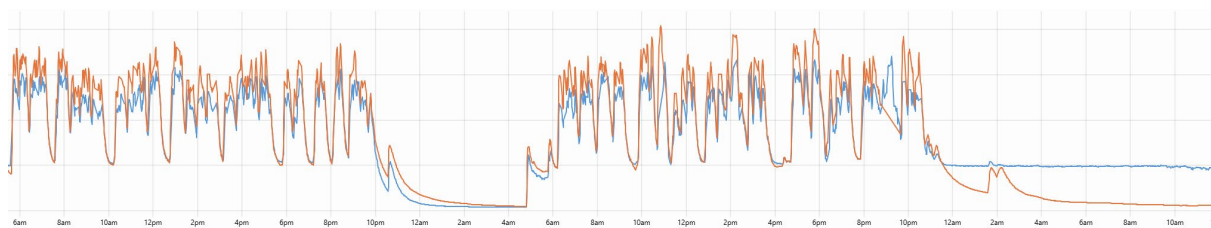
There are many parameters that can be monitored on a train, from how the doors are opening and closing, to the condition of the bearings, from fuel & lubricant & oil levels to faults on doors or toilets.

On the engine alone, you can monitor the exhaust temperature as well as that of the coolant and the charge air.

As with so much condition monitoring, just monitoring a few key parameters can enable early issue detection and even sophisticated diagnostics, for a specialist.

I have worked with a number of TOCs (Train Operating Companies) One very memorable experience involved a trial to monitor various engine temperatures. The purpose was to understand how variations between the different parameters could be used to predict issues, but we made a rather surprising discovery!

In the graph below you can see how the temperature changes over time on the exhaust pipes, located on each of two engines, at either end of the train. For a day we saw temperature go up as the engine worked harder and fall as it eased off. At the end of the day, the engines were switched off and temperature gradually fell to ambient temperature.



Then comes the surprise! At the end of Day 2, the temperature didn't drop!

The engine is idling... for hours and hours!!

It transpired that operatives had elected not to shut down the engine, because it took some time and they 'had something more important to do!' This was happening frequently and costing thousands in wasted fuel. Some procedural training took place and the issue was resolved. It just goes to show that *"You don't know what you don't know."*

[Click to see an Angel Trains case study](#)

Transport



"PowTechnology offers incredibly robust, reliable and easy-retrofit IIoT solutions. In various applications, they deliver the data Angel need to understand normal performance and to identify anomalies. Like Angel, PowTechnology are committed to continuous improvement. For ten years their solutions have really helped us understand what is happening on our trains, so we can continue to offer industry leading asset management services."



GRAHAM DUTTON
Product Technology Manager



Smart Agriculture



From knowing when to deliver fertiliser or animal feed to understanding soil temperature, from monitoring water abstraction to controlling pumps, there are so many ways that IIoT can help lower costs and improve yield.

One great example that I've been involved with concerns digestate. Digestate is a nutrient-rich substance, produced by anaerobic digestion, which improves plant growth and yield, when spread at the right time. It has become even more essential at a time when agriculture faces formidable economic, environmental and geopolitical challenges.

My customer, JF Hudson, offers 20 years of specialist agricultural engineering experience, helping farmers resolve operational and commercial challenges.

In many cases, digestate tanks are geographically dispersed, away from the main farm buildings and don't have external gauges to indicate volume. They may have valves, which can fail or suffer tampering, resulting in leakage.

The supplier typically sends a fleet of tankers from their digestion facility to fill up the farm tanks. Historically, the ordering & scheduling of deliveries was handled manually, without the use of data, leading to inefficiencies and run outs.



"
Agriculture

"We were recommended to PowTechnology by Siemens and found them agile and responsive from the outset. The proof of concept exceeded our expectations in terms of robust data and the benefits derived. The project was initiated to mitigate the consequences of run-out and overspill incidents, but the additional benefits of using accurate level data to schedule cost-effective, eco-friendly logistics has been a massive bonus. We are delighted with this digital transformation solution and have expanded its use across our operation."



JF HUDSON
Managing Great Tanks

JAMES HUDSON
Owner

Tanker drivers had no idea prior to arrival if the tank needed any more product. They filled in paper documentation to record a delivery. If they could only deliver a part-load, they would record their best guess. They may even turn up to find the tank already full! Paper records reached the customer's Logistics Department over a couple of days, where an online spreadsheet would be updated, but would already be out of date.

This is a situation where remote tank level monitoring and reliable alerts can and does make a huge improvement to emergency response and general efficiency, reducing environmental risk, exposure to Environment Agency fines, cutting logistics costs and ensuring product is always available when needed.

The IIoT solution provided remotely monitors the tanks, using power-optimised, solar-based and cellular-capable technology and advanced non-contact radar level measurement technology.



Edge processing detects when the level is dropping unexpectedly to provide leakage alarms but prevents false alarms the reason for levels dropping quickly is that spreading is taking place.

[Click here for the full case study](#)

Data can be viewed remotely on web-enabled devices. Reliable, near real-time level data allows for logical, cost-effective delivery scheduling, maximising tanker productivity, whilst reducing fuel usage and the environmental consequences of haulage.

Conclusion: The Time is Now!!

Digital manufacturing isn't about tech for tech's sake. It's about driving business outcomes—service, cost, safety, productivity, margin, sustainability and customer loyalty.

UK industry has the tools, expertise and support to get moving. The technology is often already available and proven.

With the right partner, solutions can be cost-effective, fit-to-purpose and offer rapid, demonstrable payback, in line with your overall organisational strategy. At this stage, not investigating the possibilities of IIoT, risks obsolescence.



About PowTechnology

PowTechnology are IIoT specialists delivering customer-focused, scalable, smart solutions for remote monitoring, data acquisition and automation. Their Metron devices and platform support customers of all sizes, from their first steps towards digital transformation to global estates of connected instrumentation.

Solutions are designed with the user in mind, so customers don't need specialist internal engineering resource. Solutions are often designed using innovative third-party technology to deliver customised, application-specific solutions.

As a Siemens Solution Partner and ISO9001/ISO27001 certified company, quality and security are at the heart of everything PowTechnology do.

About the Author

Dave Oakes is a seasoned digital transformation expert with a degree in physics and over 30 years of experience in industrial automation and IoT. He connected his first sensor to the internet back in 2001—long before IIoT became a buzzword. Dave has since worked with hundreds of companies to simplify complex technology and deliver measurable value. He shares insights and practical guidance on LinkedIn: [Dave Oakes LinkedIn](#).



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