

PROCESS INSTRUMENT SOLUTIONS

INSTRUMENTATION STRATEGIES TO PREPARE YOUR PLANT FOR THE ENERGY TRANSITION

POWER GENERATION

Delivering accuracy, resilience and efficiency for a lower-carbon future

About Us

Process Instrument Solutions supports businesses across multiple industries by combining deep instrumentation expertise with a practical, consultative approach to the energy transition. By assessing existing measurement and control systems, identifying gaps in accuracy, reliability and digital connectivity, and recommending proven, future-ready technologies, we help plants build a clear instrumentation roadmap aligned to decarbonisation and efficiency goals.

Through high-quality products, system integration, calibration services and ongoing technical support, Process Instrument Solutions enables organisations to improve energy performance, enhance operational resilience and confidently prepare their plants for a lower-carbon future.

Drivers of Change

The global energy transition is being accelerated by decarbonisation targets, tightening regulations and increasing sustainability expectations. Industrial plants are under growing pressure to adapt in order to remain compliant, competitive and environmentally responsible.

Beyond Energy Sources

Meeting these challenges requires more than switching to cleaner energy. Plants must also modernise how they measure, monitor and control key process variables, as accurate data is essential to understanding and improving performance.

Role of Instrumentation

Instrumentation underpins operational excellence. High-accuracy measurement, enhanced digital connectivity, predictive maintenance and advanced analytics enable plants to optimise efficiency while gaining clear visibility of energy use and carbon impact.

Purpose of This Whitepaper

This whitepaper sets out practical instrumentation strategies that help industrial sites re-engineer their measurement and control systems, providing a robust foundation for efficient, resilient and low-carbon operations.

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The Energy Transition Reality

Across energy intensive industries, legacy plants built decades ago still operate with ageing measurement systems that lack the precision, connectivity and diagnostics needed for energy optimisation. While complete infrastructure replacement may be cost-prohibitive, improved instrumentation can deliver dramatic performance gains without wholesale rebuilds. Upgrading to smart, high-accuracy sensors and analytics platforms allows operators to:

- **Reduce energy waste through tighter process control**
- **Detect inefficiencies invisible to older analogue systems**
- **Enable remote monitoring and digitalisation pathways**
- **Support safety and compliance in new fuel blends and emissions reporting**



A 2025 DNV survey of energy professionals found that only

55% BELIEVE THE ENERGY TRANSITION IS ACCELERATING

*Source - DNV

New research from 2025 shows

64% OF BUSINESSES

say rising and unstable energy costs are already hurting profitability & competitiveness

*Source - EY.com

The International Energy Agency (IEA) Energy Efficiency 2025 report indicates that while global energy efficiency progress increased to

1.8% IN 2025

*Source - IEA.org

Why Instrumentation Matters in the Energy Transition

High-precision flow, pressure, temperature and analytical measurement enables fine-tuning of process variables, reducing fuel consumption and emissions. For example, Coriolis and ultrasonic flowmeters provide near-zero maintenance and high accuracy, essential for tracking energy flows and efficiencies.

Smart sensors detect performance drift and incipient failures well before traditional threshold alarms. Predictive strategies reduce unplanned downtime and extend asset life — a clear sustainability benefit.

Instrumentation that supports HART-to-IoT gateways, wireless sensor networks and edge-to-cloud connectivity brings real-time visibility into plant performance a prerequisite for energy management systems (EnMS) and digital twins.

78% OF POWER COMPANIES HAVE INTEGRATED IOT SENSORS INTO GRID INFRASTRUCTURE

61 % UTILISE AI-DRIVEN PREDICTIVE ANALYTICS FOR EQUIPMENT MAINTENANCE

65 % REPORT IMPROVED OPERATIONAL EFFICIENCY FROM DIGITALISATION



Core Instrumentation Strategies for the Modern Plant

The following strategic themes focus on tangible, implementable instrumentation upgrades that support energy transition goals:

Assess and Prioritise Critical Measurement Needs

Perform a gap analysis to identify where measurement uncertainty most impacts energy performance. Prioritise upgrades in areas such as:

- Flow measurement for fuel and steam
- Temperature and pressure control in heat recovery systems
- Gas and composition analysis for combustion optimisation
- Moisture and humidity measurement in process inputs.

Adopt Smart and Resilient Sensors

Modern smart transmitters with drift-resistant electronics and self-diagnostics not only improve reliability but provide actionable data sooner. Retrofitable smart devices allow staged investment with minimal disruption.

Embrace Connectivity and Analytics

Ensuring instrumentation outputs can be integrated into supervisory systems, historians and analytics platforms unlocks advanced energy performance monitoring. Devices that communicate over standard protocols accelerate digital transformation.

Implement Predictive and Preventive Calibration

Calibration isn't just compliance it's energy performance assurance. Regular, documented calibration ensures instrumentation maintains accuracy where it matters most and supports predictive maintenance programmes.

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As plants incorporate alternative energy sources such as hydrogen blending, biofuels or CCUS (Carbon Capture, Utilization and Storage) instrumentation must adapt. These measurement capabilities provide the confidence operators need to safely adopt new energy carriers.



HYDROGEN-COMPATIBLE FLOW AND PRESSURE SENSORS, DESIGNED FOR HIGH PRESSURES AND UNIQUE FLUID PROPERTIES

HIGH-RESOLUTION GAS ANALYSERS FOR PURITY AND EMISSION TRACKING





ADVANCED LEAK DETECTION SYSTEMS CRITICAL FOR SAFETY IN HYDROGEN AND LOW-CARBON ENERGY ENVIRONMENTS

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Financial Strategies to Enable Investment

Financial constraints often slow instrumentation upgrades. Innovative financing approaches such as fixed monthly payment and lifecycle support programmes help remove upfront capex barriers while embedding maintenance and support into the investment.

The new way to pay from Process Instrument Solutions. SolutionsPLUS offers a complete technical and financial package for projects. With a fixed monthly fee and the assurance of a guaranteed and accurate measurement, your project will be supplied, installed, maintained and fixed/ replaced if necessary, ensuring peace of mind and total reassurance.

FEATURES AND OPTIONS	FIXED MONTHLY PAYMENTS	INSTRUMENTS PROVIDED	INSTALLATION & COMMISSIONING	CALIBRATIONS & MAINTENANCE	CONTRACT DURATION WARRANTY	ONLINE TECHNICAL SUPPORT	ACCESS TO PI PORTAL	REPAIR OR REPLACEMENT*
SOLUTIONSPLUS	✓	✓	✓	✓	✓	✓	✓	✓
INSTRUMENT PURCHASE		✓						
SERVICES			✓	✓				

*Only covers manufacturing defects (damage or misuse excluded)

These packages make instrumentation modernisation more accessible and ensure uptime and performance are part of the value proposition.



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Benefits of Instrumentation-Led Modernisation

Benefit Category	Impact
Energy Efficiency	Lower fuel and utility costs
Operational Reliability	Reduced unplanned downtime
Safety & Compliance	Better emissions and hazard management
Digital Readiness	Foundation for AI/ML and advanced analytics
Asset Life	Extended service life through predictive maintenance

The energy transition is not a single project it's a continuous journey. At its core lies information accurate, timely and actionable. By investing in modern instrumentation and supporting systems, plants can:

- **Unlock operational savings**
- **Support sustainability commitments**
- **Build resilience against future regulatory changes**
- **And create a foundation for digital transformation**

Start your journey with a strategic instrumentation assessment, map critical measurement needs to business outcomes, and invest in the right technologies that support both today's operations and tomorrow's energy challenges.

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