Nova Analytical Systems

CASE STUDY:
PRECISION SYNGAS ANALYSIS IN EXTREME CONDITIONS

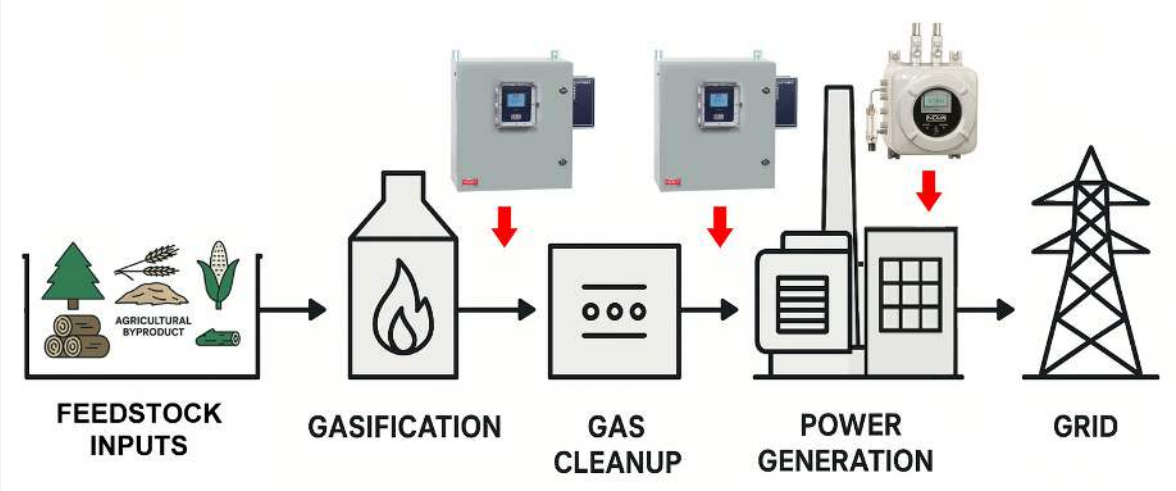
MASTERING GAS MONITORING AT A SOUTHWEST SYNGAS PLANT

THE CHALLENGE

A syngas solutions innovator based in Nevada's rapidly expanding clean energy sector has made significant strides in modernising its operations. The plant, which transforms biomass into clean syngas for sustainable energy, encountered a major challenge: accurately and continuously monitoring complex syngas compositions in the region's harsh, high-temperature desert environment. The existing gas analyser was increasingly unreliable, suffering from frequent downtime, high maintenance requirements, and inconsistent readings—issues that threatened both production and regulatory compliance.

OBJECTIVE

Recognizing the need for a robust and intelligent solution capable of delivering real-time, precise data on multiple gases without constant supervision, the plant's management team sought expert advice. Nova Analytical Systems recommended the Nova Model 970 Heavy-Duty Flue Gas Analyzer, a system specifically engineered for demanding industrial environments where accuracy, automation, and uptime are essential.



KEY FEATURES AND BENEFITS

- Comprehensive Multi-Gas Analysis: The Nova 970 simultaneously measures hydrogen (up to 100%), oxygen, carbon dioxide, carbon monoxide, and methane—critical for syngas quality and process control.
- Advanced Sensing Technology: The system utilizes a thermal-conductivity detector for hydrogen (fully compensated for measured CO, CO_2, and CH_4), an electrochemical sensor for oxygen, and infrared detection for CO_2, CO, and CH4.
- Automatic Moisture Removal: The moisture control system is equipped with a thermoelectric chiller and peristaltic pump to ensure a dry sample, enabling detector operation and reliable readings.
- Climate-Resilient Cabinet: The NEMA 4 enclosure with built-in air conditioning is designed to withstand Nevada's extreme desert temperatures. The Nevada site also required suitability for Class 1 Division 2 hazardous rated areas.
- Nova Smart-Control Package: Features include auto-calibration with programmable intervals, a one-touch "Calibrate Now" function, built-in diagnostics, calibration history, and troubleshooting guides.
- Remote Access and Control: The system can be operated and troubleshooted remotely via secure VPN or Microsoft Teams, reducing the need for on-site visits.
- Industrial-Grade Construction: Built-in surge protection, stainless steel wetted parts, and a heavy-duty sampling train ensure long-term durability.
- User-Friendly Interface: A color touchscreen HMI that shows gas readings and any alarm conditions.

IMPLEMENTATION AND RESULTS

Installation of the Nova 970 was smooth and efficient. From the outset, the analyser provided steady gas sampling at 1 L/min, integrating seamlessly with the plant's control systems and delivering accurate, real-time data with automatic alarms. The automatic calibration and remote management features significantly reduced maintenance time and provided the team with complete confidence in their gas data, even during Nevada's hottest days.

CONCLUSION

The plant now benefits from continuous, reliable gas monitoring, ensuring operational consistency and environmental compliance. Downtime and labour costs have been reduced thanks to automated calibration and minimal maintenance requirements. Enhanced process optimisation is achieved through higher-quality, real-time gas data, and the system's stability in extreme heat further supports operational resilience. The Nova 970 has become an integral part of the plant's process and safety strategy, backed by ongoing support from Nova Analytical Systems.