EMISSIONS REDUCTION

COMPARISON GUIDE

INSTRUMENT GAS ALTERNATIVES:

EASILY ASSESS TECHNOLOGIES & FIND THE RIGHT FIT FOR YOUR OPERATION

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SUMMARY

For operators tasked with reducing emissions from pneumatic devices, the 'best' instrument gas alternative isn't always clear cut. With so many factors to consider *(power availability, emissions goals, retrofit complexity)* comparing your options, side-by-side, can help! Our matrix summarizes key characteristics of each pneumatic signal alternative, including a brief description, typical site applicability, estimated cost profile, emissions reduction efficacy, as well as sizing and utility requirements.

While no single solution fits every application, this overview can help narrow your focus and guide internal discussions about what's realistically achievable at your facility.

Determining the right solution means striking a balance of cost, complexity, and regulatory compliance.

IG ALTERNATIVE TECHNOLOGIES INCLUDED:

- Instrument Air Systems
- Liquid Nitrogen Supply
- Electric Valve Actuators
- Combustion-based Vent Capture
- Compressor-based Gas Recovery
- Low-bleed Pneumatic Devices
- Hybrid Systems (Air + Electric)

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INSTRUMENT GAS ALTERNATIVES COMPARISON

IG ALTERNATIVE TECHNOLOGY	DESCRIPTION	APPLICABILITY	COST	EFFICACY	SIZING	UTILITY REQUIREMENTS
Instrument Air Systems	Compressors and dryers deliver clean, dry air to replace instrument gas.	Best for facilities with power availability and multiple pneumatic users.	• High CAPEX. • Low OPEX.	• **100% emissions elimination** from pneumatics. • Widely used in the industry.	Requires air compressors and dryers.	Power, maintenance access, adequate building heating and ventilation.
Liquid Nitrogen Supply	Vaporized nitrogen delivered via liquid nitrogen tanks to provide pneumatic signals without emissions.	Ideal for small well sites or sites with no or limited power and minimal infrastructure.	• Low CAPEX. • Medium OPEX (due to deliveries).	• **100% emissions elimination** from pneumatics. • Emerging in the industry.	Tank space only, highly scalable.	No power required. Required delivery schedule needed.
Electric Valve Actuators	Electric actuators modulate control valves, eliminating the need for pneumatics.	Great for cold-climate, power-equipped sites with few pneumatic users, or remote pipeline operations.	• High CAPEX. • Low OPEX.	• **100% emissions elimination** (actuated valves only).	Compact per unit, scale based on valve count.	Power required. Solar panels may be used in lieu of line or generator power (pipeline applications).
Combustion-Based Vent Capture	Captured gas from pneumatics is routed to combustors to meet emissions targets.	Facilities with existing combustors and limited capital.	• Low to moderate CAPEX (if combustor exists). • Low OPEX. • Moderate engineering cost.	• Reduces emissions. • Combustor destruction efficiency monitoring required.	Minimal additional space if infrastructure exists. Significant engineering and retrofitting required.	None, beyond combustor operation.
Compressor-Based Gas Recovery	Uses captured compressor emissions to power pneumatic devices.	Sites with compressors and a need for partial emissions reduction.	• Moderate engineering cost. • Low OPEX.	• Reduces emissions, and still requires reporting.	VRU required to repressurize captured vent gas.	None, beyond compressor operation.
Low-Bleed Pneumatic Devices	Upgraded pneumatic devices designed to decrease emissions.	Any facility looking to reduce emissions without major retrofits.	• Moderate CAPEX. • Low OPEX.	• Reduces but does not eliminate emissions. • May not be suitable for OOOOb compliance.	Same as traditional pneumatics.	Uses instrument gas, no new utilities.
Hybrid Systems (Air + Electric)	Combination of electric actuators for ON/OFF valves and instrument air for other pneumatic users.	Sites needing a balance between retrofit feasibility and pneumatic signal availability.	• Moderate to high CAPEX depending on configuration. • Low OPEX.	• **100% emissions reduction.**	Split sizing between electric and air components.	Power for electrically actuated valves, air for pneumatic users.

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At CANUSA EPC, we help operators make informed decisions based on real-world experience. We've seen the nuances of site power, valve density, weather risk, and regulatory targets.

When you're ready to talk instrumentation upgrades or emissions strategies, we'd be happy to share what's working in the field.

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