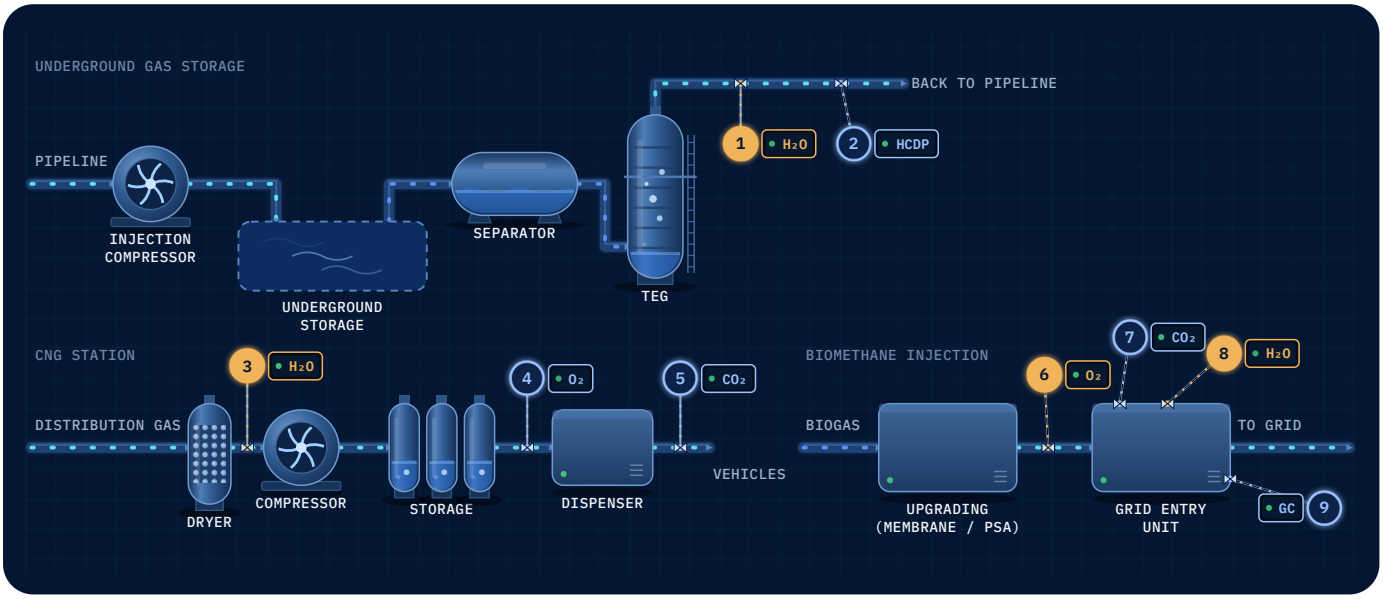
Gas storage, CNG and biomethane: where to measure moisture, O_2 and CO_2

Three places where gas re-enters a network or a vehicle: storage withdrawal, CNG dispensing and biomethane injection. Each numbered point shows what is measured, the typical limit and the analyzer that fits.



● YORK instrument ○ Integrated system (supplied through YORK)

How the process works

Each of these processes hands gas to someone else: back to the pipeline operator, to a vehicle, or into the gas grid. The handover point is where moisture, oxygen and CO_2 are checked against a written limit.

1. **Storage injection.** Pipeline gas is compressed into a depleted field or aquifer, where it picks up water and sometimes heavier hydrocarbons.
2. **Storage withdrawal.** Withdrawn gas passes a separator and is dried, usually with TEG, before it goes back to the pipeline.
3. **CNG station.** Distribution gas is dried, compressed to vehicle storage pressure, held in a cascade and dispensed.
4. **Biogas upgrading.** Membranes or pressure-swing adsorption remove CO_2 and water from biogas to make biomethane.
5. **Grid entry.** A grid entry unit checks the biomethane against the network entry limits, then odorizes and meters it.

Interactive version with animation:
https://www.yorkinstrument.ae/guides/gas-storage-cng-biomethane-measurement-points/

Measurement points

#	POINT	MEASURES	TYPICAL VALUE / LIMIT	RECOMMENDED SOLUTION
1	Storage withdrawal, after dehydration	Water dew point at line pressure	Example network limit −7 °C at 4 MPa; TEG dehydration reaches about −10 °C	DPT830, DPT990-EX, DPSS-61XX, DPT-600 Plus-EX
2	Storage withdrawal, after dehydration	Hydrocarbon dew point	Per the network specification (see the natural gas map)	Integrated system: hydrocarbon dew point analyzer or process GC
3	CNG station dryer outlet	Water dew point at storage pressure	At least 10 °F (5.6 °C) below the 99.0 % winter design temperature, at storage-container pressure (California, tested per ASTM D1142)	DPT830, DPT990-EX, DPT-600 Plus-EX
4	CNG storage / dispenser	Oxygen (%)	≤ 1.0 mol % (California CNG specification)	Integrated system: paramagnetic O_2 analyzer certified for the hazardous area
5	CNG dispenser	CO_2 (inerts)	$CO_2 + N_2 \leq 4.5$ % (California CNG specification)	Integrated system: CO_2 analyzer certified for the hazardous area
6	Biomethane grid entry	Oxygen	EN 16726: 10 ppm for sensitive users (24 h average); UK: ≤ 0.2 % above 38 barg, ≤ 1.0 % at or below; Spain: 0.01 mol %, relaxable to 1 mol % in some networks	PGA500, PGA530, POA200
7	Biomethane grid entry	CO_2 (%)	UK: ≤ 2.0 mol %; Spain: 2.5 mol %, relaxable to 4 mol % in some networks	Integrated system: NDIR CO_2 analyzer with a 0–5 mol % range in the grid-entry unit
8	Biomethane grid entry	Water dew point	UK: −10 °C at 7 barg for systems below 7 barg, up to −10 °C at 85 barg for systems above 16 barg	DM9600, DM9700, DPT810
9	Biomethane grid entry	H_2S, heating value and Wobbe index	UK entry: $H_2S \leq 5$ mg/m³; heating value calculated per ISO 6976	Integrated system: H_2S analyzer and process GC for heating value and Wobbe index

Typical values from published standards, regulations and technical literature. Your contract, licensor or plant specification always governs. Integrated systems are supplied by YORK through its partner integration factory.

Key references

1. Dehydration of gas from underground storage (Inż. Ap. Chem. 2010) — BazTech
2. Natural gas vehicle fuel regulations, Chapter 6 — California Department of Food and Agriculture
3. EASEE-gas CBP Hydrogen Quality Specification, additional material (EN 16726 limits) — ENTSOG
4. Network Entry Gas Quality Specification — Cadent Gas
5. Gas quality — Enagás
6. WG_GQ-187 gas quality comparison — Marcogaz
7. EMIB Appendix 7: Specification of water dew temperature of biomethane — Gas Governance UK