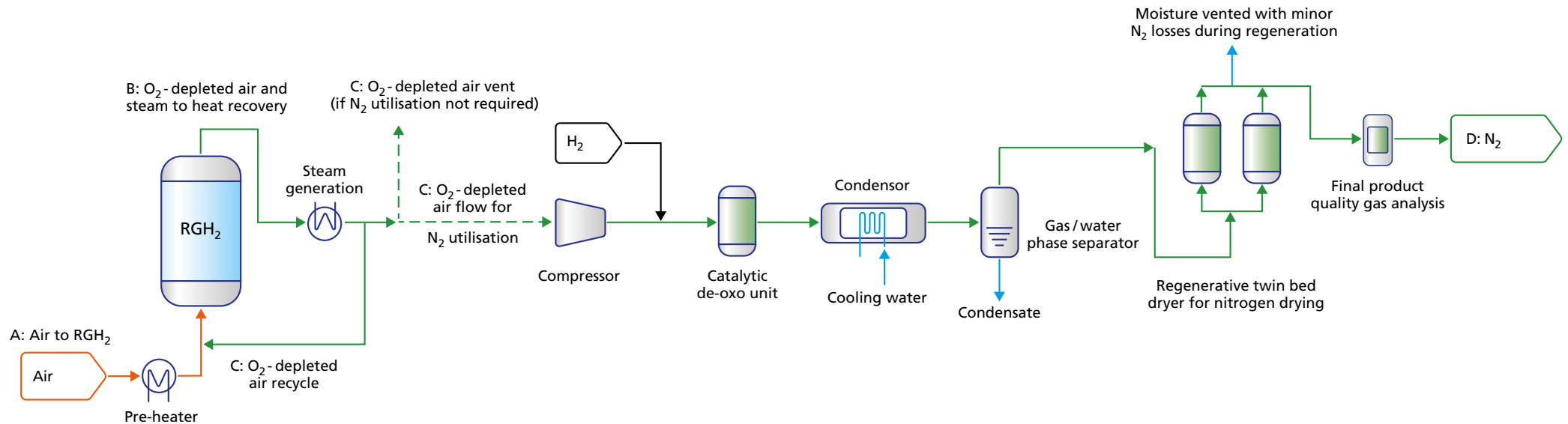
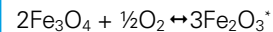


Stage 3: Air oxidation and oxygen-depleted air generation. Oxidation of the RGH₂ oxygen-carrier with air (with option for nitrogen purification).



Key reactions in the RGH₂ plug-flow, iron-oxide chemical looping reactor



* This non reversible reaction ensures complete conversion of the H₂ and CO over the iron-oxide during the stage 1. This enables separation of CO₂ and H₂O by condensation of H₂O to leave a stream with predominantly CO₂.

Biogas / Landfill gas feed Stream	O ₂ Mol%	N ₂ Mol%	H ₂ O Mol%	Temp °C	BFG / BOFG Feed Stream	O ₂ Mol%	N ₂ Mol%	H ₂ O Mol%	Temp °C
A: Air to RGH ₂	21	79	0	185	A: Air to RGH ₂	21	79	0	160
B: O ₂ -depleted air and steam heat recovery	0–8	92–100	0	923	B: O ₂ -depleted air and steam heat recovery	0–8	92–100	0	853
C: Cool O ₂ -depleted air	0–8	92–100	0	Ambient	C: Cool O ₂ -depleted air	0–8	92–100	0	Ambient
D: High purity, dry N ₂ product**	0.025	99.95	0.025	Ambient	D: High purity, dry N ₂ product**	0	99.95	0.025	Ambient

** Composition shown is indicative if the De-Oxo unit is run with slight excess of oxygen. As an alternative, the De-Oxo unit could be run with an excess of hydrogen to produce forming gas (Nitrogen with circa 2% hydrogen and zero oxygen content).