

Biomethane – Production and Quality

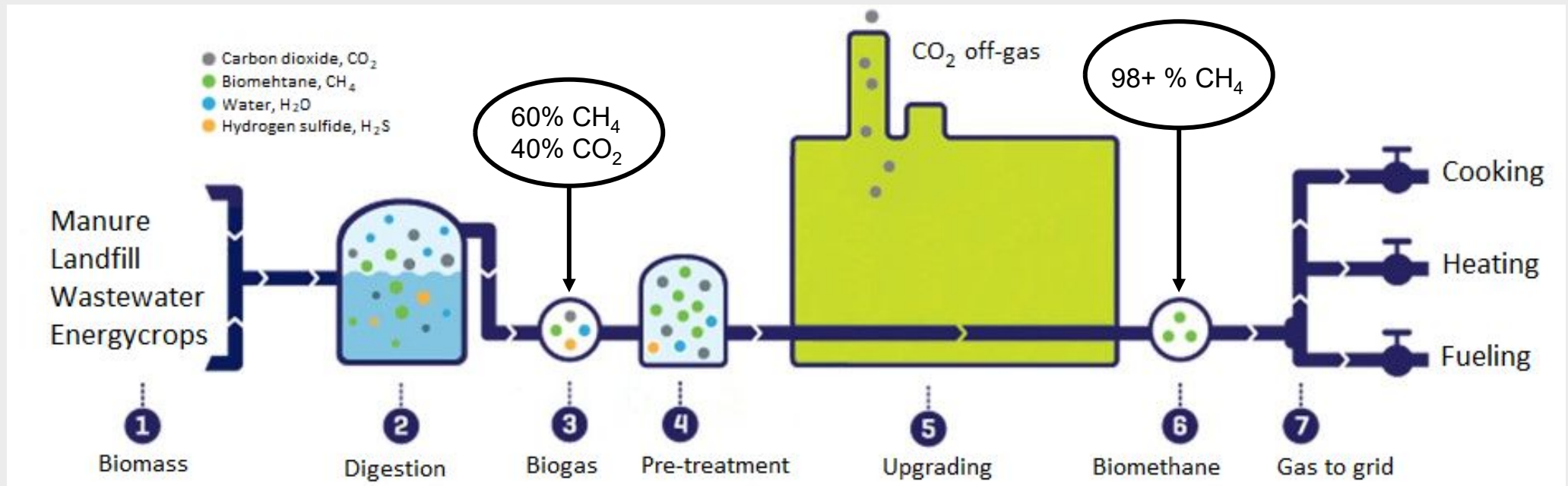
GERG 60th Anniversary conference

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Production of biomethane

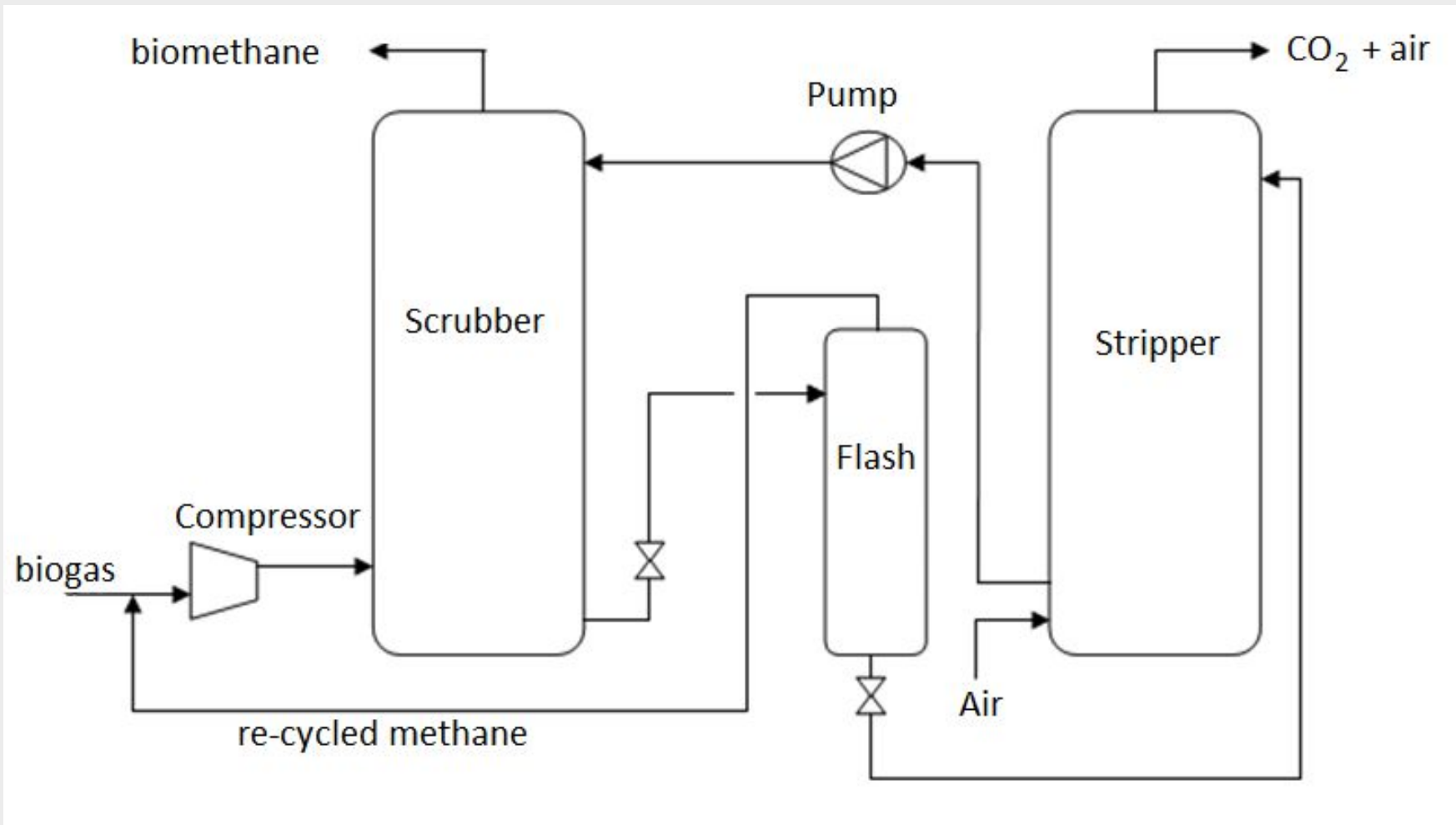


Picture modified from www.dmt-et.com

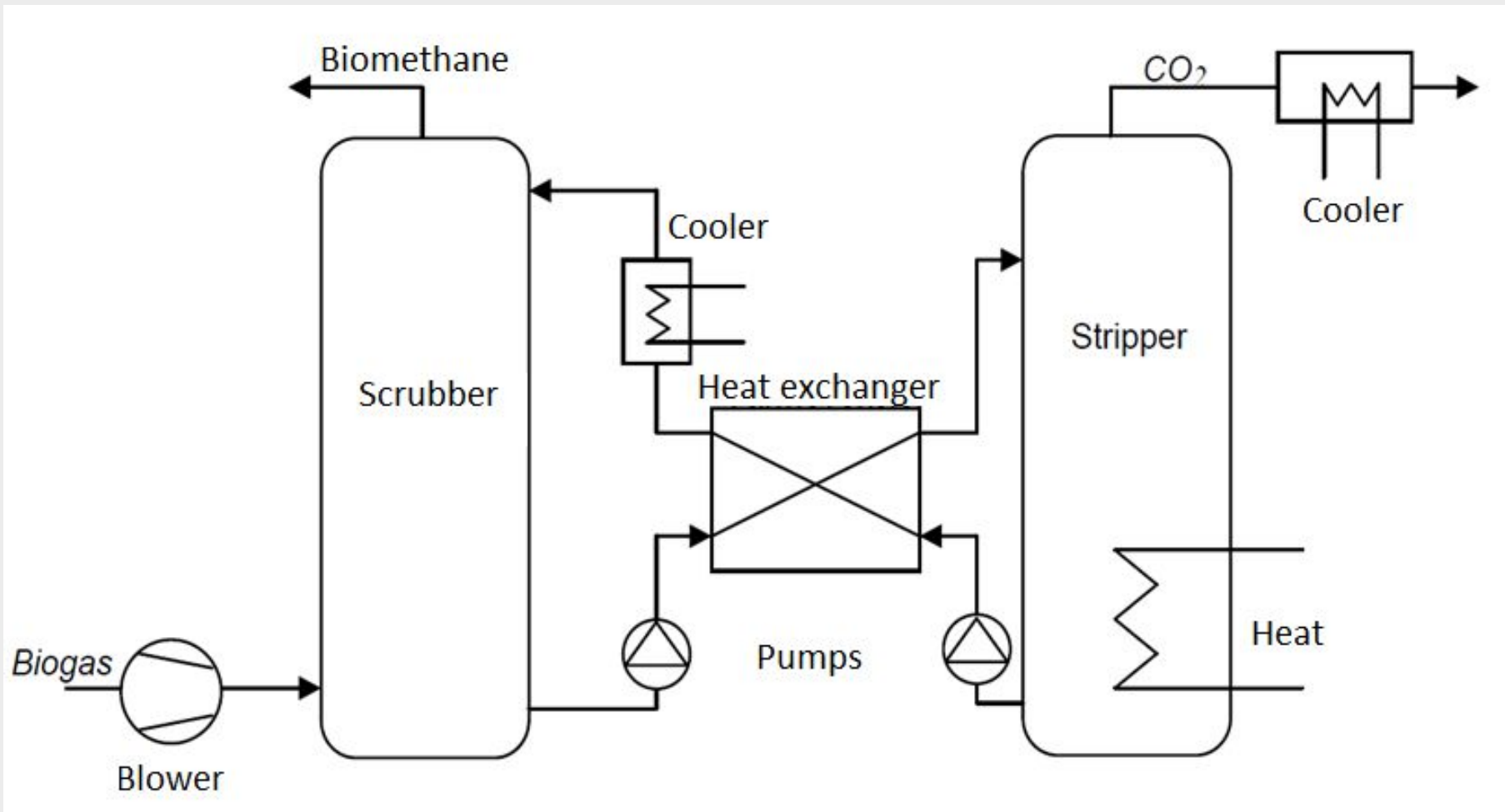
Relevant issues:

- Oxygen
- Methane loss
- CO_2 purity
- Price

Water scrubber

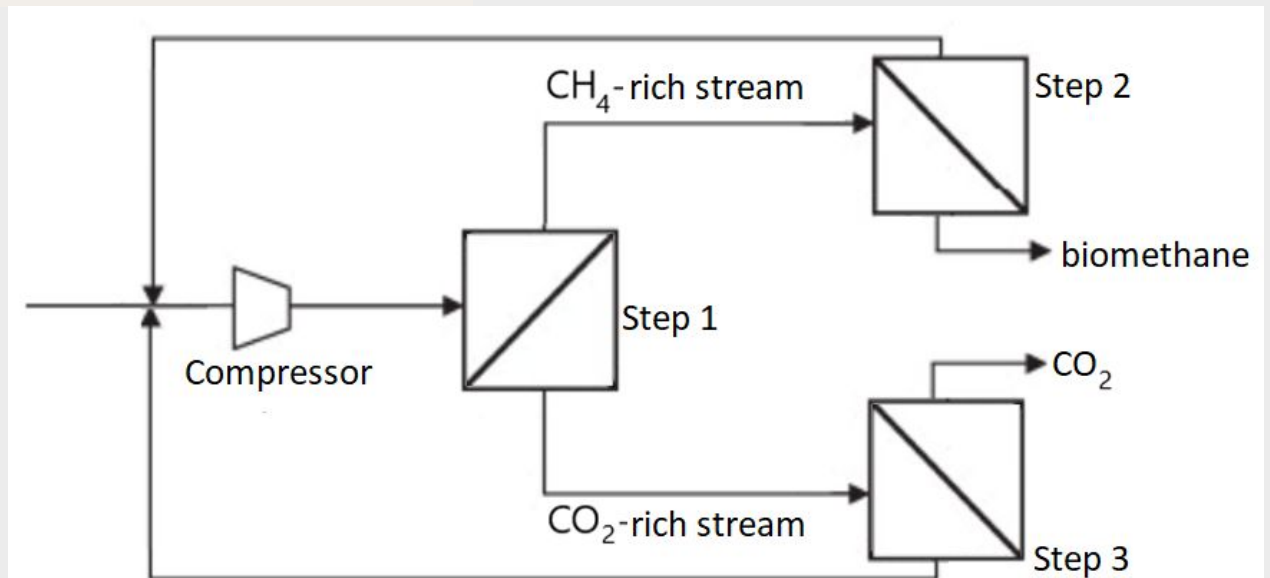
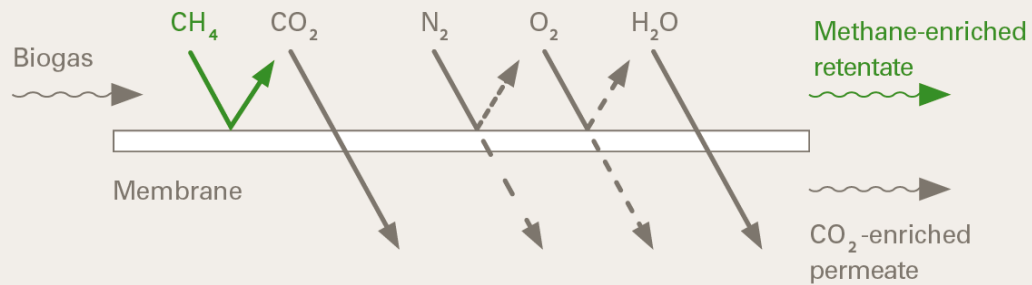


Amine scrubber

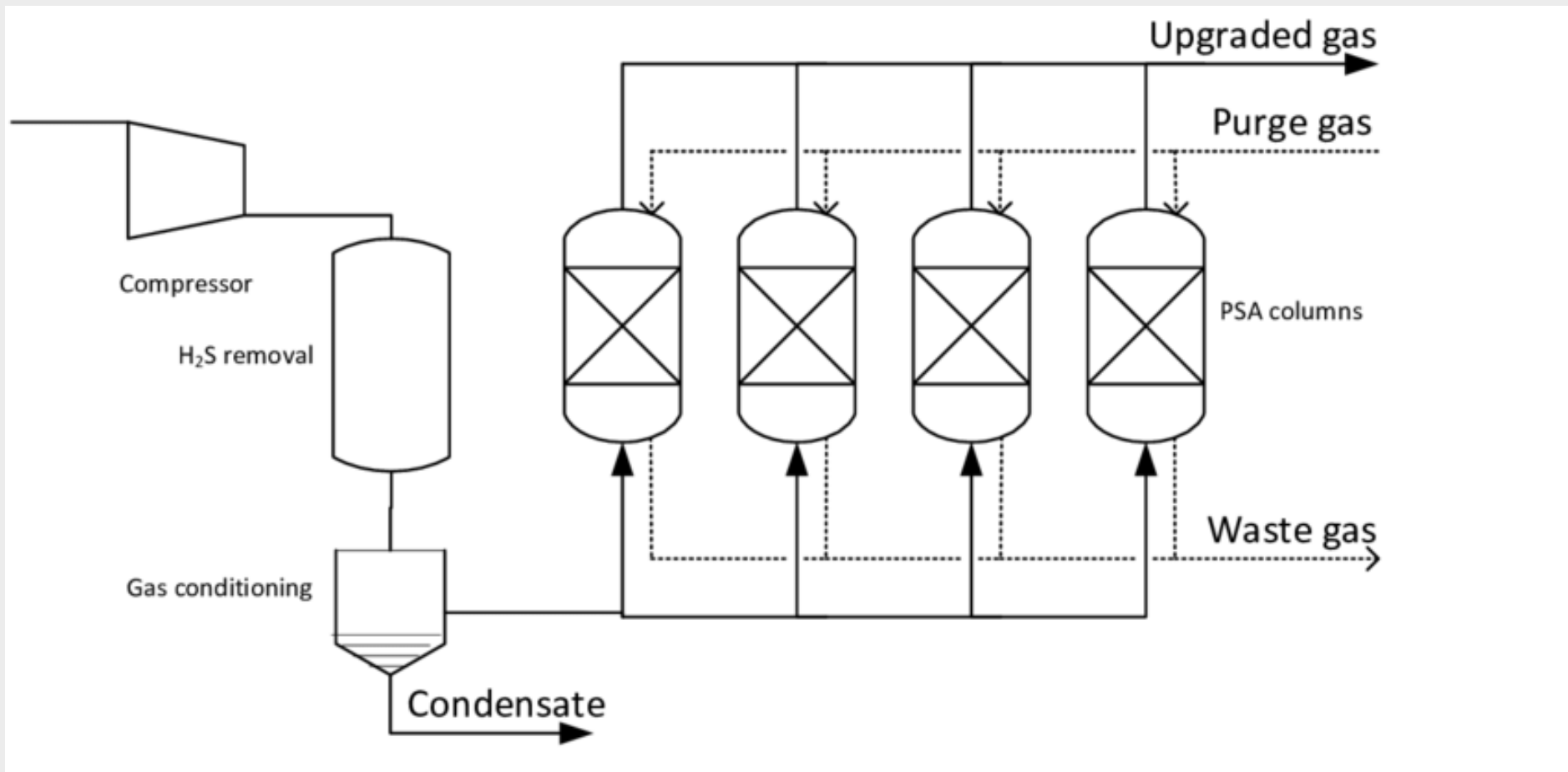


Membrane

Gas separation by means of membranes



Pressure swing adsorption (PSA)



Overview with technologies

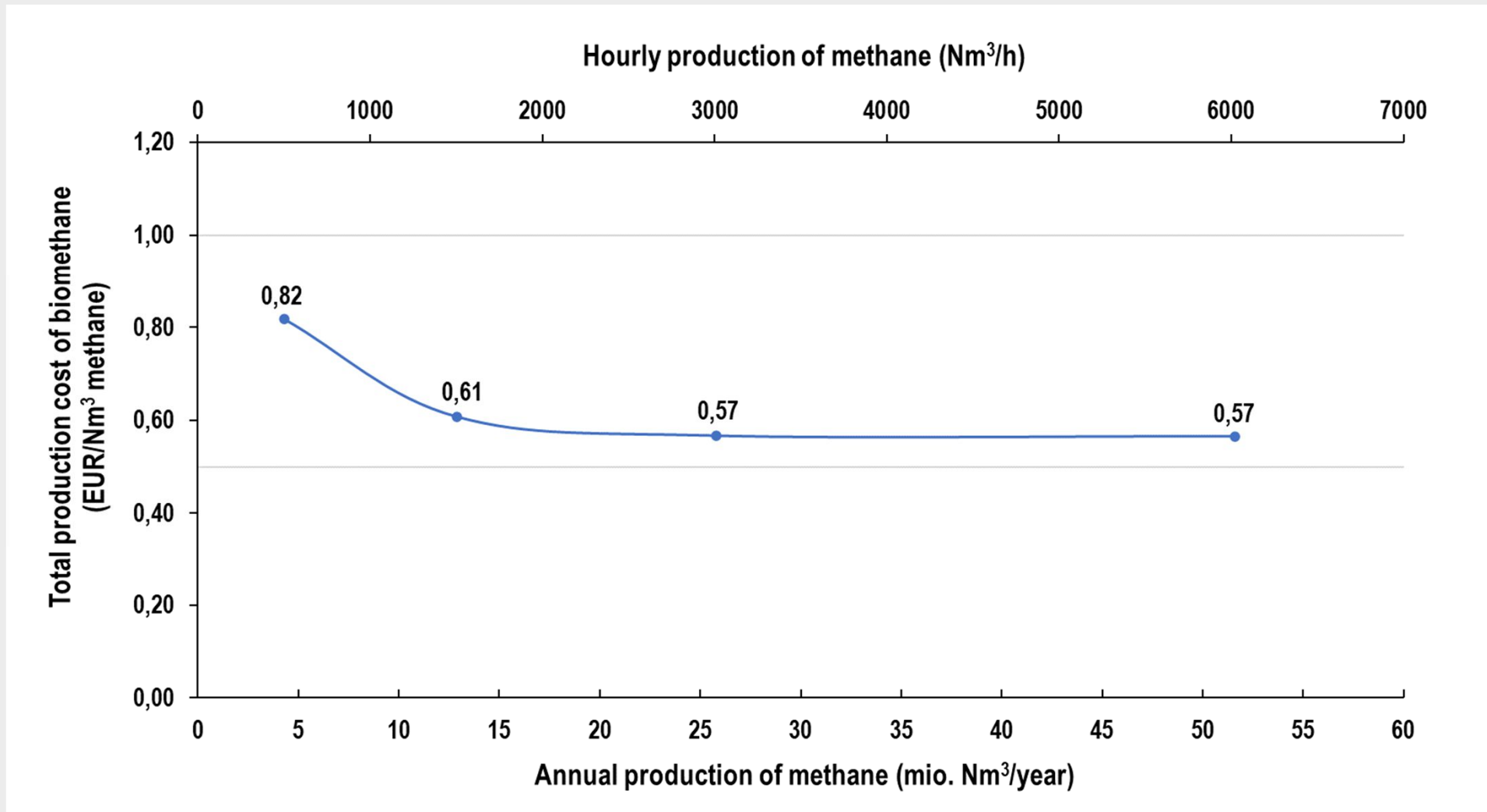
Upgrading technology	Minimum oxygen content [¤]	Methane loss [#]	Potential CO ₂ purity	Price €/Nm ³ [*]
Amine scrubber	<0,02%	≈0,05%	High	0,06-0,09
Water scrubber	0,25%	≈1%	≈85% air	0,08-0,10
Membrane	Low	≈0,5%	High	0,10-0,11
PSA	Low	1-2%	High	?

[¤] Can be removed catalytically

[#] Can be removed with RTO

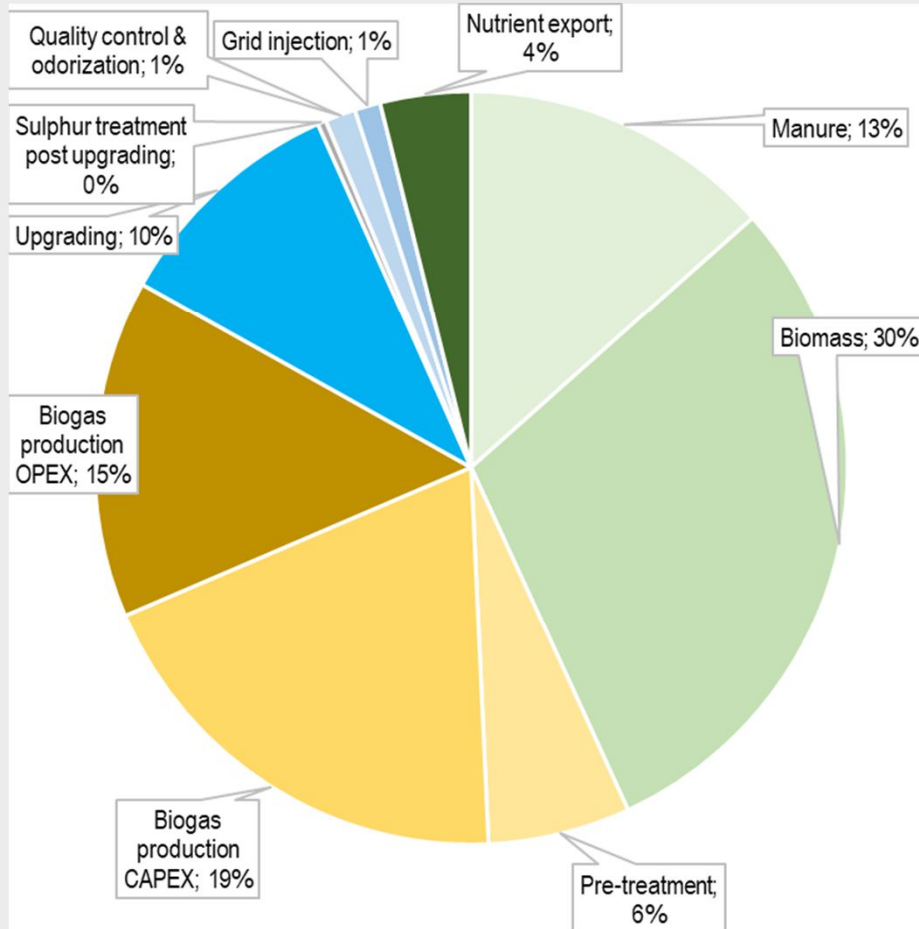
^{*} CAPEX & OPEX, for capacity of 1500 Nm³/h or 13 mio Nm³/year biomethane (2018 prices)

Economy of scale

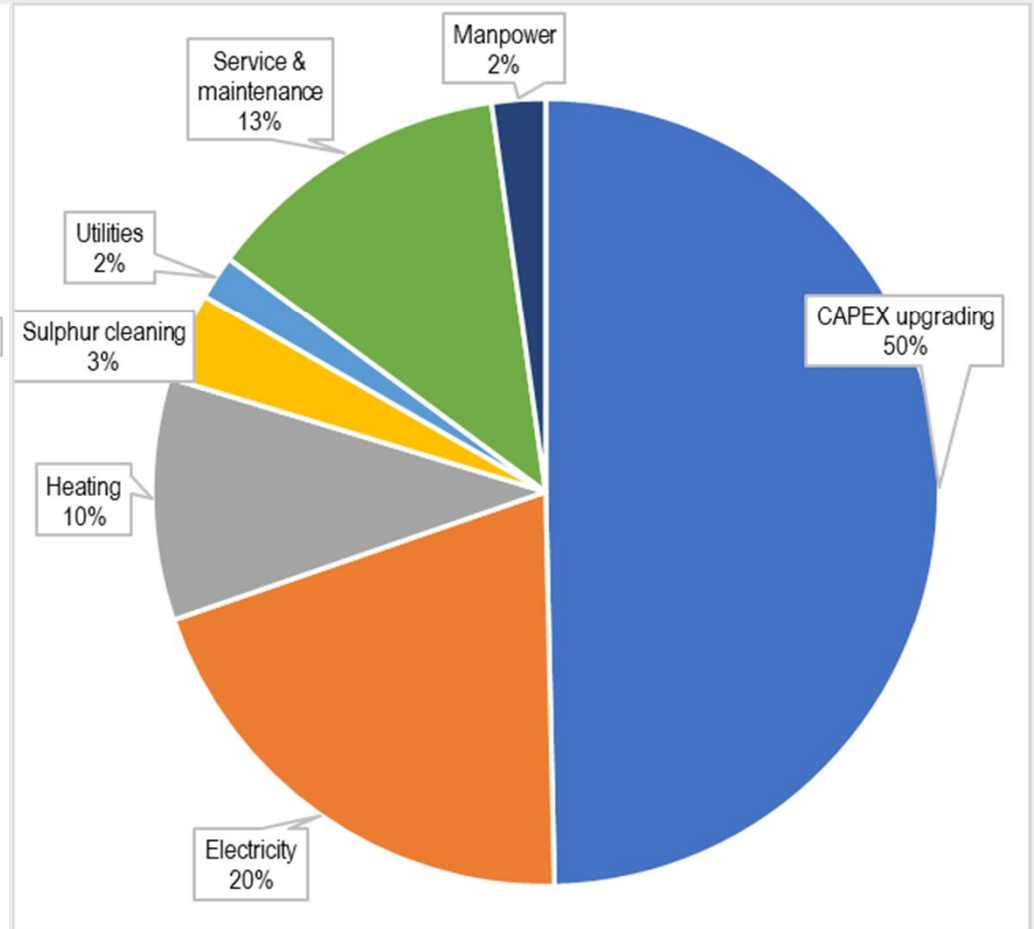


Cost of biomethane production

-from a Danish perspective (1500 Nm³/h or 13 mio. Nm³/year biomethane)



Entire biomethane production chain



Upgrading and sulphur cleaning expenses only (amine upgrading)