Operational modeling of sustainable gas supply chains

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Basic sustainable gas supply chain

- Biomass
- Cattle manure
- Digester
- Upgrading
- Injection
Cost price in relation to scale
Does decentralized production of biogas and centralized upgrading and injection in the natural gas grid make sense?
Influence decentralized production on cost price

Scale advantage for the configuration with a centralized digester, up to 13 €ct / Nm³.
Matching supply and demand

What is the cost price of green gas as a function of scale, when the seasonal fluctuation in gas demand must be met by a green gas supply chain?
Data gas demand in a geographical region
Scenario 1: Flexible biogas production

- **Biomass**
- **Cattle manure**

Diagram:
- **Digester**
- **Upgrading**
- **Injection**
Scenario 2: Green gas storage within supply chain

Q ≤ 10,000 Nm³: pipes 8.5 bar
10,000 < Q < 300,000 Nm³: pipes 100 bar (and compression)
Scenario 3: Adding second digester (with 6 months production)

Production second digester only during winter months
Comparison at scale 300 Nm$^3$/hr
Expanding the model
Increasing the Gas Demand Coverage (GDC)