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Operational modeling of sustainable gas supply chains

Evert Jan Hengeveld, Jan Bekkering

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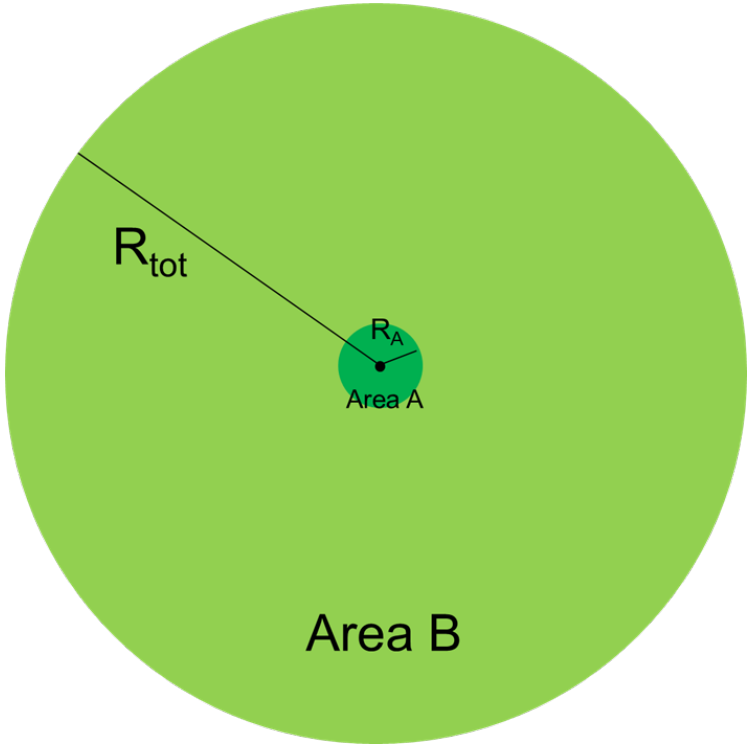
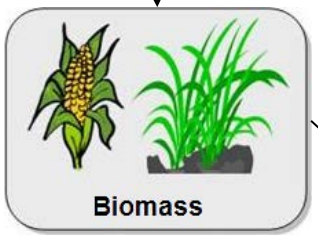
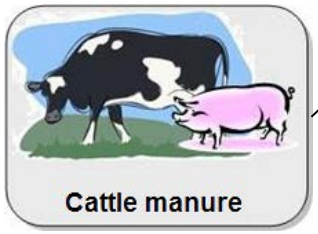
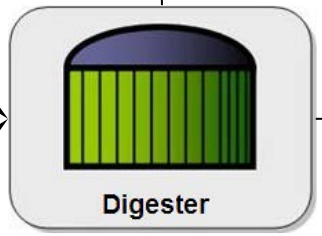
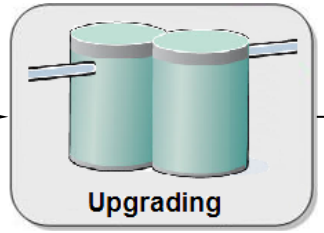
Basic sustainable gas supply chain

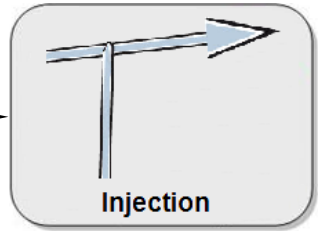












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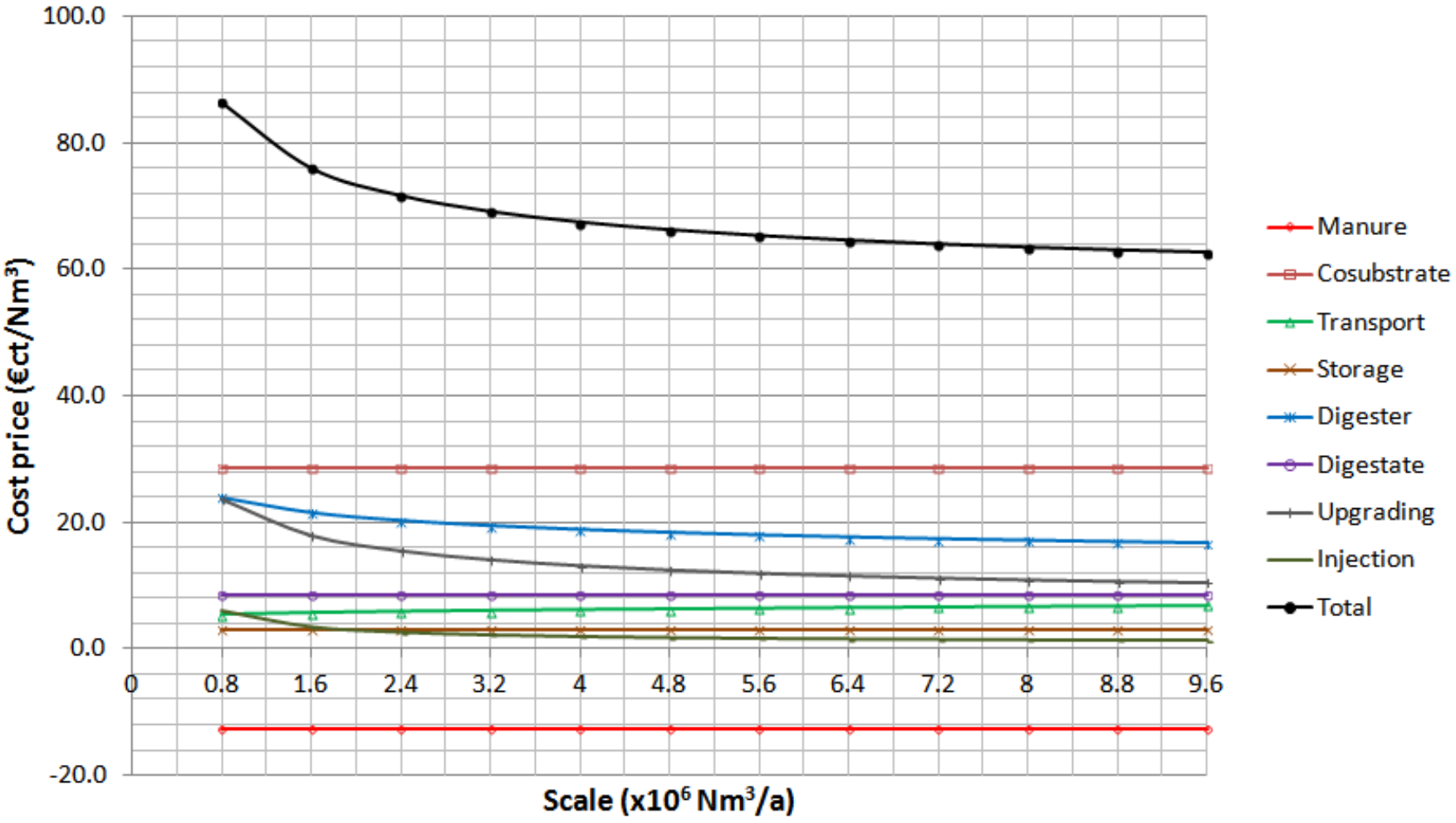
Cost price in relation to scale



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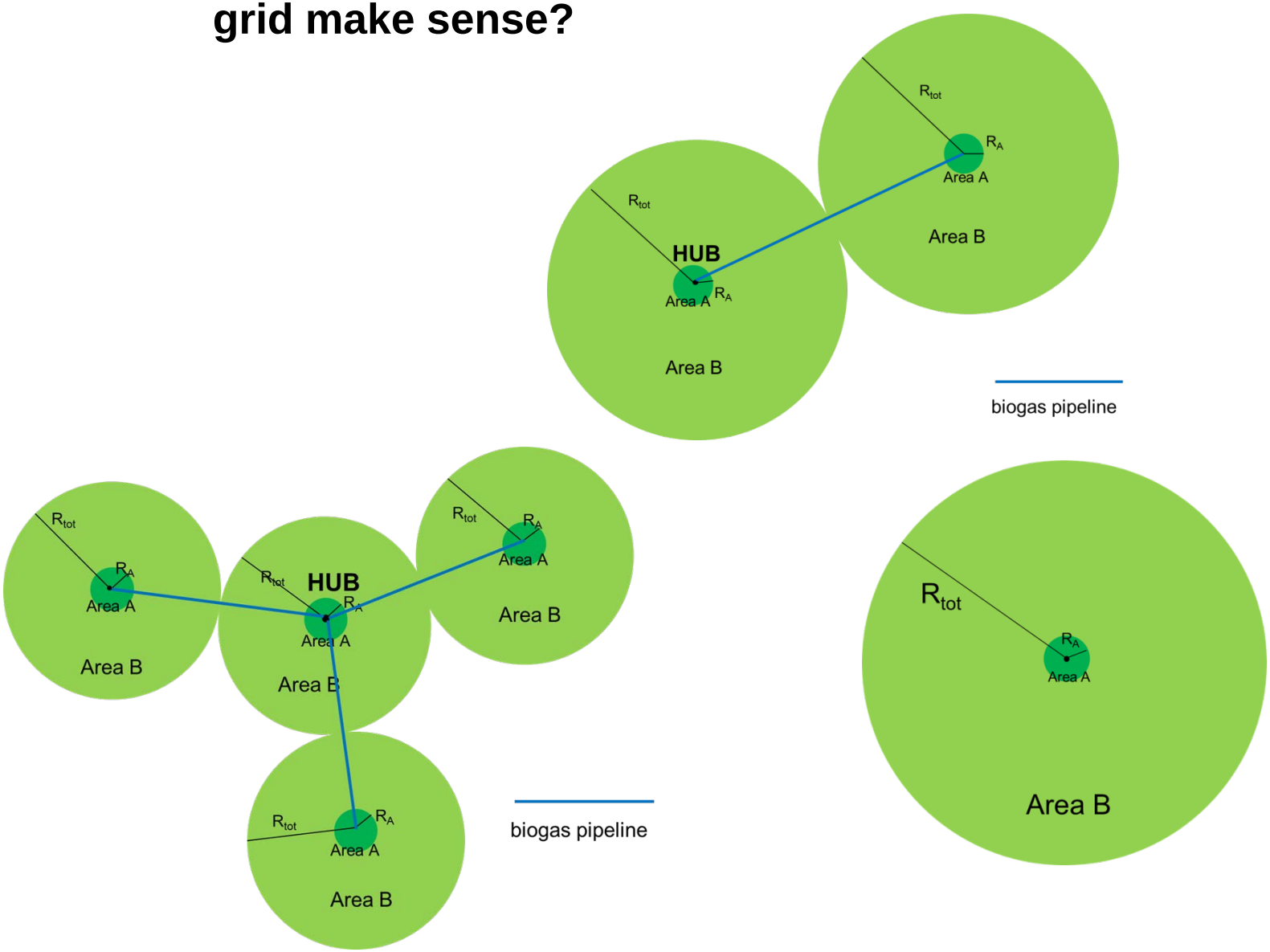
Does decentralized production of biogas and centralized upgrading and injection in the natural gas grid make sense?



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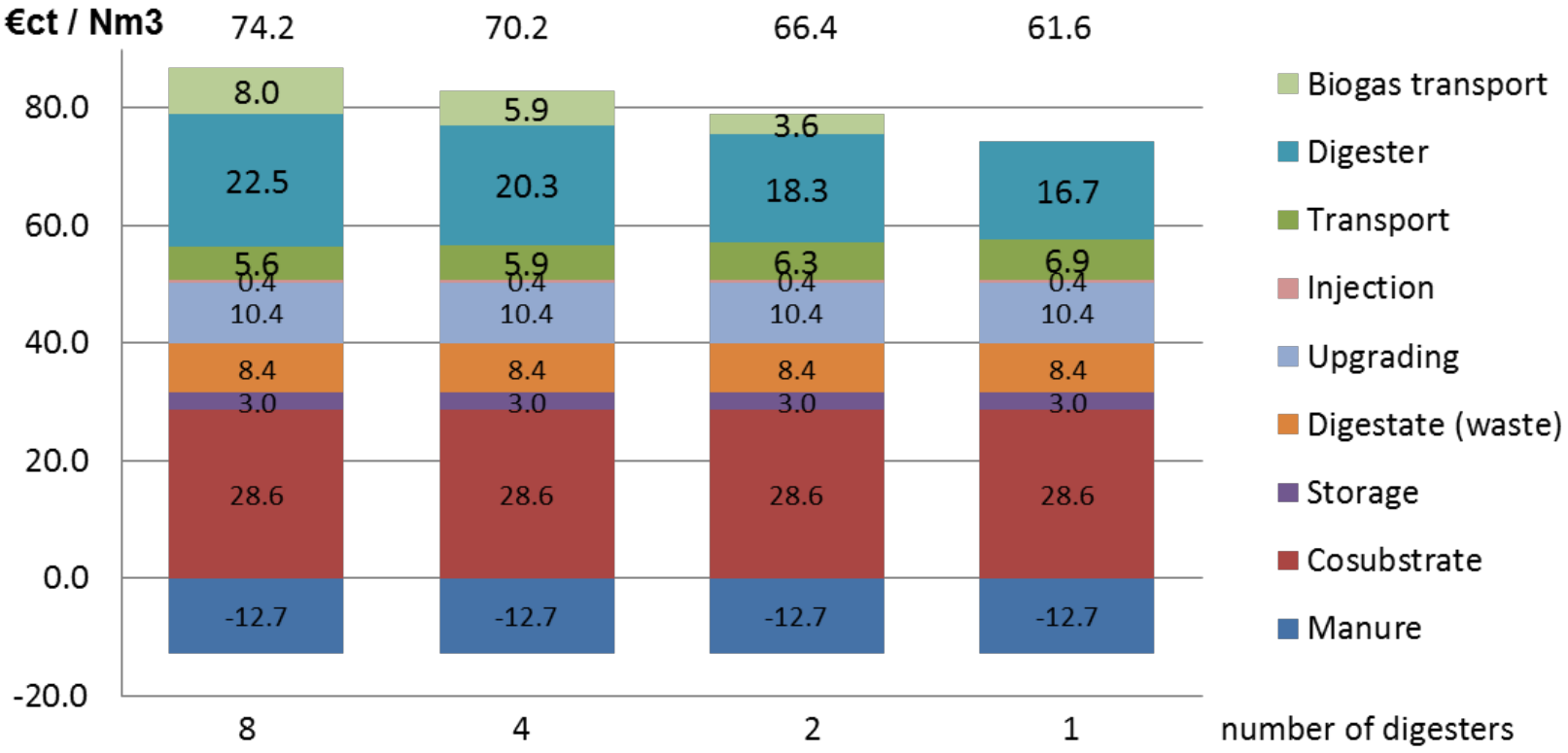
Influence decentralized production on cost price

Scale advantage for the configuration with a centralized digester, up to 13 €ct / Nm^3.



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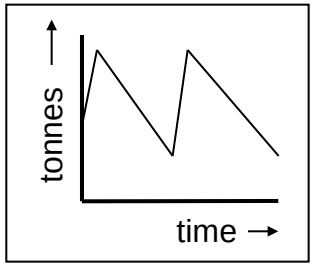
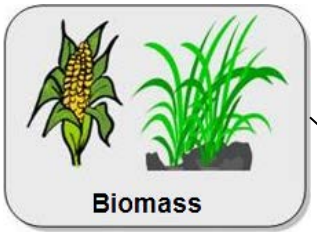
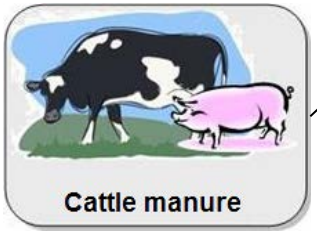
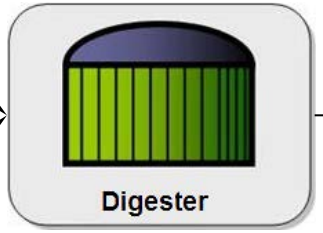
Matching supply and demand

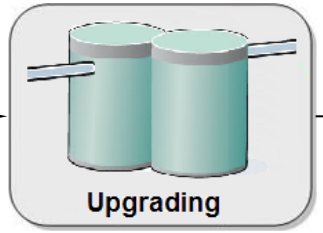


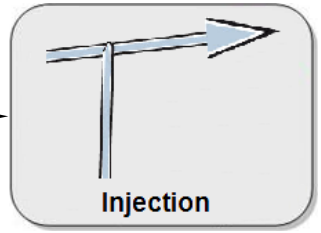
What is the cost price of green gas as a function of scale, when the seasonal fluctuation in gas demand must be met by a green gas supply chain?

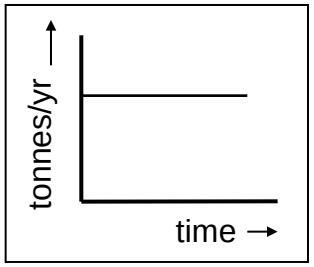


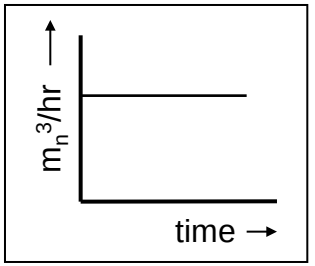


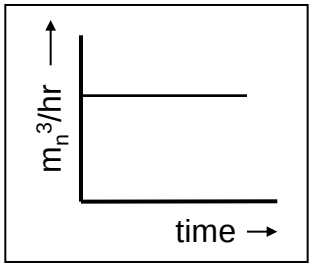


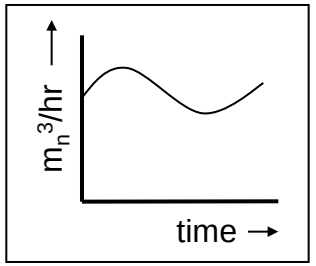












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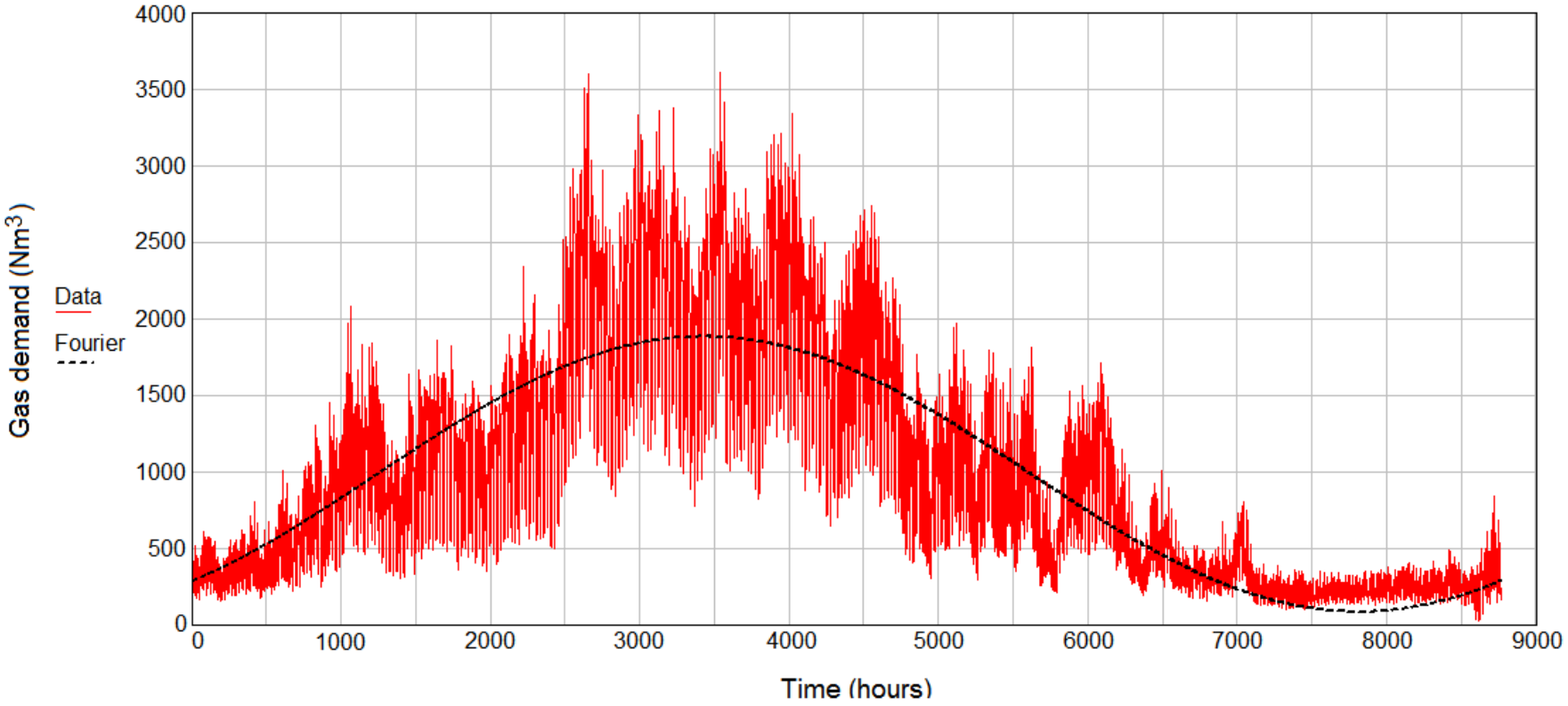
Data gas demand in a geographical region



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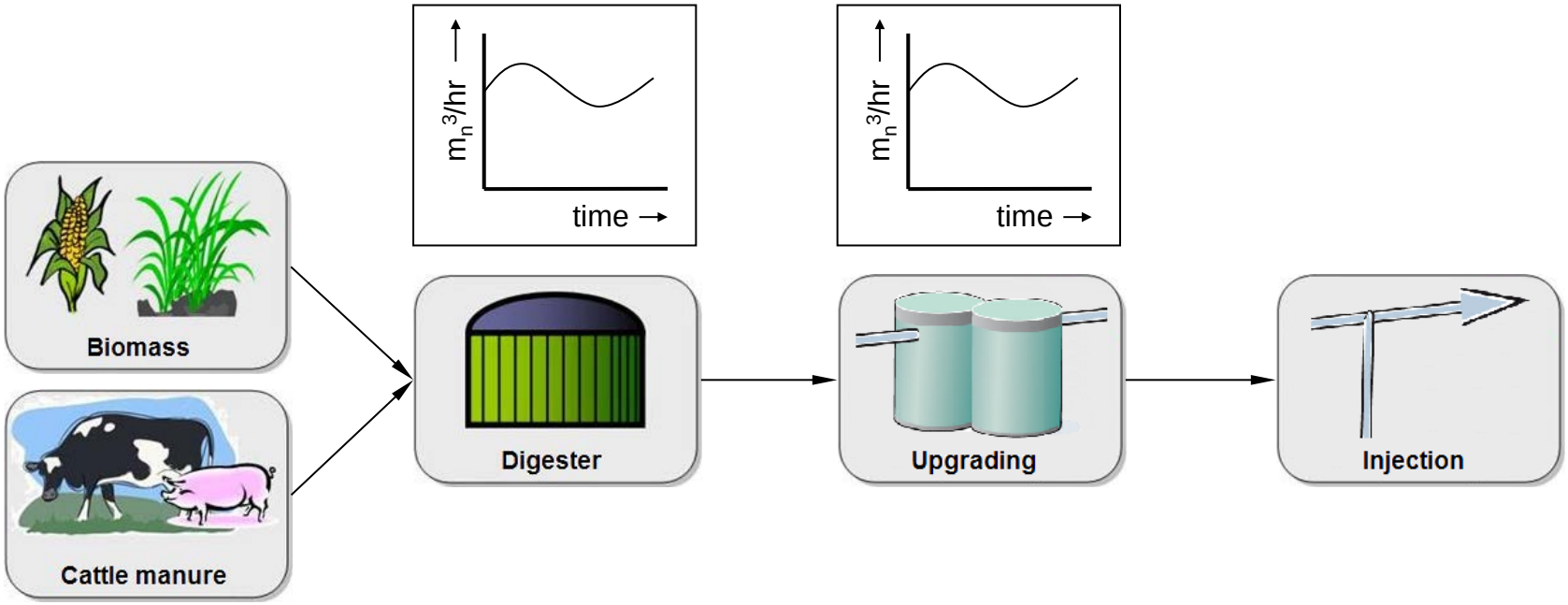
Scenario 1: Flexible biogas production



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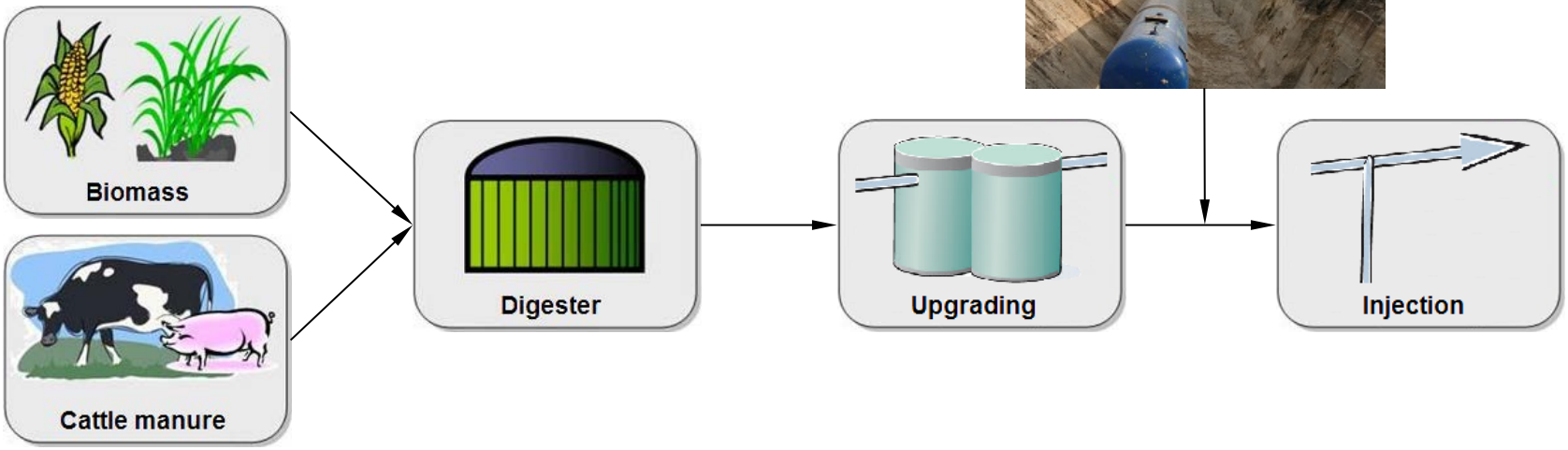
Scenario 2: Green gas storage within supply chain

Q ≦ 10,000 Nm^3:	pipes 8.5 bar
10,000 < Q < 300,000 Nm^3:	pipes 100 bar (and compression)

Gas storage



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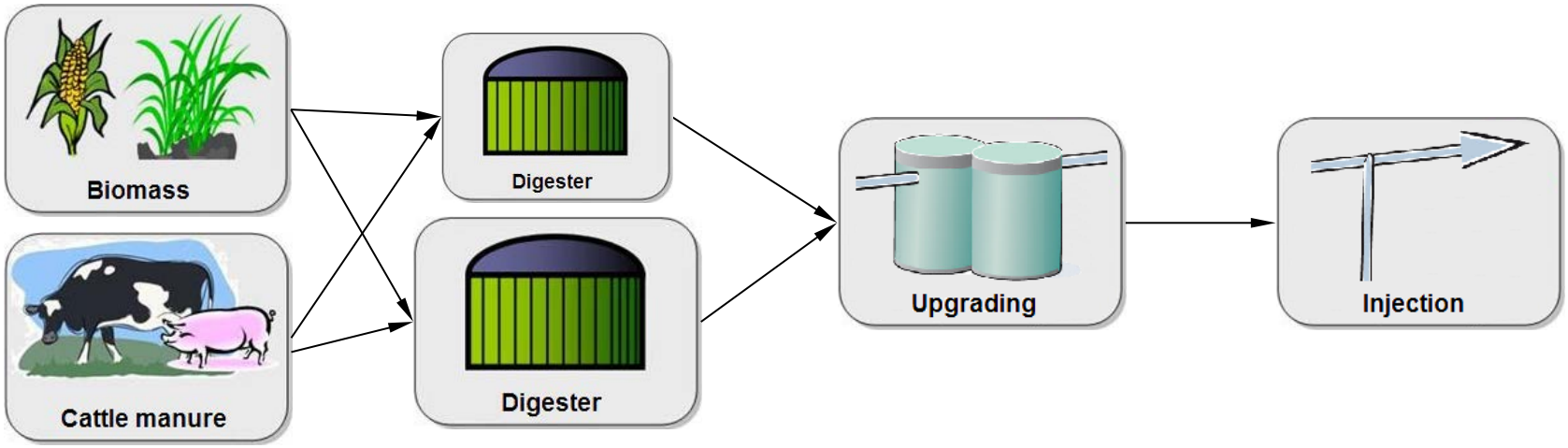
Scenario 3: Adding second digester (with 6 months production)

Production second digester only during winter months



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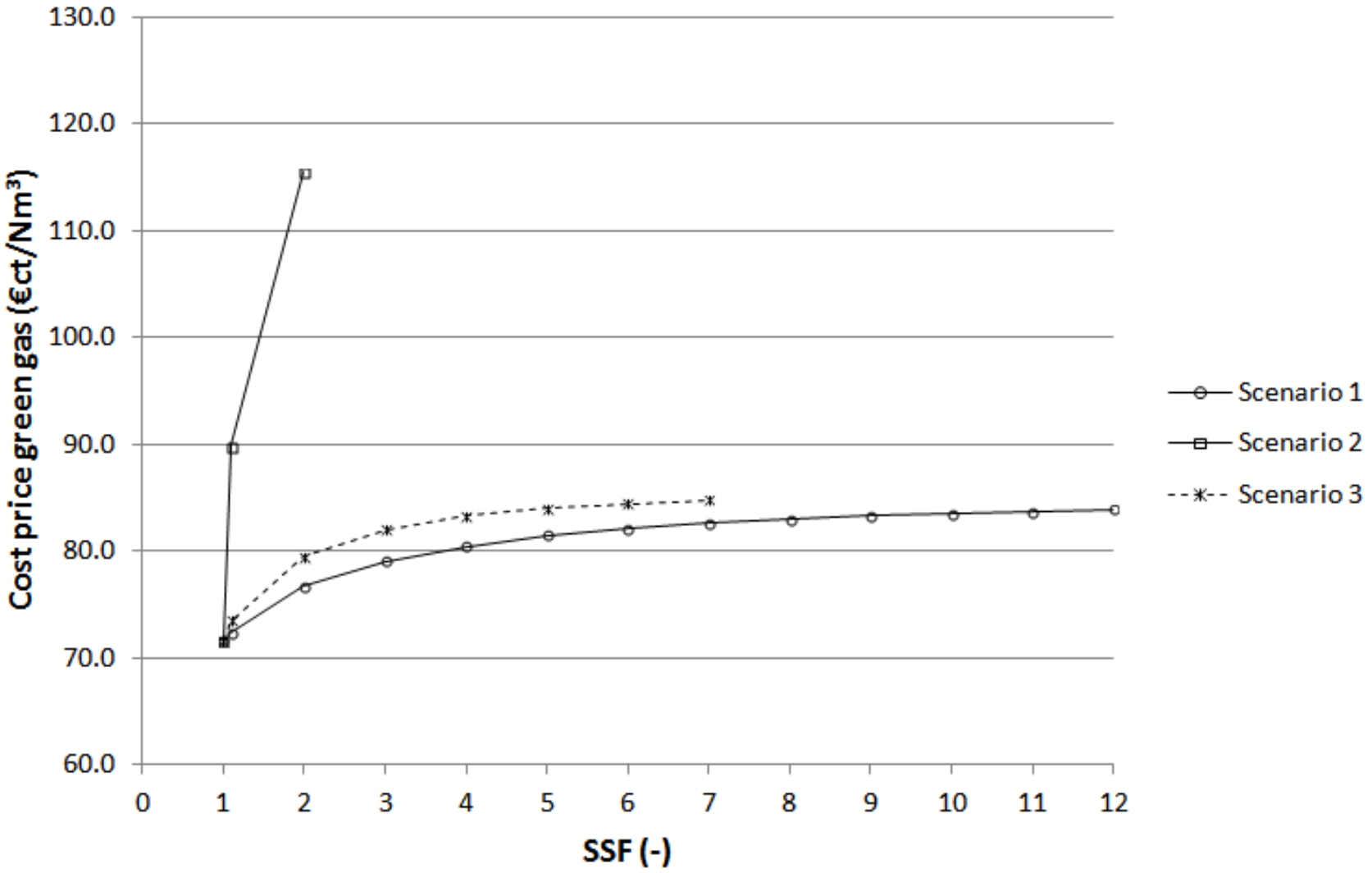
Comparison at scale 300 Nm³/hr



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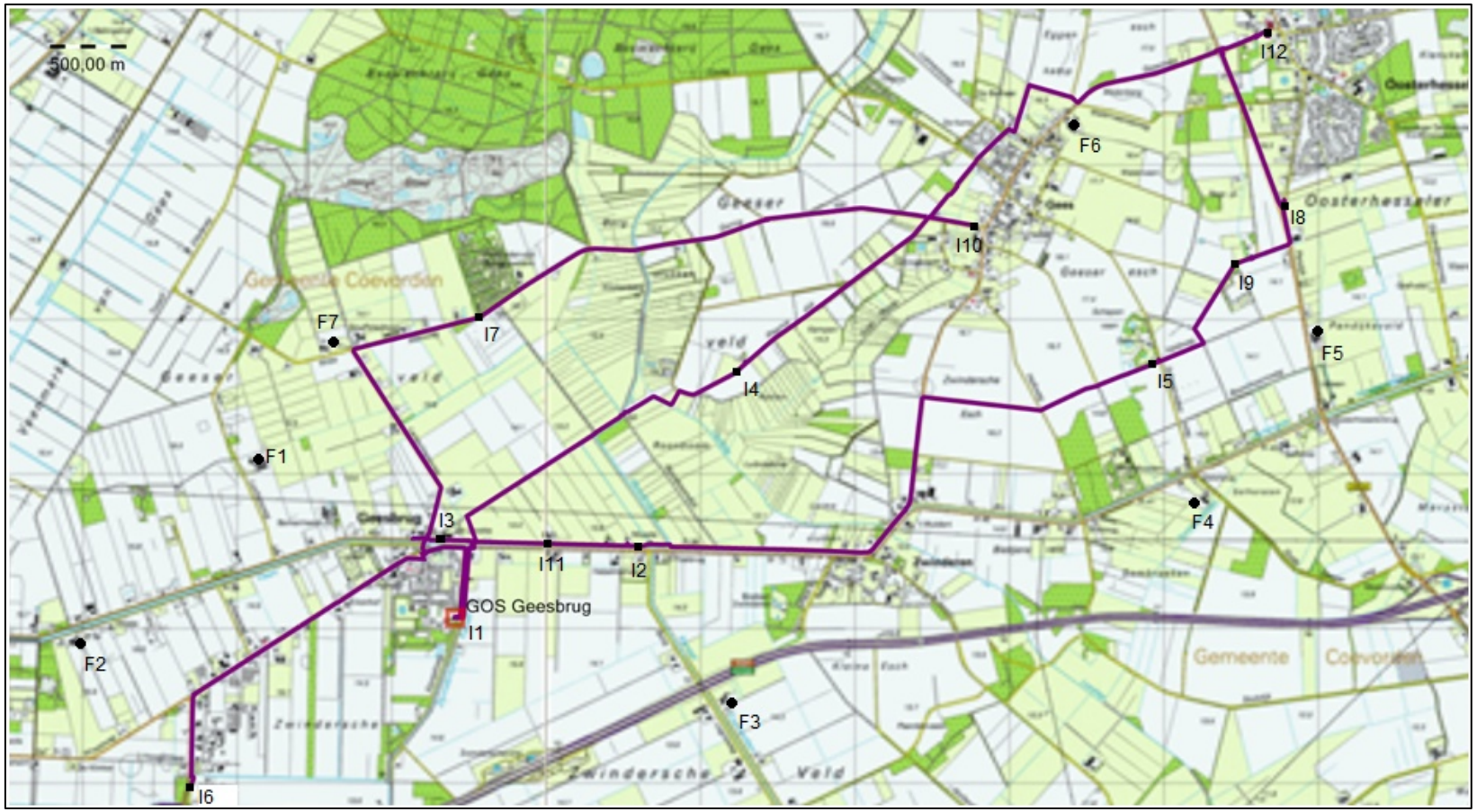
Expanding the model



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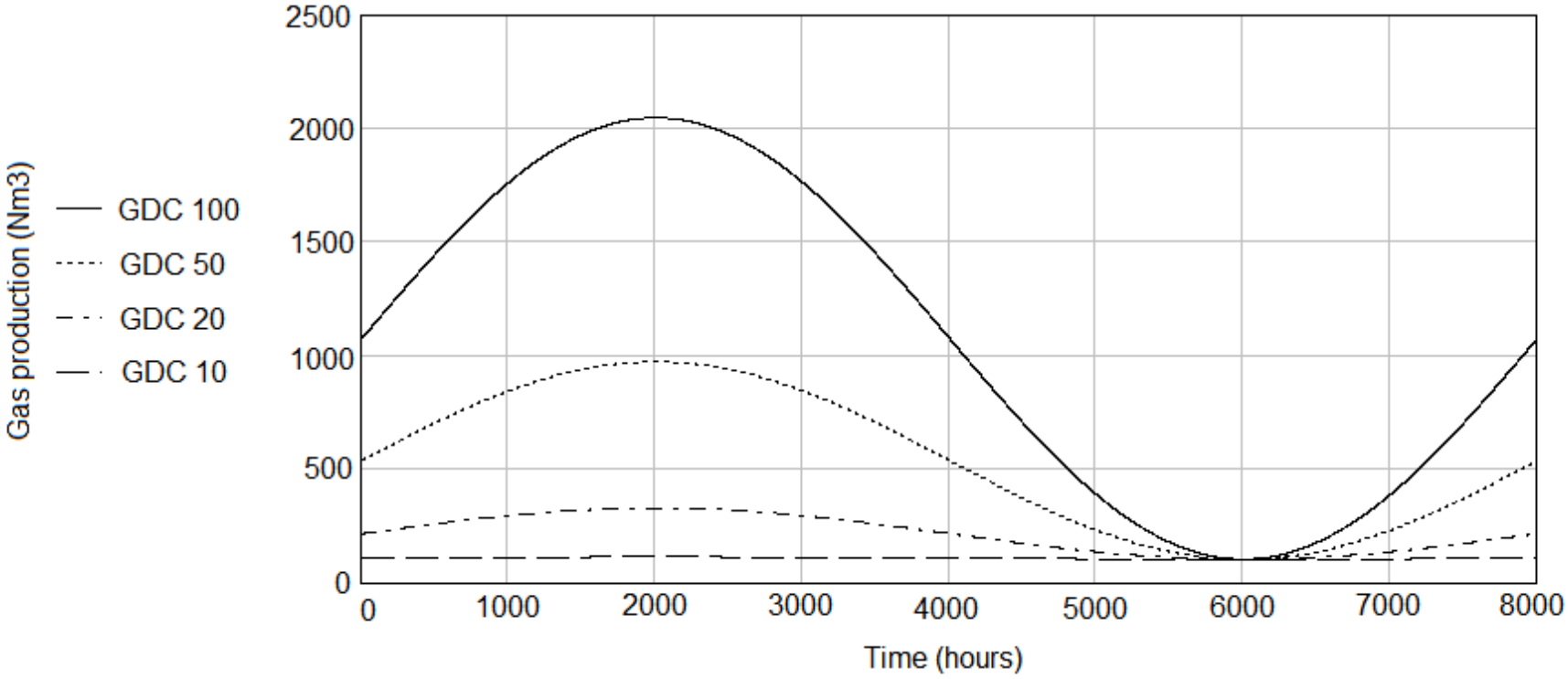
Increasing the Gas Demand Coverage (GDC)



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