Key aspects in energy and environmental analysis of system studies

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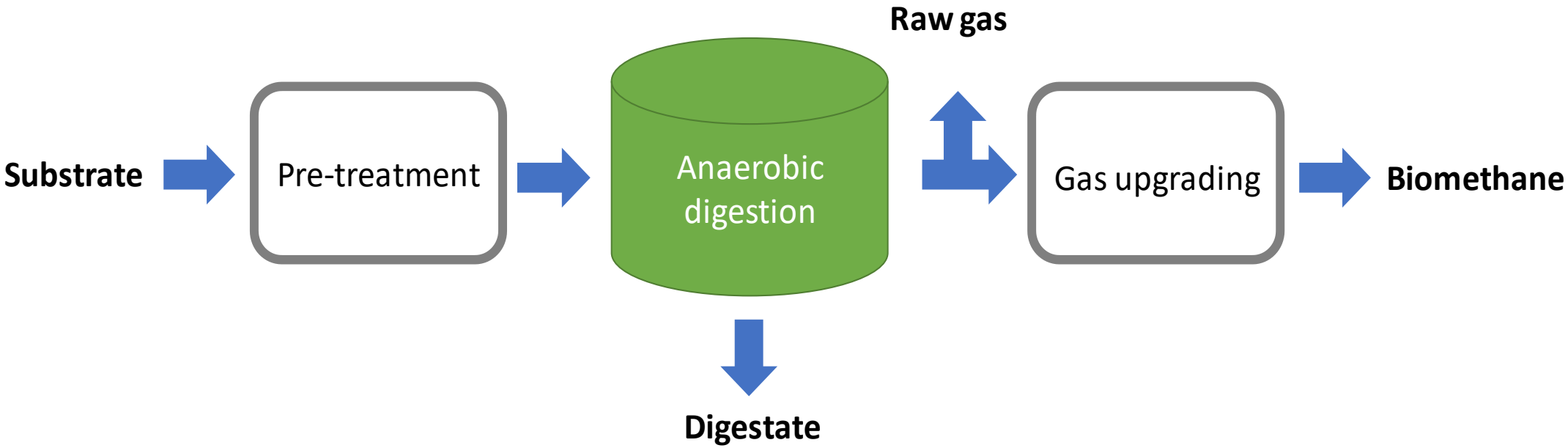
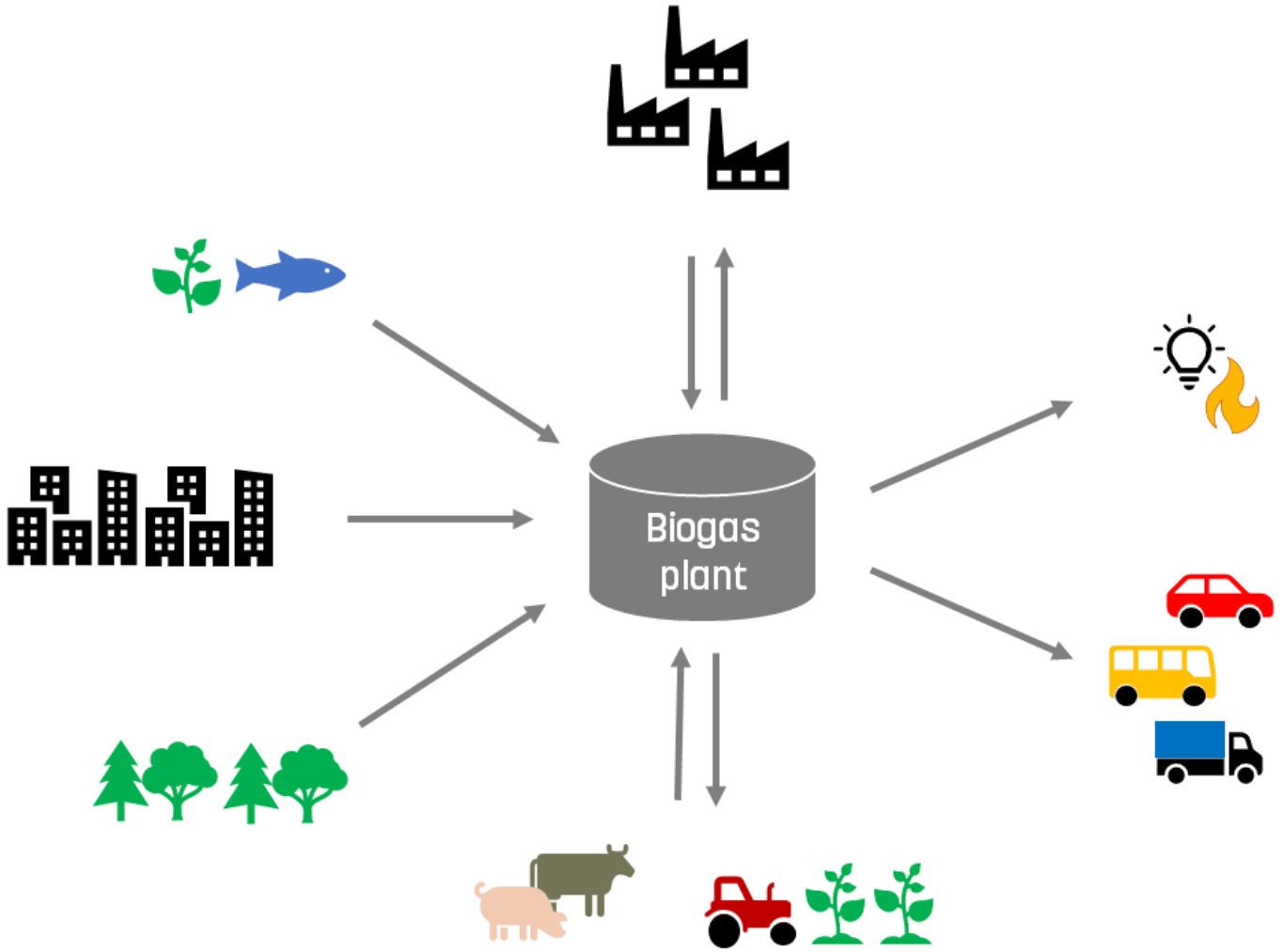
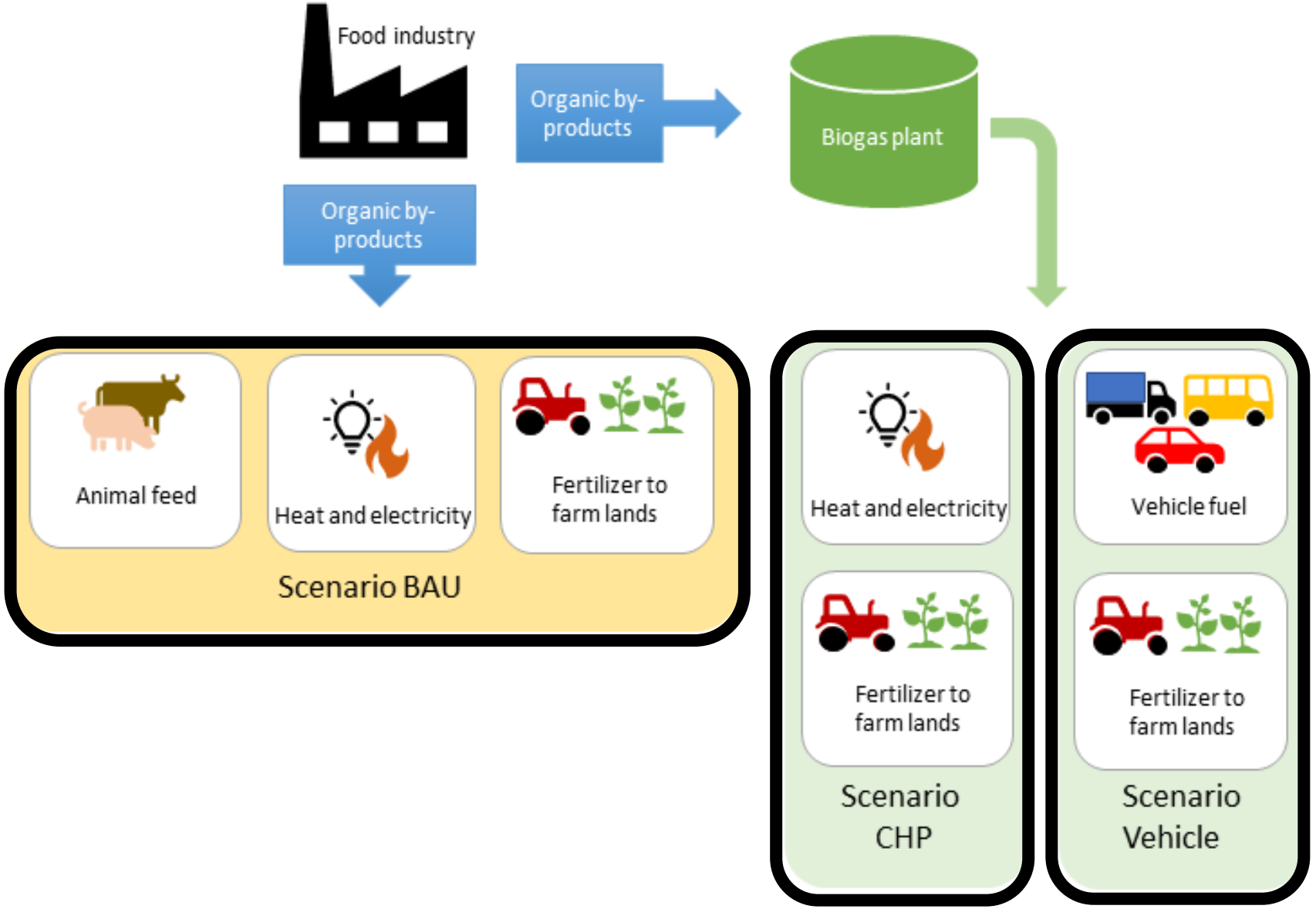
Biogas production

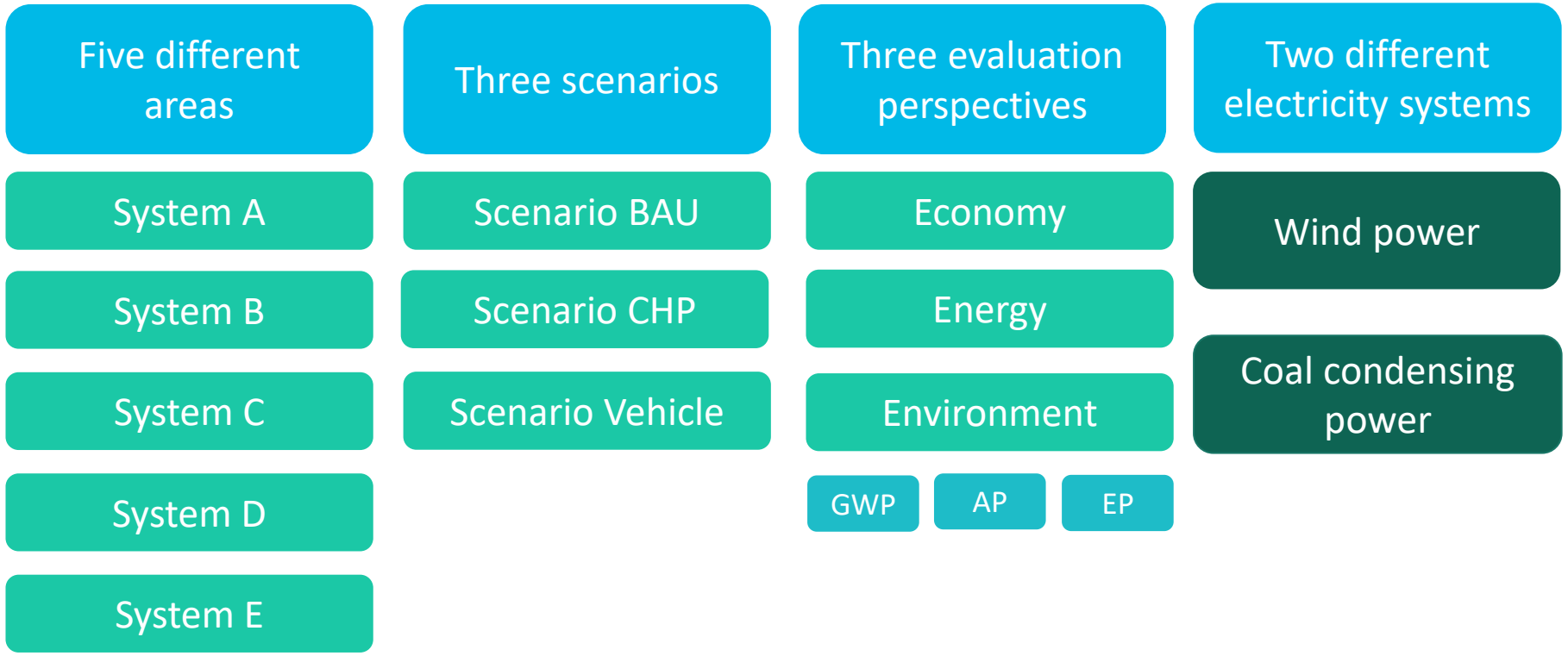


Biogas system



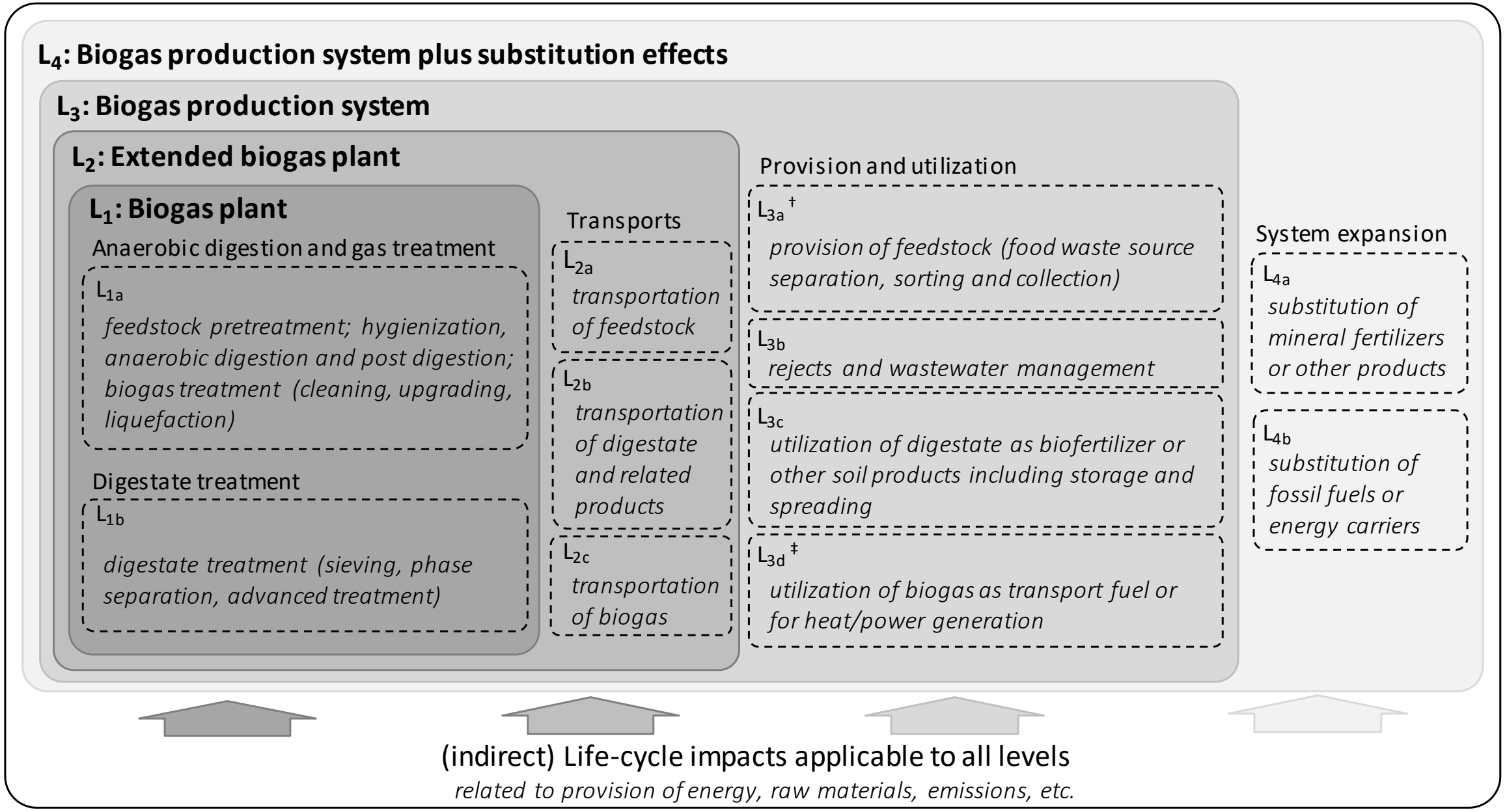

Food industry
Organic by-products
Biogas plant
Organic by-products
Animal feed
Heat and electricity
Fertilizer to farm lands
Scenario BAU
Heat and electricity
Fertilizer to farm lands
Scenario CHP
Vehicle fuel
Fertilizer to farm lands
Scenario Vehicle

Key aspects


Five different areas
System A
System B
System C
System D
System E
Three scenarios
Scenario BAU
Scenario CHP
Scenario Vehicle
Three evaluation perspectives
Economy
Energy
Environment
GWP
AP
EP
Two different electricity systems
Wind power
Coal condensing power

Results

	Economy	Energy		Environment					
				GWP		AP		EP	
		Coal	Wind	Coal	Wind	Coal	Wind	Coal	Wind
System A	Vehicle	CHP	BAU	CHP	Vehicle	CHP	Vehicle	Vehicle	Vehicle
System B	Vehicle	CHP	BAU	CHP	Vehicle	CHP	Vehicle	Vehicle	Vehicle
System C	BAU	CHP	BAU	CHP	CHP	CHP	Vehicle	Vehicle	Vehicle
System D	Vehicle	CHP	BAU/Vehicle	CHP	Vehicle	CHP	Vehicle	Vehicle	Vehicle
System E	Vehicle	CHP	Vehicle	CHP	Vehicle	CHP	Vehicle	Vehicle	Vehicle



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No.	KPI Name	Unit	System level and sub-levels
KPI_1	Effective methane yield	Nm^3 CH_4 (delivered) / t (food waste at source)	L_3 excluding L_{3d}
KPI_2	Climate impact	kg CO_2-eq / t (food waste at source)	L_4
KPI_3	Energy balance	MJ (primary energy used) / MJ CH_4 (delivered)	L_4 excluding L_{3d} and L_{4d}
KPI_4	Nitrogen recycling potential	kg N (delivered) / kg N (food waste at source)	L_3 (after spreading on field)
KPI_5	Phosphorus recycling potential	kg P (delivered) / kg P (food waste at source)	L_3 (after spreading on field)
KPI_6	Enhancement of plant-available nitrogen	kg NH_4-N (delivered) / kg NH_4-N (food waste at source)	L_3 (after spreading on field)
KPI_7	Resource cost	Euro / t (food waste at source)	L_3

Conclusions

- Important to define what is included (and not included) in your system studied.

- Be transparent about your choices for others to understand your system.

- Results dependent on what is replaced in the systems studied

Thank you!

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