



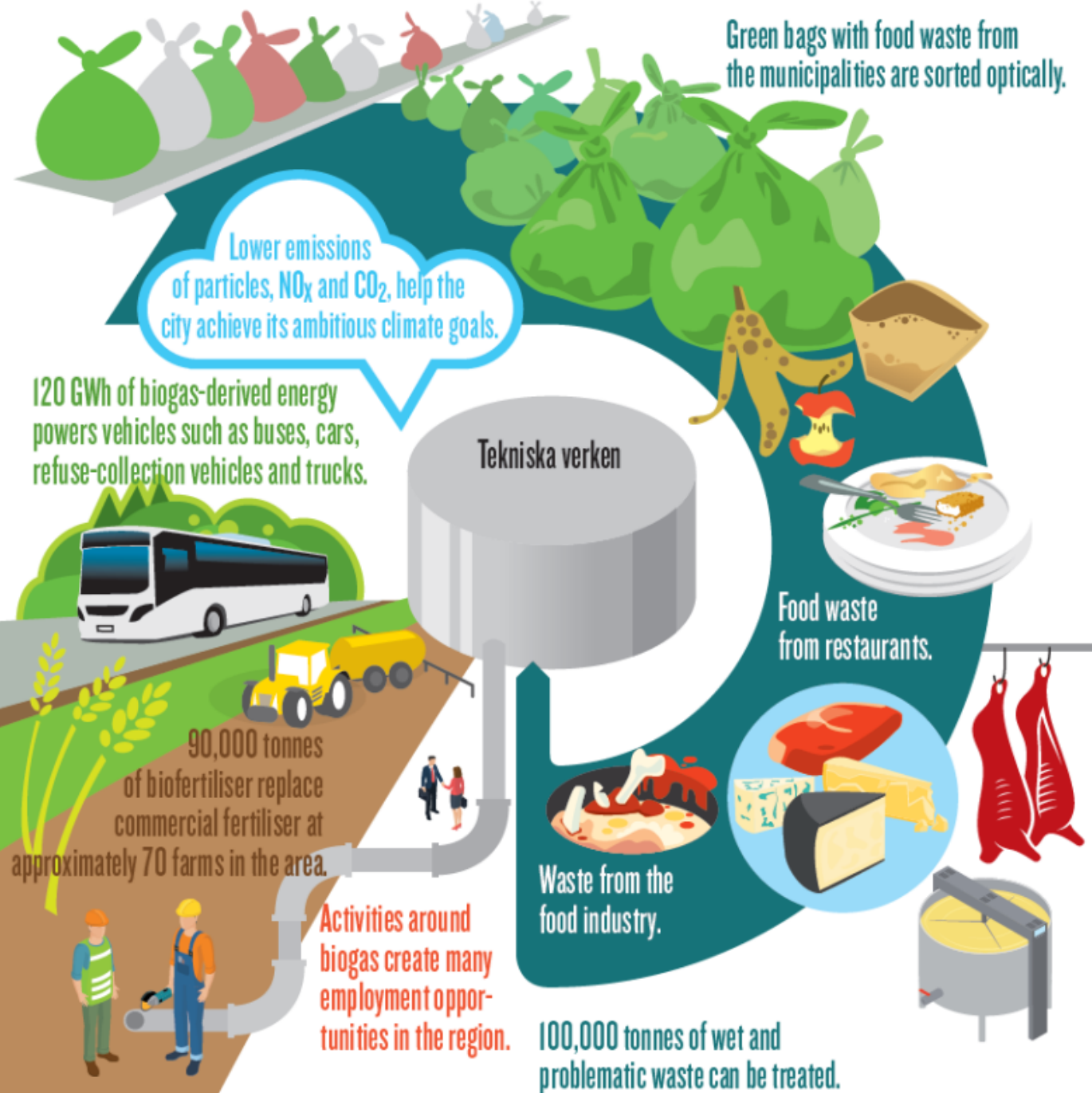
Turning waste into multiple values with the Nordic biogas model

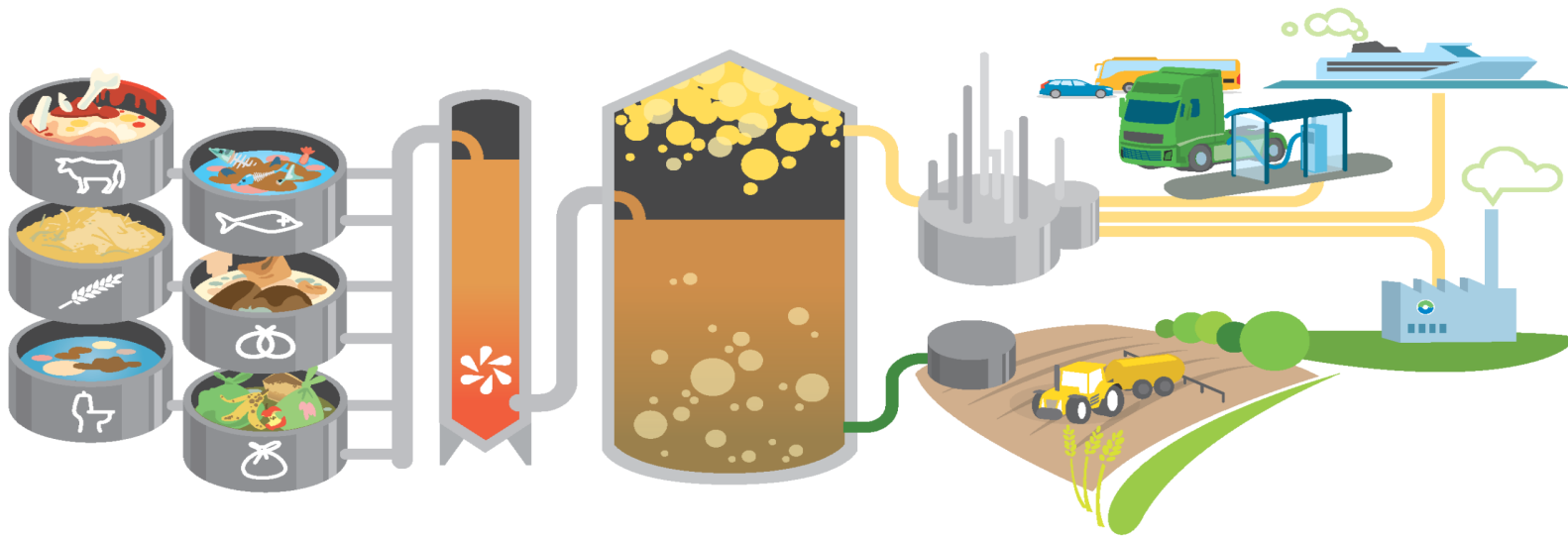
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Linköping – waste to value





Nordic biogas model

Waste management

Renewable energy

Renewable nutrients



Biogas solutions can
adress them all, at
the same time

Air pollution

Urbanisation and
congestion

Climate change

Soil health and
fertility

Amount of waste
grows

Not enough jobs

Water pollution

Fossil energy
dependency

Energy security

BIOGAS CITY VALUE CREATION (Gas buses)

- Energy recovery
- Nutrients recovery
- Sustainable waste management
- Broader effects

Knowledge and innovation

Company competitiveness

Community and company
resilience

Resource cascading and
increased valorisation

Attractive region for people
and investments

Energy security

Renewable energy

Local air quality

Reduced noise

Climate impact
mitigation

Sustainability effects

Regional environment

Water quality

Green jobs

Public health

Renewable fertilizer

Phosphorous balance

Soil health and fertility

Sustainable farming

Land availability

Hygienization of
organic waste

LANDFILL CITY VALUE CREATION (Diesel buses)

- Energy recovery
- Nutrients recovery
- Sustainable waste management
- Broader effects

Dissemination and co-creation of knowledge and innovation

Improving competitiveness for the city's companies

Better resilience for the community as well as local companies

Resource cascading and increased valorisation

More attractive region for inhabitants, tourists, and green investments

Energy security

Renewable energy recovery

Local air quality improvement

Reduced noise

Climate impact mitigation

Improved water quality

Improved sustainability performance

Number of green jobs created

Better regional environmental conditions

Better public health

Renewable fertilizer produced

National P balances

Better agricultural soil fertility

Enabling sustainable farming practices

Increased land availability

Systemization of biologically hazardous organic wastes

COMPOST CITY VALUE CREATION (Diesel buses)

Dissemination and co-creation of knowledge and innovation

Company competitiveness

Resource cascading and increased valorisation

Attractive region for people and investments

Better resilience for the community as well as local companies

- Energy recovery
- Nutrients recovery
- Sustainable waste management
- Broader effects

Energy security

Climate impact mitigation

Improved sustainability performance

Better regional environmental conditions

Renewable energy recovery

Water quality

Number of green jobs created

Better public health

Renewable fertilizer

Local air quality improvement

Phosphorous balance

Reduced noise

Soil health and fertility

Sustainable farming

Land availability

Hygienization of organic waste

INCINERATION CITY VALUE CREATION (electric buses)

Dissemination and co-creation of knowledge and innovation

Company competitiveness

Resource cascading and increased valorisation

Attractive region for people and investments

Better resilience for the community as well as local companies



Energy recovery



Nutrients recovery



Sustainable waste management



Broader effects

Energy security

Climate impact mitigation

Improved sustainability performance

Better regional environmental conditions

Renewable energy

Improved water quality

Number of green jobs created

Better public health

Renewable fertilizer produced

Local air quality

National P balances

Reduced noise

Better agricultural soil fertility

Enabling sustainable farming practices

Land availability

Hygienization of organic waste

What makes biogas solutions the superior climate mitigation option?

Substitution of fossil nutrients

Net soil carbon build-up

Methane reduction from waste and manure

Average emission of CO₂-eq for biomethane in Sweden 2022 was zero (0).

Substitution of fossil fuels

Substitution of nutrients in anaerobic water cleaning



Climate impact
(kg CO₂-eq per
person and year)
in a city with the
nordic model for
biogas.



Wide frameworks for assessment – decrease risk for problem shifting

Swedish environmental goals

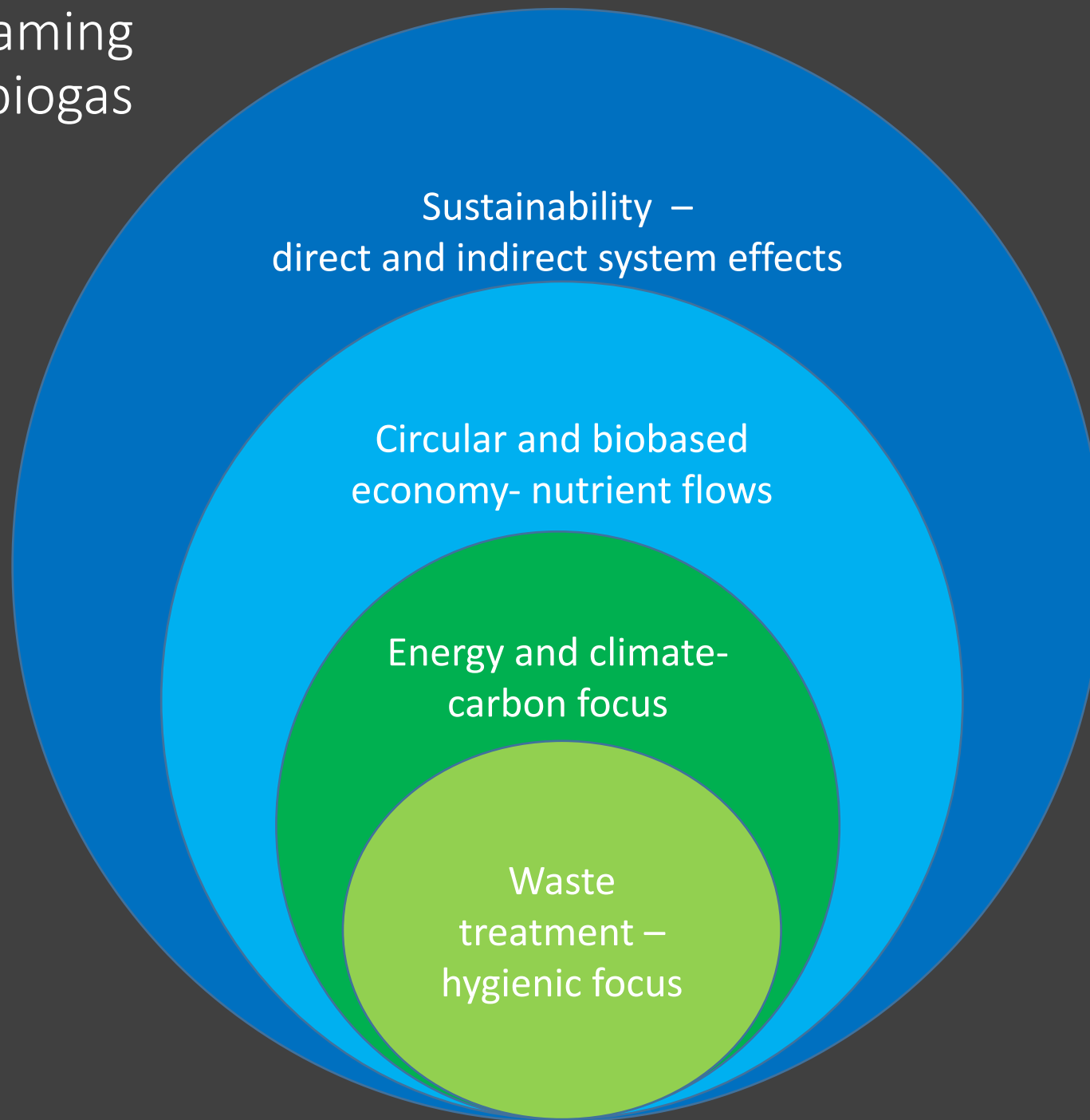
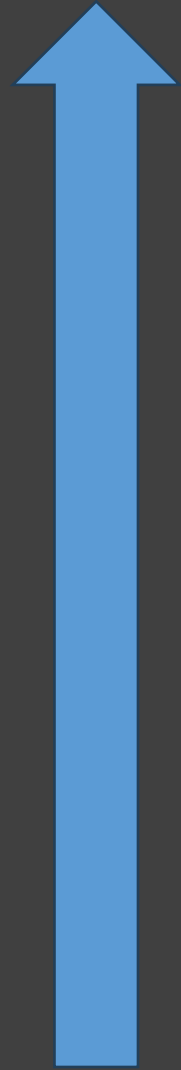


UN sustainable development goals

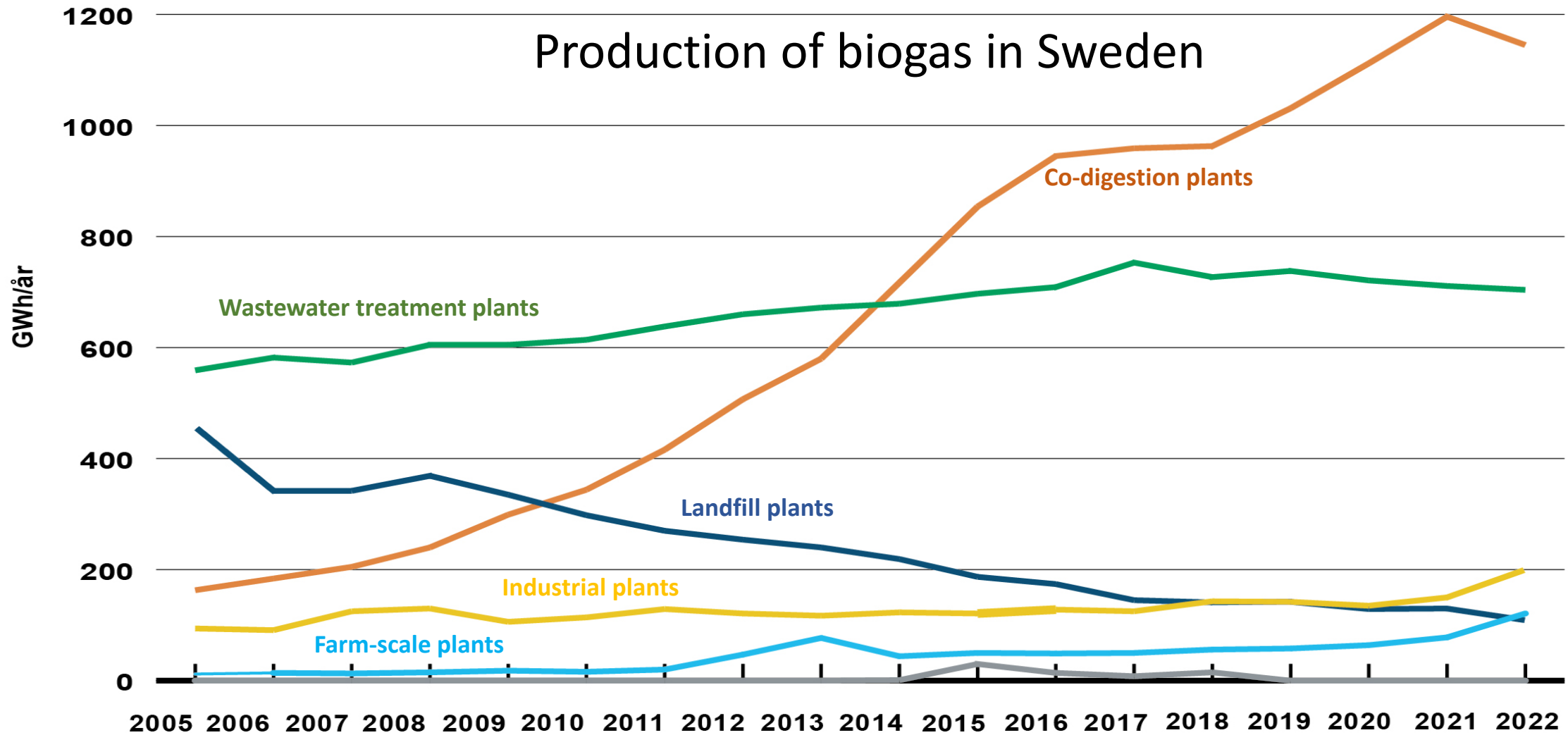


The broader the assessment – the better the result for biogas solutions

The changing framing and identity of biogas solutions



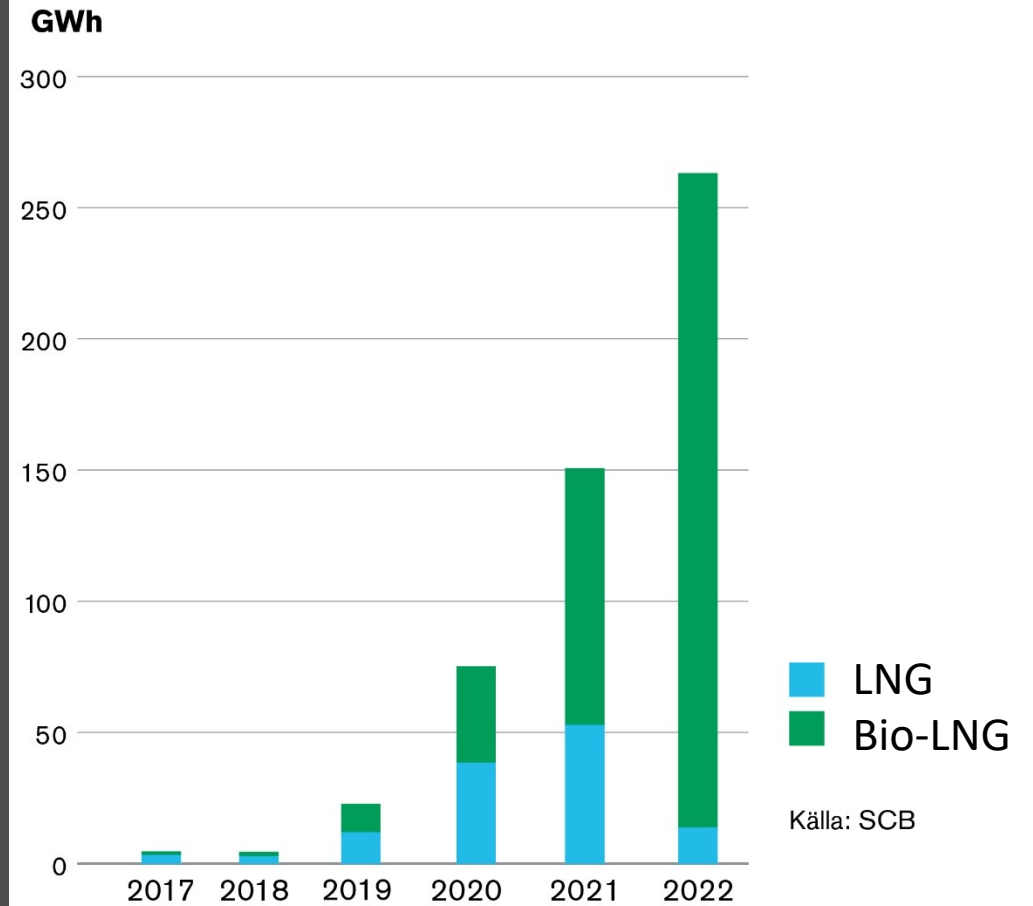
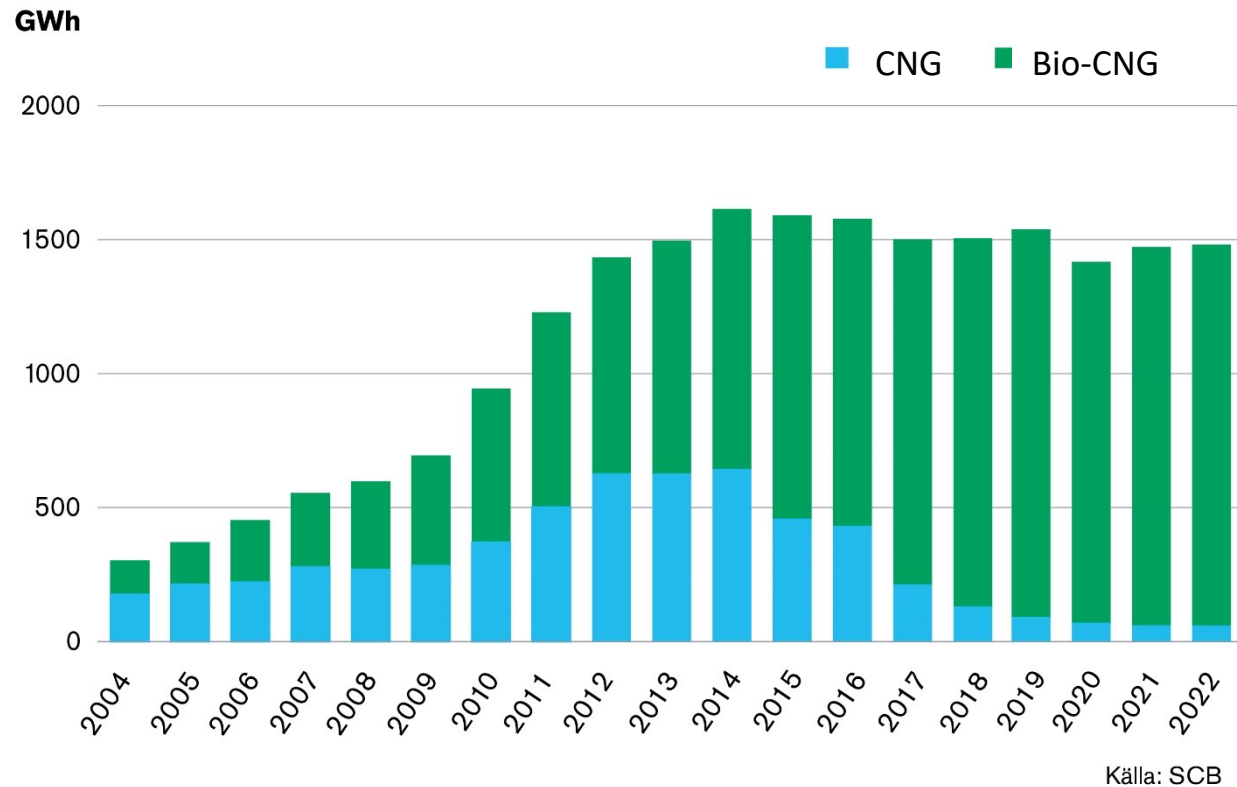
Production of biogas in Sweden

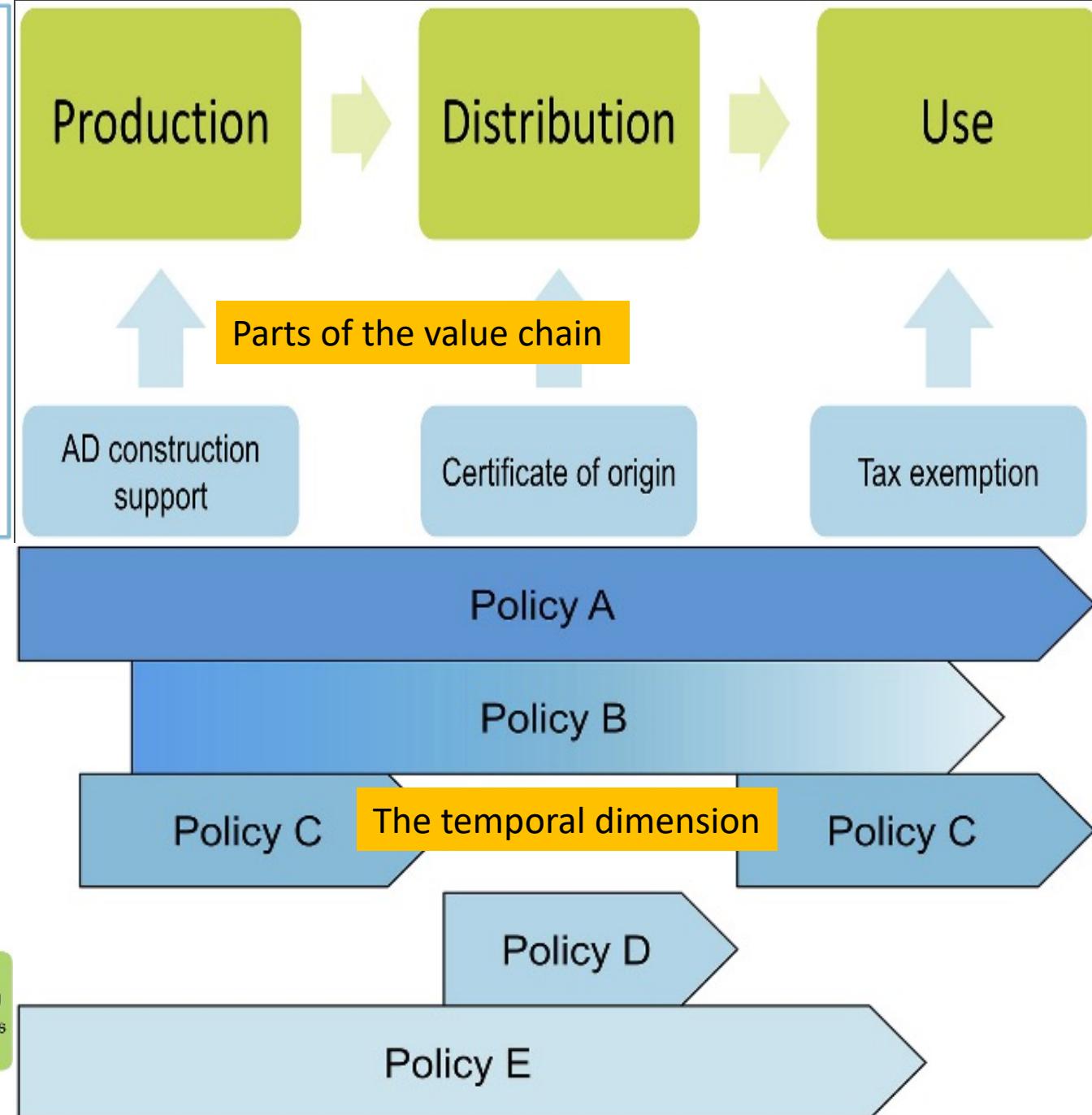
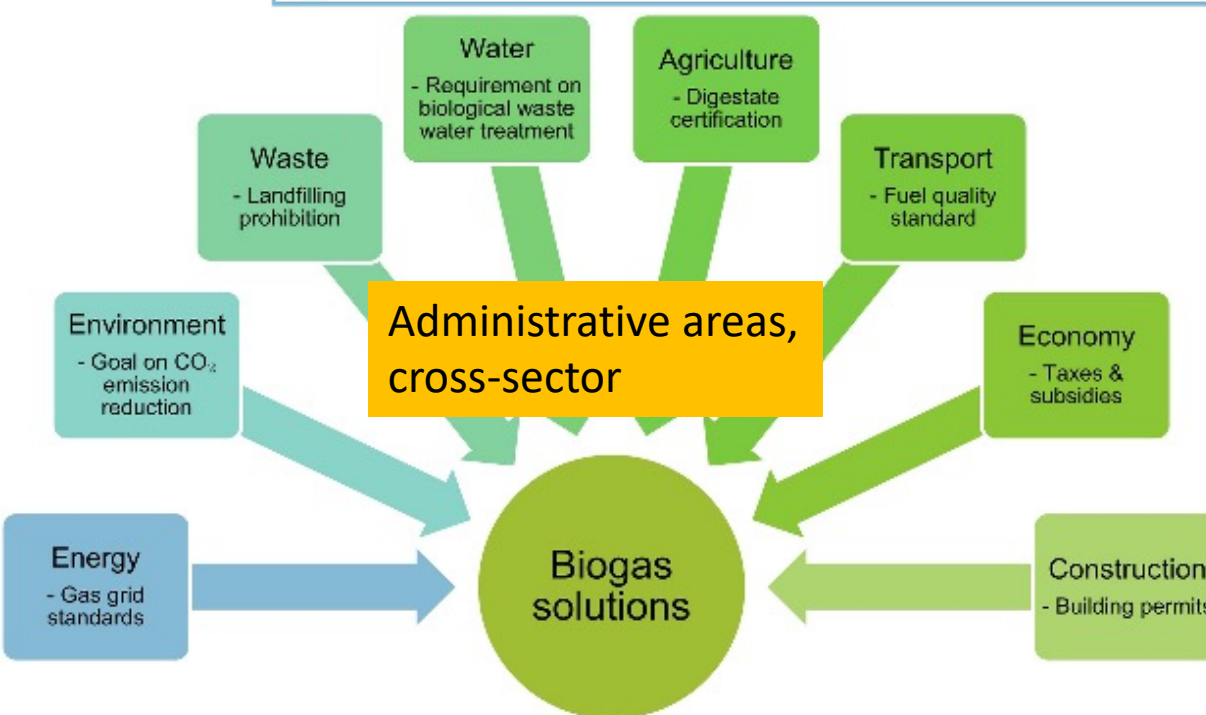
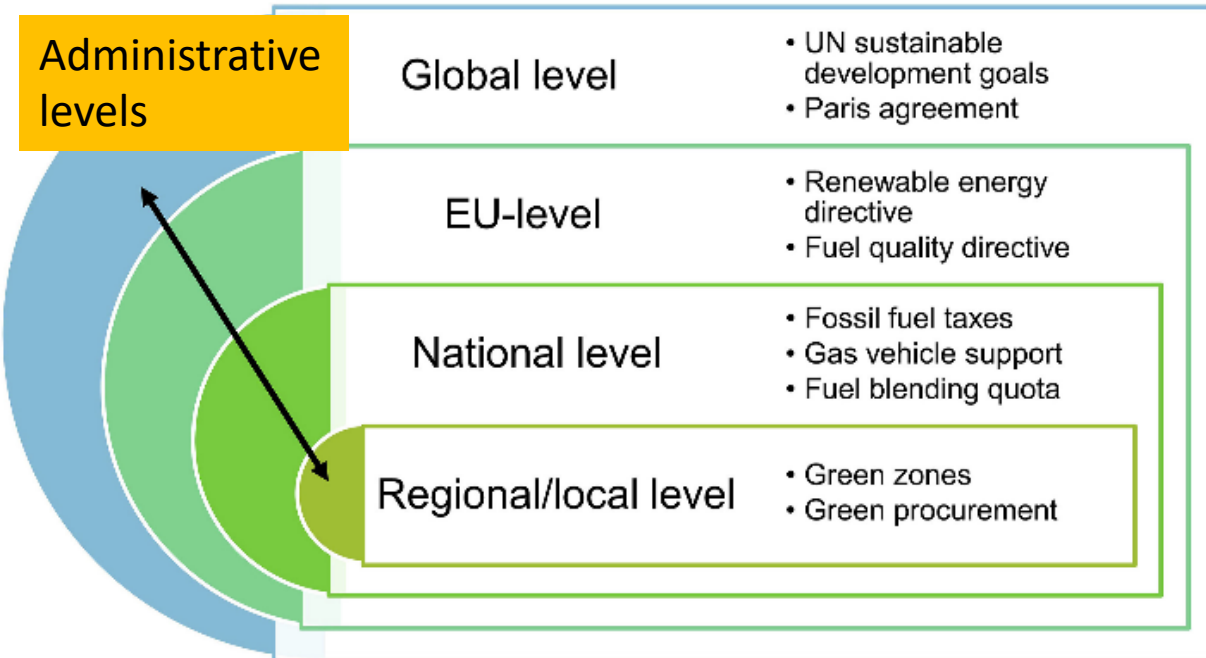


Enabling national policies include: Landfill ban for organic waste
Climate investment grants; up to 50%
Tax exemption for fuel
National goals for collection of food waste

Sector policy integration by local and regional authorities

Compressed and liquid gas as vehicle fuel, Sweden





Supporting and merging biogas concepts from waste and agricultural sectors



The Nordic model for biogas is a solution that integrates wastewater treatment, waste management, transport and nutrient recycling with global relevance.



Biogas done right/Carbon farming and related concepts makes more biomass available in a sustainable way and strengthens soil health and fertility through intermediate crops and the use of biofertilizer.

Resource and pollution problems grow because sectors and supply chains are separated

Biogas solutions reconnect parts of systems



Biogas solutions have a wider positive sustainability handprint than all other options -
No conflicting interests

Biogas is expensive to produce -
Willingness to pay highest in the transport sector

Biogas is a fragmented and sensitive policy area- **Need special attention**

Biogas solutions have better climate performance than all other options -
Negative emissions

Increased demand and production of biogas drive and finance environmental improvements

