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# Partnership for sustainable development: examples from the bioenergy sector

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# PPP - definition

## EU level:

The term public-private partnership ("PPP") is not defined at Community level. In general, the term refers to forms of cooperation between public authorities and the world of business which aim to ensure the funding, construction, renovation, management or maintenance of an infrastructure or the provision of a service.





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- The successive steps: waste – biogas – biomethane – fuel, prevent emissions into the atmosphere and allow for organic waste to be treated in a natural cycle.

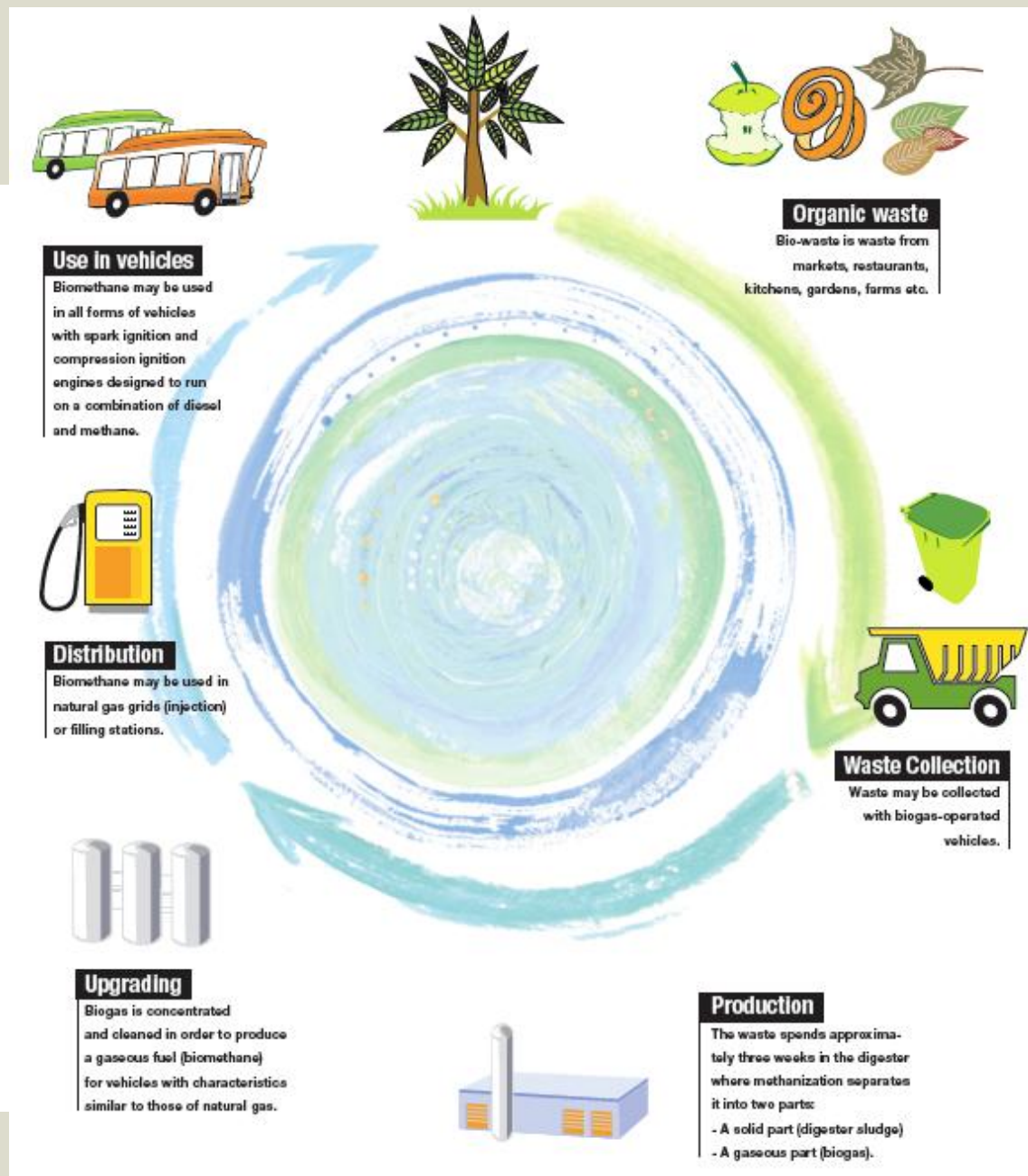


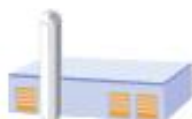


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- Anaerobic digestion can be applied to most municipal waste streams and supports biogas production.





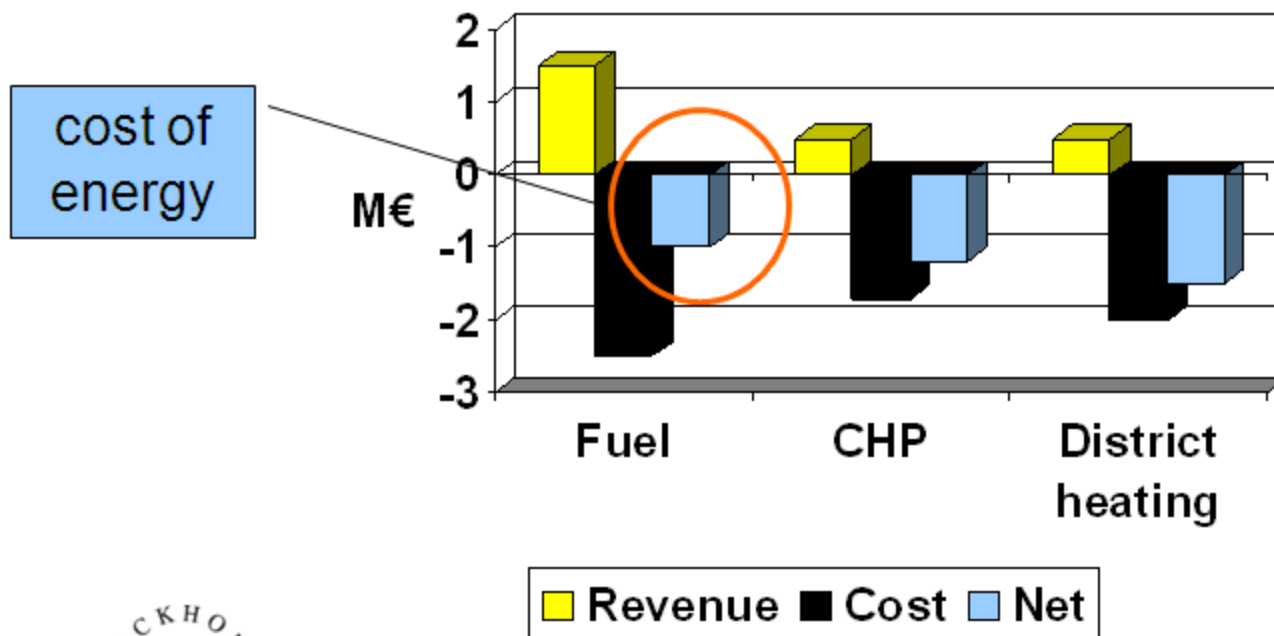
Content of demonstration projects	Urban Community of Lille (FR)	Stockholm (SE)	Göteborg (SE)	Rome (IT)
<b>Production</b>	<ul style="list-style-type: none"> <li>- Organic waste</li> <li>- Sewage</li> </ul>	<ul style="list-style-type: none"> <li>- Restaurant waste</li> <li>- Sewage</li> <li>- Biofertilizers</li> </ul>	<ul style="list-style-type: none"> <li>- Municipal waste</li> <li>- Agricultural residues</li> </ul>	<ul style="list-style-type: none"> <li>- Landfill</li> <li>- Organic waste</li> </ul>
<b>Upgrading</b>	<ul style="list-style-type: none"> <li>- Gas scrubber</li> </ul>	<ul style="list-style-type: none"> <li>- Gas scrubber</li> <li>- Pressure Swing Adsorption</li> </ul>	<ul style="list-style-type: none"> <li>- Cryogenic condensation/ distillation</li> </ul>	<ul style="list-style-type: none"> <li>- Gas scrubber</li> </ul>
<b>Distribution</b>	<ul style="list-style-type: none"> <li>- Filling on-site</li> <li>- Depot integration</li> <li>- Grid injection</li> </ul>	<ul style="list-style-type: none"> <li>- Swap-body transport</li> <li>- Biogas highway</li> </ul>	<ul style="list-style-type: none"> <li>- Direct supply filling stations</li> <li>- Biogas highway</li> <li>- Grid injection</li> </ul>	<ul style="list-style-type: none"> <li>- Filling stations</li> <li>- Storage tanks</li> </ul>
<b>Use In vehicles</b>	<ul style="list-style-type: none"> <li>- Waste collection</li> <li>- Service fleets</li> <li>- Buses</li> </ul>	<ul style="list-style-type: none"> <li>- Taxi and delivery</li> <li>- Airport buses</li> <li>- Clean Driver Network</li> </ul>	<ul style="list-style-type: none"> <li>- Clean Driver Network</li> <li>- Electric gas hybrid waste HGV</li> </ul>	<ul style="list-style-type: none"> <li>- Waste collection fleet</li> </ul>





## From the perspective of a water company

- Minimise the cost of energy for running a waste water treatment plant:



Example (2007): wwtp with 34 GWh of biogas production

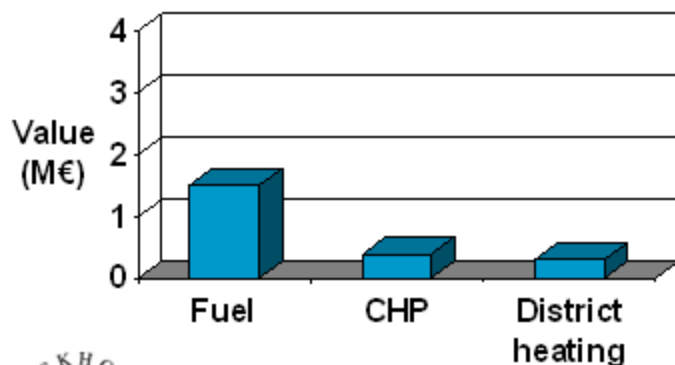




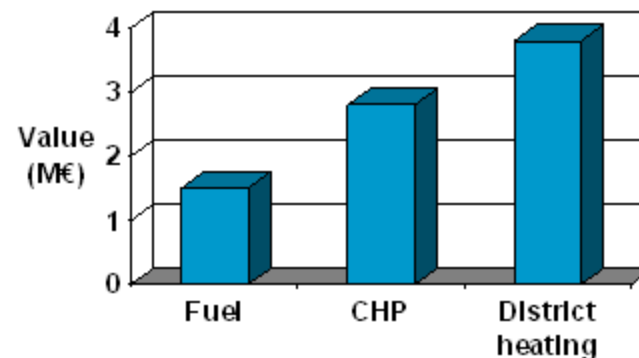
## City perspective

- High environmental value
- Higher sales value of the fuel

Actual case: Swedish electricity mix



Alternative case: coal based energy



Example (2007): Biogas fuel compared to district heating and CHP





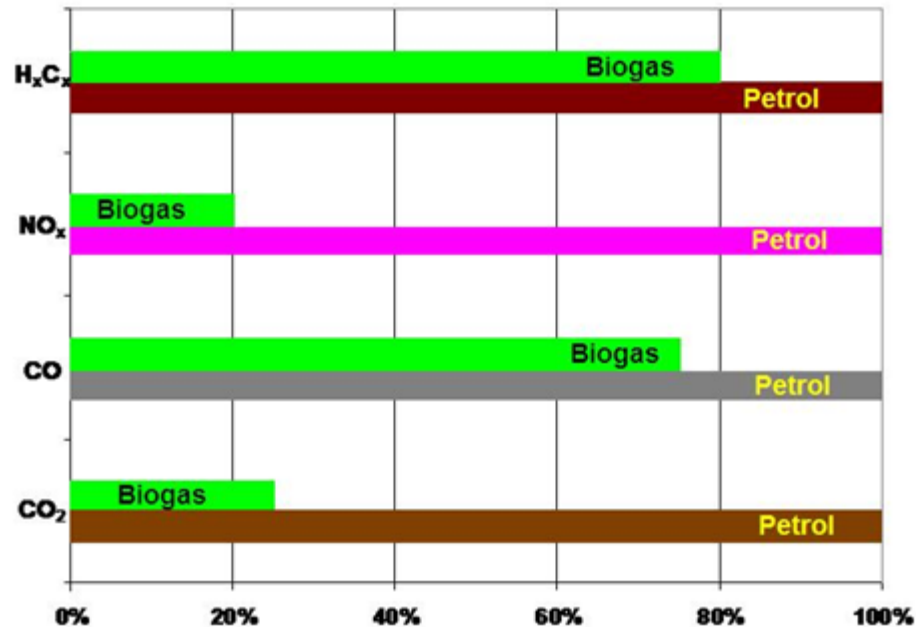
## *Local biogas cycle - from the city perspective*

- Stimulation of the local economy:
  - new local enterprise
  - new jobs
- Stability: possible independence of the locally produced biogas from the global market and oil price fluctuations
  - stable supply and demand on the local level
- The spending on fuel will remain in the local or regional economy
- Reduction of waste processing costs
- CO2 tax reduction (zero emission)
- Improvement of air quality in the city





- The biogas fuel pollution is lower than conventional fuels generated pollution

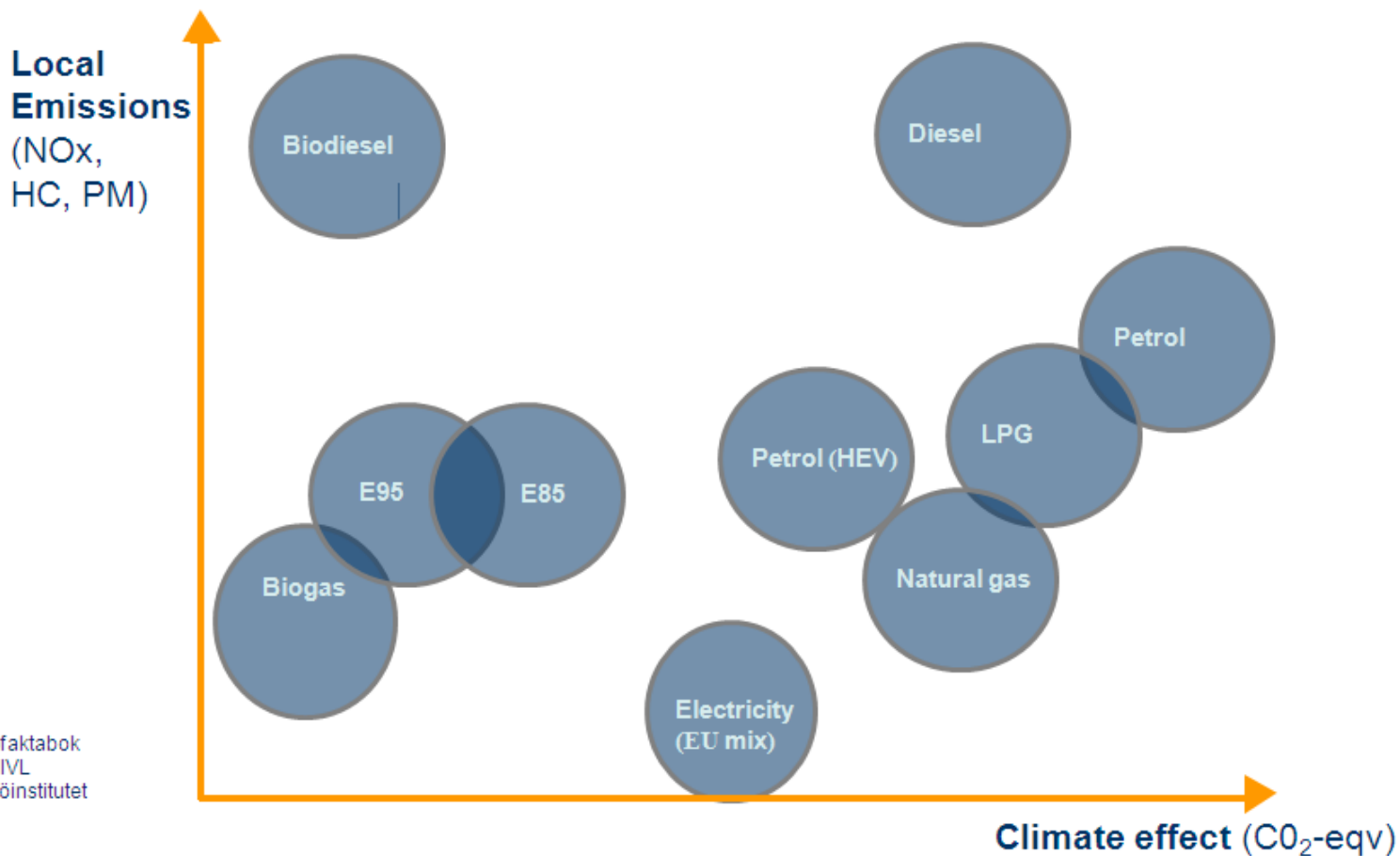




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# Why use biogas as transport fuel?



Source: Miljöfaktabok för bränslen, IVL Svenska miljöinstitutet





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# Using biogas as transport fuel: Bern

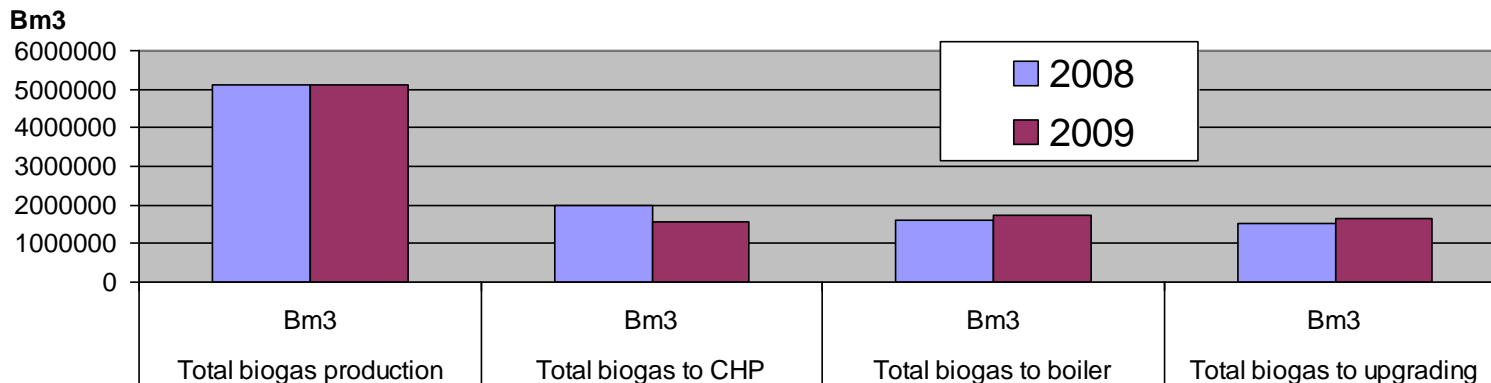




## Bern: development of biogas production and usage

Year	Unit	2006	2007	2008	2009
Total Biogas production	Bm <sup>3</sup>	4'702'728	5'239'398	6'348'434	6'332'497
Increase of gross Biogas production	%		11.4%	35.0%	34.7%
Biomethane injected	Nm <sup>3</sup>			1'034'592	1'096'065

Biogas utilisation



## Biogas fuelling stations:

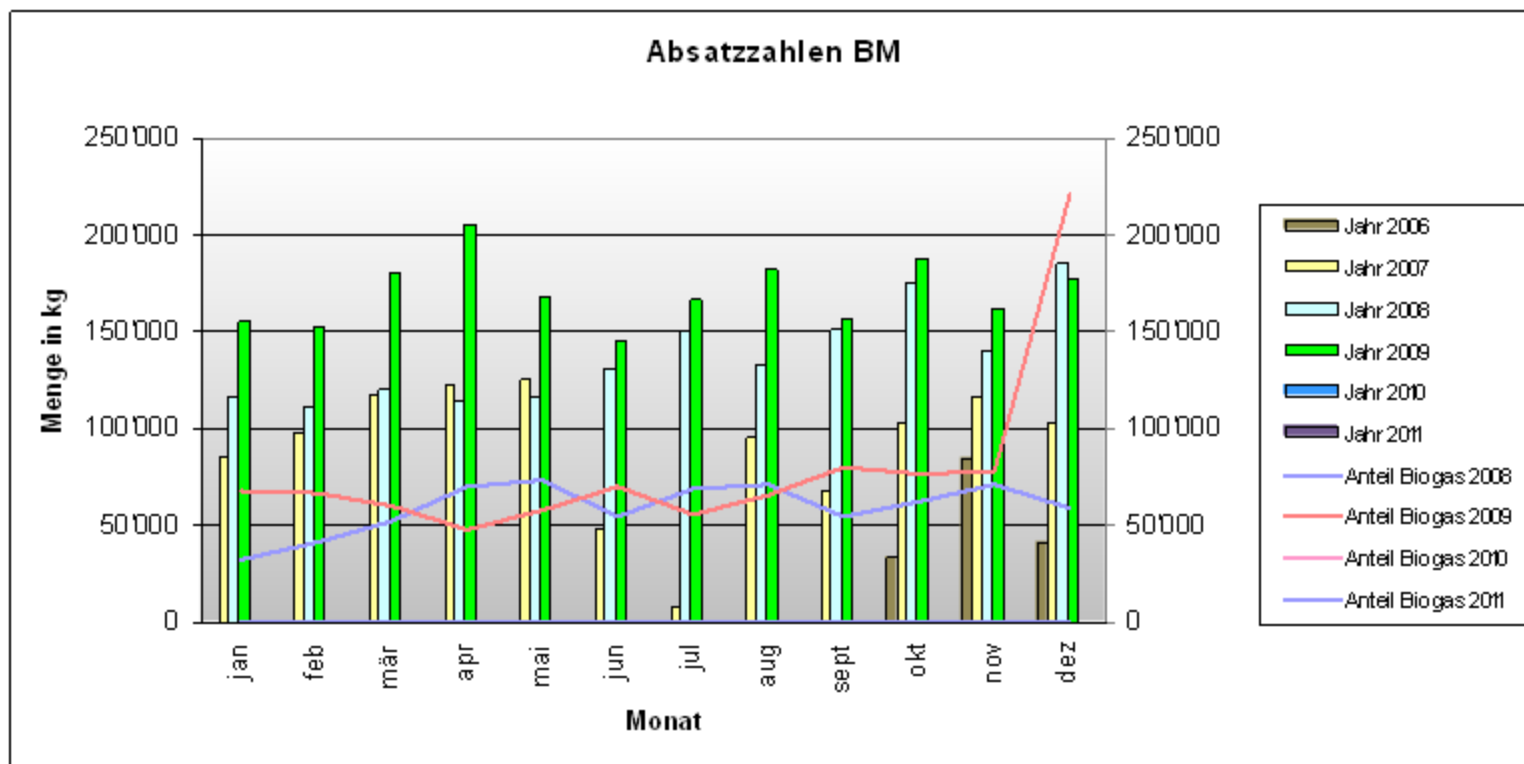
	Public	Private	Bern mobil
2008	8	1	3
2009	11	2	4

## Cars using biogas:

Year	Number of cars	Increase
end of 2006	334	
end of 2007	647	313
end of 2008	846	199
end of 2009	966	120



# Usage of gas as a fuel: Bern





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# Using biogas as transport fuel: Bern

- **Market growth**

Car market was down by 12% in the first half of 2009. However, NGV market was up by 31%

- **Environmental & economical comparison**

EMPA has made a study for the gas companies comparing 12 gas driven cars with the corresponding petrol and diesel driven cars (VW, Fiat and Opel) with respect to cost and emissions. The results can be downloaded from [www.schlau-fahren.ch](http://www.schlau-fahren.ch)





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- Waste water: Is it really only *waste* ?
- From sewage to fuel: *the long walk*
- From sewage to fuel: *the shortcut*
- Examples from European Cities





- Phase one: clean the water, let the gas evaporate
  
- Phase two: burn the methane from the sewage off:
  - reduce the volumes of sewage
  - stop the emission
  
- Phase three: start to use the biogas
  - for own energy needs: electricity
  
- Phase four: use the gas for own energy needs:
  - electricity + heat : CHP installation
  
- Phase five: biogas as extra revenue:
  - sale of biogas as a vehicle fuel





- ~~Phase one: clean the water, let the gas evaporate~~
- ~~Phase two: burn the methane from the sewage off:  
→ reduce the volumes of sewage  
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- Phase one: clean the water, let the gas *evaporate*
- Phase two: *burn* the methane from the sewage *off*:
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- Phase three: start to *use* the biogas
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- Phase five: biogas as *extra revenue*:
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# Thank you for your attention

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# Promoting biogas as a sustainable transport fuel: Bern

