Renewable fuels in Stockholm Public Transport, SL

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Today’s menu

- Something about Stockholm and SL
- Why biofuels in Public Transport?
- SLs targets för renewables
- How to get there
The County of Stockholm

- 1.6 % of Sweden’s total area
- Population 1.9 million
- Every fifth Swede lives here
- **Cars per thousand inhabitants**
  - County of Stockholm: 402
  - Sweden: 459
Stockholm Public Transport (SL)

- Procurement, Planning and Follow-up of Public Transport. Infrastructure management
- Metro, Buses, Commuter trains, high speed trams...
- 690,000 travellers per day
- 75% market share
- Owned by the Stockholm County Council
Going from fossil fuels to renewables - why?

- Global climate change
- Local (regulated) emissions
- Security & supply
- Price
- Political decisions and commitments
Interrelation of Atmospheric CO$_2$ - Temperature

- 700 ppm (2100)
- 380 ppm (now)
North pole 1973
Local Emissions (PM, NOx)

Global effect (CO₂)

- Biodiesel
- Petrol
- Diesel
- CNG
- LPG
- E85
- E95
- Biogas
- H₂, electricity (water power)
- Petrol (electric hybrid)
- CNG
- electricty (EU mix)

SL
The Oil Triangle

Within the Oil Triangle you can find roughly 60 percent of the remaining oil reserves. The 2001 Cheney report says that in year 2020 around 54 to 67 percent of the world production of oil needs to come from the Oil Triangle. USA has moved their military headquarter from Riyadh to Qatar.
By 2025, we need to find, develop and produce a volume of “new” Oil & Gas that equals 8 out of every 10 barrels produced today.

“The world needs new oil fields!”

ExxonMobil
Only 3 ways to reduce oil dependency and fossil CO₂ from transportation!

- Curb the uncontrolled growth of transport
- Increase energy efficiency
- Increase the use of biofuels
Strategic long term conclusion

- Strategically and financially very important for everyone dependent on fuels to secure the supply of renewable fuel!

- Energy strategy necessary
Targets for SL renewables

Trains

- SL should only use electricity from renewable sources (wind, hydro, biomass)

Buses

- 25% renewables 2006
- 50% 2011
- 100% 2025
Renewable Fuels…
…but which one?
Parameters to consider

- Potential to reduce local and global emissions
- Quality
- Availability, scale standardisation
- Economy
- Security of supply
- Future production potential?
- Ethics, labelling, certificate of origin etc.
  - Competition with food, energy supply, medicines,
  - Biodiversity
Two good and readily available alternatives:

- **ETHANOL = Volume and infrastructure!**
  
  Liquid – simple infrastructure  
  Large volumes (internationally)  
  High CO₂-efficiency in production  
  It works!  
  Several possible production pathways

- **BIOGAS = cleanburning (benign emissions).**
  
  Limited supply from waste water treatment  
  Expensive buses, infrastructure and maintenance.  
  Suitable for local traffic  
  It works!
How to get there

The World’s largest Ethanol Bus Fleet. All Inner City lines runs on ethanol.

Since 1989
380 buses
Renewable fuel with a large volume potential
How to get there

→ One of Europe's largest Biogas Bus Fleets to be built up

→ 51 buses
→ Approximately 120 - 130 buses in 2009
→ Long term co-operation with waste plants in the county of Stockholm
→ Looking into new possibilities for biogas
→ During 2005 decrease of 1 700 ton CO2
Bus procurements

År 2011 med 50% etanol & biogas

Biobränslebussar

Godkänd snittålder 8,0 år

Snittålder 7,1 år

Bus procurements
Philosophy for sustainability

- Use the best available solutions of today (Ethanol & biogas, etc.)

- Support and engage in projects for future solutions (Hybrids, intermodality, fuel cells, etc.)
Net gain in Stockholm with ethanol and biogas buses (status December 2006)

- 380 ethanol and 51 biogas buses (2006):
- Reduce diesel use with 16 million litres of diesel/year
- Reduce fossil CO$_2$ by approx. 41 000 tonnes/year
- Reduce particulates by approx. 4 tonnes/year (Approx 5 % of PM in Stockholm)
SL’s conclusions

- Necessary to secure the supply of fuel.
- Biogas and ethanol only functional and renewable fuels in the near future.
- Ethanol is the only renewable fuel with a large volume potential in the near future.
- We are looking into new possibilities for more biogas.
- Why wait?
- Sustainable Public Transport is already here.
Thank you for your attention!

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Fuels of the future…?

- Ethanol from Sugar Cane
- Ethanol from Cellulosic Raw Materials
- Biogas
- Hybrids (any fuel)
- Fischer-Tropsch Biofuels
- DME – DiMethylEther
- Methanol, Hydrogen,
- …