Towards a more sustainable public transport system

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Topics

- Background
- Challenges & Solutions
- Targets & Outcomes
County of Stockholm

- 26 municipalities
- Land area 6 500 km²
- 160 km from north to south
- 1.6% of Sweden’s area

- Population 2 million
- Every fifth Swede lives here
- Cars per thousand inhabitants
  County of Stockholm: 393
  Sweden: 459
SL – a company owned by the Stockholm County Council

The brand for public transports within the Stockholm region
Operators (transport services)
Attractive public transport within a sustainable transport system contributes towards making Stockholm Europe’s most attractive metropolitan region.
Challenge: Congestion

- Congestion in the transportation system
  - Increasing number of regional inhabitants
  - Increased share of elderly

- Major needs for investment and development to keep pace with the population growth and demography
Challenge & Solutions: Accessibility

- External exclamation
- Digital information
- Prator, spoken information
- Low entrance
- Tactile selection point and guidance route to bus stop
- Platform height 270 mm
- Ramp
- Tactile and visual warning indication
- Tactile indication by the bus stop
- Low entrance
Challenge: Emissions to air (CO2, NOx, PM)

"The dominating source to air pollution in the Stockholm region is road traffic. Legal air quality norms for the protection of public health are exceeded in many areas of the Stockholm region."

Extract from the regional air quality action plan on nitrogen oxides and particles (PM10)
Environmental targets in the Regional Public Transport Provision Program

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<tr>
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<th>Target 2020</th>
<th>Target 2030</th>
<th>Outcome 2013</th>
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<tbody>
<tr>
<td>Renewable energy, bus &amp; rail services combined</td>
<td>90%</td>
<td>100%</td>
<td>92%</td>
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<tr>
<td>Emissions, NOx &amp; PM from buses (base year 2009)</td>
<td>-50%</td>
<td>-75%</td>
<td>NOx (g/pkm*) -30% PM (g/pkm) -44%</td>
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<tr>
<td>Efficient energy use, bus &amp; rail transport (base year 2007)</td>
<td>-25%</td>
<td>-35%</td>
<td>0,2123 kWh/pkm -1%</td>
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*pkm – passenger kilometer
5 high level strategies linked to the targets

Traffic Strategy
Attractive & efficient means of transport

Strategy for the Infrastructure
Rational investments and operations

Business Strategy
Active business development & business mgt.

Strategy for Sustainable Development
In a sustainable way

Strategy for Communication
With a clear and unambiguous communication
Philosophy for environmental sustainability

- Use the best available solutions of today
- Support and engage in projects for future solutions (hybrids, fuel cells et c.)
Solutions: Renewable fuels for buses

BIOGAS = clean burning / benign emissions!
Limited supply – special infrastructure
Suitable for local traffic
It works!

ETHANOL = volume and infrastructure!
Liquid – simple infrastructure
Large volumes available (internationally)
It works!

RME (biodiesel) = Volume and infrastructure!
Liquid – simple infrastructure
Large volumes available (internationally)
It works!
Bus fuel consumption by volume 2013

- Ethanol: 40%
- RME (100%): 31%
- Diesel (5% RME): 16%
- Biogas: 12.7%
- Natural gas: 0.3%
Bus fleet, renewable fuels (May 2014)

- One of Europe’s largest fleets of biogas buses (pure biogas): **298 buses**
- World’s largest fleet of ethanol buses (ED95): **721 buses**
- Biodiesel buses (100% RME): **849 buses**
Promoting development of environmentally friendly technologies

- International ethanol bus consortium
- Test of 3 fuel cell buses 2003-2005
- Test of 6 electric hybrid/ethanol-buses 2009
- Test of 8 plug-in buses, start in autumn 2014
Ethanol-hybrid test 2009-2010

Testing the world’s first hybrid bus using renewable fuel!
Percentage buses running on biofuels
2011 - Today

2011: 56%
2012: 63%
2013: 82%
2014-May: 84%
2014-Aug: 85%

Expected outcome
Renewable energy in public transport 2007-2013 (bus & rail services combined)
CO$_2$ emissions from SL’s operations 2013

- Bus services: 45,325 tonnes
- Rail services: 11 tonnes
- Energy use properties: 1,582 tonnes
65% reduction in fossil CO$_2$ emissions 2009 – 2013 (bus services)
25% reduction in nitrogen oxide emissions 2009 – 2013 (bus services)
40% reduction in particle emissions 2009-2013 (bus services)

Total particle emissions ton

2009 2010 2011 2012 2013
298 biogas buses in the SL PT system
Introduction of Biogas – The history

- 21 biogas busses introduced inner city traffic (2004)
- Step wise introduction, Inner city first
- Contract with Käppalaförbundet (2007)
- Contract with Stockholm Gas (2009)
- Preparation of several depots
The EU Project: Baltic Biogas Bus
a part of the climate change solution

A project to stimulate the use of biogas as fuel for city buses aiming to reduce environmental impact.
Goals & Budget

- Strategies for biogas bus introduction
- Development of production, distribution and operation
- Dissemination of biogas potential

- Budget: 4,2 MEUR.
- Financing: Partly by the EU fund (ERDF)

A Pan-Baltic project within the Baltic Sea Region Programme 2007-2012
12 partners around the Baltic Sea

- SL, Stockholm Public Transport, Sweden
- Biogas East, Energy Agency Malardalen
- Ruter, Public Transport for Oslo and Akershus, Norway
- HOG Energy, the fuel interest organisation for Bergen region
- Hordaland County Council, Skyss
- VTT Technical Research Centre, Finland
- Tartu city, Estonia
- Riga City, Latvia
- Buses of Kaunas city, Kauno Autobusai, Lithuania
- MTI, Motor Transport Institute, Poland
- ATI erc Education, Research and Furtherance of Cooperations, Germany
- ITC Innovations and Trendcenter
Way forward

- Strategy of sustainability (& guidelines)
- Requirements & follow-up of Transport Contracts:
  - fuels,
  - engines,
  - age of vehicles,
  - energy efficiency

- Strategic planning & cooperation with the municipalities, government, universities, manufacturers, EU-partners

- Tests of partly/fully electrified power trains
Thanks!
Please check www.sll.se for further information