



biogasmax
A DRIVING FORCE



Training session 4

End-use issues

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City of Stockholm

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Introduction

Results from the vehicle demonstration of Biogasmax

Objectives of the vehicle demonstrations

- Demonstrate effective policy measures to introduce biomethane fleets
- Increase the number of vehicles running on biomethane
- Take steps towards market breakthrough



- Pioneer in 1998 with biomethane buses
- 10 waste collection trucks within the project
- Agreement between LMCU and Esterra
- Biomethane from new plant since March 2009



- Biomethane injected into natural gas grid
- 45 biomethane buses
- « Naturemade biomethane label »
- Promotion campaign and training of car dealers
- Over 500 cars sold



- Pure biomethane used (no natural gas grid)
- 25 heavy duty gas vehicles and 95 cars
- Promotion and networking
- Study of incentives
- Round-table for problem solving
- Strong growth in demand for biomethane and gas cars



- Upgraded landfill gas (pure biomethane)
- Municipal waste collection service
- 19 new waste collection trucks used
- Detailed monitoring



Follower sites

- Lombardy
 - Preparations for future demonstrations
 - Incentives for clean vehicles

- Torun and Zielona Gora
 - Test of one CNG bus in Torun
 - Study of possible market for biomethane



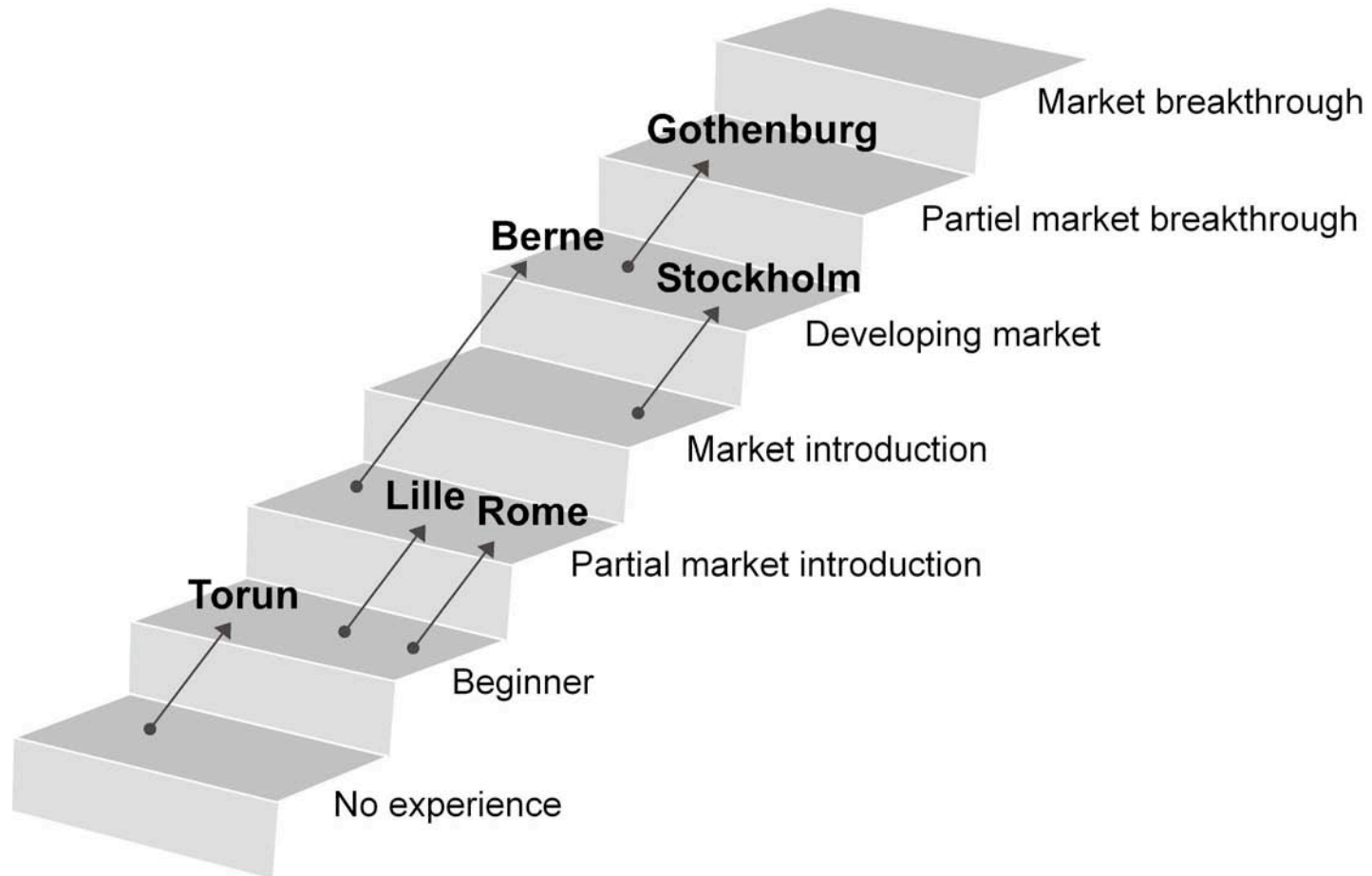
Demonstration results

- More than 900 vehicles run on biomethane in five European cities during 2006-2009
- Biomethane works as a renewable substitute for natural gas (mix of 0-100%)
- Vehicle operations not affected negatively by the shift from natural gas to biomethane
- Positive attitudes to biomethane among drivers
- Increased sales of gas vehicles in Sweden, Switzerland and Italy due to economic incentives

Technical monitoring

- 12 waste collection trucks and 51 buses monitored daily during one year
- 4,5 million km
- High availability, few gas related problems (most problems linked to doors, waste compaction or refuelling station)
- Some problems connected to gas but not biomethane
 - service needs (spark plugs, oil change, gas valves)
- Fuel consumption
 - buses 0.6-0.8 Nm³/km
 - trucks 0.8-1.0 Nm³/km
- Fast-filling stations
 - 4-22 minutes filling time

Market expansion



Driving forces for further expansion

- Environmental/climate awareness
- Economic incentives (e. g. national taxation)
- Green certificates
- Greener image of fleet



Barriers for further expansion

- High purchase cost and limited supply of NGV models
- Lack of economic advantage of biomethane compared to natural gas (some countries)
- Lack of refuelling stations



Effective policy measures

- Pre-market phase
 - remove legal/institutional barriers
 - establish basic refuelling infrastructure
 - introduce captive fleets
- Market development phase
 - campaigning and networking
 - expansion of refuelling network
 - green procurement
 - monetary incentives

Conclusions

- Biomethane works in practice in NGVs in different European cities
- Monitoring of 4.5 million km shows no negative effect on vehicles from using biomethane
- Higher fuel efficiency of NGVs would improve range and reduce operating costs
- High capacity refuelling is a key point
- Monetary incentives are effective to promote market
- Regional networking important



Thank you!

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