

# **Costs and Benefits of Green Public Procurement in Europe**

Part 3 – Potential of GPP for the spreading of new/recently developed  
environmental technologies

Service contract number: DG ENV.G.2/SER/2006/0097r

## **Case study** Sustainable Procurement of Low Emission Buses for Göteborg, Sweden

12 June 2007

Prepared by

ICLEI – Local Governments for Sustainability

Thanks to:

Lennart Löfberg – Västtrafik Göteborgsområdet AB, Peter Danielsson – Volvo, Pierre Modini –  
Göteborgs Spårvägar AB



Photos: Vasttraffik/ Ingemar Carlson



European Commission  
DG Environment



## Index

|           |  |           |
|-----------|--|-----------|
| <b>1</b>  | <b>BACKGROUND INFORMATION</b> .....  | <b>4</b>  |
| <b>2</b>  | <b>INFORMATION ON THE PRODUCT</b> .....  | <b>4</b>  |
| <b>3</b>  | <b>THE NEW ECO-TECHNOLOGIES</b> .....  | <b>4</b>  |
| <b>4</b>  | <b>THE DRIVERS RESPONSIBLE FOR PROCUREMENT OF THE BUSES</b> .....  | <b>4</b>  |
| <b>5</b>  | <b>THE TENDERING PROCESS</b> .....   | <b>5</b>  |
| 5.1       | DEVELOPING THE GREEN PROCUREMENT CRITERIA .....  | 5         |
| 5.2       | THE GREEN PROCUREMENT CRITERIA .....   | 6         |
| 5.3       | CONTRACT MANAGEMENT .....  | 7         |
| <b>6</b>  | <b>RESULTS OF THE TENDERING PROCESS AND THE KEY FACTORS THAT TRIGGERED THE MARKET FOR THE ECO-TECHNOLOGY</b> ..... | <b>7</b>  |
| <b>7</b>  | <b>BARRIERS AND DIFFICULTIES</b> .....   | <b>9</b>  |
| <b>8</b>  | <b>LESSONS LEARNED</b> .....   | <b>9</b>  |
| <b>9</b>  | <b>OUTLOOK</b> .....   | <b>9</b>  |
| <b>10</b> | <b>CONTACTS</b> .....  | <b>10</b> |
| <b>11</b> | <b>SOURCES</b> .....   | <b>10</b> |
| <b>12</b> | <b>APPENDIXES:</b>   |           |
|           | APPENDIX 1: QUESTIONNAIRE PURCHASER  |           |
|           | APPENDIX 2: QUESTIONNAIRE PREVIOUS RESEARCH  |           |

## Abbreviations

|     |                                      |
|-----|--------------------------------------|
| CNG | Compressed Natural Gas               |
| CRT | Continuously Regenerating Technology |
| LCA | Lifecycle Assessment                 |
| LPG | Liquefied Petroleum Gas              |

## **1 Background information**

The city of Göteborg, located on the west coast of Sweden, is the country's second biggest city. The population of the Göteborg region is 750.000 with approximately 470.000 living within the city boundaries. Non-commercial traffic has been growing steadily at an annual rate of 2-4% in the urban area and 4-6% in suburban areas.

Trafikkontoret (Traffic and Public Transport Authority) regulates the City's public transport system, which since 1991 has been the "purchaser-operator" within the City administration. In 1999, the Västtrafik public transport authority was formed at the regional level and this authority has a subsidiary, Västtrafik Göteborgsområdet, for the Greater Göteborg Area. Västtrafik Göteborgsområdet now undertakes planning and tendering for Göteborg.

## **2 Information on the product**

Various low emission buses are in use in the Göteborg region. In 1998, the city bus fleet consisted of 117 diesel buses with CRT-filters, 94 diesel buses without a filter and 38 biogas or natural-gas-fuelled buses. Today Västtrafik operates a total of 93 Compressed Natural Gas (CNG) buses, 10 biogas buses and 32 ethanol buses. However, the biogas and ethanol buses are not used in Göteborg but in smaller towns in the south-west of Sweden. Around 40 different bus operators currently have contracts with Västtrafik AB. Around half of the total bus traffic commissioned by Västtrafik takes place in the Greater Göteborg Area.

## **3 The new Eco-Technologies**

One of the effects of the procurement practises in the Göteborg region is that companies were encouraged to develop vehicles using recent Eco-Technologies. The development of particle filters, engines adapted to high blends of agro-fuels, natural gas, LPG (liquefied petroleum gas), hydrogen, electric motors and hybrid vehicles combining combustion engines with electric motors was stimulated. Göteborg is seen as a forerunner with regards to starting to implement the clean vehicle procurement obligations of the European Commission.

## **4 The drivers responsible for procurement of the buses**

There have been overarching national, regional and local political goals of achieving a sustainable society and a sustainable public transport system in Sweden for many years. In addition, national law in Sweden has required the provision of public transport services to be tendered since the early 1990s. These factors are reflected in the transport plan for Göteborg, which formulates a vision based on competition and sustainability. Over several years, the transport authority has tried to develop transport infrastructure in a way that makes best use of existing facilities in order to minimise the use of the private car. Specific aims are to:

- Improve the local environment by reducing traffic sources and other forms of pollution;
- Improve the overall quality and accessibility of public transport, as well as its safety record.

To achieve this Göteborg aims to develop the public transport system further and to make it more efficient. Bus operation is very important. The environmental goals are intended to be achieved with the use of more natural gas/ biogas powered buses, using latest Eco-Technologies and the application of an environmental protection zone in the city centre.

In Göteborg the objective when implementing this national law at the local level has been to use the new tender specifications and contract agreements to:

- Increase the quality and frequency of public transport services;
- Achieve a better relationship between public subsidies granted and transport provided;
- Increase environmental standards;
- Enable small bus companies to access the market; and
- Allow public as well as private companies to participate in tenders (there is no intention to privatise).

## **5 The tendering process**

The first call for tender by Trafikkontoret of the public transport system was issued in 1992, which covered one third of the bus operation. The second and third followed in 1996 while the remainder occurred in 1998. Following the introduction of Västtrafik as the regional traffic authority, subsequent tenders have been made, such as that in late 2003 which awarded the contract for bus transport within the region to Göteborgs Spårvägar AB (a transport company wholly owned by, but independent of, the City of Göteborg). The latest tender was in 2005 for the Göteborg regional transport area. Bus operations are carried out by private enterprises but Västtrafik, as the region's public transport authority, sets the requirements and issues the calls for tender. The bus suppliers sell the buses to the operators – such as the service provider Göteborgs Spårvägar AB - who act as both purchasers (from the bus suppliers) and suppliers of the service to the region – this is part of the tender requirements. Göteborgs Spårvägar AB passes on the tender requirements to their suppliers, and choose a supplier who can best fulfil these obligations.

### **5.1 Developing the green procurement criteria**

The sustainable development focus is introduced at the very beginning of the procurement process. Before Västtrafik act, they must consult their annual policy document for future tenders/bids, then take up the question of sustainability. Parallel to this, the owners of Västtrafik – the local authorities of the region – are consulted about the environmental needs they consider applicable. This forms the foundation of the requirements/ demands issued to suppliers.

## 5.2 The green procurement criteria

In order to achieve the objectives outlined on the previous pages, two strategies have been followed. The first targeted environmental emissions:

- Strict emission standards were achieved by including the requirement as part of the technical specifications of the call for tender. The requirements for NO<sub>x</sub> and particulate were already strict in Sweden and in 1999 the City of Göteborg specified that NO<sub>x</sub> levels would have to be below 5 g/kWh and particulate matter below 0.11 g/kWh. These requirements reflected the EURO 3 standards, which applied to all fifteen EU Member States since 2001. While these standards were required, some flexibility was left on how to achieve them. Between 2006 and 2008 the requirements will adjust to incorporate the EURO 4 and 5 standards respectively;
- Previous specifications required that by 2000, 10% of fuels would have to come from renewable resources and that the maximum age of the bus fleet should not be more than 10 years, with the average age being no higher than 5 years old. Contracts prescribe that all new buses shall be equipped with diesel particulate filters. Older diesel buses that enter the “environmental zone” of the inner city of Göteborg must be retrofitted with particulate filters in order to meet the local exhaust regulations that apply to that zone.

In the second approach, incentives to strive for better results than demanded were set:

- The tendering authorities have consistently made attempts to advance the quality of results by opting for challenging target setting. This is not necessarily a scientific process, in the sense that decisions have been made deliberately to advance the science and force new technological developments. In the award phase of such tendering processes, companies who could deliver emissions reductions in advance of the target were rewarded with bonuses. Volvo say that such tactics have in turn resulted in aggressive product development on their part as a supplier. The motivation for staying ahead of the game is higher, as the company has a better chance of securing future contracts and receives a good public profile for its innovation and eco-efficiency as a consequence. As similar initiatives have occurred in other Swedish cities, this also reflects the need of companies such as Volvo to respond to their consumers;
- Awarding 25% of the income generated from transport fares to the operator set incentives for good quality service. This differs from standard practice, which is for all income generated from fares go to the authority and for operators to be paid according to the number of operated vehicle kilometres; and
- The tender process allows potential bidders about 60 days to react and/or modify their approach before calculations (with an extra 30 days in summer). Within the 60 days,

potential suppliers have the right until fourteen days prior to the submission deadline to ask written questions regarding all aspects of the tender. Västtrafik must respond to any such demands. After the deadline passes, bids cannot be altered except in the case of urgent clarifications.

The key people involved in the development of the criteria and the nature of those criteria were officials at the public transport authority and through external sources such as consultants.

### **5.3 Contract management**

The bus operators' present annual written reports document how all the environmental requirements of the tender specification have been fulfilled. Some random testing of a few vehicles has also been done, but not every year. The operators have met mostly all the environmental requirements. Also, contracts containing specific targets were used which set certain performance goals and procedures of monitoring their achievement, for example an independent market research institute assesses the quality of service.

## **6 Results of the tendering process and the key factors that triggered the market for the Eco-Technology**

One of the key elements to achieve real improvements in raising standards for low-emission buses was the continuous competitive tendering of Västtrafik. This secured that the bidding suppliers were encouraged to achieve low emission levels earlier than the respective Directives for emission standards of heavy vehicles come into force.

The tendering proceedings especially fostering new Eco-Technologies while at the same time not being prescriptive on the way on how to achieve this together with the included environmental standards were key factors to successful triggering of the market for products with Eco-Technologies. The inclusion of environmental criteria in the tendering process contributed to getting buses on the road meeting Euro 3, Euro 4 and Euro 5 standards earlier than the legal requirements. Also the aim of increasing the share of renewable resources, hence decreasing the reliance of fossil fuels, was achieved two years earlier than required by the tender specification in Göteborg. Furthermore, in 1998, fuels from renewable sources covered 15% of total fuel consumption (compared to 10% in the tender specification).

These demands together with similar demands from other Swedish cities primarily have resulted in achieving a critical mass that strongly supports a business case for the use of low emission buses.

The winning service supplier – Volvo – not only maintained this practice but also made it even more stringent and changes were implemented in a number of other supply contracts held by the supplier. The full cost increase was passed on to the procurer. The costs increased by 10% of the total bus cost. This cost was sustained until the next generation of technology was implemented. The increase in costs is attributed as follows:

- 50% were incurred in the development of the technology; and
- the other 50% in new components.

Within the Volvo Group, they have a set of environment requirements applicable to all their suppliers. There is a questionnaire that has to be completed and a scoring system in place to evaluate their environmental performance. The outcome is very positive since both Volvo and the suppliers have a better control and follow up of the environmental performance. Volvo has a list of forbidden or restricted chemicals/ materials is implemented and an environmental management systems are in operation.

Volvo suggests that the first-mover advantage i.e. that they were the first company to green their bus fleet in response to the tender has been a positive outcome of the tendering process. They did this because the home market supports and demands innovation and this provides a platform for development, export, higher standards and strengthening of the brand's domestic and international image.

This approach has succeeded in its attempt to influence market supply and there has been a guarantee for the supplier that this policy of procurement practices will be sustained.

Following Göteborg's tenders other public-sector buyers across Sweden have also influenced the market in Sweden. Volvo stated that once a critical mass has been reached, with similar demands coming from similar cities, the business case for low emissions buses becomes sound. Supporting this claim, figures from another company Scania AB show that the company sold 283 buses to Swedish cities in the first two months of 2005, 123 of which were ethanol-fuelled products for the Stockholm transport authority. Stockholm, like Göteborg, has consistently set ambitious emissions-related targets. Other Swedish cities, such as Malmö and Uppsala, pursue similar objectives.

According to Volvo, this practice has influenced the wider market demand, which has started to change and now cities in several EU countries carry out similar practices. The key changes regarding the purchasing behaviour of customers are more focus on environmental features in general and a willingness to pay a premium for these features. Customers of public transport are also noticing the environmental improvements gained by improved bus technology and an increase in social standards.

## **7 Barriers and difficulties**

There have not been specific barriers or difficulties related to the implementation of green criteria into the tendering process with the aim to trigger the market of new Eco-Technologies. Nevertheless, experiences with green tenders developed steadily since 1992, sometimes struggling with difficulties in the availability of the desired products and sometimes taking time to adapt the environmental policies to the daily work of the procurement departments.

## **8 Lessons learned**

For those cities willing to undertake a similar project, it is recommended to set specific emission levels as a criterion when tendering, not demand a specific technology, for example, demanding diesel fuelled buses. The body which sets the tender will theoretically then only receive the reduction in emission levels, whilst the suppliers must then provide the adequate technology to achieve the reduction. Competition in Göteborg has shown to bring major cost savings in traffic operation whilst improving social and environmental standards and increasing the number of passenger by 7.5%. Financial savings were used to increase the service level and to reduce ticket prices. Competitive tendering has also enabled modernisation of the bus fleet.

## **9 Outlook**

In a related development, the European Commission has proposed new legislation aimed at contributing towards the creation of a market for “clean” vehicles in order to reduce pollutant emissions and make energy savings in the transport sector. By requiring public bodies to earmark a quarter of their annual procurement requirements to such vehicles, the new European rules will make it possible to give manufacturers the assurances they need in order to develop these vehicles for a wider market. At present, the technologies needed remain more expensive than conventional vehicle manufacturing technologies.

Consequently, the proposed Directive provides that public bodies (state, regional or local authorities, bodies governed by public law, public undertakings and operators contracted by public bodies to supply transport services) will be obliged to allocate a minimum quota of 25% of their annual procurement (purchasing or leasing) of heavy-duty vehicles (with a weight greater than 3.5 tonnes) to “enhanced environmentally friendly vehicles” as defined in the European Performance Standard (EEV). Heavy-duty vehicles include buses and most utility vehicles, such as refuse collection lorries.

The “clean” vehicle procurement obligations are initially limited to these vehicle categories for which the market shares accounted for by public bodies are significant (approximately 6% in the case of lorries and around one-third in the case of buses). The increased demand for these less-polluting vehicles will make it possible to support their development by manufacturers: the aim is to establish a viable market by creating sufficient demand to generate economies of scale. The

studies carried out by the Commission have demonstrated the positive impact on the competitiveness of the European motor industry. The supply of “clean” vehicles by manufacturers will become an important factor in competitiveness given the urban pollution problems encountered by a number of countries experiencing rapid economic growth.

## 10 Contacts

|  |  |
|--|--|
| <p><b>Västtrafik Göteborgsområdet AB</b><br/> <b>Lennart Löfberg</b><br/> Vice VD/Affärsområdeschef Stadstrafik<br/> Besöksadress: Folkungagatan 20<br/> Box 405<br/> 401 26 Göteborg<br/> Sweden<br/> Tel. +46/31-629244<br/> E-mail: Lennart.Lofberg@vasttrafik.se</p> | <p><b>Volvo</b><br/> <b>Peter Danielsson</b><br/> Environmental Manager<br/> Sweden<br/> E-mail: peter.j.danielsson@volvo.com</p> <hr/> <p><b>Göteborgs Spårvägar AB (bus operator)</b><br/> <b>Pierre Modini</b><br/> Sweden<br/> E-mail: pierre.modini@sparvagen.goteborg.se</p> |
|--|--|

## 11 Sources

Telephone interviews and questionnaire response from Lennart Löfberg, Vice VD/Affärsområdeschef Stadstrafik, 10 January 2006 and 24 May 2007

Telephone interview and questionnaire responses Mr Pierre Modini, Göteborgs Spårvägar AB, Sweden, 12 January 2006

Questionnaire responses from Peter Danielsson, Volvo, 20 January 2006

Västtrafik Göteborgsområdet AB, Tel. 031-629244 0708-629244, Besöksadress: Folkungagatan 20, Box 405, 401 26 Göteborg, Sweden.

Ragnar Domstad, Consultant on public transport, "Västrafik GO", Truelsväg 11, S-433 46, Partille, Sweden, ragnar.domstad@spray.se.

Umweltstandards im ÖPNV, Ein Leitfaden für Entscheidungsträger, VCD Fakten, Bonn 2001

Bus, Bahn und Pkw im Umweltvergleich, Der ÖPNV im Wettbewerb, VCD Fakten, Bonn 2001

Die Verkehrsmärkte in Schweden und Dänemark, KCW Schriftenreihe, Kompetenz Center Wettbewerb, HVV, Hamburg

News On Public Transport In Göteborg, Newsletter City of Göteborg, Ragnar Domstad, Göteborg, September 1992

News On Public Transport In Göteborg, Newsletter City of Göteborg, Ragnar Domstad, Göteborg, Spring 1995

### Internet Sources

[http://www.scania.com/news/press\\_releases/n05012en.asp](http://www.scania.com/news/press_releases/n05012en.asp)

<http://europa.eu.int/rapid/pressReleasesAction.do?reference=IP/05/1672>