

Ethanol-powered transport vehicles

A national procurement

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PREFACE

The Clean Vehicles in Stockholm project began in the mid 1990s, originally to buy clean vehicles for the City's own vehicle fleet. The Stockholm clean vehicle initiative has laid the foundation for developing an infrastructure for clean fuels and the availability of clean vehicles. Since then, a great many vehicles have been purchased, driven and evaluated and the market availability of clean vehicles and clean fuels has progressively increased. As of the date this was written, some 40,000 clean vehicles are on the roads in Stockholm County, equivalent to about 4% of all vehicles in use. Clean vehicles make up more than half of the City's shrinking vehicle fleet, but city-owned vehicles account for less than one in thousand vehicles in Stockholm.

Development of clean vehicles in the passenger car segment has taken off, but progress is considerably slower when it comes to light transport vehicles and heavy vehicles. One of the main reasons is that no clean vehicle models have been developed in those vehicle classes. In addition to its own vehicles, the City buys a variety of transport services and these services could be performed with clean vehicles. The City has successfully carried out joint procurements of clean vehicles in the past, including electric cars (Citroën Berlingo and Fiat 600) in 1998 and ethanol-powered cars (Ford Focus) in 2000.

There is already a great many ethanol/E85 filling stations in Sweden and the number is expected to increase substantially due to higher demand, but perhaps most of all in response to the law that requires large filling stations to supply an alternative fuel. In light of the situation described above, Clean Vehicles in Stockholm judged that there should be considerable interest in Sweden in a joint procurement of ethanol-powered transport vehicles in particular.

The Stockholm City Council allocated a billion Swedish kronor in June 2003 to reduce Stockholm's environmental debt and prevent new environmental problems. Clean Vehicles in Stockholm applied to the "Environmental Billion Fund" for funding for the procurement process, which was granted.

Eva Sunnerstedt from the Stockholm Environmental and Health Administration acted as the project manager for the ethanol transport vehicle procurement. Kristina Birath of WSP Analys och Strategi and Charlie Rydén of Protima provided project management support and technical consultation. Carl-Göran Bergstrand from the Kommentus Group was the procurement manager in the partnership with Kommentus regarding the actual procurement.

This report describes the implementation and results of the project. The report was written by Kristina Birath, WSP Analysis and Strategy.

Stockholm, October 2007

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1 SUMMARY

Supported by the City of Stockholm Environmental Billion Fund, the Stockholm Environment and Health Administration has carried out a technology procurement of ethanol-powered transport vehicles. The purpose of the procurement was to increase the supply of transport vehicles that run on renewable fuels. Lessons learnt from previous technical procurements, e.g. Ford Focus FFV, have shown that technology procurements are an effective means of demonstrating market interest to manufacturers.

The procurement was carried out in the following stages:

1. Survey of interest among companies with at least five transport vehicles
2. Information seminars for interested buyers
3. Limitation of the procurement to three vehicle classes
4. Drafting of specifications
5. Specifications circulated for comment by the interested companies
6. Meetings with manufacturers – ongoing information to them
7. Agreement made with Kommentus to carry out the procurement
8. Kommentus carried out the procurement (target group: all units that carry out public procurements and all companies that registered interest)
9. A tender was accepted, contract awarded to Volkswagen, and the procurement was closed.

A survey was distributed to 5,020 legal entities that owned at least five transport vehicles. About 200 responded. Specifications were drafted in cooperation with the interested buyers. The City of Stockholm subsequently entered into an agreement with Kommentus, which assumed responsibility for carrying out the procurement and entering into a contract with the selected supplier. 41 local governments/municipal companies/county councils and 186 privately owned companies (a total of 227 units) are entitled to place orders under the agreement.

The outcome of the procurement was an accepted tender for one of the three requested classes: a 2-5 m³ van. Volkswagen was awarded the general contract and will be supplying a VW Caddy 1.6 BioFlex for SEK 132,920 (excluding VAT) in early 2008.

2 BACKGROUND

There is great interest in reducing emissions of greenhouse gases among companies that use cargo vehicles, but the availability of transport vehicles up to 3.5 tonnes that run on renewable fuel has been limited. The City of Stockholm has instituted free commercial parking for companies that use clean vehicles and thus wished to increase the market availability of transport vehicles that run on renewable fuel.

Ethanol or “flexifuel” technology has been thoroughly tested and several automobile manufacturers are now capable of mass-producing ethanol vehicles at the same, or only negligibly higher, price as conventional vehicles. Operating vehicles on ethanol doesn’t affect road handling characteristics or personal comfort. Lessons learnt from previous technology procurements (e.g., Ford Focus FFV in 2000) have shown that technology procurements are an effective means of demonstrating market interest to manufacturers. About 30,000 transport vehicles up to 3.5 tonnes were sold in Sweden in 2005. One order of about 1,000 vehicles was judged sufficient to persuade a producer to develop a vehicle. Accordingly, the Stockholm Environmental and Health Administration initiated a technology procurement of ethanol-powered transport vehicles.

The project began in late 2005. The objective was to hasten the introduction of such a vehicle to the Swedish market. In a technology procurement, potential buyers define, as a group, their requirements for the vehicle they want to buy, while estimating the level of interest expressed as a number of vehicles. This demonstrates the potential market for the new vehicle to manufacturers.



3 SURVEY AND INFORMATION MEETING

The first step was a survey of interest in ethanol-powered vehicles. A list of addresses to companies and public agencies that own at least five transport vehicles under 3.5 tonnes was purchased from the Swedish Vehicle Registry. Companies in municipalities where there are no ethanol filling stations were eliminated. A total of 5,020 surveys and two reminders were sent out. The buyers indicated what types of vehicles they were interested in and how many they would consider buying.

Yes, we would like to buy ethanol-powered light transport vehicles. If the requirements in the specifications are met, we would be interested in the following number of vehicles in each class:

_____ vans 2-5 m³

_____ vans 6-18 m³

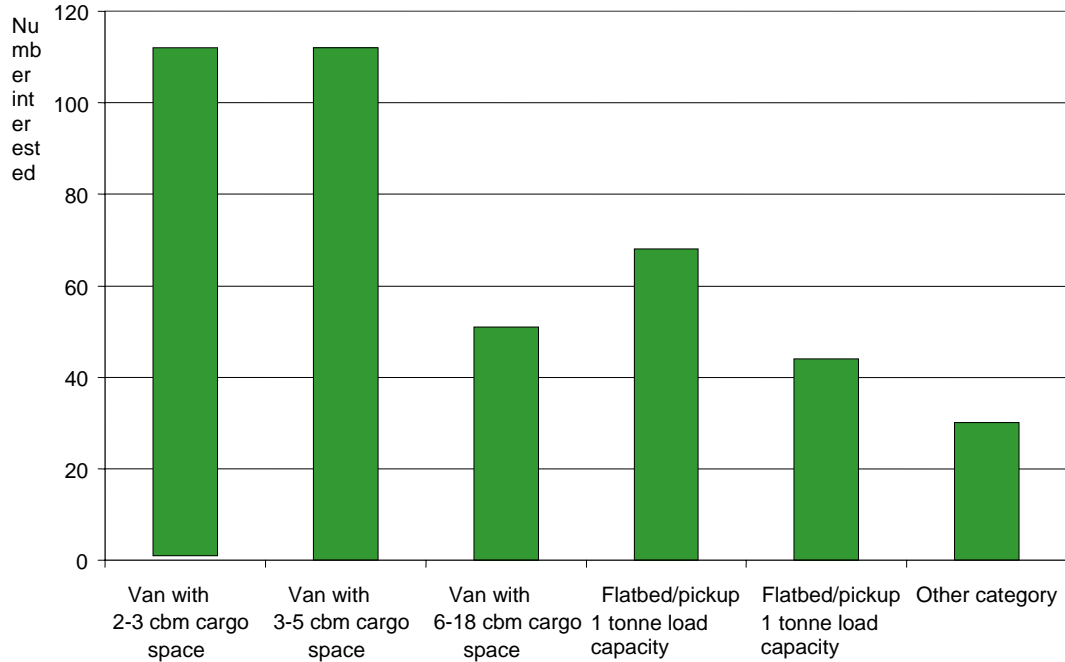
_____ flatbed/pickup trucks, approximate load capacity 1 tonne

The project received responses from 200 companies/agencies. As a group, they were interested in buying about 2,400 ethanol-powered transport vehicles.

Invitations to informational seminars in Stockholm, Göteborg and Malmö were sent out with the surveys. Companies could register to attend a morning seminar that would provide information about the background of the procurement, prospects for ethanol filling stations and how the procurement would be carried out. A total of 89 companies attended the seminars. Information meetings were also held in Växjö, for SABO's environmental managers, the network for clean vehicle municipalities and at a seminar in Tylösand.

4 WHAT VEHICLE TYPE ATTRACTED THE GREATEST INTEREST?

The survey provided a good picture of what potential buyers were interested in. The 200 responses yielded the following information:



The chart shows that the greatest interest was in transport vehicles with 2-5 m³ cargo space and pickups with up to 1.5 tonne load capacity. Other types of vehicles mentioned included 4-wheel drive pickups, minibuses (people movers), combined passenger and cargo vehicles with space for seven people. The survey showed that there was probably enough interest to persuade an automobile manufacture to respond to a request for tender covering the vehicle categories in which the buyer group was most interested. Accordingly, the procurement focused on the following vehicle categories:

- A. Van 2-5 m³
- B. Van 6-18 m³
- C. Flatbed/Pickup with approx. 1 tonne load capacity

5 SPECIFICATIONS

The next step was to prepare specifications. The interested buyers also gave suggestions for other requirements that many of them wanted to specify for the vehicle, such as flow meters that measure the current fuel consumption rate, alco-lock, automatic transmissions/gearboxes and tow hooks. Project management decided that the specifications should focus exclusively on E85 technology, i.e., developing an engine that can run on E85. The manufacturer was instead allowed to indicate whether they could supply vehicles with alco-lock, flow meters, etc., and, if so, what the devices would cost. A key consideration in designing the specifications in this way was that the cost of the E-85 technology would become more transparent.

Draft specifications were written. The draft was distributed to the buyer group for comment. The specifications were modified according to the suggested amendments. One very important requirement for technology procurements is that there must be a nationwide service organization for the vehicle. It must be possible to obtain the same service in Småland as in Stockholm, as there would otherwise be very long queues to get a vehicle repaired. The vehicle must also be available anywhere in the country at the same price.

Excerpt from the specifications for "Procurement of Ethanol-Powered Transport Vehicle." Specifications with specific connections to E85 operation:

1. Definitions

Ethanol-powered vehicles, FFV type

Vehicles with engines that can be run on all mixtures of petrol and ethanol up to a 85% ethanol mixture (E85).

2. General conditions for vehicle operation

The vehicles shall be of the FFV type and have engines and fuel systems designed to run on E85 fuel. In other respects, the vehicles shall be built and equipped in the same way as other transport vehicles already sold in the Swedish market.

3. Functional and performance specifications

Shall requirements – Cold start

The ability to start the vehicle's engine without external aids such as engine compartment heaters or preheaters for intake air, in ambient temperatures down to -7°C is a **shall requirement**.

Shall requirement – Ambient temperature below -7°C but not below -35°C

The ability to start the vehicle's engine at ambient temperatures between -8°C and -35°C is a **shall requirement**. The use of external aids, such as engine compartment heaters or preheaters for intake air is accepted, but if they are necessary, the devices must be included in the price quoted for the vehicle. All restrictions related to the mixture ratio between E85 and petrol must be specified in the tender.

Shall requirement – Fuel consumption

When driven with E85, the vehicle's fuel consumption restated as the energy content of petrol **shall** not be higher than when driven with petrol.

Shall requirement - Warrantees

The vehicle **shall** be covered by customary warrantees comparable to those extended for equivalent petrol-powered vehicles. What warrantees are provided for the vehicle and for how long?

Shall requirement – service

The vehicle supplier **shall** be able to offer local service nationwide to the same extent as for conventional vehicles. If any type of the requested vehicles will not be sold everywhere in Sweden, the locations where the vehicle will be sold **shall** be specified by name.

Shall requirement - Specification of the vehicle's technical data

Fuel consumption, mixed street/highway driving E85 l/10 km.....

6 INFORMATION TO VEHICLE MANUFACTURERS

Information was sent to all automobile manufacturers from the very beginning of the project. It takes time to develop a new product and the sooner manufacturers know what is in the works, the easier it is for them to promote the development of a new vehicle. A separate letter to manufacturers was sent to their Swedish head offices in late 2005.

Thereafter, they were given ongoing information about the progress of the project. Manufacturers were invited to a meeting after buyer interest has been determined and the specifications finalized. The meeting was held in late March 2006. The background to the procurement, survey results the specifications (in general) were presented at the meeting. One manufacturer attended. A couple of others asked for information by e-mail.

7 INFORMATION TO THE BUYER GROUP

Interested buyers who had given their e-mail addresses were given ongoing information about the project by e-mail. Information was also posted on the Clean Vehicles in Stockholm website (www.miljobilar.stockholm.se). Press releases were issued on several occasions and *Svenska Dagbladet* printed an article about the project in late 2006. The project also advertised in a newspaper insert about clean vehicles issued with *Svenska Dagbladet* in the Stockholm region in June 2006.

8 PARTNERSHIP WITH KOMMENTUS

The procurement had to comply with the Swedish Public Procurement Act (LOU) because the buyer group included public sector organisations. As it was impossible for the City of Stockholm to independently carry out the procurement on behalf of so many other municipalities and companies, the Stockholm Environmental and Health Administration contacted Kommentus. Kommentus is a company that arranges coordinated procurements in which municipalities, county councils, municipal companies and other government agencies may participate. When the procurement is concluded, Kommentus charges a fee to parties that wish to place orders under the agreement. Kommentus and the City of Stockholm entered into an agreement and Kommentus was assigned to carry out the actual procurement.

9 THE PROCUREMENT

Kommentus issued a query to all procuring units under public management. Thirty-nine municipalities, municipal companies and national government agencies wanted to participate in the procurement along with the companies (about 200) that were already part of the buyer group. The subsequently issued request for tender for a general agreement covered total future orders for about 2,500 vehicles. The tender documents specified that the stated volume was estimated based on the purchasing units' assessments and should be considered a guideline. The request for tender also specified that suppliers were given no volume guarantees.

The purpose of the procurement was to bring new technology to the market; thus, the higher the number of approved tenders, the better the project results would be. Accordingly, the following text was used in the procurement: "Kommentus, on behalf of the procuring unit, reserves the right to accept tenders in whole or in part and to award contracts to *one or more suppliers*."

Suppliers were allowed to submit tenders for purchase as well as financial and operational (full-service) leasing options with guaranteed residual value.

The request for tender was issued on 2 November 2006 and suppliers were given two and a half months to respond. The deadline for answers was 10 January 2007.

10 RESULTS OF THE PROCUREMENT

Two tenders were received: one for a 2-5 m³ van from Volkswagen and one for a 6-18 m³ van and a 1-tonne flatbed/pickup from Ford. Ford's tender was rejected due to the unacceptably long delivery time.

Swedish Volkswagen submitted a tender for an ethanol-powered Caddy 1.6 l EcoFlex. The contract applies to purchases as well as financial and operational leasing. The vehicle may be ordered in autumn 2007 for delivery in early 2008. The price of a Caddy 1.6 EcoFlex ordered under the procurement is SEK 166,150 including VAT:

Model/Specification	VW Caddy 1.6 Ecoflex
Gross price, standard vehicle	SEK 132,920 excluding VAT
Discount on standard vehicle, %	10%
Net price, standard vehicle	SEK 119,628 excluding VAT
Discount on factory installed accessories, %:	10%
Discount on locally installed accessories, %:	10%
Discount on accessories, %	10%

Swedish Volkswagen offers options for purchase as well as financial and operational leasing. Orders may be placed with all local dealers.

11 PROJECT COSTS



The costs of the project were:

Cost type	Total (SEK)	≈ Euro
Purchase of mailing lists and distribution	40,000	4,200
Layout and printing	40,000	4,200
Technical support	250,000	26,500
Project management support	300,000	32,000
Project management	150,000	16,000
Procurement consultant	0	0
Marketing (advertisement and article)	40,000	4,200
Other costs (travel, telemeetings, etc.)	15,000	1,600
Total	875,000	92,700

Ethanol-powered transport vehicles

The agreement with Kommentus was drafted in accordance with Kommentus's standard procedures, by which Kommentus carries out the procurement at no cost and later generates revenues via a commission of 0.8% per vehicle shipped, which is paid by the suppliers.

12 APPENDIX TO SPECIFICATIONS, 2 NOVEMBER 2006

Ethanol-powered transport vehicle

4. Scope

The procurement refers to three vehicle types of standard-equipped ethanol-powered transport vehicles:

- A. Van 2-5 m³
- B. Van 6-18 m³
- C. Flatbed/Pickup with approx. 1 tonne load capacity

Tenders may be submitted for only one type (A, B or C) separately, or for all types. Tenders for different vehicle types shall be specified separately.

Tenders **shall** cover purchase of vehicles.

Tenders may also be submitted for financial leasing and operational leasing (full-service).

For leasing options, equipment shall be specified as additional cost per month.

Equipment will be ordered by the vehicle user for each separate order under the contract.

Vehicle service and maintenance shall be performed in the town where the vehicle is placed.

Vehicles shall be delivered and serviced in the towns listed or as separately agreed.

With regard to towns where no authorized service providers are available, the solution should be that a contract is entered into with an existing car repair/service company. The carmaker enters into the agreement with a local car repair/service company and is liable for that service/repairs are

performed in compliance with the carmaker's standards and quality for a car repair/service company approved under warranty and otherwise for meeting the carmaker's standards for a car repair/service company.

5. Definitions

FFV type ethanol-powered vehicle

A vehicle with an engine that can be operated on any mixture of petrol and ethanol up to a minimum 85% ethanol mixture (E85).

Gross vehicle weight

The gross vehicle weight is the vehicle's highest permitted gross vehicle weight.

Vehicle load capacity

The vehicle's load capacity is the difference between the vehicle's gross vehicle weight and curb weight.

6. General conditions for vehicle operation

The vehicles shall be of the FFV type and have engines and fuel systems designed to run on E85 fuel. In other respects, the vehicles shall be built and equipped in the same way as other transport vehicles already sold in the Swedish market.

The vehicles shall be suitable for use in the Nordic climate and on the Nordic road system. Sales and service of the vehicles shall be available to an extent equivalent to comparable conventional vehicles.

The vehicles must meet all applicable standards provided in European Council directives that refer to vehicle categories N1 or M1 (whichever applies) and which are in effect on the date the General Agreement is

signed. In addition, the vehicle must meet the standards provided in applicable European Council directives with regard to environmental impact.

7. Functional and performance specifications

Shall requirement – Type approval

The supplier **shall** be liable for that type approval can be obtained in compliance with European Council Directive 92/53/EEC. The vehicle **shall** have minimum type approval according to standards for environmental class 2005.

Shall requirement – Cold start

The ability to start the vehicle's engine without external aids such as engine compartment heaters or preheaters for intake air, in ambient temperatures down to -7°C is a **shall requirement**.

Shall requirement – Ambient temperature below -7°C but not below -35°C

The ability to start the vehicle's engine at ambient temperatures between -8°C and -35°C is a **shall requirement**. The use of external aids, such as engine compartment heaters or preheaters for intake air is accepted, but if they are necessary, the devices must be included in the price quoted for the vehicle. All restrictions related to the mixture ratio between E85 and petrol must be specified in the tender.

Shall requirement – Emissions limits

The vehicle **shall** meet the following emissions limits.

Emissions limits (g/km) for environmental classification of light goods vehicles.

Environmental class	Reference weight	Carbon monoxide (CO)		Hydrocarbons (HC)		Nitric oxides (NOx)		Total value HC+NOx		Particle emissions from diesel engine operation
		B	D	B	D	B	D	B	D	
Mk2005	- 1305	1.0	0.5	0.10	-	0.08	0.25	-	0.30	0.025
	1306 – 1760	1.81	0.63	0.13	-	0.10	0.33	-	0.39	0.04
	1761 -	2.27	0.74	0.16	-	0.11	0.39	-	0.46	0.06

Shall requirement – Fuel consumption

When driven with E85, the vehicle’s fuel consumption restated as the energy content of petrol **shall** not be higher than when driven with petrol.

Shall requirement - Warrantees

The vehicle **shall** be covered by customary warrantees comparable to those extended for equivalent petrol-powered vehicles. What warrantees are provided for the vehicle and for how long?

Shall requirement – service

The vehicle supplier **shall** be able to offer local service nationwide to the same extent as for conventional vehicles. If any type of the requested vehicles will not be sold everywhere in Sweden, the locations where the vehicle will be sold **shall** be specified by name.

Shall requirement - Publications

- Driver’s manual

An illustrated driver's manual in Swedish **shall** be supplied with every vehicle. The manual **shall** contain clear, distinct instructions for daily care, operation and for such inspections and troubleshooting that can be performed by the driver.

- Maintenance manual (repair/service facility manual)

An illustrated maintenance manual in Swedish **shall** be available upon request in a separate Supply Contract. The manual **shall** contain clear, distinct instructions, connection and logic diagrams for care, inspection, troubleshooting, preventive maintenance and repairs.

- Parts catalogue

An illustrated parts catalogue in print or digital format, in Swedish or English, **shall** be available upon request in a separate Supply Contract. The illustrations must make it easy to identify all such parts that can be repaired, replaced or maintained at the local level.

Shall requirement - Specification of vehicle technical data

Vehicle type designation

.....

Dimensions and weights

Length	..... m
Width	..... m
Height	..... m
Wheel base	..... m
Wheel base, front	..... m
Wheel base, back	..... m
Curb weight	..... kg
Gross vehicle weight	..... kg
Max front axle load	..... kg
Max back axle load	..... kg

Ethanol-powered transport vehicles

Engine

Type designation
Max output kW
 at rpm rpm
Max torque Nm
 at rpm rpm

Transmission/gearbox

Type designation
Transmission/gear ratio

Steering system

Minimum turning radius m
Type of steering servo

Brake system

Brake type, front
Brake type, back

Tires

Dimension
Supplier(s)

Airbags

Driver side
Passenger side, front

Diagnostic instruments (not included in the vehicle)

Supplier and type designation

Fuel consumption, mixed street/highway driving E85 l/10 km.....

Shall requirement - Other

If exceptions apply to certain special models, the exceptions **shall** be specified in the tender.

8. Purchase

Prices **shall** be specified in the enclosed Price and Discount Appendix (Appendix 8).

9. Financial leasing

Tenders regarding financial leasing **shall** specify the following:

Net price of the vehicle after discount, net price for accessories, interest basis, interest margin, interest on advance charges.

The leasing charge **shall** be calculated according to interest rates in effect on Wednesday 3 January 2007 at 11:00 a.m.

The tender shall specify whether the customer is required or only has the right to return the vehicle to the supplier at the end of the lease.

Any additional costs upon early termination of the lease **shall** be specified in the tender.

A form including the leasing firm's standard terms and conditions for financial leases **shall** be appended to the tender.

Financial leasing shall be specified at 10,000 km intervals per 2 years or 3 years with specification of remuneration for below contract/excess mileage.

10. Residual value

A guaranteed residual value **shall** be specified. The lessee shall have first right of refusal to buy the leased vehicle at the stated residual value, adjusted for below contract/excess mileage, if applicable.

11. Full-service leasing, no buy-back

Tenders for full-service leasing should offer lease terms of up to 48 months or a maximum of 180,000 km.

Remuneration for below contract/excess mileage **shall** be specified.

The leasing charge **shall** be calculated according to interest rates in effect on Friday 3 January 2007 at 11:00 a.m.

Remuneration for excess/below contract mileage shall be settled at the end of the lease in conjunction with return of the vehicle in accordance with the agreed mileage charges. However, if actual mileage is more than 20% higher than contract mileage for the entire term of the lease, the seller shall be entitled to compensation for increased service and repair costs.

Leasing and service charges shall be specified at 10,000 km intervals per 2 years or 3 years with specification of remuneration for below contract/excess mileage.

9. Equipment

It should be possible to equip the vehicle with the equipment and accessories specified below.

If the equipment specified below is not included in the standard version of each model tendered, the supplier shall specify whether the equipment can be supplied and at what price. Prices shall be specified in the Price Appendix, Appendix 8.

1. Fuel consumption meter. Can the vehicle be equipped with a meter for current and average fuel consumption (e.g. an onboard computer)?

2. Engine preheater with timer. Can the vehicle's engine preheater be equipped with a timer? It should be possible to set the timer from the passenger compartment.
3. Tires. Can the vehicle be supplied with tires whose tread contains less than 3% HA oil?
4. Alcohol safety interlock device. Can the vehicle be equipped with an alcohol safety interlock device?
5. Seatbelt reminder. Can the equipment be equipped with a seatbelt reminder that signals with light and sound if the belt is not in use when the engine is running?
6. ESP. Can the vehicle be equipped with ESP (electronic stabilizing program) as accessory equipment?
7. Automatic transmission/gearbox. Can the vehicle be supplied with an automatic transmission/gearbox?

Decisions regarding accessory equipment are at the discretion of the entity which places orders under the contract.

10. Service

Specify service locations and the names, addresses and telephone numbers of service companies.

The tender **shall** specify the discount rates applied to

- repairs
- service costs
- parts
- accessories
- prices for tire mounting

11. Delivery times

The supplier **shall** specify when initial delivery of each vehicle type offered is possible.