

Joint Procurement of EVs and PHEVs in Sweden

Clean Fleets case study

- Buyers' group of 296 organisations
- Energy consumption < 0.37 kWh/km and emissions < 50g CO₂/km
- 34 tonnes CO₂ saved in first 1.5 years (95% reduction)



Contract tendered

- Framework contract for passenger cars and transport vehicles (light duty vans)
- Led by the City of Stockholm and covering 296 organisations (260 public and 36 private bodies). Each organisation committed to a minimum number of purchases.
- 2-year contract with possible 2-year extension, starting Oct 2011
- Estimated purchase volume of 1,250 vehicles per year – 5,000 over 4 years
- The Swedish Energy Agency will fund up to €6,000 for the first 1000 vehicles procured

Targets and planning considerations

A Clean Vehicles in Stockholm programme has been run by the Environment and Health Administration of Stockholm since 1994 to speed up the transition to clean vehicles and renewable fuels. In 2011, the City Council approved an Electric Vehicles Strategy, aiming to become one of the world's leading clean vehicle cities by 2030.

The joint procurement was initiated by the city of Stockholm and the state-owned utility company Vattenfall to demonstrate Sweden's purchasing potential to manufacturers of Electric Vehicles (EVs) and Plug-in Hybrid Electric Vehicles (PHEVs), to contribute to a quieter and cleaner fleet and to enable Swedish organisations to buy or lease EVs or PHEVs under optimal conditions.

The City of Stockholm does not normally specify one technology in its calls for tenders, unless it requires a market boost. In this case, the market for EVs was less developed than that for ethanol or biofuel driven vehicles.

Sweden has good conditions for EVs in terms of production capacity, infrastructure and distribution systems for electricity. Approximately 65% of the Swedish population has engine block heaters at home or work. They are normally used to keep the engine, coolant or oil warm in cold temperatures, but can also be used to recharge EVs.

Procurement approach

The **joint procurement** approach was applied for several reasons:

- To reduce administrative costs for the participating organisations
- To achieve price reductions (although in this case, prices did not vary much)



- To send a strong signal to the market of the demand
- To ensure that smaller municipalities would have access to such vehicles, as bidders may not otherwise be interested in such small calls for tender

Swedish procuring entities (municipalities and county councils) and private organisations were invited to participate in the joint procurement process in October 2010, two months before the start of the actual procurement process.

Participating entities jointly determined the vehicle specifications, with two seminars organised by the City of Stockholm. All potential bidders were also transparently informed about the upcoming tender.

The procurement itself was a two-phase procedure including a prequalification phase for bidders.

Two separate contracts were tendered for – one for public bodies and one for private bodies.

Clean Vehicle Directive (CVD) Methodology

- CVD Option 1 (technical specifications) was used for the tender
- The tender specified EV or PHEVs meeting the following minimum criteria:

Type	Passenger car		Transport vehicle	
	EV	PHEV	EV	PHEV
All-electric range (km)	>100	>20	>100	>20
Energy/CO ₂	<0.37 kWh/km	<50 gCO ₂ /km	No criteria	No criteria
Charging	Schuko socket, one phase, 230 V & 10 A			
Top speed (km/h)	>100		>90	
Max cost (SEK)	400,000 – 650,000		600,000 - 800,000	
(€)	48,000 – 78,000		72,000 – 96,000	

The values for energy consumption and CO₂ emissions were taken from the definition of clean vehicles of the national government. The procurers preferred to stick to the established values for energy consumption, although they could easily have been halved.

The value for CO₂ emissions derives from a national premium of 40,000 SEK (€4,647) which the government pays for every EV emitting less than 50 g CO₂/km.

- Bidders had to provide figures necessary for the procurers to calculate life cycle costs (LCC). These included:
 - Acquisition costs (including delivery) or leasing costs
 - Fuel/electricity costs
 - Maintenance costs (if vehicle purchased rather than leased)
 - Residual value following the envisaged usage period (calculated automatically)
- Life cycle cost was then calculated based on net present value (with a defined discount rate). Annual mileage, electricity and fuel costs were set in the tender for the purposes of the calculation



Contract Monitoring and Management

Due to the immature nature of the EV market, other potential environmental impacts (e.g. the use of metals such as cobalt and lithium, and nano-products) will be assessed a year into the contracts.

Although car manufacturers are required by law to take back and dispose of batteries in an environmentally responsible manner, these aspects will be also followed up by contracting authorities throughout the lifetime of the contract.

Results

- The City of Stockholm and Vattenfall both planned to purchase 20 vehicles per year. Up to May 2013 Stockholm had purchased around 40 vehicles, which makes up 5 % of their vehicle fleet of 800 cars. In total, 300 vehicles (the large majority EVs) had been purchased under the contracts by May 2013.
- 10 bids were finally submitted by suppliers, exceeding the target of 8. 12 out of 14 suppliers passed the initial prequalification phase.
- As the first year has been viewed by some organisations as a trial period, the demand was slow and the purchasing proceeded much slower than expected. Orders are now increasing, but it is doubtful that the overall target for 6,000 vehicles over four years will be met.
- Some purchasers have organised training sessions on how to handle EVs. However these are not judged to have made a big difference in terms of use or satisfaction.

Costs

Maximum prices were set after consultation with 20 manufacturers as follows (set purposely high and generous to allow many bidders to participate in the first phase of the tendering process):

- SEK 400,000 – 650,000 (€ 48,000 - € 78,000) for passenger cars
- SEK 600,000 – 800,000 (€ 72,000 - € 96,000) transport vehicles

The range of prices is for different types of cars and vans. Each type had a fixed maximum price. Offers received were below these maximum prices, e.g. 362,000 SEK (42,054 €) for the passenger car Citroën C Zero. Since the demand for EVs is much larger than the supply, it was only possible to get a max. 3 % rebate through joint procurement (low compared to other joint tenders, where 9-14% rebates are common).

Including the costs for battery leasing, prices exceeded those for equivalent petrol driven cars by 200,000 SEK (€23,234) on average, although with higher resale value.

Environmental impacts

For all vehicles receiving the Energy Agency's subsidy of €6,000, the buyers have to hand in monthly data reports to the City of Stockholm. Every six months, this data is being compiled and CO₂ emissions are being calculated with the assistance from the Royal Institute of Technology, based on the comparative figures in the table below.

By the end of 2012, 174 funded vehicles had been purchased and had driven 300,000 km in total delivering a saving of 34 tons of CO₂ compared to equivalent petrol cars (approx 95% reduction). As purchases have increased significantly in 2013, although not yet calculated, the CO₂ savings can also be assumed to have increased proportionally.

	Petrol driven vehicle	EV
Energy/fuel consumption	6 l petrol/100 km	20 kWh/100 km

CO ₂ emissions	2,3 kg CO ₂ /l petrol	66 g CO ₂ /kWh according to nordic energy mix
CO ₂ /100,000 km	over 13.8 t	just over 1.3 t

These are average Swedish figures which have been estimated from the EV procurement project in Stockholm. They are for EVs only. No reporting has been done on PHEVs yet, but will be available for the first time in August 2013.

Indirect impacts: The major impact of electric vehicles remains CO₂ emissions, as well as nuclear waste, potentially caused by electricity generation. Therefore the procurement of renewably-generated electricity to run the electric vehicles is an important element in the overall procurement approach for clean vehicle fleets.

Batteries used in EVs contain metals like cobalt and lithium as well as nano-products. Many of these can almost only be found in Congo, China and Bolivia and their extraction can cause severe environmental and social problems.

Lessons learned

- The two-phase procurement gave preparation time not only to the buyers but also to suppliers
- Recruiting public partners was quite straightforward, as they were already used to such procurement procedures. Deciding upon vehicle specifications with all stakeholders of the joint procurement was however time-consuming and challenging due to their number and concerns over vehicle safety. Nevertheless the city of Stockholm still considers “the more participants the better”.
- Recruiting private buyers was much harder, and the city of Stockholm would put less emphasis on this in future.
- Some manufacturers were disqualified in the first phase due to not filling in the tender documents correctly, despite the amount of information provided. In future a lobby organisation which has 99% of Sweden’s car industry as its members may be asked to do a course on how to tender correctly.
- The estimated purchase volumes were not realistic from the beginning. The next time, the numbers submitted by the buying organisations should be questioned more thoroughly and be adjusted if necessary.
- Also, a one-year trial phase should be considered, as buyers like to check the performance of the new cars in all weather extremes. Estimated first year purchase volumes should therefore be lower.
- The placement of the vehicles has not always been ideal - sometimes there was no possibility to recharge the vehicle in between two shifts or the driving range overestimated.

Contact information

Eva Sunnerstedt, Project manager of Clean Vehicles in Stockholm, Environment and Health Administration, City of Stockholm. Email: eva.sunnerstedt@stockholm.se



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