

## Vehicles and Transport

### Framework agreement for electric vehicles in Rotterdam



<b>Purchasing body:</b>	Municipality of Rotterdam
<b>Contract:</b>	<p>Framework contract for the supply of electric vehicles - 2 years (2015-2017) with 2 years optional extension</p> <p>Contract awarded: 31 July 2015</p>
<b>Savings:</b>	<ul style="list-style-type: none"> <li>25.4 tons of CO<sub>2</sub> emissions saved (33%)</li> </ul>

#### SUMMARY

- Framework agreement for the procurement of up to 285 vehicles, including 103 fully electric passenger cars (81 small, and 22 standard size).
- The Department of Enforcement of the Municipality of Rotterdam has purchased 40 small electric cars through this contract, achieving a 33% reduction in CO<sub>2</sub> emissions

## Procurement Approach

The procurement process was led by the procurement department of the Municipality of Rotterdam on behalf of its Car Leasing Department (Roteb Lease). The largest city within the MRDH SPP network operates a fleet of more than 1500 vehicles, including passenger cars, cleaning vehicles and waste collection trucks. The tender was completed to help promote cleaner and more efficient transportation in Rotterdam, as laid down in the city's Sustainability and Climate Change Programme 2015 – 2018<sup>1</sup>, politically adopted in 2014. The Municipality strives towards emission free city logistics by 2025. An important element in this policy is leading by example.

The framework agreement runs for 2 years (with a possible extension for 1 + 1 year). In 2017, the department of enforcement of the Municipality of Rotterdam has purchased 40 small electric cars through this contract, achieving an annual reduction in CO<sub>2</sub> emissions of 33% (25.4 tonnes).

The framework was divided into 8 lots, covering the different vehicle categories, with each lot awarded to a single supplier. Rotterdam published the European tender on 8 May 2015 via Tendered. The contract was awarded on 31 July 2015.

### FLEET MANAGEMENT POLICY

All departments of the Municipality of Rotterdam are obliged to make use of the framework agreement. The municipalities' policy aim regarding clean and efficient transport is reflected in the fleet management policy, carried out by the internal lease department Roteb Lease. The following rule applies: "all vehicles to be replaced will be electrical, unless the vehicle's autonomy does not fit the requirements imposed by their use.

## Needs analysis

Each department of the municipal authority indicated prior to tendering their expected procurement requirements under the framework contract; which resulted in the indicated total of 282 vehicles. The breakdown by year and vehicle type is indicated in the table below.

Lot	Description	Prognosis					Total
		2015	2016	2017	2018	2019	
1a	Small passenger cars	3	3	1	1	10	18
1b	Small passenger cars BEV	5	7	23	15	31	81
2	Compact hybrid passenger cars (5 doors)	4	6	22	12	44	88
3	Passenger cars hybrid (stationwagon)	4	4	7	3	4	22
4	Passenger cars plug-in hybrid	4	4	7	3	4	22
5	Passenger cars BEV	5	4	6	2	5	22
6a	9 person minibuses	0	0	6	7	8	21
6b	9 person minibuses (automatic transmission)	0	0	2	3	3	8
	<b>Total</b>	<b>25</b>	<b>28</b>	<b>74</b>	<b>46</b>	<b>109</b>	<b>282</b>

<sup>1</sup> [www.rotterdam.nl/wonen-leven/duurzaam/Programma-Duurzaam-2015-2018.pdf](http://www.rotterdam.nl/wonen-leven/duurzaam/Programma-Duurzaam-2015-2018.pdf)

The actual procurement of 40 BEV in 2017 is considerably more than initially foreseen. This reflects Rotterdam's ambition to accelerate the introduction of zero emission mobility for its own transport.

## Tender specifications and Verification

### TECHNICAL SPECIFICATIONS

All vehicles: (8 lots)

- All vehicles should meet the general basic requirements
- All vehicles should meet Euro 5/V emission criteria (715/2007/EC)

Small electric vehicles (lot 1b):

- Maximum vehicle length 4100 mm
- Minimum boot capacity 350 litres (rear seats upright)
- Minimum engine power 44 kW
- Electric engine has no CO<sub>2</sub> emission
- Theoretical range 160 km (determined according to standard procedure)

Electric vehicles (lot 5):

- Maximum vehicle length 4500 mm
- Minimum boot capacity 160 litres (rear seats upright)
- Minimum engine power 80 kW
- Electric engine has no CO<sub>2</sub> emission
- Theoretical range 160 km (determined according to standard procedure)

#### AWARD CRITERIA

- *Service and support* (10 points all lots)
- *Environment and sustainability* (30 points, all lots except 1b and 5)
- *Delivery time for spare parts* (10 points, all lots).

For all lots, a reference price criterion was defined in the tender document. Max 150 points could be earned, using the formula: score =  $(1-P/R)*150$ , where:

P = price for the vehicle

R = reference price for the vehicle

Reference prices were as follows:

<i>Lot</i>	<i>Description</i>	<b>Reference price (€)</b>
<b>1a</b>	<b>Small passenger cars</b>	10,000
<b>1b</b>	<b>Small passenger cars BEV</b>	21,000
<b>2</b>	<b>Compact hybrid passenger cars (5 doors)</b>	20,000
<b>3</b>	<b>Passenger cars hybrid (stationwagon)</b>	23,000
<b>4</b>	<b>Passenger cars plug-in hybrid</b>	32,000
<b>5</b>	<b>Passenger cars BEV</b>	33,000
<b>6a</b>	<b>9 person minibuses</b>	50,000
<b>6b</b>	<b>9 person minibuses (automatic transmission)</b>	50,000

#### Verification

Number plate registration is used as verification for the emission characteristics of the supplied vehicles, as the national vehicle registration (RDW) issues number plates only after formal registration of a specific vehicle. Vehicles may only be sold in the Netherlands after a formal test of technical specifications, including emission characteristics.

## Results

### Environmental impacts

By purchasing 40 electric vehicles through this framework contract, the Department of Enforcement of the Municipality of Rotterdam, has achieved an estimated saving of **25.4 tonnes of CO<sub>2</sub>/year**, as presented in the table below. Figures for the whole framework contract have not been calculated here, but the overall impact should obviously be considerably higher.

Tender	Consumption	CO <sub>2</sub> emissions (tonnes/year)	Primary Energy consumption (GWh/year)
<b>Benchmark (petrol cars)</b>	28,000 l/yr	78	0.25
<b>Green tender (fully electric cars)</b>	100,000 kWh/yr	52.6	0.25
<b>Savings</b>		<b>25.4 (33%)</b>	<b>0</b>

#### CALCULATION BASIS

- Each of the vehicles drives 10,000 km/year on average
- Average fuel consumption 7 l/100 km for the small passenger cars
- Average electricity consumption 25 kWh/100 km
- CO<sub>2</sub> emissions factor set at 0.526 kg/kWh for electricity
- The emission factor for petroleum is 2.766 kgCO<sub>2</sub>/l, and includes direct and indirect emissions
- For electricity, a PEF (Primary Energy Factor) of 2.5 was assumed
- Calculation made using the tool developed within the GPP 2020 project ([www.gpp2020.eu](http://www.gpp2020.eu)), and refined within the SPP Regions project. Available on the SPP Regions website.  
(More detailed calculation tables are included in the Annex below)


### Financial impacts

The procurement of these 40 BEV's reflects a political strategy, and a price comparison has therefore been regarded as less relevant. The Municipality of Rotterdam has noted that purchase prices of electric vehicles were higher, as is reflected in the reference prices. The resulting increase in monthly lease fee remained acceptable. The variable part of the energy cost per km has come down, but a

considerable investment was required to have 20 charging poles installed. Further extension of the number of electric cars stationed at the same location will require an even larger investment in an upgrade of the grid connection.

## Market response

Lot	Description	Bidders				
		I	II	III	IV	V
1a	Small passenger cars		X			X
1b	Small passenger cars BEV					X
2	Compact hybrid passenger cars (5 doors)		X			X
3	Passenger cars hybrid (stationwagon)		X			
4	Passenger cars plug-in hybrid	X	X			
5	Passenger cars BEV	X		X	X	X
6a	9 person minibus				X	X
6b	9 person minibus (automatic transmission)				X	X

 = awarded

## Contract management

Since the transition to centralized procurement in the municipality, a system for contract management is still being implemented. For the specific product group of vehicles, a specialized manager is being recruited. So apart from the operational contact with the suppliers regarding ordering and maintenance and repair, there is no systematic contract management for the contract.

## Lessons learned and future challenges

The simultaneous replacement of 40 ICE vehicles by BEV has had a considerable impact on the electricity network at the location. Moreover, an issue arose in the allocation of the costs for charging infrastructure (both the purchase and the maintenance and repair). Many of the working locations are rented, either from the municipal real estate department or from third parties. Investments in charging infrastructure or the even heavier investments in upgrading of the power grid connection are not considered to increase the value of the real estate property. An agreement has not yet been reached about a proposal by the internal lease department to include the cost of charging infrastructure in the monthly lease fee for electric vehicles.

The shift to electric driving has had an impact on the daily routines of the employees involved. On the upside, the comfort of quiet cars is appreciated. On the other hand, the absence of noise makes it extra important to be aware of pedestrians and cyclists who do not hear the cars approaching.

Another important change concerns the need to develop a routine to charge the vehicles at the end of their shift, in order to have a fully charged vehicle the next day. Adequate and prompt response to malfunctioning of a charging pole is very important.

#### CONTACT

Jos Streng

Transport Planner

City of Rotterdam Urban Development

[jma.streng@rotterdam.nl](mailto:jma.streng@rotterdam.nl)



## Annex 1 - Calculation of environmental savings

Calculations made using the tool developed within the GPP 2020 project ([www.gpp2020.eu](http://www.gpp2020.eu)), and refined within the SPP Regions project. Available on the SPP Regions website.

Location	Netherlands	CO <sub>2</sub> -emissions per kWh (kg CO <sub>2</sub> /kWh)	0,526									
<b>Input</b>	% Green electricity for Electro engine (if any)				0%		% Green electricity for Electro engine (if any)				0%	
	<b>Baseline</b>				<b>Green tender</b>							
	Quantity of vehicles	Average distance per vehicle per year (km/yr)	Kind of fuel	Amount of fuel per 100 km	Quantity of vehicles	Average distance per vehicle per year (km/yr)	Kind of fuel	Amount of fuel per 100 km	Quantity of vehicles	Average distance per vehicle per year (km/yr)	Kind of fuel	Amount of fuel per 100 km
	Standard Engine - fuel 1	40	10.000	Petroleum	7,0	l/100 km	Petroleum		Petroleum			l/100 km
Standard Engine - fuel 2			Diesel		l/100 km	Diesel		Petroleum			Nm <sup>3</sup> /100 km	
Electro Engine			Electricity		kWh/100km	40	10.000	Electricity			25,0	kWh/100km
Hybrid Engine												
Electricity (combined test cycle)			Electricity		kWh/100km			Electricity				kWh/100km
Fuel (combined test cycle)			Petroleum		l/100 km	Diesel		Diesel				l/100 km
<b>TOTAL</b>	<b>40</b>	<b>10.000</b>				<b>40</b>	<b>10.000</b>					
<b>Total consumption and emissions</b>	<b>Baseline</b>				<b>Green tender</b>							
	Annual fuel consumption		Energy consumption (GWh/yr)	CO <sub>2</sub> -emissions per year (t)	Total amount of fuel during the life time of the vehicles		Energy consumption (GWh/yr)	CO <sub>2</sub> -emissions per year (t)				
	Standard Engine - fuel 1	28.000	l	0,25	78	0	l	0,00			0	
	Standard Engine - fuel 2	0	l	0	0	0	Nm <sup>3</sup>	0,00			0	
Electro Engine	0	kWh	0,000	0,00	100.000	kWh	0,250			52,60		
Hybrid Engine												
Electricity (combined test cycle)	0	kWh	0,00	0	0	kWh	0,00			0		
Fuel (combined test cycle)	0	l	0	0	0	l				0		
<b>TOTAL</b>			<b>0,25</b>	<b>78</b>			<b>0,25</b>			<b>52,60</b>		
<b>Savings</b>	<b>Total savings (Baseline / Green tender)</b>											
	Energy savings (GWh/yr)	CO <sub>2</sub> -savings (t/yr)	% of energy savings	% of CO <sub>2</sub> -savings								
	Standard Engine - fuel 1	0,25	78	100%	100%	28.000						
	Standard Engine - fuel 2					0						
Electro Engine	-0,25	-53	#DEEL/0!	#DEEL/0!		0						
Hybrid Engine												
Electricity (combined test cycle)	0,00	0	#DEEL/0!	#DEEL/0!								
Fuel (combined test cycle)												
<b>TOTAL FOR THE PROJECT</b>	<b>-0,001</b>	<b>25,395</b>	<b>0%</b>	<b>33%</b>								



## About SPP Regions

SPP Regions is promoting the creation and expansion of 7 European regional networks of municipalities working together on sustainable public procurement (SPP) and public procurement of innovation (PPI).

The regional networks are collaborating directly on tendering for eco-innovative solutions, whilst building capacities and transferring skills and knowledge through their SPP and PPI activities. The 42 tenders within the project will achieve 54.3 GWh/year primary energy savings and trigger 45 GWh/year renewable energy.

### SPP REGIONS PARTNERS



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 649718. The sole responsibility for any error or omissions lies with the editor. The content does not necessarily reflect the opinion of the European Commission. The European Commission is also not responsible for any use that may be made of the information contained herein.