

Transport

Joint procurement of charging points in Rotterdam



Purchasing body:	City of Rotterdam with 16 other municipalities in the MRDH ¹ region (joint procurement).
Contract:	10 year concession (2016-2025) including a two year renewal option after 2023 for public charging services for electric vehicles including installation, exploitation and maintenance of EV charging points Awarded: 1 September 2016
Savings:	<ul style="list-style-type: none"> • 2,272 tons of CO₂ emissions saved • Primary energy savings 4.91 GWh • Financial savings: 100% financed by contractor

SUMMARY

- Installation of an estimated number of 2,000 public charging poles (4,000 charging points) for electric cars
- Concession contract for maximum 10 years awarded to ENGIE Infra & Mobility BV,
- Award criteria include innovation (smart charging) and use of green electricity

¹ Metropolitan Region of Rotterdam and The Hague

Procurement Approach

In setting up the procurement process for the concession agreement for electric vehicle (EV) charging stations, the City of Rotterdam, with the co-operation of MRDH, decided to also enable other municipalities within the region to use the contract. This is the first time that a tender for charging infrastructure has been put on the market on such a large scale. As a concession contract, the winning contractor is responsible for the costs of the installation and maintenance of the charging points, whilst the EV users pay for the electricity used to charge their vehicles. The charging poles are owned by the concession holder until the end of the contract. The MRDH aims to be an accessible and healthy region and therefore it wants to stimulate and facilitate the growth of electric mobility (see <https://mrdh.nl/nieuws/4000-nieuwe-laadpunten-regio>). The charging points are a public facility, which everyone can use². An important goal within the project is the considerable acceleration of the application and installation process for charging stations. In order to achieve this there will be an online application system where residents are able to check whether they meet the criteria to apply for an extension of the charging network or that they are already living or working near a charging point. It depends on the existing charging possibilities (e.g. if there is a charging point within 250 metres walking distance or when residents already have their own private charging point) whether the application is granted. The analysis of big data will also play an important part too in optimising the network and deciding where new charging points are installed. The contracting party will accurately monitor how and how often the new charging points are used. Based on these analyses they will install extra poles where necessary.

The scope of the contract is the installation of up to an estimated number of 4,000 new charging points (2,000 charging poles) for electric cars over the entire concession area, of which 1,800 points will be in Rotterdam. The concession to install, manage and exploit the poles was awarded to ENGIE Infra & Mobility on September 1st 2016. Together with the contributing municipalities and the producer of the charging poles, EV-Box, ENGIE Infra & Mobility will test innovations within the project such as smart charging induction tiles which are designed to make charging easier, more accessible, smarter and faster³. Due to this, electric driving will particularly contribute to the energy transition in the coming years.

PROCUREMENT INNOVATION

Joint procurement of charging infrastructure is boosting the use of electric vehicles in the region. Participating municipalities are signing individual concession agreements with the winning tenderer.

² They pay €0,26/kWh with a charging card excl VAT. When they use an ENGIE charging card, users don't pay a service fee.

³ For an overview of some of the innovations being tested in Rotterdam see: <https://www.livinglabsmartcharging.nl/en/projects>

Joint Procurement

The municipalities in the region signed a partnership agreement. This agreement defines the goals, roles and responsibilities, communication, the duration and how to deal with possible changes in the cooperation. The City of Rotterdam is the tendering party and will take the lead on possible changes to the agreement over the duration of the concession. Other municipalities are able to join later on in the process and make use of the contract with ENGIE, but are not able to make changes to this contract. 16 municipalities initially joined the tender, while at this moment there are 18 municipalities that make use of the contract. Furthermore, the goal of the concession is that duties, responsibilities, risks, costs and proceeds lie as much as possible with the market and that things are made easy as much as possible for the concession holder.

Needs analysis

With this tender the participating municipalities will have access to future proof charging infrastructure for electric vehicles. The concession is demand-driven. This means that the contracting authorities were looking for a candidate who wished to offer charging services in the concession area on a commercial basis deriving from real consumer and business demand. Therefore, understanding near future charging demand was important in the preparation of the concession. Prior to tendering an inventory was made in order to find out the need for public charging services based on national goals. In the City of Rotterdam, the largest participating municipality in this tender, it is expected that in 2019 there will be approximately 55,000 electric vehicles- six times the current number.

Prior to tendering, market consultation activities were also undertaken to assess the likely response of the market to the tender.

Tender specifications and Verification

TECHNICAL SPECIFICATIONS

- The charging station is compatible with all types of electric vehicles (type 2, mode 3)
- The electricity is sourced from renewable energy sources
- The life span of the charging station is at least 15 years
- Charging costs do not exceed € 0,26/kWh (excl. VAT)

AWARD CRITERIA

- Action plans including planning, communication, service level during use phase, innovation and sustainability (including recycling opportunities of the charging facility, use of green electricity and social return)
- Price of charging station including installation

VERIFICATION

The technical specifications were verified by extensive documentation. The content of the action plans was reviewed based on its contribution to stimulate electric mobility within the region. The final bid was selected based on the most economically advantageous tender.

The tenderer could receive a maximum of 55 points for quality aspects, assessed through several action plans including organisational aspects and communications, service provision of the user, innovation and sustainability.

From this quality score, points were then deducted according to the economic offer⁴ (the worse the offer, the more points deducted) to identify the overall most economically advantageous tender. The number of points deducted was calculated by the following formula:

$$\text{Points reduction} = (\text{economic offer} - \text{best economic offer received})/100^5$$

Ultimately, the procurement approach resulted in a net revenue of €500 per charging pole.

A regional approach to SPP

The municipalities concerned collaborated directly in the preparation of the tender in a joint project team, together with a representative from the MRDH. In the partnership agreement policy, legal elaboration, roles and responsibilities and the realisation process are recorded. The overarching policy framework is formed by the 'Green Deal MRDH Electric' which includes the planning, financing and innovation opportunities for electric transport in the area. In April 2016 the board members of the MRDH confirmed their support for participation in the joint tender.

⁴ Note: this could be either a positive or negative offer, i.e. the tenderer could either require payment, or offer to pay the contracting authority for each pole installed.

⁵ So if the best offer received was for the concession holder to pay the contracting authority €1,000, the bid currently being evaluated wanted to receive €2,000 in payment the calculation would be: $(2000 - -1000)/100 = 30$ points reduction. If the tenderer had received 40 points for quality aspects they would then finally receive 10 points $(40-30)$.

Results

Environmental impacts

Were all 2,000 charging poles to be installed, this would lead to an estimated emissions reduction of 2,272 tCO₂/year, and 4.91GWh/year primary energy savings. So far about 150 poles have been installed.

Table 1: Environmental savings – green tender compared to current solution

Tender	Consumption	CO ₂ emissions (tonnes/year)	Primary Energy consumption (GWh/year)
Benchmark (current contract)	829,487 ltr/a	2,311	7.37
Green tender (new contract)	2,241,856 kWh/a	38	2.47
Savings		2,272 (98%)	4.91 (67%)

CALCULATION BASIS

- 2,000 new charging poles (4,000 charging points);
- Annual mileage of the conventional vehicles to be replaced - 12,442,299 km/a;⁶
- Average fuel consumption of the vehicles to be replaced – 6.7 l/100km (gasoline);
- Average electricity consumption of electric vehicles - 18 kWh/100km;
- Conversion rate for gasoline – 2.786 kg CO₂/l
- Conversion rate for electricity – 0.526 kg CO₂/kWh
- Calculation made using the tool developed within the GPP 2020 project (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).

⁶ Total amount of electricity charged in 2016 was 2,239,614 kWh. This equals 12,442,299 kilometres with an electric vehicle. In 2016 there were 2000 charging points available in the region. This is approximately 6,200 kilometres per charging point.

Data shows that the average charging duration is 7.5 hours. This is derived from the yearly amount of electricity charged and the number of charging sessions. Hence, the maximum capacity per charging point is 3 times the current use, so the number of kilometres is likely to increase in the coming years when more people will use the charging points at different times (this would require some scheduling). Therefore the calculation presented here is a conservative estimate.

Other environmental benefits include the design of the charging station. The charging poles by EV-Box are produced in the Netherlands and the poles have been developed with reducing material use in mind. Due to a modular design all parts are interchangeable one by one and these can be replaced by parts with the latest technical innovations. Finally, the charging poles are made with low-maintenance materials like stainless steel, bent out of one single plate and provided with a special powder coating.

Financial impacts

Savings predominantly occur because of the synergies in the joint procurement approach. Rotterdam has prepared the procurement policy and documents, published the contract and provides staff for contract management and communication. Other municipalities may use this contract to deliver charging services to their inhabitants. The procurement approach and tender specifications (see table above) resulted in a net revenue of €500 per charging pole. These funds are being reinvested in pilot projects for smart charging.

The concession model implies that the contractor is investing in charging infrastructure.

Social impacts

ENGIE values Corporate Social Responsibility a great deal and therefore meets the requirements of Social Return. At the production facilities of the charging poles of EV-Box 35% of the staff come from socially disadvantaged backgrounds. These people make the wiring harnesses in the charging stations, provide printed matter and carry out packaging activities. ENGIE works together with UWV (the employees' insurance agency) and municipalities on reintegration for long-term unemployed. Between 2014 and 2016 six fulltime jobs have been created, out of the trial placement of eleven long-term unemployed.

Market response

There were 6 consortia that responded to the tender, including Alfen, ENGIE, Greencrowd, Nuon, Pit Point and Ecotap. ENGIE was rewarded the contract. The good response seems indicative of the strategic interest companies have in penetrating and getting an early lead in the EV recharging market, hence the willingness to actually pay the contracting authority to install the poles.

Contract management

The contractor incorporated a number of requirements which apply to the user phase. An availability demand of 99% per month of the public charging services was incorporated in the requirement. At any given moment it is possible for the grantor to log in unannounced in the back-end system of the concession holder, in order to check this. Therefore ENGIE is locally anchored in the concession area, with mechanics responsible for fixing breakdowns. The new charging locations are being installed by an operational contract partner, situated in Rotterdam-Europoort. With this ENGIE provides an emergency service with qualified staff which is available 24/7.

ENGIE also manages the charging locations (including lineation, signs and (if applicable) a collision safety system) and sees to it that these locations meet the requirements. When abnormalities are reported ENGIE will return the charging location within 3 working days to its original state. In any case the mobility of a driver should not be disturbed because of breakdowns or defects in the public charging service. Breakdowns or defects which form a safety danger must be restored within two hours after detection or report. In the framework of joint data research the concession holder provides free of charge and actively – at a minimum on a monthly basis – all the necessary current and historic information on the public charging services.

Lessons learned and future challenges

This concession agreement puts strong emphasis on communication with the inhabitants who apply a charging pole as well as innovation possibilities, such as smart charging. However, the processing of the applications and the use of the application portal has caused several issues to be dealt with in the first period of the concession. In the next period (2018 and later) of the concession more focus will be put on developing innovation projects.

The tender has a public goal: to realise a network of charging poles which covers the need of the drivers of electric cars and to make sure that, by continuously working on innovation, the network is ready for the future. In fact the role of the City of Rotterdam is one of monitoring, stimulating and organising that the job is done. Recent market circumstances (new affordable models later on the market, fiscal regime) are the reason that the actual demand for charging poles is lagging behind the expectations at the moment of the tender. Another lesson learned refers to the role of the organisation which is responsible for the electricity network (infrastructure). This organisation has a monopoly to connect the charging pole to the network In the future and needs to be involved in the tender.

A future challenge is to integrate the network of public charging poles with all the other charging possibilities, such as private, semi-public, charging in garages (both private and public) and fast charging.

A future challenge is also to model all available charging data from the complete network to forecast the need for the different types of charging poles.

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City of Rotterdam



Location	Netherlands	CO ₂ -emissions per kWh (kg CO ₂ /kWh)	0,526							
Input	% Green electricity for Electro engine (if any)			0%	% Green electricity for Electro engine (if any)			100%		
	Baseline				Green tender					
	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	1	Petroleum	6,7 l/100 km			Diesel	l/100 km		
	Standard Engine - fuel 2		Diesel	l/100 km			Petroleum	l/100 km		
	Electro Engine		Electricity	kWh/100km	1	12 442 299	Electricity	18,0 kWh/100km		
	Hybrid Engine									
	Electricity (combined test cycle)		Electricity	kWh/100km			Electricity	kWh/100km		
	Fuel (combined test cycle)		Diesel	l/100 km			Diesel	l/100 km		
	TOTAL	1	12 442 299			1	12 442 299			
Total consumption and emissions	Baseline				Green tender					
	Annual fuel consumption		Primary energy consumption (GWh/yr)	CO ₂ -emissions per year (t)	Total amount of fuel during the life time of the vehicles		Primary energy consumption (GWh/yr)	CO ₂ -emissions per year (t)		
	Standard Engine - fuel 1	829 487 l	7,37	2 311	0 l	l	0,00	0		
	Standard Engine - fuel 2	0 l	7,37	0	0 l	l	0,00	0		
	Electro Engine	0 kWh	0,000	0,00	2 241 856 kWh	kWh	2,466	38,11		
	Hybrid Engine									
	Electricity (combined test cycle)	0 kWh	0,00	0	0 kWh	kWh	0,00	0		
	Fuel (combined test cycle)	0 l	7,37	2 311	0 l	l	0,00	0		
	TOTAL		7,37	2 311			2,47	38,11		
	Savings	Total savings (Baseline / Green tender)								
Energy savings (GWh/yr)		CO ₂ -savings (t/yr)	% of energy savings	% of CO ₂ -savings						
Standard Engine - fuel 1		7,37	2 311	100%						
Standard Engine - fuel 2										
Electro Engine		-2,47	-38	#DIV/0!	#DIV/0!					
Hybrid Engine										
Electricity (combined test cycle)		0,00	0	#DIV/0!	#DIV/0!					
TOTAL FOR THE PROJECT	4,91	2 272	67%	98%						

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



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