



## Renting of electric scooters for Barcelona City Police

Barcelona City Council, Department of Logistics and Infrastructures

- 100% reduction in direct CO<sub>2</sub>-emissions and 87% reduction in total CO<sub>2</sub>-emissions
- 85% energy savings
- 36,144 litres petrol saved in 4 years



Image source: Barcelona City Council

### Previous tender

- 30 heat engine-powered scooters (petrol)
- 20 t direct CO<sub>2</sub>-emissions/year
- 25.2 t direct and indirect CO<sub>2</sub>-emissions/year
- 6.9 toe energy consumption/year

### GPP 2020 Tender

- 30 electric scooters (increasing to 198 in 2018)
- 0 t direct CO<sub>2</sub>-emissions/year
- 3.2 t indirect CO<sub>2</sub>-emissions/year
- 1 toe energy consumption/year

### Results

- 80 t less CO<sub>2</sub> direct emissions
- 88 t CO<sub>2</sub> total emissions savings
- 23.5 toe energy savings

## Contract tendered

- Renting of electric scooters for the City Police – Department of Logistics and Infrastructures at the Barcelona City Council Prevention, Security and Mobility Division.
- General data: 30 electric motor scooters, type 20, equipped and adapted (GPS, audible signals, paint and stickers, etc.), with 30,000 km max.
- Contract length: 48 months.
- Tender budget: € 486,720.00 VAT excluded.

In the upcoming and consecutive years, heat-engine scooters will progressively be replaced until there is a total fleet of 198 electric scooters, according to this timeline:

Evolution of the electric motor scooter fleet of Barcelona City Police					
	2014	2015	2016	2017	2018
Annual planned substitution		30	64	49	55
Total number	0	30	94	143	198

## Procurement approach

**Technical specifications:** The technical specifications establish the vehicle characteristics. The chart below details features related to electric engines (1.1 Engine; 1.5 Autonomy and battery)

1. - TECHNICAL CHARACTERISTICS	
1.1. Engine specifications	Type: Electric engine Nominal power: > 10 kW Maximum power: > 33 kW Engine torque: > 70 Nm
1.5. Autonomy and battery	Min. 90 km in city with a discontinuous 8-hour cycle and a 120 kg load. Charged battery cycles ≥ 2000. Full charge: maximum 5 h Quick charge (80%): maximum 3 h Recharging using domestic power plug not greater than 16 A. Recovery of charge during braking operations. Recovery of charge when reducing speed.

The contract also includes: comprehensive vehicle maintenance according to factory delivery, repairs of all failures and all scooter systems, 24-hour city and roadside assistance, tyre replacement, all inspections as recommended by the producer, replacement of all parts due to wear, breakage and/or failure and all regular inspections as determined by Vehicle Technical Inspection legislation in force. It also includes the taking out of an insurance policy that

guarantees the financial consequences stemming from the use and driving of motor vehicles, which shall be an 'all risks vehicle insurance without deductible'.

## Criteria development

Renewing the current fleet of heat-engine scooters with electric vehicles that provide the same features to the City Police has been a priority action for the sustainable development line taken by the Prevention, Security and Mobility Division in accordance with its 2013-2022 Strategic Sustainability Plan.

The Department of Logistics and Infrastructures has conducted different pilot tests on electric motor scooter models for performing the police force's regular tasks. The assessments of the technical features of the different electric vehicle models have been very diverse. The last pilot test of a new model by the 39 agents who tested it obtained an extremely positive rating. The success of this pilot test was a decisive factor to start implementing the progressive greening of Barcelona's City Police fleet and to give a solid push to using two-wheeled electric vehicles.



## Results

With the data available on the replaced vehicles and the technical data on the electric vehicles leased via the present contract, the following results are obtained.

	Direct CO <sub>2</sub> -emissions	Direct and indirect CO <sub>2</sub> -emissions	Energy consumption
Electric vehicles (2015 tender)	0.0 t CO <sub>2</sub> /year	3.2 t CO <sub>2</sub> /year	1.0 toe/year
Conventional vehicles (until 2014)	20.0 t CO <sub>2</sub> /year	25.2 t CO <sub>2</sub> /year	6.9 toe/year
Annual saving 2015 (30 vehicles)	20.0 t CO <sub>2</sub> /year	22.0 t CO <sub>2</sub> /year	5.9 toe/year
Total saving (4 years)	80.0 t CO <sub>2</sub>	88.0 t CO <sub>2</sub>	23.5 toe

Calculations were done using the vehicles' technical data for the contract duration and the GPP 2020 calculator for vehicles.

### Basic data for calculations

- Usage data on 30 replaced heat-engine vehicles: 3 different models with average consumption of 6.05 l/100 km and average annual distance of 4,975 km per vehicle
- Average distance: Calculations employed the annual average of the 30 substituted vehicles, significantly lower than the maximum established in the specifications for the purposes of contract guarantees (approx. 19,900 km instead of maximum of 30,000 km in 48 months).
- The energy conversion factors included in the GPP 2020 calculator for vehicles: energy content of petrol (32 MJ/l), direct and total (= direct and indirect) CO<sub>2</sub> emissions of petrol (2,218 kg/l and 2,786 kg/l respectively).
- Electric consumption of the new vehicles: the technical data were used from the vehicle specification sheet (8 kWh/100 km) for the same average distance as the replaced vehicles.
- The emissions factor applied to the electric mix is that recommended by the Catalan Office on Climate Change (2015 Practical Guide for Calculating GHG Emissions): 0.267 kg CO<sub>2</sub>/kWh

4



Advantages obtained by incorporating electric motor scooters:

- 87% reduction in total CO<sub>2</sub> emissions and 100% reduction in direct emissions from fuel combustion.
- 85% energy savings.
- A saving of 36,144 litres of petrol in 4 years with the associated financial savings.

Since this contract is part of an already approved Plan, which foresees the gradual substitution of 198 scooters, we can make a first estimate of the benefits for the whole planning, with following results:

	Direct CO <sub>2</sub> -emissions	Direct and indirect CO <sub>2</sub> -emissions	Energy consumption
Annual saving 2016 (94 vehicles)	62.8 t CO <sub>2</sub>	68.9 t CO <sub>2</sub>	18.4 toe
Annual saving 2017 (143 vehicles)	95.5 t CO <sub>2</sub>	104.7 t CO <sub>2</sub>	28.0 toe
Annual saving 2018 (198 vehicles)	132.2 t CO <sub>2</sub>	145.0 t CO <sub>2</sub>	38.8 toe
<b>Total accrued saving (2015-2018)</b>	<b>310.5 t CO<sub>2</sub></b>	<b>340.6 t CO<sub>2</sub></b>	<b>91.1 toe</b>

## Lessons learned

- The successive pilot tests let us verify that the electric vehicle market and technology is mature enough to consider acquiring these vehicles for municipal services and let us prove that the progressive greening of the fleets is now possible.
- Prior to the entry into force of the new tender, the recharging infrastructure had to be installed for the 30 electric motor scooters in a car park of the City Police.
- Once the entire fleet of heat-engine vehicles is replaced, the reduction in CO<sub>2</sub> emissions generated, the energy saving and financial saving for unconsumed petrol will be significant every year.
- In addition to the benefits above, adding electric vehicles also entails an important reduction in atmospheric polluting emissions (NO<sub>x</sub>, PM, etc.), thus contributing to improving air quality, one of the main environmental challenges for the Barcelona metropolitan area.



## Contact

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<http://ajuntament.barcelona.cat/seguretatimobilitat/ca/>



## About the GPP 2020 Project

The aim of the GPP 2020 Project is to promote low carbon emission public procurement throughout Europe to help obtain EU targets, with an eye on 2020, of reducing greenhouse gas emissions by 20%, increasing the use of renewable energies by 20% and increasing energy efficiency by 20%.

With this target, the GPP 2020 Project will implement more than 100 low carbon call for tenders to obtain a significant reduction in direct CO<sub>2</sub> emissions. The GPP 2020 Project is also driving forward a training programme that will include both courses and exchanges. –

[www.gpp2020.eu](http://www.gpp2020.eu)



## On the PRIMES Project



The purpose of the PRIMES Project is to help local companies in six European countries – Denmark, Sweden, Latvia, Croatia, France and Italy– overcome difficulties with green public procurement processes, as many of these organisations do not have great enough skill or knowledge to apply them.

The PRIMES Project plans to develop basic skills and offer practical advice so that public procurement organisations can overcome obstacles when applying green public procurement. Consequently, this will foster energy saving and the reduction of CO<sub>2</sub> emissions. –

[www.prim.es-eu.net](http://www.prim.es-eu.net) .



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