Mobility tomorrow: a new business model for our parking infrastructure

EU Infrastructure Advisory Team
November 2017
Europe has around 800 cities with over 50,000 inhabitants, turning into hubs of growth and innovation as they continuously attract new investment, people and services.

If seen from above, our cities are a restless world in motion: cars getting from A to B, trains taking commuters to work, bicycles and motorcycles snipping through traffic, pedestrians hurrying on sidewalks, taxis waiting for their next passenger, trucks carrying away waste or delivering goods ...

Whether it is to reach the office, explore the surroundings or visit a relative, mobility is the lifeblood of our cities and essential for the quality of our urban lives.

Our desire and increasing need for mobility brings, however, some consequences, as cities are more and more noisy, congested and polluted.

In 2013 already, nine out of ten Europeans declared they often got stuck in traffic when travelling within cities; 28 European cities were in the Top 2016 world most congested ones, with daily congestion rates over 25% (increase in the overall travel time compared to the free flow situation). Not only congestion increases the impact of GHG emissions, but it leads to waste of fuel and time, with the European Commission estimating that costs at around 1% of the EU’s GDP.

The European Commission has been addressing the issue of urban mobility by setting targets for GHG reduction and use of alternative low-emission and renewable fuels. European targets aim to frame future mobility as more sustainable, less polluting and supported by an alternative fuel infrastructure and long-term investment.

Sources:
1 According to Tom Tom Traffic Index 2016
2 According to the Eurobarometer 406 Attitudes of Europeans towards urban mobility, Eurostat

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**How is the EC framing the future of mobility?**

**More sustainable**

**Proposed revision of Directive 2009/28 on Renewable Energy**

Currently in negotiations

- The target for 10% renewable energy in the transportation sector is removed after 2020.
- Union-wide target of 27% renewable energy share in total gross final consumption of all sectors by 2030.
- Fuel suppliers to provide a share of low-emission and renewable fuels at least equal to 1.5% in 2021 and 6.8% in 2030.

**Less polluting**

**Directive 2009/33 on Clean Vehicles**

Sets technical specifications to include energy and environmental impacts in the purchasing decision

**Directive 2009/30 on Fuel Quality**

6% GHG reduction per unit of energy supplied into EU fuel mix for fuel suppliers by 2020, overall target of 10% reduction

**Supported by infrastructure and investment**


Requirement for alternative fuel refuelling infrastructure and sustainable long-term investment and sector specific coverage targets to be achieved.

- **Electricity**
  - By end 2020: appropriate number of publically accessible points in urban/suburban and other densely populated areas
  - By end 2025: Ports of the TEN-T core network and other ports at shore-side

- **CNG**
  - By end 2020: appropriate number of publically accessible points in urban/suburban and other densely populated areas
  - By end 2025: Appropriate number of points along the TEN-T core network

- **LNG**
  - By end 2025: at maritime ports of the TEN-T core network and appropriate number of points for HDV along the TEN-T core network.
  - By end 2030: at inland ports of the TEN-T core network

- **Hydrogen**
  - By end 2025: appropriate number of points in the Member States who choose to develop it
Current trends influencing urban mobility

This ambition from the EU has led to the development of alternative-fuel vehicles (LPG, NG, EV) and the emergence of new consumption trends in the passenger car market. The number of LPG passenger cars almost doubled between 2005 and 2015, reaching 10 million vehicles in 2015, 4.22% of the total passenger car fleet. The number of natural gas (NG) passenger cars almost tripled between 2005 and 2015. Electric cars are slowly penetrating the EU market and include battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV) and electric vehicles with a range extender (REEV). Rapid developments in battery technology are expected to remove current barriers such as high cost, efficiency and range anxiety, thus driving EV adoption.

However, if more sustainable fleet solutions can help reduce pollution, they don’t solve the problem of congestion.

The way people move around cities must therefore be rethought, and future mobility is likely to be very different from what most European cities experience today. Numerous trends such as digital innovation, the Internet of Things and energy decentralization are already influencing urban mobility and disrupting the paradigm of car ownership, thus creating new incentives and a new model for the sharing economy.

Think of how rapidly ride-hailing services through smartphone application have grown over the past few years to be able to compete not only with traditional car-sharing and car-pooling services, but also with private vehicle ownership.

The next generation of car sharing models will be enabled by blockchain technology, facilitating peer-to-peer interactions between owners and making car ‘ownership’ a tradeable commodity.

In parallel, the purchase and maintenance costs of new vehicles will increase due to improved in-vehicle technology, making it more expensive to own a personal one. This will support a shift of the ownership paradigm by paving the way to ‘fractional ownership’ and enabling more people to access vehicles they may not have had the opportunity to before.

EY has recently filed a patent application for a blockchain enabled fractional car ownership platform, currently being tested in Singapore and Hong Kong.
Mobility has thus to be thought no longer as an individual citizen concern, but rather as part of a common city framework, where its growing demand is supported by shared platforms providing people with the most suitable options in terms of time and itineraries, while being at the same time safe and sustainable.

**Mobility will become a service offered to citizens**, who will be at the heart of this revolution and will be adopting new technologies and services. They will have access to a digital platform enabling them to choose the transport mode better responding to their day-to-day experience, with the possibility to use a car every time they need without bearing the operation and maintenance burden.

**Digital innovation will be a crucial enabler**, as the Internet of Things will change our relationship with cars and mobility: greater connectivity will foster the interaction between mobility demand and supply, while big data and analytics will offer deeper insights on the customer experience, making it easier to understand evolving mobility patterns.

There already exist some smart initiatives aimed to anticipate, design and deploy sustainable solutions and accelerate the transition to clean vehicles and new forms of mobility. These can be applications that offers their customers shared mobility options and facilitate urban travellers in finding a free parking space. Some use digital technology and multi-modal information services (MIS) to allow for electronic payment, contactless ticketing and real-time information systems.

**Parking operators**

- Vinci upgraded several supermarket parking facilities with EV charging points.
- Q-park app-controlled e-bike service “E-Bike-To-Go” available in their infrastructure to offer mobility alternatives.
- Interparking offers access to DriveNow shared fleet of electric vehicles in several cities.

**ICT system developers**

- Google Maps new feature helps finding free parking spaces.
- Siemens Integrated Smart Parking Solution collects parking data and assess in real-time space usage to offer new traffic management options.
- Park Indigo is a smartphone application to locate and access over 4000 parking spaces.

If we imagine our future mobility as a service to be chosen on a digital platform, what kind of urban infrastructure could support such shift? How can the existing infrastructure be adapted and/or transformed to best serve the future mobility?

At EY we have been considering whether new infrastructure would be required to address the growing demand for mobility and its adaptation to new digital and technological needs. We believe the key to future mobility is already in the hands of our cities and may lay in their parking infrastructure.
Building on our existing parking infrastructure ...

There are over 440 million parking spaces in Europe, including 155 million off-street slots.

30m
Off-street floors of shops and offices
(25m. non-regulated and 5m. regulated)

10m
Off-street purpose built
(regulated)

115m
Off-street open-air public space
(100m. non regulated and 15m. regulated)

155 million off-street parking spaces*

*Off-street parking space refers to public-use parking spaces with access control. Private-use spaces and spaces on the roadway (on-street) are excluded.

Types of off-street parking space

- 2.6% Airports
- 2.7% Deterrent parking (P+R)
- 5.9% Hospitals, universities and others
- 6.4% In leisure facilities
- 9.2% Surface level
- 15.7% In shopping centre
- 21.5% In structure

780€
Annual turn-over per off-street parking space

25%
Estimated growth of the off-street regulated car park market, from 30 to 40 million parking spaces

The current trends are towards a reduced number of private-owned cars, with cities increasingly banning cars to solve congestion, pollution and noise issues. Oslo plans to permanently ban all cars from its city centre by 2019, for instance.

In light of this evolving urban mobility landscape, the existing parking infrastructure will need to be adapted and its use rethought.

... What if we leveraged on the existing parking infrastructure, adapting to future mobility needs and transforming it into a multi-service platform, that everyone can access through his or her mobile phone?
Imagine if ...

Our future cities will be served by an appropriate number of parking infrastructure, smartly located across the city, so as to enable the most access to mobility solutions for local residents, businesses, commuters, and tourists.

And all of that accessible by a simple touch on your mobile phone?

Integrating the existing parking infrastructure with new mobility services offers the opportunity to develop a wide Mobility 3.0 shared platform.

**Parking infrastructure**
- Are used as base stations for public and private car fleets
- Provide mobility solutions at users’ convenience as well as other car services including recharging, repairing, washing, etc. while stationing
- Are strategically covering cities’ mobility demand while offering last mile delivery solutions for freights

**Heavy-duty vehicles**
- Are mainly gas-powered
- Produce less air pollution and noise
- Can count on a widespread gas distribution network at well-located parking/modal-switch stations

**Users**
Get access to mobility services’ networks through their smartphones to select, book, pay, operate and share the best available solution to their mobility needs.

**Cars**
- Mainly E-powered, are mobile batteries that once plugged-in can help balance local grid by means of micro-charges/discharges
- Communicate and interact with users, maintenance services and signalling systems for a full autonomy
- Are available to and affordable for everyone thanks to smart leasing solutions

**Several mobility options available**
- E-bikes, Motorcycles, EV, access to public transport with intermodal eTicketing, etc.

**Are there more business models to explore for the future of parking infrastructure?**

**What would be the actual effect on congestion?**
Our methodology

EY has built a tool for policy makers and parking operators to assess and guide their parking management decisions. More specifically, the EY parking impact model allows to showcase the impact on the parking business model based on different indicators:

- **macro-indicators** (population growth, shift in car per capita)
- **the evolution of the car fleet** (shift in the fuel use, shift in ownership paradigm from private to full car ownership)
- **policy choices** (cities deciding to ban cars)
- **technology disruption**

EY has modelled the parking ecosystem and demonstrate how the whole picture could evolve up to 2040. The EY parking impact model can be used as a starting point in different studies: e.g. city master plans, parking feasibility studies, and parking operational models.

Our insights

One specific feature of the EY parking impact model is that it clearly depicts how the parking (revenue) model can alter from shifting from the traditional way of car owning towards a parking built around a model of car sharing.

### EY’s insight on the impact on the parking revenue model

**Future scenario:**
- High car-sharing adoption
- Low private ownership

The inclusion of new services by parking operators can greatly expand the turn-over per off-street parking space.

**Current situation:**
- Cars are privately owned
- Low car-sharing adoption

**Increase in service offering**
- Car rental
- Service and repair
- Refuelling
- Tyre maintenance
- Parking operating system
- Parking rental

**6.548€**

**780€**

### EY’s insight on the impact on the demand and supply side of the parking eco-system

**Current situation**
- 256 million cars
- Car utilisation rate: 10%
- Parked 90% of their time
- Very low car-sharing
- Parking slots needed: 440 millions

**Future scenario** *(full adoption of car-sharing)*
- 50% less cars on the street
- Car utilisation rate: 50%
- Parked: 50% of their time
- High car-sharing
- Parking slots needed: 224 millions