

A man in a grey suit and glasses is standing on a city street, holding a blue charging cable connected to a bright green electric car. He is looking down at the cable. In the background, there are multi-story brick buildings and a blurred car. The scene is brightly lit, suggesting daytime. The overall image conveys a message of sustainable urban transportation.

ENGIE

Green Mobility: Fostering the energy (r)evolution in transports

6th European Energy Forum, Paris, 22-23 May 2017

ENGIE: a provider of green mobility for cities & regions



Urban planning & Engineering

Engineering services in **France, Belgium** and **overseas**

Major achievements for **Brussels** (Mobil2040, Brabo2, Rail4Brussels) and **overseas** (road access plan for Cameroon, pedestrian access plan to World Cup 2020...)



Public transport

12 000 km high speed & main lines electrified

1 800 km tramway lines electrified

35 000 busses & BRT equipped with CAD/AVL

85 tramways & 18 metro lines equipped

equipped or electrified by ENGIE worldwide



Intelligent Transportation Systems

First **references** in **Brazil** (Rio de Janeiro & Niteroi)



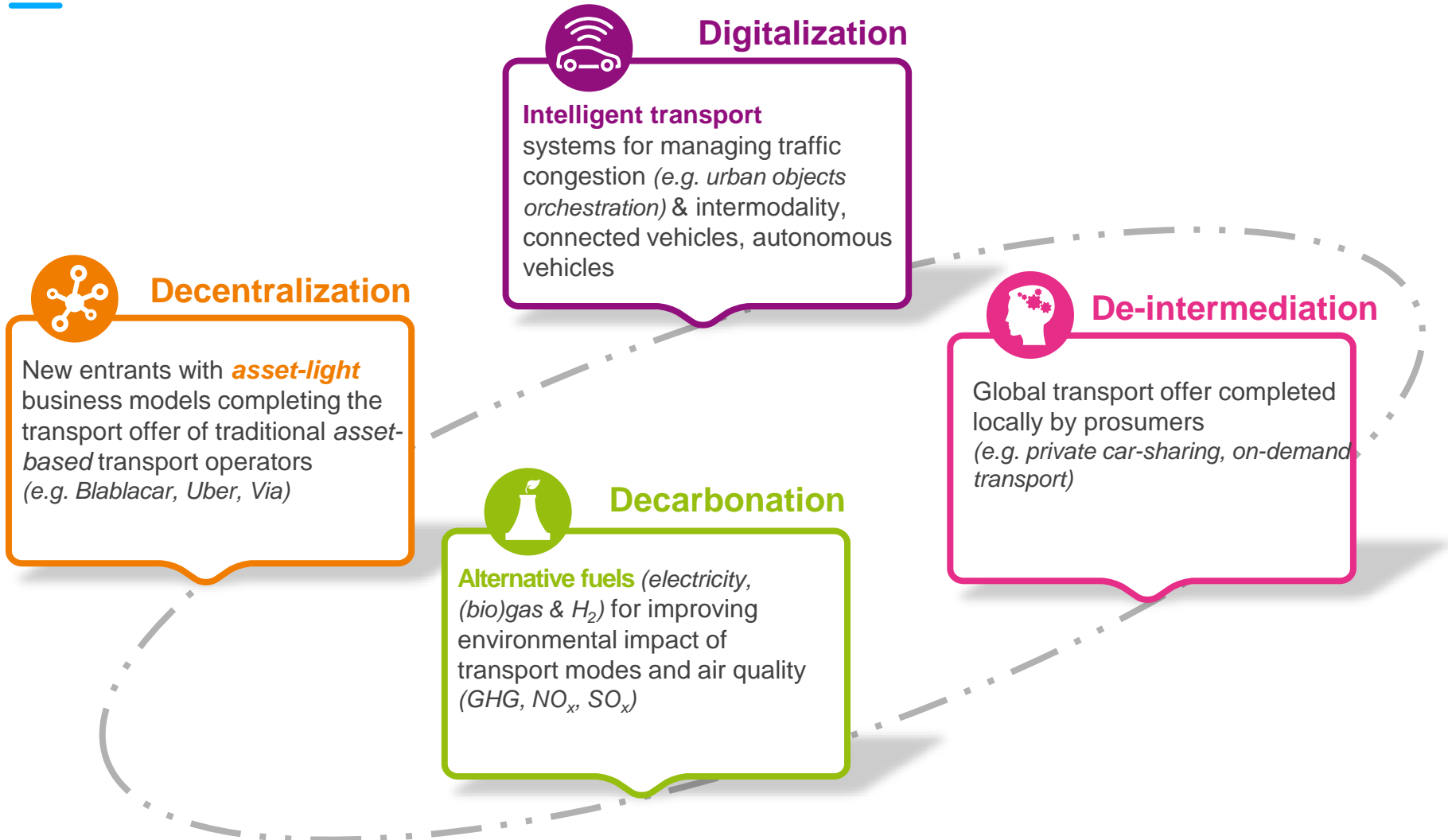
Alternative fuels

7 000 charging points installed in France & Benelux

45 000 charging points sold & installed in 980 cities (26 countries)

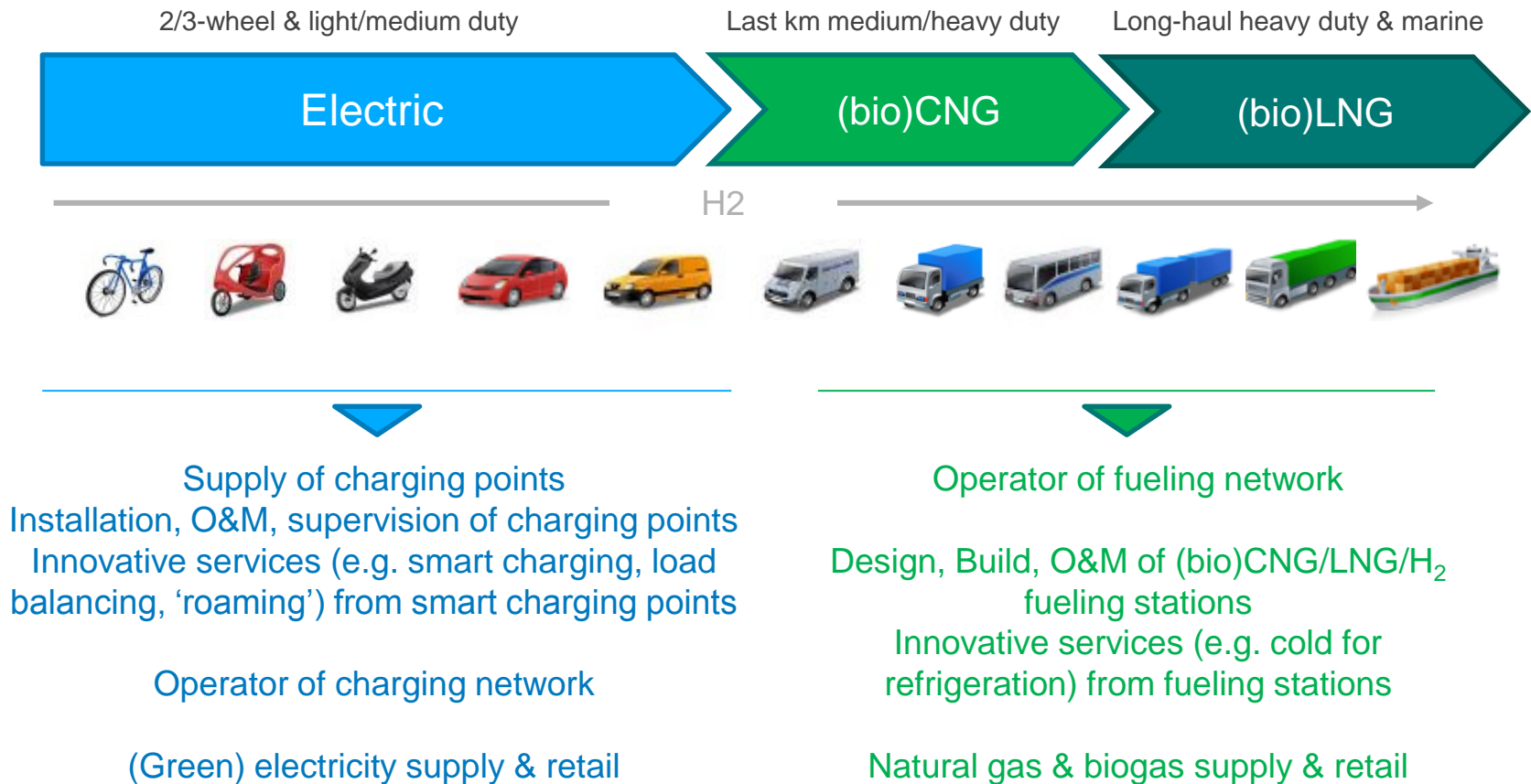
150+ gas fueling stations (CNG, LNG), pilot projects for H₂ in Europe

Energy transition & mobility revolution: similar trends?



Decarbonation: complementarity of alternative fuels

- For utilities, alternative fuels offer business perspectives along existing value chains



Natural Gas Vehicle: a proven business model

Driving force with shippers through tenders for green logistics (image, CSR)

Stringent norms & standards on vehicle emissions, noise: Euro 6

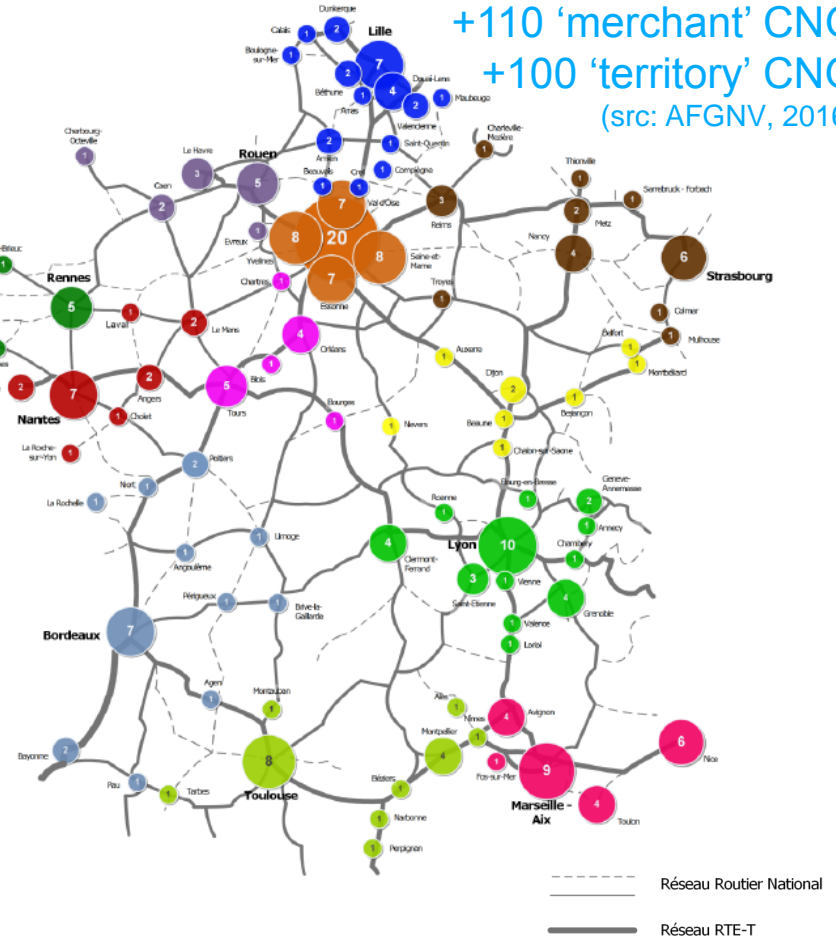
Increasing restrictions of access to city centers (diesel ban, authorized hours)

Economical incentive due to tax differentials gas vs. diesel

France = n°1 (very) dynamic market in Europe with new entrants

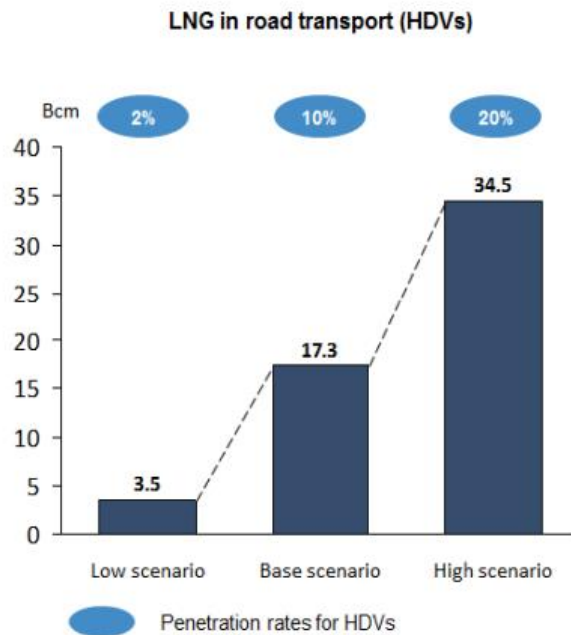
An asset-based business model (Build, Finance, M&O) for energy retail

250 gas fueling stations by 2020:
40 LNG/L-CNG
+110 'merchant' CNG
+100 'territory' CNG
(src: AFGNV, 2016)



NGV: an additional usage of gas

- For European utilities, NGV market represents a new/additional outlet for pipeline gas, biogas and LNG in a context of stagnating energy consumption



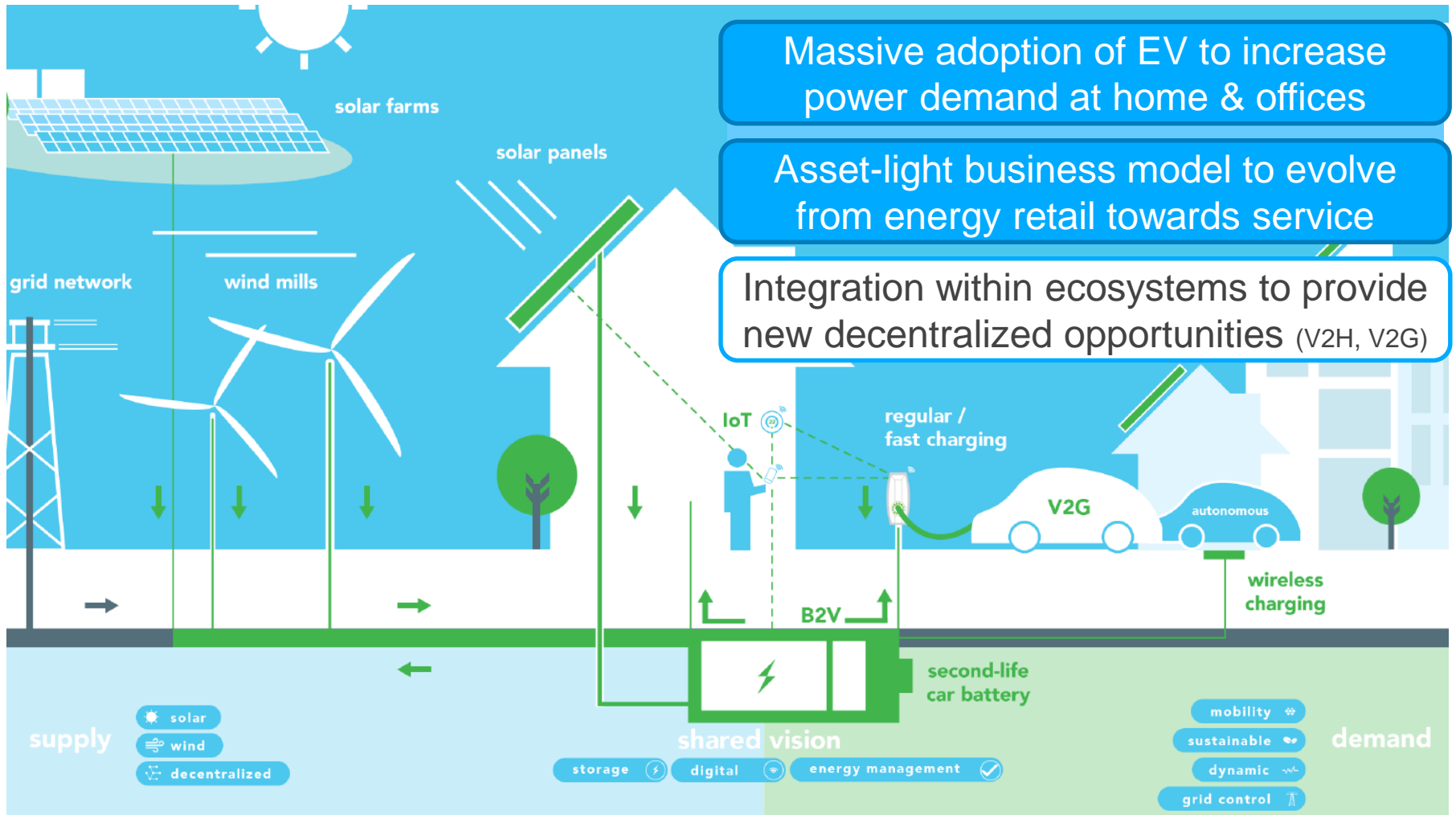
Main objectives (CNG & LNG)

- ▶ 20% of new trucks sales NGV
- ▶ 410,000 NGV trucks (mainly LNG)
- ▶ 4,000 L-CNG refuelling points (1,000 stations à 4 dispensers)
- ▶ CNG: 5-10 Mio ton (distribution & garbage trucks)
- ▶ LNG: 12-25 Mio ton (long haul trucks)
- ▶ The share of bio-methane has the potential to increase to 10-20%

(src: NGVA Europe, 2016)

Key requirements to accelerate NGV adoption: vehicle affordability, visibility on taxation framework

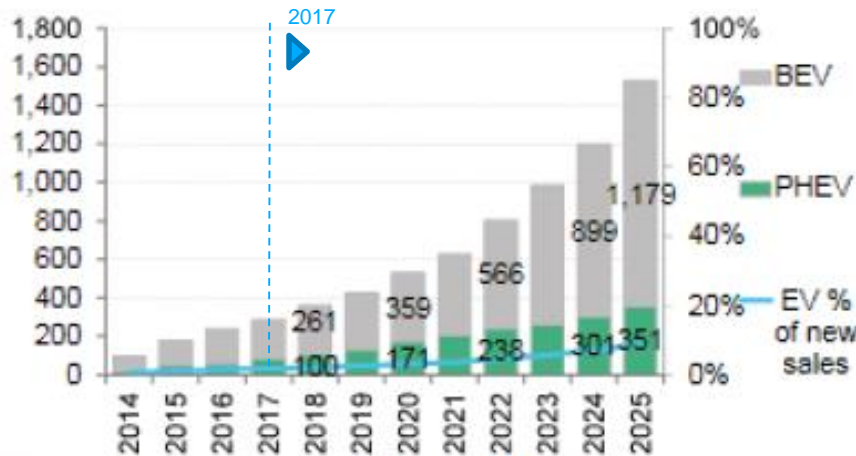
Electric Vehicle: an opportunity for innovative business models



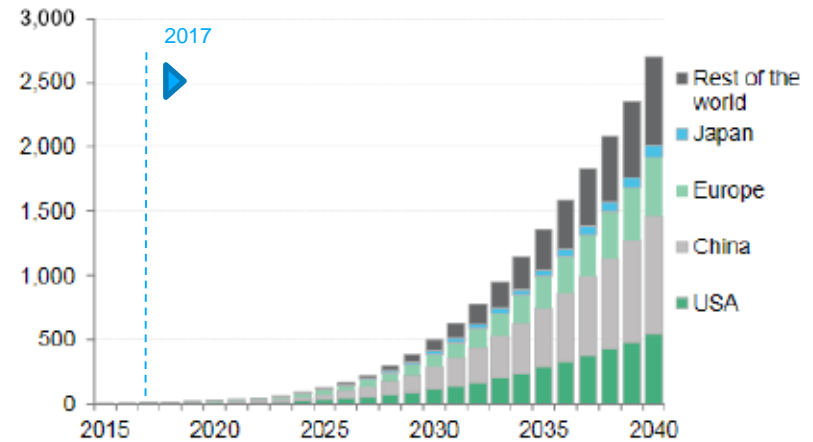
Electric Vehicle: a market opportunity for utilities

- For utilities, EV uptake would add demand for electricity and create demand for additional services (e.g. smart charging, load balancing, roaming)

Forecast of EV sales in Europe over 2014-25
(thousand units, % of vehicles sold)



Annual electricity consumption from EV (TWh)



(src: Bloomberg New Energy Finance, 2016)

Key requirements to accelerate EV adoption: vehicle performance, affordability & diversified offer, customer behavior

Fostering the energy (r)evolution in transports

- Greener mobility requires a combination of proven and innovative business models from players with diverse missions and market expectations



Public transport



(bio)gas & H2 as alternative fuels



Electricity as alternative fuel



New mobility services

Evolution

Revolution

Proven/known business asset-based models

Innovative asset-light & digital business models to be tested & strengthened



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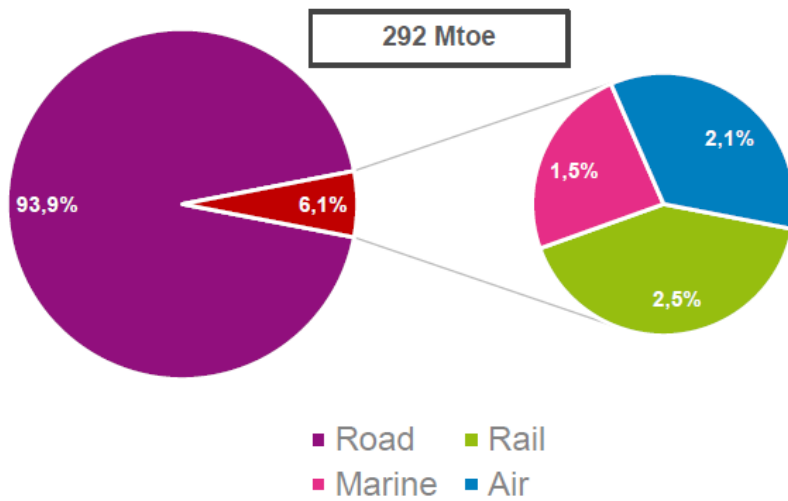
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Energy mix for transports: an oil predominance

- Road transportation (goods, persons) = 2nd highest GHG emissions source in EU, i.e. 24% total GHG emissions at EU level in 2012 (1.03 bn ton CO2 with ¼ due to trucks and buses)

Energy Split by transport mode (Mtoe) - 2015 - EU19



Source: Enerdata

Energy consumption of Road transports - 2015 - EU19

