

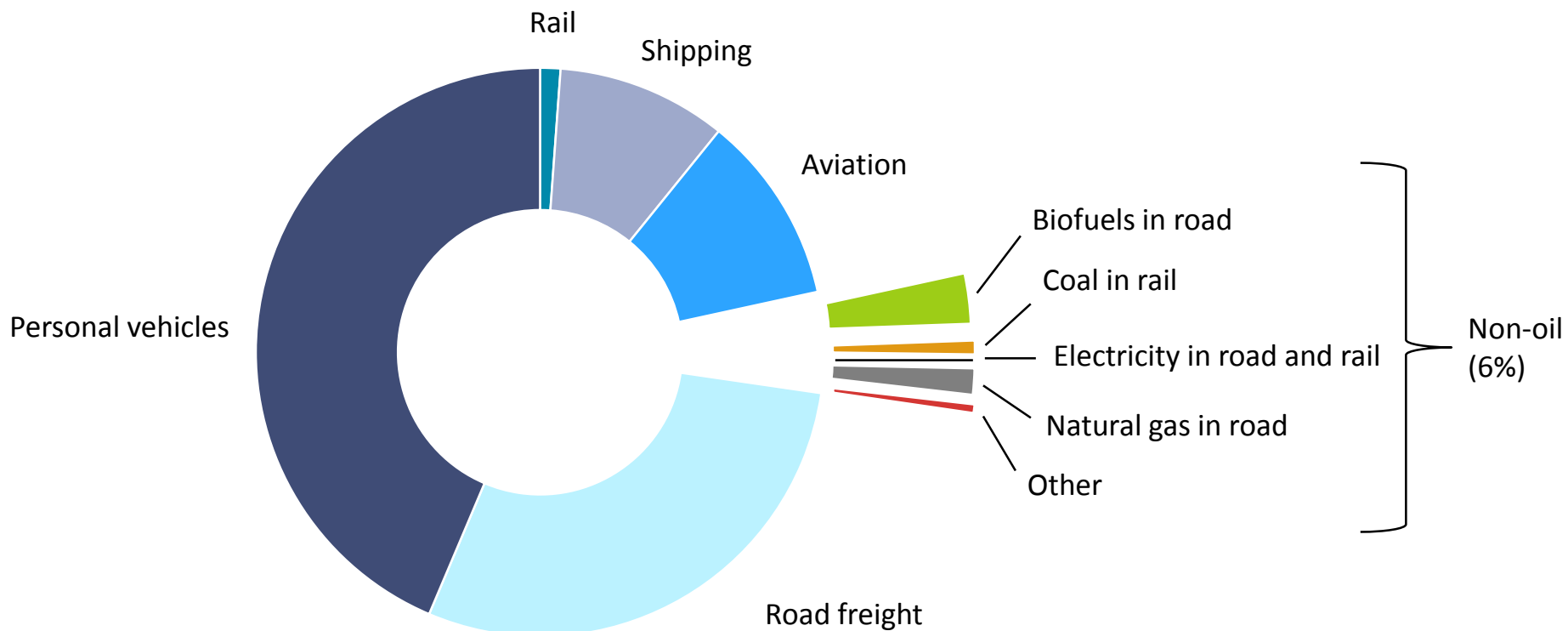
Energy technology and oil in the transport sector

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Oil – the backbone of transport



Oil supplies 94% of transport energy, three-quarters of which is used on road.

Energy efficiency and low fossil fuel prices



1 America



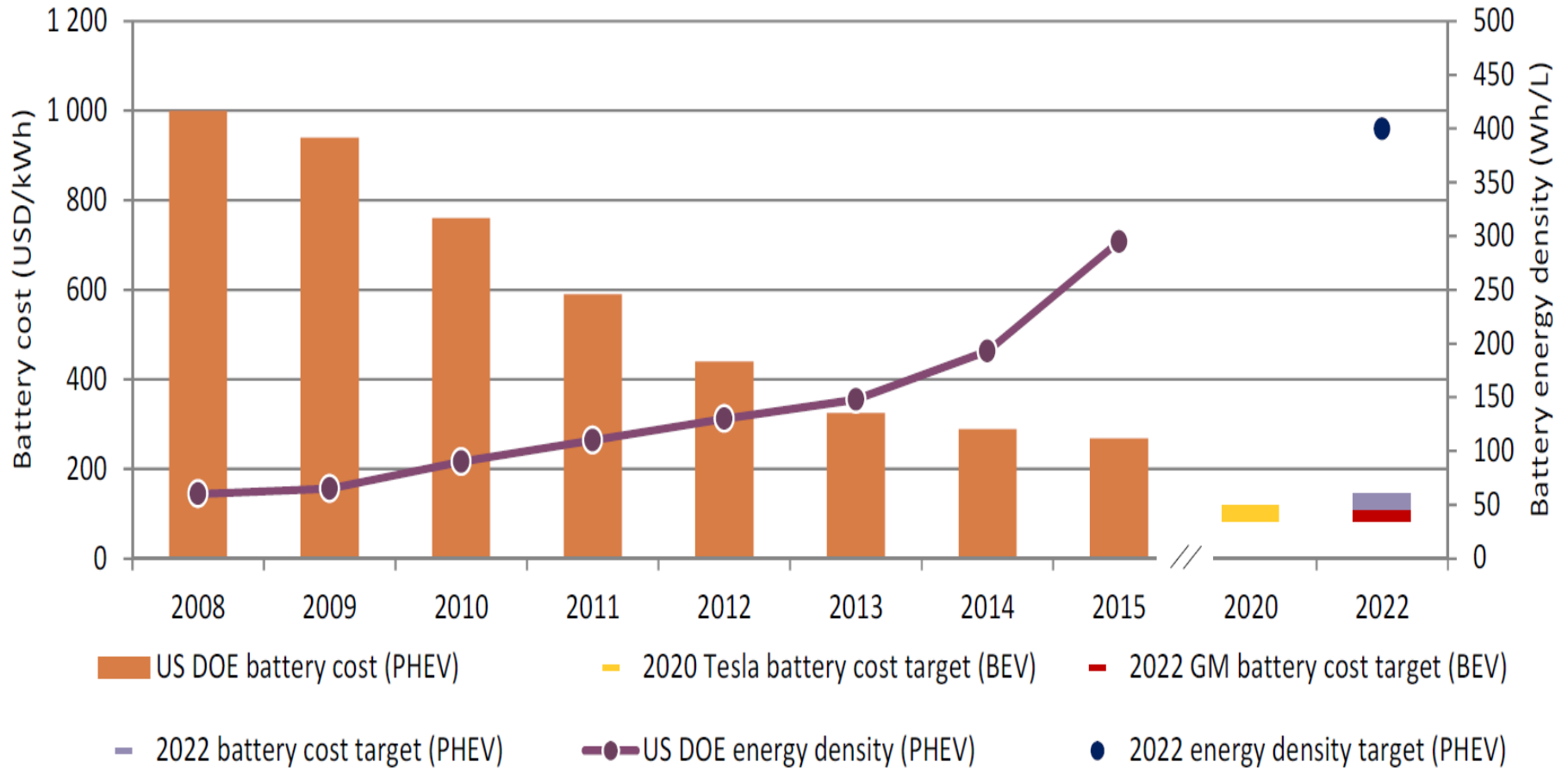
Appliance standards lock in efficiency improvements despite declining electricity prices

The beginning of a technology competition



Electric cars generate consumer excitement, but displaced only 0.01% of oil production last year

Battery costs fell 73% in 7 years, exceeding previous expectations



Self driving – shared economy vehicles and electric engines: a match made in heaven?



The “Uber utilization” cuts the breakeven oil price for an EV by 30 \$/barrel compared to average EU usage.

However, there are still open questions



- Sustainability of fiscal incentives
- Boundaries for L Ion technology
- System impact and pricing of fast chargers
- Consumer preferences beyond the 2nd car

A large scale electrification of the car fleet requires a strong policy push and further technology development

Gas as a heavy duty transport fuel



- An electric heavy duty truck would need a 500 kwh battery – 100k \$ and 5 tons weight
- Urban particulate pollution from diesel trucks
- High mileage and often stop-go traffic
- Shipping: SO₂ regulation on bunker fuel

Aviation: income growth and difficulty of substitution



9 out of the 10 busiest EU air routes run parallel to already existing high speed trains

Will air quality concerns lead to rethinking dieselisation?



Budapest in smog, winter 2016/17

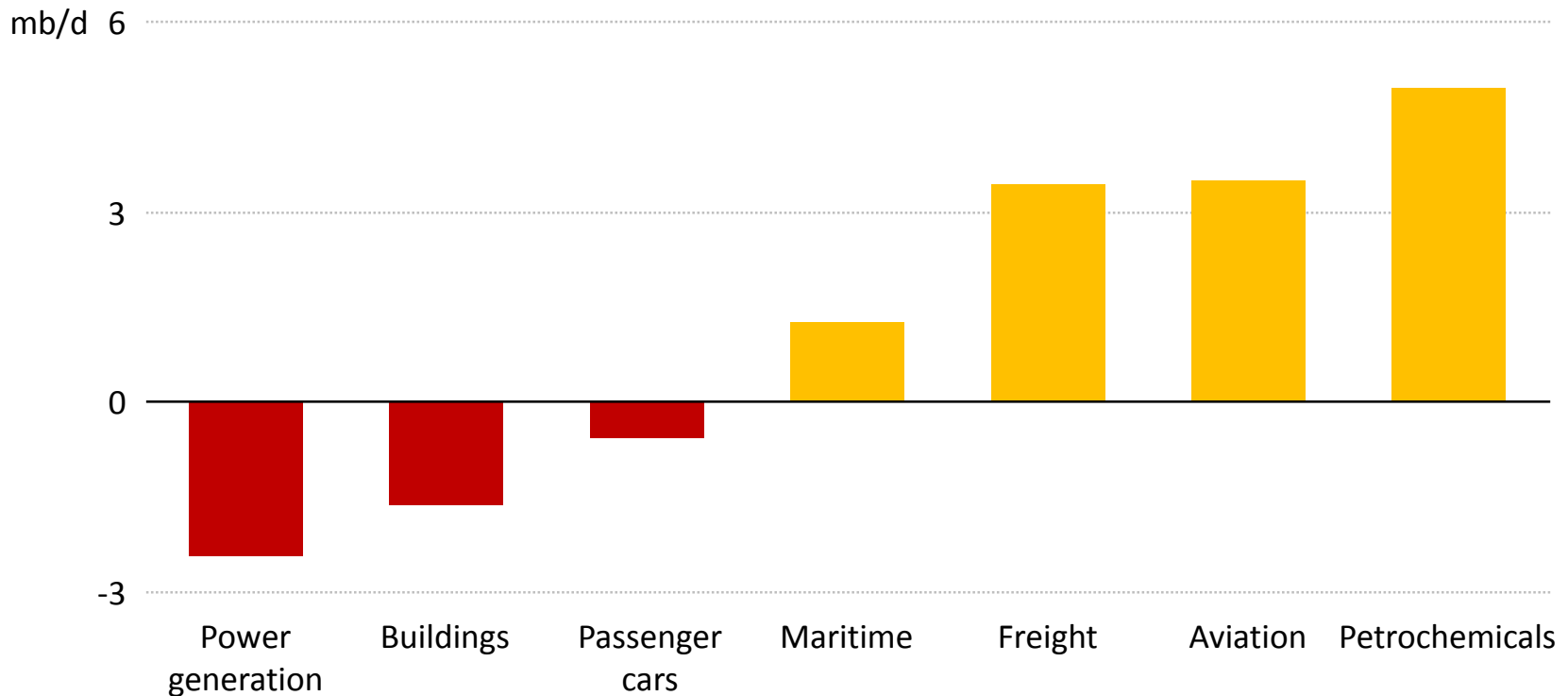


Paris in smog, winter 2016/17

The majority of urban air pollution in Europe is not coming from coal - and will not be solved by wind and solar power alone.

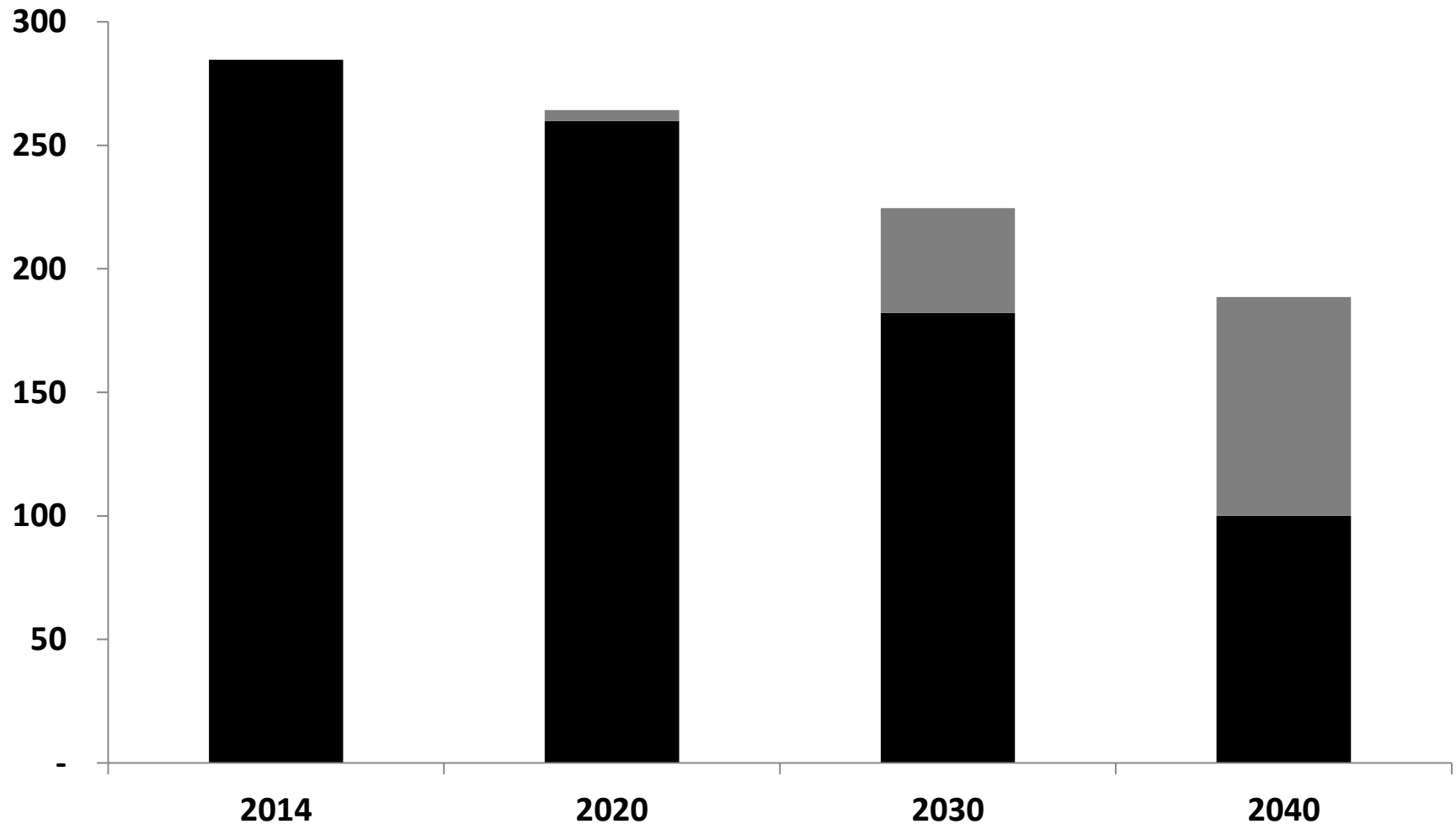
No peak yet in sight, but a slowdown in growth for oil demand

Change in oil demand by sector, 2015-2040



The global car fleet doubles, but efficiency gains, biofuels & electric cars reduce oil demand for passenger cars; growth elsewhere pushes total demand higher

Declining demand in EU transport: the taste of things to come



EU downstream outside transport: declining industrial and disappearing heating oil demand

