

# Commentary

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## Estimating the Size and Efficiency of the Saudi Vehicle Fleet

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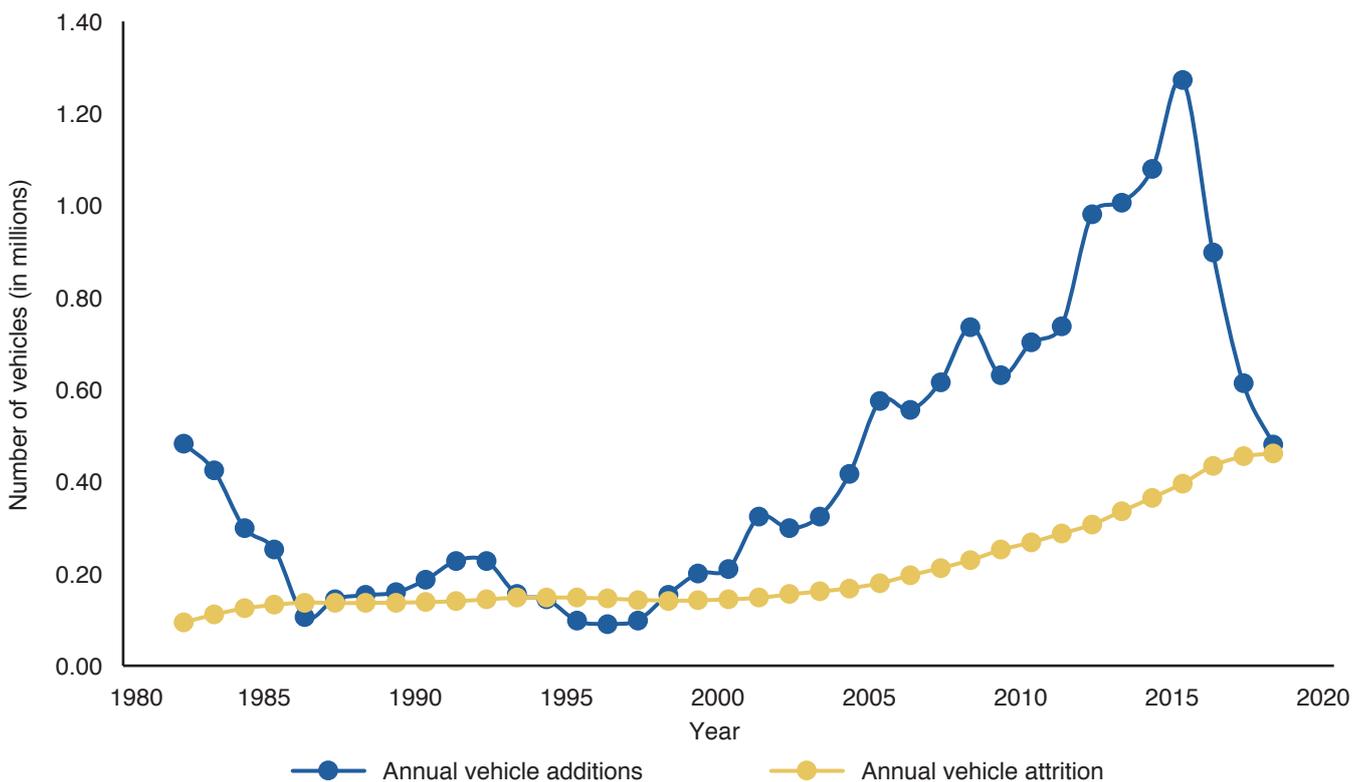


**Estimates of the size of Saudi Arabia's vehicle fleet in 2015 vary from as high as 18 million (Arab News 2014) to as low as 6.6 million (OICA 2019).**

Estimates of the size of Saudi Arabia's vehicle fleet in 2015 vary from as high as 18 million (Arab News 2014) to as low as 6.6 million (OICA 2019). This significant variation stems from the fact that the Kingdom does not operate a vehicle registration program that deletes vehicle registrations from the records after a vehicle is exported, destroyed in an accident, or depreciated by wear and tear (Algadhi, Mufti, and Malick 2002). Therefore, there are no statistics on the actual number of vehicles in use in Saudi Arabia for any given year, other than for the years 1403H (1983) and 1421H (2000), when the mandated re-registration and license plate change requirements resulted in official estimates (Algadhi, Mufti, and Malick 2002). This commentary provides a rough estimate of the total number of vehicles in operation in the country, including both passenger and commercial vehicles.

We estimated the evolution of the Saudi vehicle fleet by combining the vehicle fleet size from 1403H (1983) with the annual vehicle additions and attritions for the following years. Because of a lack of available data on new vehicle sales, we assumed that the number of vehicles imported represents the number of additional vehicles.<sup>1</sup> Annual vehicle import data (Figure 1) was obtained from the General Authority for Statistics' (GaStat's) statistical yearbooks (GaStat 1982-2018).

**Figure 1.** Estimated annual vehicle additions and attrition for Saudi Arabia.



Source: KAPSARC Analysis.

<sup>1</sup> It is important to note that GaStat's data on the number of vehicle plates issued annually cannot be used to account for new vehicle sales. This is because, for some years, the data includes used vehicles required to get new vehicle plates issued because of the mandated changes in vehicle plate design.

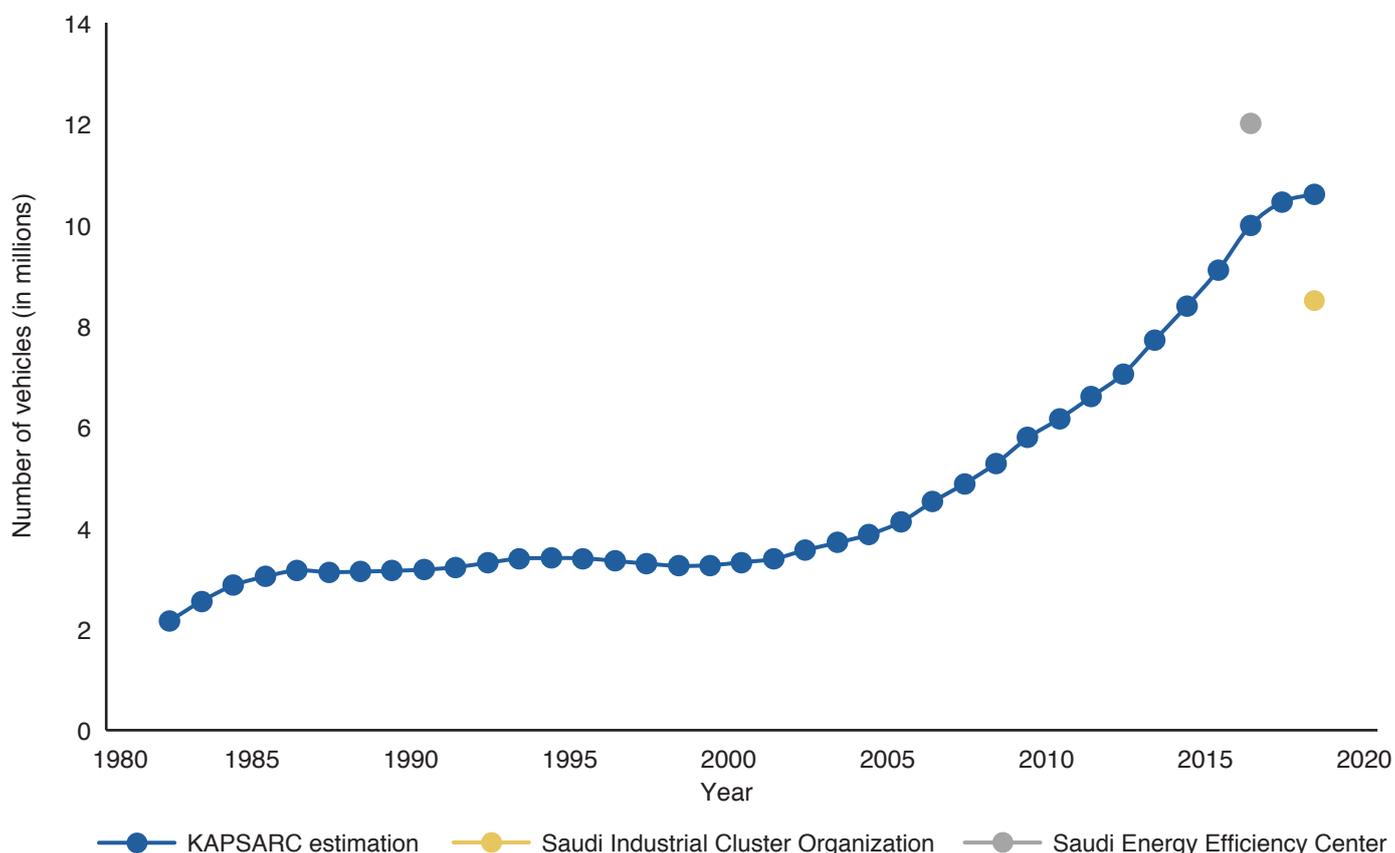
A constant attrition rate of 4.35% was assumed, based on comparing our estimated vehicle fleet size number in 1421H (2000) with the value reported in the literature (Algadhi, Mufti, and Malick 2002). The attrition rate should account for vehicle exports and retirements (due to accidents, or depreciation through wear and tear).

Figure 2 shows the estimated evolution of Saudi Arabia’s vehicle fleet. Our estimates fall in between the range of estimates provided in various reports from different Saudi agencies. These include the Saudi Industrial Cluster’s automotive aftermarket report (Industrial Clusters 2018), which estimated a total fleet of 8.5 million vehicles, and the Saudi Energy Efficiency Center’s 2016 report (Al-Sahlawi, Miah, and Al-Titi 2018), which estimated it to be 12 million.

Combining our estimated 2016 vehicle fleet size of 9.99 million vehicles with the reported 2016 vehicle fleet fuel consumption of 0.92 million barrels of oil equivalent per day (SEEC 2018a), we get an estimated vehicle fleet fuel economy of 4.94 kilometers per liter (km/L).<sup>2</sup>

**Our estimates fall in between the range of estimates provided in various reports from different Saudi agencies.**

**Figure 2.** Estimated vehicle fleet size for Saudi Arabia.



Source: KAPSARC Analysis.

<sup>2</sup> For this calculation, we assumed an annual mileage of 16,421 miles. This number is based on the reported annual mileage for the combined passenger and commercial vehicle sector in the U.S., scaled up using a multiplier for Saudi Arabia. The multiplier value of 1.39 is based on the annual mileage for passenger vehicles in the Kingdom of 16,000 miles (Sheldon and Dua 2019) and 11,507 miles for the U.S. (FHWA 2019).



**We estimate the total number of passenger cars in Saudi in 2016 to be around 8.38 million.**

This estimated vehicle fleet fuel economy for Saudi Arabia is 35% lower than the estimated 2016 United States vehicle fleet fuel economy. The latter was calculated using the vehicle fleet size, annual mileage and fuel consumption values reported by the U.S. Federal Highway Administration (FHWA 2019).

To arrive at an estimate of the distribution of passenger and commercial vehicles in Saudi Arabia's vehicle fleet, we used GaStat's demographic survey data (GaStat 2016). The data provides information on the number of passenger cars owned by Saudi households in 2016. The data shows that Saudi households had 5.37 million passenger cars in 2016, with an average of 1.69 cars per household. Foreign households accounted for about 35.9% of the population of Saudi Arabia in 2017 (Arab News 2017). Assuming a similar rate of car ownership for foreign households as Saudi households in 2016, and assuming the same average number of cars per foreign household as for Saudi households, we estimate the total number of passenger cars for foreign households to be 3.01 million. Combining the two estimates, we get an estimate of the total number of passenger cars in Saudi in 2016 to be around 8.38 million. This suggests that passenger cars comprised around 84% of the 9.99 million active vehicles on the road in 2016. By comparison, passenger cars comprise 92% of the total vehicle fleet in the U.S. (FHWA 2019).

Combining the estimated 2016 passenger car fleet size in Saudi Arabia of 8.38 million vehicles with the reported passenger car fleet fuel consumption in 2016 of 0.52 million barrels of oil equivalent per day (SEEC 2018a), we estimate that the passenger car fleet fuel economy in Saudi Arabia is 7.15 km/L.<sup>3</sup> This estimate is 23% lower than the estimated 2016 U.S. passenger car fleet fuel economy, as reported by the FHWA (2019).

The new passenger car fleet fuel economy in Saudi Arabia in 2016 was roughly 13.5% lower than in the U.S. (Sheldon and Dua 2019; University of Michigan 2018). These numbers highlight that the Saudi passenger car fleet includes a higher fraction of older passenger cars and could benefit from a vehicle retirement program, an option currently being explored by the Saudi Energy Efficiency Center (SEEC 2018b).

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<sup>3</sup> For this calculation, we assumed an annual mileage for passenger vehicles of 16,000 miles in Saudi Arabia (Sheldon and Dua 2019).

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## About the project

Promoting the adoption of energy-efficient vehicles has become a key policy imperative in both developed and developing countries. KAPSARC's research into light-duty vehicle demand seeks to understand the impact of various factors on light-duty vehicle adoption rates. These factors include (i) consumer-related factors – demographics, behavioral, and psychographics; (ii) regulatory factors – policies, incentives, rebates, and perks; and (iii) geo-temporal factors – weather, infrastructure, and network effects. Our team is currently developing micro-level models using large-scale data of new car buyers' profiles, and macro-level models using aggregated adoption data to understand and project the effects of various factors on the adoption rates of energy-efficient vehicles.

## About KAPSARC

The King Abdullah Petroleum Studies and Research Center (KAPSARC) is a non-profit global institution dedicated to independent research into energy economics, policy, technology and the environment across all types of energy. KAPSARC's mandate is to advance the understanding of energy challenges and opportunities facing the world today and tomorrow, through unbiased, independent, and high-caliber research for the benefit of society. KAPSARC is located in Riyadh, Saudi Arabia.

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