

Energy Security Fact Pack

Q4 2017



Securing America's
Future Energy



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SAFE's Energy Security Fact Pack provides a data-driven overview of the latest trends in U.S. energy security, including domestic and global oil production and consumption, oil market dynamics, energy prices, consumer spending on oil, fuel efficiency, and advanced fuel vehicles.

Opportunities to Reduce Oil Demand

- Increasing domestic oil production could help the United States reclaim its status as the world's second largest crude producer. New EIA data pegs December 2019 output at 11.2 million barrels per day (Mbd) [Pages 9 & 10]. At domestic oil prices of roughly \$65 per barrel, shale production has become even more economical, leading producers to finish drilled but uncompleted wells, and growing overall U.S. liquids supply by 10% year-on-year (y/y) [Pages 9, 15 & 25]. Although these new supplies have helped reduce the nation's oil import burden, the United States still relies on OPEC for 31% of its crude imports [Pages 12 & 13].
- Russia's commitment to cooperate in oil market management with Saudi Arabia and other petro-states continues to create global supply uncertainties [Page 20]. Alongside rising non-OECD demand, market fundamentals remain in flux [Page 16]. SAFE spotlights China's market as one important driver of this uncertainty. SUVs now represent approximately 40% of China's new passenger vehicle sales, growing the country's gasoline demand. However, Beijing's electric vehicle (EV) mandate could help offset this increase [Pages 21 & 22].
- SAFE highlights opportunities for the United States transportation sector to reduce oil demand. Forecasting agencies have unveiled a wide-range of oil displacement scenarios, in part differentiated by varying fuel efficiency and EV market share expectations [Page 4]. EIA's latest outlook shows substantial light-duty vehicle (LDV) fuel economy improvements through 2050 [Page 5]. Although tax credit availability has helped make EVs an affordable and viable option for consumers, a couple of automakers will soon hit the current tax threshold [Page 6]. EV and autonomous vehicle (AV) demand is nevertheless likely to pick up as auto and tech companies spend more on innovations that further increase affordability [Page 7].

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Oil Displacement Scenarios

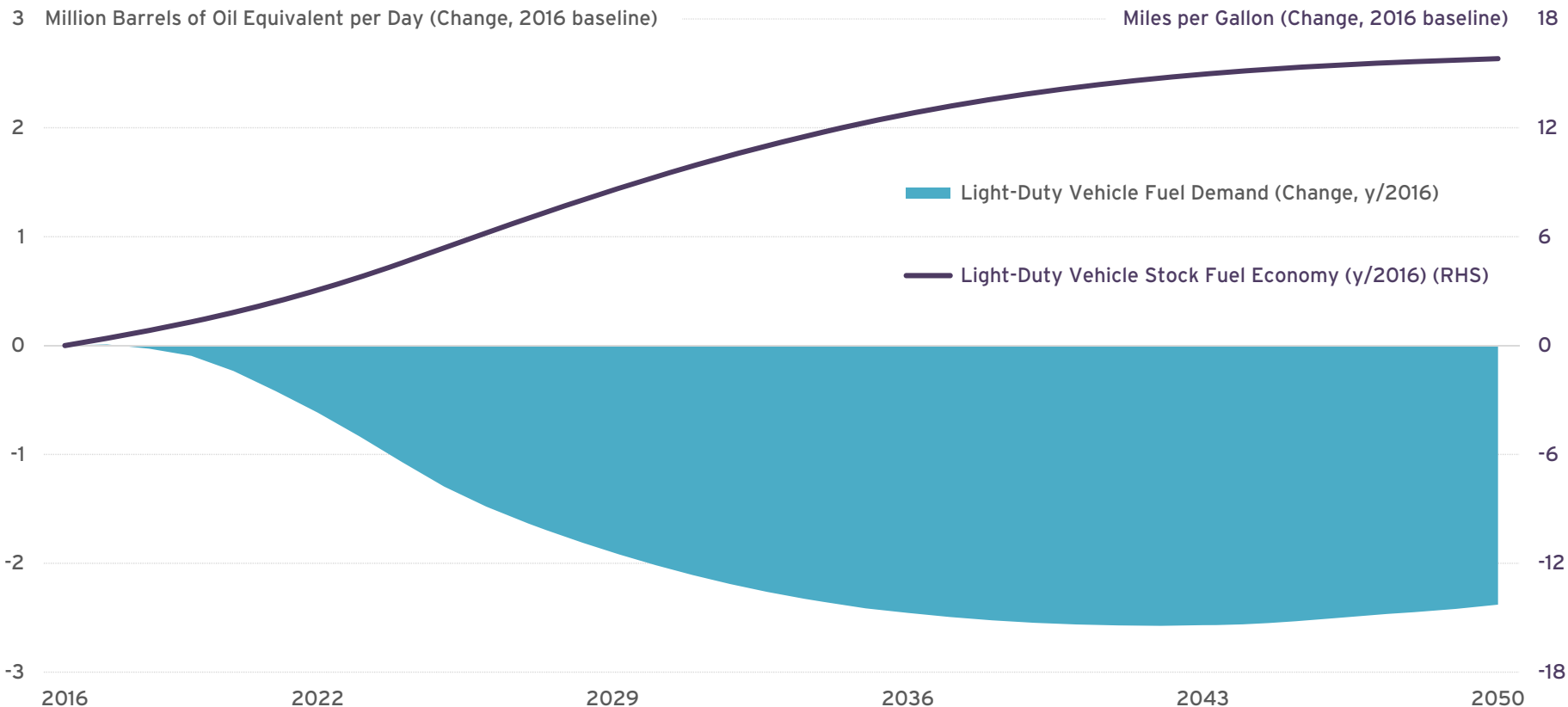
Several oil companies including Shell, BP, ExxonMobil and Statoil foresee steady reductions in petroleum demand through 2040. To varying degrees, forecasts cite growing EV market share as a prominent driver for global oil demand reductions.

Company	Year	EV Total Fleet	Transport Fuel Demand
EIA [1]	2025 and 2040	1.1 million EV sales by 2025 under reference case, or 7% of total sales. By 2040, U.S. BEV sales increase to 10% and PHEV sales increase to 1.8% of total sales.	Efficiency is the main driver for decreases in motor gasoline consumption.
Statoil ASA [2]	2030	36 million BEV and 15 million PHEV sales, or 12% market share.	Demand falls from 23.6 Mbd in 2014 to 22.4 Mbd by 2030.
IEA [3]	2030	56 million under reference case or 14% of new LDV sales.	EV's will have a limited impact on global fuel demand by 2022. Growth in Developing Countries will drive demand increases. Oil demand does not peak until the 2040s.
Royal Dutch Shell PLC [4]	2030	No information given.	Could peak in 2030s.
BP PLC [5]	2040	320 million or 16% global fleet	Roughly flat (18.7 Mbd in 2016 versus 18.6 Mbd in 2040). EV fleet transition and fuel efficiency gains displace growth in travel demand.
ExxonMobil Oil Corp [6]	2040	10% EV (United States)	More than 22 Mbd.
BNEF [7]	2040	EVs sales at 54% of new LDV sales and 33% of the global fleet.	EV sales displaces 8 Mbd over 2017 levels.
Deloitte LLP [8]	2040	No information given.	U.S. motor fuel consumption decreases by 2.9 Mbd over 2016 levels.

Source: [1] EIA. AEO. 2018. p. 116 [2] Statoil. Energy Perspectives 2017: Long-Term Macro and Market Outlook. 2017. Note: Uses Statoil's "Reform" Case. [3] IEA. Global EV Outlook, 2017. [4] Ben Van Beurden quoted in Ambrose. Shell braces for 'lower forever' oil amid electric vehicle boom. The Telegraph. July 27, 2017. p. 3. [5] BP. Energy Outlook, 2018. [6] Exxon. Global Energy Outlook, 2017 [7] BNEF Electric Vehicle Outlook 2017, Executive Summary. p. 3. [8] Slaughter & Shattuck. The future of mobility: Impact on transportation fuel. Deloitte Insights. Nov. 15, 2016.

Fuel Economy Improvements

LDV fuel economy will save up to 2.6 Mbd in the coming decades as current rules boost efficiency over 2016 levels. Fleetwide miles per gallon (mpg) will improve from 22.4 mpg to 38.2 mpg by 2050 (+15.8 mpg over 2016 levels).

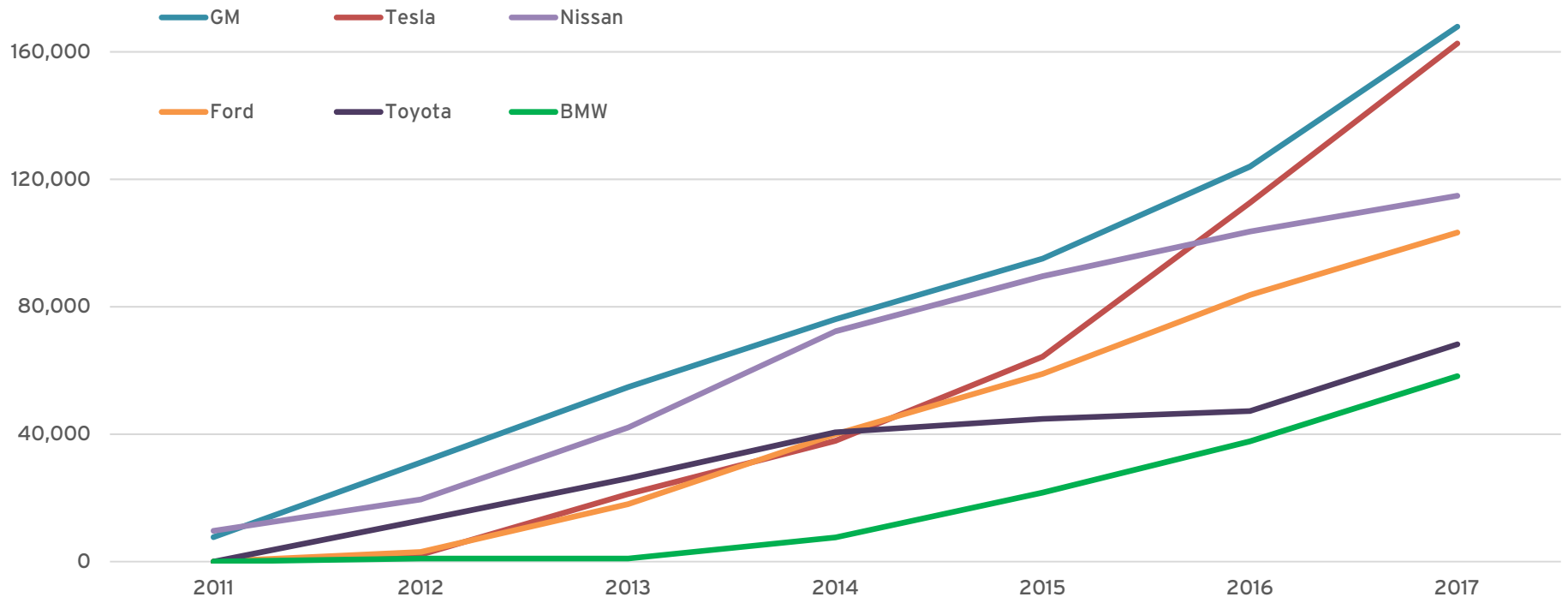


Source: SAFE analysis based on data from EIA

Federal EV Tax Credit

Several automakers are nearing the maximum 200,000 federal tax credits available for EVs. Roughly 32,000 and 37,000 tax credits remain for GM and Tesla, respectively. Popular 2018 model year vehicles will likely exhaust the availability of these consumer credits.

200,000 Estimated Federal EV Tax Credits Consumed as of December 2017

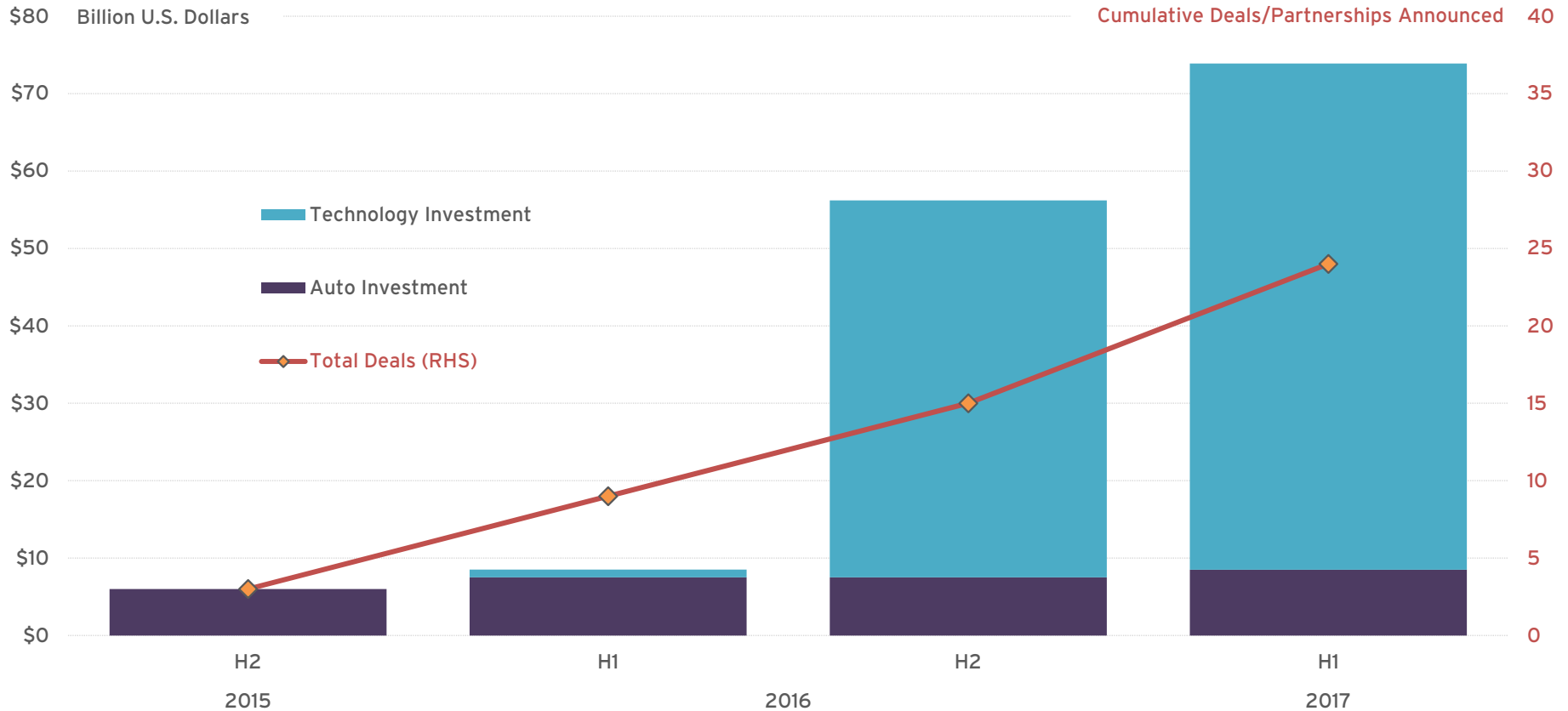


Note: Chart includes automakers with 50,000 or more cumulative EV sales.

Source: SAFE analysis based on data from Hybridcars.com

Autonomous Vehicle Investments

As EV demand picks up, auto and tech companies are investing heavily in AVs. Alongside electrification, ridesharing and autonomy can catalyze fuel displacement. In H1 2017, tech firms announced \$65 billion in AV spending and created 24 new partnerships.



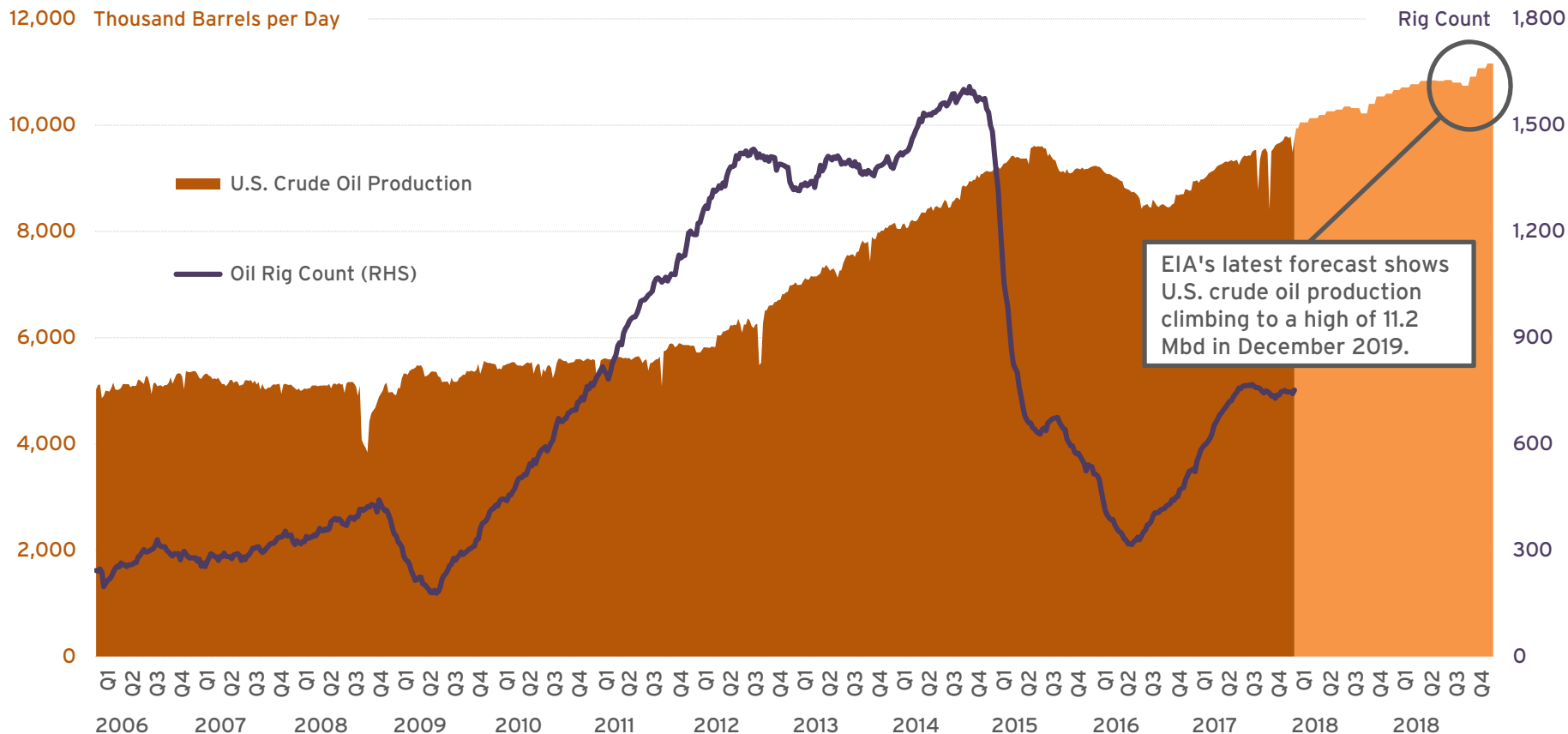
Source: SAFE analysis based on data provided by Brookings

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U.S. Oil Rig Count Flat

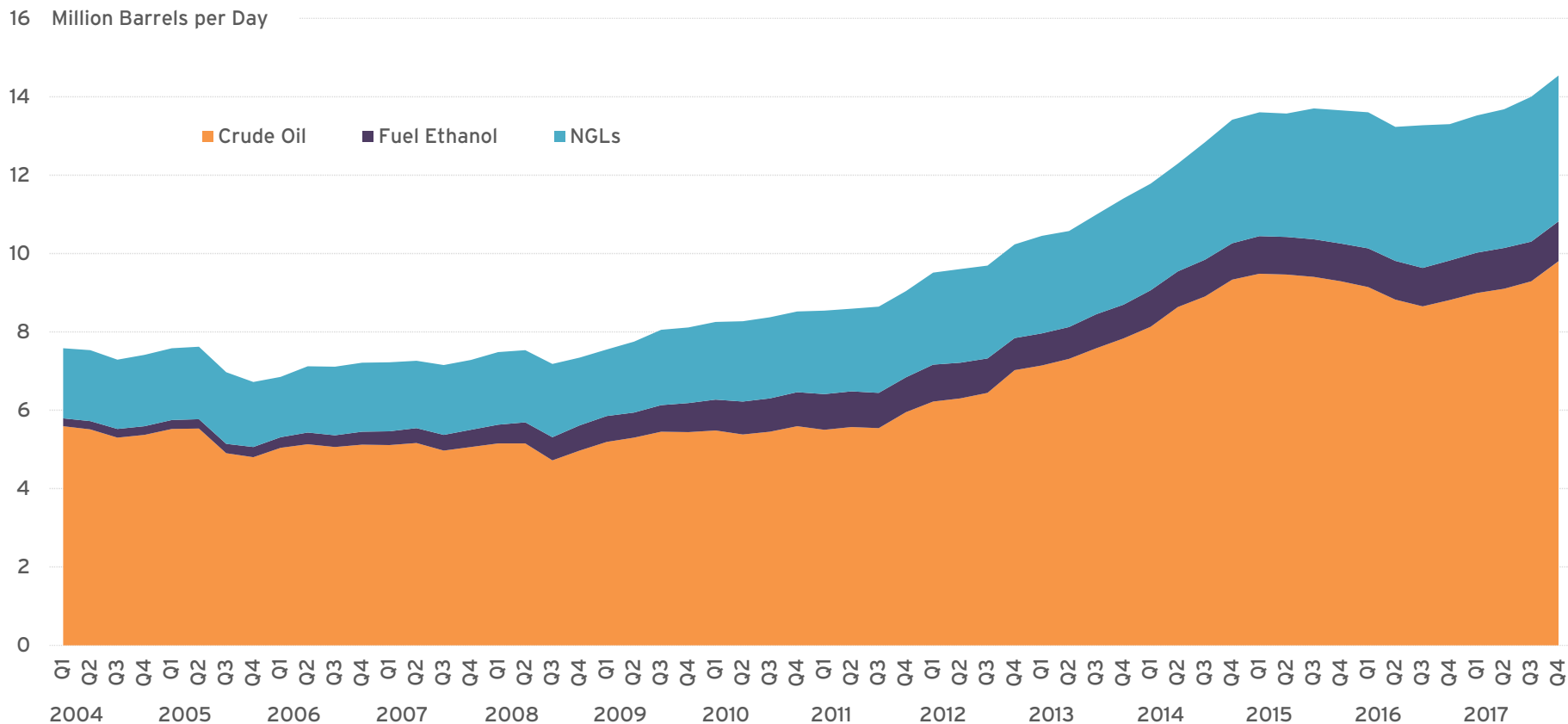
The U.S. oil rig count remained roughly flat in Q4, falling to 747 by December 2017. The rig count ended Q4 down 3 rigs quarter-over-quarter (q/q). Crude oil production reached 9.8 Mbd (+0.2 Mbd q/q), partially as a result of producers finishing drilled but uncompleted wells.



Source: EIA and Baker Hughes

U.S. Oil Production Rebound Continues

U.S. liquids production grew 0.72 Mbd q/q in Q4 2017 to 14.8 Mbd (+1.4 y/y). Inclusive of fuel ethanol and natural gas liquids, total U.S. liquids production is roughly 6.6 Mbd higher than in 2008. The United States is the world's largest liquid fuels producer.

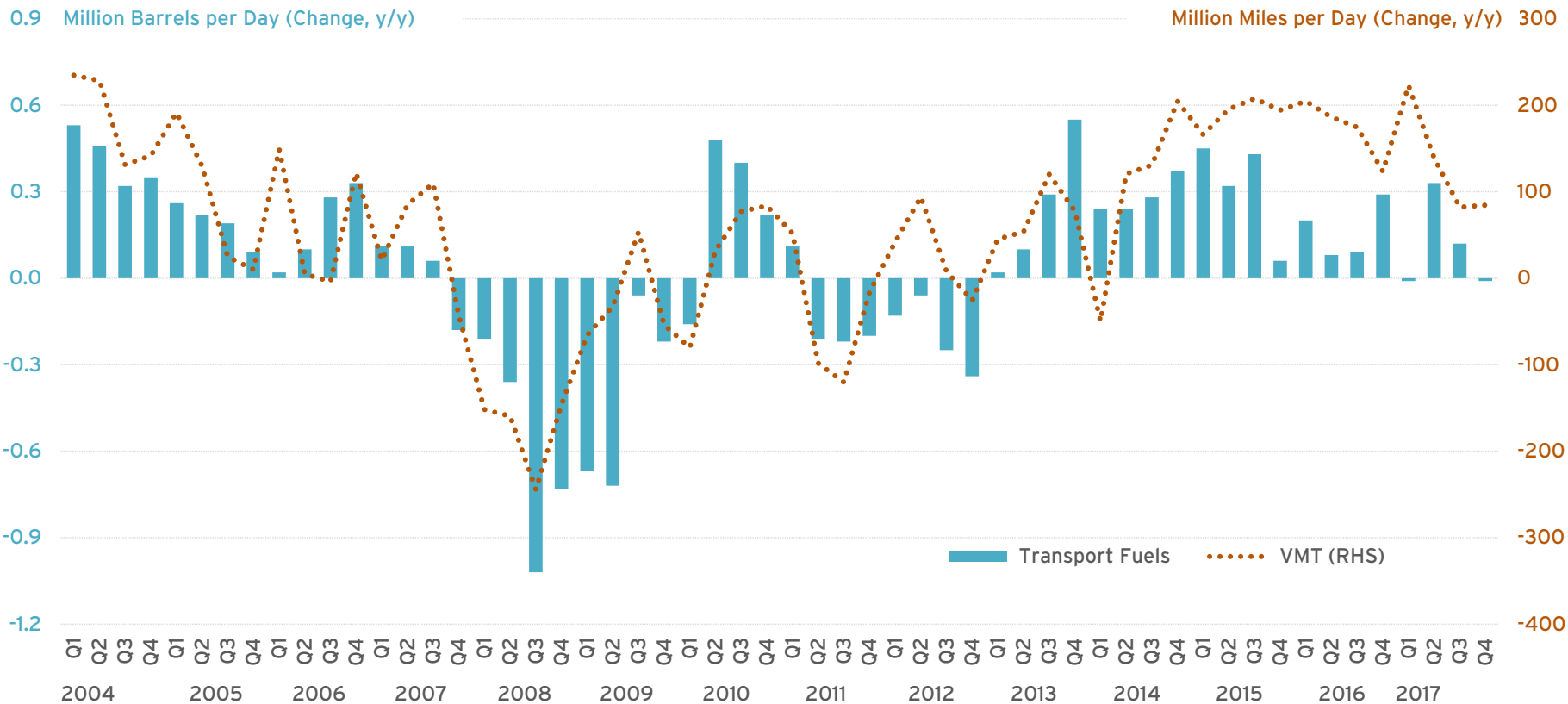


Source: SAFE analysis based on data from EIA



Transportation Fuel Demand Growth is Steady

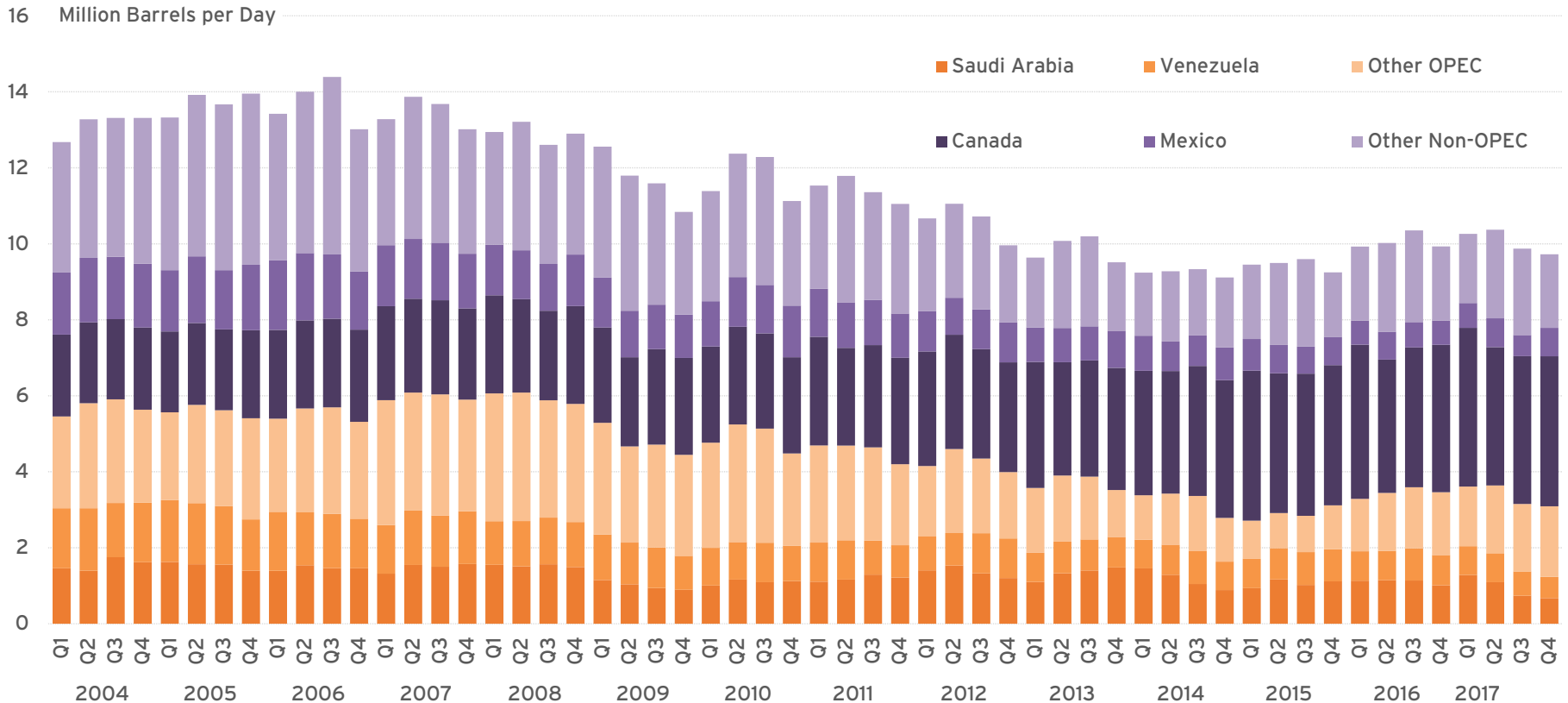
U.S. demand for gasoline, diesel, and jet fuel averaged 14.5 Mbd in Q4 2017, roughly on par with Q4 2016. Total vehicle miles traveled (VMT) increased 85 million miles y/y (+1.0%), continuing 15 consecutive quarters of growth.



Source: SAFE analysis based on data from EIA

Imports Continue to Fall on OPEC Cutbacks

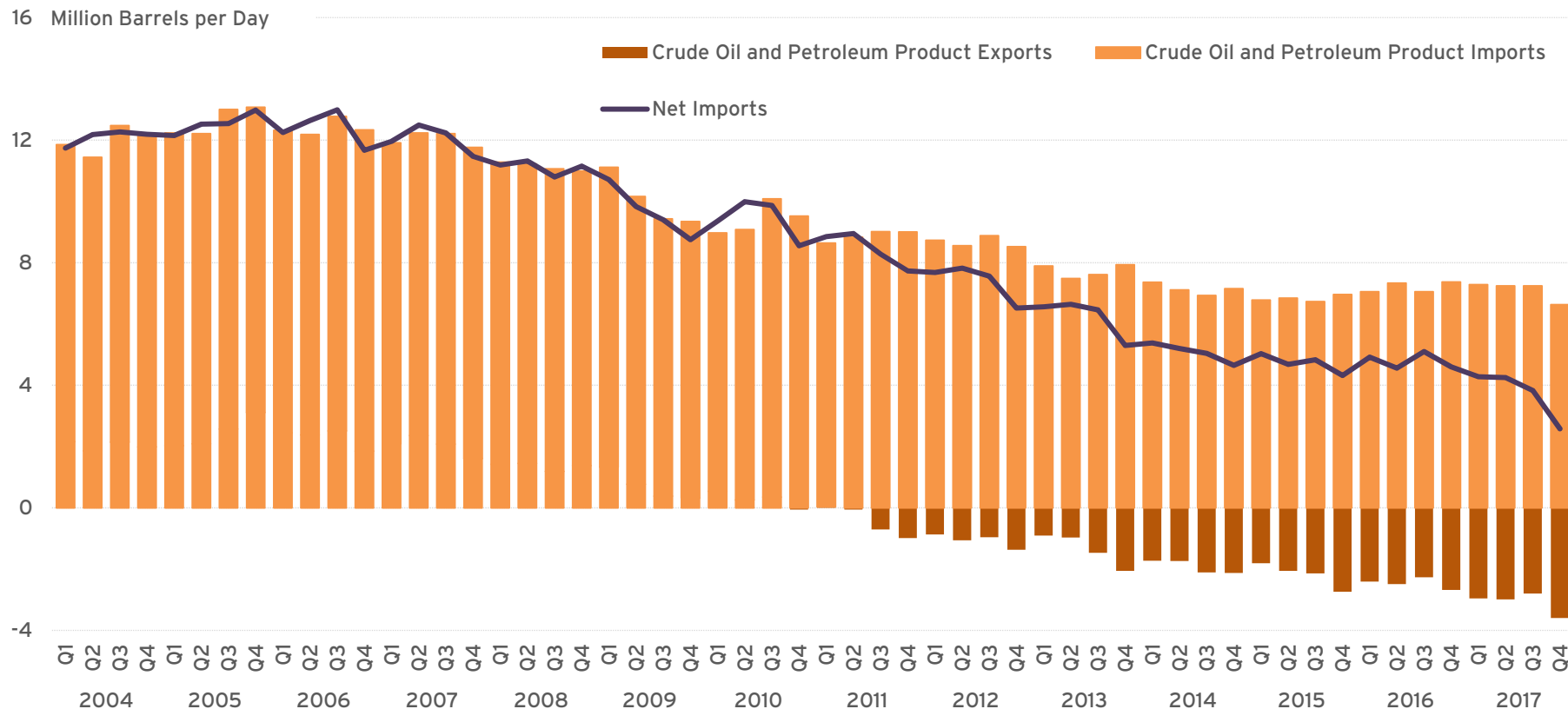
Gross U.S. crude oil and petroleum product imports fell to 9.7 Mbd in Q4 2017 (-0.2 Mbd y/y). Imports from Saudi Arabia and Venezuela fell by 0.6 Mbd y/y. OPEC accounted for roughly 31% of total Q4 U.S. imports.



Source: SAFE analysis based on data from EIA

U.S. Net Imports Fall Sharply

Although net imports have fallen by about two-thirds since 2005, the United States continues to rely on imported crude oil. Total net imports of petroleum products fell to a 3.1 Mbd in Q4 (-1.8 Mbd y/y). Petroleum product exports increased 0.9 Mbd y/y to 3.6 Mbd.



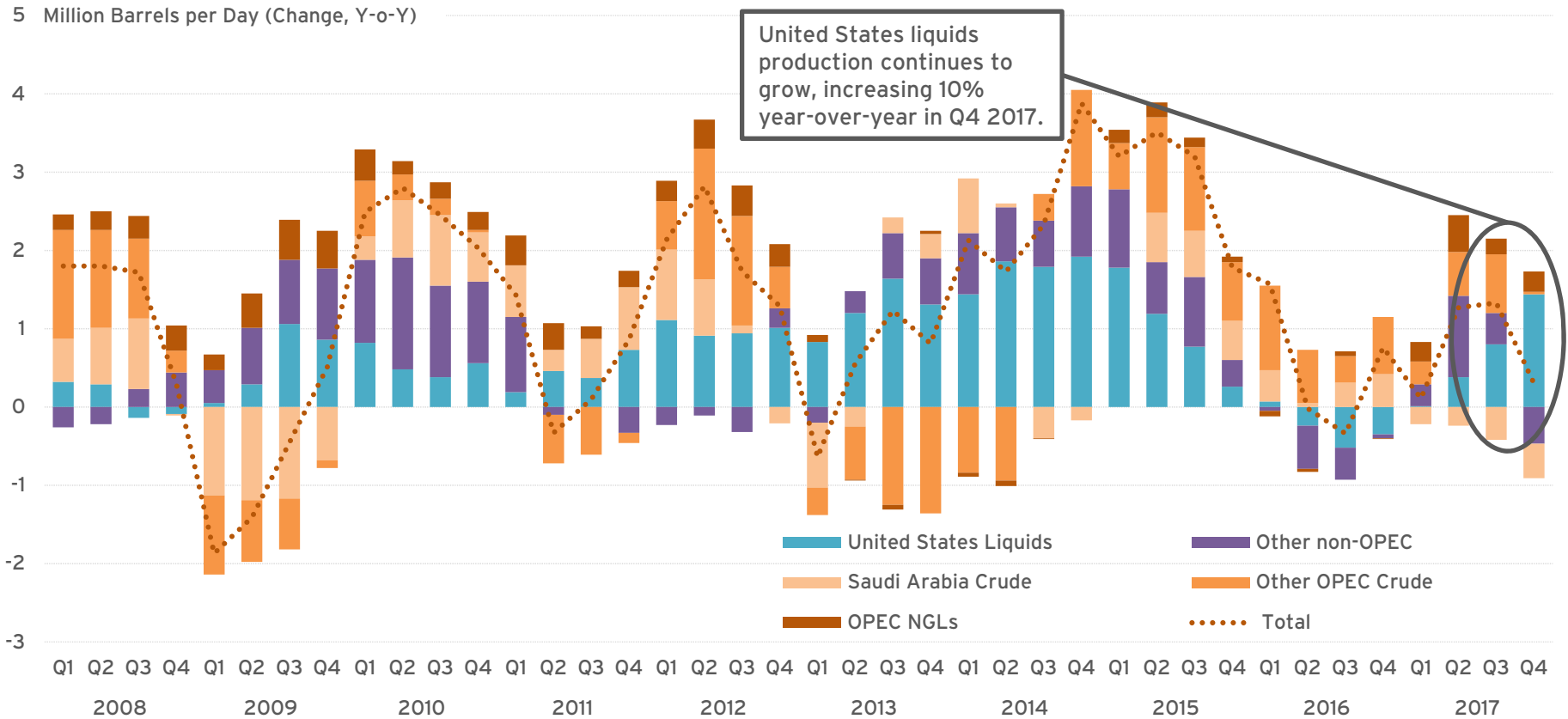
Source: SAFE analysis based on data from EIA

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Global Oil Supplies Rise on U.S. Liquids Growth

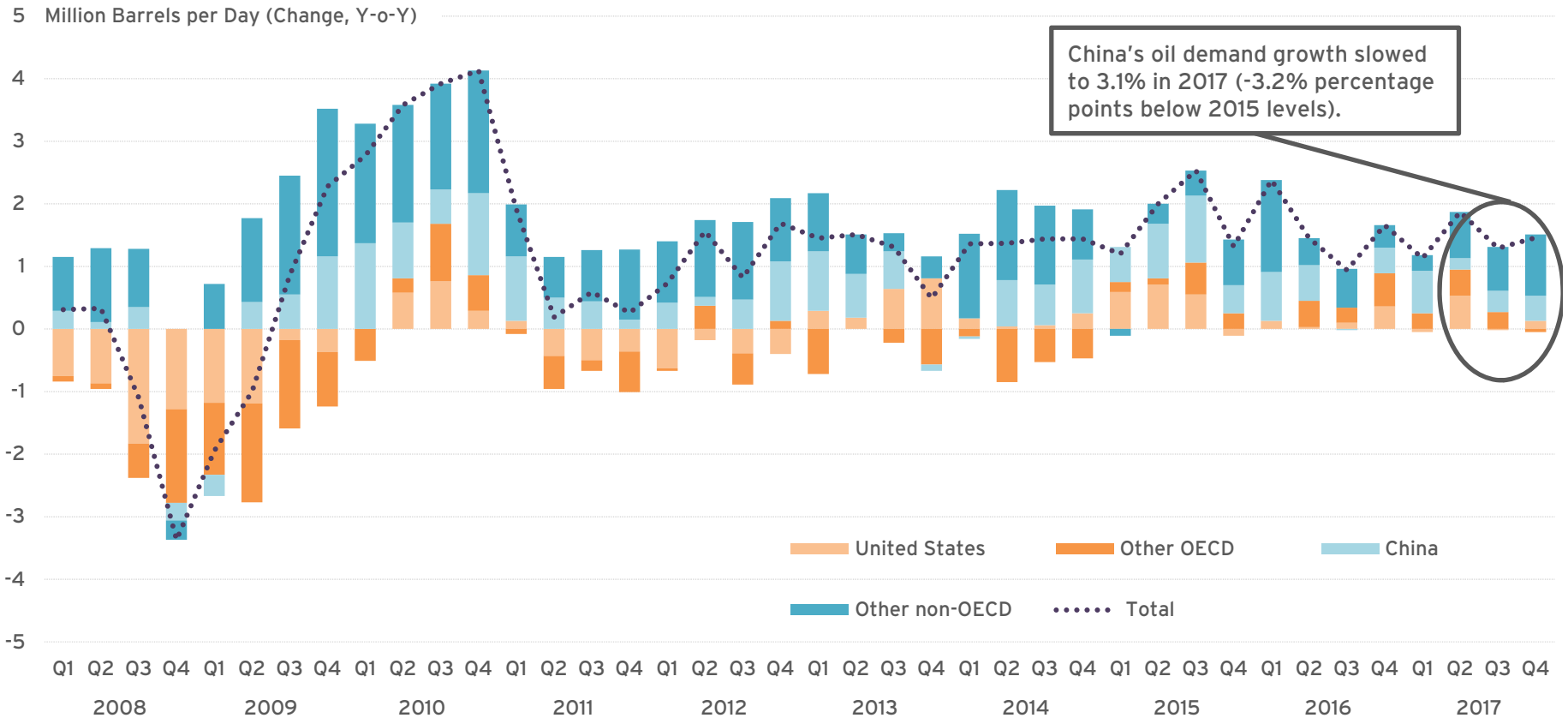
Global oil production increased in Q4 2017 to 98.6 Mbd as OPEC's cuts were offset by resurgent production elsewhere. The United States has contributed approximately 61% of net global supply growth between 2012 and 2017.



Source: SAFE analysis based on data from EIA

Global Oil Demand Growth Keeps Steady

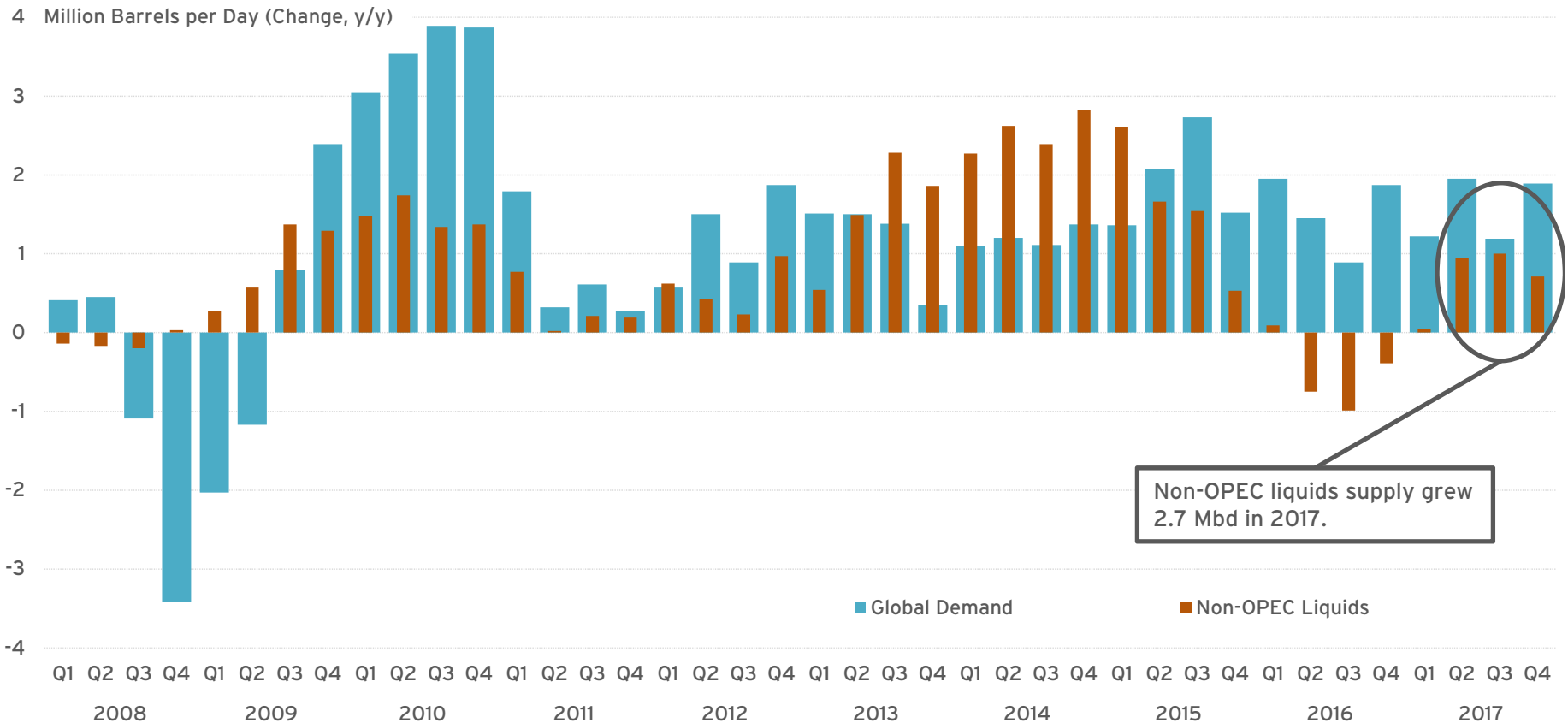
Global oil demand grew 1.5 Mbd y/y in Q4 2017, driven by growth in non-OECD countries (+1.4 Mbd y/y). Demand in OECD countries was roughly flat at 47.3 Mbd (+0.08 Mbd y/y). Global oil demand reached approximately 99.0 Mbd in Q4.



Source: SAFE analysis based on data from EIA

Non-OPEC Supply Continues Resurgence

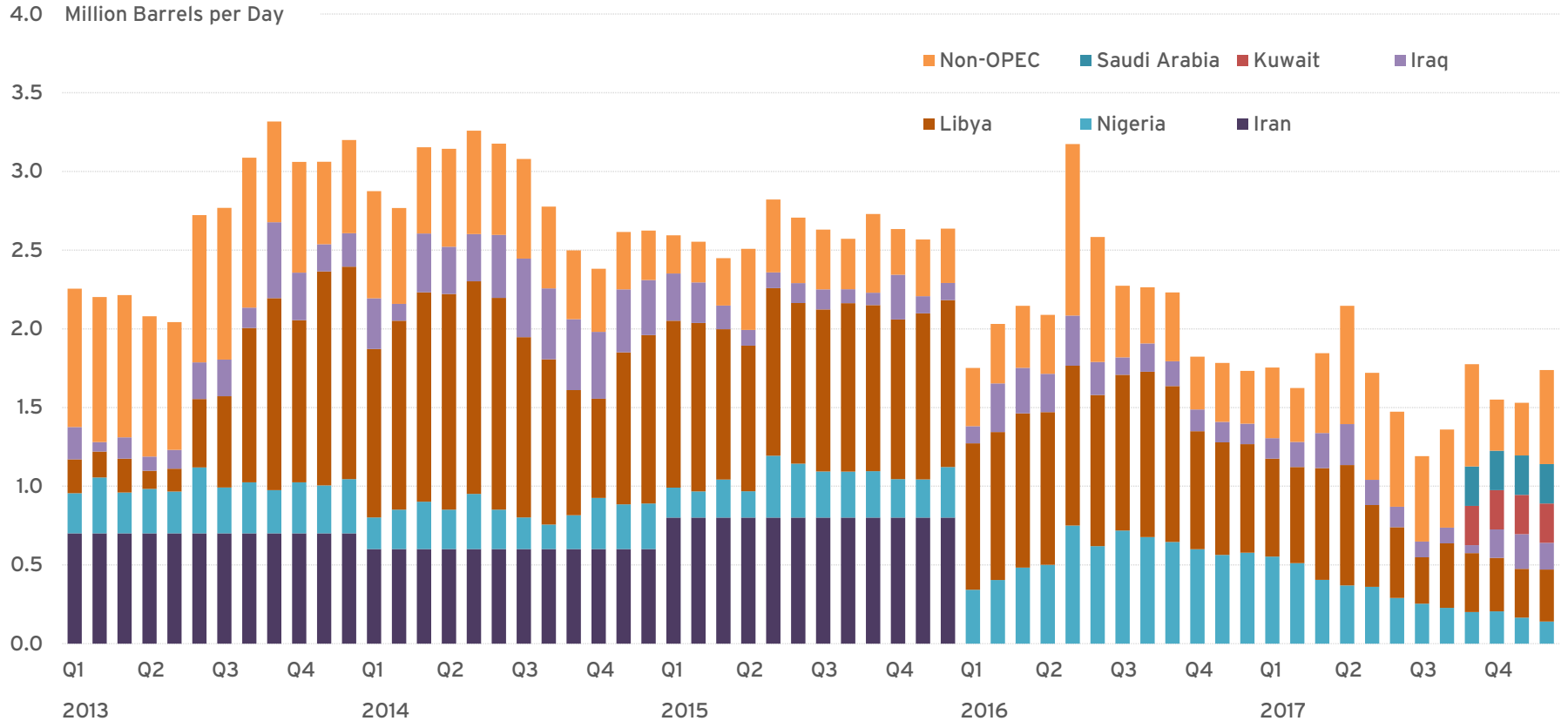
Non-OPEC supply increased for a fourth consecutive quarter after seeing declines in 2016. Global oil demand growth has outpaced non-OPEC liquids supply for the last 11 quarters, rising 1.2 Mbd above non-OPEC liquids supply in Q4.



Source: SAFE analysis based on data from EIA

Unplanned Crude Oil Outages Rise

Global unplanned outages rose to 1.6 Mbd in Q4 2017 (+0.2 Mbd q/q) as Saudi Arabia and Kuwait each experienced 0.25 Mbd in outages. OPEC outages increased 0.35 Mbd q/q to 1.2 Mbd, and non-OPEC outages decreased 0.2 Mbd to 0.4 Mbd q/q.

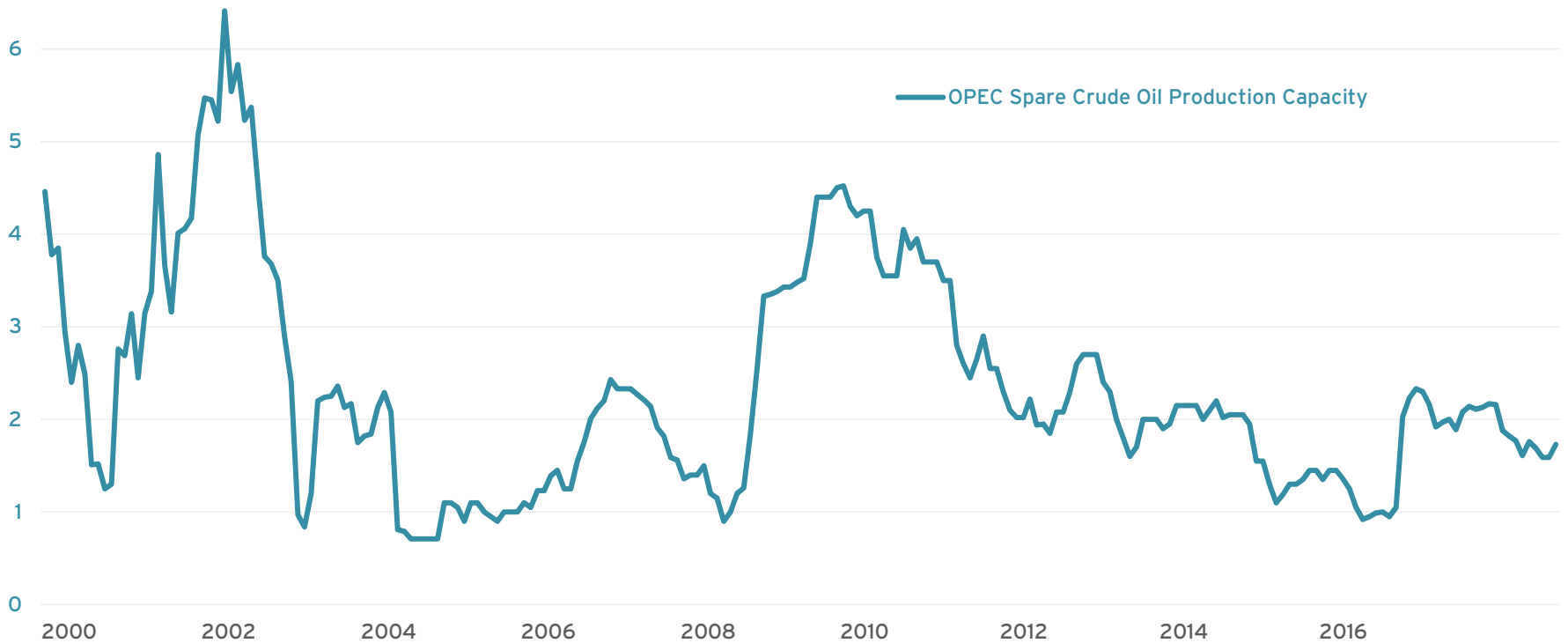


Source: SAFE analysis based on data from EIA

OPEC Spare Crude Oil Production Capacity Holds Steady

OPEC spare crude oil production capacity was 1.3 Mbd in Q4 2017 (-0.4 Mbd y/y), equivalent to 1.2% of global consumption. The majority of OPEC's spare production capacity is held by Saudi Arabia.

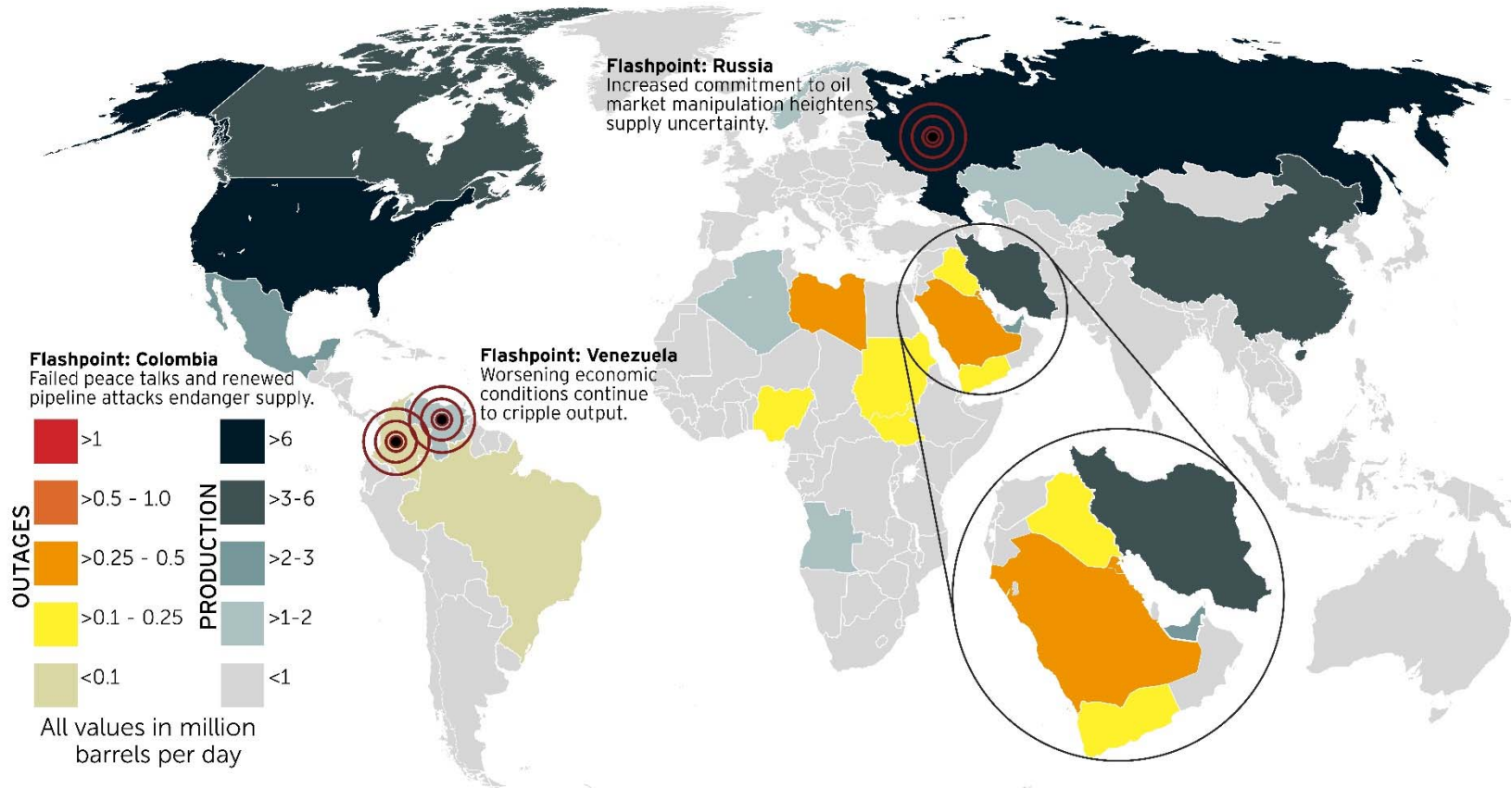
7 Million Barrels per Day



Source: SAFE analysis based on data from EIA

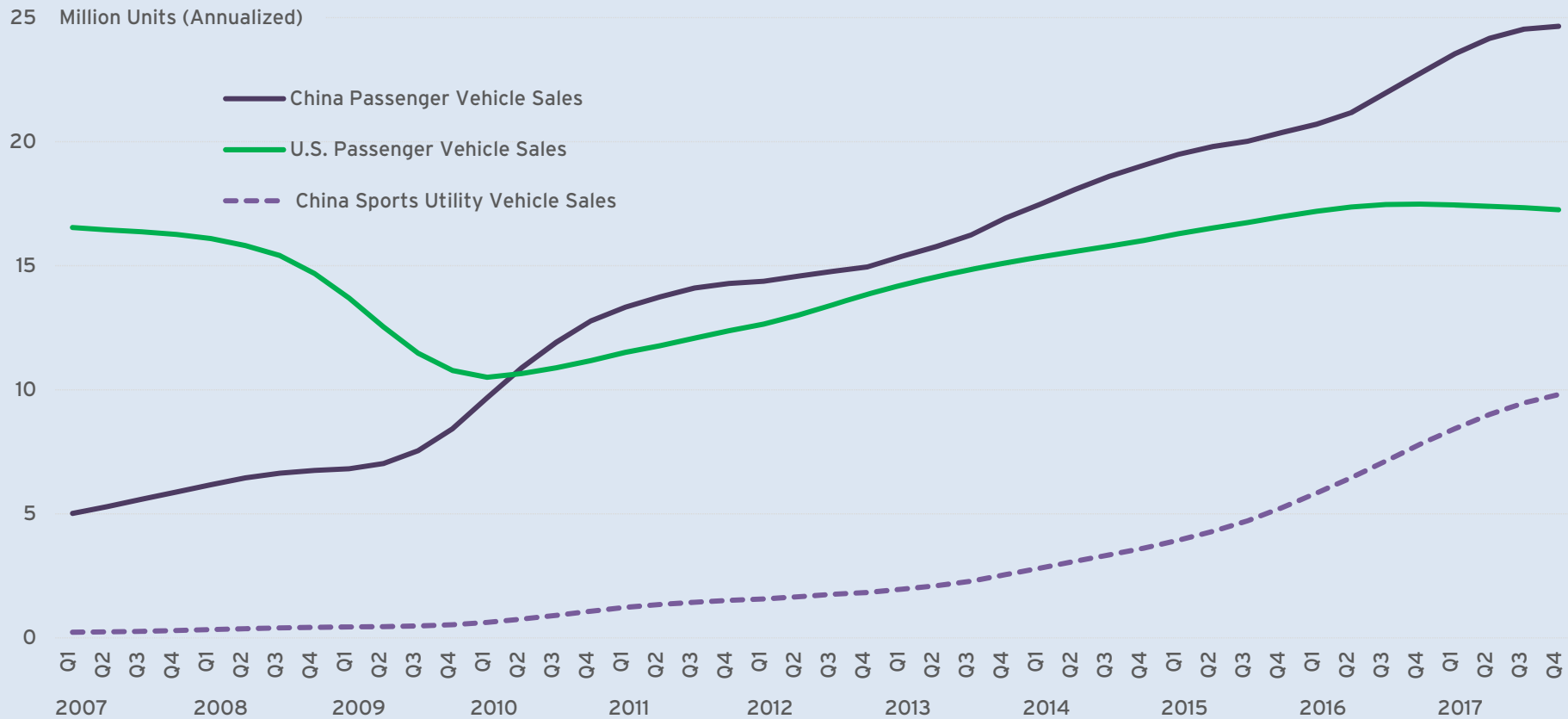
Barrels at Risk Map

Russia's commitment to coordinate with Saudi Arabia on oil market management continues to undercut global supply. Deteriorating political conditions in Venezuela, Colombia, and Iran also threaten to further undermine output.



China's SUV Sales Lift Off

China's passenger vehicle sales increased to 24.7 million units in Q4 2017 (+8% or 1.9 million cars y/y). Meanwhile, gasoline demand held steady y/y at 2.9 Mbd. Growing consumer interest in SUVs could fuel future demand. Nearly 40% of Q4 2017 passenger vehicle sales were SUVs.

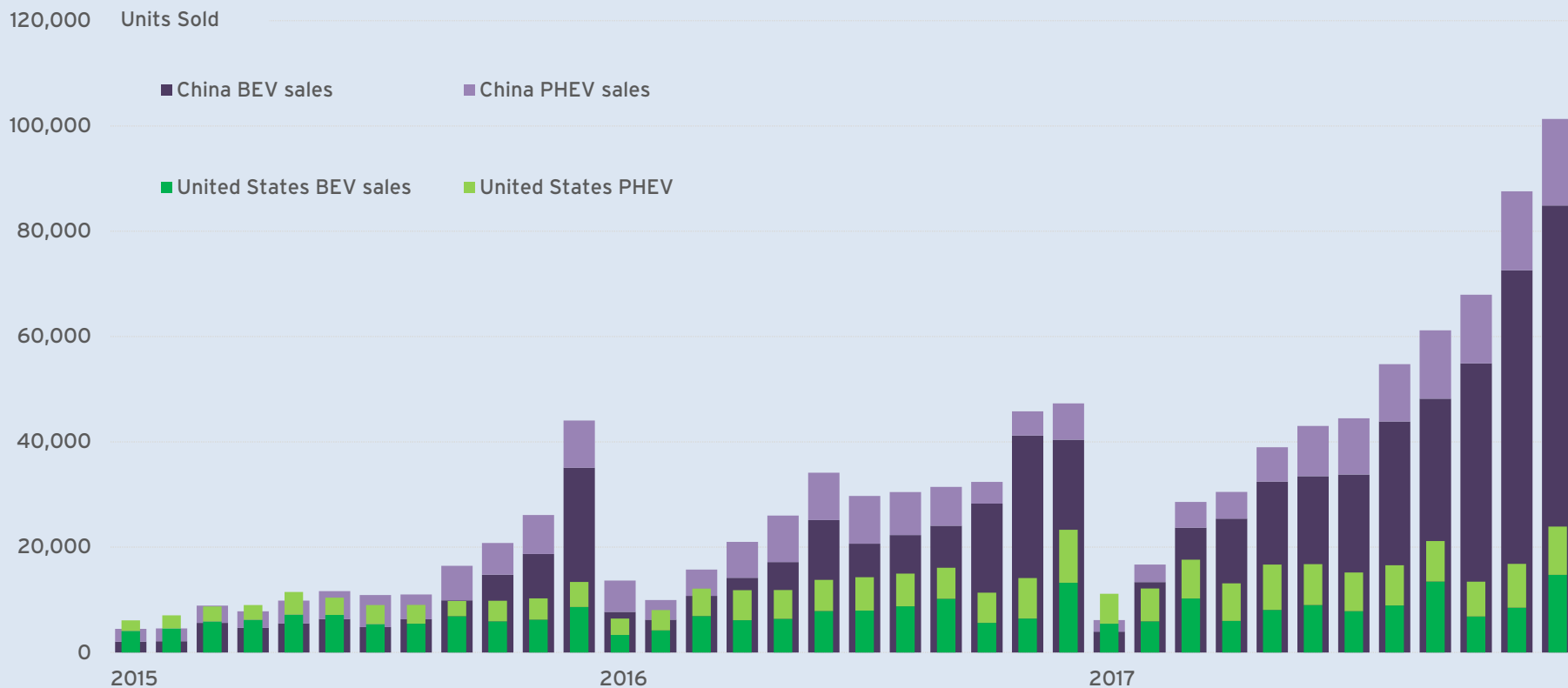


Source: SAFE analysis based on data from BEA and Bloomberg, LP.



China's Electric Vehicle Sales Rise Sharply

China's EV sales continue to grow as the government expands incentives for consumer adoption. EV sales increased roughly 243,000 units y/y to 581,000 vehicles in 2017 (+71% y/y). Beijing recently pushed forward its ambitious 8% EV mandate to 2019.



Note: In September 2017, China's Ministry of Industry and Information Technology announced an 8% EV mandate on new passenger vehicles to start this year. The plan, a component of the "Made in China" 2025 initiative, was recently delayed until 2019.

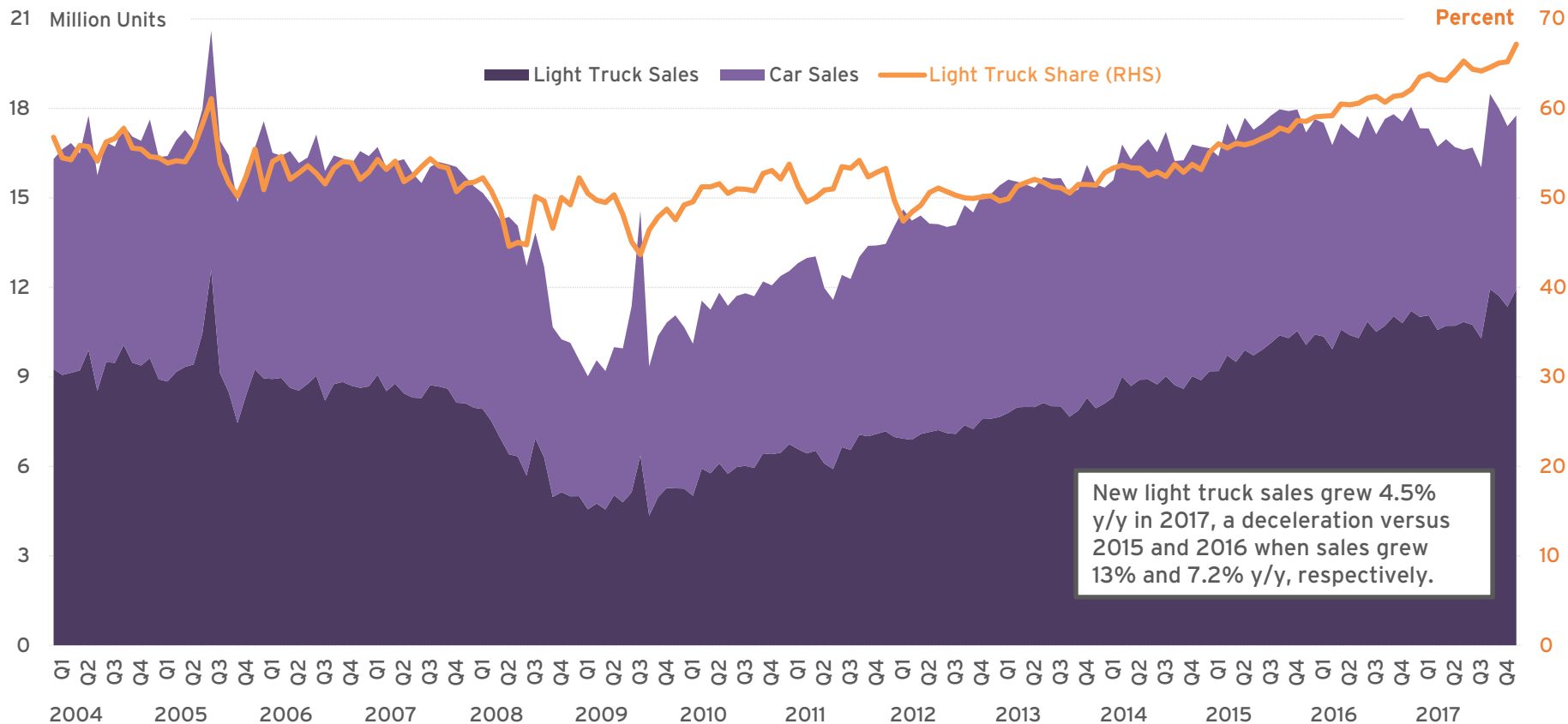
Source: SAFE analysis based on data from Bloomberg, LP.

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Light Truck Sales Continue on Record Surge

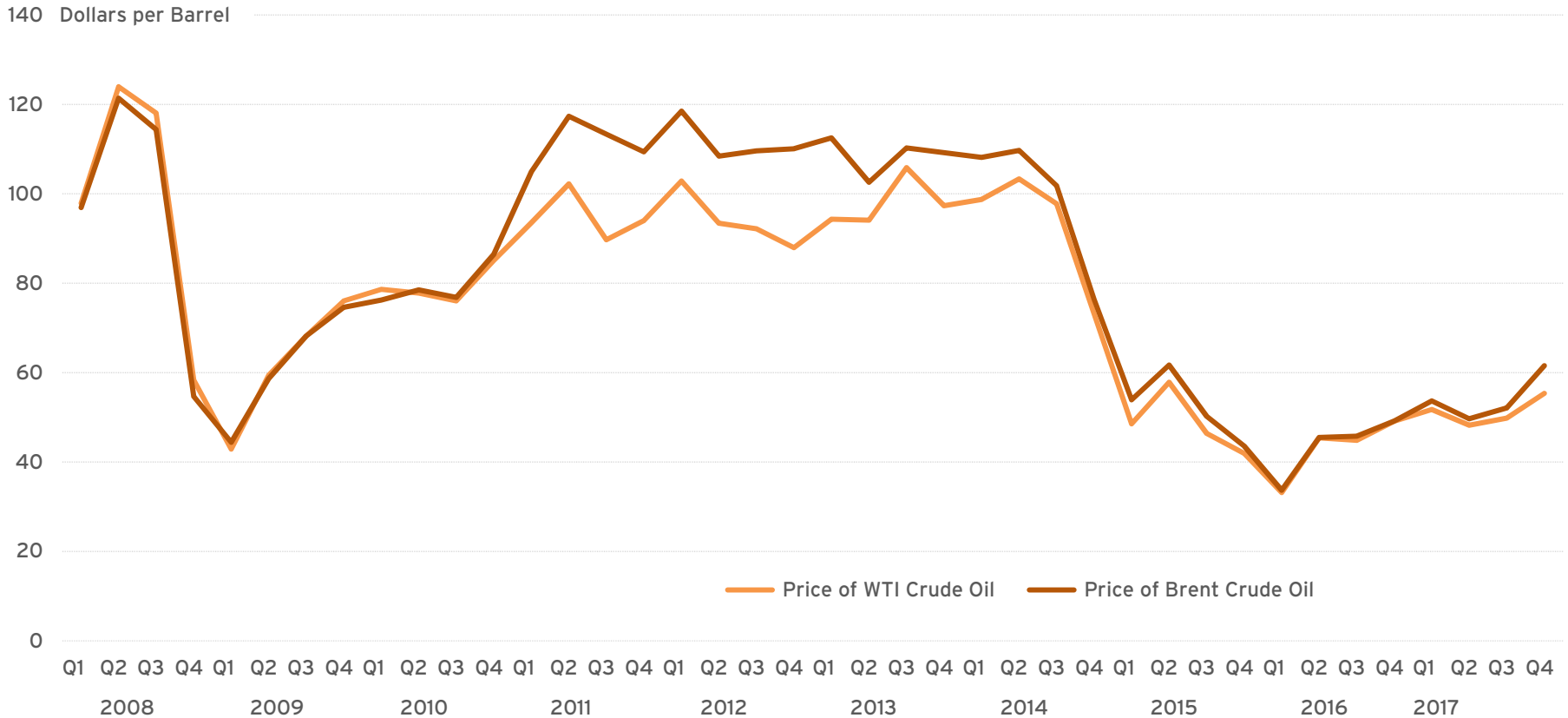
New light truck sales averaged 11.7 million units in Q4 2017, increasing by approximately 0.65 million units y/y. Light trucks now account for roughly 66% of new light-duty vehicle sales, a 5.9 percentage point increase y/y.



Source: SAFE analysis based on data from BEA

Brent and WTI Prices Continue to Spread

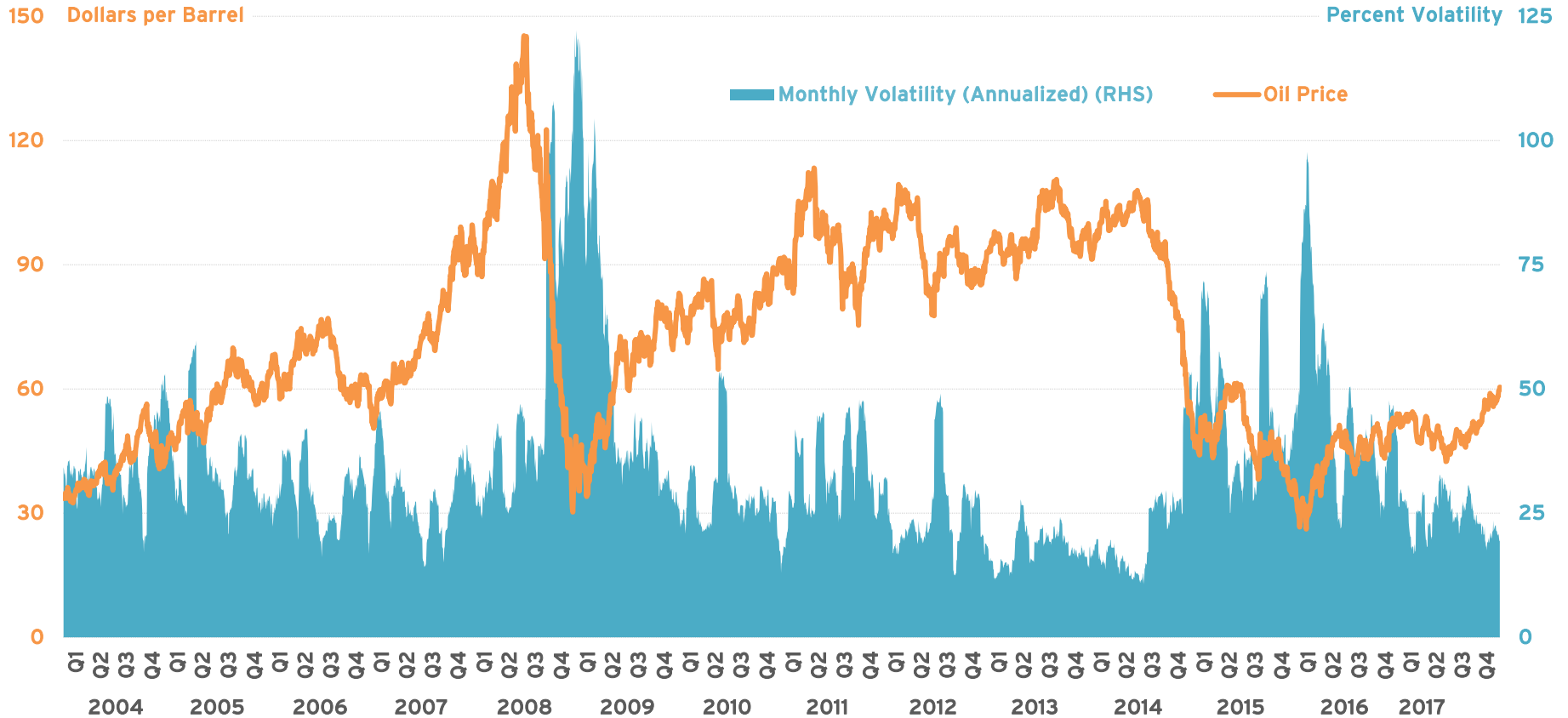
Oil and product prices saw moderate increases in Q4. Average December Brent was \$64.37/bbl and WTI was \$57.88/bbl. Relatively lower domestic prices have made U.S. crude oil more competitive in international markets, supporting record exports.



Source: SAFE analysis based on data from EIA

Oil Price Volatility Remains Low

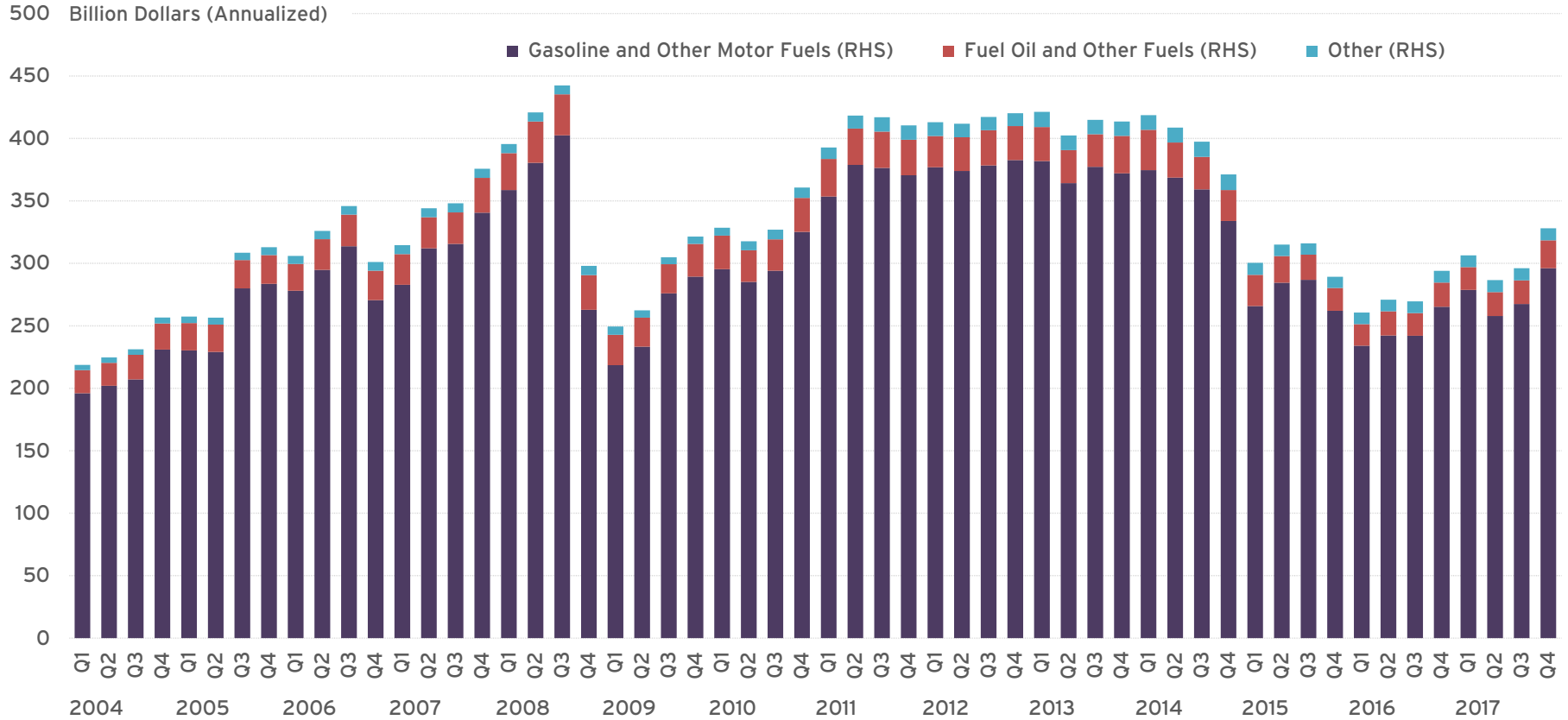
Oil price volatility was relatively low throughout 2017, averaging 25 percent for the year. Volatility across all asset classes has declined due to the end of quantitative easing. Thirty-day WTI crude oil volatility averaged 21% in Q4.



Source: SAFE analysis based on data from EIA

Household Gasoline Expenditures Rise

Household expenditures rose to their highest level since 2014 as consumers spent \$296 billion on gasoline and other petroleum products (+\$31 billion y/y and +\$30 billion q/q). Expenditures continue to rise following steady increases in U.S. gasoline prices.



Source: SAFE analysis based on data from EIA and BEA

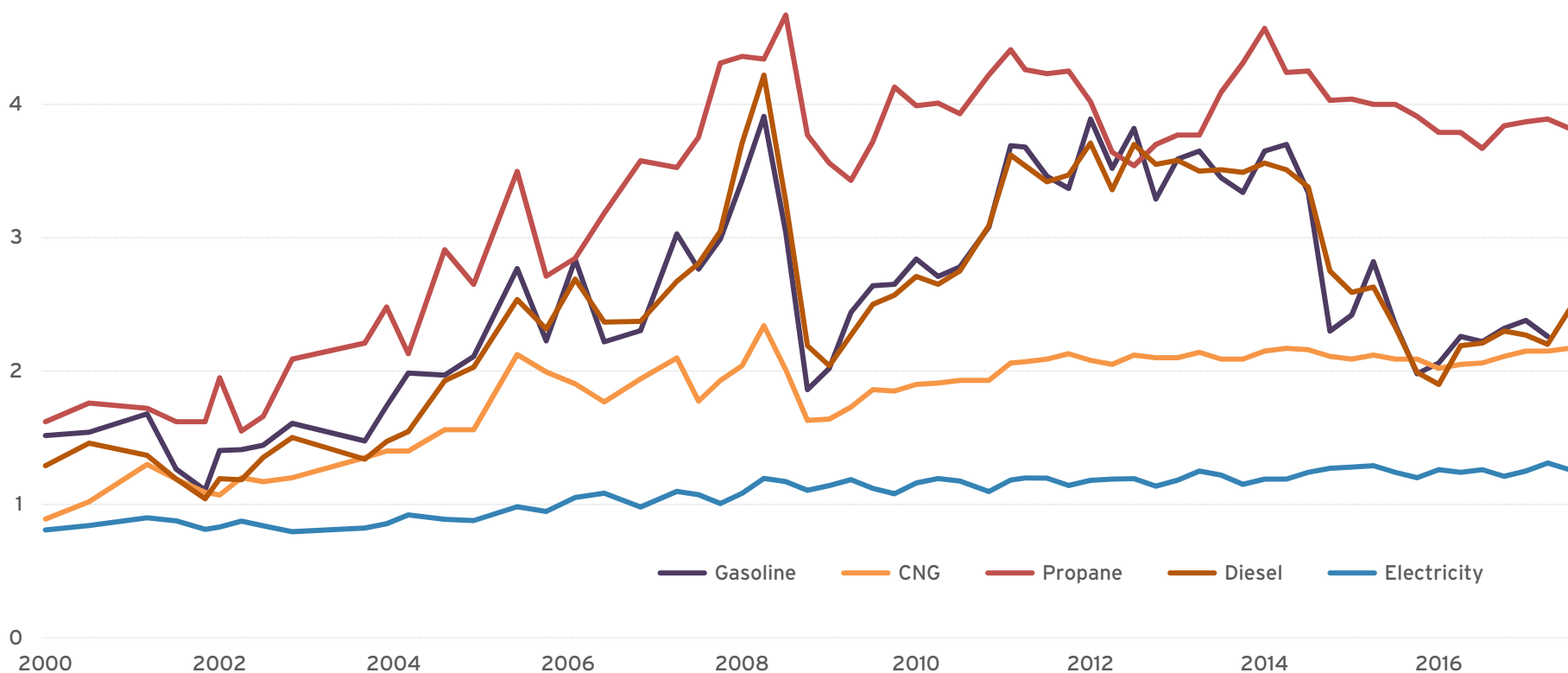
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Electricity and Natural Gas Prices Remain Stable

Liquid fuel prices have experienced substantial volatility since 2000. The prices of compressed natural gas (CNG) and electricity, however, have remained relatively stable during the same time period.

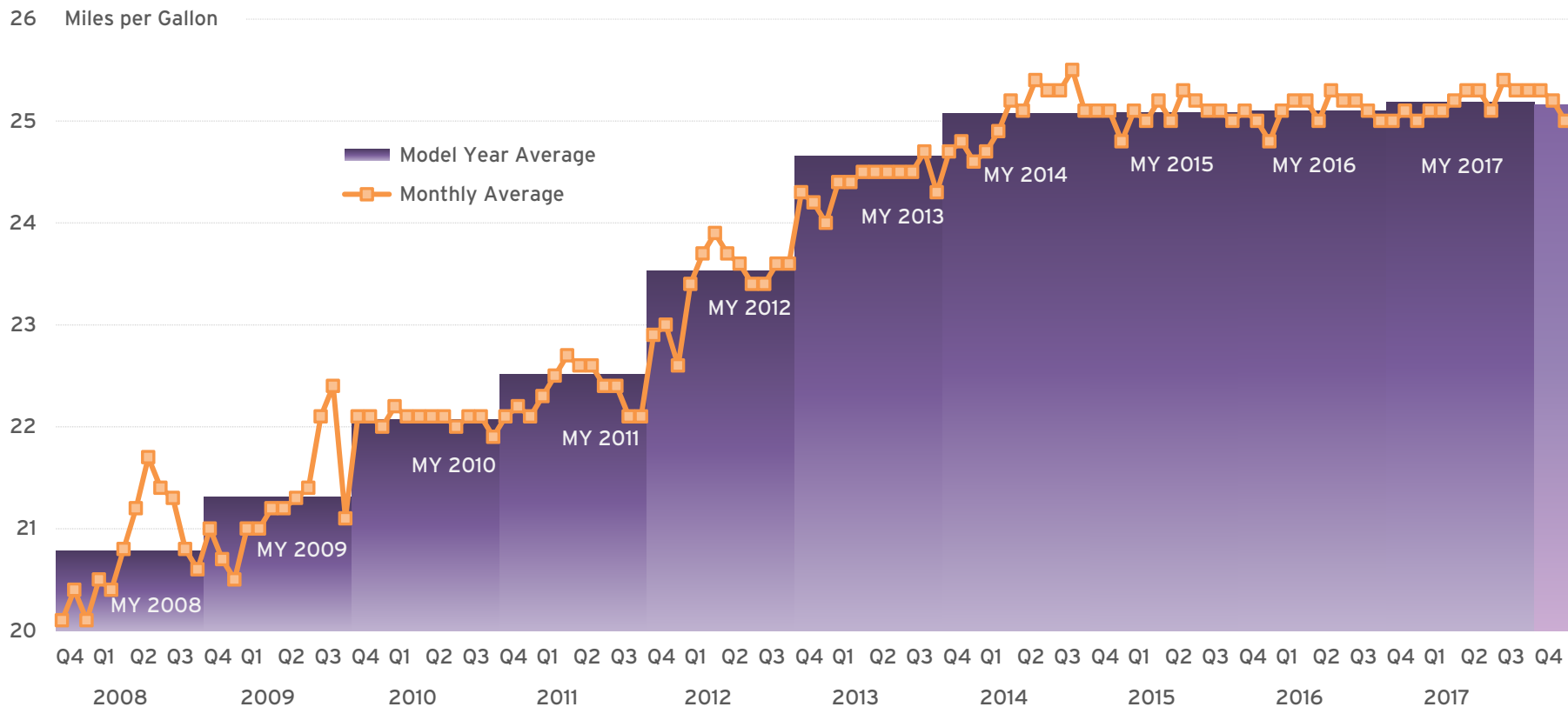
5 Dollars per Gasoline Gallon Equivalent



Source: SAFE analysis based on data from Clean Cities Alternative Fuel Price Reports

New Light-Duty Vehicle Fuel Economy Ratings Stable

The average fuel economy rating of new light-duty vehicles fell slightly in Q4 2017 to 25.2 mpg (-0.1 mpg q/q), continuing a two-year trend. MY 2018 fuel economy is 25.2 mpg, approximately 12% higher than 2010 levels.



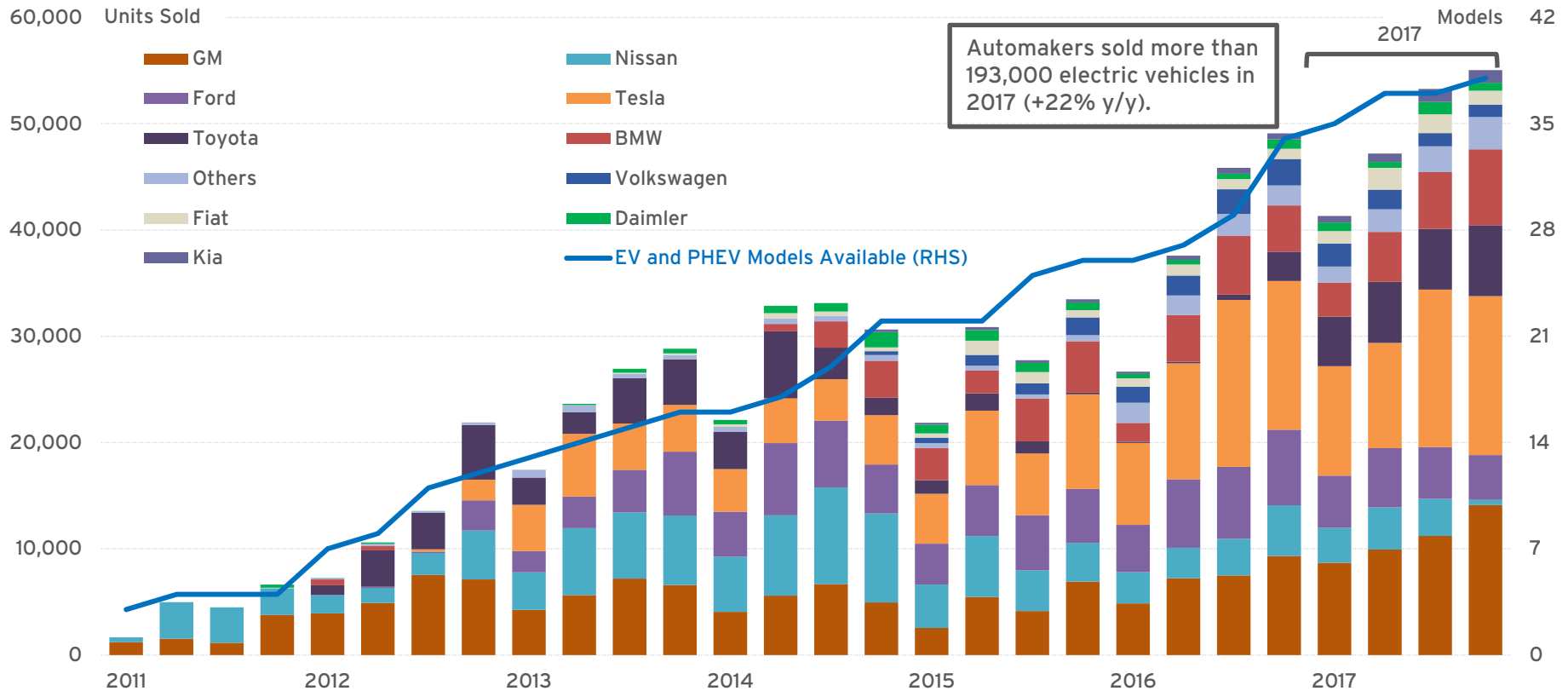
Note: Average sales-weighted fuel-economy rating of purchased new light-duty vehicles.

Source: SAFE analysis based on data from Michael Sivak and Brandon Schoettle, University of Michigan Transportation Research Institute



Plug-in Electric Vehicle Sales Reach New Heights

Over 53,000 plug-in electric vehicles were sold in Q4 2017 (+8.9% y/y and +0.6% q/q). The outlook for EVs in 2018 is positive because of the extension of the \$7,500 federal tax credit, competitive pricing among EV models, improvements in range, and rising gasoline costs.

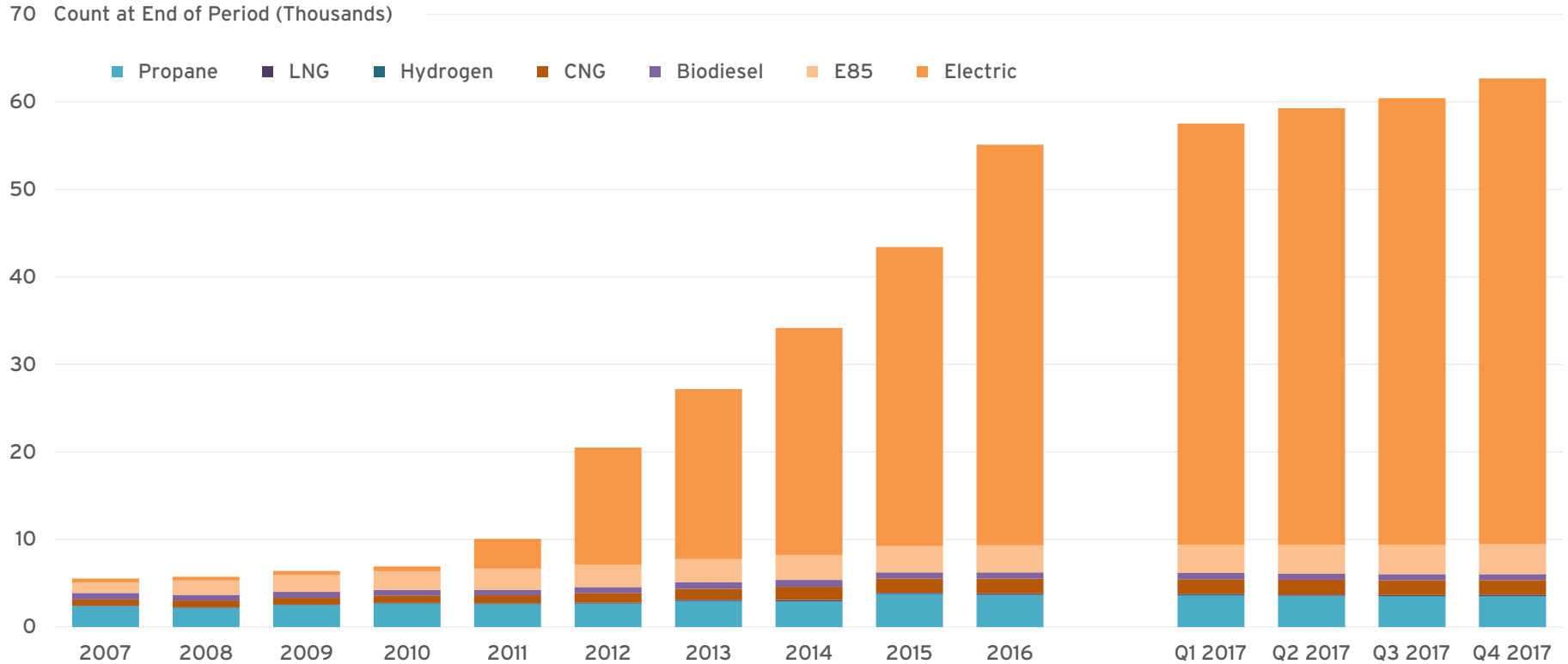


Source: SAFE analysis based on data from HybridCars.com



Advanced Fueling Stations Continue to Climb

The number of advanced fueling stations nationwide increased 131% between 2013 and 2017, a net addition of approximately 35,600 stations. The vast majority of these new additions (95%) were for electric charging.



Note: Starting in 2011, electric charge equipment was counted by the plug rather than by the geographic location. This is different than other fuels, which only count the geographic location regardless of how many dispensers or nozzles are on site.

Source: Alternative Fuels Data Center

About, Links, and Contact

ABOUT

Securing America's Future Energy (SAFE) is an action-oriented, nonpartisan organization that aims to reduce America's dependence on oil. Near-total dependence on petroleum in the transportation sector undermines the nation's economic and national security, and constrains U.S. foreign policy. To combat these threats, SAFE advocates for expanded domestic production of U.S. oil and gas resources, continued improvements in vehicle fuel efficiency, and transportation sector innovations including electric vehicles, natural gas trucks, and autonomous vehicles.

SAFE's Energy Security Fact Pack, launched in 2014, provides a data-driven overview of the latest trends in U.S. energy security, including domestic and global oil production and consumption, oil market dynamics, energy prices, consumer spending on oil, fuel efficiency, and advanced fuel vehicles.

LINKS

SAFE: www.secureenergy.org

Electrification Coalition: www.electrificationcoalition.org

The Fuse: www.energyfuse.org



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