

How Does Saudi Arabia's Recent Energy Performance Compare With Other G20 Countries?

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Instant Insight

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Whilst we make every effort to ensure that the information provided is accurate at the time of publication, we have updated the sections below:

- 1) Page 3, Context.
- 2) Page 3, New observations, ***point number 2.***
- 3) Page 7, What does our research explain?
- 4) Page 7, Conclusion.
- 5) Page 8, References, added reference 3.
- 6) Page 8, About the Authors, added Nicholas Howarth biography.

About KAPSARC

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Introduction

The 68th annual edition of the BP Statistical Review, released recently, is a comprehensive account and analysis of global energy data. Saudi Arabia will be hosting the G20 summit in 2020, and the release of BP's annual compilation provides a good opportunity to benchmark the Kingdom against its G20 peers. The G20 summit is an international economic forum for the governments and central bank governors from 19 countries and the European Union. Member countries are Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, the United Kingdom, and the United States.

Context

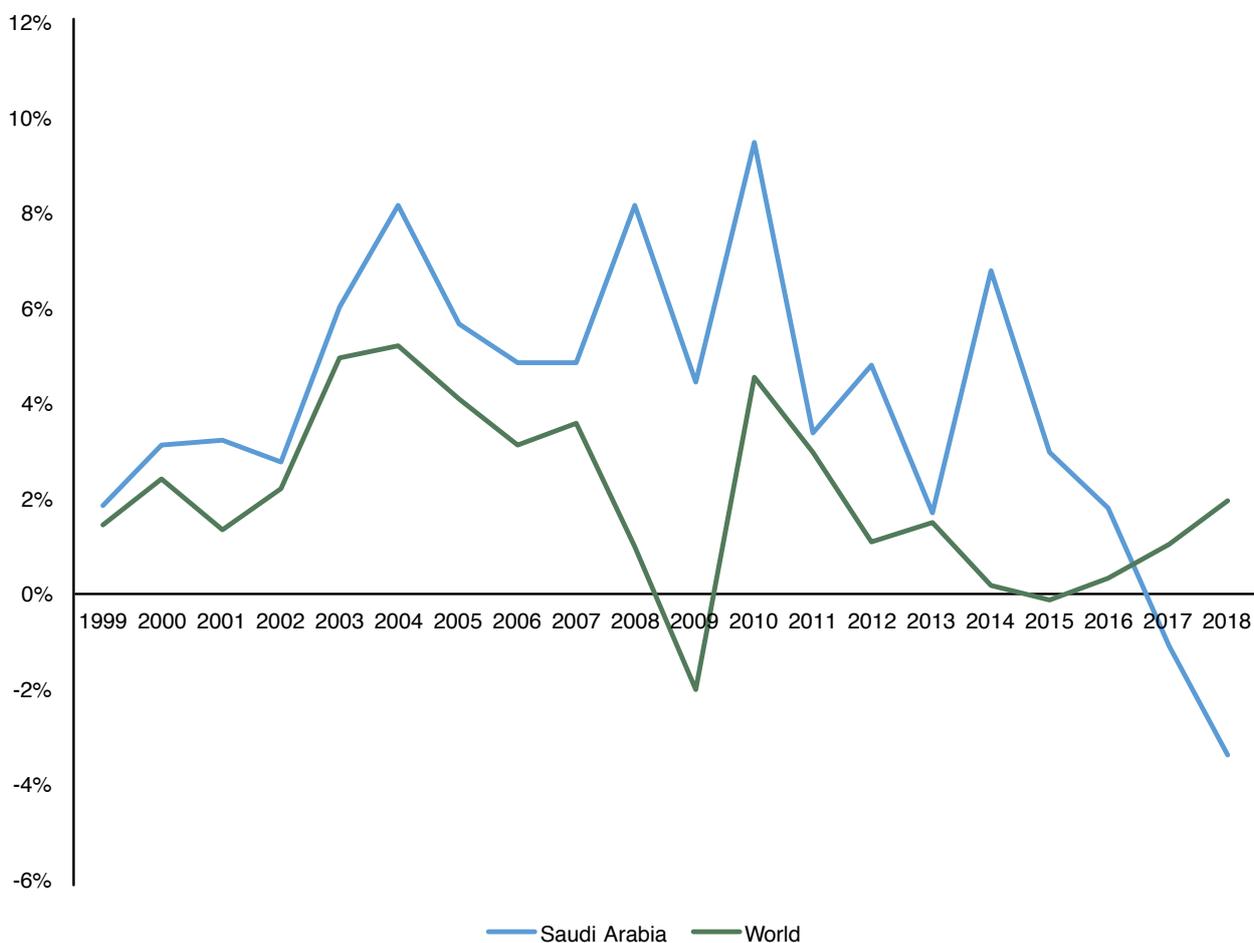
Global carbon emissions seemed to stabilize in 2014-2016; however, in 2017 global emissions picked up once more, rising above 2% growth in 2018. Since 2010, increases in Saudi Arabia's carbon emissions have been slowing, and in 2018 the Kingdom's emissions fell significantly for the first time in recent history. This transition has been driven by a combination of energy efficiency programs in transportation, industry, and buildings, as well as a deliberate shift from very low administered energy prices toward prices more reflective of international benchmarks, especially in gasoline and electricity. The data suggests the Kingdom is sustaining momentum on reducing carbon emissions, even as emissions growth picks up globally.

New observations

The data contained in BP's Statistical Review allows us to make the following observations:

- 1) Saudi Arabia's emissions growth is below the world average for the first time since BP started recording these statistics (Figure 1). After decades of increased rates, the Kingdom's carbon emissions decreased by -1.1% in 2017 and -3.4% in 2018, while global carbon emissions increased by 1% and 2%, respectively. From 2015 to 2018, Saudi Arabia's carbon emissions decreased by -2.7%. This drop in emissions cannot be attributed to a lack of economic growth since, as shown Figure 3, during this period the Kingdom's gross domestic product (GDP) grew by 3.1%. Nor can falling emissions be attributed to a slowdown in population growth, as it increased by 6.3% during this time.
- 2) The Kingdom's energy price reform and efficiency policies seem to be working. While the full impacts of these programs will become apparent only over many years, the data from 2010-2014 shows a volatile but improving pattern of the Kingdom's domestic energy consumption that accelerated across 2015-2018. The data suggests an initial decoupling of domestic energy consumption from economic growth and population growth. While GDP grew between 2015 and 2018, primary energy consumption stagnated (0.1%), and the domestic consumption of oil dropped (-6.2%).

Figure 1: The rapid decline in Saudi Arabia’s carbon emissions (annual growth).



Source: BP Statistical Review of World Energy 2019.

The use of oil to generate electricity in Saudi Arabia declined from 2015-2018, with annual changes of -5.1%, -2.8% and -4.0%. The cumulative decline of this period was -11.4%. The share of oil used in electricity generation fell to 39.2% in 2018, from 47.3% in 2015.

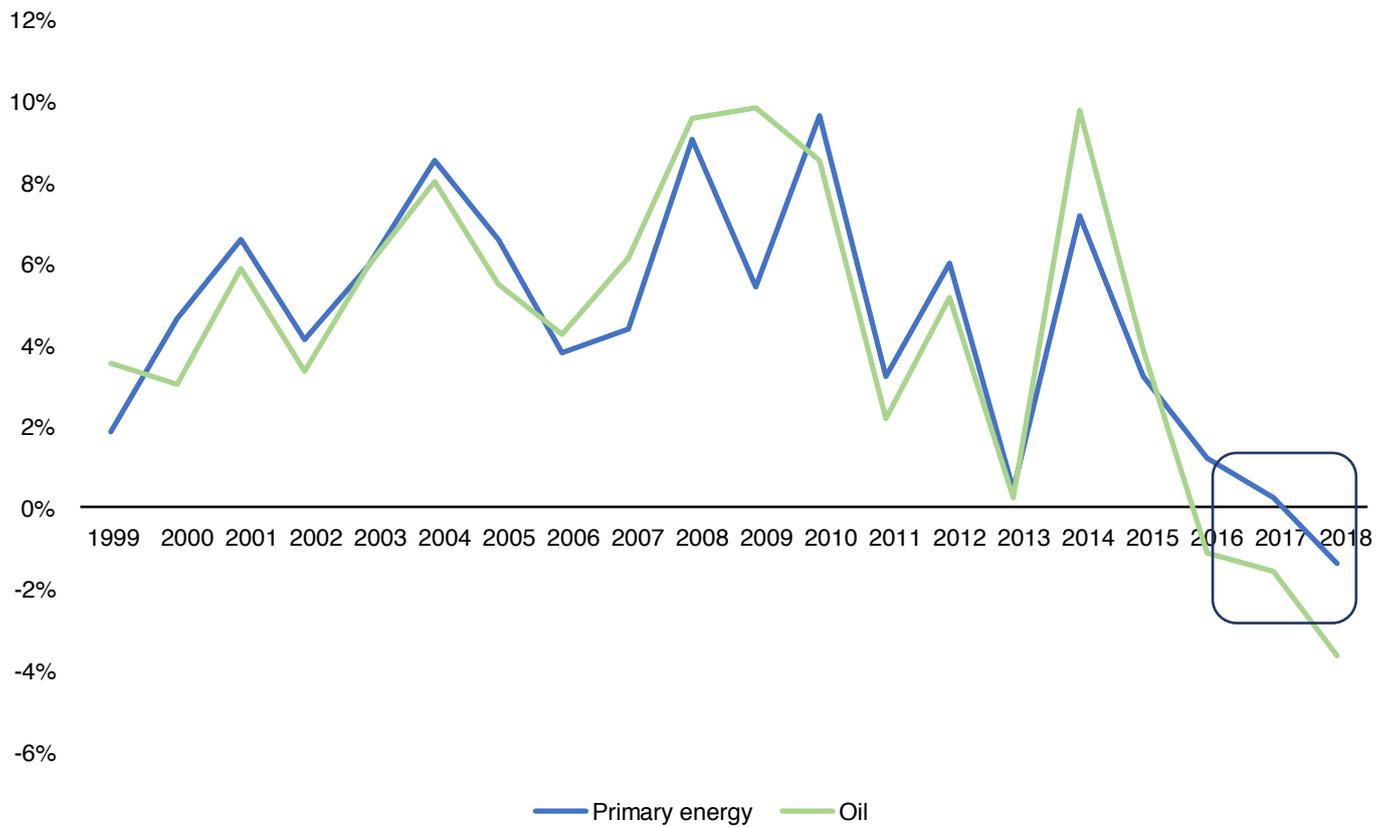
3) Comparison with other G20 countries (2015-2018)

BP’s statistics allow us to compare Saudi Arabia’s energy performance with other G20 countries and the rest of the world.

- As previously mentioned, the Kingdom’s carbon emissions declined by -2.7%, while the G20 average grew by 2.3%. The global average carbon emissions rate grew by 3.3% in the same period.
- The world’s primary energy consumption grew by 6.3% over 2015-2018. The primary energy use of Saudi Arabia fell, while the G20 average grew by almost 5.9%.

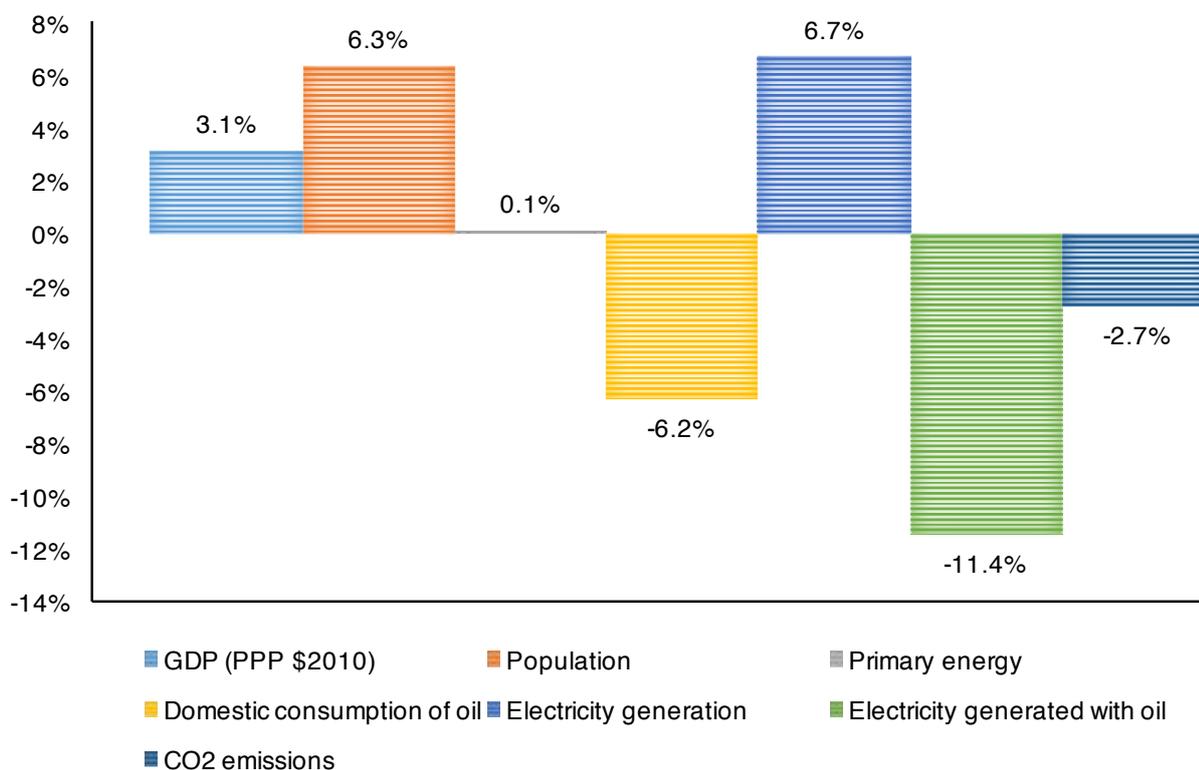
- Global and G20 oil consumption grew almost at the same rate (4.4% and 4.3% respectively), while, as mentioned earlier, the Kingdom's oil consumption dropped -6.2%.
- Electricity generation in the Kingdom grew but at a slower rate (6.7%) than the G20 average (10%) and the global average (9.6%).

Figure 2: Annual growth of primary energy and oil used for electricity generation in Saudi Arabia.



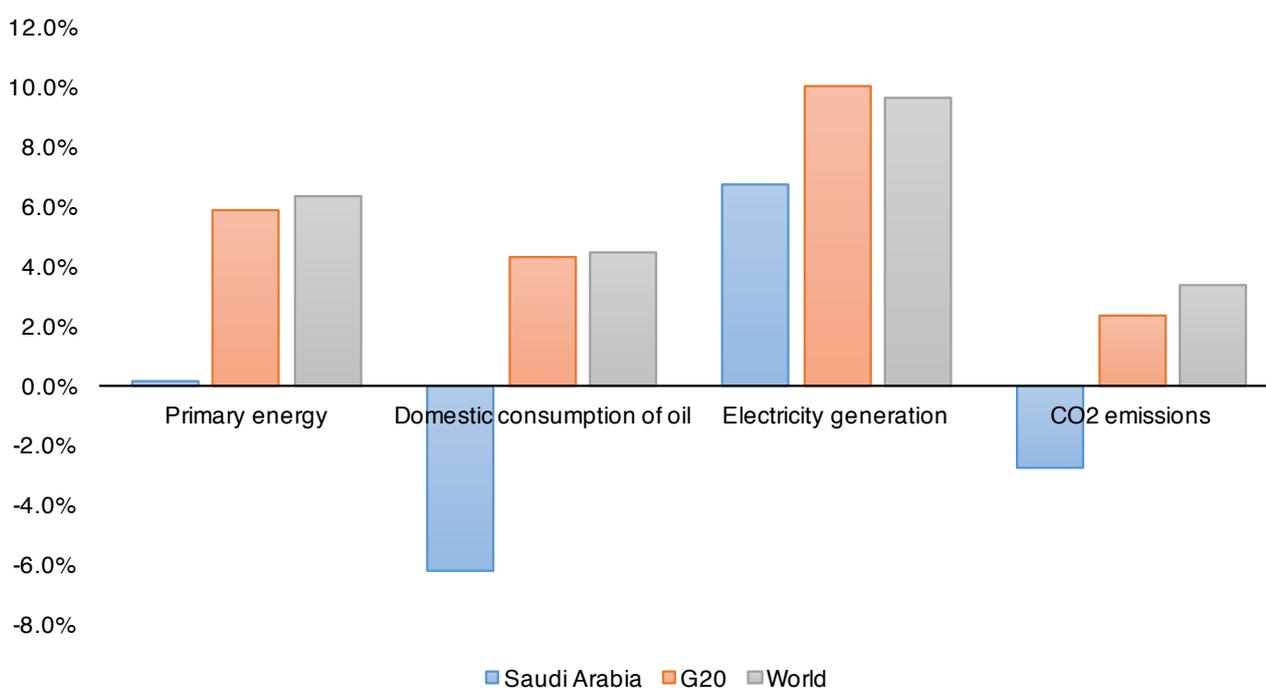
Source: BP Statistical Review of World Energy 2019.

Figure 3: Cumulative growth of key variables in Saudi Arabia.



Source: BP Statistical Review of World Energy 2019.

Figure 4: Growth rates of key variables for Saudi Arabia, the G20 and the world, 2015-2018.



Source: BP Statistical Review of World Energy 2019.

What does our research explain?

The results reported in this insight concur with KAPSARC's own research, which anticipated the shifts that are starting to emerge in the Kingdom's energy use, with far-reaching economic effects that go well beyond those that can be inferred from the BP Statistical Review.

For example, KAPSARC researchers Sheldon and Dua (2019) show that fuel economy standards introduced by Saudi regulators, along with changing consumer preferences and product offerings, accounted for 58% of the new vehicle fleet efficiency improvement between 2014 and 2016, while the increase in gasoline prices accounted for the remaining 42% over the same period.

The Kingdom's energy price reform and energy efficiency programs not only enable the country's efficient use of energy, but also allow the nation to increase oil revenues by exporting oil which would otherwise be used domestically. In the long run, Saudi Arabia could reduce domestic oil consumption by around 724,000 barrels per day, which a 2018 KAPSARC paper found would increase welfare by an amount equivalent to an aggregate private consumption increase of \$2.6 billion, and reduce carbon dioxide emissions by 97 million tonnes a year (Blazquez et al. 2018).

The environmental gains observed in these statistics are also consistent with findings by KAPSARC researchers Matar and Anwer (2017), who argue that the price reform provides significant energy and financial savings and a natural decarbonization of the power sector. They show that when prices are set at the long-run marginal cost of delivering electricity, the generation mix switches from oil toward natural gas and solar photovoltaics. This is already taking place.

Conclusion

The trends evident in the latest edition of BP's Statistical Review show promising developments in the Kingdom following implementation of its energy efficiency programs and energy price reforms.

- The Kingdom raised the price of 91-octane gasoline by 20% in 2015, by about 67% in 2016, and by approximately 82% in 2018. In 2016 and 2018, the Kingdom also raised electricity prices to final consumers, in some cases more than doubling them. Energy price reform continues as a key initiative aimed at fostering rational consumption via a gradual removal of energy subsidies, with proper attention given to the social safety net.
- Beginning in 2010 with the formation of the Saudi Arabian Energy Efficiency Center (SEEC), the Kingdom has introduced significant regulations to improve energy efficiency. Today, the Kingdom has around 80 energy efficiency initiatives targeting major energy consuming sectors, and these initiatives played a strong role in the trends evident in the BP Statistical Review.
 - o For buildings, this has included a stronger code and enforcement activities, particularly for air conditioning, where the standard has improved efficiency of new units in the market by 57% since 2012.

- o For industry, energy efficiency plans have been developed for all major energy consumers, focusing on petrochemical, steel and cement companies, which together account for around 80% of industrial energy consumption.
- o For transportation, corporate average fuel economy (CAFE) standards for light duty vehicles improved the efficiency of the new fleet by approximately 10% between 2016 and 2018. Consumer disclosure requirements, including fuel efficiency labels, are required for all new cars. The new regulations are contributing significantly to reductions in fuel consumption.

Policies induce changes in the behavior of economic agents, but these changes take time to be noticed at the macroeconomic level. Awareness of energy reforms has been supported through a major communications drive across both social media and traditional advertising. While it may still be too early to judge all of the effects, the Kingdom's energy price and regulatory reforms are clearly an important driver behind the recent improvements in Saudi Arabia's energy and environmental landscape.

References

Blazquez, Jorge, Baltasar Manzano, Lester C. Hunt, and Axel Pierru. 2018. "The Value of Saving Oil in Saudi Arabia." KAPSARC Discussion Papers ks-2018-dp30.

Matar, Walid, and Murad Anwer. 2017. "Jointly Reforming the Prices of Industrial Fuels and Residential Electricity in Saudi Arabia." *Energy Policy* 109:747-756.

Sheldon, Tamara, and Rubal Dua. 2019. "Drivers of New Light-Duty Vehicle Fleet Fuel Economy in Saudi Arabia." KAPSARC Discussion Papers ks-2019-dp55.

About the Authors

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Baltasar has been involved in economic research for the last three decades at Universidad de Vigo, with a particular focus on energy. He also served as an economic adviser of the President of Galicia from 2005 to 2009. He has been a visiting researcher at KAPSARC since 2014.

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Nicholas is a research fellow at KAPSARC and an applied economist specializing in energy, technological change and climate change. He obtained his D.Phil. in Economic Geography and M.Sc. in Environmental Change and Management from the University of Oxford and has a Bachelor of Economics with honors from the University of Adelaide, South Australia.



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