

# A Look Back on Saudi Fossil Fuel Incentives in the Last Decade

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**Instant Insight**

March 10, 2020

KS--2020-II08

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The Joint Organisations Data Initiative (JODI) and the Saudi Electricity Company (SEC) have just released energy use data for 2019. This insight provides an up-to-date estimation of how fossil fuel incentives have changed in 2019 compared with 2009.

The government of Saudi Arabia administers the country's energy prices. It began reconsidering those energy prices in the first half of the 2010s. At that time, fuel prices for local utilities and industry had not changed in nominal terms since the turn of the millennium. Arab Light crude oil, natural gas, industrial diesel, and fuel oil were offered to public utilities<sup>1</sup> at 4.24 dollars per barrel (\$/b),<sup>2</sup> 0.75 \$ per million British thermal units (MMBtu), 3.60 \$/b, and 2.08 \$/b, respectively. Low energy prices resulted in the inefficient use of oil for power generation, and low electricity generation costs that justified low electricity tariffs. Transport fuel prices had been 0.12 \$/liter for gasoline and 0.07 \$/liter for diesel until the end of 2015. In 2014, KAPSARC began contributing analyses<sup>3</sup> to the energy price reform discussion.

The government initiated the first step of its energy price reform in 2016, following the fall in oil prices in 2014 and 2015. The nominal prices of Arab Light, natural gas, industrial diesel, and fuel oil were subsequently raised<sup>4</sup> to 6.35 \$/b, 1.25 \$/MMBtu, 14.00 \$/b, and 3.80 \$/b. Of course, there were additional benefits that motivated the reform, namely improved economic and energy efficiency, which should lead to lower per-capita energy use and lower greenhouse gas emissions.

In 2018, the lowest electricity tariff for households was raised to 3.6 times its 2017 value. The average tariff since has been close to being cost-reflective. Under the reform, the transport diesel price became 0.13 \$/liter, from 0.07 \$/liter previously, and gasoline prices were formulated to track an international benchmark on a quarterly basis. The linkage between domestic and global gasoline prices was tightened in February 2020. Domestic gasoline prices are presently revised monthly, thus improving the economic efficiency with which local short-run demand and supply react. Table 1 summarizes the price changes for intermediate and end-use fuels in Saudi Arabia.

The latest energy price reforms and fiscal policy changes, like the government's introduction of a value-added tax in 2018, gave rise to the Citizen's Account Program, a cash transfer program to help low- and middle-income families, and a cost-of-living allowance. These direct transfers are only given to Saudi citizens, unlike past incentive schemes, and vary by the beneficiary's income. There is an income cutoff point after which no direct transfers are made. The Citizen's Account Program distributed<sup>5</sup> \$7.28 billion in 2018 and \$8.08 billion in 2019.

**Table 1.** Fuel prices in Saudi Arabia in 2015 and 2020.

Fuel		Price (in nominal terms)	
		2015	2020
Crude oil	Arab Light	4.24 \$/b	6.35 \$/b
	Arab Heavy	2.67 \$/b	4.40 \$/b
Gasoline		0.12 \$/L for 91-octane gasoline	Value matches international markets but varies monthly
Diesel	Industrial	3.60 \$/b for power generation, 10.6 \$/b for other industrial uses	14.00 \$/b
	Transport	0.07 \$/L	0.13 \$/L
Fuel oil (360 cSt)		2.08 \$/b	3.80 \$/b
Jet fuel		18.44 \$/b	Value matches international markets but varies monthly
Natural gas (methane)		0.75 \$/MMBtu	1.25 \$/MMBtu
Ethane		0.75 \$/MMBtu	1.75 \$/MMBtu

Sources: KAPSARC data portal; ECRA; Council of Ministers Decision 95; Saudi Arabia's WTO accession document.

Note: cSt = centistoke; b = barrel; L = liter; MMBtu = million British thermal units

## The effects of existing policy on fossil fuel incentives since 2009

The International Monetary Fund (IMF) differentiates energy incentives between pre- and post-tax (Coady et al. 2019). It defines pre-tax incentives as the difference between what consumers pay for a good and the corresponding opportunity cost of providing the good. The opportunity cost is the revenue that could have been attained by selling the good on the international market. Hypothetically, incentive removal may cause additional exports and drive prices down.<sup>6</sup> A post-tax incentive adds the taxes needed to reflect externality costs to the supply cost of the good. Examples of externality costs include climate change costs, traffic congestion costs, and pollutant costs. For this analysis, the ex-post international prices of oil in 2009 and 2019 are used to estimate the pre-tax incentive change.

The energy sources we considered were crude oil, various oil products, natural gas, ethane, and electricity. Fuel use data are primarily acquired from the JODI (2020) database. They cover fuel consumption for all of 2019. The international prices of oil are fixed at their 2009 levels, allowing us to observe how energy incentives have changed relative to 2009, without the bias of changing real market prices over time. Since Saudi natural gas is not traded internationally, its reference cost for the incentive calculation is chosen as its marginal cost of production. The cost of producing non-associated natural gas is 4 \$/MMBtu and 2 \$/MMBtu to transport it to the consumer (Alyousef and Stevens 2011). The 2009 total marginal cost is set at 6 \$/MMBtu.

The Kingdom's fossil fuel incentives in 2009 totaled \$51.43 billion in 2009 dollars. The higher nominal prices in 2019 are dampened once deflated to 2009 dollars. When that is combined with the higher fuel demand in 2019, the overall incentive rises by \$3.13 billion between 2009 and 2019 in 2009 dollars. Incentives for natural gas and ethane accounted for the total increase, whereas oil and electricity incentives were lower in 2019 than in 2009. However, given the economy grew between 2009 and 2019, fossil fuel incentives were less of a share of Saudi Arabia's real output in 2019 than in 2009. Table 2 separates the incentives by energy type and shows the share of the total fossil fuel incentive as a percentage of real gross domestic product (GDP).

**Table 2.** 2019 fossil fuel incentives in Saudi Arabia relative to 2009.

		2009	2019	
Incentive amount (billions of 2009 dollars)	<b>Crude oil (for direct use)</b>	9.17	8.76	
	<b>Gasoline<sup>7</sup></b>	7.20	3.56	
	<b>Diesel</b>	<b>Industry</b>	6.82	1.47
		<b>Transport</b>	6.55	8.95
	<b>Fuel oil</b>	4.69	10.22	
	<b>Kerosene-type jet fuel</b>	1.18	1.86	
	<b>Natural gas (methane)</b>	12.10	16.33	
	<b>Ethane</b>	2.95	3.80	
	<b>Electricity</b>	0.77	≈0.00	
	<i>Total</i>	<i>51.43</i>	<i>54.95</i>	
	Total fossil fuel Incentive as a share of real GDP (%)		10.6	8.1

Sources: Author's estimation using Table 1 sources; JODI (2020); Saudi Aramco (2014) for natural gas and ethane demand in 2009, and estimated for 2019 based on discussions with the Saudi Ministry of Energy; SAMA (2019) for real GDP in 2009 and the export price of Arab Light crude oil; GaStat (2020) for real GDP in 2019; SEC (2020) for total electricity use and average electricity tariff in 2019; ECRA (2010, 2018) for average electricity cost in 2017 and average electricity tariff in 2009; Alyousef and Stevens (2011), and the EIA for international oil prices other than crude oil.

Electricity in Saudi Arabia is almost exclusively generated by fossil fuels. To net out fuel incentives, which cause lower electricity generation costs, the incremental support for electricity is calculated as the average electricity price minus the average electricity (all-inclusive) cost-of-service multiplied by the quantity of electricity used. Table 2 uses the average electricity cost-of-service in 2017 from the Electricity and Co-Generation Regulatory Authority (ECRA) (2018), because fuel prices for the Saudi Electricity Company (SEC) and independent power (and water) producers have not changed, and the thermal efficiency of the capital stock has only slightly improved.

## Future energy policy considerations

The reforms have had positive effects on reducing excessive energy use. Their impact will still be felt over time as the long-run price response takes hold, including energy efficiency investment. Oil and gas are still being offered to utilities and industry at below market values, but some challenges stymie further energy price changes. Even with price-induced energy efficiency investment, the competitiveness of local industries is a major issue. For petrochemicals and fertilizers, rising natural gas production in the United States, and thus lower ethane and natural gas prices, is a concern for local policymakers. The regional competitiveness of the cement, aluminum, and steel industries has also garnered attention. Ensuring public acceptance without expanding government transfers is another issue for the government to overcome, especially when implementing cost-reflective electricity pricing and incorporating externality costs in the prices of transport fuels.

However, a number of mitigating circumstances are expected over the next 10 years. First, the Kingdom is planning to boost its natural gas production (SV2030 2017). Second, the costs of alternative energy technologies will likely continue to fall (IEA 2019a, 2019b). Matar and Shabaneh (2019) show that the domestic market-clearing, or unincentivized, price for natural gas should fall considerably by the end of this decade due to higher domestic supply. A lower market-clearing price for natural gas, coupled with lower alternative technology costs, would allow the government to remove the remaining oil incentive more easily. Indeed it is possible that at that point all oil and natural gas incentives could be removed.

## Endnotes

<sup>1</sup> The Saudi Electricity and Co-generation Regulatory Authority (ECRA) (2009).

<sup>2</sup> From 2009-2015, the average international real price of Arab Light crude oil was 74.30 2005 \$/b (SAMA 2019).

<sup>3</sup> For example, Matar et al. (2014, 2015), Atalla et al. (2017), Matar and Anwer (2017), and Matar (2017) highlight the benefits the Saudi energy economy would attain by reforming fuel prices.

<sup>4</sup> Council of Ministers Decision 95.

<sup>5</sup> Summing the monthly appropriations detailed on [portal.ca.gov.sa](http://portal.ca.gov.sa) and in media reports.

<sup>6</sup> This estimation uses ex-post international market prices.

<sup>7</sup> This estimation is based on the assumption that all gasoline sales are 91-octane.

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