

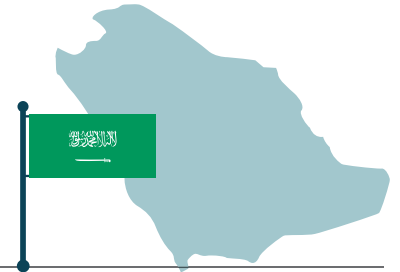


**BROWN TO GREEN:**

**2019**

**THE G20 TRANSITION TOWARDS A NET-ZERO EMISSIONS ECONOMY**

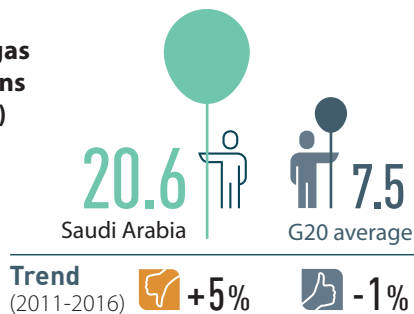
# SAUDI ARABIA



**Saudi Arabia's greenhouse gas (GHG) emissions are – per capita – almost three times the G20 average.**

Total GHG emissions (excl. land use) have tripled since 1990 and are projected to increase further.

**Greenhouse gas (GHG) emissions (incl. land use) per capita<sup>1</sup>**  
(tCO<sub>2</sub>e/capita)



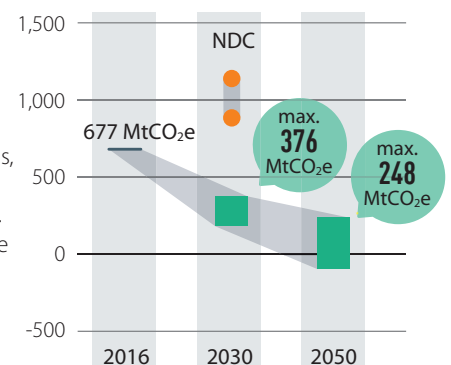
Data for 2016  
Source: CAT 2019;  
PRIMAP 2018;  
World Bank 2019



**Saudi Arabia is not on track for a 1.5°C world.**

Saudi Arabia's fair-share range is below 376 MtCO<sub>2</sub>e by 2030 and below 248 MtCO<sub>2</sub>e by 2050. Under Saudi Arabia's 2030 NDC target, emissions would only be limited to 861-1,105 MtCO<sub>2</sub>e. 1.5°C-compatibility can be achieved via strong domestic emissions reductions, supplemented with contributions to global emissions-reduction efforts. All figures are drawn from the Climate Action Tracker and exclude land use.

**1.5°C compatible pathway<sup>2</sup>**  
(MtCO<sub>2</sub>e/year)



Source: CAT 2019

## Recent developments<sup>3</sup>



In 2019, Saudi Arabia raised its renewable energy target from 9.5 GW in 2023 to 58.7 GW by 2030.



At the UN climate talks in Bonn 2019, Saudi Arabia blocked acceptance of the IPCC report on 1.5°C warming.

## Key opportunities for enhancing climate ambition<sup>3</sup>

Transport emissions per capita in Saudi Arabia are more than double the G20 average and continue to rise

→ **Phase out fossil fuel cars by 2035.**



**#1**

Fossil fuels make up 100% of Saudi Arabia's electricity mix

→ **Develop a long-term strategy for renewable energy that leads to net CO<sub>2</sub> emissions in the power sector by 2050.**



**#2**

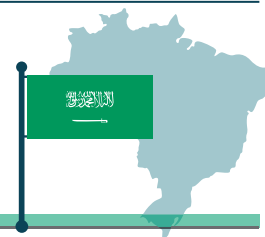
Saudi Arabia provided subsidies of US\$44 billion for fossil fuel in 2017

→ **Conduct a peer review, together with another G20 country, and develop a strategy to phase out subsidies by 2030.**



**#3**

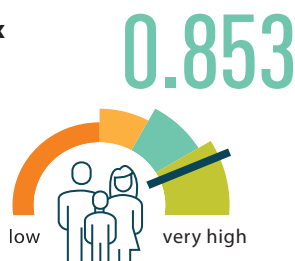
# SAUDI ARABIA – SOCIO-ECONOMIC CONTEXT



## Human Development Index

The Human Development Index reflects life expectancy, level of education, and per capita income. Saudi Arabia ranks among the highest countries.

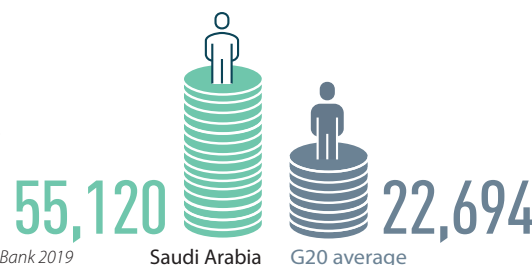
Data for 2017 | Source: UNDP 2018



## Gross Domestic Product (GDP) per capita

(PPP US\$ const. 2018, international)

Data for 2018 | Source: World Bank 2019

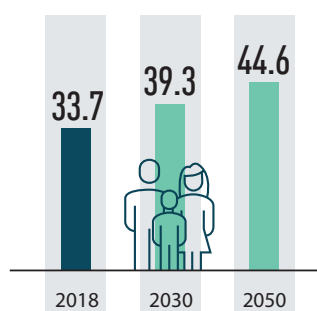


## Population projections

(millions)

The World Bank expects Saudi Arabia's population to increase by about 34% by 2050.

Source: World Bank 2019

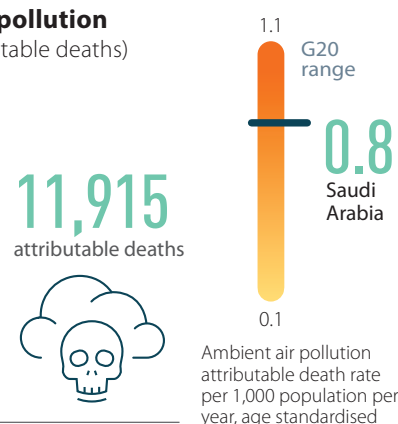


## Death through ambient air pollution

(total ambient air pollution attributable deaths)

Almost 12,000 people die in Saudi Arabia every year as a result of outdoor air pollution, due to stroke, heart disease, lung cancer and chronic respiratory diseases. Compared to total population, this is one of the highest levels in the G20.

Data for 2016  
Source: World Health Organization 2018



# JUST TRANSITION<sup>3</sup>

Oil and gas have historically contributed more than half of Saudi Arabia's nominal GDP. The country's NDC prioritises diversifying its economy away from its "heavy reliance on income generated from a single resource".

The 'Saudi Vision 2030' was unveiled in 2016, calling for raising the share of non-oil exports from 16% to 50% of export value by 2030, as well as expanding the role of renewable energy in the Saudi energy system and localising the renewable energy and industrial equipment sectors. Some of the more ambitious goals of the Vision were revised in 2017.

Potential effects on workers and communities in the oil and gas sector are not clear, with limited evidence of public discourse on just transitions in Saudi Arabia. However, the Vision had aimed for creating 1.2 million private sector jobs by 2020, and reducing unemployment from 11.6% to 9%. More recently, at the Bangkok Climate Conference 2018, Saudi Arabia described a just transition as "central to their ecological future".



## Legend for all country profiles

### Trends

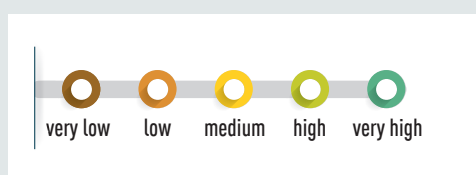


The trends show developments over the past five years for which data are available.

The thumbs indicate assessment from a climate protection perspective.

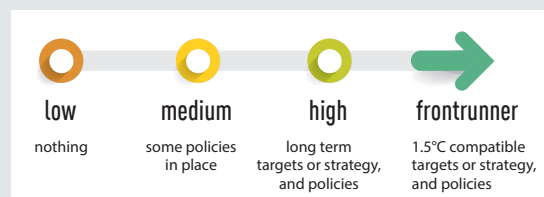
## Decarbonisation Ratings<sup>4</sup>

These ratings assess a country's performance compared to other G20 countries. A high scoring reflects a relatively good effort from a climate protection perspective but is not necessarily 1.5°C compatible.



## Policy Ratings<sup>5</sup>

The policy ratings evaluate a selection of policies that are essential pre-conditions for the longer-term transformation required to meet the 1.5°C limit.



For more information see the Annex and Technical Note

## MITIGATION BIG PICTURE



Saudi Arabia's GHG emissions have tripled (1990-2016) and the government's climate targets are not in line with a 1.5°C pathway.

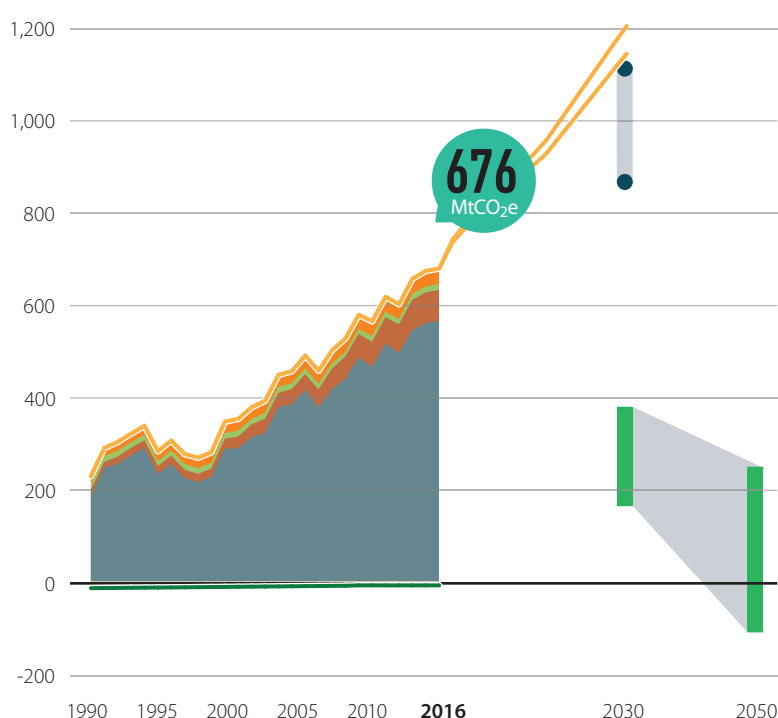
In 2030, global GHG emissions need to be 45% below 2010 levels and reach net zero by 2070.

1.5°C<sup>6</sup>

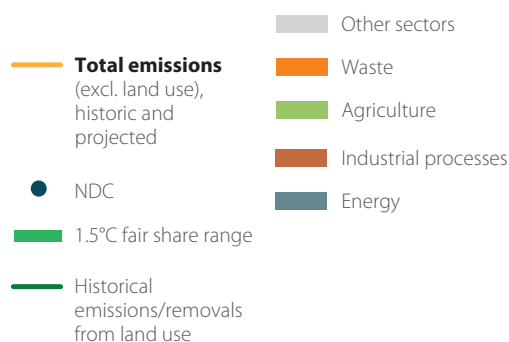
Source: IPCC SR1.5 2018

Total GHG emissions across sectors<sup>2</sup>

MtCO<sub>2</sub>e/year



## GHG emissions by sector



Saudi Arabia's emissions (excl. land use) tripled between 1990 and 2016 and are projected to continue growing until at least 2030. Saudi Arabia is on track to meet its NDC and may overachieve it if planned policies are implemented, indicating significant potential for the government to scale up its climate action and strengthen its NDC. Much greater emissions reductions will be required to become 1.5°C compatible.

Source: PRIMAP 2018; CAT 2019

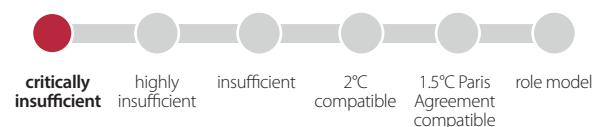
## Nationally-determined contribution (NDC): Mitigation

<b>Targets</b>	Seeking to achieve mitigation co-benefits ambition of up to 130 million tons of CO <sub>2</sub> e avoided by 2030 annually through contributions to economic diversification and adaptation
<b>Actions</b>	Actions specified (sectors: energy, industry, buildings, transport)

Source: UNFCCC, NDC of respective country

## Long-term strategy (LTS) to be submitted to the UNFCCC by 2020

<b>Status</b>	No information
<b>2050 target</b>	–
<b>Interim steps</b>	–
<b>Sectoral targets</b>	–

Climate action tracker (CAT) evaluation of NDC<sup>2</sup>

Source: CAT 2019

Fossil fuels still make up 100% of Saudi Arabia's energy mix (including power, heat, transport fuels, etc). The carbon intensity of the mix has not changed over the years.

Source: UNFCCC, LTS of respective country

## MITIGATION ENERGY



## SAUDI ARABIA

**!** Fossil fuels still make up 100% of Saudi Arabia's energy mix (including power, heat, transport fuels, etc). The carbon intensity of the mix has not changed over the years.

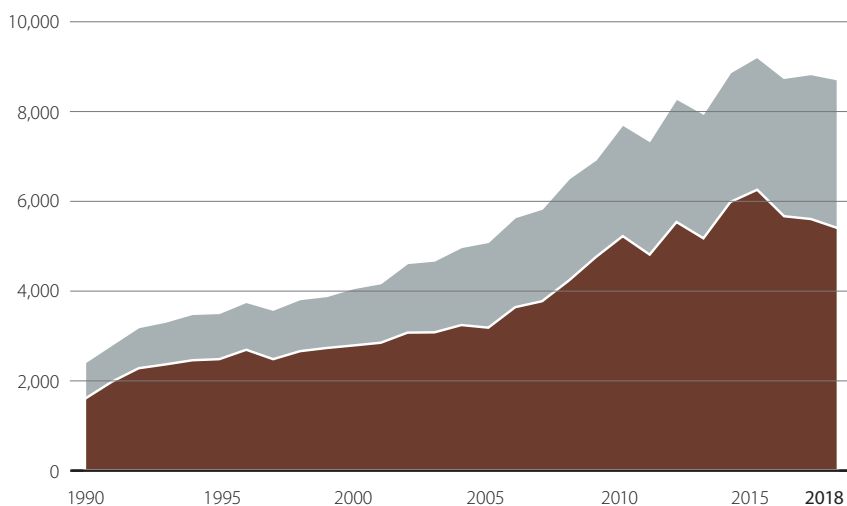
The share of fossil fuels globally needs to fall to 67% of global total primary energy by 2030 and to 33% by 2050 and to substantially lower levels without Carbon Capture and Storage.

**1.5°C**<sup>6</sup>

Source: IPCC SR1.5 2018

Energy mix<sup>7</sup>

Total primary energy supply (PJ)



Share in 2018

0% Renewables

0% Nuclear

38% Gas

62% Oil

0% zero carbon

100% fossil

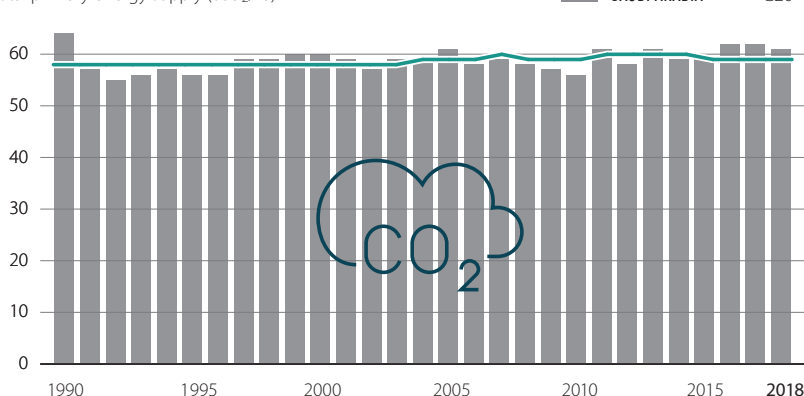
Source: Enerdata 2019

This graph shows the fuel mix for all energy supply, including energy used for electricity generation, heating, cooking, and transport fuels. Fossil fuels (oil, coal and gas) still make up 100% of Saudi Arabia's energy mix, which is the highest proportion in the G20. Oil use has decreased slightly in recent years, but was replaced by gas rather than renewables. The share of renewable energy remains negligible (0.0001%).

## Carbon intensity of the energy sector

Tonnes of CO<sub>2</sub> per unit of total primary energy supply (tCO<sub>2</sub>/TJ)

SAUDI ARABIA G20



Source: Enerdata 2019

Rating of carbon intensity compared to other G20 countries<sup>4</sup>

Rating trend (2013-2018)

very low

Rating current level (2018)

low

Source: own evaluation

Carbon intensity shows how much CO<sub>2</sub> is emitted per unit of energy supply. The carbon intensity of Saudi Arabia's energy sector has remained at the level of around 61 tCO<sub>2</sub>/TJ over the past two decades with only minor ups and downs. It is currently above the G20 average and is increasing (+3%, 2013-2018), in contrast to the decreasing G20 trend.

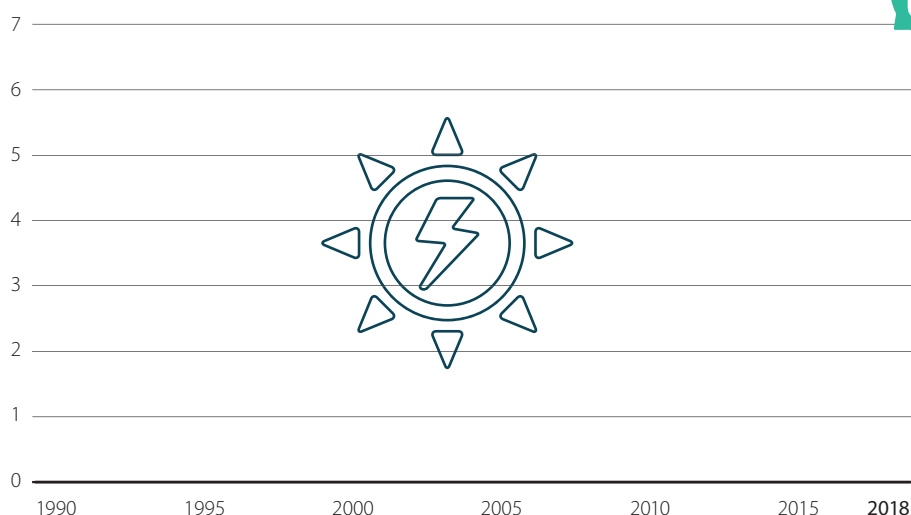
## MITIGATION ENERGY



## SAUDI ARABIA

Solar, wind, geothermal and biomass development<sup>8</sup>

Total primary energy supply (TPES) from solar, wind, geothermal and biomass (PJ)



Share of TPES in 2018

0.00% Solar

0.00% Wind

0.00% Geothermal

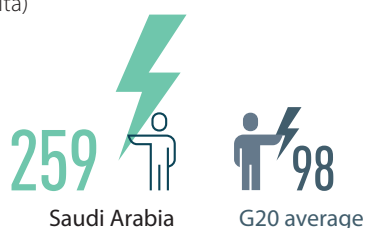
0.00% Biomass, excl. traditional biomass

Solar and modern biomass together make up only 0.0001% of Saudi Arabia's energy supply, and there is no wind or geothermal energy. The G20 average is 6%. The share has increased slightly thanks to the development of solar energy in recent years.

Rating of share in TPES compared to other G20 countries<sup>4</sup>

## Energy supply per capita

Total primary energy supply per capita (GJ/capita)



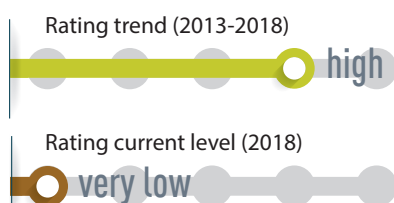
The level of energy supply per capita is closely related to economic development, climatic conditions and the price of energy.

At 259 GJ/capita, Saudi Arabia has one of the highest levels of energy supply per capita in the G20. However, the level is decreasing at a faster rate than in most G20 countries.

Trend (2013-2018) -6%

+1%

Data for 2018 |  
Source: Enerdata 2019;  
World Bank 2019

Rating of energy supply per capita compared to other G20 countries<sup>4</sup>

## MITIGATION ENERGY



## SAUDI ARABIA



Saudi Arabia has one of the highest levels of energy supply per capita in the G20 and a very energy-intensive economy. However, both energy supply and energy-related CO<sub>2</sub> emissions have begun to decrease in recent years.

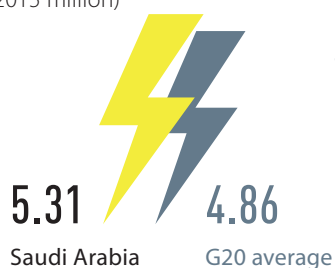
Global energy and process-related CO<sub>2</sub> emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

1.5°C<sup>6</sup>

Source: IPCC SR1.5 2018

## Energy intensity of the economy

(TJ/PPP US\$2015 million)



## Trend

(2013-2018)



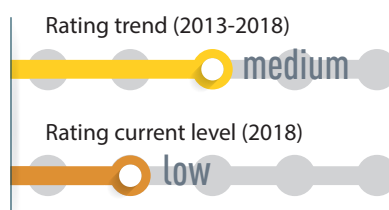
-4%



-12%

Data for 2018 | Source: Enerdata 2019; World Bank 2019

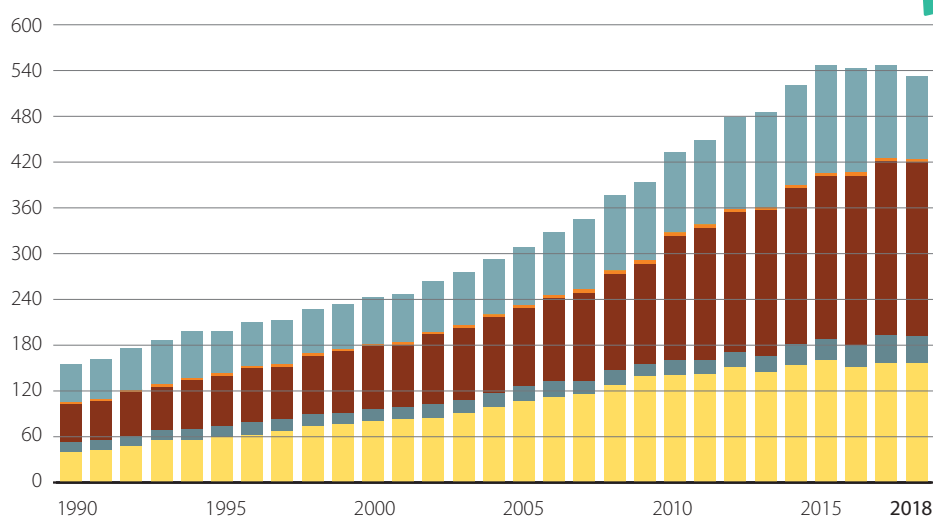
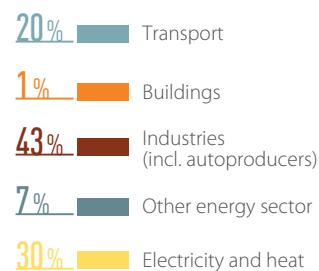
This indicator quantifies how much energy is used for each unit of GDP. This is closely related to the level of industrialisation, efficiency achievements, climatic conditions or geography. The energy intensity of Saudi Arabia's economy is above the G20 average and is decreasing less (-4%, 2013-2018) than the G20.

Rating of energy intensity compared to other G20 countries<sup>4</sup>

Source: own evaluation

Energy-related CO<sub>2</sub> emissions<sup>9</sup>

CO<sub>2</sub> emissions from fuel combustion (MtCO<sub>2</sub>/year)

Share of total energy-related CO<sub>2</sub> emissions in 2018

Source: Enerdata 2019

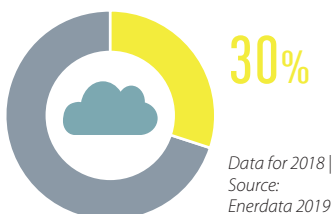
The largest driver of overall GHG emissions are CO<sub>2</sub> emissions from fuel combustion. In Saudi Arabia, they increased up until 2014 and have slightly decreased since then. The industry sector is the largest contributor at 43%, followed by electricity generation at 30%.

## MITIGATION POWER SECTOR



## SAUDI ARABIA

**!** Saudi Arabia is not using coal for power generation but sources 100% of its electricity from oil and gas. The share of renewables is still negligible. In order to be compatible with a 1.5°C pathway, the share of renewables needs to increase significantly.

Share in energy-related CO<sub>2</sub> emissions

Coal must be phased out in the EU/OECD no later than 2030, in the rest of the world no later than 2040. Electricity generation needs to be decarbonised before 2050, with renewable energy the most promising option.<sup>5</sup>

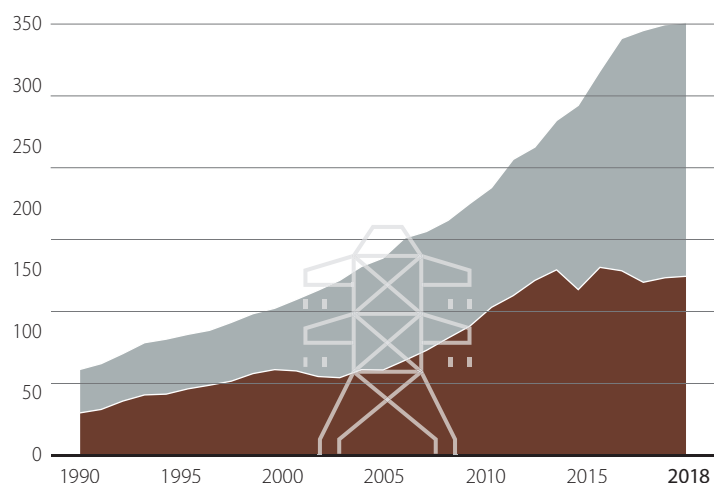
**1.5°C**<sup>6</sup>

Source: IPCC SR1.5 2018; Climate Analytics 2016; Climate Analytics 2019

## STATUS OF DECARBONISATION

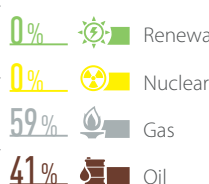
## Power mix

Gross power generation (TWh)

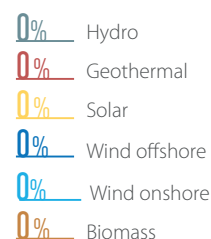


Source: Enerdata 2019

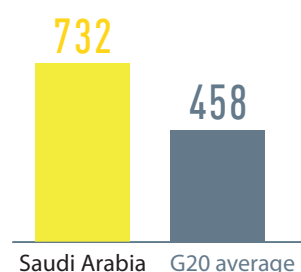
## Shares in 2018



## Renewables shares



Saudi Arabia is producing some electricity from solar, but the amount is so small that it is negligible in the power mix – 100% of electricity is produced from fossil fuels. Gas accounts for the largest share in the power mix (59%), followed by oil (41%).

Emissions intensity of the power sector (gCO<sub>2</sub>/kWh)

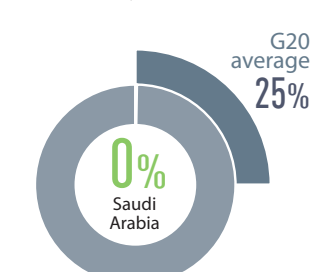
Data for 2018 | Source: Enerdata 2019

## Trend (2013-2018)

Rating of emissions intensity compared to other G20 countries<sup>4</sup>

Source: own evaluation

## Share of renewables in power generation (incl. large hydro)



Data for 2018 | Source: Enerdata 2019

## Trend (2013-2018)

Rating of share of renewables compared to other G20 countries<sup>4</sup>

Source: own evaluation

For each kilowatt hour of electricity, 723 gCO<sub>2</sub> are emitted in Saudi Arabia. This is well above the G20 average. Emission intensity has remained constant over the past five years, reflecting the continuing high share of gas and oil in the power mix (G20 average: -11%, 2013-2018).

## MITIGATION POWER SECTOR



## SAUDI ARABIA

POLICIES<sup>5</sup>

## Renewable energy in the power sector



In 2019, Saudi Arabia raised its renewable energy target from 9.5 GW by 2023 to 58.7 GW installed capacity by 2030. It tenders renewable energy projects under its National Renewable Energy Programme and runs a public investment fund for renewables co-financed by the SoftBank Group, ensuring the use of components from domestic manufacturing. No long-term strategy exists, however.

Source: own evaluation

## Coal phase-out in the power sector

Not applicable

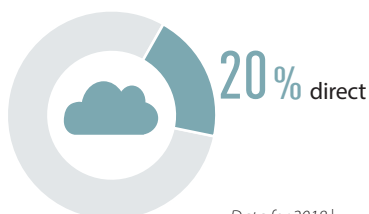
Saudi Arabia does not use coal for power generation.

Source: own evaluation

## MITIGATION TRANSPORT SECTOR



**!** Saudi Arabia's transport emissions per capita are among the highest in the G20 but have dropped by 20% (2013-2018). Emissions from aviation are rising greatly. In order to stay within a 1.5°C limit, passenger and freight transport need to be decarbonised.

Share in energy-related CO<sub>2</sub> emissions

Data for 2018 |  
Source: Enerdata 2019

The proportion of low-carbon fuels in the transport fuel mix must increase to about 60% by 2050.

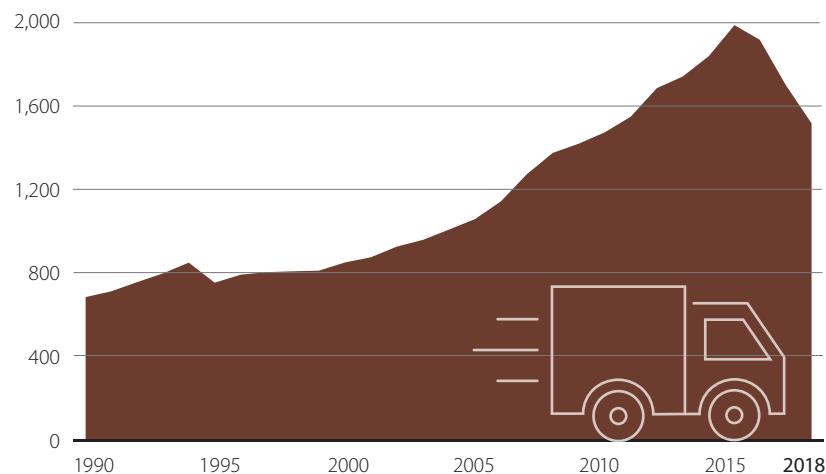
1.5°C<sup>6</sup>

Source: IPCC SR1.5 2018

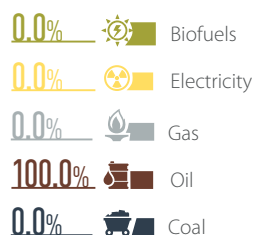
## STATUS OF DECARBONISATION

## Transport energy mix

Final energy consumption of transport by source (PJ/year)



## Share in 2018



Saudi Arabia uses neither biofuels nor electricity for transport.

Source: Enerdata 2019



## MITIGATION TRANSPORT SECTOR

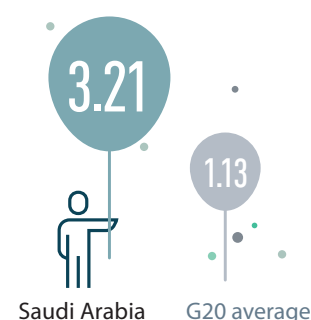


## SAUDI ARABIA

## STATUS OF DECARBONISATION (continued)

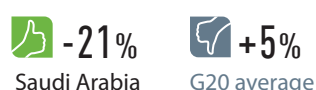
Transport emissions per capita<sup>10</sup>

(tCO<sub>2</sub>/capita,  
excl. aviation emissions)



Data for 2018  
Source: Enerdata 2019; World Bank 2019

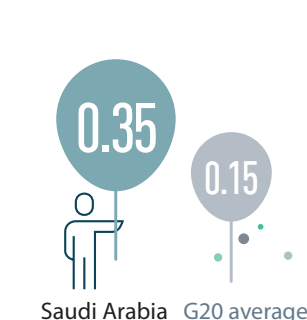
## Trend (2013-2018)

Rating of transport emissions compared to other G20 countries<sup>4</sup>

Source: own evaluation

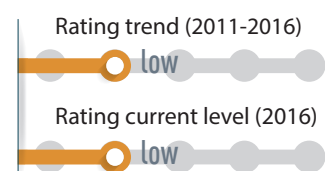
Aviation emissions per capita<sup>11</sup>

(tCO<sub>2</sub>/capita)



Data for 2016  
Source: Enerdata 2019; IEA 2018

## Trend (2011-2016)

Rating of aviation emissions compared to other G20 countries<sup>4</sup>

Source: own evaluation

## Motorisation rate

(vehicles per 1,000 inhabitants)



Data for 2005 | Source: Agora 2018

## Market share of electric vehicles in new car sales (%)

(%)



Source: IEA 2019

## Passenger transport

(modal split in % of passenger km)



Source: Agora 2018

## Freight transport

(modal split in % of tonne-km)



Source: Agora 2018

POLICIES<sup>5</sup>

## Phase out fossil fuel cars



Saudi Arabia does not plan to phase out fossil fuel cars but in 2016 implemented a fuel efficiency standard for cars (last updated in 2019). In 2018, its sovereign wealth fund invested US\$1bn in a US-based electric vehicle (EV) manufacturer, which might lead to production hubs in the Kingdom. The government does not yet support EVs but is currently considering to invest in charging infrastructure and grid modifications.

Source: own evaluation

## Phase out fossil fuel heavy-duty vehicles



Saudi Arabia has no plans for reducing absolute emissions from freight transport, and has no fuel standards in place for heavy-duty vehicles (HDVs). It currently assesses two initiatives to improve the energy efficiency of HDVs: improving the fuel economy through enforcing anti-idling and aerodynamics regulations, and accelerating the retirement of inefficient HDVs.

Source: own evaluation

## Modal shift in (ground) transport



The Vision 2030 sets qualitative objectives to increase the use of public transport and improve the efficiency of railways. Measures include the establishment of the Public Transport Authority in 2012, the allocation of ca. US\$27mn for public transport projects, and the Saudi Railway Master Plan aimed at the construction of 9,900 km of railway (2010-2040).

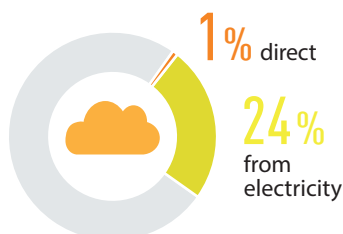
Source: own evaluation

## MITIGATION BUILDINGS SECTOR



## SAUDI ARABIA

**!** Saudi Arabia's building emissions – including heating, cooking and electricity use – make up a quarter of total CO<sub>2</sub> emissions. Per capita, building-related emissions are still rising, and current policies are insufficient.

Share in energy-related CO<sub>2</sub> emissions

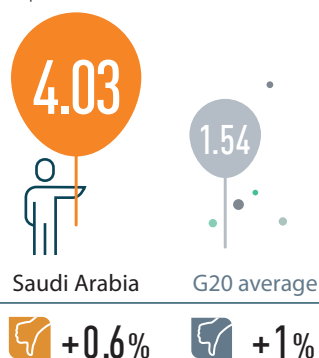
Data for 2018 | Source: Enerdata 2019

Global emissions from buildings need to be halved by 2030, and be about 80% below 2010 levels by 2050, achieved mostly through increased efficiency, reduced energy demand and electrification in conjunction with complete decarbonisation of the power sector.

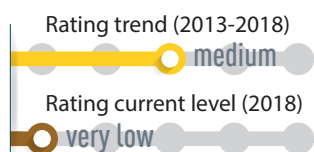
**1.5°C**<sup>6</sup>

Source: IEA ETP B2DS scenario assessed in IPCC SR1.5 2018

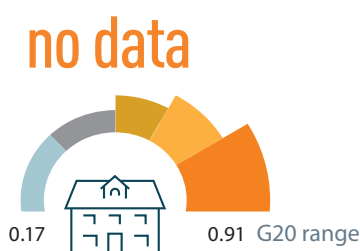
## STATUS OF DECARBONISATION

Building emissions per capita  
(incl. indirect emissions)  
(tCO<sub>2</sub>/capita)

Trend (2013-2018)

Rating of building emissions compared to other G20 countries<sup>4</sup>

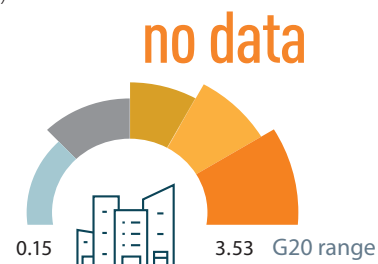
Source: own evaluation

Residential buildings:  
energy use per m<sup>2</sup>  
(GJ)

Source: ACEEE 2018

Data for 2018 | Source: Enerdata 2019; World Bank 2019

Building-related emissions per capita are more than double the G20 average. Similar to the G20 average, the level of emissions is slightly increasing in Saudi Arabia. This is mainly driven by low electricity prices and increasing need for cooling.

Commercial and public buildings:  
energy use per m<sup>2</sup>  
(GJ)

Source: ACEEE 2018

Building emissions are largely driven by how much energy is used in heating, cooling, lighting, household appliances, etc. There is no data on energy use per m<sup>2</sup> in Saudi Arabia.

POLICIES<sup>5</sup>

## Near-zero energy new buildings



Saudi Arabia has no long-term strategy for zero-energy new buildings. Mandatory energy efficiency standards and regulations apply to the residential and commercial sectors. The Saudi Green Building Forum promotes the construction of energy- and resource-efficient and environmentally responsible buildings. By 2018, it accounted for 1,218 projects.

Source: own evaluation

## Renovation of existing buildings



Saudi Arabia has no building retrofit policies or strategy in place.

Source: own evaluation

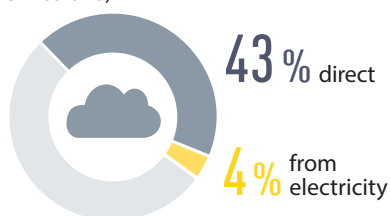
## MITIGATION INDUSTRY SECTOR



## SAUDI ARABIA

**!** Industry-related emissions make up almost half of CO<sub>2</sub> emissions in Saudi Arabia – more than in any other G20 country. Emissions from this sector rose by 19% between 2011 and 2016. This trend needs to reverse in order to be compatible with a 1.5°C pathway.

**Share in energy-related CO<sub>2</sub> emissions** (not including process emissions)



Data for 2018 | Source: Enerdata 2019

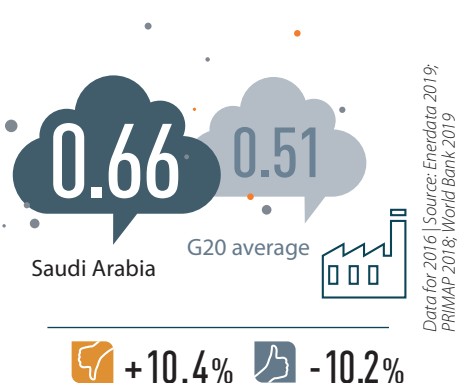
Global industrial CO<sub>2</sub> emissions need to be reduced by 65–90% from 2010 levels by 2050.

1.5°C<sup>6</sup>

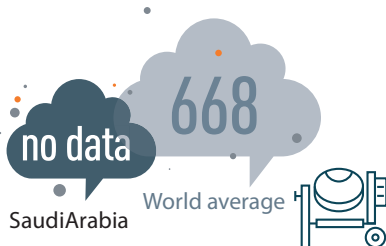
Source: IPCC SR1.5 2018

## STATUS OF DECARBONISATION

**Industry emissions intensity<sup>12</sup>**  
(tCO<sub>2</sub>e/US\$2015 GVA)

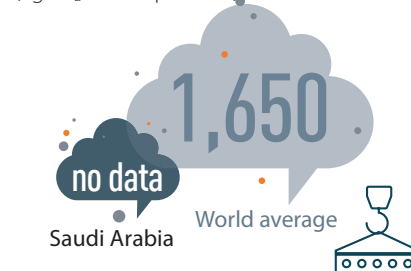


**Carbon intensity of cement production<sup>13</sup>**  
(kgCO<sub>2</sub>/tonne product)



Data for 2015 | Source: CAT 2019

**Carbon intensity of steel production<sup>13</sup>**  
(kgCO<sub>2</sub>/tonne product)



Data for 2015 | Source: CAT 2019

When comparing industrial emissions with the gross value added (GVA) from the industry sector, Saudi Arabia's industry emission intensity is only slightly above G20 average, but increasing much more (+10%, 2011–2016) in contrast to the decreasing G20 average (-10%). Cement, iron and steel production are the main sources.

Steel production and steelmaking are significant GHG emission sources, and are challenging to decarbonise. There is no data available for Saudi Arabia.

POLICIES<sup>5</sup>

**Energy efficiency**



Since 2011, Saudi Arabia has implemented an energy efficiency framework for industrial plants. The Saudi Industrial Development Fund provides soft loans for energy efficiency-related projects in industry.

Source: own evaluation

## MITIGATION

## LAND USE



## SAUDI ARABIA

! Forests cover less than 1% of Saudi Arabia's territory.

Global deforestation needs to be halted and changed to net CO<sub>2</sub> removals by around 2030.

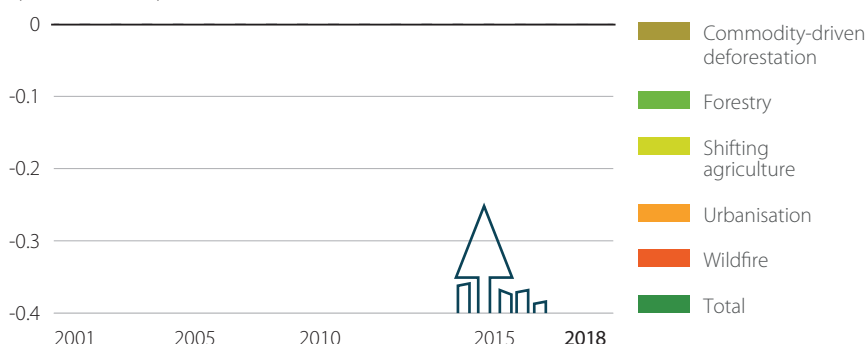


1.5°C<sup>6</sup>

Source: IPCC SR1.5 2018

Gross tree cover loss by dominant driver<sup>14</sup>

Tree cover loss  
(million hectares)



Source: Global Forest Watch 2019

Note: 2000 tree cover extent | >30% tree canopy | these estimates do not take tree cover gain into account

There are basically no forests in Saudi Arabia.

POLICIES<sup>5</sup>

## (Net) zero deforestation

## Not applicable

Forests cover less than 1% of Saudi Arabia's territory.

Source: own evaluation

## MITIGATION

## AGRICULTURE



! Saudi Arabia's agricultural emissions are mainly from livestock manure, digestive processes in animals, and the use of synthetic fertilizers. A 1.5°C pathway requires dietary shifts, increased organic farming, and less fertilizer use.

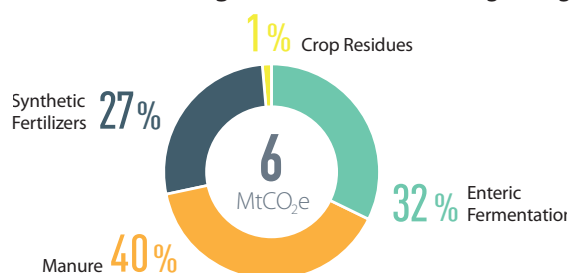
Global methane emissions (mainly enteric fermentation) need to decline by 10% by 2030 and by 35% by 2050 (from 2010 levels). Nitrous oxide emissions (mainly from fertilizers and manure) need to be reduced by 10% by 2030 and by 20% by 2050.



1.5°C<sup>6</sup>

Source: IPCC SR1.5 2018

## GHG emissions from agriculture (not including energy)



In Saudi Arabia, agricultural emissions make up only a small share of total emissions. The largest sources of non-energy GHG emissions in the agricultural sector are livestock manure, digestive processes in animals (enteric fermentation), and the use of synthetic fertilizers. A shift to organic farming, more efficient use of fertilizers, and diet changes could help reduce emissions.

Data for 2016 | Source: FAOSTAT 2019

## SAUDI ARABIA

## ADAPTATION

- Saudi Arabia is vulnerable to climate change and adaptation actions are needed.
- On average, 26 fatalities and losses amounting to US\$238 million occur yearly due to extreme weather events.
- With global warming, society and its supporting sectors are increasingly exposed to extreme weather events such as extreme heat.
- With a 3°C warming, Saudi Arabia would experience around 190 days per year when temperatures reach higher than 35°C.



## ADAPTATION POLICIES

## Nationally-determined contribution: Adaptation

<b>Targets</b>	Not mentioned
<b>Actions</b>	Actions specified (sectors: water, biodiversity/ecosystems, agriculture, forestry, infrastructure)

Source: UNFCCC, NDC of respective country

## National adaptation strategies

Document name	Publication year	Fields of action (sectors)												M&E process (reporting frequency)
		Agriculture	Biodiversity	Coastal areas & fishing	Education & research	Energy & industry	Finance & insurance	Forestry	Health	Infrastructure	Tourism	Transport	Urbanism	
No adaptation policy														

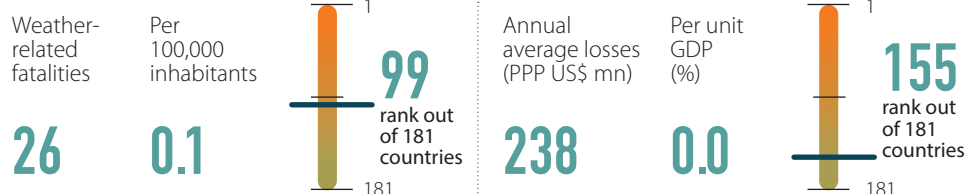
Source: own research

## ADAPTATION NEEDS

Climate Risk Index  
for 1998-2017

Impacts of extreme weather events in terms of fatalities and economic losses that occurred

## Global Climate Risk Index 2019 | All numbers are averages (1998-2017)



Saudi Arabia has already been struck by extreme weather events such as extreme rainfall, flash flooding, dust storms and heat waves. As highlighted by the numbers from the Climate Risk Index, such extreme weather events result in fatalities and economic losses. Climate change is expected to worsen the intensity, frequency and impacts of such events.

## Exposure to future impacts at 1.5°C, 2°C and 3°C

		1.5°C	2°C	3°C
Water	% of area with increase in water scarcity	Low	Low	Low
	% of time in drought conditions	Medium	Medium	Medium
Heat & Health	Heatwave frequency	Medium	High	High
	Days above 35°C	High	High	High

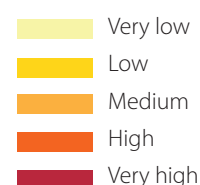
Source: own research

Overall, with rising temperatures, all sectors are adversely affected. In the water sector, water scarcity slightly increases and time spent in drought conditions increases significantly. Heat wave frequency increases drastically, together with a very high number of days when temperatures are above 35°C.

Agriculture	Maize	Reduction in crop duration	Low	Low	Medium
		Hot spell frequency	High	High	High
		Reduction in rainfall	High	High	High
	Wheat	Reduction in crop duration	Low	Low	Medium
		Hot spell frequency	High	High	High
		Reduction in rainfall	Low	Low	Low

Source: Based on Arnell et al 2019

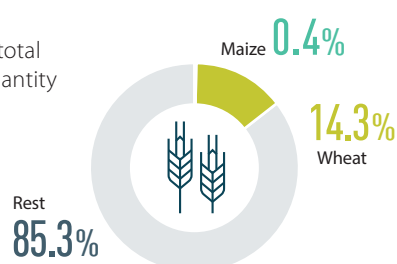
## Impact ranking scale



Blank cells signify that there is no data available

National crop  
production

(share in % of total production quantity in tonnes)



Data for 2017 | Source: FAOSTAT 2019

Wheat represents the largest proportion of crop production out of the four crops analysed (maize, rice, soybeans, wheat). Wheat experiences a slight increase in hot spell frequency and a slight reduction in rainfall. It is also impacted by a drastic reduction in crop duration.

## FINANCE



Saudi Arabia's fossil fuel subsidies totalled US\$44 billion in 2017, mainly for petroleum, and the country has no carbon pricing scheme.

Investment into green energy and infrastructure needs to outweigh fossil fuel investments by 2025.

 **1.5°C**<sup>6</sup>

Source: IPCC SR1.5 2018

## Nationally-determined contribution: Finance

<b>Conditionality</b>	NDC not conditional on international financial support
<b>Investment needs</b>	Not specified
<b>Actions</b>	Not mentioned
<b>International market mechanisms</b>	Not mentioned

Source: UNFCCC, NDC of respective country

## Financial policy and regulation supporting a brown to green transition

Through policy and regulation governments can overcome challenges to mobilising green finance, including: real and perceived risks, insufficient returns on investment, capacity and information gaps.

Category	Instruments	Objective	Under discussion/ implementation		Not identified	
<b>Green Financial Principles</b>	N/A	This indicates political will and awareness of climate change impacts, showing where there is a general discussion about the need for aligning prudential and climate change objectives in the national financial architecture.	<b>X</b>			
<b>Enhanced supervisory review, risk disclosure and market discipline</b>	Climate risk disclosure requirements	Disclose the climate-related risks to which financial institutions are exposed	<b>Mandatory</b>	<b>Voluntary</b>	<b>Under discussion</b>	<b>Not identified</b>
	Climate-related risk assessment and climate stress-test	Evaluate the resilience of the financial sector to climate shocks				<b>X</b>
<b>Enhanced capital and liquidity requirements</b>	Liquidity instruments	Mitigate and prevent market illiquidity and maturity mismatch				<b>X</b>
	Lending limits	Limit the concentration of carbon-intensive exposures				<b>X</b>
		Incentivise low carbon-intensive exposures				<b>X</b>
	Differentiated Reserve Requirements	Limit misaligned incentives and canalise credit to green sectors				<b>X</b>

Source: own research



In spite of longstanding international opposition to climate protection agreements, the Saudi financial sector is increasingly recognising the implications of transition and physical risk for investments. The Central Bank has indicated its intention to join the Sustainable Banking Network. This notwithstanding, no evidence was found of green financial policy or regulation, or formal engagement with initiatives compliant with TCFD (Task Force on Climate-related Financial Disclosures).

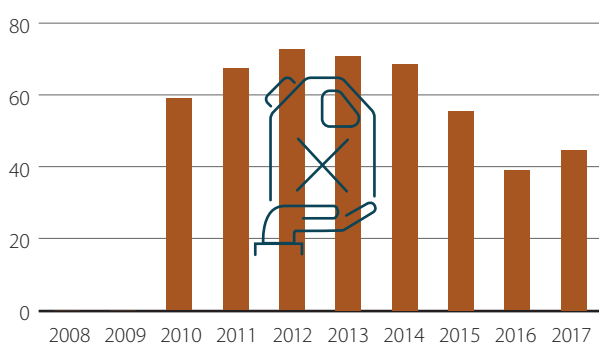
## FINANCE

## Fiscal policy levers

Fiscal policy levers raise public revenues and direct public resources. Critically, they can shift investment decisions and consumer behaviour towards low-carbon, climate-resilient activities by reflecting externalities in prices.

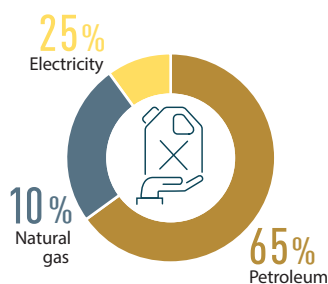
## Fossil fuel subsidies

US\$ billions



Source: IEA 2019

## Subsidies by fuel type

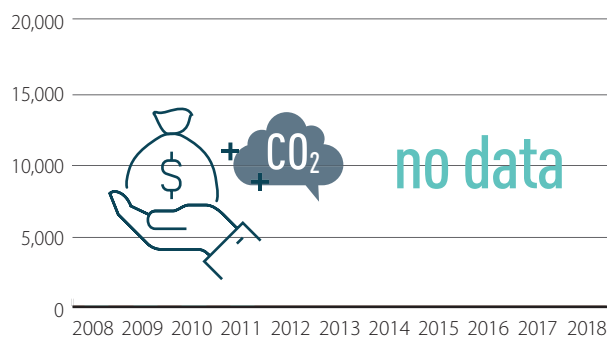


Data for 2017 | Source: IEA 2019

In 2017, Saudi Arabia provided US\$44.6bn in fossil fuel subsidies (from US\$59bn in 2010, and with a peak amount of US\$72.7 in 2012 between then and now). This amount is for the estimate of consumption subsidies alone, adopting the price-gap approach (unlike the data provided for the other G20 countries in this report). In 2017, the government introduced plans to reduce consumption subsidies for gasoline, natural gas and diesel, in order to meet international prices by 2025.

## Carbon revenues

Carbon revenues (US\$ millions)  
from explicit carbon pricing schemes



Source: IACE 2019

No explicit carbon pricing scheme from 2007 to 2018.

Saudi Arabia does not have a national carbon tax or emissions trading scheme, nor are any such schemes planned.

Carbon pricing gap<sup>15</sup>

% of energy-related CO<sub>2</sub> emissions



Data for 2015 | Source: OECD 2018

No data available for Saudi Arabia.



## FINANCE

## SAUDI ARABIA

## Public finance

Governments steer investments through their public finance institutions including via development banks, both at home and overseas, and green investment banks. Developed G20 countries also have an obligation to provide finance to developing countries and public sources are a key aspect of these obligations under the UNFCCC.

Public finance for coal<sup>16</sup>

(million US\$)



No finance was identified for coal or coal-fired power production between 2016-2017 by the public finance institutions of Saudi Arabia.

● Domestic Finance  
● International Finance



Data year: 2016-2017 average  
Source: Oil Change International 2019

Commitments to restrict public finance to coal and coal-fired power<sup>17</sup>

MDB level	National development agencies and banks	Domestic export credit agencies	Export credit restriction in OECD	Comment
				No commitments were identified.

X yes

no

not applicable

Source: own research

Provision of international public support<sup>18</sup>

Saudi Arabia is not listed in Annex II of the UNFCCC and it is therefore not formally obliged to provide climate finance. While Saudi Arabia may channel international public finance towards climate change via multilateral and other development banks, it has not been included in this report.

## Obligation to provide climate finance under UNFCCC



United Nations  
Framework Convention on  
Climate Change

## Bilateral climate finance contributions

Annual average contribution  
(mn US\$, 2015-2016)

0

## Theme of support

Mitigation	Adaptation	Cross-cutting	Other
0%	0%	0%	0%

Source: Country reporting to UNFCCC

## Multilateral climate finance contributions

Annual average contribution  
(mn US\$, 2015-2016)

0

## Theme of support

Mitigation	Adaptation	Cross-cutting	Other
0%	0%	0%	0%

See Technical Note for  
multilateral climate funds  
included and method to  
attribute amounts to countries

Source: Country reporting to UNFCCC

## Core/General Contributions

Annual average contribution  
(mn US\$, 2015-2016)

0

Source: Country reporting to UNFCCC

## ENDNOTES



1) 'Land use' emissions is used here to refer to land-use, land use change and forestry (LULUCF). The Climate Action Tracker (CAT) derives historical LULUCF emissions from the UNFCCC Common Reporting Format (CRF) reporting tables data converted to the categories from the IPCC 1996 guidelines, in particular separating Agriculture from Land use, land-use change and forestry (LULUCF), which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).

2) The 1.5°C fair share ranges for 2030 and 2050 are drawn from the CAT, which compiles a wide range of perspectives on what is considered fair, including considerations such as responsibility, capability, and equality. Countries with 1.5°C fair-share ranges reaching below zero, particularly between 2030 and 2050, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by contributions to global emissions-reduction efforts via, for example, international finance. On a global scale, negative emission technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions.

The CAT's evaluation of NDCs shows the resulting temperature outcomes if all other governments were to put forward emissions reduction commitments with the same relative ambition level.

The 2030 projections of GHG emissions are from the CAT's June 2019 update and are based on implemented policies, expected economic growth or trends in activity and energy consumption.

The CAT methodology does not consider GHG emissions from LULUCF due to the large degree of uncertainty inherent in this type of data, and also to ensure consistency and comparability across countries.

- 3) See the Brown to Green 2019 Technical Note for the sources used for this assessment.
- 4) The Decarbonisation Ratings assess the relative performance across the G20. A high scoring reflects a relatively good efforts from a climate protection perspective but is not necessarily 1.5°C compatible. The ratings assess both the 'current level' and 'recent developments' to take account of the different starting points of different G20 countries. The 'recent developments' ratings compare developments over the last five available years (often 2013 to 2018).
- 5) The selection of policies rated and the assessment of 1.5°C compatibility are informed by the Paris Agreement, the Special Report on 1.5°C of the International Panel on Climate Change (2018), and the Climate Action Tracker (2016): 'The ten most important short-term steps to limit warming to 1.5°C'. The table below displays the criteria used to assess a country's policy performance. See the Brown to Green Report 2019 Technical Note for the sources used for this assessment.

On endnote 5)	low	medium	high	frontrunner
<b>Renewable energy in power sector</b>	No policy to increase the share of renewables	Some policies	Policies and longer-term strategy/target to significantly increase the share of renewables	Short-term policies + long-term strategy for 100% renewables in the power sector by 2050 in place
<b>Coal phase-out in power sector</b>	No target or policy in place for reducing coal	Some policies	Policies + coal phase-out decided	Policies + coal phase-out date before 2030 (OECD and EU28) or 2040 (rest of the world)
<b>Phase out fossil fuel cars</b>	No policy for reducing emissions from light-duty vehicles	Some policies (e.g. energy/emissions performance standards or bonus/malus support)	Policies + national target to phase out fossil fuel light-duty vehicles	Policies + ban on new fossil-based light-duty vehicles by 2035 worldwide
<b>Phase out fossil fuel heavy-duty vehicles</b>	No policy	Some policies (e.g. energy/emissions performance standards or support)	Policies + strategy to reduce absolute emissions from freight transport	Policies + innovation strategy to phase out emissions from freight transport by 2050
<b>Modal shift in (ground) transport</b>	No policies	Some policies (e.g. support programmes to shift to rail or non-motorised transport)	Policies+ longer-term strategy	Policies + longer-term strategy consistent with 1.5°C pathway
<b>Near zero-energy new buildings</b>	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + national strategy for near zero-energy new buildings	Policies + national strategy for all new buildings to be near zero-energy by 2020 (OECD countries) or 2025 (non-OECD countries)
<b>Retrofitting existing buildings</b>	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + retrofitting strategy	Policies + strategy to achieve deep renovation rates of 5% annually (OECD) or 3% (non-OECD) by 2020
<b>Energy efficiency in industry</b>	No policies	Mandatory energy efficiency policies cover more than 26-50% of industrial energy use	Mandatory energy efficiency policies cover 51-100% of industrial energy use	Policies + strategy to reduce industrial emissions by 75%-90% from 2010 levels by 2050
<b>(Net) zero deforestation</b>	No policy or incentive to reduce deforestation in place	Some policies (e.g. incentives to reduce deforestation or support schemes for afforestation/reforestation in place)	Policies + national target for reaching net zero deforestation	Policies + national target for reaching zero deforestation by 2020s or for increasing forest coverage

## ENDNOTES (continued)

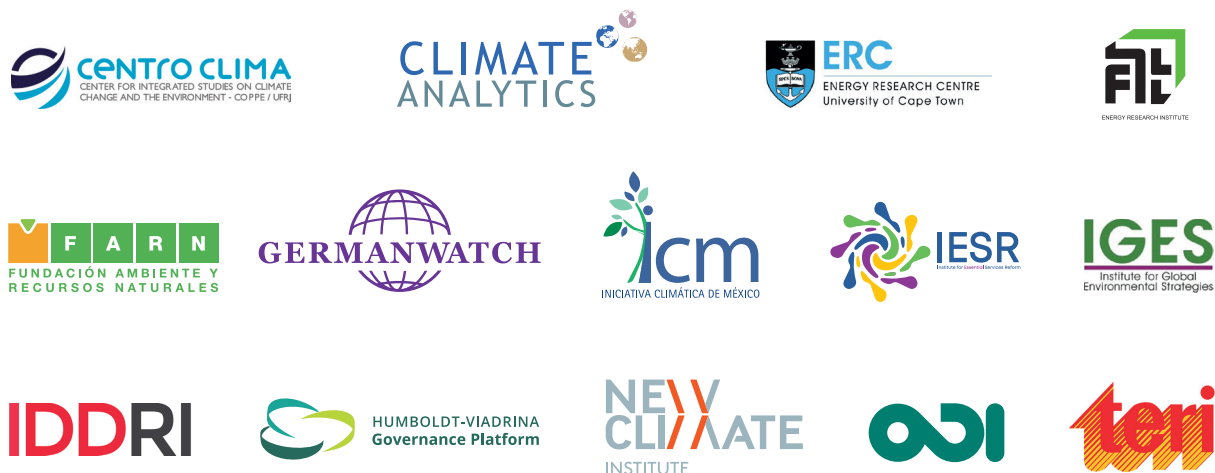


- 6) The 1.5°C benchmarks are based on the Special Report on 1.5°C of the International Panel on Climate Change (2018). See the Brown to Green 2019 Technical Note for the specific sources used for this assessment.
- 7) Total primary energy supply data displayed in this Country Profile does not include non-energy use values. Solid fuel biomass in residential use has negative environmental and social impacts and is shown in the category 'other'.
- 8) Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.
- 9) The category 'electricity and heat' covers CO<sub>2</sub> emissions from power generation and from waste heat generated in the power sector. The category 'other energy use' covers energy-related CO<sub>2</sub> emissions from extracting and processing fossil fuels (e.g. drying lignite).
- 10) This indicator shows transport emissions per capita, not including aviation emissions.
- 11) This indicator adds up emissions from domestic aviation and emissions from international aviation bunkers in the respective country. Emissions by aircrafts in the higher atmosphere lead to a contribution to climate change greater than emissions from burning fossil fuels. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.
- 12) This indicator includes only direct energy-related emissions and process emissions (Scope 1) but not indirect emissions from electricity.
- 13) This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).
- 14) This indicator covers only gross tree-cover loss and does not take tree-cover gain into account. It is thus not possible to deduce from this indicator the climate impact of the forest sector. The definition of 'forest' used for this indicator is also not identical with the definition used for the indicator on page 3.
- 15) 'Effective carbon rates' are the total price that applies to CO<sub>2</sub> emissions, and are made up of carbon taxes, specific taxes on energy use and the price of tradable emission permits. The carbon pricing gap is based on 2015 energy taxes and is therefore likely to be an underestimate, as taxation has tended to increase in countries over time.
- 16) The database used to estimate public finance for coal is a bottom-up database, based on information that is accessible through various online sources, and is therefore incomplete. For more information, see to the Brown to Green 2019 Technical Note.
- 17) See the Brown to Green 2019 Technical Note for the sources used for this assessment.
- 18) Climate finance contributions are sourced from Biennial Party reporting to the UNFCCC. Refer to the Brown to Green Report 2019 Technical Note for more detail.

For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: <http://www.climate-transparency.org/g20-climate-performance/g20report2019>

# CLIMATE TRANSPARENCY

## Partners:



## Funders:



## Data Partners:



<http://www.climate-transparency.org/g20-climate-performance/g20report2019>